Chapter 1230

Geometric Cross Section Basics

1230.01 General
The geometric cross section is composed of multiple lateral design elements such as lanes, shoulders, medians, bike facilities, and sidewalks. The designer’s task is to select, size, and document these elements appropriately. There is flexibility in the selection of design element dimensioning.

All WSDOT routes, regardless of context, are referred to in the Design Manual as “highways.” Under this definition, freeways are a subset of highways while Interstate freeways are one specific type of freeway.

Refer to the Design Manual Glossary of Terms for many of the terms used in this chapter. See Chapter 300 for design documentation requirements.

1230.02 Guidance for Specific Facility Types
Guidance regarding geometric cross sections is located in various Design Manual chapters. The chapter depends on the facility type. Examples of specific facility types include:

- Highways (general)
- Freeways
- Ramps
- Auxiliary lanes
- Collector-Distributor lanes
- Service lanes
- Frontage roads
- HOV facilities
- Median U-turns and crossovers
- Transit facilities including bus pull-outs
- Enforcement areas
- Slow vehicle turn-outs
- Truck weighing facilities
- Shared use paths
- Sidewalks
- Bicycle Facilities

Exhibit 1230-1 shows some common facility types along with the corresponding chapter that geometric cross section guidance can be found in.
### Exhibit 1230-1 Geometric Cross Section - Guide to Chapters

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Lane width</th>
<th>Turning roadway width</th>
<th>Shoulder width</th>
<th>Median width</th>
<th>Lateral clearance to curb or barrier</th>
<th>Side slope</th>
<th>Cross slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highways (General)</td>
<td>Chapter 1231</td>
<td>Chapter 1240</td>
<td>Chapter 1231</td>
<td>Chapter 1239</td>
<td>Chapter 1239</td>
<td>Chapter 1239</td>
<td>Chapter 1250</td>
</tr>
<tr>
<td>Freeways</td>
<td>Chapter 1232</td>
<td>Chapter 1240</td>
<td>Chapter 1232</td>
<td>Chapter 1239</td>
<td>Chapter 1239</td>
<td>Chapter 1239</td>
<td>Chapter 1250</td>
</tr>
<tr>
<td>Ramps</td>
<td>Chapter 1360</td>
<td>Chapter 1240</td>
<td>Chapter 1360</td>
<td>Chapter 1239</td>
<td>Chapter 1239</td>
<td>Chapter 1239</td>
<td>Chapter 1360 &amp; Chapter 1250</td>
</tr>
<tr>
<td>Auxiliary lanes</td>
<td>Chapter 1270 or Chapter 1360 [1]</td>
<td>Chapter 1240</td>
<td>Chapter 1270 or Chapter 1360 [1]</td>
<td>N/A</td>
<td>Chapter 1239</td>
<td>Chapter 1239</td>
<td>Chapter 1270</td>
</tr>
<tr>
<td>C-D roadways</td>
<td>Chapter 1360</td>
<td>Chapter 1240</td>
<td>Chapter 1360</td>
<td>N/A</td>
<td>Chapter 1239</td>
<td>Chapter 1239</td>
<td>Chapter 1360</td>
</tr>
<tr>
<td>HOV lanes, ramp bypass lanes, etc.</td>
<td>Chapter 1410</td>
<td>Chapter 1410</td>
<td>Chapter 1410</td>
<td>N/A</td>
<td>Chapter 1410 &amp; Chapter 1239</td>
<td>Chapter 1239</td>
<td>Chapter 1410</td>
</tr>
<tr>
<td>Left-side direct HOV access (DHOV)</td>
<td>Chapter 1420</td>
<td>Chapter 1420</td>
<td>Chapter 1420</td>
<td>Chapter 1420 (for DHOV)</td>
<td>Chapter 1420 &amp; Chapter 1239</td>
<td>Chapter 1239</td>
<td>Chapter 1250</td>
</tr>
<tr>
<td>Part-time shoulders</td>
<td>Chapter 1430</td>
<td>Chapter 1240</td>
<td>Chapter 1430</td>
<td>Chapter 1239</td>
<td>Chapter 1430</td>
<td>Chapter 1239</td>
<td>Chapter 1250 &amp; Chapter 1430</td>
</tr>
<tr>
<td>Metered shoulders</td>
<td>Chapter 1440 &amp; Chapter 1440</td>
<td>Chapter 1440</td>
<td>Chapter 1360</td>
<td>Chapter 1440</td>
<td>Chapter 1440</td>
<td>Chapter 1239</td>
<td>Chapter 1360 &amp; Chapter 1250</td>
</tr>
<tr>
<td>Shared use path</td>
<td>Chapter 1515</td>
<td>Chapter 1515</td>
<td>Chapter 1515</td>
<td>N/A</td>
<td>Chapter 1515</td>
<td>Chapter 1515</td>
<td>Chapter 1515</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Geometric cross section guidance for other special purpose facilities is in various chapters. Examples include special use lanes, bridges, transit facilities, bus pull outs, median U-turns and crossovers, enforcement areas, truck weighing facilities, pedestrian bridges and tunnels, sidewalks &amp; bicycle facilities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

