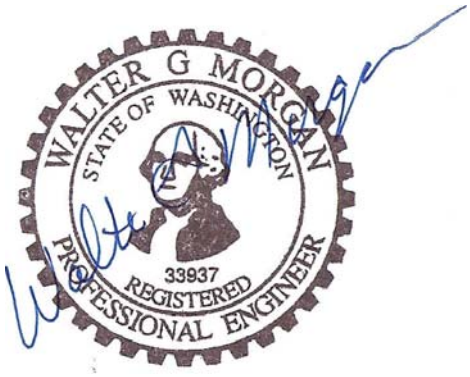
# *GARFIELD COUNTY ROAD STANDARDS*

RESOULUTION NUMBER ***13842***

Adopted: SEPTEMBER 15, 2008




GARFIELD COUNTY PUBLIC WORKS
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# RESOLUTION NO. *13842*

## A RESOLUTION OF GARFIELD COUNTY, WASHINGTON

## COUNTY ROAD STANDARDS REVISION

**WHEREAS**, the Garfield Board of County Commissioners has determined that the current County Road Standards is no longer adequate to meet the current and future needs of Garfield County; and

**WHEREAS**, the Board of Garfield County Commissioners pursuant to Chapter 36.86, Revised Code of Washington, have the authority to set minimum County Road Standards by which both public and private roads are to be constructed; and

**WHEREAS**, Garfield County is anticipating significant growth and a corresponding increase in development activity; and

**WHEREAS**, Garfield County Board of Commissioners desire to update the road standards to meet consistent with current regulations and regional standards; and

**WHEREAS**, the previous County Road Standards is hereby being revised and hereinafter superseded;

**WHEREAS**, a public hearing on the Road Standards was held on August 11, 2008, preceded by a two week comment and notification period; and

**WHEREAS,** all public comment was evaluated and incorporated into the revised Garfield County Road Standards where deemed appropriate by the Board of County Commissioners.

NOW, THEREFORE BE IT RESOLVED BY THE GARFIELD BOARD OF COUNTY COMMISSIONERS THAT THE ATTACHED REVISED "**COUNTY ROAD STANDARDS**" BE ADOPTED:

Adopted by the Garfield Board of County Commissioners this 15th day of September, 2008.

Chair

Member

Member

Attest:

Auditor, Clerk of the Board

Approved as per form:

Prosecuting Attorney

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# I. GENERAL PROVISIONS

## A. Authority

1. The County Road Standards are developed based on the authority given to the Board of Garfield County Commissioners pursuant to Chapter 36.86, Revised Code of Washington.

2. Chapter 36.80.030, Revised Code of Washington, states in part that, "The County road engineer shall have supervision, under the direction of the board, of establishing, laying out, construction, altering, improving, repairing [and] maintaining all County roads in the county." To this end the county engineer for Garfield County shall oversee all design and construction work related to county roads within unincorporated Garfield County.

3. The county engineer will be the final authority in resolving disputes concerning questions of fact in connection with standards for road and bridge construction not directly covered by this chapter, as set forth in RCW 36.75.020 County roads—County legislative authority as agent of state standards.

## B. Procedures

1. Chapter 36.80, Revised Code of Washington, requires that Garfield County employ a full-time county engineer who shall be a registered and licensed professional civil engineer under the laws of the State of Washington, and charges the county engineer with the responsibility to prepare standards of construction for roads and bridges. In the event that standards change to the degree that it becomes necessary to amend this chapter, the county engineer shall prepare and submit such recommendations for amendment to the Board of County Commissioners for their review and adoption in accordance with RCW 36.86.030.

2. It shall be the responsibility of the individual using this chapter to verify with the Department of Public Works that all technical requirements being used are the most current.

## C. General Criteria

1. These standards establish uniform technical requirements for road and bridge design, construction, and reconstruction.

2. In establishing these uniform technical requirements, the County Engineer has sought to encourage standardization of road design elements where necessary for consistency and to assure so far as practical that motorized, bicycling, and pedestrian public safety needs are met. Considerations include safety, convenience, aesthetics, proper drainage, and economical maintenance.

3. The county's permitting and licensing activities require the adoption of specific, identifiable standards to guide individuals and entities in the administrative process of procuring the necessary County approval(s). The County must also maintain flexibility in carrying out its general duty to provide safe and adequate streets, roads, and highways to meet the needs

of the traveling public and others that use the public right-of-way. Accordingly, this chapter is not intended to represent the legal standard by which the County's duty to the public is to be measured.

4. The decision to use a particular road design element at a particular location should be made on the basis of an engineering analysis of the location. Thus, while this document provides minimum requirements for design, it is not a substitute for professional engineering judgment. It is the intent that the provisions of this chapter be uniform requirements for road design, but may not be appropriate for all locations and conditions.

5. These standards cannot provide for all situations. It is intended to assist, but not to substitute for, competent work by design professionals. It is expected that each professional will bring to each project the best of their skills and abilities. These uniform requirements are also not intended to unreasonably limit any innovative or creative effort that could result in the more effective and appropriate combination of design, cost savings, or both.

6. The applicant's engineer should take into account all available information and use the professional judgment that comes from training and experience to make the final design determination. There should be some record, not necessarily formal or cumbersome, of the matters that were considered during the design process that would justify the decisions that were made regarding the final project design.

7. The County Engineer will judge any proposed designs that depart from the requirements outlined in this chapter on the likelihood that such deviation will produce compensating or comparable results, adequate for the road uses and the general public. The county engineer will be the final authority in resolving disputes concerning questions of fact in connection with standards for road construction not directly covered by this chapter.

8. In addition to design provisions, this document also provides direction regarding the development of traffic impact studies (TIAs), which may be required at the discretion of the County Engineer prior to the initiation of new development projects. Traffic impact studies assist with design of transportation facilities in relationship to a new development project, and also outline improvements that may be needed to mitigate the impact of new development growth within the county.

## D. Applicability

All requirements contained in this chapter, together with any and all amendments thereto, shall apply to all road, bridge, and other new construction of public and private roads in unincorporated Garfield County consistent with the provisions adopted by the county for the unincorporated urban growth area boundaries for the city of Pomeroy, and as far as practicable and feasible for reconstruction, resurfacing, restoration, and rehabilitation of existing public and private roads in unincorporated Garfield County. In case of any ambiguity or dispute over interpretation of the provisions of this chapter, the decision of the county engineer shall be final.

*These standards do not apply to single access residential driveways serving two or less residences.*

## E. Relationship to other documents

**1.** The most current edition of the following publications and manuals are approved for use by the County Engineer and may be used to supplement this chapter when a specific subject is not covered or discussed:

- Standard Specifications for Road, Bridge and Municipal Construction, as published by the Washington State Department of Transportation and the American Public Works Association, under No. M4-10, as amended.

- Standard Plans for Road, Bridge and Municipal Construction, as published by the Washington State Department of Transportation, under No. M21-01.

- Manual on Uniform Traffic Control Devices, as published by the U.S Department of Transportation, Federal Highway Administration, as amended and approved by the Washington State Department of Transportation under No. M24-01; commonly known as the "MUTCD", as amended.

- A Policy on Geometric Design of Highways and Streets, as published by the American Association of State Highway and Transportation Officials, commonly known as the "AASHTO Green Book", as amended.

- Standard Specifications for Highway Bridges, and any interim specifications, as adopted by the American Association of State Highway and Transportation Officials, as amended.

- AASHTO LRFD Bridge Design Specifications, as adopted by the American Association of State Highway and Transportation Officials, as amended.

- Geometric Design of Very Low-Volume Local Roads (ADT≤400), as adopted by the American Association of State Highway and Transportation Officials, as amended.

- Construction Manual, as published by the Washington State Department of Transportation, under No. M41-01, as amended.

- Eastern Washington Storm Water Guidelines as published by Washington State Department of Ecology.

- Local Agency Guidelines, as published by the Washington State Department of Transportation, under No. M36-62, commonly known as the "LAG Manual."

- Circular 209 - Highway Capacity Manual, as published by the Transportation Research Board, as amended.

- Trip Generation, as published by the Institute of Transportation Engineers, as amended.

- Guide for the Planning, Design and Operation of Pedestrian Facilities, as adopted by the American Association of State Highway and Transportation Officials, as amended.

**2.** The most current edition of the following publications are recognized by the County Engineer as industry authorities and may be consulted on specific subjects not covered or discussed in this chapter or the above supplemental documents:

- Plans Preparation Manual, as published by the Washington State Department of Transportation, under No. M22-31, as amended.
- Design Manual, as published by the Washington State Department of Transportation, under No. M22-01, as amended.
- Bridge Design Manual, as published by the Washington State Department of Transportation, under No. M23-50, as amended.
- Roadside Design Guide, as published by the American Association of State Highway and Transportation Officials, as amended.
- Highway Runoff Manual as published by the Washington State Department of Transportation.

**3.** The applicant's engineer may need to consult not only this chapter, but also a number of other Garfield County documents. All road plans submitted to the County for review and approval shall be consistent with these other adopted county standards or ordinances, as amended. These documents or standards include, but are not limited to:

- Garfield County Comprehensive Plan and applicable city comprehensive plans.
- Uniform Fire Code as adopted by Garfield County.
- Garfield County Development Regulations (Subdivision, Zoning, Critical Area, Shoreline Management, etc).
- Washington State Environmental Policy Act (SEPA)
- Washington Administrative Code (WAC's).

## D. Legal References

For the purposes of determining the applicable standard for development, the density and type of land use shall be the maximum density allowed by the applicable zoning classification or the Comprehensive Plan. The applicable standards shall be determined by the location (urban or rural areas), function (public or private), use (residential, industrial, commercial, etc.), functional classification (arterial, collector or local access) and projected traffic volumes. The governmental codes found in Table D-1 establish the County's right to establish design and construction standards.

Table D-1

Governmental Code References

| Code | Title of Code | Description |
|---|---|---|
| RCW 36.75.020 | County Roads - Standards | Sets requirements to utilize adopted County road design standards under the direction of the County Engineer. |
| RCW 36.75.140 | Approaches to County Roads | Outlines rules for construction of approaches to County roads and supervised by County Engineer. |
| RCW 36.80 | Roads and Bridges – Engineer | Outlines role of the County Engineer and duties including preparation of design standards. |

# II. DESIGN STANDARDS

## A. Roadway Design

Roadway design guidelines apply to the new construction or reconstruction of County Roadways, and public or private roadways within Garfield County. Design plans for new or reconstructed roadways will be submitted to and approved by the County Engineer prior to construction. Roadway designs should be prepared under the supervision of and certified by a licensed professional engineer. Variant or alternate designs from these guidelines will be provided only at the approval of the County Engineer.

### *1. Functional Classification of Roadways*

Garfield County uses several functional classifications as a means of distinguishing the design parameters for roadways. These classifications are distinguished by the purpose of the roadway, design speed and the traffic volumes supported by the roadway.

