

APPENDIX D
2030 LEVELS OF SERVICE WITH IMPROVEMENTS

TABLES D-1 THROUGH D-6
2030 LEVELS OF SERVICE WITH IMPROVEMENTS

Table D-1 Near-Term Signalized Intersection Improvements

| Exit | Approach Dir. | Mvmt. | 2006 AM No-Build | | | 2006 AM Build | | | 2006 PM No-Build | | | 2006 PM Build | | |
|---------------------|-------------------------------|------------|------------------|-----------|------------|---------------|-----------|------------|------------------|-----------|------------|---------------|-----------|------------|
| | | | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) |
| 38 NB | Route 38 EB | L | 18 | B | m#121 | 17 | B | m#129 | 52 | D | #316 | 23 | C | m135 |
| | Route 38 EB | T | 7 | A | 91 | 6 | A | 70 | 21 | C | 261 | 8 | A | m93 |
| | Route 38 EB | R | 4 | A | m9 | 4 | A | m7 | 18 | B | 50 | 7 | A | m10 |
| | Route 38 EB | ALL | 9 | A | - | 8 | A | - | 28 | C | - | 12 | B | - |
| | Route 38 WB | L | 48 | D | 65 | 40 | D | 60 | 53 | D | 127 | 38 | D | 94 |
| | Route 38 WB | T | 22 | C | 149 | 19 | B | 131 | 32 | C | #498 | 33 | C | #345 |
| | Route 38 WB | R | 19 | B | 38 | 16 | B | 34 | 24 | C | 65 | 20 | B | 45 |
| | Route 38 WB | ALL | 24 | C | - | 20 | B | - | 33 | C | - | 31 | C | - |
| | Home Depot NB | L | 29 | C | #106 | 61 | E | #96 | 65 | E | #222 | 45 | D | #171 |
| | Home Depot NB | T | 30 | C | 44 | 29 | C | 42 | 45 | D | 78 | 35 | C | 67 |
| | Home Depot NB | R | 29 | C | 24 | 27 | C | 24 | 43 | D | 38 | 33 | C | 38 |
| | Home Depot NB | ALL | 29 | C | - | 45 | D | - | 54 | D | - | 39 | D | - |
| | Exit ramp SB | L | 26 | C | 109 | 32 | C | #119 | 65 | E | #220 | 30 | C | 130 |
| | Exit ramp SB | T | 28 | C | 72 | 26 | C | 73 | 47 | D | 104 | 31 | C | 84 |
| | Exit ramp SB | R | 27 | C | 62 | 25 | C | 65 | 55 | E | 182 | 32 | C | #118 |
| Exit ramp SB | ALL | 27 | C | - | 28 | C | - | 59 | E | - | 31 | C | - | |
| INTERSECTION | | | 20 | C | - | 20 | C | - | 40 | D | - | 27 | C | - |
| 39 SB | Route 133 EB | L | 9 | A | 19 | 14 | B | 28 | 24 | C | #144 | 17 | B | 17 |
| | Route 133 EB | TR | 16 | B | 415 | 69 | E | #279 | 13 | B | 331 | 6 | A | 156 |
| | Route 133 EB | ALL | 15 | B | - | 63 | E | - | 15 | B | - | 9 | A | - |
| | Route 133 WB | L | 20 | C | #332 | 11 | B | #140 | 5 | A | m8 | 5 | A | m4 |
| | Route 133 WB | TR | 3 | A | 76 | 12 | B | #243 | 9 | A | 375 | 16 | B | #451 |
| | Route 133 WB | ALL | 10 | B | - | 12 | B | - | 9 | A | - | 15 | B | - |
| | International Place NB | L | 46 | D | 10 | 10 | B | 3 | 46 | D | 15 | 20 | C | 9 |
| | International Place NB | T | 47 | D | 61 | 11 | B | 18 | 236 | F | #449 | 53 | D | #241 |
| | International Place NB | R | 46 | D | 41 | 11 | B | 16 | 47 | D | 54 | 21 | C | 44 |
| | International Place NB | ALL | 46 | D | - | 11 | B | - | 140 | F | - | 37 | D | - |
| | Exit ramp SB | L | 48 | D | 81 | 11 | B | 24 | 84 | F | #104 | 22 | C | 43 |
| | Exit ramp SB | T | 79 | E | #293 | 12 | B | 67 | 47 | D | 70 | 21 | C | 40 |
| | Exit ramp SB | R | 47 | D | 87 | 11 | B | 35 | 48 | D | 90 | 21 | C | 62 |
| | Exit ramp SB | ALL | 59 | E | - | 11 | B | - | 51 | D | - | 21 | C | - |
| | INTERSECTION | | | 25 | C | - | 27 | C | - | 48 | D | - | 19 | B |

95th percentile volume exceeds capacity, queue may be longer.

