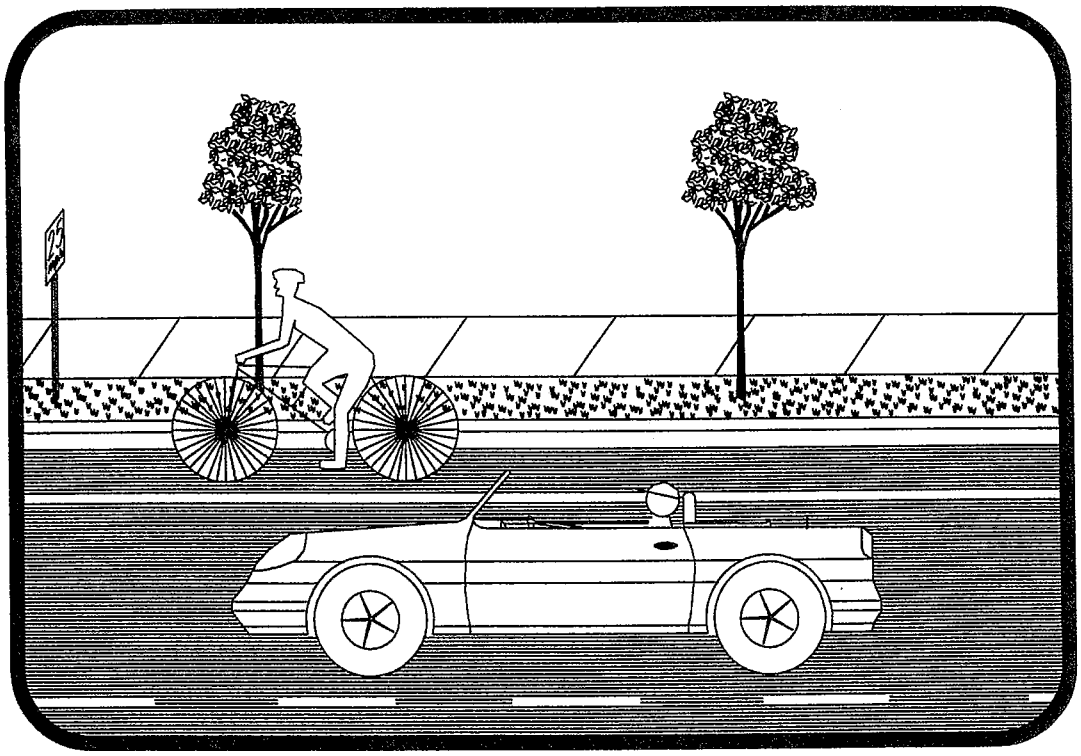
CHAPTER 5
ROAD STANDARDS

MAY 2004



WHATCOM COUNTY DEVELOPMENT STANDARDS

WHATCOM COUNTY
EXECUTIVE'S OFFICE
County Courthouse
311 Grand Avenue, Suite #108
Bellingham, WA 98225-4082

Pete Kremen
County Executive

May 17, 2004

Executive Declaration

Subject: **Approval of Whatcom County Development Standards – Chapter Five – Road Standards**

I, Pete Kremen, in my capacity as the Whatcom County Executive, hereby approve Chapter Five of the Whatcom County Development Standards regarding Road Standards, as proposed by the Technical Advisory Committee.

This approval will be on an interim basis pending the formal review and adoption of revisions to Whatcom County Code, Title 12 Construction Standards and Title 2 Administration and Personnel by the Whatcom County Council

Pete Kremen, County Executive

5-20-04
Date

PURPOSE

The general purpose of these Development Standards is to provide consistent standards and procedures under which the physical aspects of development will be implemented. The purpose is to provide:

- A safe, efficient, cost-effective, aesthetically-pleasing, and environmentally-sensitive system for the movement of motor vehicles, bicycles and pedestrians that is economical to maintain.
- Standard road design and construction elements.
- Standard requirements for the location and installation of utilities and other road-related features.
- Road geometrics and design elements conforming to current federal, state, and local requirements.

These Standards are intended neither to provide for all situations nor to be static in form or content. They are intended to assist, but not to substitute for, competent work by design professionals. Revisions to these Standards may be made when warranted by changed conditions or needs.

These Standards are not intended to limit any innovative or creative design effort. However, all variances from these Standards are subject to the approval of the County Engineer, or other designated official, based on satisfactory evidence that the proposed variance will produce an equivalent or superior result.

These Standards are to be followed except for those urban growth areas (UGA) where the applicable city standard will apply. For those instances where there is no city standard the appropriate county standard will prevail.

CHAPTER 5 - ROADS AND RELATED WORK

TABLE OF CONTENTS

Page

Page

Page

501 REGULATORY AUTHORITY

The State of Washington has enacted regulations and delegated powers to Whatcom County to control and regulate activities affecting the public and private roads systems. These regulations and powers are set forth in:

RCW 36.70 Planning Enabling Act
RCW 36.75 Roads and Bridges
RCW 36.86 Roads and Bridges - Standards
The authority for this chapter is derived by the adoption of Chapters 12.08 and 12.09 of the Whatcom County Code and several County ordinances, including:

Whatcom County Ordinance 80-001 Trail Permit
Whatcom County Ordinance 88-079 Revocable Encroachment Permit
Whatcom County Ordinance 94-018 Development Standards
Whatcom County Ordinance 94-022 Stormwater Management
Whatcom County Ordinance 96-049 Road Naming System
Whatcom County Ordinance 97-056 Critical Areas Ordinance (CAO)
Title 21 Whatcom County Subdivision Regulations
Title 20 Whatcom County Zoning Regulations

On this basis, all development within Whatcom County is subject to the road standards provisions of this chapter unless specifically exempted.

502 TECHNICAL ADMINISTRATOR

Whatcom County has designated a Technical Administrator to review and enforce both the administrative and technical aspects of the road standards. For the purpose of the provisions of this chapter, the County Engineer has been designated as the Technical Administrator. The County Engineer may delegate various review and technical functions. This designation is limited to the requirements established in this chapter.

503 EXEMPTIONS

Whatcom County ordinances recognize certain circumstances where the requirements of this chapter would be inappropriate. These circumstances include very low levels of development or activities that are covered under other ordinances and regulations. For this reason, the applicable County ordinances have fully or partially exempted certain development activities from the requirements of this chapter. In most cases, these activities are subject to other ordinances, restrictions and requirements.

The following activities are exempt:

1. Development undertaken by the Washington State Department of Transportation (hereinafter called “WSDOT”) in State Highway rights-of-way when regulated by Chapter 173-270 WAC, the Puget Sound Highway Runoff Program.

2. Agricultural Activities, as defined in RCW 7.48.300.

3. Forest Practices (except Class IV General Forest Practices).

Because these exemptions are general in nature, owners are encouraged to discuss proposed projects with County staff to determine which regulations and requirements apply.

504 GENERAL CONSIDERATIONS

A. Shortened Designation

These Whatcom County Road Standards shall be cited routinely in the text as "Standards."

B. Applicability

These Standards shall apply to all public and private development actions in unincorporated Whatcom County. Moreover, persons involved with the following actions or permits shall be required to demonstrate compliance with the requirements of these Standards prior to County approval and/or commencement of construction work:

1. Flood Control Zone permits.

2. Substantial Development permits as required by the Whatcom County Shorelines Substantial Management Program.

3. Short and long subdivision approvals, lot line adjustments, and exemptions.

4. Industrial and commercial building permits.

5. Planned unit developments and binding site plans.

6. Conditional use and Major development permits, Administrative approvals and variances.

7. Revocable Encroachment permits.

8. Trail permits.

9. County construction, reconstruction, and gravel road conversion projects done by private contract or by county forces. Routine county rehabilitation, restoration and resurfacing work, and emergency repairs are excluded.

10. Forest practices, as defined in Chapter 76.09 RCW, where (a) the application therefore submitted to the Washington State Department of Natural Resources, as now or hereinafter amended, indicates that the lands will be converted to a use other than commercial timber production, or (b) the forest practice is to occur on lands that have been platted after January 1, 1960, as provided in chapter 58.17 RCW (see RCW 76.09.240).

C. References

These Standards, when implemented, are intended to be consistent with:

1. Whatcom County Code
   - Title 16, Environmental Policy
   - Title 17, Flood Damage Prevention
   - Title 18, Shoreline Management Program
   - Title 20, Zoning
   - Title 21, Subdivisions
   - Title 22, Guide Meridian

2. Whatcom County Comprehensive Land Use Plan.

3. Washington State County Design Standards as adopted per RCW 43.32.020.

4. WSDOT "Local Agency Guidelines."

5. State of Washington Shoreline Management Act.

6. National and State Environmental Policy Acts.

7. State of Washington Growth Management Act.

8. Whatcom County Bicycle Plan, adopted May 6, 2003 or current revision.

D. Adopted County Specifications

Except as otherwise provided in these Standards, design detail, workmanship, and materials shall be in accordance with the relevant sections of the following:

1. All chapters of the Whatcom County Development Standards.

2. WSDOT "Standard Specifications for Road, Bridge and Municipal Construction" - current edition. These will be referred to as "State Standard Specifications."

3. WSDOT "Standard Plans for Road and Bridge Construction" - current edition, hereinafter referred to as "State Standard Plans."

4. WSDOT "Design Manual" – current edition.

E. Other County Specifications

The following specifications may also be followed when specifically cited by these Standards, when required by a higher level funding authority having jurisdiction, or in the absence of specific standards when applicable and approved by the County Engineer.

1. "U.S. Department of Transportation Manual on Uniform Traffic Control Devices for Roads and Highways” - current edition as amended and approved by WSDOT, hereinafter referred to as "MUTCD."

2. "Standard Specifications for Highway Bridges” - current edition adopted by the American Association of State Highway and Transportation Officials, hereinafter referred to as the " AASHTO Bridge Specifications."

3. "Washington State Department of Transportation Highway Hydraulic Manual" - current edition, hereinafter referred to as "WSDOT Hydraulic Manual."

4. “Washington State Department of Transportation Construction Manual” – current edition.

5. "Urban Hydrology for Small Watersheds-Technical Release No.55 - U.S. Department of Agriculture, Soil Conservation Service, 1975," hereinafter referred to as "SCS Technical Release No. 55."

6. "NOAA Atlas 2 Precipitation-Frequency Atlas of the Western United States – Vol. IX, Washington," Soil Conservation Service - current edition.

7. "Storm Drainage Control - Storm Water Management Practices," King County Department of Public Works, Division of Public Works, Division of Hydraulics - current edition.

8. "Urban Storm Water Management-Special Report No. 49 American Public Works Association."

9. "Uniform Building Code,” - current edition, hereinafter referred to as "UBC."

10. "A Policy on Geometric Design of Highway and Streets” - current edition AASHTO.

11. "Geometric Design Guide for Local Roads and Streets, Parts I and II, current edition AASHTO," hereinafter referred to as the "AASHTO."

12. "Highway Functional Classification-Concepts, Criteria and Procedures," U.S. Department of Transportation, current edition.

13. “Pedestrian Facilities Guide Book,” Washington State Department of Transportation, 1997.

14. ITE - Traffic Calming: State of the Practice (Aug. 1999).

F. Variances

Administrative Variance Procedure. Alternatives to any specific requirement of the development standards may be considered through an administrative variance procedure. The Technical Administrator will be responsible for reviewing applications for variances to the development standards and shall be responsible for making variance determinations. Variances to Whatcom County Development Standards may be issued upon receipt of technical documentation acknowledging that minimum performance requirements will be met.

1. Criteria for Variance Approval

    a) The resulting variance provides an equivalent outcome, conforming to the minimum performance requirements, and the objectives of safety, function, environmental protection, and facility maintenance are fully met, based upon sound engineering principles; and

    b) there are special physical circumstances or conditions affecting the property such that the strict application of these provisions would deprive the applicant of all reasonable use of the parcel of land in question and every effort to find creative ways to meet the intent of the minimum performance requirements have been made; and

    c) the granting of the variance will not be detrimental to the public health and welfare, nor injurious to other properties in the vicinity; and

    d) the variance is the least possible exception that could be granted to comply with the intent of the minimum performance requirements.

2. Any variance request must be made to the Technical Administrator. The Technical Administrator will establish the minimum informational requirements that shall be specified for each issue. No variance shall be issued which has the overall impact of reducing safety standards, levels of service, or which will not comply with the intent of Whatcom County regulations.

3. An administrative variance to the Standards will be subject to a fee per the Uniform Fee Schedule.

G. Appeals

The applicant may appeal any final decision of the Technical Administrator. The appeal shall be made to the Technical Advisory Committee (TAC). Refer to Whatcom County Code 12.08.027. Appeals.

H. Issuance of Building Permits

Building permits may be issued prior to substantial completion of the required development improvements if the County Engineer, with the concurrence of the Building Official, finds that the issuance and subsequent building construction does not interfere with emergency accessibility or the completion of improvements. In this case, occupancy will not be allowed until the improvements are completed.

I. Severability

If any of these Standards, as established by ordinance, shall be found invalid, all other parts shall remain in effect.

505 ROAD TYPES AND GEOMETRICS

A. General

County roads are classified as urban and rural. Within the classifications of urban and rural, county roads are further divided by the function they provide as indicated in Sections 505.B through D (definitions are provided in Section 515). Classifications of roads are determined in part by rights-of-way, road width, and other geometric factors. The classification is further refined based on the function of these roads with secondary consideration(s) given to access/intersection spacing, and average daily traffic (ADT).

B. Rural Roads

Routes that serve rural land areas and land-uses outside the urban growth areas. They typically require a shoulder and use open ditch(es) for drainage. These routes are generally classified by function and ADT, as shown in Tables 1 and 2.

Rural roads serving development(s) with urban type densities shall conform to the applicable urban street standards.

C. Urban Streets

Urban streets serve single and multi-family residential, commercial, industrial and similarly dense developments that are normally within the urban growth area and are typically one net acre or less in size. Urban streets typically require curbs and gutters with catch basins and underground drainage systems. These routes are generally classified by function and ADT, as shown in Tables 1 and 2.

Certain exceptions to the curb/gutter and shoulder/open ditch standards may apply where site-specific conditions warrant it.

