

Appendix C.

Metered Traffic Calculations

Notes on the ramp meter worksheets

Version 21-Dec-07

- 1 If entering demand is greater than freeway capacity, the freeway volume is set to the capacity limit.
- 2 The 95% capacity column is used to provide a 5% factor of safety before reaching LOS F.
- 3 Exit ramps and freeway through volumes are reduced proportionally to account for constrained traffic
- 4 The ramp meter columns indicate the volume reduction as a percentage of the entrance ramp volume.
- 5 Unmet demand column indicates the volume of vehicles held back by the ramp meter.
- 6 Storage required columns indicate length of ramp to stop bar for 1 to 3 lanes.
- 7 System entrance ramps are not metered and are indicated with a blacked-out square.
- 8 Values in the worksheets can be changed to explore different ramp scenarios
- 9 When the freeway cells under ramp meters turn yellow the volume has exceeded the 95% capacity and red if over capacity.

0.95 Planned Capacity

I-75 Northbound AM

| Location | # of Through Lanes | # of Aux Lanes | Total # of Lanes | Truck % | Design Speed | Theoretical Capacity | Planned Capacity | Certified Traffic Volumes | | Adjusted Exit | Adjusted Entrance | Ramp Meter | | Storage Required (Ft) | | | |
|----------------------|--------------------|----------------|------------------|---------|--------------|----------------------|------------------|---------------------------|------|---------------|-------------------|------------|------|-----------------------|----------|---------|----------------|
| | | | | | | | | Freeway | Exit | | | Entrance | Exit | % | Entrance | Freeway | Unmet Entrance |
| South of WHV | 4 | 4 | 8 | 13% | 60 | 7775 | 7386 | 5680 | | 420 | | | 5680 | | | | |
| WHV Exit | 4 | 4 | 8 | 13% | 60 | 7775 | 7386 | 5260 | 420 | | | | 5260 | | | | |
| Bank Street Entrance | 4 | 4 | 8 | 13% | 60 | 7775 | 7386 | 5680 | 420 | 420 | 420 | 412 | 5672 | 8 | 200 | 100 | 67 |
| WHV Entrance | 5 | 5 | 10 | 13% | 60 | 9718 | 9232 | 6590 | 910 | 910 | 910 | 892 | 6564 | 18 | 450 | 225 | 150 |
| Hopple Exit | 5 | 5 | 10 | 13% | 60 | 9718 | 9232 | 6120 | 470 | 468 | | | 6096 | | | | |
| I-74 Exit | 4 | 4 | 8 | 13% | 60 | 7775 | 7386 | 4520 | 1600 | 1594 | | | 4502 | | | | |
| Hopple Entrance | 4 | 4 | 8 | 13% | 60 | 7775 | 7386 | 4970 | 450 | 450 | 450 | 441 | 4943 | 9 | 225 | 113 | 75 |
| I-74 Entrance | 4 | 4 | 8 | 16% | 60 | 7667 | 7284 | 7270 | 2300 | 1616 | | | 6559 | | | | |
| Mitchell Exit | 4 | 4 | 8 | 16% | 60 | 7667 | 7284 | 6290 | 980 | 884 | | | 5675 | | | | |
| Mitchell Entrance | 4 | 4 | 8 | 15% | 60 | 7702 | 7317 | 7260 | 970 | 970 | 970 | 951 | 6626 | 19 | 475 | 238 | 158 |
| Nonwood Exit | 4 | 4 | 8 | 14% | 60 | 7738 | 7351 | 5680 | 1580 | 1442 | | | 5184 | | | | |
| Nonwood Entrance | 4 | 1 | 5 | 14% | 60 | 9673 | 9189 | 7980 | 2300 | 600 | 2300 | 2300 | 7484 | | | | |
| Paddock Exit | 4 | 4 | 8 | 14% | 60 | 7738 | 7351 | 7340 | 640 | 600 | | | 6884 | | | | |
| Paddock Entrance | 4 | 1 | 5 | 14% | 60 | 9409 | 8939 | 7950 | 610 | 847 | 610 | 598 | 7482 | 12 | 300 | 150 | 100 |
| RR EB Exit | 5 | 5 | 10 | 17% | 60 | 9539 | 9062 | 7050 | 900 | 489 | | | 6635 | | | | |
| RR WB Exit | 4 | 4 | 8 | 17% | 60 | 7631 | 7249 | 6530 | 520 | 386 | | | 6146 | | | | |
| Galbraith Exit | 4 | 4 | 8 | 17% | 60 | 7631 | 7249 | 6120 | 410 | | | | 5760 | | | | |
| RR EB Entrance | 4 | 4 | 8 | 17% | 60 | 7631 | 7249 | 7240 | 1120 | 864 | 864 | 864 | 6624 | | | | |
| Galbraith Entrance | 4 | 4 | 8 | 17% | 60 | 7631 | 7249 | 7780 | 540 | 540 | 540 | 524 | 7148 | 16 | 400 | 200 | 133 |
| RR WB Entrance | 4 | 4 | 8 | 17% | 60 | 7631 | 7249 | 7880 | 500 | 451 | | | 6797 | | | | |
| Shepherd Exit | 4 | 4 | 8 | 18% | 60 | 7596 | 7216 | 7390 | 490 | | | | 690 | | | | |
| Shepherd Entrance | 4 | 1 | 5 | 18% | 60 | 9495 | 9020 | 8080 | 690 | 1112 | | | 7487 | | | | |
| Glendale Exit | 4 | 4 | 8 | 19% | 60 | 7562 | 7184 | 6880 | 1200 | | | | 6375 | | | | |
| Glendale Entrance | 4 | 1 | 5 | 19% | 70 | 9863 | 9370 | 7510 | 630 | 630 | 630 | 630 | 7005 | | | | |
| SHR Exit | 4 | 4 | 8 | 19% | 70 | 7890 | 7496 | 6540 | 970 | 905 | | | 6100 | | | | |
| SHR Entrance | 4 | 1 | 5 | 19% | 70 | 9863 | 9370 | 7090 | 550 | 550 | | | 6650 | | | | |

