

## APPENDIX H

### DIRECTORY OF FIGURES AND TABLES

		Page
Figure 5-1	Stopping Sight Distance for Crest Vertical Curves	5-6
Figure 5-2	Stopping Sight Distance for Sag Vertical Curves	5-7
Figure 5-3	Stopping Sight Distance on Horizontal Curves	5-8
Figure 5-4	Developing Superelevation on 2-Lane Highways	5-12
Figure 5-5	Developing Superelevation on 4-Lane Highways	5-13
Figure 5-6	Standard Superelevation	5-21
Figure 5-7	Rounding of Cutbanks	5-27
Figure 5-8	Full Width Median Detail	5-31
Figure 5-9	Landscaping Accommodation	5-33
Figure 5-10	End Treatments	5-35
Figure 5-11	Freeway and Highway Clearances	5-42
Figure 5-12	Railroad Clearances	5-43
Figure 5-13	Concrete Barrier Placement at Bridge Column	5-46
Figure 5-14	Truck Speed Distance Curves	5-55
Figure 5-15	Median Detail with Right In/Right Out	5-57
Figure 5-16	Raised Median Detail-Right In/Right Out	5-58
Figure 5-17	Vehicle-Pedestrian Conflict	5-59
Figure 5-18	Pork Chop with Non-Traversable Median	5-60
Figure 5-19	Left Ingress from One Direction Only	5-61
Figure 5-20	Left Ingress from Both Directions	5-62
Figure 5-21	Example of Frontage Road Locations	5-65
Figure 5-22	U-Turn at Intersection	5-66
Figure 5-23	U-Turn at Mid-Block	5-67
Figure 6-1	Standard Urban Freeway Section	6-9
Figure 6-2	Measurement of Spacing Standards for Table 6-3	6-11
Figure 6-3	Measurement of Spacing Standards for Table 6-4	6-12
Figure 6-4	Standard Freeway Sections	6-13
Figure 7-1	Standard Sections for Rural Highways	7-12
Figure 8-1	Expressway Median Widths and Dual Left Turns Detail	8-4
Figure 8-2	Positive and Negative Offset at Intersections	8-5
Figure 8-3	Oregon Highway Plan Land Use Designation Overlay	8-11
Figure 8-4	Potential Special Transportation Area (STA) Photo	8-14
Figure 8-5	Potential Urban Business Area (UBA) Photo	8-24
Figure 8-6	Potential Commercial Center (CC) Photo	8-31
Figure 8-7	Urban Fringe/Suburban Photo	8-34

## APPENDIX H

### DIRECTORY OF FIGURES AND TABLES

		Page
Figure 9-1	Accommodating and Designing for Vehicles Detail	9-4
Figure 9-2	Offset Approaches	9-5
Figure 9-3	Functional Intersection Area	9-6
Figure 9-4	Throat Distance at Approaches	9-7
Figure 9-5	Approach Roads/Sidewalks	9-10
Figure 9-6	Right Turn Channelization	9-12
Figure 9-7	Left Turn Channelization	9-17
Figure 9-8	Reversing Curve Option for Left Turn Channelization	9-18
Figure 9-9	Channelized Intersection	9-20
Figure 9-10	Curb Extensions	9-22
Figure 9-11	Skew Angle and Excessive Skew	9-24
Figure 9-12	Island Geometry	9-25
Figure 9-13	Crosswalk Ramp Placement	9-27
Figure 9-14	Signal Pole Placement	9-29
Figure 9-15	Dual Left Turn Channelization	9-31
Figure 9-16	Dual Right Turn Channelization	9-32
Figure 9-17	Elements of a Roundabout	9-35
Figure 9-18	Central Island Cross Section	9-38
Figure 9-19	Minimum Splitter Island Dimensions	9-40
Figure 9-20	Bike Curb Cut	9-42
Figure 9-21	Interchange Ramp Details	9-47
Figure 9-22	Interchange Ramp Details	9-48
Figure 9-23	Interchange Ramp Spread	9-52
Figure 9-24	Exit and Entrance Ramp Terminals	9-53
Figure 9-25	Swept Path	9-55
Figure 9-26	Non-Freeway Interchange Ramp Typical Section	9-56
Figure 9-27	2-Lane Ramp Meter with Taper to One Lane Entrance Ramp	9-57
Figure 9-28	Minimum Ramp Terminal Spacing	9-60
Figure 9-29	Non-Freeway Interchange Example	9-64
Figure 9-30	Non-Freeway Interchange Example and Future Improvements	9-65
Figure 10-1	Ritchie's Rockfall Catch Ditch Design Chart	10-21
Figure 10-2	Sliver Fill Benching Detail	10-27
Figure 11-1	Criteria for Pedestrian Rail at Back of Walk Detail	11-6
Figure 11-2	Sight Distance at Mid-Block Raised Median Crossing	11-11
Figure 11-3	Cut Through Median Crossing	11-11
Figure 11-4	Sight Lines with Curb Extensions	11-12