TABLE 1 - ARTERIAL ROADS

CLASSIFICATION		PRINCIPAL ARTERIALS		MINOR ARTERIALS		COLLECTOR ARTERIALS OR COLLECTORS			
FUNCTION		Inter-community highways connecting largest community centers and facilities.		Intra-community highways connecting community centers and facilities.		Intra-community highways connecting residential neighborhoods with community centers and facilities			
Access		Controlled with very restricted access to abutting properties.		Controlled with infrequent access to abutting properties.		Partially controlled with limited access to abutting properties.			Controlled with infrequent access to abutting properties.
Land Use Area		**Rural**	**Urban**	**Rural**	**Urban**	**Rural**			**Urban**
Subcategory		--		--		Major	Minor		--
Intersection Spacing		2–5 miles		2-3 miles	Under 2 miles	Under 2 miles			
ADT [1]		>8000	>10,000	>2000	>4000	>2000	400-2000	<400	1001-4000
CRITERIA									
Design Speed (mph) [2]		40-60	40-60	40-60	40-60	40-50	35-50	35-50	35-50
Maximum Superelevation (%)		6	6	6	6	4	4	4	4
Horizontal Curvature		See Section 505.I							
Maximum Grade (%)[3]		9	9	10	10	10	10	10	12
Standard Sight Distance		See Section 505.H							
Minimum Traveled Way (Ft)	2-Lane	24	24	24	24	24	24	22	24
	4-Lane	46	46	44	44	--	--	--	--
	5-Lane	58	58	56	56	--	--	--	--
Minimum Roadway Width	2-Lane	40	34[5]	40	34[5]	40	36[4,5]	32[4,5]	34[4,5]
	4-Lane	62	56[5]	60	54[5]	--	--	--	--
	5-Lane	74	68[5]	72	66[5]	--	--	--	--
Type of Curb, Shoulder, & Drainage [7,8] (width in Ft)		8' shoulder & ditch [6]	Vertical curb, gutter, & storm sewer	8' shoulder & ditch [6]	Vertical curb, gutter, & storm sewer	8' shoulder & ditch [6]	6' shoulder & ditch [6]	6' shoulder & ditch [6]	Vertical curb, gutter, & storm sewer
Minimum Rights-of-way (Ft) [9]	2-Lane	60	60	60	60	60	60	60	60
	4-Lane	80	70	80	60	--	--	--	--
	5-Lane	100	80	100	80	--	--	--	--
Bicycle Facilities Required		Yes – see Drawing 508.C-1	Yes – see Drawing 508.C-1	Yes – see Drawing 508.C-1	Yes – see Drawing 508.C-1	Yes – see Drawing 508.C-1	Yes – see Drawing 508.C-1	Yes – see Drawing 508.C-1	Yes – see Drawing 508.C-1
Parking Allowed		No	No	No	No	Yes	Yes	Yes	Yes
Standard Structural Section		See Drawing 505.B-3	See Drawing 505.D-1	See Drawing 505.B-3	See Drawing 505.D-1	See Drawing 505.B-3	See Drawing 505.B-3	See Drawing 505.B-3	See Drawing 505.D-1

1. ADT shall be based on a study area build-out or design life of the roadway with a minimum 20-year traffic projection.
2. Design speed is a basis for determining geometric design and other geometric elements, but does not imply posted or legally permissible speeds.
3. Maximum grades may be exceeded, subject to the County Engineer's approval, provided that:
   a) No practical alternative exists.
   b) Grades exceeding the maximum listed above may be approved by the County Engineer, but shall not exceed 18%.
   c) Any grade of 12% or over shall extend no further than 600 feet without being interrupted by an intersection or a switch-back, with a maximum 8 foot difference in elevation over a distance of 100 feet.
   d) Any grade over 15% shall be paved with grooved Portland cement concrete.
4. No Parking allowed without additional 8 feet for parking one side or an additional 16 feet for parking on both sides.
5. Includes additional pavement to provide for two 5-foot bikeways.
6. Shoulder width specified shall be paved, including 1-foot gravel shoulder.
7. Rural shoulder widths shall be used when ¾ frontage improvements are required.
8. Shoulders shall be widened 2 feet where guardrail is planned.
9. Rights-of-way widths shall increase where warranted by geometric requirements.

TABLE 2 – RESIDENTIAL ROADS

CLASSIFICATION	**NEIGHBORHOOD COLLECTOR**		**LOCAL ACCESS**		**MINOR ACCESS**	
FUNCTION	Streets connecting two or more neighborhoods and typically connecting to higher classification roads or other collectors.		Streets providing circulation within neighborhoods typically connecting to neighborhood collectors.		Permanent cul-de-sacs or loops, with low traffic, providing circulation and access to off-street parking within residential developments.	
Public or Private	Public		Public		Public or Private	
Access	Restricted, lots front Local Access where feasible.		As needed, with minimal restrictions.		As needed.	
Land Use Area	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**
Intersection Spacing (Ft)	300		150		150	
ADT [1]	>1000	>1000	161-1000	161-1000	≤ 160	≤ 160
CRITERIA						
Design Speed (MPH) [2,12]	35-45	35-45	25-45	25-45[12]	25-35	25-35[12]
Minimum Superelevation (%)	2	2	2	2	2	2
Horizontal Curvature	See Section 505.I.					
Maximum Grade (%) [3]	12	12	15	15	15	15
Standard Sight Distance	See Section 505.H.					
Minimum Traveled Way (Ft)	24	24	22	24	20	24
Minimum Roadway (Ft)	36[4, 6]	32[4, 6]	30[6]	28[14] / 24[13]	26[6]	24[14] / 22[13]
Type of Curb, Shoulder, & Drainage (width in Ft) [7,8]	6' shoulder & ditch[5]	Vertical curb, gutter, & storm sewer	4' gravel shoulder & ditch	Rolled or Vertical curb, gutter, & storm sewer	3' gravel shoulder & ditch	Rolled or Vertical curb, gutter, & storm sewer
Minimum Rights-of-way (Ft) [9]	60	60	60	50	50	40
Minimum One-way (Ft) [10]	14	14[11]	14	14	14	14
Roadway Pocket Parking (Ft)	See Drawing 505.C-2.					
Traffic Calming Devices	NA	NA	NA	Section R	NA	Section R
Bicycle Facilities Required	Yes – see Drawing 508.C-1	Yes – see Drawing 508.C-1	No	No	No	No
Parking Allowed	Yes	Yes	Yes	Yes	Yes	Yes
Standard Structural Section	See Drawing 505.B-2	See Drawing 505.C-3	See Drawing 505.B-1	See Drawing 505.C-1	See Drawing 505.B-1	See Drawing 505.C-1

1. ADT shall be based on a study area build-out or design life of the roadway with a minimum 20-year traffic projection.
2. Design speed is a basis for determining geometric design and other geometric elements, but does not imply posted or legally permissible speeds.
3. Maximum grades may be exceeded, subject to the County Engineer's approval, provided that:
   a) No practical alternative exists.
   b) Grades exceeding the maximum listed above may be approved by the County Engineer, but shall not exceed 18%.
   c) Any grade of 12% or over shall extend no further than 600 feet without being interrupted by an intersection or a switch-back, with a maximum 8-foot difference in elevation over a distance of 100 feet.
   d) Any grade over 15% shall be paved with grooved Portland cement concrete.
4. Includes additional pavement to provide for two 5-foot bikeways.
5. Shoulder width specified shall be paved, including 1-foot gravel shoulder.
6. No parking allowed without additional 8 feet for parking on one side or an additional 16 feet for parking on both sides.
7. Rural shoulder widths shall be used when 3/4 frontage improvements are required.
8. Shoulders shall be widened 2 feet where guardrail is planned.
9. Rights-of-way widths shall increase where warranted by geometric requirements.
10. Each lane shall be considered one-way when medians are used.
11. Includes 5-foot bicycle lane.
12. Design speeds may be reduced based on limitations imposed by traffic calming.
13. Add 7 feet for pocket parking per side.
14. On street parking allowed.

D. Commercial and Industrial Streets

Streets serving commercial/industrial-zoned property shall meet the standards shown in Table 3. All other streets whose volumes exceed 5% AWDT Truck Traffic shall also meet the standards shown in Table 3.

TABLE 3 - COMMERCIAL AND INDUSTRIAL STREETS

Land Use Area	Urban	Rural
Design Speed (mph)	35	35
Maximum Grade (%)	10	10
Minimum Traveled Way (Ft.)	24	24
Minimum Roadway (Ft.)	40	24 ft. + shoulder
Type of Curb, Shoulder, & Drainage	Vertical curb, gutter, & storm sewer	Paved shoulder (see Tables 1 & 2 for width) with ditch section
Minimum Rights-of-way (Ft.)	60	60
Inside Radius (Ft.)	35-55	35-55
Standard Structural Section	See Drawing 505.D-1	See Drawing 505.D-2

The width must be sufficient to accommodate both through traffic and local truck movements such as backing, turning, and positioning for loading. A roadway base and surfacing design will be required to determine surfacing depths (see Section 510.C). The street ends shall be a cul-de-sac and conform to Section 505.L-1 as a minimum, or larger to accommodate truck traffic.

E. Private Roads and Streets

Roads/streets that are privately owned, generally within an easement providing direct access to private land(s) for local traffic movement and connect to local public access, collectors or arterial roads/streets. Private roads/streets are maintained with private funds and where the county, municipality or WSDOT performs no maintenance.

Criteria for Authorization: Private roads/streets may be permitted when so provided in appropriate ordinances or at the discretion of the County Engineer when:

1. Covenants have been approved and recorded with the County which provide for maintenance of the private streets and associated parking areas by owners in the development, including placing of liens for non-payment of fees, and/or road maintenance agreement(s) on the face of the Long Plat, Short Plat, or Binding Site Plan.

2. Provision is made for the roads to be open at all times for emergency and public service vehicle use.

3. The private road is not needed as a public road and will not obstruct public street circulation.

4. The roads are within a private community with a corporate identity or Homeowners Association, as identified by the State of Washington under RCW 64.38.

5. Intersection spacing between private roads shall be consistent with the spacing shown in Section 505.M.

Criteria for Construction: Private roads/streets shall conform to the applicable sections of these Standards. See Drawings 505.E-1 and 505.E-2.

F. P.U.D. Streets

All streets within planned unit developments shall be consistent with street and rights-of-way widths, geometrics and other requirements for street design and construction of these standards. The minimum rights-of-way and pavement width for private and public access streets exclusively serving the needs of a planned unit development may be reduced if adequate consideration is made during the review of a planned unit development proposal of the following factors:

1. Provision of off-street parking.

2. Restriction of on-street parking.

3. Provision of adequate clearance for emergency vehicles.

4. Provision of clear vision at intersections.

5. Minimum sidewalk on one side of the street provided that an alternative bicycle and/or pedestrian path is substituted for the other sidewalk.

6. The traveled roadway needs to be adequate for the anticipated traffic volume(s).

7. Provisions of adequate utility easements outside of roadway.

8. Future revision or extension of street is not contemplated.

G. Expressways and Other Higher Classification Roads

In the instance where State or Federal standards exceed these Standards, State and Federal standards shall govern.

H. Sight Distance

1. Stopping Sight Distance is the sum of the distance traversed by the vehicle from the instant the driver sights an object necessitating a stop to

the instant the brakes are applied and the distance needed to stop the vehicle from the instant brake application begins. Roadway geometrics shall be designed to provide sight distance equaling or exceeding the values given in Table 4. Stopping sight distance is measured from an eye height of 3.50 feet to an object height of 0.50 feet.

TABLE 4 - DESIGN STOPPING SIGHT DISTANCE ON GRADES

Design Speed (mph)	Stopping Sight Distance (ft)						
	Level	Down Grade			Up Grade		
	0%	-3%	-6%	-9%	3%	6%	9%
25	155	158	165	173	147	143	140
30	200	205	215	227	190	184	179
35	250	258	271	288	237	229	222
40	305	315	333	354	289	278	269
45	360	378	401	428	345	331	320
50	425	447	474	508	405	389	375
55	495	520	553	594	470	450	433
60	570	599	638	687	539	515	495
65	645	683	729	786	612	585	561
70	730	772	826	892	690	658	631
80	910	966	1037	1123	860	818	782

Note: Source of Table is WSDOT Design Manual – English Version.

For stopping sight distances on grades between those listed, interpolate between the values given.

2. Passing Sight Distance for the use in design should be determined on the basis of the length needed to complete normal passing maneuvers in which the passing driver can determine that there are no potentially conflicting vehicles ahead before beginning the maneuver. Passing sight distance for arterials and collectors shall equal or exceed the values given in Table 5. (Sight distance is measured from an eye height of 3.50 feet and an object height of 4.25 feet.)

TABLE 5 - MINIMUM PASSING SIGHT DISTANCE

Design Speed (mph)	Passing Sight Distance (ft)
35	1280
40	1475
50	1770
60	2065

Note: Source of table is WSDOT Design Manual – English Version.

3. Minimum Sight Distance at Intersections – The driver of a vehicle approaching an intersection should have an unobstructed view of the entire intersection, including any traffic-control devices sufficient to permit the driver to anticipate and avoid potential collisions. Sight distance is also provided at intersections to allow the drivers of stopped vehicles a sufficient view of the intersecting road to decide when to enter the intersecting roadway or to cross it. Roadways or driveway approaches intersecting with other roadways shall be designed to provide sight distances equaling or exceeding the values given in Table 6. Corner sight distance is measured 18 feet from the edge of the intersection-traveled roadway and from an eye height of 3.50 feet and an object height of 4.25 feet. For driveway sight distance see Appendix J, Intersection Sight Distance Process Guideline.

TABLE 6 - Minimum Sight Distance at Intersections

Design Speed (mph)	Intersection Sight Distance (ft)
25	300
30	380
35	480
40	590
45	730
50	860
60	1,150

Note: Source of table is WSDOT Design Manual – English Version.

I. Roadway Alignment

Horizontal and vertical alignments are the primary controlling elements for roadway design. It is important to coordinate these two elements with design speed, sight distance, drainage, intersection design, and aesthetics, land use, physical and environmental features, and availability of rights-of-way in the early stages of design.

1. Design Considerations for Arterial/Collector Roads and Streets

   a) Make the roadway alignment as direct as possible and still blend with the topography while considering developed and undeveloped properties, community boundaries, and environmental concerns.

   b) Make the roadway alignment consistent by using gentle curves at the end of long tangents using a transition area of moderate curvature between the large radius curves of rural areas and the small radius curves of populated areas, making horizontal curves visible to approaching traffic.

c) Avoid minimum radii and short curves unless restrictive conditions are present and are not readily or economically avoidable. On two-lane highways, minimum radii will result in tangent sections long enough for needed passing.

d) Avoid any abrupt change in alignment and design reverse curves with an intervening tangent long enough for complete superelevation transition for both curves.

e) Avoid the use of curves in the same direction connected by short tangents (broken back curves); substitute a single larger curve.

f) Avoid compound curves in the road alignment if a simple curve can be obtained.

2. Design Considerations for Local/Minor Access Roads and Streets

a) Local streets should be designed to carry low traffic volumes at low speeds and to function safely while minimizing the need for extensive traffic regulations, control devices, and enforcement. A successful design will result in traffic calming and reduce the need for future installation of traffic calming measures.

b) Street design should be responsive to topography and should avoid or minimize impacts to natural features, water-related resources, and wildlife corridors.

c) Minimum radii curves may be used to slow traffic.

d) Tangents between reverse curves and superelevation are not a necessity for low speed residential streets.

e) Local street alignment should be designed to efficiently and safely accommodate the typical emergency vehicle.

f) Street alignment should be pedestrian and bicycle friendly.

g) Roadways should be compatible with the aesthetics of the neighborhood.

3. Horizontal Curves - The Design Engineer shall employ horizontal curves consistent with design speed(s) shown in Tables 1 and 2. A lower design speed may be used by administrative variance in special instances where restrictive conditions are present and mitigated appropriately, including signage and other traffic control measures per MUTCD.

Design speed is the governing element of horizontal curves.

Use the following factors to determine the radius for a curve:

a) Stopping sight distance where sight obstructions are on the inside of a curve. The following are examples of sight obstructions: median barrier, bridges, walls, cut slopes, wooded areas, buildings, and guardrail. See Section 505.H for minimum stopping sight distance for the selected design speed.

b) Superelevation is the rotation or banking of the roadway cross-section to overcome part of the centrifugal force that acts on a vehicle traversing a curve.

c) Avoid simultaneous changes in vertical and horizontal alignment.

d) Areas of historically-sustained ice and snow conditions may require a modified composite side friction factor.

The minimum horizontal curve radius shall be determined as follows:

$R = V^2 \div 15 (e+f)$ (from AASHTO – A Policy on Geometric Design of Highways and Streets, 2001)

Where:

R = Minimum Horizontal Radius centerline, in feet
V = Design speed in miles per hour (mph)
e = Superelevation (road section cross slope), in feet per foot
f = Composite side friction factor
(Note: For a 2% standard crown through a curve section e = -0.02)

Radii shall be rounded to the nearest multiple of five (5) feet. Curves are to be expressed using radii in feet.

TABLE 7 - LOW SPEED URBAN STREETS DESIGN VALUES

		Minimum Radius for Given Superelevation (ft)			
Design Speed	**Max. f**	**0%**	**2%**	**4%**	**6%**
25	0.252	165	155	145	135
30	0.221	275	250	230	215
35	0.197	415	375	345	320
40	0.178	600	540	490	450

Source: AASHTO – A policy on Geometric Design of Highways and Streets, 2001.

TABLE 8 - RURAL ROAD AND HIGH SPEED URBAN DESIGN VALUES

		0% Superelevation		2% Superelevation	
Design Speed	**Max. f**	**e+f**	**Minimum Radius (ft)**	**e+f**	**Minimum Radius (ft)**
25	0.165	0.165	255	0.185	225
30	0.160	0.160	375	0.180	335
35	0.155	0.155	530	0.175	470
40	0.150	0.150	710	0.170	630
45	0.145	0.145	930	0.165	820
50	0.140	0.140	1190	0.160	1040
55	0.130	0.130	1550	0.150	1345
60	0.120	0.120	2000	0.140	1715

Source: Derived from Exhibit 3-14, Page 145 , AASHTO – A policy on Geometric Design of Highways and Streets, 2001.