- Rural Arterial. This classification identifies roadways with trip lengths and densities suitable for regional travel between and extending outside of neighboring counties and includes freeways, multi-lane arterials, and sometimes two-lane arterials extending into urban areas. Rural principal arterials are characterized with higher speeds ranging from 40 to 60 mph; wider travel lanes and shoulders; gradual changes in both vertical and horizontal alignment; elevated vertical clearance and extended horizontal clearances and setbacks. Traffic volumes on these roadways most frequently range from 2,000 up to 20,000 average daily traffic (ADT). Pedestrian and bicycle activity is not encouraged on rural arterials.
- Rural Collectors (Major). These roadways provide a link between cities, towns and large traffic generators (such as resorts, national parks, shipping points, etc.) within or between neighboring counties. These roadways are characterized with moderate travel speeds ranging from 25 to 50 mph (set by local Code, bur are subject to modification by Commissioners); average lane widths; can allow for more abrupt changes in horizontal and vertical alignments; but still should have reasonable horizontal and vertical clearances/setbacks. Pedestrian and bicycle activities are permitted along these roadways. Traffic volumes can vary, but typically are less than 10,000 ADT. These roadways have a Federal functional class of 07.
- Rural Collectors (Minor). These roadways are intended to accumulate traffic from local streets and population centers and bring them to major collectors or arterials. Design attributes are slightly reduced from that of major collectors (widths, clearances, setbacks, etc.), as they support less traffic and have reduced travel speeds ranging from 25 to 50 mph (set by local Code, bur are subject to modification by Commissioners). Pedestrian and bicycle activities are permitted along these roadways. Traffic volumes can vary, but typically are less than 5,000 ADT. These roadways have a Federal functional class of 08.
- Rural Local Roads. These roadways are for travel over short distances and primarily provide access directly to properties and homes. Local Roads are characterized by narrow streets and shoulders, may have unusual or abrupt horizontal or vertical changes and have less substantial clearances and setbacks (horizontally and vertically). These roadways typically support less than 2,000 ADT and have travel speeds under 50 mph (set by local Code, bur are subject to modification by Commissioners). Pedestrian and bicycle

activities are permitted along these roadways. These roads have a Federal functional class of 09.

- Rural Low-Volume. This class refers to a category of roadways that are of significant importance to rural counties as they provide for agricultural or recreational access during specific times or seasons. These roadways support less than 400 ADT (based from AASHTO Design Manual); thus, widths and shoulders are reduced but, designs of these roadways must be appropriate as they frequently support heavy vehicles (tractors, heavy trucks, R.V.'s, etc.). These roadways operate at speeds less than 50 mph (set by the legislator, subject to local modification by Commissioners). Seasonal road is a similar, but unpaved class of roadway.
- Urban Arterials. These arterials are intended to move higher traffic volumes through urban environments. They are limited access roadways with wider and frequently higher numbers of travel lanes; should typically have sidewalk, curbs, and gutters aligned; have gradual changes in both vertical and horizontal alignment; and have elevated vertical clearances with greater setbacks. Speeds on these arterials range between 30 and 45 mph with volumes that typically exceed 10,000 ADT. Although, many urban arterials currently support less than 10,000 ADT and are classified as urban arterials due to function only. Pedestrian accommodations are necessary and bike lanes are allowed.
- Urban Collectors. These roadways support access between urban arterials and high trip generators such as residential neighborhoods, commercial centers and industrial/business centers. These arterials provide a balance between mobility and accessibility by allowing direct access only to high trip generators and local streets. Direct access from individual homes and small trip generators should be limited. Urban collectors have moderate travel lane widths; should typically support fewer travel lanes; should typically have sidewalk, curbs, and gutter aligned; can allow for more abrupt changes in horizontal and vertical alignments; but still should have reasonable horizontal and vertical clearances/setbacks. Speeds on these roadways range between 25 and 35 mph. Traffic volumes can vary, but typically are less than 10,000 ADT. Pedestrian accommodations are necessary and bike lanes are encouraged. These roads have a Federal functional class of 17.
- Urban Local Streets. These roadways primarily provide access directly to properties and homes. They are characterized by narrow streets and shoulders; may have unusual or abrupt horizontal or vertical changes; have less substantial clearances and setbacks (horizontally and vertically); and have curb, gutter, and sidewalk adjacent. The roadways typically support less than 2,000 ADT and have travel speeds at or under 25 mph. Pedestrian accommodations are necessary and bike lanes are encouraged along these arterials. These roads have a Federal functional class of 19.
- Seasonal Roads (Gravel and Dirt). These roadways exist primarily to provide a means of getting agricultural products in and out of farm fields, provide service to low-density housing developments, and to access remote areas such as campgrounds, lakes, and wind turbines within Garfield County. The majority of these roadways will remain unpaved due to very low traffic volumes and/or due to the economic infeasibility of maintaining pavement. The design and maintenance criteria for these roadways are provided within a separate section of these guidelines separate from those provided for the remaining arterials and roadways. Further definition of these roads is provided in Section I.B.
- All Weather Roads. These roads are constructed to a standard that allows for truck traffic activity to occur year-round, without appreciable damage to the road surface or structure.

These roads provide for commercial trucking, logging, and agricultural activity between loading and unloading points.

### *2. Design Attributes - Definitions*

Several design attributes are used in the planning and engineering of arterials and roadways. This section provides definitions for the design attributes used for County roadways:

- Arterial Spacing. Distance between arterials or roadways of similar classification.
- Average Daily Traffic (ADT). Average volume supported by a roadway or arterial over a 24-hour weekday period. Used as a primary means to define functional classification.
- Border or Buffer. The border or buffer is the space between edge of curb or shoulder and sidewalk or utility corridor.
- Center Lane Width. Width of two-way left turn lane located along median of roadway.
- Clear Distance. The continuous length of highway ahead visible to the driver.
- Clear Zone. The total roadside border area, starting at the edge of the traveled way, available for use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a nonrecoverable slope, or a clear run-out area. The zone cannot contain a critical fill slope.
- Cross-Slope. Drainage facilitation measure calculated as grade from crown to edge of travel-way.
- Curbing. Defines preference of curb versus shoulder along arterial or roadway.
- Curb Radii. Radius of the curb return needed to accommodate design vehicle turn radius.
- Curb Return/Gutter. Foot wide gutter section between edge of roadway and edge of curb.
- Roadway Structural Section(ballast/pavement section). The structural portion of the roadway designed to support the design vehicle loading. A Structural section may be constructed of any combination of crushed aggregates, pavement, subgrade reinforcement and other types and combinations of materials.
- Design Speed. Speed used to determine the various geometric design features of an arterial or roadway. Used as a primary means to define functional classification.
- Grade. Length and slope of an arterial or roadway.
- Lane Width. Distance/breadth of travel lane.
- Number of Lanes. Total travel lanes along an arterial or roadway.
- Paved/Either. Denotes whether a roadway is paved, or can be either paved or unpaved.
- Posted Speed. The speed at which drivers are observed operating their vehicles during free-flow conditions. The design speed used in the engineering of roadways should be the posted speed plus 5-mph (in most instances).
- Radius of Curvature. Horizontal curve of an arterial or roadway with maximum superelevation.
- Right-of-Way. Public easement within which the cross section of the roadway (travel lanes, sidewalks, drainage trenches, borders, etc.) and maintenance corridors are located.
- Road Width. Total travel distance/breadth of an arterial or roadway.
- Shoulder Width. Distance/breath of paved or graveled edge of arterial or roadway outside of vehicle travel lanes.

- Shy Distance. The distance from the edge of the traveled way beyond which a roadside object will not be perceived as an obstacle by the typical driver to the extent that the driver will change the vehicle's placement or speed.
- Sidewalk Width. Distance/breadth of paved or concrete pedestrian walkway located along arterial or roadway.
- Stopping Sight Distance. Perception-reaction and deceleration time between full vehicle speeds to a complete stop along a roadway.
- Superelevation. Height between inner and outer edges of the roadway.
- Utility Accommodation. Utility clear zone located along both sides of rural or urban arterial or roadway.
- Vertical Clearance. Distance from high point of road and vertical obstruction or crossing.

### *3. Design Attributes - Values*

Design attributes for arterials and roadways are summarized on Table 1. Each table is organized with functional classes located along the top row, with the remaining rows defining the various design elements and attributes. These are typical guidelines provided for the purpose roadway planning and design. Figure 2 provides example cross sections of urban and rural arterials.

Table 1. Typical Arterial and Roadway Design Elements and Attributes[1]

| | Rural Roadways | | | | | Urban Roadways | | |
|---|---|---|---|---|---|---|---|---|
| Functional Classification | Rural Arterial | Major Collector | Minor Collector | Local | Low Volume | Arterial | Collector | Local |
| Arterial Spacing | 1-mile | 1-mile | 1/2-mile | 1/4-mile | N.A. | 1-mile | 1/2-mile | 1/4-mile |
| Average Daily Traffic | | | | | | | | |
| - Low Range (by variance) | 2,000 | 1,000 | 1,000 | 0 | 0 | 10,000 | 2,000 | 0 |
| - High Range | 20,000 | 10,000 | 5,000 | 2,000 | 400 | No Max | 10,000 | 2,000 |
| Posted Speed | | | | | | | | |
| - Low Range (by variance) | 40-mph | 35-mph | 25-mph | 25-mph | 25-mph | 25-mph | 25-mph | 25-mph |
| - High Range | 60-mph | 50-mph | 50-mph | 50-mph | N.A.[2] | 45-mph | 35-mph | 35-mph |
| - Design Speed | 45-65 mph | 40-55 mph | 30-55 mph | 30-55 mph | 30 mph | 30-50 mph | 30-45 mph | 25-40 mph |
| Number Lanes | | | | | | | | |
| - Low Range (by variance) | 2-lanes | 2-lanes | 2-lanes | N.A.[2] | N.A.[2] | 4-lanes | 2-lanes | N.A.[2] |
| - High Range | 5-lanes | 5-lanes | 3-lanes | 2-lanes | 2-lanes | 7-lanes | 5-lanes | 2-lanes |
| Lane Width | | | | | | | | |
| - Low Range (by variance) | 11-feet | 11-feet | 11-feet | 11-feet | 10-feet | 11-feet | 11-feet | 11-feet |
| - High Range | 12-feet | 12-feet | 12-feet | 12-feet | 11-feet | 12-feet | 12-feet | 12-feet |
| - Recommended | 12-feet | 12-feet | 12-feet | 12-feet | 11-feet | 12-feet | 12-feet | 12-feet |
| Center Lane Width | | | | | | | | |
| - Low Range (by variance) | 12-feet | 12-feet | 12-feet | N.A.[2] | N.A.[2] | 12-feet | 12-feet | N.A.[2] |
| - High Range | 14-feet | 14-feet | 14-feet | N.A.[2] | N.A.[2] | 14-feet | 14-feet | N.A.[2] |
| - Recommended | 14-feet | 14-feet | 14-feet | N.A.[2] | N.A.[2] | 14-feet | 14-feet | N.A.[2] |
| Curbing | Shoulder | Shoulder | Shoulder | Shoulder | Shoulder | Curb | Curb | Curb |
| Curb Return | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] | 1-foot | 1-foot | 1-foot |
| Border or Buffer | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] | 6-feet | 4-feet | 2-feet |
| Shoulder Width | | | | | | | | |
| - Low Range (by variance) | 3-feet | 2-feet | 2-feet | 2-feet | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] |
| - High Range | 8-feet | 6-feet | 6-feet | 4-feet | 2-feet | N.A.[2] | N.A.[2] | N.A.[2] |
| - Recommended | 8-feet | 6-feet | 6-feet | 4-feet | 2-feet | N.A.[2] | N.A.[2] | N.A.[2] |
| Sidewalk Width | | | | | | | | |
| - Low Range (by variance) | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] | 5-feet | 5-feet | N.A.[2] |
| - High Range | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] | 8-feet | 8-feet | 5-feet |
| - Recommended | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] | 8-feet | 8-feet | 5-feet |
| Road Width | | | | | | | | |
| - Low Range (by variance) | 28-feet | 28-feet | 24-feet | 24-feet | 24-feet | 68-feet | 42-feet | 38-feet |
| - High Range | 78-feet | 74-feet | 50-feet | 32-feet | 26-feet | 116-feet | 88-feet | 40-feet |
| - Recommended | 78-feet | 74-feet | 50-feet | 32-feet | 26-feet | 116-feet | 88-feet | 40-feet |

