PW

AGENDA SUMMARY

To: The Board of County Commissioners

From: John Langley, P.E., Senior Engineer
Kent Cash, P.E., Asst. County Engineer

Reviewed and Approved:

Kenneth C. Stone, P.E., County Engineer

Martin Carty, Director

Re: RESOLUTION
Adopt Cowlitz County Road and
Street Design Standards
and Repeal Resolution No. 94-028

Agenda Item No. 5 -

Dept. of Origin: Public Works

Date Submitted: 03/31/99

For Agenda of: 04/05/99

Expenditure Required: $ n/a

Amount Budgeted: $ n/a

Budget Action Required: n/a

Clearance of Other Concerned Departments:

Approved for Agenda:

Attending: No one will attend.

List of Exhibits:

Resolution
Cowlitz County Road and Street Design Standards

Summary Statement and Department Recommendation:

Attached are a resolution and revised Cowlitz County Road and Street Design Standards for county roads. These revised standards reflect various changes from the previously adopted standards (Resolution No. 94-028).

It is the recommendation of the Department of Public Works that the Board move to adopt the attached resolution adopting the Cowlitz County Road and Street Design Standards for county roads and repealing Resolution No. 94-028.

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Attachments

Cowlitz County
Department of Public Works

COWLITZ COUNTY

ROAD AND STREET DESIGN STANDARDS

Resolution No. 99 054

COWLITZ COUNTY
Department of Public Works
County Administration Building, Room 101
207 Fourth Avenue North
Kelso, Washington 98626-4189
Phone (360) 577-3030

FOREWORD

The following standards have been adopted as required and in conformance with the Revised Code of Washington, Chapter 36.86.

APPLICABILITY

These design standards shall apply to all new construction of county roads, and, as far as practicable, feasible and in the best interests of the county, to the reconstruction of county roads.

INTENT

The intent of this document is to provide uniform design standards to help insure reasonable convenience and safety of the motoring public, economy of maintenance and adequate access for emergency vehicles.

DEVIATIONS

These design standards do not preclude the use of innovative designs such as one-way loops, separated roadway levels and other special treatments. Each design proposal, which has a roadway section different than the standard, will be considered by the County Engineer, but deviations must be justified on the basis of topographic or other special problems inherent in the site under development. Request for deviations shall be made at the time a proposal is filed. The County Engineer shall review and approve the request and/or make a recommendation to the Board of County Commissioners and/or Washington State Department of Transportation as required by county policy and/or state law.

DEFINITIONS

TYPES OF STREETS/ROADS

Low Volume Access - Place -- A short street, cul-de-sac, or court. The primary purpose of a "place" is to conduct traffic to and from dwelling units to other streets within the hierarchy of streets. Usually a place is a dead end street with no thru-traffic.

Access - Lane -- A short street, cul-de-sac, or court, or a street with branching places or lanes. The primary purpose of a "lane" is to conduct traffic to and from dwelling units to other streets within the hierarchy. Occasionally, a lane will connect with two or three small places or lanes. Usually, there is no thru-traffic between two streets of a higher classification.

Minor Collector - Subcollector – Provides access to places and lanes and conducts traffic to an activity center or a higher classification street. It may be a loop street connecting one collector or arterial street at two points, or a more or less straight street conducting traffic between collector and/or arterial streets.

Major Collector - Collector -- Functions to conduct traffic between major arterial streets and/or activity centers. It is a principal traffic artery within residential areas and carries relatively high volume. A collector has potential for sustaining minor retail or other commercial establishments along its route which will influence the traffic flow.

Arterial -- The major street in the hierarchy. It has high average daily traffic and is not intended to be a residential street. An arterial provides connections with major state and interstate roadways and has a high potential for the location of significant community facilities as well as retail, commercial and industrial facilities.

Abbreviations –

ADT . . . . . Average Daily Traffic

LBST . . . . . Light Bituminous Surface Treatment

PCC . . . . . Portland Cement Concrete

ACC . . . . . Asphalt Cement Concrete

AASHTO . . . . . American Association of State Highway and Transportation Official

MUTCD . . . . . Manual of Uniform Traffic Control Devices

WSDOT . . . . . Washington State Department of Transportation

DHV . . . . . Design Hour Value

NAVD . . . . . North American Vertical Datum

GENERAL REQUIREMENTS

1. Workmanship and materials shall be in accordance with the latest edition of the *State of Washington Standard Specifications for Road and Bridge Construction* or as approved by the County Engineer.

2. All roadway design shall be accomplished through the use of current state-of-the-art design criteria (WSDOT and AASHTO) and shall be approved by the County Engineer.

3. The roadway widths specified in the urban section of these standards were developed to handle the parking generated in a typical single-family residential development. Other types of developments with greater or lessor needs for roadside parking may require greater or lessor width. (Parking is allowed on both sides of the street.) All roadways in the urban section have curbs and gutters and piped drainage.

4. A traffic generation factor of ten (10) vehicles per day for a single-family dwelling shall be used to determine which roadway section shall apply.