4. Vertical Curves - Symmetric, parabolic curves shall be used.

The minimum length of vertical curve shall be computed from the formula:

L= KA (from AASHTO – A policy on Geometric Design of Highways and Streets, 2001)

Where L= The length of vertical curve, in feet
K= Constant
A= The algebraic difference in grades, in percent

K is a constant for each design speed and its selection for crest vertical curves is based on stopping sight distance requirements. For sag vertical curves, K is based on headlight stopping distance. The following K values (shown in Table 9) for crest and sag curves at various design speeds shall be used.

TABLE 9 - DESIGN VALUES K VALUES

Design Speed (mph)	Crest Curve	Sag
25	12	26
30	19	37
35	29	49
40	44	64
45	61	79
50	84	96
55	114	115
60	151	136

Source: AASHTO – A Policy on Geometric Design of Highways and Streets, 2001.

Vertical curves shall be of sufficient length to provide minimum sight distance, refer to Section 505.H for minimum sight distance.

5. Minimum Street Grades - Straight sections of roadway shall have a minimum grade of 0.5% provided that roadways with grades between 0.5% and 0.8% shall have an integral curb and gutter (see Section 508.F). Straight sections of roadway may have a grade less than 0.5% if the pavement is Portland cement concrete.

J. Side Slopes

1. Earth side slopes in cut or fill sections shall be constructed no steeper than 2 (H) to 1 (V) and a maximum of 15 vertical feet. Steeper slopes or other measures may be allowed based on a geotechnical engineering report. Areas prone to or showing signs of instability will require a geotechnical engineering report.

2. Side slopes shall be stabilized by grass sod or seeding, or by other planting or surfacing materials acceptable to the County Engineer.

3. Side Slopes shall meet the clear zone requirements specified in Section 505.S of this chapter.

K. Medians

Medians are an optional design feature and shall be additional to, not part of, the specified width of traveled way. Medians shall have vertical curbs and be a minimum of five (5) feet in width from back of curb to back of curb (see Drawing 505.K-1).

Medians may be grassed, landscaped, or surfaced with aggregate. Medians shall be designed so as not to limit turning radii or sight distance at intersections. Plants used for landscaping shall: have no branches or foliage between two (2) feet and seven (7) feet in height above the road surface; trees shall have a maximum trunk diameter (caliper) of four (4) inches at maturity; and not extend beyond the back of curb. Additional rights-of-way shall be provided for the median. The Homeowners' Association or individual homeowners shall maintain any vegetation and associated irrigation. For further details on landscaping see Section 508.M and Whatcom County's approved plant list in Appendix I.

L. Street and Road Ends

1. Cul-de-sacs shall be provided at all public street ends (see Drawing 505.L-1).

Criteria:

a) Minimum rights-of-way width across bulb section shall be l00 feet. Minimum pavement width across bulb: 88 feet in urban curb and gutter section (flow line to flow line); 80 feet in the rural areas with a 5/8 inch minus crushed surfacing top course shoulder of four (4) feet in width and a drainage ditch section beyond the shoulder.

b) Cul-de-sac Island - Optional feature providing at least 20 feet of paved travel way in a curb and gutter section around circumference. The island shall have concrete vertical curb and be grassed or landscaped. It shall be maintained by the Homeowners' Association or adjoining lot owners.

2. No maximum length is given on cul-de-sacs; however, for roads greater than 1000 feet, turnarounds shall be provided at the approximate midpoint or at 1000 foot intervals, whichever is less.

3. Cul-de-sacs will serve no more than 50 residential units or 500 ADT.

4. Turnarounds (other than cul-de-sacs). Turnarounds may be used on private roads and non-maintained County rights-of-way, provided the street serves single-family detached dwelling units, including Accessory Dwelling Units, is over 150 feet in length and does not exceed 120 ADT. All other residential uses may use the provision of turnaround(s) with appropriate internal circulation patterns.

   Minimum length per leg shall be 60 feet from the centerline as shown on Drawing 505.L-2.

5. Temporary Dead Ends. Where a street is temporarily dead-ended, provisions for a turnaround must be provided where the road is longer than 150 feet. The turnaround may be a hammerhead or a cul-de-sac with gravel crushed rock surfacing.

6. Partial cul-de-sac (eyebrows). The use of eyebrows on residential streets may be provided within the public rights-of-way to facilitate driveway access. Residential access from an eyebrow may not exceed six (6) dwelling units. Eyebrows shall conform to the provisions of Section 505.L-1 (a and b).

M. Intersections

Intersections of roads shall be designed in accordance with the following criteria:

1.	Angle of intersection	85° to 95°
2.	Minimum centerline radius (2-lane)	55 feet

3. Minimum curb radius 35 feet
(reduce to 25 feet for minor and local accesses)

4. Minimum property line radius 25 feet

5. Minimum stopping sight distance See Section 505.H

6. Minimum centerline offset of adjacent roads/streets from an intersection or low speed curve:

   a) All access streets crossing or connecting to access streets: 150 feet.

   b) Access streets, neighborhood collectors and collector streets, crossing or connecting to any neighborhood collector, collector or arterial; or arterials intersecting arterials: 300 feet.

7. On sloping approaches at an intersection, landings shall not exceed three percent for a minimum distance of 30 feet approaching an arterial or collector, or five (5) percent for a minimum distance of 20 feet approaching a residential street, measured from the nearest edge of travel way of the intersecting street.

N. Connections of State Highway and New Roads

The developer shall prepare and submit to the County Engineer a design of the proposed State Highway Intersection acceptable to the WSDOT. WSDOT approval of the proposed design must be received prior to the filing of the plat or construction. Improvements of the State Highway are to be the responsibility of the developer, and they may either be constructed or a bond posted to cover the cost of such improvements. The bond shall be furnished to the County Engineer or to WSDOT in the amount as determined by the County Engineer and WSDOT.

O. Railroad Grade Crossings

"At-grade" crossings are discouraged and should not be allowed unless the applicant can demonstrate that they are the only feasible alternative.

The crossings shall be designed in accordance with the current WSDOT Design Manual. Standard signs and markings in accordance with the MUTCD shall be installed at all railroad-street grade crossings.

Flashing light signals and gates which indicate the approach or presence of trains shall be installed at those railroad-street crossings where studies which are required by the County Engineer indicate the need of warning beyond that provided by standard signs and markings.

P. Dedications and Easements

1. Rights-of-way shall be dedicated for streets and other improvements as required per Sections 505.B through G to accommodate motorized and non-motorized transportation, parking, and utility requirements. The minimum rights-of-way requirements for all roads and streets shall be in accordance with the widths indicated in Section 505.

   Rights-of-way widths greater than 60 feet may be required along state routes or county roads where geometric factors warrant.

2. Easements shall be provided for all public systems or public utilities when they cannot be located within the public rights-of-way.

3. Non-Motorized Access Easements (see Section 508).

4. In short subdivisions, minimum private roadway easement width shall be 30 feet or as shown on Drawing 505.E-1 and E-2. In addition, rights-of-way may be required to be dedicated as permitted by State law as a condition of approval of the short subdivision to provide additional width to conform to minimum standards where the short plat abuts an existing public street or to provide rights-of-way for the extension of existing public streets or new streets to provide compatibility with the area's circulation system.

Q. Frontage Improvements

Improvements to roadways adjacent to a development, including offsite transitions to the existing roadway (tapers to be not less than 10:1), shall be consistent with Section 507-Road Design and Construction Plans, and shall comply with the following provisions:

1. Rural Frontage Improvements are equal to one-half the total pavement width for the road classification with appropriate shoulder along the subject property together with a minimum 10-foot paved lane and a four (4)-foot gravel shoulder to the opposite side of the subject property (three-quarter frontage improvements). An overlay of two (2) inches minimum Class B asphalt concrete may be required, unless the applicant submits an engineering report demonstrating that the existing pavement surface is structurally competent for the design loads.

2. Urban Frontage Improvements are equal to one-half the total pavement width for the road classification with curb, gutter and sidewalk installed along the subject property together with a minimum 10-foot paved lane and a four (4)-foot gravel shoulder to the opposite side of the subject property (three-quarter frontage improvements). An overlay of two (2) inches minimum Class B asphalt concrete may be required, unless the

applicant submits an engineering report demonstrating that the existing pavement surface is structurally competent for the design loads.

3. Urban Growth Area and Water and Sewer Service Extensions: projects using city services may be required to use city standards and participate in traffic impact fees and/or mitigation.

R. Traffic Calming Devices

Traffic calming consists of safe physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users.

Traffic calming is encouraged in neighborhoods on local and minor urban access streets to promote safe and pleasant conditions for motorists, bicyclists, pedestrians, and other non-motorized means of transportation on residential streets.

All traffic calming devices shall be designed by a professional engineer and approved by the County Engineer.

Traffic calming objectives include:

- achieving slow speeds for motor vehicles;
- reducing collision frequency and severity;
- increasing the safety and the perception of safety for non-motorized users of the street(s);
- reducing the need for police enforcement;
- enhancing the street environment (e.g., streetscape);
- increasing access for all modes of transportation; and
- reducing cut-through motor vehicle traffic.

Any of the following traffic calming measures can be used separately or in combination.

1. Raised Crosswalks are raised and flat-topped with crosswalk markings and signage for pedestrian crossings, providing a level street crossing from sidewalk to sidewalk. Raised crosswalks are generally only used with some form of intersection control such as a stop sign or traffic signal.

2. Textured Pavement, such as brick or stone surfaces, cause drivers to have a slightly bumpy ride over an extended distance, while improving the aesthetic quality of the street environment.

3. Traffic Circles are islands, placed in intersections around which traffic circulates. These should be constructed with vertical curbs. Some may use rolled curb with short distance of textured surface to accommodate larger truck turns. Traffic circle landscaping involves consideration of irrigation and long-term maintenance.

4. Roundabouts require traffic to circulate counterclockwise around a center island. Unlike traffic circles, roundabouts are used on higher volume streets to allocate rights-of-way among competing movements.

5. Chicanes are curb extensions or islands that alternate from one side of the street to the other, forming S-shaped curves.

6. Other reasonable engineered traffic calming techniques.

S. Clear Zone

1. Analysis - Clear zone is that roadside border area starting at the edge of the traveled lane that is available for safe use by errant vehicles. The available clear zone is the distance measured in feet normal to the roadway beginning at the edge of the traveled way to the closest part of any fixed object. Traffic control signs and luminaries with breakaway supports are not considered hazardous for the purpose of defining the available clear zone distance. The required clear zone is a function of the posted speed, side slope, and traffic volume. Clear zone distances, as found in Chapter 700, Roadside Safety, of the WSDOT Design Manual shall be used as a guide for evaluation and placement of roadside features within the county rights-of-way.

   In urban conditions, with travel speeds of 35 mph or less, it is desirable to place any rigid object as far away as possible from the edge of the travel lane, such as beyond the sidewalk or at the edge of the right-of-way. Where this cannot be accomplished, the minimum clear zone distance is established at 10 feet beyond the edge of traveled way or 24 inches beyond the face of the curb.

   For travel speeds greater than 35 mph, clear zone distances are contained within Chapter 700 of the WSDOT Design Manual.

2. Hazards - There are three general categories of hazards: embankment hazards, objects, and water.

   a) Embankment Hazards - Evaluation of embankments for guardrail installations shall be in accordance with Chapters 700 and 710 of the WSDOT Design Manual. Height and slope of embankments are the basic factors in determining barrier needs for a fill section. The preferred mitigation, over the installation of a traffic barrier, is the flattening of the side slopes where it is feasible.

   b) Objects - When feasible, objects that are hazards, as determined by the County Engineer, should be removed. Other mitigative measures include relocating an object outside of the clear zone,

reducing the hazard such as using an appropriate breakaway feature, and installing a traffic barrier or earth berm.

c) Water - Open water with a depth of two (2) feet or more and located within the clear zone shall be considered a hazard and require mitigation.

T. Traffic Barriers

Traffic barriers are used to reduce the severity of accidents that may occur when an errant vehicle leaves the traveled way. However, traffic barriers are obstacles that the vehicles will encounter and shall only be used when justified by accident history or the criteria in Section S of this chapter.

Traffic barriers shall be designed and installed consistent with the performance standards specified in the WSDOT Design Manual, Section 710.

U. Special District Road Widths

In recognition of the need to reduce stormwater runoff by limiting new impervious area in the locations designated special districts, developers shall work with design professionals to reduce stormwater runoff by presenting low impact alternatives to the standard road design.

Drawings 505.U-1 to 505.U-5 show recommendations for road widths based on users in the areas designated special districts.

The county engineer shall review low-impact alternatives to the standard road design by evaluating the number of users, terrain, land use, geometry, parking, emergency vehicle access, and other factors as warranted to reduce stormwater runoff in the special district areas.

506 TRAFFIC

A. Traffic Mitigation

All development(s), which will affect the service level, safety or operational efficiency of the Whatcom County public road system, are responsible to mitigate said impact. The responsibilities of the developer are to be determined by the County before development approval. The responsibilities depend on the condition of the impacted road system, which is described by the level of service (LOS) and defined in the current edition of the Highway Capacity Manual. All improvements shall be made in accordance with Whatcom County standards.

In all cases, the responsibility of the developer is to construct frontage road improvements and, where applicable, dedication of the required rights-of-way for public roads adjoining the property. Other responsibilities include such roadway elements as sight distance, roadway width, surface condition, and other structural/functional elements that must be improved to assure that following development the road will function at the prescribed LOS. When the LOS falls below LOS C for rural areas and LOS D for urban fringe areas, the developer is to mitigate direct impacts of the development on public streets and intersections.

A building permit will only be issued when all funding mechanisms necessary to improve the road condition(s) are committed. Occupancy of the development may only occur after the required road improvements are completed.

Required roadway improvements may include traveled way or shoulder widening, addition of turn lanes, structural roadway repairs, signalization, sign installation, lighting, and/or bicycle and pedestrian facility installation or improvements. Additionally, a voluntary contribution to scheduled programs may be mutually agreed upon between the developer and the County Engineer.

B. Traffic Studies

A Preliminary Traffic Information form shall be required on all developments. Any development abutting and/or impacting existing public roads shall improve frontage of those roads. The extent of those improvements and additional off-site improvements shall be based on an assessment of the proposed project impacts. The County Traffic Engineer shall make the initial assessment. An Engineered Traffic Study may be required by Whatcom County in order to adequately assess the impacts of a development proposal on the existing and/or planned street system. An Engineered Traffic Study will be required if the proposed project will generate over 400 ADT.

1. Preliminary Traffic Information Form - The Preliminary Traffic Information form can be found in Appendix D. Two copies of the information form must be submitted with the project application. The applicant or the applicant’s designee may prepare the Preliminary Traffic Information form. ADT shall be based on a minimum 20-year traffic projection.

Whatcom County Division of Engineering shall use this form to determine what roadway improvements are required for the project, or if an Engineered Traffic Study will be required for the project.

2. Engineered Traffic Study - All engineered traffic studies shall be prepared and stamped by a professional Civil Engineer with expertise and experience in transportation engineering and who is licensed in the State of Washington. The engineered traffic study shall be submitted directly to the Division of Engineering for review and approval. The Engineered Traffic Study Guidelines can be found in Appendix E.

   The Engineered Traffic Study report shall contain the following statement:

ENGINEER'S DECLARATION/CERTIFICATION

"I, _____, a Professional Engineer registered in the State of Washington as a Civil Engineer, do hereby declare that the Engineered Traffic Study titled _____, and dated _____, 20___, was prepared by, or under my personal supervision, and that said report was prepared generally consistent with the Institute of Transportation Engineers guidelines for traffic studies. I hereby affirm that, to the best of my knowledge, information and belief, subject report was prepared in full compliance with Chapter 12.09 of the Whatcom County Code and in compliance with the Whatcom County Development Standards and all Technical Standards adopted thereunder; EXCEPT as specifically set forth under "Exceptions to Whatcom County Standards," page ____ of this report."