1. Typical Design Attributes for Palouse RTPO Counties. Designs can vary by jurisdiction and discretion of each county engineer. Design elements should be confirmed prior to plan development.
2. NA = Not applicable.

| Table 1 (continued). Arterial and Roadway Design Elements and Attributes [1] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Rural Roadways | | | | | Urban Roadways | | |
| Functional Classification | Rural Arterial | Major Collector | Minor Collector | Local | Low Volume | Arterial | Collector | Local |
| Utility Accommodation | 5-feet | 5-feet | 5-feet | 5-feet | 5-feet | 5-feet | 5-feet | 5-feet |
| Right-of-Way | | | | | | | | |
| - Low Range (by variance) | 60-feet | 60-feet | 60-feet | 60-feet | 20-feet | 78-feet | 60-feet | 60-feet |
| - High Range | 88-feet | 84-feet | 60-feet | 60-feet | 26-feet | 126-feet | 98-feet | 60-feet |
| - Recommended | 88-feet | 84-feet | 60-feet | 60-feet | 26-feet | 126-feet | 98-feet | 60-feet |
| Paved (PA)/Either (ET)[1] | PA.[3] | PA.[3] | ET.[3] | ET.[3] | ET.[3] | PA.[3] | PA.[3] | PA.[3] |
| Cross-Slope | | | | | | | | |
| - Low Range (by variance) | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% |
| - High Range | 2.0% | 2.0% | 2.0% | 3.0% | 3.0% | 2.0% | 2.0% | 2.0% |
| - Recommended | 2.0% | 2.0% | 2.0% | 3.0% | 3.0% | 2.0% | 2.0% | 2.0% |
| Curb Radii | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] | N.A.[2] | 30-feet | 30-feet | 20-feet |
| Grade | | | | | | | | |
| - Desired Max | 6% | 6% | 8% | 8% | 8% | 6% | 8% | 8% |
| - Variant Max[2] | 10% | 10% | 12% | 12% | 12% | 8% | 10% | 12% |
| Radius of Curvature (Low - High Speed) | | | | | | | | |
| - Low Grade (0% - 4%) | 565-1505 ft | 420-930 ft | 205-730 ft | 205-420 ft | 205 | 150-310 ft | 150-310 ft | 150-310 ft |
| - Mid Grade (5% - 8%) | 465-1205 ft | 350-760 ft | 170-600 ft | 170-350 ft | 170 | 170-350 ft | 170-350 ft | 170-350 ft |
| - High Grade (9% - 12%) | 395-1005 ft | 300-645 ft | 145-510 ft | 145-300 ft | 145 | N.A. | 145-300 ft | 145-300 ft |
| Maximum Superelevation (Low - High Speed) | | | | | | | | |
| - Low Grade (0% - 4%) | 7% - 5% | 7% - 6% | 8% - 6% | 7% | 8% | 7% | 7% | 7% |
| - Mid Grade (5% - 8%) | 8% - 6% | 8% - 7% | 8% - 7% | 8% | 8% | 8% | 8% | 8% |
| Vertical Clearance | 16.5-feet | 16.5-feet | 16.5-feet | 16.5-feet | 16.5-feet | 16.5-feet | 16.5-feet | 16.5-feet |

1. Typical Design Attributes for Palouse RTPO Counties. Designs can vary by jurisdiction and discretion of each county engineer. Design elements should be confirmed prior to plan development.
2. NA = Not applicable.
3. PA = paved roadway or ET = either paved or unpaved.

### *4. Cul-De-Sac*

Dead-end public roads shall have a cul-de-sac constructed at the terminus of dead-end arterials and roadways. In areas not served by fire hydrants, cul-de-sacs shall have a radius of 50 feet. On paved rural roads, a paved cul-de-sac with a 45-foot radius and a 5-foot gravel shoulder may be used.

### *5. Design Deviation*

Design deviations/variances should require enough information and description so the County Engineer can provide an approval or denial. The deviation/variance request must identify the standard design element, and then explain why the design cannot be used for the subject project. The deviation must then provide an alternate design and justification for the appropriateness and safety of the design. Such justification should include: a cost-benefit analysis, engineering judgment, and reference to any alternate standard. A registered professional engineer should certify the design deviation/variance. The deviation applies to only the project for which it is approved. A deviation request must be resubmitted for a new project.

### *6. Design Horizon and Level of Service*

New or reconstructed roadways should be designed to have a capacity adequate to accommodate forecasted 20-year ADT volumes. The desired level of service based upon 20-year forecasts is LOS C for roadway or arterial segments, as based upon volume to capacity ratios, capacity, or travel times (pending County LOS methods) and LOS D for intersections as based upon the methods of the current Highway Capacity Manual. Forecast volumes and LOS should be submitted in a summary design report/letter submitted to the County Engineer for approval prior to the development of designs. At a minimum, the design report/letter should include:

1. Definition of problem and need statement.
2. Evaluation of alternatives using traffic forecasts and LOS (arterial/capacity and intersection).
3. A basic/brief cost-benefit analysis.
4. Definition of the preferred alternative (based upon capacity and cost-benefit analysis).
5. Design determinations for the preferred alternative based upon forecast conditions.

By way of definition, levels of service (LOS) are a qualitative measure of traffic flow and congestion for a roadway or intersection. LOS methodologies are established by methods set by the local jurisdiction, or as defined within the Highway Capacity Manual (HCM), which is a standard industry resource. Criteria range from LOS A, indicating free-flow conditions with minimal vehicle delays, to LOS F, indicating congestion with significant vehicle delays. Table 2 provides general LOS definitions for roadways and intersections.

Table 2. Intersection Level of Service Criteria

| Level of Service | General Description |
|---|---|
| A | Free Flow |
| B | Stable Flow (slight delays) |
| C | Stable flow (acceptable delays) |
| D | Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding) |
| E | Unstable flow (intolerable delay) |
| F | Forced flow (jammed) |

Source: Highway Capacity Manual (TRB, 2000)

### *7. Documentation and Plan Requirements*

The primary steps in the plan development for are:

1. Hold a pre-design meeting to review concept drawings and discuss and concur upon major design parameters prior to design.
2. Develop design report documenting forecast volumes, levels of service, and designs.
3. As needed, secure approval of design variations. The deviation process is summarized in a previous section.
4. Perform a pre-submittal meeting with the County Engineer to assure that appropriate documents/plans are provided.
5. Address submittal/plan comments and resubmit for certification/acceptance.

The following summarizes the requirements for plan sets:

- Plan sheets should be 24 inches by 36 inches in size, with fonts that are clear and easily understood and lines and symbols that are consistent with APWA, AASHTO or WSDOT Standards.
- The Cover Sheet in a typical Plan set should include the project title, vicinity map, index of plan sheets, engineer's certification, and signature blocks. Section, township, and range should also be provided on cover sheet.
- Road alignments with 100-foot stationing provided from left to right, increasing from west to east and/or south to north. Stationing should be provided at points of curve, tangents, and intersections, with appropriate ties to existing road surveys, section corners, quarter corners, and horizontal control net.
- Bearings should be provided on road centerline, keyed to an associated plat map.
- Curve data should be provided including radius, delta, arc lengths, and semi-tangent length, on all road centerlines and curb returns.
- Plans should identify right-of-way lines, width for proposed roads, intersection roads, and existing roads improvements with dimensions.
- Show all topographic features within and reasonably outside existing and/or proposed right-of-way limits to identify setback, slope, drainage, access, and road continuation parameters.
- Denote all existing and proposed utilities.
- Provide identification for all roads and adjoining subdivisions/properties.
- Provide a traffic control plan
- Provide a drainage plan showing existing and proposed drainage features, direction of flow, size, and type of drainage channel, pipe, and structure, as specified by the County Engineer.
- A one-inch to 50-foot scale should be used, unless coordinated previously with County Engineer that some alternate scale is appropriate given the design situation.
- Provide a north arrow on each plan and title block identifying the project name, sheet number, road name, road limit, and County project number.
- Denote new control monuments and the beginning and end of each new road and show all found survey reference monuments.
- Provide a standards symbol sheet.

- Show section and lot lines.
- Show beginning, middle and ending elevation of curb returns.

The profile elements of plan sets should include:

- Original ground line at 100-foot stations and at significant ground breaks.
- A final road and storm drain profile; including stationing of points of curve, tangent, lengths and point of intersection of vertical curves, with evaluations to 0.01 feet.
- Profiles for tops of curb and road centerline (centerline only for shoulder roads),
- Provide a continuous profile of existing and proposed improvements on a grid of numbered lines.
- Show grade and vertical curve data.
- Shown datum used and all benchmarks.

The cross section elements of plan sets should include:

- Dimensions of traffic lanes, shoulders, gutters, sidewalks, swales, depths, planting strips, easements, and right-of-way.
- Cross slope of all elements such as pavement, ditches, swales, gutters, sidewalk, and planting strips.
- Type of curb.
- Dimensions of structural section material layers.
- Retaining walls when utilized.
- Sections should be shown for each design of varying roadway sections.

### *8. Drainage*

Various types of drainage facilities may be required to protect the highway against surface and subsurface water. Drainage facilities must be designed to convey the water across, along, or away from the highway in the most economical, efficient and safe manner without damaging the highway or adjacent property.

Refer to the WSDOT Highway Runoff Manual and the Stormwater Management Manual for Eastern Washington (Washington State Department of Ecology). These Manuals will be used as references in the planning and design of drainage facilities.

### *9. Half-Streets*

Half streets may be used as an interim facility until such time that the owner of the opposite property proceeds with development. Full road construction must occur on roads proposed in widths less than 30 feet, with the exception of opposite curb, gutter, and sidewalk. Half the road plus ten-feet should be provided for roadways with widths over 30 feet.