^mVolume for 95th percentile queue is metered by upstream signal.

Table D-2 Mid-Term Unsignalized Intersection Improvements

| Exit | Approach Dir. Mvmt. | 2006 AM No-Build | | | 2006 AM Build Signal | | | 2006 PM No-Build | | | 2006 PM Build Signal | | |
|-------|-----------------------|------------------|----------------|----------------|----------------------|-----|------------|------------------|----------------|----------------|----------------------|-----|------------|
| | | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) |
| 33 NB | Exit ramp EB L | 50 | F | 140 | 13 | B | 170 | 54 | F | 111 | 18 | B | 167 |
| | Exit ramp EB R | 24 | C | 109 | 12 | B | 104 | 14 | B | 51 | 13 | B | 33 |
| | Route 4 NB T | Not Reported | Not Reported | Not Reported | 6 | A | 94 | Not Reported | Not Reported | Not Reported | 11 | B | 341 |
| | Route 4 SB T | Not Reported | Not Reported | Not Reported | 10 | B | 255 | Not Reported | Not Reported | Not Reported | 6 | A | 143 |
| 34 NB | Exit ramp WB L | 20 | C | 40 | 28 | C | 42 | 88 | F | 28 | 47 | D | 182 |
| | Exit ramp WB R | 11 | B | 13 | 24 | C | 38 | 27 | D | 77 | 42 | D | 69 |
| | Route 110 SB L | Not Applicable | Not Applicable | Not Applicable | 13 | B | 56 | Not Applicable | Not Applicable | Not Applicable | 17 | B | 136 |
| | Route 110 SB T | 2 | A | 2 | 4 | A | 246 | 4 | A | 14 | 2 | A | 159 |
| | Route 110 NB TR | Not Reported | Not Reported | Not Reported | 12 | B | 375 | Not Reported | Not Reported | Not Reported | 12 | B | 620 |
| 34 SB | Exit ramp EB L | 16 | C | 9 | 25 | C | 65 | 526 | F | 269 | 27 | C | 83 |
| | Exit ramp EB R | 11 | B | 23 | 0 | A | 0 | 27 | C | 129 | 0 | A | 0 |
| | Route 110 NB L | Not Applicable | Not Applicable | Not Applicable | 6 | A | 11 | 7 | A | 37 | 10 | B | 155 |
| | Route 110 NB T | 1 | A | 6 | 4 | A | 125 | Not Reported | Not Reported | Not Reported | 3 | A | 117 |
| | Route 110 SB T | Not Reported | Not Reported | Not Reported | 14 | B | 251 | Not Reported | Not Reported | Not Reported | 20 | C | 377 |
| 37 NB | Exit ramp EB L/T | 68 | F | 111 | 17 | B | 56 | 234 | F | 242 | 42 | D | 167 |
| | Exit ramp EB R | 28 | D | 145 | 22 | C | 129 | 12 | B | 34 | 32 | C | 53 |
| | Woburn St. NB TR | Not Reported | Not Reported | Not Reported | 5 | A | 101 | Not Reported | Not Reported | Not Reported | 23 | C | 574 |
| | Woburn St. SB L | 15 | C | 34 | 4 | A | 36 | 18 | C | 31 | 23 | C | 128 |
| | Woburn St. SB T | Not Reported | Not Reported | Not Reported | 5 | A | 164 | Not Reported | Not Reported | Not Reported | 8 | A | 121 |
| | Christman Ave. WB LTR | 2 | A | 7 | 16 | B | 30 | 3 | A | 10 | 31 | C | 50 |
| 37 SB | Exit ramp WB L | 622 | F | 707 | 22 | C | 186 | 576 | F | 403 | 37 | D | 199 |
| | Exit ramp WB R | 10 | B | 17 | 15 | B | 37 | 12 | B | 26 | 32 | C | 61 |
| | Woburn St. NB L | 6 | A | 19 | 13 | B | 117 | 6 | A | 32 | 13 | B | 168 |
| | Woburn St. NB T | Not Reported | Not Reported | Not Reported | 4 | A | 31 | Not Reported | Not Reported | Not Reported | 3 | A | 68 |
| | Woburn St. SB TR | Not Reported | Not Reported | Not Reported | 8 | A | 153 | Not Reported | Not Reported | Not Reported | 13 | B | 260 |
| 43 NB | Exit ramp NB L | 159 | F | 141 | 32 | C | 40 | 83 | F | 46 | 21 | C | 41 |
| | Exit ramp NB R | 22 | C | 118 | 31 | C | 1 | 17 | C | 71 | 22 | C | 53 |
| | Mass. Ave. EB L | 3 | A | 10 | 24 | C | 80 | 5 | A | 19 | 28 | C | 102 |
| | Mass. Ave. EB T | Not Reported | Not Reported | Not Reported | 1 | A | 62 | Not Reported | Not Reported | Not Reported | 2 | A | 42 |
| | Loring St. WB TR | Not Reported | Not Reported | Not Reported | 21 | C | 819 | Not Reported | Not Reported | Not Reported | 22 | C | 588 |