ENGINEER'S SEAL

_____
Engineer's Name and Registration Number

Date _____, 20 __

3. The Traffic Study submitted during one permit/approval process may be modified as required by the County Engineer and subsequently submitted for use with future permit or project applications.

507 ROAD DESIGN AND CONSTRUCTION PLANS

A. General

Plans for proposed road, utility and site construction within and adjacent to county rights-of-way are governed by these Standards, and shall be prepared and submitted in accordance with the following:

When public or private road construction is required per the Applicability Section 504.B, a complete set of horizontal plans and vertical profiles, together with applicable stormwater and erosion–sedimentation control plans, all applicable plans for grading and utility construction within and adjacent to roads shall be submitted to the County Engineer for review and approval.

1. Plans shall include a complete summary and documentation of the design (criteria for which the plans are based upon, specifications, calculations, and conclusions, etc.). In cases where it is not appropriate to present a complete summary and documentation of the design on the plans, a separate bound report, including all said information, shall be included with the plan submission.

2. Plan sheets shall be prepared, signed, and stamped by a professional engineer that has been retained by the developer. The plans shall be submitted to the County Engineering Division. The Professional Engineer shall make the following statement:

"I hereby declare that these documents were prepared under my direct supervision and that the plans, specifications and design shown herein generally conform to accepted engineering standards and meet the requirements set forth under Chapter 5 of the Whatcom County Development Standards, except as specifically set forth under note ____, page ____ of these plans."

ENGINEER'S SEAL

_____
Engineer's Name and Registration Number

Date _____, 20 __

Final engineered plans (including stormwater and all grading and utility plans) must have the approval of the County Engineer prior to any construction. Recording of final plats, binding site plans, or P.U.D. document shall not be granted prior to approval of the plans. In addition to the provisions herein, the stormwater and erosion-sedimentation control plans shall be prepared in accordance with the requirements outlined in Chapter 2 - Stormwater Management of the Whatcom County Development Standards.

B. Plan Submittal Procedure

The process of submitting engineered road, utility and site plans to the County for the purpose of review and approval shall be in accordance with the procedure outlined below:

1. Initial Submission - The first submission shall include a single complete set of engineered road plans and specifications (check prints) illustrating plan and profile, and including utilities such as sewer and water (if any), and other related facilities, together with any detail sheets. The plans shall include a complete summary and documentation of the design including criteria for which the plans are based upon, specifications, calculations, and conclusions. A Stormwater Management Plan and Specifications prepared in compliance with Chapter 2 - Stormwater Management of the Whatcom County Development Standards shall also be submitted. The plans shall include a professional certification note; the signature and stamp of the Engineer of Record is not required for the initial submission.

   Following a review by the County Engineer, the reviewed check prints ("redlines") will be returned to the Engineer of Record for any modifications that may be required. The general review process shall be based upon generally-accepted engineering practice.

2. Final Submission - The final submission shall include one (1) complete set of revised engineered road plans, specifications and supporting calculations reflecting comments documented in the first submission. The plans shall be original drawings which are stamped, signed, and dated by the Engineer of record. This final submission shall also include the original redline check prints. Upon approval by the County Engineer, the plans (final submission) will be signed and returned to the Engineer of Record.

3. "As-Built" Submission - Prior to final acceptance of any road, structure, or facility for maintenance by the County or built to public road standards, a complete set of reproducible copies (mylar or approved equal) of the "As-built" record plans shall be submitted to the County Engineer by the Engineer of Record. As-built record drawings shall describe any and all revisions or additions to the approved plans. On all pages of these "As-built" drawings, a Professional Engineer shall make the following statement :

"I hereby affirm that all infrastructure improvements shown on these As-built drawings and specifications have been constructed in substantial compliance with the plans and specification approved by the County Engineer. I affirm that the plans accurately depict the horizontal and vertical location of and the type, size and class of all roadways, roadside structures, drainage element, grading features and other roadway and site facilities constructed pursuant to the approved plans. I further affirm that all specified inspections and testing have been completed and that all Transportation, Environmental, Mechanical and Structural elements shown on the approved plans function as designed.

ENGINEER'S SEAL

_____
Engineer's Name and Registration Number

Date _____, 20 __

All final "As-built" drawings shall be submitted to the County in a digital format on a computer disk recorded in the current release of AutoCAD (or compatible format). The digital "As-built" drawings shall generally conform to the current AutoCAD drafting standards adopted by the Washington State Chapter of the American Public Works Association (APWA).

C. Plan Format

1. The plans shall be submitted on 24 x 36-inch sheets.

2. Vicinity Maps shall be located on the first sheet of all plan sets and shall show the location of the project in respect to the nearest major street intersection.

3. A north arrow and bar scale shall be shown on each plan view sheet of the plans and adjacent to any other drawing which is not oriented the same as other drawings on the sheet.

4. Site Development Plans shall generally be organized as follows:

   a) Title Sheet.

   b) Proposed Development, P.U.D. or Preliminary Plat Layout.

   c) Existing Conditions, Boundary, Topography, Utilities, and Soils.

   d) Pre- and Post-Development Hydrology of Site and Drainage Basin (see Whatcom County Standards, Chapter 2).

   e) Temporary Erosion and Sedimentation Control Plan (see Whatcom County Standards, Chapter 2).

f) Clearing Plan.

g) Grading Plan/Retaining Structures.

h) Street Plan/Profile/X – Sections.

i) Street Illumination Plan.

j) Storm Sewer Plan/Profile and Details (see Whatcom County Standards, Chapter 2).

k) Detention and Surface Water Quality Assurance Plan and Details (see Whatcom County Standards, Chapter 2).

l) Sanitary Sewer Plan/Profiles and Detail (per City/Utility District Standards).

m) Water Supply, Storage and Distribution Plans/Profiles and Details (per City/Utility District Standards).

n) Private Utility Plans/Profiles and Details.

o) Composite Utility Plan, including any potential conflicts.

p) Landscape Plan.

q) Outline Specifications/Special Provisions.

r) Material Schedule and Quantity of Materials.

5. Title sheet to include project name, vicinity map, name and mailing address of developer/owner and engineering firm, general notes, notice to excavators, index, and space for county approval stamp (3 x 3-inch) in the lower right quadrant.

6. Composite utility plan shall include existing public and private utilities, and all proposed utility improvements.

7. Sanitary sewer and water plans and profiles shall include all relevant appurtenance assemblies as required. Details of these assemblies shall be included on the detail page.

8. Street and storm sewer plans shall show all existing and finished contours at two (2)-foot (minimum) intervals unless shown on the grading plan.

9. Grading plan shall conform to the provisions of Section 507.F of these Standards.

10. Approved preliminary plat, P.U.D., or development plan (if applicable).

11. Details - All County Standard Drawings and details shall be no less than 66% of original size. Any modifications to a County Standard Drawing or detail must be clearly marked and initialed by the Engineer, along with the date of approval for modifications. Pre-approval is required for modifications to County Standard Drawings and details.

12. The minimum horizontal graphic scale shall generally be 1 inch = 40 feet for all drawings except structural details. A graphic scale shall be shown with north arrow and within a title block. Plan/Profile ratio shall generally be 1(H) to 10(V).

13. Letter size shall not be smaller than 0.10 of an inch high.

14. All plans shall show the project horizontal and vertical datum used. The location and description of control monuments and benchmarks shall be shown. Survey points shall reference NAD83 datum. No other datum shall be used without prior approval of the County Engineer. Temporary control benchmarks and elevations shall be shown on the plans.

15. A title block shall appear on each sheet of the plan set and shall be placed in the lower right-hand corner. The title block shall include the names of the project, the engineering firm, the owner, the sheet title, and the sheet number.

16. The description and date of all revisions to the plans shall be shown on each sheet affected, and shall be approved and dated by the registered Professional Engineer of record as evidenced by an original signature or initial.

17. Use standard drafting symbols to indicate the location and direction of view for all sections.

18. Standard drafting symbols shall be in accordance with current APWA standards and all symbols and abbreviations used on the plans shall be shown and defined in a legend.

D. Plan View

Plan views shall show the following:

1. Rights-of-way, property, tract, and easement lines (existing and proposed).

2. Subdivision name, lot numbers, street names, and other identifying labels. New street names are subject to approval by the County.

3. Location and stationing of existing and proposed street center lines and curb faces.

4. Horizontal alignment and curve data of street center lines and curb returns.

5. Existing surface and underground utilities and vegetation within the construction limits.

6. Location of existing buildings, wells, septic tanks, drain fields, fuel tanks, and any other buried structures.

7. Location, stationing, and size of all mains and service lines for storm sewer, sanitary sewer and water and private utilities within the rights-of-way. Stationing shall be located in relationship to the street stationing at all manholes or other key locations.

8. Match lines with sheet number references.

9. Provisions for cross-connection control must be clearly shown on the plans, including any retro-fitting of existing water service connections and existing auxiliary water supplies, conversions to City or utility district of water services that are required as a condition of development approval, upgrading of existing service connections by replacement of same, and any other cross connection control required by State and local rules and codes.

10. Location of the sag and crest points of street grades and curb returns.

11. Sidewalk locations. This shall include ramps, transitions in location or width, and relationship with driveways and catch basins.

12. Crown lines along portions of streets transitional from one typical section to another.

13. Center line stationing of all intersecting streets.

14. Location and description of relevant existing survey monuments, section corners, quarter corners, donation land claim corners, and county benchmarks.

15. Location of proposed street intersection monument cases.

16. FEMA-designated 100-year flood plains and floodways, or areas of flooding during a 100-year storm event.

17. Wetland areas and stormwater quality undisturbed corridors (buffer strips).

18. Any other pertinent design information that the County deems necessary.

E. Profile View

Profile Views shall show the following:

1. Stationing, elevations (10:1 ratio recommended), vertical curve data (including curve K factors) and centerline slope of streets. For super-elevation cross-sections, both gutter flow lines for curbs shall be profiled. Where curbs are not to be constructed, centerline of street and ditch inverts shall be shown. Show all sags and crests.

2. Original ground along the centerline and, if necessary, at the edges of the rights-of-way if grade differences are significant.

3. Centerline and gutter flow lines of existing streets for a distance of at least 300 feet each way at intersections with proposed streets. For stub streets that may be extended in the future, the vertical alignment shall be designed for at least 300 feet beyond the scope of the proposed construction. At the discretion of the County Engineer, additional design information concerning the vertical and horizontal alignment of future street extensions may be required.

4. Vertical design grades and parabolic curve data, including length, stationing and “K” factor of all street centerlines.

5. The gutter flow line of curb for all cul-de-sacs, eyebrows and curb returns.

6. All proposed drainage facilities, including all invert and top of structure elevations.

7. Existing drainage facilities including off-site facilities upstream and downstream that affect the design (i.e., downstream restrictions that back water on to project site). In addition, base flood elevations for the 100-year flood event shall be shown on the profile.

8. Profiles for ditch and creek flow lines shall extend a minimum of 50 feet beyond the project, both upstream and downstream.

9. Designate structures using alpha or numeric labels on profiles to correspond with plan view notation.

10. Profile for existing and proposed storm sewers, sanitary sewers, and water mains.

11. All existing and proposed sanitary sewers, water mains, storm sewer lines and other utility crossings shall be on the profile with the vertical clearances between crossing utilities specified.

F. Site Grading Plan

1. A grading plan shall be prepared for all projects proposing excavation and/or embankment outside of the proposed rights-of-way and/or for all projects proposing excavation and/or embankment within the project site, the volume of which exceeds 500 cubic yards.

2. Grading plans shall be based upon a topographic map that has been prepared by a PLS or a PE utilizing recent ground survey data. The topographic map shall show contour intervals as follows:

Average ground slope	Contour intervals
Less than 2%	One foot
2% - 15%	Two foot
15% - 40%	Five foot
Over 40%	Ten foot

Planemetric detail shall include relevant drainage features and structures. Design contours shall be shown by two (2)-foot contour intervals.

3. The extent and limit of all grading shall be shown by clearly delineated boundaries including all catch points, beginning and end of all cut and fills, elements of topsoil, and vegetation stripping. Cut and fill slopes shall not exceed 2(H) to 1(V) without a supporting geotechnical engineering analysis. A geotechnical engineering analysis shall be required when there is evidence of unstable soils present. All earth-retaining structures shall be designed consistent with Section 508.E of these Standards.

4. Grading plans shall show the total volume of earthwork to be moved, including:

- Volume of excavation.
- Volume of embankment.
- Volume of material to be exported from the site.
- Volume of material to be imported to the site.

5. All excavation and embankment shall be designed and constructed in accordance with WSDOT Specifications – Division 2. The grading plan shall define and clarify all embankment areas by the applicable WSDOT designation and type of compaction required.

6. Grading plans shall specify all materials to be imported and/or used in the embankment sections and shall specify applicable WSDOT methods and required testing schedules.

7. As-built plans shall be submitted in accordance with Section 507.B–3 of these Standards.

G. Stormwater Plan

A stormwater plan shall be included with the road construction plan submission and shall be prepared in accordance with Chapter 2 - Stormwater Management of the Whatcom County Development Standards. The stormwater plan and profile shall include a complete summary and documentation of the design (criteria, specifications, calculations, and conclusions). Stormwater plans shall encompass the grading and drainage of the entire area to be developed. In cases where it is not appropriate to present a complete summary and documentation of the design on the stormwater plan, a separate bound report including all said information shall be included in the initial road construction plan submission. The Stormwater Design Report may be submitted before the construction plans.

H. Temporary Erosion and Sedimentation Control

1. A separate temporary erosion and sedimentation control (TESC) plan detailing the control measures intended to minimize the effects of erosion due to construction activities and their locations shall be included as part of the initial road construction plans submittal. The TESC plan shall be prepared in accordance with, and make reference to, the provisions outlined in Chapter 2 - Stormwater Management of the Whatcom County Development Standards. The TESC plan shall account for construction phasing issues. TESC plans shall encompass the entire area to be developed.

2. Development that complies with the terms of this section shall meet all the requirements of Whatcom County Fill and Grade permits and therefore not be subject to a Fill and Grade permit unless materials are being removed from the site.

I. Detail Sheets

Detail sheets shall be provided as part of the Site Development Plans (unless details are shown on each applicable design sheet plan). The detail sheet shall show all County Standard Drawings and special details necessary for the project.

All County Standard Drawings and details shall be no less than 66% of original size. Any modifications to a County Standard Drawing or detail must be clearly marked by the Engineer.

J. Other Requirements

Construction plans must sufficiently document and summarize the design assumptions, computations and parameters that form the basis of the project design. The plans and/or a separate design report shall include a complete summary and documentation of the design data including criteria for which the plans are based upon, specifications, general design philosophy, calculations, and conclusions. Examples of Design Data for a typical set of construction plans and reports may include, but are not limited to, the following:

- Geotechnical and soil report.
- Wetland report.
- Structural reports including foundation and stability calculations for retaining walls, bridges, embankments, etc.
- Topographic maps.
- Traffic report.
- Pavement design report.
- As-builts of existing utilities.
- Street classification.
- Design speeds.

K. Plan Checklists

Checklists are included in Appendix F and are to be used as a supplement. The checklist is not intended to be an exhaustive list of issues regarding any particular site and should be used in conjunction with generally accepted engineering practices.

508 ROADSIDE FEATURES

Public access easements shall be dedicated and safe non-motorized facilities provided wherever practical or necessary, within a one mile radius of community places such as schools, shopping, libraries, or other neighborhoods to facilitate pedestrian and bicycle circulation in addition to rights-of-way provided for a street. Access easements shall be a minimum of 10 feet wide. Structures shall be set back from the edge of the easement pursuant to Title 20. Improvements to the easements shall be consistent with this section. Fences may not be constructed within the access easements. Separated bicycle and pedestrian ways shall be seriously considered. For pedestrian facilities design specifications or conditions not covered below refer to WSDOT Design Manual section 1025 Pedestrian Design Considerations.