5. Prior to construction, complete plans and specifications shall be submitted to the County Engineer for approval. These plans shall be prepared and signed by a licensed civil engineer in accordance with state law. The plans and specifications shall generally furnish, but are not limited to, the following data:

   A. General Information – Plan size shall be 24" x 36".

      1. Vicinity maps shall be located on the first sheet of all plans and shall show the project location in respect to the nearest major intersection.
      2. Letter size shall not be smaller than 0.10 of an inch high.
      3. A north arrow shall be shown on each plan view.
      4. Drawing scales shall be 1" = 20', 50', or 100' horizontally and 1" = 2', 4', 5', or 10' vertically, as approved except structural drawings.
      5. The location and elevation of a NAVD 88, United States Geological Survey, State Highway, or Cowlitz County bench mark shall be shown. No other datum shall be used without the permission of the County Engineer. Temporary bench marks shall be shown on the plans.
      6. Title sheet shall include a table of design elements used including:
         a. Road classification;
         b. Design speed;
         c. Superelevation (Maximum);
         d. ADT or DHV; and
         e. Any additional information that the county deems necessary.
      7. Index to drawings;
      8. Appropriate title block;
      9. Legend, if applicable;
      10. Typical cross sections; and
      11. Structural design methods and calculations for roadway sections and structures.

B. Plan View – Plan views shall show the following:

1. Right of way, property, tract and easement lines;
2. Subdivision name, lot numbers, road names and other identifying labels;
3. Location and stationing of existing and proposed road centerlines and curb faces, 50-foot tic marks with all major features and points of control properly stationed. Minimum stationing of 100-ft. intervals.
4. Horizontal curve information and curb return data. Include top of curb return elevation, station, offset at quarter points;
5. Existing and proposed utilities;
6. Location and size of drainage facilities. Drainage facility stationing shall be located in relationship to the street stationing at all manholes, basins or other key locations;
7. Sidewalk ramp locations;
8. Centerline stationing of all intersecting streets. Include station equations at intersections;
9. Location and description of existing survey monuments, including section corner, quarter corners, donation land claims and others as appropriate.
10. Any additional information that the county deems necessary.

C. Profile View – Profile views shall show the following:

1. Stationing, elevations, vertical curve data and slopes for centerline of roads.;
2. Top of curb and/or ditch inverts may be required;
3. Existing ground along the centerline of the roadway;
4. Centerline of existing roads at least 200 feet beyond proposed intersections;
5. Show existing ground beyond existing roads if necessary;
6. Vertical alignment of roads;
7. All proposed drainage facilities, types, inverts, top elevations, slopes, materials, station and offset;
8. Existing drainage facilities that affect the design;
9. Datum and bench mark locations;
10. Superelevation diagram; and
11. Any additional information that the county deems necessary.
12. Cross sections for review.

6. Cut slopes shall be a maximum slope of 1.5:1 and fills a maximum slope of 2:1 unless otherwise approved by the County Engineer.

7. All traffic control devices shall conform to the *Manual for Uniform Traffic Control Devices* (MUTCD).

8. Sidewalk access ramps shall be included in all construction as required by state law and approved by the County Engineer.

9. Clear zone areas and guardrails will be required in accordance with Washington State Department of Transportation standards as approved by the County Engineer.

BASE AND SURFACING

1. Source and type of base and surfacing materials must be approved by the County Engineer before construction begins. Native materials meeting the specifications may be approved for construction use by the Engineer.

2. The following structural sections may generally be used where fair to good soil conditions exist and where little, if any, heavy truck traffic is expected. Under all other conditions, a pavement design completed by a licensed civil engineer will be required by the County Engineer:

Table I
Road Structural Section

		Alternate #1			Alternate #2
	Road Type	**Crushed Surfacing Base Course**	**Crushed Surfacing Top Course**	**Asphalt**	**Type & Amount of Material**
URBAN	Place	8"	4"	3-1/2"	6" PCC
	Lane	8"	4"	3-1/2"	6" PCC
	Subcollector	8"	4"	3-1/2"	6" PCC
	Collector	Requires Structural Design			
	Arterial	Requires Structural Design			
	Road Type	**Crushed Surfacing Base Course**	**Crushed Surfacing Top Course**	**Surfacing**	
RURAL	Low Volume Access	9"	3"	2-1/2" ACP	
	Access	9"	3"	2-1/2" ACP	
	Minor Collector	9"	3"	3-1/2" ACP	
	Major Collector	Requires Structural Design			
	Arterial	Requires Structural Design			

3. Construction Geotextile for stabilization required unless otherwise approved by the County Engineer.

DESIGN

Horizontal Alignment. Alignments shall meet the following requirements:

a. Centerline alignment of improvements shall be parallel to the centerline of the right of way.

b. Centerline of a proposed street extension shall be aligned with the existing street centerline.

Intersections. The following specify minimum requirements for intersections:

a. A tangent section shall be carried a minimum of 20 feet each side of the intersecting right of way lines.

b. The interior angle at intersecting streets' centerlines shall be kept as near 90 degrees as possible, and in no case will it be less than 75 degrees.

c. Curb return radii at intersections shall be as shown in Table II below. The right of way radii at intersections shall be sufficient to maintain at least the same right of way to curb spacing as the lower class roadway.