I-75 Southbound AM

| Location | # of Through Lanes | # of Aux Lanes | Total # of Lanes | Truck % | Design Speed | Theoretical Capacity | Planned Capacity | Certified Traffic Volumes | | Adjusted Exit | Adjusted Entrance | Ramp Meter | | Storage Required (Ft) | | | |
|-----------------------|--------------------|----------------|------------------|---------|--------------|----------------------|------------------|---------------------------|------|---------------|-------------------|------------|------|-----------------------|----------|---------|----------------|
| | | | | | | | | Freeway | Exit | | | Entrance | Exit | % | Entrance | Freeway | Unmet Entrance |
| I-275 to Sharon Road | 4 | 1 | 5 | 19% | 70 | 9863 | 9370 | 8430 | | 1130 | | | 8430 | | | | |
| Sharon Exit | 4 | 4 | 8 | 19% | 70 | 7890 | 7496 | 7300 | 1130 | | | | 7300 | | | | |
| Sharon Entrance | 4 | 1 | 5 | 19% | 70 | 9863 | 9370 | 7750 | 450 | 450 | 450 | 396 | 7696 | 54 | 1,350 | 675 | 450 |
| Glendale Exit | 4 | 4 | 8 | 18% | 60 | 7596 | 7216 | 6000 | 1750 | 1738 | | | 5958 | | | | |
| Glendale Entrance | 4 | 1 | 5 | 18% | 60 | 9495 | 9020 | 6550 | 550 | 541 | | | 5901 | | | | |
| Shepherd Exit | 4 | 4 | 8 | 18% | 60 | 7596 | 7216 | 6000 | 550 | | | | 5901 | | | | |
| Shepherd Entrance | 4 | 4 | 8 | 17% | 60 | 7631 | 7249 | 6150 | 150 | 150 | 150 | 132 | 6033 | | | | |
| AW Galbraith RR Exit | 4 | 4 | 8 | 17% | 60 | 7631 | 7249 | 5820 | 330 | 324 | | | 5709 | | | | |
| AW Galbraith Entrance | 4 | 4 | 8 | 17% | 60 | 7631 | 7249 | 6380 | 560 | 560 | 560 | 493 | 6202 | 67 | 1,675 | 838 | 558 |
| RR WB Entrance | 4 | 4 | 8 | 17% | 60 | 7631 | 7249 | 7230 | 850 | 850 | 850 | 850 | 7052 | | | | |
| RR EB Entrance | 4 | 1 | 5 | 14% | 60 | 9062 | 8609 | 8770 | 1540 | 1187 | | | 8239 | | | | |
| Paddock Exit | 4 | 4 | 8 | 14% | 60 | 7738 | 7351 | 7810 | 960 | 902 | | | 7337 | | | | |
| Paddock Entrance | 4 | 1 | 5 | 14% | 60 | 9673 | 9189 | 9070 | 1260 | 2160 | 1260 | 1109 | 8446 | 151 | 3,775 | 1,888 | 1,258 |
| SR 562 Exit | 4 | 4 | 8 | 14% | 60 | 7738 | 7351 | 6750 | 2320 | | | | 6286 | | | | |
| SR 562 Entrance | 4 | 4 | 8 | 15% | 60 | 7702 | 7317 | 7960 | 1210 | 1450 | | | 6046 | | | | |
| Mitchell Exit | 4 | 4 | 8 | 16% | 60 | 7667 | 7284 | 6950 | 530 | 756 | | | 5809 | | | | |
| Mitchell Entrance | 4 | 4 | 8 | 13% | 60 | 7775 | 7386 | 6150 | 800 | 756 | | | 5809 | | | | |
| I-74 Exit | 4 | 4 | 8 | 13% | 60 | 11662 | 11079 | 10530 | 4380 | 3078 | | | 8887 | | | | |
| I-74 Entrance | 5 | 1 | 6 | 13% | 60 | 9718 | 9232 | 9500 | 1030 | 869 | | | 8018 | | | | |
| Hopple Exit | 5 | 5 | 10 | 13% | 60 | 9718 | 9232 | 10300 | 800 | 869 | | | 8018 | | | | |
| Hopple WB Entrance | 5 | 5 | 10 | 13% | 60 | 9718 | 9232 | 10300 | 800 | 230 | 230 | 225 | 8243 | | | | |
| Hopple EB Entrance | 4 | 1 | 5 | 13% | 60 | 9513 | 9037 | 10530 | 230 | 800 | 800 | 784 | 9027 | 16 | 400 | 200 | 133 |
| WHV Exit | 4 | 4 | 8 | 13% | 60 | 7775 | 7386 | 10270 | 260 | 223 | | | 3078 | | | | |
| WHV Entrance | 4 | 1 | 5 | 13% | 60 | 9718 | 9232 | 11330 | 1060 | 1060 | 1060 | 1060 | 8835 | | | | |