A. Urban Pedestrian Facilities

1. Sidewalks shall be provided on both sides of all new arterial, collector, local access, and commercial/industrial streets in urban areas.

2. Frontage sidewalks shall be provided on all arterial, collector, neighborhood collector, local access, and commercial/industrial streets in urban areas.

3. Sidewalks shall be provided on one side of all minor access streets in urban areas.

4. Walkways shall be provided on one side of existing perimeter public roads adjoining any development, which creates, in the professional judgment of the County Engineer, the potential for significant additional pedestrian movement and the roadway traffic has an ADT of over 400 vehicles.

5. Urban sidewalks shall be constructed with cement concrete. Cement concrete sidewalks shall be at least five (5) feet in width and four (4) inches or six (6) inches in depth, depending on location and curb type (see Drawing 508.A-1). Sidewalk construction shall conform to APWA and WSDOT standard specifications. Back of sidewalk drains shall be a minimum of four (4)-inch diameter perforated pipe and shall be required in cut sections of the roadway (see Drawing 508.A-2).

6. Facilities for the Handicapped: Ramps are required per RCW 35.68.075 (see Section 508.G). Where a sidewalk ends at a shoulder, a transition ramp shall be provided (see Drawing 508.A-3).

7. A handrail is required when the vertical drop is more than 30 inches, side slopes exceed 2(H):1(V), and the top of the slope is horizontally less than four (4) feet away from the edge of the sidewalk (see Drawing 508.E-1).

Handrails shall be galvanized steel or aluminum. Horizontal rails and vertical supports shall be 1-1/2 inch diameter Schedule 40 Standard pipe and balusters shall be 3/4 inch diameter Schedule 40 Standard pipe. Vertical support posts shall be on eight (8)-foot centers maximum and balusters on four (4)-inch clear space maximum. Finished height of the railing shall be 42 inches above pedestrian walking surface. Provide slip joints at stairway expansion joints and at 24 feet on center maximum (see Drawing 508.E-2).

B. Rural Pedestrian Facilities

1. Walkways in rural areas shall be provided on at least one side of all new roads having a potential ADT greater than 160 vehicles.

2. Walkways shall be provided on one side of existing perimeter public roads adjoining any development which creates, in the professional judgment of the County Engineer, the potential for significant additional pedestrian movement and the roadway traffic has an ADT of over 400 vehicles.

3. Minimum walkway improvements shall be five (5) feet in width and surfaced with a two (2)-inch lift of compacted crushed rock material (5/8 inch minus) over an approved subgrade. When a walkway is incorporated into the road shoulder, the typical roadway section shall govern. Paved shoulders shall be required when walkway is combined with bikeway.

4. A handrail is required when the vertical drop is more than 30 inches, side slopes exceed 2(H):1(V), and the top of the slope is horizontally less than four (4) feet away from the edge of the walkway (see Drawing 508.E-1).

   Handrails shall be galvanized steel or aluminum. Horizontal rails and vertical supports shall be 1-1/2 inch diameter Schedule 40 Standard pipe and balusters shall be 3/4 inch diameter Schedule 40 Standard pipe. Vertical support posts shall be on eight (8)-foot centers maximum and balusters on four (4)-inch clear space maximum. Finished height of the railing shall be 42 inches above pedestrian walking surface (see Drawing 508.E-2).

C. Bikeway Classification and Applicability

1. Bikeways shall be provided when required per Table 1 or Table 2, or when called for in an adopted Whatcom County ordinance, or when a traffic analysis shows substantial bike usage that would benefit from a designated bike facility.

2. Bicycle facilities shall be designed and installed consistent with the performance standards specified in the WSDOT Design Manual - Section 1020 and shall generally conform with Drawing 508.C-1.

3. Selection of an appropriate facility shall ensure that the proposed facility will not encourage or require bicyclists or motorists to operate in a manner that is inconsistent with the Rules of the Road (RCW 46.61).

D. Driveway Approaches

1. Type

Driveway approaches serve 20 ADT or less. All others shall be considered a road.

2. Requirements

a) All driveway approaches within public rights-of-way shall have a Whatcom County Revocable Encroachment Permit (see Appendix B).

b) Driveway approach construction or maintenance work shall not be allowed before issuance of a Whatcom County Revocable Encroachment Permit.

c) All driveway approaches abutting a paved public road shall have a paved apron as shown on Drawing 508.D-4.

d) Minimum easement width for a driveway is 30 feet.

e) Driveways that serve two (2) dwellings and are longer than 150 feet shall be considered roads.

f) Driveways shall be setback five (5) feet from the property line and neighboring driveway edges shall be 10 feet or more apart.

g) Joint-use driveway approaches serving two adjacent parcels shall be encouraged and may be built upon formal written agreement of both property owners and approved by the County Engineer.

3. Specifications

a) Dimensions, slope and detail shall be as indicated in Drawings 508.D-1, 508.D-2, 508.D-3 and 508.D-4, and as further specified in the following subsections.

b) Conditions of Approval of New Driveway approaches:

i) Driveway approaches providing access onto arterial/collector streets shall be denied if a reasonable alternate access is available.

ii) All abandoned driveway approach areas on the same curb/gutter/sidewalk frontage shall be removed and the shoulders/ditch section shall be properly restored.

iii) Maintenance of driveway approaches, including stormwater culverts, shall be the responsibility of the owner(s) whose properties they serve.

iv) Every driveway approach must provide access to an off-street parking area located on private property. Every vehicle entering the driveway must be able to park, stand or load entirely off the street rights-of-way. In addition, use of the sidewalk, pathway or sight distance clear zone shall not be hindered or blocked. An adequate turn around area shall be provided for any driveway off an arterial/collector street, allowing vehicles to enter the travelway in a forward motion.

v) No driveway approach shall be allowed to access into a designated pocket parking area.

vi) No vehicle shall be allowed to back out onto any street from an industrial, commercial or multi-family parking area.

vii) No driveway approach shall be constructed in such a manner that it causes a hazard to any existing stormwater inlet, culvert, street lighting standard, utility pole, traffic regulating devices or striping, fire hydrant, or other public facility. The cost of relocating any such public facility, when necessary to do so, shall be borne by the property owner/applicant. Said relocation of any public or private facility shall be performed only through the agency holding authority for the particular structure involved.

viii) For driveway sight distance see Appendix J, Driveway Intersection Sight Distance Guidelines.

ix) All surface stormwater from driveways shall be managed in accordance with the Chapter 2 Stormwater Standards section. No surface stormwater shall be allowed to flow onto the County road surface.

x) For single-family residences and joint-residential driveway approaches crossing an open ditch section, culverts shall be a minimum 12 inches in diameter or larger if so required to carry anticipated storm water flows. The culvert size shall be as approved by the County Engineer.

xi) All commercial or industrial access approaches shall be designed and constructed to roadway intersection standards. The design will be based on a traffic engineering analysis submitted that considers, among other factors, intersection spacing, sight distance, and traffic volumes.

xii) On access road frontage of 75 feet or less, no more than one driveway approach shall be constructed. On frontages over 75 feet, two or more driveway approaches may be permitted, subject to approval by the County Engineer.

xiii) Notwithstanding any other provision, driveway approaches will not be allowed where they are prohibited by a separate County Council action or where it is determined by the County Engineer or reviewing agency to create a hazard or impede the operation of traffic on the roadway.

4. Location and Width of New Driveway Approaches are as shown on Drawing 508.D-3. Driveway approach locations are to be measured from the closest edge of the intersection travelway to the centerline of the driveway approach, as shown in Table 10.

TABLE 10 – DRIVEWAY SPACING FROM INTERSECTION

ADT	Distance from Intersection Travelway
<501	60 feet
501 - 1000	100 feet
> 1000	120 feet
All Commercial & Industrial approaches	300 feet

E. Retaining Walls

Retaining walls for the containment of cut or fill embankments up to a maximum height of four (4) feet in stable soil conditions may be constructed without an engineered design (see Appendix G). For heights over four (4) feet, or when soil is unstable, or when specifically required by the Uniform Building Code (UBC), a structural wall designed by a professional engineer qualified in retaining wall design shall be submitted for approval.

1. Retaining walls may be constructed of rock, treated wood, compacted earth, concrete, pre-manufactured or engineered specialty items or other materials as approved by the County Engineer. Standard details for various types of retaining walls are provided in Appendix G.

2. The retaining wall shall be started by excavating a trench not less than six (6) inches in depth.

3. The wall backfill shall be uniform, free flowing, and have strength consistent for the intended use. The County Engineer may require independent testing to verify material suitability or placement.

4. All retaining walls shall provide for positive drainage.

5. The location of retaining walls shall not restrict sight distance as detailed in the Title 20, Official Whatcom County Zoning Ordinance.

6. When a sidewalk is to be built over a retaining wall, the top of the wall shall be sealed and leveled with a cap constructed of Concrete, Class 3000, in accordance with the applicable provisions in the WSDOT Standard Specifications - Section 6-02, but with reduced water content resulting in a slump of not over two (2) inches (see Drawing 508.E-1).

7. A handrail is required when the vertical drop is more than 30 inches, side slopes exceed 2(H):1(V), and the top of the slope is horizontally less than four (4) feet away from the edge of the sidewalk (see Drawing 508.E-1).

   Handrails shall be galvanized steel or aluminum. Horizontal rails and vertical supports shall be 1-1/2 inch diameter Schedule 40 Standard pipe and balusters shall be 3/4 inch diameter Schedule 40 Standard pipe. Vertical support posts shall be on eight (8)-foot centers maximum and balusters on four (4)-inch clear space maximum. Finished height of the railing shall be 42 inches above pedestrian walking surface (see Drawing 508.E-2).

F. Curb and Gutters

1. Rolled or vertical curb and gutter shall be utilized for street edges in urban areas.

2. Vertical curb shall be used for edges of all islands associated with paved surfaces and the tangent sections parallel to the sidewalk in a pocket parking section.

3. Thickened edge asphaltic curbs may be used on private streets when approved by the County Engineer.

4. Refer to Drawing 508.F-1 for details.

G. Curb Ramps

On all streets with curbs, a ramp section to facilitate passage of handicapped persons shall be installed at all street intersections where there is sidewalk and/or at other crosswalk locations (see Drawings 508.G-1 and 508.G-2). Where a ramp is constructed

on one side of the street, a ramp shall also be provided at a corresponding location on the opposite side of the street.

H. Survey Monuments

1. All existing survey control monuments which are disturbed, lost, or destroyed during construction or maintenance shall be replaced by a professional land surveyor retained by the responsible party at their own expense in accordance with Drawing 508.H-1. A licensed land surveyor shall file a land corner record with the County Auditor and the County Engineer showing methods used to reestablish the monuments' position and references.

2. Survey control monuments shall be placed or replaced in accordance with recognized good practice in land surveying, and in conformance with all applicable State and local regulations. The control and boundary survey shall be tied to the Washington State Coordinate system per RCW 58.29 if suitable control is available within one (1) mile of the survey.

3. Standard survey monument shall be cast in Class 3000 concrete, reinforced with a 5/8-inch (No. 8) reinforcing bar, and have a 2-inch minimum brass cap with a 2-1/2-inch shank. See Drawing 508.H-1.

4. A brass disc encased in concrete shall be placed at all points of curves, points of tangent, intersections, and as needed for intervisibility of monuments in streets.

5. An alternative plan of intervisible monuments may be proposed by the Surveyor subject to the approval of the County Engineer.

6. A signed and sealed statement from the land surveyor that all monuments have been set shall be provided to the County before release of the road maintenance security.

I. Mailboxes

The location, style and height of the mailbox shall be obtained from the local U.S. Postal Office. Adjustments to the location may be necessary to accommodate the following:

1. Mail box installation shall not be located in such a manner as to cause vehicles to stop on neighborhood collector or higher classified roads without the use of a dedicated pocket pullout area signed for no parking.

2. The installation shall not create a roadway obstruction or restrict sight distance.

3. When mailboxes are located in the sidewalk, individually or in clusters, sidewalk alignment shall be such that the distance from the back edge of the sidewalk to the mailbox is not less than five feet. See Drawing 508.I-1.

J. Guardrails

Guardrail shall be provided as specified in the WSDOT Design Manual, 710 “Traffic Barriers.” Cross-sections shall be submitted to assure proper guardrail location. The guardrail shall conform to Standard Plans with related details.

K. Traffic Control

1. Signing - All traffic control shall be compliant with MUTCD and State Standards Specifications. All equipment and materials required for traffic control shall be furnished, installed and maintained by the developer to the satisfaction of the County Engineer until County acceptance. The developer shall install all signs as provided in the approved plans. The County may install signs within existing or proposed rights-of-way at the discretion of the County Engineer. The County shall be reimbursed for the cost of materials and installation by the developer.

2. Pavement Marking - Pavement markings including buttons, striping and delineators may be required to provide roadway safety. Such markings shall be provided by the developer. All work shall be approved by the County Engineer prior to installation. The County may install pavement marking within existing or proposed rights-of-way at the discretion of the County Engineer. The County shall be reimbursed for the cost of materials and installation by the developer. All materials shall comply with WSDOT Standards.

3. Work Zone Safety - Construction activities shall comply with appropriate federal, state and local requirements with regard to worker and public safety.

4. Maintenance of Traffic - Traffic control shall be maintained at all times. Existing travelways and accesses shall remain open and maintained in a safe condition at all times. Approval must be received from the County Engineer for all detours and road closures. A formal traffic control plan complying with MUTCD shall be submitted to Public Works for review and approval by the County Engineer (see Section 511.G). The County Engineer may require a signed and sealed traffic control plan prepared by a professional engineer if the project is deemed sufficiently complex. The County will ensure that the project is coordinated with emergency medical services and other agencies before any work proceeds.

L. Street Illumination

1. Requirements - Streetlights may be required in urban developments and commercial and industrial developments. Basic illumination shall conform to the guidelines of WSDOT Design Manual or equivalent, and shall be provided at intersections and at other locations and intervals as required by the County Engineer. All luminaries shall be maintained by the power supplier or owner/developer/association or by a public agency.

2. Plats - The design for streetlights, when required or requested in new urban plats, shall be submitted before the final plat is recorded. The County shall not be responsible for any cost of maintenance, replacement of operating costs of street light systems, and the developer shall submit evidence that the lighting systems will be owned or operated by a public agency or private organization (including homeowner associations and/or a private utility company).

3. Commercial/Industrial - Streetlights required in commercial areas shall be provided at the time of construction. The developer or property owner shall be responsible for the maintenance, replacement, and operating costs of the lighting systems.

M. Landscaping

The following guidelines will be utilized in evaluating and administering proposed or existing landscaped areas within county road rights-of-way.

1. Design - When landscaped areas and such other features are proposed or required:

   a) Such plans shall show in detail the proposed areas, location and type of plantings, irrigation, stormwater, and other relevant factors.

   b) The landscape plan may be required to be prepared by a licensed landscape architect if the proposed areas are sufficiently extensive or sensitive.

   c) All median areas shall utilize low maintenance plantings. Refer to Whatcom County's approved plant list in Appendix I.

   d) Such plans shall be approved or rejected by the County Engineer based upon such factors as traffic safety and effect on road maintenance.

2. Maintenance -

a) Maintenance of landscape areas and survival of the plantings shall be the responsibility of the developer and/or homeowners' association or successor owners of lots adjoining landscaped areas.

b) Initial installation and maintenance for a two (2) year period shall be the responsibility of the developer, who shall secure such performance by filing an appropriate security (see Section 509.A). After the two (2) year period, maintenance responsibility shall either pass to a homeowners' association (where such an entity has been created) or to individual lot owners as appropriate.

c) Plantings and other landscaping shall have a minimum vertical clearance of eight (8) feet over sidewalks and walkways. There shall also be at least a one (1) foot clear zone behind the back of sidewalks and walkways. Vertical clearance over streets and roads shall be a minimum of 14 feet.

d) If not adequately maintained, the County may take such corrective action as deemed necessary. The corrective action will be at the expense of the developer/association/homeowner. In addition, the County may make corrective action based on traffic safety, which will also be at the expense of the developer/association/homeowner. Plantings or other improvements within the rights-of-way installed by abutting property owners are subject to removal when the rights-of-way are needed for public use. The property owner(s) are responsible for removing any landscaping or improvements upon official notice.