General guidance for curb design is in Chapter 1239. Guidance for curb is also found for numerous types of facilities (Chapter 1310 and others.)

[1] Passing and climbing lanes, see Chapter 1270; Auxiliary lanes between interchanges see Chapter 1360.

Exhibit 1230-1 is not a comprehensive list of guidance associated with either a facility or a design element. It is intended to be a quick reference to the chapter containing the primary guidance related to the specific element and facility type.
For guidance related to intersections see Chapter 1310. For guidance related to sidewalks see Chapter 1510. For
guidance related to bicycle facilities see Chapter 1520. For guidance related to bridges see Chapter 720.

1230.03 Common Elements
In addition to the guidance specific to the facility type, also see the general guidance related to cross-sectional
elements that are common to various facility types:

- Lanes Chapter 1231
- Shoulders, side slopes, medians & curbs Chapter 1239
- Lateral clearance to curb and barrier Chapter 1239
- Parking & streetside (behind the curb) elements Chapter 1238
- Cross slope and superelevation Chapter 1250

1230.04 Jurisdiction for Design and Maintenance
On all state highways in locations outside of cities or towns and within limited access design areas, geometric
design is to be consistent with this Design Manual.

On state highways within an incorporated city or town, develop design features in cooperation with the local
agency. For NHS routes, use the Design Manual. For non-NHS routes, the Local Agency Guidelines may be used
for dimensioning design elements

Cross-sectional design within incorporated cities or towns can get complicated due to the joint-jurisdictional
authority. WSDOT typically has jurisdiction between the backs of curbs, and cities typically have jurisdiction
outside the backs of curbs (see Exhibit 1230-2). When no curb is present, the city or town holds responsibility for
the roadside outside the paved shoulder. Despite the jurisdictional differences, it is extremely important to
cooperatively determine a cross-sectional design.

Refer to Chapter 301 for additional information on jurisdictional maintenance responsibilities and
considerations for maintenance agreements.
Exhibit 1230-2 State and City Jurisdictional Responsibilities

Roadway

City Responsibility/ Jurisdiction

Extent of State Responsibility / Jurisdiction

Curb & Gutter (typ.)

R/W

City Responsibility/ Jurisdiction

Roadway with Raised Median
(Landscaped)

City Responsibility/ Jurisdiction

Extent of State Responsibility / Jurisdiction

Curb & Gutter (typ.)

R/W
1230.05 References

1230.05(1) Design Guidance

- Highway Runoff Manual, M 31-16, WSDOT
- Local Agency Guidelines (LAG), M 36-63, WSDOT
- Plans Preparation Manual, M 22-31, WSDOT
- Standard Plans for Road, Bridge, and Municipal Construction, M 21-01, WSDOT
- Standard Specifications for Road, Bridge, and Municipal Construction, M 41-10, WSDOT

1230.05(2) Supporting Information

- Understanding Flexibility in Transportation Design – Washington, WA-RD 638.1, Washington State Department of Transportation, 2005  
  www.wsdot.wa.gov/research/reports/fullreports/638.1.pdf
  www.nacto.org
- A Policy on Geometric Design of Highways and Streets (Green Book), AASHTO, current edition
  Available from the WSDOT Library.