### *10. Interjurisdictional Projects*

Plans sets for new or reconstructed roadways that effect/impact two or more jurisdictions should be subject to the approval of Engineers from all affected agencies. Any discrepancy or contention between design attributes should be resolved through predesign meetings with affected agencies.

### *11. Private Alleys - Urban*

Private alleys can be constructed to provide secondary access to residential lots or businesses. The alley should not intersect with arterials, but can intersect with collectors and local streets. The minimum width of a private alley is 16 feet. Outside of width parameters, the remaining design attributes of alleys should conform to that of low-volume roadways. The design of alleys should be provided and certified by a registered professional engineer.

### *12. Private Roads*

Although community road requirements are usually best served by public roads, owned and maintained by the county, private roads may be appropriate for some rural local access roads for either residential or commercial/industrial property. Proposed private roads within an adopted urban growth area are addressed by the associated cities development standards. These standards apply to private roads and are intended as guidelines to be followed when the intent is to provide adequate access for normal and emergency vehicle use to individual parcels throughout Garfield County.

Developers and property owners may apply for a variance to these standards as outlined in the Land Division and Subdivision Ordinances, however, variances to these standards may limit the ability for emergency vehicles to adequately access the properties. ***Garfield County has no responsibility to ensure that private roads are built, improved, maintained, or otherwise serviceable. Furthermore, Garfield County has no responsibility to ensure that adequate provisions have been made to provide for emergency vehicle access to properties served by private roads.***

No Public street or road will be accepted as part of the County road system for maintenance or other work until after the street or road has been constructed by the applicant and approved as meeting the county standards of alignment, grade, width and surfacing as required by the County Road Engineer. A minimum of 60' right-of-way is required for roads to be accepted into the County road system.

Private roads are maintained by property owners, and should have sufficient width and structural section to accommodate emergency vehicles, 10-foot easements to allow for utility access and should not intersect in locations that would restrict the circulation of all public roads.

Private roads serving commercial or industrial properties shall be design to the standards listed in Table 1 based on the Design Year Average Daily Traffic.

Private roads serving new subdivisions shall be upgraded to the following recommended standards. Also, any new subdivision requiring the use of an existing private road may require updating the existing private road to meet or exceed the following recommended standards.

Urban Residential Private Roads located within the urban growth area serving more than ***2 lots*** and Rural Private roads serving ***15*** or more lots shall be designed and constructed to the standards for low volume roads, whether paved or unpaved and shall have a minimum of 50' of right-of-way minimum.

Rural Private roads serving ***3 to 14 lots*** shall be designed and constructed with a minimum of 12' gravel driving surface, minimum 30' right-of-way, maximum 12% grade, provide intervisible

turnouts (widening the road to 20' wide for a 30' section with tapers at both ends), minimum 13'6" unobstructed clearance, and minimum 50' radius curves.

Rural Private roads serving ***fewer than 3 lots*** are exempt from the county road standards, However it is recommended that the roads be constructed to the 3 to 14 lot standard for emergency vehicle access.

The property owner(s) should note on their plat map, language filed with the plat, and property title a statement that Garfield County is not responsible for maintenance of private roads (or any other infrastructure). The developer must create a property owners association, with CC&R's, that specifically state that dissolving the association in no way will cause the County to take ownership of roads and facilities. Furthermore, the only way for the road to convert to a public road is by the sole discretion of the County Engineer, and that improvements will need to be made to the road at the sole expense of the property owners. The design of these roadways should be submitted and certified by a registered professional engineer who is providing road design, and drainage studies and plans. Any signage must be approved by the County Engineer, and designed and installed according to the criteria of the most current Manual of Uniform Traffic Control Devices.

(A) General Requirements. Private roads are approved only when all of the following conditions are met:

(i) Designed for an average daily traffic count (ADT) of four hundred or less vehicles per day. Current ITE guidelines indicate that a single-family dwelling generates approximately ten trips per day, thus forty legal lots with one single-family dwelling will generate a total average daily traffic county of four hundred. This maximum ADT provision shall only apply to new private roads directly accessing a county road. New private roads directly accessing a county road that will generate more than four hundred ADT will be permitted only by approval of a planned unit development and will be required to meet the appropriate rural or urban road standards contained herein. Short plats proposed on properties to which the access is over private roads that do not meet the standards in this section shall be denied.

(ii) New private bridges and other crossing structures shall be built to Garfield County road standards for loading.

(iii) Not obstructing, or part of, the present or future public neighborhood circulation plan developed in processes such as the Garfield County comprehensive plan, applicable community plan, or capital improvement plan.

(iv) Permanently established by right-of-way, tract, or easement providing legal access to each affected lot, dwelling unit, or business and sufficient to accommodate required improvements, to include provision for future use by adjacent property owners when applicable.

(v) Any private road serving as access more than 2 lots shall file a maintenance and upgrading agreement appurtenant to all the property owners having a vested interest in the private road prior to recording the final plat with the Garfield County auditor's office with a copy to be provided to the Garfield County department of building/fire safety and planning and Garfield County public works department. Reference the auditor's file number on the plat. The maintenance and upgrading agreement shall provide for the perpetual maintenance through a road maintenance fund of the private roads and associated parking areas by a capable and legally responsible owner, homeowner's association or other legal entity made up of all benefited property owners. The term "benefited property owners" shall include the owners of record of all properties with frontage, including access rights, on the private road or otherwise have legal access, whether constructed or not, to the private road.

(vi) The face of any plat or binding site plan containing a private road, and all subsequent documents transferring ownership of lots within such plat or binding site plan, shall bear the following language***: "Garfield County has no responsibility to build, improve, maintain, or otherwise service any private road for this plat/binding site plan. Any right-of-way dedicated to the public by this plat/binding site plan shall not be opened as a county road until such time as it is improved to county road standards and accepted as part of the county road system."***
Furthermore, if a variance is granted to reduce the road design requirements to less than standard, the face of the plat or site plan and all subsequent documents transferring ownership of lots, shall also bear the following language: "***Garfield County has no responsibility to ensure that adequate provisions have been made to provide for emergency vehicle access to properties served by private roads. The roads in connection with this plat were approved by a variance process and do not meet the minimum road standards recommended by Garfield County."***

(vii) Private roadway signs and pavement striping, if required, will be provided by the applicant and shall conform to MUTCD Guidelines. A signing plan shall be submitted and approved before any sign installation. Names for private roads shall be approved by the county engineer.

(viii) The placement of utilities shall be coordinated as much as possible with the placement of private roads and public rights-of-way.

(ix) Sidewalk may either be a monolithic structure with the concrete curb and gutter or separated by a five-foot planting strip.

(x) Private roads and the entire easement or right-of-way width shall be open and unobstructed for use by emergency, public service, and utility vehicles.

(B) Cul-de-sacs and Eyebrows.

(i) Whenever a dead-end street serves more than four lots a cul-de-sac shall be constructed with a minimum diameter forty-five feet of paving surfacing across the bulb. A minimum right-of-way radius of fifty feet from the central point in a permanent cul-de-sac across the bulb section and a sixty-foot from the center line in a temporary cul-de-sac, with the bulb area lying outside straight-street right-of-way provided as temporary easement pending forward extension of the street. Removal of the temporary cul-de-sac and extension of the sidewalk shall be the responsibility of the developer who extends the road.

(ii) The county engineer or designee may require an off-street walk or an emergency vehicle access to connect a cul-de-sac at its terminus with other streets, parks, schools, bus stops, or other pedestrian traffic generators, if the need exists.

(C) Notes.

(i) Design speed is a basis for determining geometric elements and does not imply posted or legally permissible speed.

(ii) Stopping sight distance (SSD) shall apply unless otherwise approved by the county engineer.

(iii) Entering sight distance (ESD) shall apply at intersections and driveways unless otherwise approved by the county engineer.

(iv) For guardrail installations, shoulders shall be two feet wider.

(v) If area has a unstable subgrade as determined by the county engineer or designee, an alternate roadway section may be required.

(vi) "Commercial access streets" serve multiple dwelling, business, and industrial developments. Within the above parameters, geometric design requirements shall be determined for specific streets consistent with the WSDOT Design Manual.

(vii) The following Section 13. Road Surface and Materials shall apply to private roads.

### *13. Road Surface and Materials*

The materials and depth/thickness of materials used in roadway construction shall be capable of supporting the design vehicle loading. Road surface and material designs will be coordinated with each County Engineer during predesign meetings to determine the appropriate roadway structural section requirements and surface type. In no case shall any structural section be less than 6" of Crusher Surfacing Top Course as defined in WSDOT Standard Specifications.

### *14. Safety*

A large proportion of crashes on rural roadways occur at intersections. Factors to be considered in designing an intersection are total traffic volume, amount of cross traffic, turning movements, type of roadway, type of traffic control needed, design of the crossroad sight distance, and the utilization of islands and channelization. The identification of potential safety problems, the evaluation of the effectiveness of alternative solutions and the programming of available funds for the most part effective improvements are of primary importance.

On high-speed highways a clear recovery area of 30 feet from the edge of the traveled way permits about 80 percent of the vehicles leaving the highway to safely stop or return to the roadway. WSDOT Design Manual and AASHTO,s Roadside Design Guide are by reference standard to be considered.

All traffic control devices should have the following characteristics: 1) fulfill an important need, 2) command attention, 3) convey a clear, simple meaning, 4) command respect of road users, and 4) provide adequate response time. In addition, devices that control or regulate traffic must be sanctioned by law. Four basic attributes of traffic control devices are essential to ensure that these devices are effective: design, placement, maintenance, and uniformity. Consideration should be given to these attributes during the design of a highway to ensure that the required number of devices can be kept to a minimum and that those that are needed can be properly placed. The Manual on Uniform Traffic Control Devices is by reference standards to be considered.

### *15. Secondary Access*

Secondary access/roadways may be required for developments that generate in excess of 150 daily trips. This represents greater than 15 single-family homes, 22 apartment units, or 25 town-homes/condos. Equivalencies may be derived for other residential types and businesses based upon the latest Institute of Transportation Engineers Trip Generation Manual. The functional classification of secondary roadways should be that of a rural or urban local road.

Secondary access/roadways generally provide traffic movement connecting primary roads with individual use areas. The smaller volumes of traffic carried by these roads permit slower design speeds to accommodate for stop-and-go traffic. On-street parking should be prohibited on secondary roadways throughout the installation in order for emergency vehicles to access the area. Appropriate street lighting, walkway and bicycle lanes, signage, and landscape planting should be incorporated in the design.

### *16. Slopes*

Per the WSDOT Roadside Safety Design Manual 700.05, slopes can present a hazard to an errant vehicle with the degree of severity dependent upon the slope and height of the fill. Providing fill slopes that are 4H:1V or flatter can mitigate this hazard. If flattening the slope is not feasible or cost effective, the installation of a barrier might be appropriate.

Slope recommendations and designs should be based on geotechnical report/investigations and should consider both slope stability and erosional characteristics in the design. The County Engineer will make the determination as to the level of design required.

### *17. Traffic Control and Signage*

Channelization, traffic controls and signage should conform to the guidelines outlined within the most current Manual of Uniform Traffic Control Devices. Striping and signage plans should be submitted with development plans and are subject to the approval of the County Engineer.