Table D-2 Mid-Term Unsignalized Intersection Improvements

| Exit | Approach Dir. Mvmt. | 2006 AM No-Build | | | 2006 AM Build Signal | | | 2006 PM No-Build | | | 2006 PM Build Signal | | |
|--------------|---------------------------|------------------|----------------|----------------|----------------------|-----|------------|------------------|--------------|--------------|----------------------|-----|------------|
| | | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) |
| 43 SB | Exit ramp SB L | 29 | D | 143 | 25 | C | 287 | 83 | F | 46 | 20 | B | 145 |
| | Exit ramp SB R | 11 | B | 34 | 16 | B | 39 | 17 | C | 71 | 15 | B | 34 |
| | Loring St. WB L | Not Applicable | Not Applicable | Not Applicable | 20 | B | 115 | 5 | A | 28 | 14 | B | 51 |
| | Loring St. WB T | Not Reported | Not Reported | Not Reported | 5 | A | 34 | Not Reported | Not Reported | Not Reported | 2 | A | 16 |
| | Loring St. EB TR | Not Reported | Not Reported | Not Reported | 36 | D | 244 | Not Reported | Not Reported | Not Reported | 25 | C | 282 |
| 44 SB | Exit ramp SB L | 29 | D | 143 | 7 | A | 153 | 50 | E | 212 | 8 | A | 148 |
| | Exit ramp SB R | 11 | B | 34 | 4 | A | 23 | 10 | B | 14 | 5 | A | 17 |
| | Merrimack St. EB T | Not Reported | Not Reported | Not Reported | 8 | A | 51 | Not Reported | Not Reported | Not Reported | 8 | A | 87 |
| | Merrimack St. WB T | Not Reported | Not Reported | Not Reported | 8 | A | 47 | Not Reported | Not Reported | Not Reported | 7 | A | 32 |
| 55 NB | Exit ramp NB R | 217 | F | 892 | 16 | B | #313 | 138 | F | 653 | 19 | B | 257 |
| | Route 150 EB T | Not Reported | Not Reported | Not Reported | 12 | B | 86 | 0 | A | 0 | 9 | A | 62 |
| | Route 150 WB T | Not Reported | Not Reported | Not Reported | 15 | B | 161 | 0 | A | 0 | 14 | B | 206 |

Not Reported: Major movements through unsignalized intersections are not reported.