N. Road Name Signs

All road names shall be approved by the County per Ordinance No.96-049 (or current) before installation. Refer to Drawing 508.N-1 for sign type and method of installation of road name signs.

509 SECURITIES

A. Performance Securities

In lieu of completing improvements per the County approved plans, or required improvements prior to plat recording or development approval, the developer or agent shall post a security with the County Engineer. The County Engineer shall determine improvements for which securities may be posted or are required as they relate to general life/health/safety concerns, environmental issues and economic constraints. The security is to guarantee completion of said improvements and shall conform to the following conditions:

1. The security shall be equal to 125% of the engineer's certified construction cost estimate or 150% of other construction cost estimates approved by the County Engineer.

2. The security shall be of a form approved by the Prosecuting Attorney's office. Types of securities include cash deposits, assigned savings, bonds and other assurance devices as may be approved by the County Engineer.

3. The security shall be for a period of one (1) year, which may be extended for an additional period of one (1) year at the option of the County Engineer. The Technical Advisory Committee may grant an extension beyond the initial two years. The amount of the security shall be recalculated at the time of any extension.

4. The security shall be used by the County Engineer to make the required improvements or initiate vacation of the development if the improvements are not made in the allotted time.

5. Performance securities assuring construction of the improvements to public facilities shall not be released until the facilities are provisionally accepted and the maintenance security has been received by the County Engineer.

6. The County Engineer will release performance securities assuring construction of the improvements to private facilities upon completion and approval of the work.

7. In the event that collection of a security is necessary, all costs related to said collection shall be deducted from the security amount prior to release of any residual monies.

8. A fee shall be collected at the time that a security is posted to cover the administration costs as set forth in the current Whatcom County Unified Fee Schedule.

B. Quality Assurance Securities

Prior to acceptance by the County of any road or stormwater facility within county rights-of-way, the developer shall cause to be posted with the County Engineer's office a Maintenance Security Device that conforms to the following:

1. The security shall be in effect for two (2) years from the date of County approval of completed road and stormwater facilities.

2. The security shall be of a form approved by the Prosecuting Attorney's office. Types of securities include cash deposits, assigned savings, bonds and other assurance devices as may be approved by the County Engineer.

3. The maintenance security shall be for an amount of 10% of the County-approved construction costs or $5,000 (whichever is greater).

4. During the two (2)-year assurance period the developer is responsible to correct defects as may be determined by the County Engineer. The posted security shall ensure the corrections of defects in design, materials and workmanship of all facilities shown on the approved As-built plans.

5. The County may do emergency repairs if there is a public hazard. A.) The County will be reimbursed for its work when the damage was caused by faulty workmanship, materials or design. B.) If the emergency did not relate to workmanship, materials or design, then the County will bear any cost associated with the repairs.

6. The release of this security on the effective date shall be for the amount of the security minus all costs attributed to the developer as set forth in paragraphs 4 and 5.A above.

Private stormwater facilities out of county rights-of-way shall comply with the provisions of Chapter 2 – Stormwater Management and items 1 through 5.A., and 6 above.

C. Permit Securities

The County Engineer may require a security for restoration or damage occurring to county roads/rights-of-way. Said security may be up to 150% of the proposed construction activity or road rights-of-way use, but not less than $5,000. The security shall be submitted prior to the issuance of said permit to work within county rights-of-way.

510 CONSTRUCTION – ROADWAY BASE AND SURFACING

A. General Requirements

A pavement surfacing design procedure must be performed for all public roads and private roads with ADT greater than 120. The minimum standards specified in Section 510.B may be used in place of performing a pavement design for residential access and private roads if the subgrade is determined to be suitable. The design life for all roads shall be a minimum of 20 years. The design procedure used must be approved by the County Engineer and must consider the following:

1. Traffic Loading - an estimate of the number and types of loading the roadway will carry for the design life. This estimate of loading must be established by a procedure accepted by the County Engineer and be expressed in 18-Kip Equivalent Single Axle Loads (ESALs).

2. Subgrade Support - a representative value for the stiffness and strength of the native material on which the road will be built. This value will be established by a procedure accepted by the County Engineer and be expressed as modulus of resilience (MR). When determining MR, soil sampling is to include obtaining a sufficient number of soil samples which adequately represents the subgrade MR and where significant changes in MR occur.

3. Construction of a soil log to a minimum depth of 5 feet below proposed subgrade and classify the soil per Unified Soil Classification System (USCS). See Appendix H.

4. Record the location of where the samples were obtained, normally by road centerline station and offset.

5. Analysis - a procedure for establishing the surfacing depth requirements of each lift of material for a given traffic loading and subgrade resilient modulus. This procedure must be approved by the County Engineer. The following procedure is deemed to have pre-approval: *Guide for Design of Pavement Structure*s, 1993, by the American Association of State Highway and Transportation Officials (AASHTO).

B. Local and Minor Access Roads/Streets

The minimum thickness of road structural section on local access and minor roads and streets shall be as follows:

1. Surfacing: Class "B" asphalt - Two-and-one-half (2-1/2) inch minimum compacted depth for local and minor access roads.

2. Roadway Bases – 10 inch compacted depth aggregate for gravel base or eight (8) inch minimum compacted depth crushed surfacing base course. Two (2) inch compacted depth crushed surfacing top course. Aggregate for gravel base shall retain a minimum of 60% on the U.S. No. 4 sieve.

3. Alternatives for Roadway Base - Asphalt treated base (ATB) may be substituted with the approval of the County Engineer for the typical roadway base. The ATB shall be placed in accordance with WSDOT Design Manual and Section 511.

4. Requirements on a Poor Subgrade - The minimum material thickness indicated on the standard roadway sections are not acceptable if there is any evidence of instability in the subgrade or the soils are classified CL, SC, MH, OH or Pt per USCS (see Appendix H). Both the soils analysis and the resulting pavement design shall be subject to review and approval by the County Engineer.

C. Arterials, Collectors, Neighborhood Collectors, Commercial and Industrial Streets

A Professional Engineer shall design the roadway section of arterials, collectors, neighborhood collectors, commercial and industrial streets. The Engineer shall conform to the requirements of Section 510.A.

D. Unopened Rights-of-Way

Requirements and definitions are provided in WCC 12.14 (see Appendix B) as adopted by Whatcom County Council dated January 10, 1980 (or current). See Drawing 510.D-1 for minimum improvement standards applicable to unopened public rights-of-way.

E. Gravel Road Conversions

Roadways within public rights-of-way that do not meet the current standards and/or may not be maintained by the County may be brought into compliance with the requirements set forth by these Standards by a third party. The third party may then request that a non-maintained road be adopted for maintenance. Adoption only occurs with the approval and acceptance by the County Council after being initiated through the Public Works Department.

1. Maintained Public Roads - Upon receipt of a petition by a majority of the abutting property owners on any section of road or portion thereof, the County Engineer will determine the appropriate road standard(s) and will prepare an estimated cost of construction for the roadway to said standard(s). The petition shall be accompanied by verification that the roadway is within county rights-of-way stamped by a licensed surveyor. If the petitioners agree to pay the estimated cost, the construction of the road to the design standards, see Drawing 510.E-1, shall be in accordance to the policy attached in Appendix C.

2. Rural Non-Maintained Roads within County Rights-of-way - The County Engineer, upon a petition of a majority of the property owners along a rural residential, agricultural or forest property road, may make a recommendation to the County Council for adoption of maintenance of roads within existing county rights-of-way. The road must meet current standards as determined by the County Engineer. The specific policy for this process is attached in Appendix C.

511 CONSTRUCTION INSPECTION

A. Basis for Control of the Work

1. Work performed in the construction or improvement of county roads, whether by or for a private developer, by county forces, or by county contractor, shall be done in accordance with these Standards and approved plans and specifications. It is emphasized that no work may be started until such plans are approved. The County Engineer shall approve any revision to such plans before being implemented.

2. The County Engineer is authorized to enforce the Standards as well as other referenced or pertinent specifications.

3. On all County contract projects, the term Engineer, as referenced in the WSDOT/APWA Standard Specifications, shall mean County Engineer.

4. When on other than county contract projects, the developer shall retain a consulting engineer to ensure facilities are constructed in accordance with the approved plans, specifications and approved change orders. For projects of this type, the term Engineer, as referenced in the WSDOT/APWA Standard Specifications, shall be the Consulting Engineer.

    a) The Consulting Engineer shall be a registered professional Civil Engineer in the State of Washington.

    b) The Consulting Engineer shall act as the owner's agent during the course of construction for all technical matters related to construction.

    c) The Consulting Engineer shall conduct and arrange for all inspections and testing of constructed facilities which are required by these Standards.

    d) The Consulting Engineer shall require all other testing, inspection, and construction surveillance, which in the engineer's opinion is necessary to assure that the required facility has been constructed in accordance with the approved plans, specifications and change orders.

    e) Construction shall be monitored, inspected and approved by the Consulting Engineer.

5. Changes from the approved plans and specifications shall require an approved change order. Change orders shall be authorized by the owner,

approved by the Consulting Engineer and by the County Engineer, and shall:

a) Be prepared by the Consulting Engineer in written form.

b) Contain a description of, the nature of, and reason for the proposed change.

c) Include appropriate drawings, details, and engineering analysis supporting the proposed change. The County Engineer shall determine the need for revised drawings before approval of the requested revision. The County Engineer shall base the requirement for revised drawings on the complexity of the change and/or for general clarification.

d) Be copied and transmitted to the contractor, owner, and County Engineer.

e) All changes shall be reflected on the “As-built drawings” as specified in Section 507.B.3 of this chapter.

B. Development Inspection

On all road and utility construction, proposed or in progress, which relates to public or private development and rights-of-way development, control and inspection shall be done to the satisfaction of the County Engineer. Unless otherwise instructed by the County Engineer, construction events, which require monitoring and/or inspection, shall adhere to the notification periods as shown in Table 11.

TABLE 11 - INSPECTION SEQUENCE *(Note: These are minimum mandatory inspections. Other inspections may be required)*			
Inspection	**Description**	**Working days notice**	**Notes:**
1	Pre-construction conference	3	Conference shall precede construction and include contractor, Consulting Engineer, utilities, and other parties affected. Plan approvals and permits must be in hand before the conference. An agenda may be required by the County Engineer before the meeting.
2	Temporary erosion/sedimentation control	1	Required before initial site work but after placement of TESC measures. All work shall be in accordance with Chapter 2 of the Whatcom County Development Standards and/or the approved plans.
3	Utility installation	1	During trenching and construction of retention/detention systems, placement of storm sewers and underground utilities.
4	Utility backfill and compaction	1	Before backfill and compaction of underground utilities.
5	Subgrade completion	1	At the stage that underground utilities and roadway grading are complete, to include placement of gravel base, if required.
6	Aggregate placement	1	To check placement and compaction of base course.
7	Curb and sidewalk forming	1	To verify proper forming and preparation prior to pouring concrete.
8	Curb and sidewalk placement	1	To check placement of concrete.
9	Crushed surfacing placement	1	To check placement and compaction of top course.
10	Paving	3	Notice in advance of paving with asphalt or Portland cement concrete.
11	Structural	3	Prior to each of the critical stages such as placing foundation piling or footings, placement and assembly of major components, and completion of structure and approaches. Tests and certification requirements will be as directed by the County Engineer.
12	Final construction inspection	15 days to respond	Upon completion of the approved construction, the developer or his agent shall request a final inspection in writing. The County Engineer shall respond with a letter of conformance or a construction deficiency list within 15 working days. Upon the successful completion of the final inspection, the developer shall conform to the requirements of Section 509.B.
13	Final maintenance inspection	30	Prior to end of the maintenance period, upon written request of the developer, the County Engineer shall inspect the improvements. Within 15 working days, the County Engineer shall respond with a letter of conformance or a construction deficiency list. If the deficiencies are not corrected pursuant to an approved timeline, the County Engineer shall exercise the authority vested under Section 509.B. If the Improvements are in conformance, the County Engineer shall exercise the authority vested under Section 509.B.

C. Embankment Construction Control in Development

The provisions of Section 2-03 of the WSDOT/APWA Standard Specifications apply in all respects to development construction unless otherwise approved by the County Engineer. The following elements are mentioned for clarification and emphasis:

1. Embankment and Cut Section Compaction - Compaction within the roadway structural sections shall meet a minimum 95% of maximum density in accordance with WSDOT/APWA Standard Specifications Section 2-03.3(14).

2. Testing for Density - Prior to placing any surfacing material on the roadway, it shall be the responsibility of the developer/contractor to provide density test reports reviewed and approved by a professional engineer. Optimum moisture content and maximum density shall be determined by methods cited in Section 2-03.3(14)D of WSDOT/APWA Standard Specifications or by other test procedures approved by the County Engineer. In fill sections, a minimum of one test shall be taken for every 1,000 cubic yards or fraction thereof and on each lift of embankment. In cut sections, the interval shall be every 100 feet of roadway. For work to be accepted, tests must show consistent uniform density as required by tests referenced above.

    a) In cases where tests do not meet the minimum standard, corrective action shall be taken such as adding water, aerating, replacing material, or applying more compactive effort as directed by the Consulting Engineer. Re-tests shall show passing densities before placing the next lift of subgrade fill.

    b) All test results shall be submitted to the County Engineer.

    c) Testing frequency may be modified based on site-specific conditions and approval of the County Engineer.

    d) For trenching in existing roads, see Section 512 of this chapter.

3. Finishing Subgrade - After the subgrade preparation has been completed, it shall be thoroughly checked by the developer or his agent using a level, string line, crown board, or other means to determine that the subgrade conforms to the typical section or special plan conditions prior to placing any surfacing material.

D. Aggregate Density

1. Prior to placing any surfacing material on the roadway, it shall be the responsibility of the developer or his agent to provide density test reports reviewed and approved by a professional engineer. Density shall be

determined by methods cited in Section 4-04.3(5) of WSDOT/APWA Standard Specifications or by other test procedures approved by the County Engineer. The test interval shall be every 100 feet of roadway. For work to be accepted tests must show consistent uniform density as required by tests referenced above.

2. In cases where tests do not meet the minimum standard, corrective action shall be taken such as adding water, aerating, replacing material, or applying more compactive effort as directed by the developer's engineer. Re-tests shall show passing densities before placing the next lift of aggregate.

3. Placement of aggregate shall comply with Division 4 of WSDOT/APWA Standard Specifications or by other procedures approved by the County Engineer.

4. All test results shall be submitted to the County Engineer.

5. Testing frequency may be modified based on site specific conditions and approval of the County Engineer.

6. For trenching in existing roads, see Section 512 of this chapter.

E. Concrete Testing

1. Subgrade compaction shall be 95% of maximum density for curbs, gutters and rolled curb/sidewalk units. Subgrade compaction for all other sidewalks shall meet 90% of maximum density.

2. Concrete for curbs, gutters and sidewalks shall be Class 3000, furnished and placed in accordance with WSDOT/APWA Standard Specifications, Sections 6-02, 8-04 and 8-14. Weather precautions as set forth in WSDOT/APWA Standard Specifications Sections 5-05.3(14) and 6-02.3(6)A shall apply.

F. Asphaltic Concrete Pavement Testing

Paving shall be in accordance with WSDOT/APWA Standard Specifications and the following requirements:

The compaction shall be at least 91% based on a Rice theoretical maximum density, as determined in conformance with AASHTO Test Method T-209, see WSDOT/APWA Standard Specifications Section 5-04.3(10).

G. Traffic Control in Development Construction

1. Interim Traffic Control - The developer/contractor shall be responsible for interim traffic control during construction on or along traveled County roads. When road or utility work is to be performed on County roads that are open to traffic, the developer/contractor will be required to submit a traffic control plan as specified in Section 508.K. Traffic control shall follow the guidelines of Section 1-07.23 of the WSDOT/APWA Standard Specifications. All barricades, signs and flagging shall conform to the requirements of the MUTCD Manual. Signs shall be legible and visible and should be removed at the end of each work day if not applicable after construction hours.