## B. Seasonal Roads (Gravel and Dirt Roads)

Seasonal roads are service roads used to enhance access to agricultural properties, provide service to low-density housing developments, and to access remote areas such as campgrounds, lakes, and wind turbines. The majority of these roadways will remain unpaved due to very low traffic volumes and/or due to the economic infeasibility of maintaining pavement. Paved seasonal roads should be designed in accordance with the low volume design standards provided previously within this document.

### *1. Design Attributes*

The cross sectional designs of seasonal roads are less stringent than those provided for low volume roadways, as these roads will support very low ADT. If possible, it is desirable to maintain a two-lane roadway (for properties that access more than one farm, residence, or is expected to support more than a few trips per day) and design attributes have been provided/stated as such. The upper width of agricultural vehicles is 8.5 feet. Thus, the variance from minimum recommendations should at a minimum account for comfortable operating designs beyond this width. A summary of fundamental design attributes for seasonal roads are provided on Table 3.

Table 3. Typical Seasonal Road Design Attributes

| Functional Classification | Low Volume |
|---|---|
| Number Lanes | 2 lanes |
| Lane Width | 10 feet |
| Shoulder Width | 1 foot |
| Road Width | 22 feet |
| Right-of-Way | 40 to 60 feet |

The type and configuration of materials used in the construction of roadways will vary and should be coordinated with the County Engineer prior to construction. General material recommendations are as follows:

- Good Surface Gravel- A gravel road needs is sufficient fine material that has a plastic or "binding characteristics."
- Base gravel does not make good surface gravel. Good gravel for base courses will generally have larger top-sized stone and a very small percentage of clay or fine material. This is necessary for the strength and good drainability needed in base gravels. This material will not form a crust to keep the material bound together on a gravel road. It will become very difficult to maintain.
- Surface gravel should have following properties before using in gravel road.
    - Proper gradation-Good surface gravel needs a percentage of stone, which gives strength to support loads —particularly in wet weather. It also needs a percentage of sand-sized particles to fill the voids between the stones and give stability. But a percentage of good, plastic fines are also needed to bind the material together, which allows a gravel road to form a crust and shed water.
    - Maximum size of 3/4-inch.
    - Eight to 15 percent fines.
    - Enough clay in fine for good plasticity.
- The gravel needs to be crushed and not pit run. In a few cases the gravel may simply be loaded onto trucks without processing. This is often referred to as "bank run" or "pit run" gravel. There are few natural deposits of material that have an ideal gradation without being processed. In some areas of the country it is still common to process gravel simply by screening to a maximum top size. A great benefit is gained from processing the material by crushing. This means that a good percentage of the stone will be fractured in the crushing process. The broken stones will embed into the surface of a gravel road much better than rounded, natural-shaped stone.

### *2. Maintenance*

The following Maintenance information is included for general information only and is not intended as a guideline, policy or standard by which maintenance activities are to be planned or executed. It is left up to the discretion of the County Engineer to determine what type and to what extent maintenance activities will be required for a given roadway.

Maintenance is a critical element of gravel roadways as they are more subject to weathering and "rutting" (tire wear due to vehicles) versus paved roadways. General elements of roadway maintenance are summarized as follows:

- A properly drained gravel road should have crown. Recommendations from supervisors and skilled operators indicate that at least 1/2 inch of crown per foot (approximately 4%) on the cross slope is ideal. the recommended crown is a straight line from the shoulder to the centerline that rises approximately 1/2 inch per foot (or approximately 4%).
- The shoulder should meet the edge of the roadway at the same elevation. In other words, the shoulder should be no higher or no lower than the edge of the roadway. By maintaining this shape, the low shoulder or drop-off is eliminated which is a safety hazard and also reduces roadway edge support. But the other extreme, which is a high shoulder, should be avoided.

- Maintain a motor grader running speed of three to five miles per hour is ideal in shaping gravel roadways.
- Reshaping involves restoring crown and recovering material.
- The angle of the moldboard is also critical to good maintenance. This angle is fixed on some grading devices, but on motorgraders it can be easily adjusted. It is important to keep the angle somewhere between 30 and 45 degrees Adjust angle to between 30° to 45°.
- Adjust the pitch (or tilt) the moldboard. If back too far, the material will build up. If too far forward, the materials will roll/blend and will not blade cut.
- Use motor grader articulation to improve stability. Virtually all-modern motorgraders are equipped with frame articulation. It can be an advantage to slightly articulate the machine to stabilize it even in a common maintenance operation.
- While reshaping remove potholes, ruts, and washboarding. The Causes of washboarding include vehicles, poor aggregate, lack of moisture, and running motor grader too fast.
- Shouldering disk is an alternative way of retrieving gravel from shoulder/ditch. The use of a shouldering disk helps mulch up the sod and vegetation before it is pulled onto the roadway either to be removed or recycled on the road as reusable gravel.
- Compact gravel after reshaping.
- Gravel roads should be routinely maintained, such as light trimming and removing defects, in the summer and fall.
- Reshaping surface and shoulder can be corrected with the motorgrader alone. Spring is the best time for this as there is minimal vegetation growth and moisture is present.
- Reshaping entire cross section is needed because of several rutting, loss of crown, gravel loss and deep secondary ditches. Major reshaping often has to be done on the entire cross section and it may have to be done immediately regardless of the vegetative growth. Motorgraders, disks, pulverizers/mixers and rollers are often needed.
- Dust Control-When the fines are lost from a gravel surface, the stone and sand-sized particles that remain will tend to remain loose on the surface, leading to some distresses like washboarding and reduced skid resistance. It will become very hard to maintain. Four reasons to consider dust control are: increase safety, saves money (minimize fines from blowing away), keeps residents happy, and reduces routine maintenance.
- There are several chemical options to control the dust from gravel road surface. Most agencies use either magnesium or calcium chloride. These chemicals works best with good surface gravel and four percent crown.
- When blading adjust moisture content for good compaction. When adequate moisture is present, the use of either a grader mounted or traditional roller machine will produce a tighter and smoother surface.

### C. All Weather Roads

A road is considered “All Weather” (really all-season) if it is constructed to a standard that allows it to carry legal loads year-round, without appreciable damage to the road itself. If a road is not constructed to the all-season standard, it is considered "seasonal " with respect to truck traffic. During the spring thaw, the roads that are not considered “All-Weather” must be posted with signs warning of seasonal load limitations or weight restrictions. In Washington, as in other "frost-belt" states, the freeze/thaw cycle causes a seasonal instability in the ground which surrounds and

supports roads. Essentially, an all-season road is distinguished from other roads by having a thick base of well drained granular material that is not susceptible to frost action. The thick base allows the all season road to absorb heavy loads (up to legal limits) without significant damage, even when the ground is unstable. If these same heavy loads were permitted on "seasonal" roads during spring thaws, a significant amount of damage could result. Posting of seasonal load limitations or weight restrictions on roads is a necessary action to preserve our capital investment in the road system and prolong pavement life.

Commercial trucking, logging, and heavy agricultural vehicles require a continuous and connected system of all-season roads, between their point of loading (or unloading) origin and the ultimate destination. Statewide and regional economies are dramatically affected by the lack of a complete interconnected all-season road system which either requires that commodities are not moved for a portion of the year, or that truckers must drive many extra miles to avoid "seasonal" roads. The needs of the commercial trucking industry (and local agriculture) can be met by an all-season road network which is a sub-system of all the public roads. In other words, there is no need for every highway, road, and street to be built to an “all-weather” (all-season) standard. In addition, weight restrictions are in effect a relatively short period of time -typically from early to mid January until sometime in March or April. This varies greatly from year to year across our area.

The State DOT system is typically built to a higher standard than the county system. Therefore, counties implement weight restrictions independently of the state.

## D. Approach Designs (Intersection and Driveway)

Roadway design guidelines apply to the new construction or reconstruction of public or private intersections or driveways. Design plans for new or reconstructed intersections will be submitted to and approved by the County Engineer prior to the provision of construction approvals. Intersection designs should be prepared under the supervision and certified by a licensed professional engineer. Variant or alternate designs from these guidelines will be provided only at the approval of the County Engineer.

### *1. Approach Spacing*

Intersection spacing is an important element of maintaining the function of arterials and roadways. Table 4 provides the desired spacing of intersections based upon roadway functional classification tiers. These intersections are intended to be full access breaks, unless safety conditions merit access restrictions. Spacing intersections below these criteria is subject to variant approval.

Table 4. Intersection Spacing

| Functional Classification | Rural Roadways | | | | | Urban Roadways | | |
|---|---|---|---|---|---|---|---|---|
| | Rural Arterial | Major Collector | Minor Collector | Local | Low Volume | Arterial | Collector | Local |
| Intersection | 1-mile | 1-mile | 1/2-mile | 1/4-mile | N.A. | 1-mile | 1/2-mile | 1/4-mile |
| - Spacing of local or low volume roadways should be verified with each County Engineer prior to Design. | | | | | | | | |

Driveway spacing is an important element of maintaining the appropriate function of arterials and roadways. Table 5 provides the desired spacing of driveways based upon roadway functional classification tiers. This table is organized to indicate spacing in accordance with varying channelization allowances and restrictions. Driveway spacing below this criteria are subject to a variant approval.

Table 5. Driveway Spacing

| Functional Classification | Rural Roadways | | | | | Urban Roadways | | |
|---|---|---|---|---|---|---|---|---|
| | Rural Arterial | Major Collector | Minor Collector | Local | Low Volume | Arterial | Collector | Local |
| Full Access Break | 1/2-mile | 1/4-mile | 1/8-mile | N.A. | N.A. | 1/2-mile | 1/8-mile | N.A. |
| Minor Approach, Left Turn Restrictions | 1/4-mile | 1/8-mile | 1/16-mile | N.A. | N.A. | 1/4-mile | 1/16-mile | N.A. |
| Right-In and Right-Out | 1/8-mile | 1/16-mile | 1/32-mile | N.A. | N.A. | 1/8-mile | 1/32-mile | N.A. |
| - Spacing of local or low volume roadways should be verified with each County Engineer prior to Design. | | | | | | | | |

As shown, there are no recommended driveway spacing standards for local and low volume roadways (identified as N.A., not applicable in Table 4). It is assumed that these driveways will provide access primarily to individual residential, commercial, or agricultural lots or parcels on low volume roadways. Thus, the need to provide spacing standards to minimize congestion or safety issues is not necessary. However, when possible, it is recommended that the first driveway access to corner lots or parcels be located as far from intersections as possible. All other spacing along local or low volume roadways should be verified with the County Engineer prior to design.

### *2. Intersection Turning Radius*

The principal dimensions affecting the turning paths designs are the minimum centerline turning radius, out-to-out track width, the wheelbase, and the path of the inner rear tire. The design turn radius for an intersection should be between 24 feet to 60 feet depending upon the design vehicle type (AASHTO Design Manual). The equivalent design vehicles for this are a Passenger Car and a Turnpike Double Semi-trailer/ trailer (WB-109D), respectively.