Table II
Turning Radii
(feet- minimums)

Street Classification	Edge of Pavement/Curb Returns				
	Arterial	Major Collector/ Collector	Minor Collector/Sub Collector	Access/ Lane	Low Volume Access/Place
Arterial	55	40	30	25	25
Major Collector/Collector	40	40	30	25	25
Minor Collector/ Subcollector	30	30	30	25	25
Access/Lane	25	25	25	25	25
Low Volume Access/Place	25	25	25	25	25

Cul-de-sacs, Roadway Crown, Sidewalks, Guardrails and Transitions. Minimum requirements for cul-de-sacs are as follows:

a. Minimum curb radius for cul-de-sac bulbs shall be 50 feet. Right of way radius shall be sufficient to maintain at least the same right of way to curb spacing as in the adjacent portion of the road.

b. The minimum curb radius for transitions into cul-de-sac bulbs shall be 25 feet. Right of way radius shall be sufficient to maintain at least the same right of way to curb spacing as in the adjacent portion of the road.

c. Roadways shall have a normal cross-slope of 2½ percent.

d. Sidewalks and driveway approaches shall be constructed in accordance with County Standards.

e. Sidewalk width shall be 5-feet measured from back of curb, or if a 2-foot minimum planter strip is provided behind the curb, the sidewalk width may be reduced to four feet (4') (measured from back of planter strip).

f. Guardrail design shall be based on AASHTO publication, "Guide for Selecting, Locating and Designing Traffic Barriers" and WSDOT Standard Plans for Road and Bridge Construction.

g. Road width transitions from a narrower width to a wider width shall be designed with a minimum 10 to 1 taper, as approved.

h. Road width transitions from a wider width to a narrower width shall have a length of transition taper designed as follows:

$$L = SW \quad \text{Where S = 45 mph or more.}$$

$$L = \frac{WS^2}{60} \quad \text{Where S = less than 45 mph.}$$

Where L = Minimum length of taper (ft).
S = Posted speed.
W = Edge of pavement to edge of pavement offset width.

Vertical Alignment. Alignments shall meet the following requirements:

a. Maximum road gradients shall be as shown in Table V.

b. Intersections shall be provided with a landing averaging four percent (4%) or less, within 20 feet of the edge of the intersecting road.

c. Changing in vertical grade greater than one percent (1%) shall be accomplished with a vertical curve meeting standard design criteria and as shown in the tables below:

Table III

Crest Vertical Curves

Design Speed	K*
25	20-20
30	30-30
35	40-50
40	60-80
45	80-120
50	110-160
55	150-220

Table IV

SAG Vertical Curves

Design Speed	K*
25	30-30
30	40-40
35	50-50
40	60-70
45	70-90
50	90-110
55	100-130

$*K = \frac{L}{A} = \frac{\text{Feet}}{\text{Percent}}$ (per AASHTO)

A = Algebraic difference in grades (percent)
L = Length of vertical curve (feet)

Table V

ROAD AND STREET DESIGN STANDARDS

	Street Type	Traffic Volumes Per Day	Typical Speed	Roadway Width	Surfacing Width	Surfacing Type	Maximum Curvature * (Min. Radius)			Maximum Grade			Right of Way[1]
							Flat Terrain	Rolling Terrain	Mount. Terrain	Flat Terrain	Rolling Terrain	Mount. Terrain	
URBAN	Place	0-100	25	32'	32'	PCC/ACP	250'	200'	100'	8%	12%	15%	60'
	Lane	75-350	25	32'	32'	PCC/ACP	460'	300'	200'	7%	10%	12%	60'
	Subcollector	200-1000	25	36'	36'	PCC/ACP	700'	430'	230'	6%	8%	11%	60'
	Collector	500-3000	30	40'	40'	PCC/ACP	760'	460'	250'	6%	7%	9%	60'
	Arterial	1500+	35+	44'+	44'+	PCC/ACP	830'+	500'+	270'+	4%-	5%-	7%-	70'+
RURAL	Low Volume Access	0-160	25	26'	24'	LBST/ACP	250'	200'	100'	8%	12%	15%	50'
	Access	160-480	30	26'	24'	ACP	460'	300'	200'	7%	10%	12%	50'
	Minor Collector	400-1000	35	30'	30'	ACP	700'	430'	230'	6%	8%	11%	60'
	Major Collector	800-3000	35	36'	36'	ACP	760'	460'	250'	6%	7%	9%	60'
	Arterial	1500+	40+	40'+	40'+	ACP	830'+	500'+	270'+	4%-	5%-	7%-	80'+
PRIVATE	**For private road standards, contact the Fire and Life Safety Coordinator at Cowlitz County Dept of Building and Planning.**												

*Appropriate superelevation shall be provided.

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[1] Additional right of way may be required to accommodate cuts, fills and utilities. Turnarounds shall be constructed at the end of all roadways.