## APPENDIX H

### DIRECTORY OF FIGURES AND TABLES

		Page
Figure 12-1	Bus Pullout Detail	12-8
Figure 12-2	Near-side Bus Stop with Curb Extensions	12-10
Figure 12-3	Far-side Bus Stop with Curb Extensions	12-13
Figure 12-4	Fully Developed Bus Stop	12-14
Figure 12-5	Typical Intersection Design for Bus	12-17
Figure 12-6	Conceptual Park and Ride Applications	12-22
Figure 13-1	Design Exception Request Form	13-7,13-8
Figure 13-2	Design Concurrence Request Form	13-10, 13-11
Table 2-1	Design Standards Selection Matrix	2-11
Table 5-1	Urban Non-Freeway Design Speeds	5-3
Table 5-2	Safe Stopping Sight Distance	5-5
Table 5-3	Standard Spiral Lengths and Superelevations (Freeways/2-Lane Rural)	5-17
Table 5-4	Standard Spiral Lengths and Superelevations (Urban-eMax 4%)	5-18
Table 5-5	Standard Spiral Lengths and Superelevations (Suburban-eMax 6%)	5-19
Table 5-6	Safe Speed Table	5-22
Table 5-7	Embankment Widening on High Fills	5-26
Table 5-8	Left Side Shy Distance	5-32
Table 5-9	Clear Zone Distances	5-44
Table 5-10	Horizontal Curve Adjustments	5-45
Table 6-1	ODOT 4R/New Design Standards for New Construction and Reconstruction	6-8
Table 6-2	Interchange Spacing	6-10
Table 6-3	Minimum Spacing Standards-Freeways with 2-Lane Crossroads	6-11
Table 6-4	Minimum Spacing Standards-Freeways with Multi-Lane Crossroads	6-12
Table 6-5	Interstate Maintenance Design Features	6-18,6-19
Table 6-6	Maximum Gradient	6-16
Table 7-1	Rural Expressway Standards	7-3
Table 7-2	ODOT 4R/New Rural Arterial Design Standards	7-8
Table 7-3	ODOT Rural 3R Lane and Shoulder Widths	7-19
Table 7-4	3R Rural Minimum Usable Bridge Widths	7-21
Table 7-5	3R Rural Mandatory Design Features	7-23
Table 7-6	3R Rural Low-Cost Safety Measures	7-24

## APPENDIX H

### DIRECTORY OF FIGURES AND TABLES

		Page
Table 8-1	ODOT 4R/New Urban Standards-Expressways	8-7
Table 8-2	ODOT 4R/New Urban Standards-STAs	8-23
Table 8-3	ODOT 4R/New Urban Standards-UBAs	8-30
Table 8-4	ODOT 4R/New Urban Standards-Urban Fringe/Suburban Area	8-38
Table 8-5	ODOT 4R/New Urban Standards-Traditional Downtown/CBD	8-45
Table 8-6	ODOT 3R Urban Design Standards	8-47
Table 8-7	3R Urban Minimum Usable Bridge Widths	8-49
Table 8-8	3R Urban Mandatory Design Features	8-51
Table 8-9	3R Urban Low-Cost Safety Measures	8-52
Table 8-10	Urban Preservation Design Features	8-54,8-55
Table 8-11	Additional Urban Design Features	8-56
Table 9-1	Typical Private Approach Style and Width	9-8
Table 9-2	Freeway Interchange Spacing	9-44
Table 9-3	Ramp Design Speed	9-45
Table 9-4	Single Lane Ramp Capacity	9-45
Table 9-5	Minimum Radius and Sight Distance on Ramps	9-46
Table 9-6	Maximum Grades for Ramps	9-50
Table 10-1	20 Year Design-Mobility Standards	10-38
Table 10-2	Ideal Daily Capacity	10-40
Table 10-3	FS Adjustment Chart	10-41
Table 10-4	FT Adjustment Chart	10-41
Table 12-1	Typical Bus Stop Spacing	12-3
Table 12-2	Advantages/Disadvantages of Far-side, Near-side, Mid-block Bus Stops	12-5
Table 12-3	Advantages and Disadvantages of Bus Pullouts	12-7
Table 13-1	Data Needs for Design Exception Justification	13-6
Table 13-2	Design Exception List	13-9