### *3. Roundabout*

A roundabout can be considered as means for controlling intersection traffic if the majority of the following questions can be answered affirmatively:

1. Will the intersection operate unacceptably as a two-way stop-controlled, four-way stop-controlled, or uncontrolled intersection?
2. Is the daily entering volume less than the maximum daily service volume for a roundabout?
3. Is the intersection located outside of a coordinated signal network?
4. Is the ratio of major-to-minor road traffic less than 5.0?
5. Is the entering driver's view free of sight obstructions?
6. Will large or over-sized trucks infrequently use the subject intersection?

7. Will pedestrians and bicyclists infrequently use the subject junction?

Roundabout design is currently evolving within the United States. The WSDOT Design Manual maintains current design practices and should be used in the geometric planning/design of roundabout facilities.

The following steps may be followed when deciding whether to implement a roundabout at an intersection:

- Step 1: Consider the context. What are there regional policy constraints that must be addressed? Are there site-specific and community impact reasons why a roundabout of any particular size would not be a good choice?
- Step 2: Determine a preliminary lane configuration and roundabout category based on capacity requirements.
- Step 3: Identify the selection category. This establishes why a roundabout may be the preferred choice and determines the need for specific information.
- Step 4: Perform the analysis appropriate to the selection category. If the selection is to be based on operational performance, use the appropriate comparisons with alternative intersections.
- Step 5: Determine the space requirements. Determine the space feasibility. Is there enough right-of-way to build it? This is a potential rejection point. There is no operational reason to reject a roundabout because of the need for additional right-of-way; however, right-of-way acquisition introduces administrative complications that many agencies may wish to avoid.
- Step 6: If additional space must be acquired or alternative intersection forms are viable, an economic evaluation may be useful.

The results of the steps above should be documented to some extent. The level of detail in the documentation will vary and will generally be influenced by the size and complexity of the roundabout. A roundabout selection study report may include the following elements:

- It may identify the selection category that specifies why a roundabout is the logical choice at this intersection;
- It may identify current or projected traffic control or safety problems at the intersection if the roundabout is proposed as a solution to these problems;
- It may propose a configuration, in terms of number of lanes on each approach;
- It may demonstrate that the proposed configuration can be implemented feasibly and that it will provide adequate capacity on all approaches; and
- It may identify all potential complicating factors, assess their relevance to the location, and identify any mitigation efforts that might be required.

Agencies that require a more complete rationale may also include the following considerations:

- It may demonstrate institutional and community support indicating that key institutions (e.g., police, fire department, schools, etc.) and key community leaders have been consulted;
- It may give detailed performance comparisons of the roundabout with alternative control modes;

- It may include an economic analysis, indicating that a roundabout compares favorably with alternative control modes from a benefit-cost perspective; and
- It may include detailed appendices containing traffic volume data, signal, or all-way stop control (AWSC) warrant analysis, etc.

None of these elements should be construed as an absolute requirement for documentation. The above list is presented as a guide to agencies who choose to prepare a roundabout study report. Please refer to the Roundabouts: An Informational Guide report from USDOT for further information or to the attached roundabout references.

### *4. Sight Distance*

Stopping sight distance refers to the length of roadway needed for a vehicle to come to a complete stop upon driver observance of an obstruction within the roadway. Intersection sight distance refers to the roadway distance required for a vehicle to turn or move through an intersection from a stopped position and accelerate to the posted travel speeds. Finally, a clear sight triangle refers to the distance needed for a vehicle approaching an uncontrolled intersection to stop upon observance of another vehicle approaching an intersection. These recommendations were adapted from the AASHTO Design Manual.

For the purpose of these evaluations, a height of 3.5-feet above the roadway surface is assumed for the driver height. The driver must have a clear sight corridor to an object located 2.0-feet above the roadway surface for the distances summarized in Table 5 through Table 7.

Table 6 provides a summary of stopping sight distances along roadways, as a function of speed.

| Table 6. Stopping Sight Distance, Approaching an Obstruction on Road | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design Speed (mph) | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 |
| Stopping Distance (Feet) | 80 | 115 | 155 | 200 | 250 | 305 | 360 | 425 | 495 | 570 | 645 | 730 |
| Source: Geometric Design of Highways and Streets (AASHTO, 2004) | | | | | | | | | | | | |

Table 7 provides a summary of intersection sight distance (clear sight triangle from a stopped position), as a function of the posted speed limit.

| Table 7. Intersection Sight Distance, Turn or Travel Through Intersection from Stop | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design Speed (mph) | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 |
| Stopping Distance (Feet) | 170 | 225 | 280 | 335 | 390 | 445 | 500 | 555 | 610 | 665 | 720 | 775 |
| Source: Geometric Design of Highways and Streets (AASHTO, 2004) | | | | | | | | | | | | |

Table 8 provides a summary of uncontrolled intersection sight distance (clear sight triangle approaching an intersection), as a function of the posted speed limit.

| Table 8. Clear Sight Triangle, Approaching an Uncontrolled Intersection | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design Speed (mph) | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 |
| Stopping Distance (Feet) | 70 | 90 | 115 | 140 | 165 | 195 | 220 | 245 | 285 | 325 | 365 | 405 |
| Source: Geometric Design of Highways and Streets (AASHTO, 2004) | | | | | | | | | | | | |

In residential neighborhoods on local streets, a lesser sight triangle of 50-feet of either approach to an intersection can be utilized at uncontrolled intersections, as needed, to minimize corner lot impacts. However, obstructions such as fences and shrubs should be kept to a minimum within these sight triangles.

### *5. Signalized Intersections*

The need for a traffic signal should be established based upon the current warrants of the Manual of Uniform Traffic Control Devices. Unless an unusual pedestrian safety issue exists, the volume warrants should be used to establish the need for a traffic signal. Of the volume warrants, both the four and eight hour warrants can be used to exclusively demonstrate the need for a traffic signal. The peak hour volume warrant should be supported with the justification of an additional warrant to demonstrate a signal need, unless the County Engineer provides a variant approval.

The geometrical configuration and control/phasing of signalized intersections should be determined based upon an analysis of traffic function/operation utilizing the methodologies of the most current Highway Capacity Manual (HCM). Various application software packages can be used, so long as the reported results are compatible with the methods of the HCM.

The analysis should be performed based upon a review of 20-year traffic forecast during the two top peak/commute hours of the typical weekday (weekends can be reviewed also, per the discretion of the County Engineer). The geometrical configurations needed to maintain a level of service (LOS) D standard for the overall intersection, and also a LOS D standard upon all approaches and turn lanes, is desired for the intersection based upon the forecast 20-year review/analysis.

Table 9 outlines the LOS criteria for signalized and unsignalized intersections. As shown, level of service thresholds, as a function of delay, varies between signalized and unsignalized intersections. This is because driver tolerances for delay have been documented to be much higher at signalized intersections than at unsignalized intersection.

Table 9. Intersection Level of Service Criteria

| Level of Service | Signalized Control Delay (sec/veh) | Unsignalized Average Delay (sec/veh) |
|---|---|---|
| A | ≤10 | ≤10 |
| B | >10 – 20 | >10 – 15 |
| C | >20 – 35 | >15 – 25 |
| D | >35 – 55 | >25 – 35 |
| E | >55 – 80 | >35 – 50 |
| F | > 80 | >50 |

Source: Highway Capacity Manual (TRB, 2000)

Queue/storage lanes for signalized intersections should be sufficient to accommodate a balance between average (50$^{th}$ percentile) and maximum (95$^{th}$ percentile) queue projections, which represent the typical queue outputs of HCM compatible software. This balance should be

confirmed with the County Engineer, but attempt to address an 85th percentile queue condition for turn lanes.

Per the discretion of the County Engineer, signal plans should be developed in accordance with American Association of State Highway and Transportation Officials or local WSDOT guidelines. Signal plans should be certified by a licensed professional civil engineer with electrical plans certified by a licensed electrical engineer.

### *6. Turn Lane Warrants*

Operations and safety at an intersection can be improved with the addition of a left-turn bay on the major road to a two-way stop-controlled intersection. The following guidelines may be required to determine when to provide a left-turn bay on the major road of a two-way stop-controlled intersection:

- A left-turn lane should be considered at any median crossover on a divided, high-speed road.
- A left-turn lane should be provided on the unstopped approach of a high-speed rural highway when it intersects with other arterials or collectors.
- A left-turn lane is recommended on the unstopped approach of any intersection when the combination of intersection volumes intersect above or to the right of the appropriate trend line shown in the NCHRP Report 457 or the revised/updated equivalent report version. Provided in the technical appendix to these road standards are the left-turn lane warrant excerpts from this report.

Significant improvement can be made to the operations and safety of an intersection with the addition of a right-turn bay on the major road to a two-way stop-controlled intersection. Guidelines are based on an evaluation of the operating and collision costs associated with the right-turn maneuver relative to the cost of constructing a right-turn bay. Guidelines were developed and displayed on a chart in the NCHRP Report 457. Provided in the technical appendix to these road standards are the right-turn lane warrant excerpts and charts from this report.

### *7. Unsignalized Intersections and Driveways*

The geometrics of a stopped approach to an intersection or driveway and need for stop-signs should also be based upon a functional/operational review of forecast, 20-year traffic conditions during the top two peak/commute hours of the typical weekday, as based upon the method of the most current HCM. A LOS D standard should be maintained for an entire intersection with four-way stop controls, or on the overall approach (not specific lane) at a single or two-way stop controlled intersection. Queue/storage lanes should also be sufficient to accommodate a balance of average (50th percentile) and maximum (95th percentile) queue projections, which is assumed to be sufficient to accommodate 85th percentile queues.

## E. Pedestrian and Bicycle Facilities

Roadway design guidelines apply to the new construction or reconstruction of public sidewalks . Design plans for new or reconstructed sidewalks within urban areas will be submitted to and approved by each County Engineer prior to the provision of construction approvals. Sidewalk designs should be prepared under the supervision and certified by a licensed professional

engineer. Variant or alternate designs from these guidelines will be provided only at the approval of the County Engineer. Sidewalks are not required on rural roadways.

### *1. Bicycle Facilities*

Where strategically appropriate, bicycle lanes can be provided to offer an alternative commute mode or to promote recreation. The desired width of a bike lane is four feet, either as a designated travel-way along an urban arterial or as the shoulder of a rural arterial. The one-foot curb returns located along a road should not be included in this width, as they are often the location of storm inlet grates.

In urban areas, bicycle facilities should be marked with adequate signage provided in accordance with the criteria set forth in the most current Manual on Uniform Traffic Control Devices (MUTCD). Bicycle crossings at signalized and unsignalized intersections should also be provided in accordance with MUTCD guidelines.

### *2. Multi-Use Pedestrian and Bicycle Facilities*

Multi-use bicycle and pedestrian paths are generally located on rights-of-way with minimal cross flow by vehicles. They should be trails not served by streets and highways or where they are adjacent to but not right next to parallel streets. Multi-use paths can either provide a recreational opportunity or, in some instances, can serve as direct high-speed commuter routes if cross flow by motor vehicles can be minimized. The most common uses are along highway rights-of-way, rivers, oceanfront's, canals, utility rights-of-way, abandoned railroad rights-of-way, within college campuses, within and between parks or part of a planned development.