I-74 Eastbound AM

| Location | # of Through Lanes | # of Aux Lanes | Total # of Lanes | Truck % | Design Speed | Theoretical Capacity | Planned Capacity | Certified Traffic Volumes | | Adjusted Exit | Adjusted Entrance | Ramp Meter | | Storage Required (Ft) | | | |
|----------------------|--------------------|----------------|------------------|---------|--------------|----------------------|------------------|---------------------------|------|---------------|-------------------|------------|------|-----------------------|----------|---------|----------------|
| | | | | | | | | Freeway | Exit | | | Entrance | Exit | % | Entrance | Freeway | Unmet Entrance |
| West of Montana | 2 | 2 | 4 | 17% | 60 | 3816 | 3625 | 4380 | | | | | 4380 | | | | |
| Montana Entrance | 2 | 1 | 3 | 15% | 60 | 5777 | 5488 | 5790 | 1410 | 1410 | 1410 | 1410 | 5226 | | | | |
| Colerain Exit | 2 | 2 | 4 | 14% | 60 | 3869 | 3676 | 4980 | 810 | 731 | | | 3959 | | | | |
| Colerain Entrance | 2 | 1 | 3 | 13% | 60 | 4694 | 4459 | 6680 | 1700 | 1700 | 1700 | 1700 | 4694 | | | | |
| I-75 Northbound Exit | 2 | 2 | 4 | 2% | 50 | 3921 | 3725 | 4380 | 2300 | 1616 | | | 3078 | | | | |

I-74 Westbound AM

| Location | # of Through Lanes | # of Aux Lanes | Total # of Lanes | Truck % | Design Speed | Theoretical Capacity | Planned Capacity | Certified Traffic Volumes | | Adjusted Exit | Adjusted Entrance | Ramp Meter | | Storage Required (Ft) | | | |
|-------------------------|--------------------|----------------|------------------|---------|--------------|----------------------|------------------|---------------------------|------|---------------|-------------------|------------|------|-----------------------|----------|---------|----------------|
| | | | | | | | | Freeway | Exit | | | Entrance | Exit | % | Entrance | Freeway | Unmet Entrance |
| I-75 NB to I-74 WB Ramp | 2 | 2 | 4 | 13% | 50 | 3718 | 3532 | 1600 | | | | | 1594 | | | | |
| Hopple Merge | 2 | 2 | 4 | 13% | 60 | 3887 | 3693 | 1700 | 100 | 100 | 100 | 100 | 1694 | | | | |
| I-75 SB Merge | 3 | 1 | 4 | 13% | 60 | 7775 | 7386 | 2500 | 800 | 756 | | | 2450 | | | | |
| Colerain Exit | 3 | 3 | 6 | 13% | 60 | 5831 | 5539 | 1890 | 610 | 598 | | | 1852 | | | | |
| Colerain Entrance | 3 | 3 | 6 | 13% | 60 | 5831 | 5539 | 2250 | 360 | 360 | 360 | 360 | 2212 | | | | |
| Montana Exit | 2 | 2 | 4 | 13% | 60 | 3887 | 3693 | 1670 | 580 | 570 | | | 1642 | | | | |