Not Applicable: Movement does not exist in No-Build case

Table D-3 Long-Term Unsignalized Intersection Improvements

| Exit | Approach | Dir. | Mvmt. | 2030 AM No-Build | | | 2030 AM Build Signal | | | 2030 PM No-Build | | | 2030 PM Build Signal | | |
|-------|-----------|------|-------|------------------|--------------|--------------|----------------------|-----|------------|------------------|----------------|----------------|----------------------|-----|------------|
| | | | | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) |
| 49 NB | Exit ramp | NB | L | 192 | F | 117 | 19 | B | 40 | 461 | F | 260 | 9 | A | 49 |
| | Exit ramp | NB | R | 21 | C | 127 | 20 | C | 54 | 466 | F | 1442 | 47 | D | #491 |
| | Route 113 | EB | L | 12 | B | 2 | 16 | B | #106 | Not Applicable | Not Applicable | Not Applicable | 15 | B | 64 |
| | Route 113 | EB | T | Not Reported | Not Reported | Not Reported | 4 | A | 105 | Not reported | Not Reported | Not reported | 17 | B | 269 |
| | Route 113 | WB | T | Not Reported | Not Reported | Not Reported | 11 | B | #522 | Not reported | Not Reported | Not reported | 28 | C | #292 |
| 49 SB | Exit ramp | SB | L | 29 | D | 67 | 11 | B | 83 | 85 | F | 163 | 8 | A | 51 |
| | Exit ramp | SB | R | 11 | B | 9 | 10 | A | 24 | 13 | B | 19 | 8 | A | 18 |
| | Route 113 | EB | L | 8 | A | 2 | 9 | A | 22 | Not Applicable | Not Applicable | Not Applicable | 4 | A | 19 |
| | Route 113 | EB | T | Not Reported | Not Reported | Not Reported | 10 | A | 74 | Not reported | Not Reported | Not reported | 7 | A | 158 |
| | Route 113 | WB | T | Not Reported | Not Reported | Not Reported | 11 | B | m69 | Not reported | Not Reported | Not reported | 5 | A | 112 |
| | Route 113 | WB | R | Not Reported | Not Reported | Not Reported | 20 | B | m39 | Not reported | Not Reported | Not reported | 4 | A | 29 |
| 52 NB | Exit ramp | WB | L | 147 | F | 292 | 12 | B | 121 | 39 | E | 106 | 12 | B | 27 |
| | Exit ramp | WB | R | 15 | B | 31 | 10 | B | 32 | 21 | C | 118 | 11 | B | 199 |
| | Route 110 | SB | L | 2 | A | 4 | 6 | A | 25 | Not Applicable | Not Applicable | Not Applicable | 10 | A | 114 |
| | Route 110 | SB | T | Not Reported | Not Reported | Not Reported | 6 | A | 112 | Not reported | Not Reported | Not reported | 14 | B | 54 |
| | Route 110 | NB | TR | Not Reported | Not Reported | Not Reported | 11 | B | 232 | Not reported | Not Reported | Not reported | 17 | B | 221 |

Not Reported: Major movements through unsignalized intersections are not reported.