According to AASHTO, under most conditions, a recommended paved width for a two-directional shared use path is 10 feet. A minimum width of a one-directional shared use path is 6 feet. In general, a minimum design speed of 20 mph should be used, although, the speed a bicyclist travels is dependent on several factors (i.e. condition, location and grade of the path, winds, number and types of users on path, etc.). Also, grades greater than 5 percent are undesirable because the ascents are difficult for many bicyclists to climb and the descents cause some bicyclists to exceed the speeds at which they are competent or comfortable.

### *3. Pedestrian Facilities*

There are several goals/objectives in the design of pedestrian facilities. These goals are intended to promote safe pedestrian routes and encourage pedestrian activities. Pedestrian facility goals/objectives are summarized below:

- Provide physical facilities (neighborhoods, commercial centers, etc.) along walking routes
- Provide buffers between sidewalks and edge of vehicle travel-way
- Pedestrian facilities should have sufficient illumination
- Promote traffic calming measures necessary to manage speed and provide safe crossings
- Promote links to surrounding pedestrian facilities, neighborhoods and trip generators
- Assure clear sight distances for vehicle traffic approaching pedestrian crossings
- When possible, provide flashing beacons or signalized controls at heavier utilized pedestrian crossings

Sidewalks are constructed along one or both sides of urban arterials, collectors and local streets. The minimum width of sidewalks is 5-feet and maximum is 8-feet along arterials. Buffers are provided to separate the sidewalk from the vehicle travel-way. Table 10 provides a summary of cross sectional sidewalk designs based upon functional classifications for urban arterials.

Table 10. Sidewalk and Buffer Widths

| Functional Classification | Urban Roadways | | |
|---|---|---|---|
| | Arterial | Collector | Local |
| One or Both Sides of Arterial | Both | Both | One |
| Border or Buffer | 6-feet | 4-feet | 2-feet |
| Sidewalk Width | | | |
| - Low Range | 5-feet | 5-feet | N.A. |
| - High Range | 8-feet | 8-feet | 5-feet |

Pedestrian crossings should be provided at major intersections, preferably at the intersection spacing criteria summarized on Table 3. Mid-block crossings are not preferred, but can be allowed at the discretion of the County Engineer when the space between crossings exceeds 660 feet. The criteria/goals where mid-block crossings can be most effective are as follows:

- A number of mid-block crossings have been noted to already occur at the subject location
- An existing or proposed land-use creates the potential for high mid-block crossings (mall, arena, etc.)
- The safety and capacity of adjacent intersections or large turning volumes create a situation where it is difficult to cross the street
- The vehicle capacity of the roadway will not be substantially reduced with the implementation of a mid-block crossing
- Adequate sight distance is available for both pedestrians and vehicles

Pedestrian crossings at intersections or mid-block locations should be designed in accordance with the criteria set forth in the most current Manual on Uniform Traffic Control Devices.

# III. Regional Traffic Impact Study Guidelines

The following guidelines are designed to help development proponents and their representatives prepare a Traffic Impact Analysis (TIA) in accordance with expectations of the Palouse Regional Transportation Planning Organization (RTPO) and those County and City agencies that sanction the guidelines. In addition, the attached summary checklist/worksheet can be used with these guidelines to assist with the development and/or agent review of a TIA.

A TIA is an analytical study that quantifies the impacts of a residential, recreational, institutional, and/or commercial development proposal upon traffic and transportation conditions within a finite study area. As necessary, the TIA will define what traffic/transportation capacity improvements may be warranted to assure the safe and functional mobility/flow of traffic (within the defined study area), and should also define what level of participation should be required of a development to mitigate traffic related impacts. Impact mitigation options are summarized later in this document.

A TIA will be required at the discretion of the land use authority (engineering and/or planning staff) and will be identified during pre-application interviews/meetings. Submittals will be required prior to various stages of project approval, pending the discretion of the agency representative. Most typically, the TIA will be required in conjunction with the State Environmental Policy Act (SEPA) documentation that is required of most development applications prior to zone changes, plat approvals, building permission, etc. However, a TIA may be required at any point in the development process, if deemed appropriate by each County Engineer or land use jurisdiction.

An applicant wishing to pursue a land use action within Palouse RTPO Counties should first submit a trip generation and distribution letter for review to the County Engineer. The County Engineer or land use jurisdiction will use this letter to help determine whether a traffic impact analysis should be required for the proposed land use action.

### A. Trip Generation and Distribution Letter

A Trip Generation and Distribution (TG&D) letter may be required of applicants wishing to pursue a land use action within Palouse RTPO boundaries. This includes actions for both new and redevelopment land use actions. The purpose of the TG&D letter is to help the County Engineer or land use jurisdiction determine whether a traffic impact analysis will be required for the development; and in certain situations, at the discretion of an agency, can be used as a means of assigning improvement fees without the development of a TIA (mitigation options described later in this document).

The TG&D letter should be submitted during or shortly following pre-application discussions/interviews, to provide the applicant sufficient time to develop a traffic impact analysis, if required by the County Engineer or land use jurisdiction, prior to project approval. Each County Engineer or land use jurisdiction will determine the scope of study requirements. Most typically, the information provided within a TG&D letter may include:

- Project Location. A written description of the project location in relation to public facilities located within the vicinity of the project site. The site should also be displayed graphically on an attached figure.

- Project Action. A written description of the land use actions should be provided. The description should include: use and size of the project (both site area and, as available, building area); existing and proposed zoning; project access locations; and development/phasing and completion schedules. A graphical site plan is desired as an attached figure, when possible.

- Trip Generation. The TG&D letter should identify the number of trips anticipated with project development. Trip generation should be determined based upon the methodologies of the most current, Institute of Transportation Engineers (ITE) Trip Generation Manual, unless trip generation data more applicable to the proposed land use can be presented by the applicant. The County Engineer or land use jurisdiction will determine whether supplemental trip generation data can be used for the TG&D letter.

  When relevant, total project trips will be separated into trip types (i.e., new, pass-by, diverted, and shared) to better describe the traffic characteristics of retail and commercial developments. Trip types should also be identified using ITE resources or some other means acceptable to the County Engineer or land use jurisdiction. Project trip generation should be provided for the typical weekday, weekday AM peak hour and weekday PM peak hour only, unless the County Engineer or land use jurisdiction requests some other time period for analysis (i.e., Saturday or Sunday peak hours).

- Trip Distribution and Assignment. A description of project trip distribution and assignments will be provided in the TG&D letter. The methodologies used to distribute and assign project trips will be discussed/provided in the TG&D letter. As a guide, trip assignments should be provided for site access and key intersections located within the direct vicinity of the site, and for those key intersections projected to support more than 25 peak hour trips beyond the immediate site vicinity during the typical weekday or other time period specified by the County Engineer or land use jurisdiction.

**B. Traffic Impact Analysis**

A traffic impact analysis (TIA) is intended to forecast and identify potential transportation and traffic deficiencies. As needed, the study will provide recommendations to mitigate the transportation and traffic impacts of a proposed land use development or redevelopment project. Trip letters, TIA studies, or mitigations may be required as a result of land use actions under SEPA, zone changes, or comprehensive land use changes. A TIA will be required at the discretion of the County Engineer or land use jurisdiction. However, the following is used to help guide agent determinations:

- Project is projected to generate more than 25 trips (250 daily trips) during the AM and/or PM peak hours (or some other time period specified by the County Engineer or land use jurisdiction).

- When it is expected that project driveway trips will significantly impact traffic operations on adjacent arterials.

- The project is proposed along a route(s) that historically experience or is projected to experience level-of-service or accident safety issues.

- The project is proposed within the vicinity of a school, community park, or some area with high levels of pedestrian and neighborhood activity.

The scope and extent of the TIA is established at the discretion of the County Engineer or land use jurisdiction. However, there are two general TIA levels or tiers that can be required under RTPO guidelines, per the discretion of the County Engineer or land use jurisdiction. For those land use projects that generate between 25 and 99 peak hour trips (250 to 999 daily trips), a Level One TIA will be used to address traffic operations/conditions at site driveways/access and at key intersections located immediately upstream and/or downstream of the project site. The Level Two TIA is typically used for projects that generate in excess of 100 peak hourly trips (1,000 or more daily trips). This TIA examines site driveways/access and intersections that experience greater than a 25-trip gain in peak hourly trips (greater than 250 daily trips).

The TIA will address traffic conditions/operations during one or two peak periods of traffic activity during the typical weekday on adjacent streets (i.e., AM peak, Noon, or PM "rush"/commute peak hours), per the discretion of the County Engineer or land use jurisdiction. Additional timeframes can be requested for analysis if peak periods/timeframes of activity are expected to occur during a weekend (i.e., commercial developments, recreational activities, church services, etc.).

The study will address traffic conditions/functions during the forecast completion year of the project, as this represents the horizon in which project impacts are greatest in comparison to background (non-projected related) traffic. However, the initial forecast/horizon year should not extend beyond six years of the time of traffic counts and/or study preparation as this is outside of the timeframe of agency Capital/Transportation Improvement Plans. Long-range analyses may be performed for developments with a completion date that extends beyond six years. However, an intermittent phase must be examined within a timeframe that falls at or below the six-year threshold.

Each County Engineer or land use jurisdiction will determine the scope of study requirements. In addition to the project location, project action, trip generation, and trip distribution/assignment information required of the TG&A letter, a TIA report may also include the following information:

- Introduction. The introduction must define the purpose of the TIA, provide a project description, discuss the scope and extent of the study, and discusses methodology and assumptions. The introduction should also provide the site location and description information, as highlighted by the TG&D section, for the TIA. Site location and site plan figures are required with the TIA.

- Roadway Inventory. A TIA must provide a description of the transportation network located within the project study area, as established by the County Engineer or land use jurisdiction. These descriptions include roadway classifications, roadway channelization, speed limits, intersection controls (signal, stop-controlled, etc.), intersection channelization (includes turn lane storage), etc. A figure or table highlighting roadway characteristics (class, lanes and speeds) and intersection channelization and controls are recommended.

- Traffic Counts. Recent weekday and peak hour traffic counts must be secured for study arterials and intersections. Average daily traffic/24-hour (weekday) counts must be secured for at least one location on primary study arterials. Intersection turn movement

counts must be obtained for study intersections identified by the County Engineer or land use jurisdiction for peak study hours. Counts conducted 18-months prior to study initiation cannot be used in the TIA and must be updated. A figure that summarizes existing turn movement counts is required in the TIA. Weekday counts can either be summarized graphically or in a table within the TIA. Raw count data should be included in an appendix to the TIA.

- Accident Histories (Discretionary). The County Engineer or land use jurisdiction may require collision histories for roadways and intersections located within the study area. Typically, the most current, three-year period of collision activity is requested from WSDOT and/or local officials. The data is examined to summarize the number and severity of accidents, highlight the reoccurrence of particular accident types and sometimes to examine accident frequency/rates as compared with Washington State averages.