2. Temporary Road Closures and Detours - When temporary road closures cannot be avoided the developer/contractor shall post "To Be Closed" signs a minimum of five days prior to the closing. The types and locations of the signs shall be shown on a detour plan. A detour plan shall be prepared and submitted to the County Engineer at least 10 working days in advance and approved prior to closing any County road. In addition, notification shall occur as specified in Section 508.K-4.

3. Haul Routes **-** If the construction of a proposed development is determined by the County Engineer to require special routing of large trucks or heavy construction equipment to prevent impacts to surrounding roads, residences, or businesses, the developer/contractor shall be required to develop and use an approved haul route. When required, the haul route plan must be prepared and submitted to the County Engineer and approved prior to beginning or continuing construction. The haul route plan shall address routing, hours of operation, signage, flagging, and daily maintenance. If the developer/contractor's traffic fails to use the designated haul route, the County Engineer may prohibit or limit further work on the development until such time as compliance with the requirements of the haul route are achieved.

4. Haul Road Agreement - When identified as a need through the SEPA review process or by the County Engineer, a haul road agreement shall be obtained. This shall apply to the franchised utility, developer, or property owner responsible for the restoration and/or rehabilitation procedures to be performed during or upon completion of the haul operation. The County Engineer may require a security to guarantee the restoration and/or rehabilitation.

H. County Forces and County Contract Road Inspection

Road construction performed by County forces or by contract for the County will be inspected under the supervision of the County Engineer.

I. Call Before You Dig

Contractors are responsible for timely notification of utilities in advance of any construction in rights-of-way or utility easements. The Utility Notification Center phone number (1-800-424-5555) should be prominently displayed on the work site.

512 UTILITIES

A. Franchising Policy and Permit Procedure

1. Utilities to be located within existing and proposed County road rights-of-way shall be constructed in accordance with current franchise and/or permit procedure and in compliance with these Standards. In their use of the rights-of-way, utilities will be given consideration in concert with the traffic carrying requirements of the road which are, namely, to provide safe, efficient and convenient passage for motor vehicles, pedestrians, and other modes of transportation. Aesthetics shall be a consideration. As a matter of policy, locating electric utilities underground will be strongly encouraged, and may be required by other county regulations. Utilities are subject to County policies relating to drainage, erosion/sedimentation control and sensitive areas as set forth in Whatcom County Code Chapters 12.24 through 12.30 as they apply.

2. Permits for new placement and replacement of existing utility poles and other utility structures shall be accompanied by written certification from a professional engineer (or from an agent authorized by the utility to certify) that the installation conforms to these Standards and that the proposed work is in conformity with sound engineering principles related to roadway safety and environmental protection.

3. Requests for exceptions to these Standards will be processed in accordance with the variance procedure in Section 504.F.

4. Contractors are responsible for timely notification of utilities in advance of any construction in rights-of-way or utility easements. Utility Notification Center phone number - 1-800-424-5555.

5. The Utility Agency or authorized representative shall submit plans detailing the nature, location, size and type of utility to be installed. Plans shall conform to Section 507 of these Standards.

6. The Utility Agency shall comply with the provisions of Section 511 of these Standards.

7. The Utility Agency or authorized representative shall submit As-built plans in conformity to the provisions of Section 507.B-3 of these Standards.

B. Securities

The County Engineer may require a performance security as specified in Section 509.

C. Trench Excavation

Trench excavations shall not be left open over night on roads unless provisions have been approved. General provisions for maintenance of traffic shall be in accordance with Section 508.K-4 of this chapter.

D. Utility Locations

Utilities within the rights-of-way on new roads or in roadways where existing topography, utilities or storm drains are not in conflict (or as required by Title 21) shall be located as shown on the typical sections in Drawings 512.E-1 and E-2, and as indicated below. Where existing utilities or storm drains are in place, new utilities shall conform to these Standards as nearly as practical and yet be compatible with the existing installations. All utilities shall be buried at least 36 inches deep from finished grade, unless otherwise approved by the County Engineer. Where utilities are placed in the ditch area, the buried depth shall be at least 30 inches below the bottom of the ditch. Notwithstanding other provisions, underground systems shall be located at least three (3) feet away from road centerline and where they will not otherwise disturb existing survey monumentation. Exceptions may be approved when necessary.

1. Gas and Water Lines:

   a) Shoulder and ditch section-

      Preferable: Outside of ditch line.
      Otherwise: In shoulder three (3) feet from edge of pavement.

   b) Curb and gutter section-

      Preferable: one-and-a-half (1-1/2) feet from the back of curb, or at a distance that will clear root masses of street trees if these are present or planned.
      Otherwise: In the street as close to the curb as practical without encroaching on the stormwater system.

   Mains and service connections to all lots shall be completed prior to placing of surfacing materials.

2. Sanitary Sewers - In the general case, three (3) feet south and west of centerline; depth to be 36 inches minimum cover from finished grade, or 30 inches from ditch bottom or natural ground. Wherever possible, sanitary sewers proposed on existing roads shall consider locating outside road rights-of-way within separate easements.

3. Designated side of centerline:

   GAS: SOUTH AND WEST
   WATER: NORTH AND EAST
   SANITARY SEWER: SOUTH AND WEST

4. Gravity systems - Sanitary or stormwater systems shall have precedent over other systems in planning and installation except where non-gravity systems have already been installed under a previously-approved permit and are subject to applicable provisions of such permits or franchises.

5. Electric Utilities, Power, Telephone, Cable TV - The preferred location is underground, either side of road at plan location and depth of at least 36 inches, at the edge of rights-of-way and compatible with other utilities and storm drains.

6. Locations are as above unless a common utility trenching plan is approved.

   Otherwise: Every new placement and replacement of existing utility poles and other utility structures above grade shall conform to the following:

   a) Utility poles and other structures shall be as close to the edge of rights-of-way as practical.

      i) Roads with shoulders: poles or appurtenances shall be located back of ditches and in accordance with the criteria in Drawing 512.E-1, unless protected by an approved impact attenuating device.

      ii) Roads with sidewalks: poles or above ground appurtenances shall be located a minimum of two (2) feet from the back of sidewalk, or two (2) feet from back of curb if sidewalk is not present (see Drawing 512.E-2).

      iii) The integrity of the proposed utility, provisions for public safety during the course of construction, and the safety/accident potential for the life of the installation shall be considered.

7. For work not authorized by franchise or other agreement, a permit may be required for occupancy of road rights-of-way by all utility facilities, including private lines. No facility shall be used for other than the purpose stated, unless written approval is granted by the County. A pole or other appurtenance, which incurs repeated damage, shall be relocated or protected.

8. Locations of poles shall be compatible with driveway approaches, intersections, and other road features (i.e., they shall not interfere with sight distances, road signing, traffic signals, culverts, etc.). To the extent possible, utilities shall share facilities.

E. Utility Installations

The WSDOT/APWA Standard Specifications, particularly Division 7, will generally apply unless otherwise stated below.

1. Pole utilities and underground utilities, including service crossings, shall be installed or relocated prior to the start of road construction if planned road cuts and fills are minimal and location of road elements can be clearly indicated in advance. Otherwise such utilities, with connections, shall be installed or relocated after the subgrade has been completed but before surfacing has been placed.

2. All utility installations inside county rights-of-way shall be done under a Revocable Encroachment Permit, approved by the County Engineer.

F. Utility Cuts On Existing Traveled Roads

1. Generally, as a matter of policy, utility trenching or transverse cuts in County roads will be discouraged. They will not be permitted unless it can be shown that alternatives, such as boring or jacking or relocating outside of the paved area are unfeasible, or unless the utility can be installed just prior to reconstruction or overlay of the road.

2. In instances where trenching or cutting is permitted, the following procedures will apply: Pavement patching shall include cutting existing pavement; removal of existing pavement; preparation/placement, and compaction of backfill material; placement and compaction of aggregate base material; temporary patch (if required); application of tack coat; and construction of asphalt concrete or Portland cement concrete pavement "patch" in accordance with the applicable sections of the current edition of the WSDOT/APWA Standard Specifications and the following:

   a) Pavement Cutting - The existing pavement shall be first cut by an appropriate means to facilitate removal. Immediately prior to placement of the permanent "patch," the existing pavement shall be cut with a saw along rectangular lines as shown on the approved plans. The pavement shall be removed so as to provide a firm, neat, straight, vertical edge to join. The Contractor shall be responsible for maintaining the edge. Additional saw cuts may be required to correct broken or damaged edges.

   b) Backfilling - Backfilling shall be done in accordance with WSDOT/APWA Standard Specifications, Section 7-08.3(3), or equivalent. Minimum width of trench shall be two (2) feet to accommodate vibratory compactor.

As an alternative to mechanical compaction, trench backfill above the bedding and below the base course or ATB may be accomplished by use of controlled density backfill in a design mixture approved by the County Engineer. Cylinders tested shall be between 200 and 500 psi. The 28-day test strength shall be between 200 and 500 psi. On crossings that required to be open to traffic before final trench restoration is completed may use steel sheet plates as approved by the County Engineer.

c) Temporary Pavement Patching - A temporary two (2)-inch thick cold asphalt plant mix patch may be required to be placed and maintained over the trench area until final settlement is satisfactory to the County Engineer. The temporary patch shall be removed and the existing pavement cut before permanent repairs are made.

d) Permanent Pavement Repair - The structural section of the patch shall be equal to the section of the existing pavement. In no case shall the thickness of asphalt concrete be less than two-and-a-half (2-1/2) inches. Full depth asphalt concrete patches shall be placed in layers not exceeding three (3) inches with adequate compaction.

e) Tack Coat - A tack coat shall be uniformly applied to all edges to be joined and lapping six (6) inches over the existing pavement. The lines from the new asphalt pavement shall be raked over the tack coat, feathered and rolled or tamped to seal the joint. The joint shall be sealed per the WSDOT/APWA Standard Specifications.

f) Asphalt Concrete - Asphalt concrete used for patching shall be Class "B" and shall be furnished, placed and compacted in conformance with WSDOT/APWA Standard Specifications.

g) Portland Cement Concrete: Portland cement concrete mix used for patching shall be a 6.5 sack mix and shall be furnished and placed in conformance with the WSDOT/AWPA Standard Specifications.

h) Overlay - Any disruption of one-third or more of the travel lane, may require a full width overlay or pavement reconstruction at the direction of the County Engineer. See Drawing 512.E-4.

3. Permanent pavement restoration shall be performed according to Drawings 512.E-3 and 512.E-4. A performance security may be required to guarantee final restoration work as described in Section 509.

4. No person, firm, or corporation shall commence work or permit any person, firm, or corporation to commence work on the construction, alteration, repair, or removal of any utility or the cutting and/or paving within county rights-of-way without first obtaining a Revocable

Encroachment Permit or a determination from the County Engineer that a permit is not required, except under emergency conditions.

5. Any person/contractor who does the work within the county rights-of-way is liable for the quality and stability of their work.

G. Public Water Line Installation

All water lines installed in county rights-of-way which are intended to serve the general public shall meet generally-accepted engineering standards regarding water supply, distribution and fire protection, and shall be in compliance with applicable local, state and federal requirements.

513 BRIDGES AND ASSOCIATED RETAINING WALLS

A. Bridge Design Criteria

Except as specified below, Whatcom County bridges, whether on public roads or on private roads, shall be designed and constructed to meet the minimum performance requirements and criteria set forth in the latest edition of "Standard Specifications for Highway Bridges," adopted by AASHTO and in accordance with the requirements of WSDOT/APWA Standard Specifications. Bridge and approach railings shall be provided in accordance with those references or with WSDOT/APWA Standard Plans. All new bridges shall be designed to carry an AASHTO HS 20-44 live load or greater. All bridge work is subject to flood and critical area review.

B. Bridge Geometrics

1. In the general case, the bridge shall comprise the full width and configuration of the road being served. This may include the traveled way plus curb, sidewalks, walkway, bike facility, and equestrian facility and/or shoulder on one or both sides. Requirements for utilities shall be duly considered. Bridge roadway width shall be measured between curbs or between faces of rails, whichever is less, but in no case shall it be less than 24 feet.

2. Where typical speeds are 35 mph or higher, and in the professional judgment of the County Engineer, significant pedestrian, bike and/or horseback traffic can be expected, the County Engineer may require that the facilities for these other modes of traffic be separated from motor vehicle traffic.

3. Approach railings shall be made structurally continuous with bridge railings and shall meet AASHTO specifications as cited in Section A above.

4. The height of bridge clearance above streams shall be as specified in Section 513.C.

C. Bridge Clearance Requirements

Bridges shall be designed to convey flows for runoff events up to and including the 100-year event in a manner that does not increase the potential for flooding in the surrounding community or cause bridge failure. To assure this goal, the bridge must provide sufficient clearance (vertical clearance between the 100-year peak water surface and the low chord of the bridge) to allow for passage of debris. In addition, the bridge must provide sufficient clearance to allow for uncertainties in hydraulic calculations such as an increase in floor elevation due to bed aggradation and flows exceeding 100-year rates.

Clearance requirements differ with size (mean annual flow) of the stream as described below. A risk analysis shall be performed on all streams. The risk analysis shall address debris passage, bed aggradation and a safety margin as described below and clearly quantify the required clearance. Estimation of mean annual flow can be from simple measurement of normal winter flow. Mean annual flow may also be made from gauge records, continuous hydrological modeling, or regression methods as described in the WSDOT Hydraulics Manual Section 2-7.

1. For streams with mean annual flows greater than or equal to 40 cfs, design clearance shall be at least six (6) feet above the maximum stage of the 100 year storm event.

    a) Debris passage - Required clearance for debris should be based on the expected height of material above the water surface, considering the maximum material size available, the ability of the stream to transport it, and the proximity of debris sources. Clearance for debris passage should be applied to the width of channel where debris flow is expected. At a minimum, the width shall be between ordinary high water marks or the tops of defined banks, whichever is greater.

    b) Bed aggradation - Where bed aggradation is probable, a hydraulic analysis shall be submitted with the bed raised by an amount expected during a suitable design life (40 year minimum). Aggradation estimates shall be based on a sediment transport analysis that, where possible, is calibrated to direct cross-section comparisons over time.

    c) Safety margin - The safety margin should account for uncertainties in flow rates, water surface elevations and aggradation over time. In addition, the safety margin should be increased when the surrounding community is especially susceptible to flood damages that could be exacerbated by a debris jam at the bridge.

2. For streams with mean annual flows less than 40 cfs, minimum design clearance within the debris path shall be three (3) feet above the maximum stage of the 100-year storm event. Design clearances less than three (3) feet are allowed if supported by an analysis as outlined above.

D. Bridge Approach Slopes

On streams with levees, the portion of the approach slopes subject to floodwaters must be connected to the existing levees and the approach slopes designed to meet Federal Emergency Management Administration (FEMA) levee construction and stability standards.

E. Bridge Retaining Wall Design Criteria

Retaining walls on public or private roads, or retaining walls required as an integral element of the site grading activity subject to Section 507-F of these Standards shall be designed and constructed consistent with the minimum performance specifications of AASHTO as set forth in the latest edition of "Standard Specifications for Highway Bridges," and in accordance with the performance specifications of WSDOT/APWA Standard Specifications.

514 ENFORCEMENT AND PENALTIES

The purpose of this section is to ensure that regulations and standards relating to construction activities are followed. Failure to comply with these Standards will be cause for withholding or withdrawing approval of permits or plans, forfeiture of security, and/or other penalties as provided by law.

Whenever any work is being done contrary to the provisions of these Standards, the County Engineer may order the work stopped. The notice shall be in writing and served on any persons engaged in the doing or causing such work to be done, or may be conspicuously posted at the site (see 514.B. for procedure of stop work order). Any such persons shall forthwith stop such work until authorized by the County Engineer or the administrative authority to proceed with the work.

A. Offense and Penalty

Any person who engages in or is responsible for development activities, and fails to:

- Obtain a permit or project approval; or
- comply with any permit conditions or requirements of approval; or
- comply with the requirements of these standards,

commits a civil offense and may be fined a sum not to exceed $1,000.00 for the first time offense. The amount of the fine shall be referred to as the penalty.