SR 562 Eastbound AM

| Location | # of Through Lanes | # of Aux Lanes | Total # of Lanes | Truck % | Design Speed | Theoretical Capacity | Planned Capacity | Certified Traffic Volumes | | Adjusted Exit | Adjusted Entrance | Ramp Meter | | Storage Required (Ft) | | | |
|----------------------|--------------------|----------------|------------------|---------|--------------|----------------------|------------------|---------------------------|------|---------------|-------------------|------------|------|-----------------------|----------|---------|----------------|
| | | | | | | | | Freeway | Exit | | | Entrance | Exit | % | Entrance | Freeway | Unmet Entrance |
| I-75 NB to SR 562 EB | 1 | 1 | 2 | 7% | 50 | 1913 | 1817 | 1580 | | | | | 1442 | | | | |
| I-75 SB Entrance | 2 | 1 | 3 | 10% | 60 | 4031 | 3829 | 3900 | 2320 | 2160 | | | 3180 | | | | |
| Paddock Exit | 2 | 2 | 4 | 10% | 60 | 3943 | 3746 | 3400 | 500 | 462 | | | 3140 | | | | |
| Paddock Entrance | 2 | 2 | 4 | 10% | 60 | 3943 | 3746 | 3400 | 350 | 350 | | | 3490 | | | | |

SR 562 Westbound AM

| Location | # of Through Lanes | # of Aux Lanes | Total # of Lanes | Truck % | Design Speed | Theoretical Capacity | Planned Capacity | Certified Traffic Volumes | | Adjusted Exit | Adjusted Entrance | Ramp Meter | | Storage Required (Ft) | | | |
|------------------|--------------------|----------------|------------------|---------|--------------|----------------------|------------------|---------------------------|------|---------------|-------------------|------------|------|-----------------------|----------|---------|----------------|
| | | | | | | | | Freeway | Exit | | | Entrance | Exit | % | Entrance | Freeway | Unmet Entrance |
| East of Paddock | 2 | 2 | 4 | 10% | 60 | 3943 | 3746 | 3820 | | 640 | | | 3820 | | | | |
| Paddock Exit | 2 | 2 | 4 | 10% | 60 | 3943 | 3746 | 3180 | 640 | 640 | | | 3180 | | | | |
| Paddock Entrance | 2 | 2 | 4 | 10% | 60 | 3943 | 3746 | 3510 | 330 | 330 | | | 3510 | | | | |
| I-75 SB Exit | 2 | 2 | 4 | 10% | 50 | 3771 | 3582 | 2300 | 1210 | 1210 | | | 2300 | | | | |

Ronald Reagan Eastbound AM

| Location | # of Through Lanes | # of Aux Lanes | Total # of Lanes | Truck % | Design Speed | Theoretical Capacity | Planned Capacity | Certified Traffic Volumes | | Adjusted Exit | Adjusted Entrance | Ramp Meter | | Storage Required (Ft) | | | |
|--------------------|--------------------|----------------|------------------|---------|--------------|----------------------|------------------|---------------------------|------|---------------|-------------------|------------|------|-----------------------|----------|---------|----------------|
| | | | | | | | | Freeway | Exit | | | Entrance | Exit | % | Entrance | Freeway | Unmet Entrance |
| West of Galbraith | 2 | 2 | 4 | 4% | 60 | 4059 | 3856 | 3890 | | 130 | | | 3890 | | | | |
| Galbraith Exit | 2 | 2 | 4 | 3% | 60 | 4079 | 3875 | 3760 | 130 | 130 | | | 3760 | | | | |
| Galbraith Entrance | 2 | 2 | 4 | 3% | 60 | 3901 | 3706 | 5060 | 1300 | 1187 | | | 3561 | | | | |
| I-75 SB Exit | 2 | 2 | 4 | 3% | 60 | 4079 | 3875 | 3520 | 1540 | 864 | | | 2714 | | | | |
| I-75 NB Exit | 2 | 2 | 4 | 3% | 60 | 4079 | 3875 | 2400 | 1120 | 864 | | | 1850 | | | | |
| Reading Exit | 2 | 2 | 4 | 3% | 60 | 4079 | 3875 | 3300 | 900 | 670 | | | 2697 | | | | |
| Galbraith Entrance | 2 | 2 | 4 | 3% | 60 | 4079 | 3875 | 2480 | 820 | 380 | | | 2407 | | | | |

Ronald Reagan Westbound AM

| Location | # of Through Lanes | # of Aux Lanes | Total # of Lanes | Truck % | Design Speed | Theoretical Capacity | Planned Capacity | Certified Traffic Volumes | | Adjusted Exit | Adjusted Entrance | Ramp Meter | | Storage Required (| | |
|----------|--------------------|----------------|------------------|---------|--------------|----------------------|------------------|---------------------------|--|---------------|-------------------|------------|--|--------------------|--|--|
|----------|--------------------|----------------|------------------|---------|--------------|----------------------|------------------|---------------------------|--|---------------|-------------------|------------|--|--------------------|--|--|