  An accident review is intended to identify any deficiencies that may result as a function of poor geometrical or traffic control roadway or intersection designs. The first identifier of a potential safety issue is noted when an average of greater than five accidents per year is noted at an intersection. A straight collision rate should then be calculated to help further determine whether a safety issue exists at an intersection or specific location, per the following equation.

  $$\text{Intersection Collision Rate (ICR) (collisions per million entering vehicles)} = \frac{\text{Average Accidents per Year} * 1{,}000{,}000}{365 * \text{Total Entering Intersection Volumes}}$$

  Less than 0.99 collisions per million entering vehicles typically does not denote a safety issue at an intersection. Intersection collision rate (ICR) that ranges between 1.00 and 2.49 collisions per million entering vehicles represents an intersection that should be watched/flagged for further safety evaluations. ICR rates that exceed 2.50 collisions per million entering vehicles denote a possible high accident location (HAL). The TIA should then attempt to analyze the cause of the accidents and recommend potential improvement options.

- Pedestrians/Transit. A summary of adjacent or nearby pedestrian and transit accommodations within the study area should be summarized in TIA reports.

- Programmed Improvements. The TIA must describe any improvements that are programmed by agencies or other developments, as they may influence travel patterns or capacity within the study area. Programmed improvements must be factored, as necessary, within traffic forecasts and the future operations analysis. A figure highlighting programmed improvements is recommended. The County and State Transportation Improvement Programs, local capital improvement program documentation and other TIA traffic studies are typical resources to identity future improvements. The source for each improvement must be identified within the TIA.

- Baseline (Without-Project) Forecasts. Baseline traffic volume should be developed for the forecast build-out year of the proposed project, but not at a horizon year that extends beyond six years of traffic counts and/or study development. Forecast traffic volumes will be developed by using a specific annual growth rate, as identified through historical traffic counts and confirmed by the County Engineer or land use jurisdiction. As necessary, the

trips generated by recently approved, concurrently developing projects should be included into baseline forecast projections. The County engineer or land use jurisdiction will identify these "pipeline" projects and should typically be able to provide trip assignments from other relevant TIA studies. In some instances, pipeline trip assignments may need to be assumed for the study area. A figure that summarizes pipeline project location and pipeline project trip assignments is required, as well as a figure that highlights future baseline traffic volumes.

- Future Project Volumes: Project trip generation, distribution, and assignment must also be summarized in the TIA, as specified by the TG&D section (and approved subsequently by the County Engineer or land use jurisdiction). Future with-project traffic volumes will be developed by combining project trip assignments with baseline traffic volumes. Figures that highlight project trip assignments and future with-project traffic volumes are required within the TIA.

- Traffic Operations. Traffic operations should be gauged according to the intersection/driveway Level Of Service (LOS) methodologies of the most current Highway Capacity Manual (HCM), as developed by the Transportation Research Board. A range of software options is acceptable for LOS calculations as long as methodologies are consistent with the HCM. LOS worksheets containing summary assumptions (channelization, controls, peak hour factors, heavy vehicle assumption, etc.) must be provided in the appendix to the TIA.

  The LOS analysis will be provided for the existing, future baseline, and future project conditions at site driveways and at study intersections. Note that LOS D is the threshold for traffic operations at signalized intersections, unsignalized intersections; and LOS E at project driveways within the RTPO area, unless specified otherwise by the County Engineer or land use jurisdiction.

### A. Typical TIA Outline

An outline of the typical traffic impact analysis study is as follows:

I. Executive Summary
   a. Project Description
   b. Trip Generation & Distribution
   c. Deficiencies Identification
   d. Improvements and Mitigation
II. Introduction and Background
   a. Project Definition
   b. Scope and Study Area
   c. Study Methods and Definitions
III. Existing Conditions
   a. Road/Intersection Description
   b. Traffic Volume Summaries
   c. Traffic Operations
   d. Safety Reviews
   e. Pedestrian/Transit Facilities
IV. Future Without Project Conditions
   a. Programmed Improvements
   b. Pipeline Projects and Base Forecasts
   c. Traffic Operations
V. Future With Project Conditions
   a. Trip Generation
   b. Trip Distribution
   c. Traffic Forecasts
   d. Traffic Operations
   e. Additional/Discretionary Analysis
VI. Improvements and Mitigation
   a. Improvement Alternatives
   b. Project Participation /Mitigation
   c. Improvement Timelines
VII. TIA Summary
   a. Project Description
   b. Trip Generation & Distribution
   c. Deficiencies Identification
   d. Improvements and Mitigation

- Additional Analysis (Discretionary). The County Engineer of the jurisdiction may require additional analyses with the TIA that may include, but not necessarily be limited to,

weekday traffic forecasts, weekday roadway capacity comparisons (as compared/established against RTPO and local jurisdiction road development guidelines), sight distance assessment, speed studies, heavy vehicle characteristics (forecasts, operating times, turning pathways, etc.), special analysis conditions, pedestrian facilities, air quality, noise, etc.

- Capacity Improvements. As needed, improvements should be recommended to mitigate capacity issues within the study area (those intersections projected to operate below LOS D and driveways projected to operate below LOS E). If possible, two improvement alternatives should be identified for each of the deficiencies noted by the study. The first improvement alternative should be developed to specifically offset the impacts of the project, as measured in LOS and/or average vehicle delays. The second should highlight an improvement necessary to elevate intersection operations back to within the LOS C range during the study peak hours. Under both alternatives, it is expected that the transportation improvements recommended maintain the objective LOS for a timeframe of an additional five years beyond the study/forecast horizon year. Again, the project horizon plus six year analysis is only required for those intersections that are proposed for improvement.

  Improvement recommendations should also be supported with additional industry guides/measures. MUTCD (Manual on Uniform Traffic Control Devices) warrants should be utilized to support the need for 4-way stops and signals. Turn bay length recommendations for signalized intersections and stop-controlled approaches at unsignalized intersections, should be established based upon a reconciliation of average and 95$^{th}$-percentile queues, as coordinated with the County Engineer or land use jurisdiction (rounded upward 25-feet to the nearest average vehicle length). The length of deceleration lanes departing an uncontrolled, major roadway should be determined/estimated based upon AASHTO (American Association of State Highway and Transportation Official) and/or WSDOT standards. Project responsibilities regarding these improvements are summarized in the next section.

  In addition, any improvements recommended to correct safety, sight distance, noise, etc. conditions would be provided, with the deficiency restated in the improvement section.

- Summary and Conclusion. The TIA must contain a summary section that clearly highlights the conclusions and recommendations of the study. This summary section, if separated from the document for cursory review by members of the public or a public agency, should provide sufficient detail to describe the project, provide a summary of trip generation and study results and provide a clear understanding of proposed improvements and project mitigation.

The attached spreadsheet summarizes the primary checklist that will be used for reviewing TIA reports. The spreadsheet also shows the preferred organization of a TIA, although, the RTPO is flexible so long as the required information is provided by the report.

## 1. SEPA

The primary role of SEPA in project review is to focus on those environmental impacts that have not been addressed by the county's or city's development regulations and/or comprehensive plan, or other local, state and federal laws and regulations. SEPA substantive authority should

only be used when a project's environmental impacts cannot be adequately addressed by existing laws. "Adequately addressed" is defined as having identified the impacts and avoided, otherwise mitigated, or designated as acceptable the impacts associated with certain levels of service, land use designations, development standards, or other land use planning decisions. An example as it pertains to transportation is as follows:

- Designated as acceptable the impacts associated with certain levels of service. Inside the urban growth area, a county decides that it will accept a certain level of traffic congestion (level of service standard) in the transportation element of its comprehensive plan. When an application for a grocery store is submitted, the county determines that the system-wide transportation impacts of the proposal have been addressed because the amount of traffic generated by the store will not cause the transportation level of service to fall below the standards established in the comprehensive plan. The transportation impacts associated with the established level of service were designated as acceptable in the comprehensive plan pursuant to GMA.

Once a determination has been made that an impact has been adequately addressed, the jurisdiction may not require additional mitigation for that particular impact under its SEPA substantive authority. However, the jurisdiction may find that its development regulations address some, but not all, of a project's impacts. The jurisdiction may still need to rely on SEPA substantive authority to address transportation site-specific impacts such as safety, on-site traffic circulation, and direct access to the site if the transportation element and development regulations only dealt with impacts to the transportation system.

**C. Mitigation Determination**

The TIA will be developed and submitted prior to project approval. The arrangement/condition of mitigation from a project will be expected/exacted prior to the issuance of a building and/or occupancy permit. Project mitigations will be required at the discretion of the County Engineer or land use jurisdiction. However, the County Engineer or land use jurisdiction will work to assure that improvements are proportionate to the level of the project's impact. Mitigation participation will typically be required under the four following conditions. 1) the project causes the degradation or participates in the further degradation of an intersection that operates below acceptable thresholds (those intersections projected to operate below LOS D and driveways projected to operate below LOS E), 2) the traffic impacts of a project cause LOS to degrade by two full levels at an intersection (in which case, improvements would have to be recommended by the TIA to offset the impacts), 3) when special studies (sight distance, queuing, speed studies, etc.) identify the need for improvements outside of typical/conventional LOS analysis and 4) when a jurisdiction is already in the process collecting improvement/impact fees to help fund current six-year improvement projects.

Typically, the applicant can expect one or more of the following as mitigating measures:

- Frontage Improvement: Frontage improvements provide the County Engineer or land use jurisdiction the opportunity to progress with road and pedestrian facilities in a manner consistent with current RTPO Road Planning Guidelines. Frontage improvements would extend along arterials within property boundaries and can include, but would not be limited to, road improvements, sidewalk/pathway construction, bike lanes, parking lanes, and landscape buffers.

- Direct Mitigation: Direct mitigation is intended primarily to offset the specific impacts of a development project under the following two circumstances: 1) As indicated previously, one improvement alternative at a deficient intersection is specifically developed to offset the direct impacts of development trips, as measured via LOS and delay comparisons. For instance, the 30-seconds in average vehicle delays gained at an intersection (operating within the LOS E/F range) as a result of project trips must be directly mitigated via these offsetting improvements. 2) Similarly, a project must develop a specific offsetting improvement to correct a two-grade LOS drop created as a result of project development.

- Partial Mitigation. The County Engineer or land use jurisdiction may allow an applicant to participate proportionately with other applicants and/or other public entities to construct improvements that are not exclusively the responsibility of any single applicant or entity. This is most typically applied for those improvement alternatives that correct intersection deficiencies to within the LOS C or higher range. The project's proportionate share of an improvement is typically determined by dividing project trip assignments along a roadway section or at an intersection by total projected volumes on a weekday basis (preferred) or via some weighted comparison of peak hourly volumes where daily counts/projections are insufficient. Partial mitigation is also assumed to be the primary technique upon which improvement/impact fees would be assigned for those projects that are already programmed within an agency's six-year program, in which development participation is being requested. The proportionate contribution may be requested via financial assistance, or the acquisition of right-of-way or construction of partial improvements (in advance of the primary improvement) to a financial equivalent equal to the proportionate contribution.