1. Length of Offense – Each day, or portion thereof, of development activity conducted in violation of any of these regulations shall constitute a separate offense. An offense committed in violation of any of these regulations shall begin on the date that a Notice of Violation has been issued.

2. Notice of Violation and Stop Work Order – In the event any person violates any of the provisions of these Standards or fails to make corrections after being informed of such violation, the County Engineer shall issue a notice of violation to be delivered to the owner and the owner's agent, and a copy of which shall be conspicuously posted at the site. The notice shall describe the violation and may order all work to cease until authorized to proceed. Failure to comply with the order to stop work shall be a gross misdemeanor punishable upon conviction, by a minimum fine of $500 up to a maximum fine of $5,000, or one year in jail or both. Under no circumstance may the court defer or suspend any portion of the minimum $500.00 fine for any conviction under this section. Each day or part thereof of noncompliance with said stop work order shall constitute a separate offense.

3. Notice of Penalty – The penalty provided in this section shall be imposed by a notice in writing, either by certified mail with return receipt requested, or by personal service to the person incurring the same. The notice of penalty shall include the amount of the penalty imposed and shall describe the violation with sufficient detail to reasonably ensure all involved parties have an understanding of the act which caused the violation.

4. Restoration or Mitigation – If the construction or related activities have occurred on the site in violation of these standards, prompt corrective action, restoration or mitigation of the affected area will be required when appropriate to protect the health, life safety, and environment in and around development areas. If this provision is not complied with, the County may restore or mitigate the affected area and charge the responsible person the full cost of such activity.

5. Penalties - Penalties and fines shall be administered in the following manner:

6. First Offense – Any person who commits only one offense within a five (5) year period of time is guilty of a first offense.

7. Repeat Offense – Any person who commits an offense subsequent to a first offense shall be guilty of a repeat offense regardless of the location or type of offense set forth in Section 514.A. of this section.

8. Penalty for repeat offenses – Repeat offenses shall receive a penalty that equals the sum of the fines for the first offense and all subsequent fines multiplied by a number corresponding to the number of offenses committed. Repeat offenses will be added to this formula until a five-year period passes without an offense.

9. Remission of Fines – Within 20 days after the notice is received, the person incurring the penalty may apply in writing to the County Engineer for remission or mitigation of such penalty. Upon receipt of the application, the County Engineer may remit or mitigate the penalty upon whatever terms are deemed proper.

10. Authority of the Prosecuting Attorney – The prosecuting attorney may enforce compliance with this section by such injunctive, declaratory or other actions as deemed necessary to insure that violations are prevented, ceased or abated.

11. Other Available Relief – In addition to the civil remedies provided above, the County Engineer or the owner or owners of land affected by violations of the provisions of this section may bring such injunctive, declaratory or

other actions as deemed necessary to ensure that violations are prevented or cease and to otherwise enforce the provisions of this section.

12. Appeals – Appeals of administrative decisions may be made pursuant to Section 504.G of these Development Standards.

B. Procedures for Issuing Stop-Work Orders

The following procedures have been developed in recognition of property owners' and County-permit applicants ' rights to due process of law pertaining to the issuance of Stop-Work Orders (SWO) by the Whatcom County Public Works Department. These procedures include provision for an initial assessment of whether the situation requiring the issuance of an SWO is an emergency situation or a non-emergency situation. This initial assessment of the situation shall be documented and may require advisement by a Division Manager or Department Director.

1. Non-Emergency Situation – A situation may be assessed as non-emergency in those instances where there is a code violation but no associated imminent and significant threat to public safety or the environment. In a non-emergency situation, the County official shall issue a Correction Notice (CN). The CN may include the intent to issue an SWO no less than 10 (ten) business days following receipt of the CN. If the CN includes notice of the intent to issue an SWO, the CN shall include notice of the right to request an administrative deprivation hearing within 10 (ten) business days following receipt of the CN. The CN shall be hand delivered or sent by both certified and regular mail.

2. Emergency Situation – A situation may be assessed as an emergency in those instances where there is a code violation and an associated imminent and significant threat to public safety or the environment. In an emergency situation, the County official shall issue an SWO. The SWO shall include, in writing, notice of the right to request a deprivation hearing within 72 hours following receipt of the SWO and information on the normal code-specific consequences of violations and appeal procedures. If there is no person on site to receive the SWO, the SWO, along with notice of the right to request a deprivation hearing within 72 hours, and information pertaining to the normal code-specific consequences of violations and appeal procedures shall be sent by certified and regular mail.

3. Administrative Pre-deprivation Hearing – The deprivation hearing will be attended by the County official who issued the CN or SWO, and the Division Manager or Department Director.

   In a deprivation hearing for a non-emergency situation, the preliminary determination made by the County official and the intent to issue an SWO will be reviewed. A final determination will be made by the Division

Manager or Department Director whether to uphold or annul the official's decision to issue an SWO. If the intent to issue an SWO is upheld, an SWO will be issued and the normal code-specific consequences of violations and appeal procedures shall apply. If the administrator determines that the intent to issue an SWO shall not be upheld, the notice of intent to issue an SWO shall be withdrawn.

In a deprivation hearing where an emergency situation exists, the preliminary determination made by the County official to issue the SWO will be reviewed. A final administrative decision will be made by the Division Manager or Department Director whether to uphold or annul the decision to issue the SWO. If the issuance of the SWO is upheld, the normal code-specific consequences of violations and appeals procedures shall apply. If the administrator determines that the SWO was issued in error, the SWO shall be annulled and immediately withdrawn. In the event that the person in receipt of the SWO timely filed an appeal and had paid the appeal fee, and the administrator determines that the SWO was issued in error and that the SWO shall be annulled, the entire appeal fee will be refunded.

515 DEFINITIONS AND ABBREVIATIONS

A. Definitions

The terms used in these Standards are defined below:

Access Easement

Provides public and/or private access for pedestrians through private property and/or provides a public utility vehicular access to a public facility located outside of public rights-of-way.

ADT

Average Daily Traffic defined as the total volume during a given time period (in whole days), greater than one day and less than a year, divided by the number of days in that time period.

AWDT (AWT)

Average Weekday Traffic is an average 24-hour traffic volume occurring on weekdays (Monday through Friday) for some period of time less than one year.

Bridge

A structure built over a depression or obstacle for use as a passageway.

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 non-recoverable slope, and/or a clear run-out area. The clear zone cannot contain a critical slope (slopes steeper than 3H:1V). Design Clear Zone is the minimum target value used in highway design.

Channel

A feature that conveys surface water and is open to the air.

Collector Arterial or Collector

A road whose function is to connect local traffic within a subarea of the county to arterial or collector roads. Service to adjacent land uses is subordinate to traffic movement. Direct access to abutting properties is discouraged and only permitted under extreme circumstances. Through traffic is encouraged and facilitated by movement preference at intersections with access roads and streets. Bicycle and pedestrian activities range from moderate to high.

County

Whatcom County, a municipal corporation and a charter county in the State of Washington. This shall also mean the Whatcom County Engineer.

County Engineer

The Whatcom County Engineer having authorities specified in RCW 36.75.050 and RCW 36.80, or the County Engineer's authorized representative.

County Road

A public road or street which is maintained by Whatcom County as part of the County's road system, as designated by the County Council.

Cul-de-sac

A road or street having one end open to traffic and being terminated by a circular vehicle turnaround and having as its primary function the provision of access to adjoining properties.

Design Hourly Volume, DHV

The DHV is generally the 30th highest hourly volume of the future year chosen for design. On the average rural road or arterial, DHV is about 15% of ADT. For urban areas, DHV is usually between 8-12% of the ADT.

Design Speed

The design speed is the maximum safe speed that can be maintained over a specified section of roadway when conditions are so favorable that the design features of the roadway govern the maximum speed. Typically, roadways are designed for a design speed of 10 miles per hour greater than the anticipated posted speed.

Developer

Any owner of a proposed land, utility or building improvement.

Development

Any activity that requires Federal, State or local approval for the use or modification of land or its resource. These activities include; but are not limited to, subdivision and short subdivisions, binding site plans, planned unit developments, variances, shoreline substantial development, clearing activity, fill and grade work, activity conditionally allowed, building or construction, revocable encroachment permits, and septic approval.

Drainage

The collection, conveyance, containment and/or discharge of surface and stormwater runoff.

Driveway Approach

A privately-maintained access approach to a residential property.

Easement

An interest in land owned by another that entitles the holder of an easement to a specified right of use or general use.

Engineered

Designed by a professional engineer.

Erosion

The gradual wearing away of the land surface by running water, wind, ice or other geological agents, including such process as gravitational creep and the detachment and movement of soil or rock fragments by water, wind, ice or gravity.

Excavation

The mechanical removal of earth and rock material.

Franchise Agreement

An agreement entered into by an entity with Whatcom County to maintain and/or repair utilities in Whatcom County rights-of-way.

Frontage

That portion of a parcel adjacent to a public road that includes the vehicular access point(s).

Grading

Any act which changes the elevation of the ground surface.

Highway

As used herein, a major road owned and maintained by the WSDOT.

Landscape Architect

An individual licensed by the State of Washington to practice landscape architecture under RCW 18.96.

Landscape Areas

For the purpose of these guidelines, "landscape areas" means areas within County rights-of-way, easements or stormwater percolation areas intended or utilized for the planting of trees, shrubbery or other plants. Such areas include: median areas, planter strips and islands.

Local Access Road/Street

Primary function is to provide direct access to adjoining properties. Provides for traffic circulation within and through a neighborhood and may access to higher classification roads and streets.

Level of Service (LOS)

A qualitative measure describing operational conditions within a traffic stream, generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

Minor Access Road/Street

Primarily functions to provide direct access to adjoining properties. Provides for low-speed, low-volume traffic, and access to roads and streets of higher classification.

Minor Arterial

A road connecting two or more towns or communities, connecting two highways of equal or greater capacity, serving as the primary access to a large land area or other major traffic generators. Relatively high overall travel speeds, with through traffic encouraged and facilitated by movement preference at intersections. Access is controlled and infrequent to abutting properties.

Neighborhood Collector

Streets connecting two or more neighborhoods and typically connecting to higher classification streets or other collectors. Transit use is low while the neighborhood focus is for bicycle and pedestrian use. Direct driveway access is discouraged but may be provided to abutting properties only in the event that no other feasible alternative exists.

Perimeter Public Road

The road adjacent to the portion of a parcel that has no internal road access point.

Principal Arterial

A road which moves high volumes of traffic quickly across and between cities and/or towns. Access is normally limited to intersections with other arterials or collectors. Direct access to abutting property is prohibited or minimal. The level of fixed route transit service is high; bicycle and pedestrian activities are low.

Professional Civil Engineer (PE)

An individual licensed by the State of Washington to practice civil engineering under RCW 18.43.

Professional Land Surveyor (PLS)

A person licensed by the State of Washington to practice land surveying under RCW 18.43.

Public Road

A road, which serves the general public, is within public rights-of-way, and is maintained either by the County, a municipality, or WSDOT.

Rights-of-way

A legal right of passage over a parcel of land generally established by either dedication, ownership or easement.

Road

Connotes rural characteristics when used with a route classification (see "Street"). Also connotes the combination of roadway and rights-of-way.

Roadway

The general term used to describe the strip of land, structure and surface treatment over which vehicles travel. Roadway, as used herein, includes the area between the outside edges of shoulders, or between curb faces, and excludes ditches, curbs and sidewalks.

Rural

The general land use classification that identifies those areas outside the Urban Growth Area and having residential lot sizes greater than one (1) net acre as defined in Title 20, Definitions, Minimum Lot Size.

Sediment

Fragmented earthen material that originates from the weathering and erosion of rocks or unincorporated deposits and is transported by, suspended in, or deposited by water action.

Sedimentation

The depositing of sediment.

Sidewalk

A paved pedestrian facility adjacent to, or in near proximity to, a public or private street.

Street

Except where applied to a specific route classification, "Road" and "Street" shall be considered interchangeable terms for the purposes of these Standards. When used with a route classification, connotes urban characteristics.

Technical Advisory Committee

See Appendix A, Chapter 2.37, Whatcom County Code.

Traveled way

The portion of the roadway intended for movement of vehicles, exclusive of shoulders and lanes for parking, bicycles, turning and storage for turning.

Truck Traffic

All buses, single-unit trucks and truck combinations, except the light delivery trucks. A light delivery truck is a single-unit truck, such as a van or pickup, with size and operating characteristics similar to those of a passenger car and commonly used for short-haul, light delivery service. Vehicles in the commercial truck class are normally those having 26,001 lb or greater gross vehicle weight (GVW) rating of the manufacturer (RCW 46.25.010).

Urban

General land use classification which identifies those areas inside the Urban Growth Area as defined by the Whatcom County Comprehensive Plan with an intensive land use or having urban residential lot size characteristics equal to one (1) net acre or less (as defined in Title 20, Definitions, Minimum Lot Size).

Utilities

Any water, gas, sanitary sewer, stormwater conveyance system, electrical, telephone, wire or television communication service, and all persons, companies or governmental agencies furnishing the same.

Walkway

A pedestrian facility, typically in rural areas, which may or may not be adjacent to a road. Walkways differ from sidewalks in standards, alignment, shape, location, construction material, and overall installation. A walkway may also function as a bicycle path/facility in which cases the bikeway standards will prevail.

Wetlands

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

B. <u>Abbreviations</u>

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disability Act
ADT	Average Daily Traffic
APWA	American Public Works Association
ASTM	American Standard for Testing Materials

AWDT	Average Weekday Traffic
DHV	Design Hourly Volume
LOS	Level of Service
MUTCD	Manual of Uniform Traffic Control Devices
NOAA	National Oceanic and Aerospace Administration
RCW	Revised Code of Washington: Legislated requirements of the State of Washington
SCS	U.S. Soil Conservation Service
UBC	Uniform Building Code (1979 or current)
USCS	Unified Soil Classification System
WAC	Washington Administrative Code: Requirements developed by State of Washington agencies
WCC	Whatcom County Code
WSDOT	Washington State Department of Transportation

INDEX TO DRAWINGS

508.E-1	HANDRAIL FOR A ROCK RETAINING WALL DETAIL
508.E-2	HANDRAIL DETAIL
508.F-1	CURB DETAIL
508.F-2	STANDARD CATCH BASIN FRAME AND GRATE DETAIL
508.F-3	THRU-CURB INLET CATCH BASIN FRAME AND GRATE DETAIL
508.F-4	ROLLED CURB FRAME AND GRATE
508.G-1	CURB RAMP DETAIL -TYPE 1
508.G-2	CURB RAMP DETAIL -TYPE 2
508.G-3	CURB RAMP DETAIL -TYPE 3
508.G-4	CURB RAMP DETAIL -TYPE 4
508.G-5	CURB RAMP LOCATION DETAIL
508.H-1	PERMANENT CONTROL MONUMENT DETAIL
508.I-1	MAILBOX DETAIL
508.N-1	ROAD NAME SIGN DETAIL
510.D-1	MINIMUM IMPROVEMENTS FOR OPENING PUBLIC RIGHTS-OF-WAY DETAIL
510.E-1	GRAVEL ROAD CONVERSIONS TO BITUMINOUS SURFACE TREATMENT DETAIL
512.E-1	RURAL ROAD STANDARD UTILITY LOCATION DETAIL
512.E-2	URBAN STREET STANDARD UTILITY LOCATION DETAIL
512.E-3	TRENCH REPAIR DETAIL
512.E-4	PAVEMENT RESTORATION DETAIL

APPENDICES

A. ROAD STANDARDS ORDINANCE

B. TRAIL PERMIT, ENCROACHMENT PERMIT, AND OTHER ROAD-RELATED ORDINANCES

C. GRAVEL ROAD CONVERSION POLICY

D. PRELIMINARY TRAFFIC INFORMATION FORM

E. ENGINEERED TRAFFIC STUDY GUIDELINES

F. PLAN CHECKLIST

G. RETAINING WALL DETAILS

H. UNIFIED SOIL CLASSIFICATION SYSTEM

I. WHATCOM COUNTY'S APPROVED PLANT LIST