Not Applicable: Movement does not exist in No-Build case

Table D-4 Long-Term Signalized Intersection Improvements

| Exit | Approach Dir. | Mvmt. | 2030 AM No-Build | | | 2030 AM Build | | | 2030 PM No-Build | | | 2030 PM Build | | |
|---------------------|----------------|-------|------------------|----------|------------|---------------|----------|------------|------------------|----------|------------|---------------|----------|------------|
| | | | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) | Delay (s) | LOS | Queue (ft) |
| 32 NB | Exit ramp EB | L | 15 | B | 29 | 31 | C | 99 | 20 | B | 73 | 29 | C | 202 |
| | Exit ramp EB | R | 92 | F | #346 | 38 | D | 164 | 18 | B | 23 | 20 | C | 0 |
| | Exit ramp EB | ALL | 79 | E | - | 37 | D | - | 19 | B | - | 25 | C | - |
| | Boston Rd. SB | L | 24 | C | - | 6 | A | 70 | 6 | A | 100 | 16 | B | 22 |
| | Boston Rd. SB | T | 24 | C | m#357 | 13 | B | 644 | 6 | A | 100 | 4 | A | 80 |
| | Boston Rd. SB | ALL | 24 | C | - | 12 | B | - | 6 | A | - | 6 | A | - |
| | Boston Rd. NB | TR | 6 | A | 61 | 8 | A | 76 | 8 | A | 276 | 10 | B | #516 |
| | Boston Rd. NB | ALL | 6 | A | - | 7 | A | - | 8 | A | - | 10 | B | - |
| INTERSECTION | | | 31 | C | - | 16 | B | - | 9 | A | - | 12 | B | - |
| 32 SB | Exit ramp WB | L | 17 | B | 132 | 12 | B | 105 | 18 | B | 82 | 24 | C | 108 |
| | Exit ramp WB | R | 13 | B | 19 | 9 | A | 16 | 19 | B | 109 | 24 | C | 119 |
| | Exit ramp WB | ALL | 16 | B | - | 11 | B | - | 19 | B | - | 24 | C | - |
| | Boston Rd. SB | T | 7 | A | 116 | 9 | A | 157 | 6 | A | 172 | 4 | A | 58 |
| | Boston Rd. NB | T | 64 | E | #751 | 4 | A | 48 | 10 | B | #468 | 4 | A | m121 |
| INTERSECTION | | | 38 | D | - | 9 | A | - | 12 | B | - | 11 | B | - |
| 38 NB | Route 38 EB | L | 21 | C | m#118 | 20 | B | m107 | 53 | D | #346 | 23 | C | m#128 |
| | Route 38 EB | T | 9 | A | 104 | 8 | A | m103 | 22 | C | 256 | 6 | A | m73 |
| | Route 38 EB | R | 5 | A | 9 | 6 | A | m11 | 19 | B | 50 | 7 | A | m8 |
| | Route 38 EB | ALL | 11 | B | - | 11 | B | - | 29 | C | - | 10 | B | - |
| | Route 38 WB | L | 40 | D | #81 | 40 | D | #81 | 53 | D | 140 | 39 | D | 104 |
| | Route 38 WB | T | 23 | C | 176 | 23 | C | 181 | 39 | D | #640 | 42 | D | #392 |
| | Route 38 WB | R | 19 | B | 43 | 19 | B | 44 | 25 | C | 97 | 19 | B | 45 |
| | Route 38 WB | ALL | 24 | C | - | 24 | C | - | 38 | D | - | 38 | D | - |
| | Home Depot NB | L | 32 | C | #128 | 30 | C | 96 | 70 | E | #252 | 46 | D | #204 |
| | Home Depot NB | T | 31 | C | 49 | 31 | C | 49 | 43 | D | 82 | 35 | D | 74 |
| | Home Depot NB | R | 29 | C | 29 | 29 | C | 26 | 42 | D | 38 | 33 | C | 41 |
| | Home Depot NB | ALL | 31 | C | - | 30 | C | - | 57 | E | - | 40 | D | - |
| | Exit ramp SB | L | 29 | C | #169 | 29 | C | #169 | 78 | E | #253 | 33 | C | 33 |
| | Exit ramp SB | T | 28 | C | 93 | 29 | C | 99 | 47 | D | 110 | 33 | C | 94 |
| | Exit ramp SB | R | 26 | C | 63 | 27 | C | 67 | 56 | E | 193 | 43 | D | 206 |
| | Exit ramp SB | ALL | 28 | C | 8 | 29 | C | - | 65 | E | - | 37 | D | - |
| INTERSECTION | | | 21 | C | - | 21 | C | - | 44 | D | - | 31 | C | - |
| 46 NB | Exit ramp EB | LT | 34 | C | 117 | 28 | C | 88 | 264 | F | #615 | 29 | C | 291 |
| | Exit ramp EB | R | 0 | A | 0 | 0 | A | 0 | 0 | A | 0 | 0 | A | 0 |
| | Exit ramp EB | All | 17 | B | - | 14 | B | - | 181 | F | - | 20 | B | - |
| | Gas Station WB | All | 29 | C | 55 | 21 | C | 41 | 29 | C | #76 | 10 | A | 22 |
| | Route 110 NB | All | 1 | A | 15 | 6 | A | 71 | 1 | A | 217 | 5 | A | 98 |
| | Route 110 SB | L | 4 | A | 12 | 3 | A | 11 | 4 | A | 17 | 16 | B | 34 |
| | Route 110 SB | T | 6 | A | 188 | 5 | A | 175 | 6 | A | 81 | 17 | B | 144 |
| | Route 110 SB | All | 5 | A | - | 5 | A | - | 5 | A | - | 17 | B | - |
| INTERSECTION | | | 7 | A | - | 7 | A | - | 7 | A | - | 14 | B | - |

95th percentile volume exceeds capacity, queue may be longer.

^mVolume for 95th percentile queue is metered by upstream signal.

Table D-5 Long-Term Ramp Operation Improvements

| Interchange | 2030 AM No-Build | | 2030 AM Build | | 2030 PM No-Build | | 2030 PM Build | |
|---|-----------------------|-----|-------------------------|-----|-----------------------|-----|-------------------------|-----|
| | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS |
| Exit 32: I-495 at Boston Rd. | | | | | | | | |
| I-495 NB off-ramp to Boston Rd. | over cap | F | 16 | B | 21 | C | 12 | B |
| I-495 NB on-ramp to Boston Rd. | over cap | F | 27 | C | 32 | D | 23 | C |
| I-495 SB off-ramp to Boston Rd. | 33 | D | 27 | D | over cap | F | 29 | D |
| I-495 SB on-ramp to Boston Rd. | 32 | D | 26 | C | over cap | F | 28 | D |
| Exit 33: I-495 at Route 4 | | | | | | | | |
| I-495 NB off-ramp to Route 4 | over cap | F | 21 | C | 26 | C | 17 | B |
| I-495 SB on-ramp to Route 4 | 33 | D | 25 | C | over cap | F | 27 | C |
| Exit 34: I-495 at Route 110 | | | | | | | | |
| I-495 NB off-ramp to Route 110 | 33 | D | 25 | C | 29 | D | 21 | C |
| I-495 SB off-ramp to Route 110 | over cap | F | 26 | C | over cap | F | 29 | D |
| I-495 SB on-ramp to Route 110 | 30 | D | 24 | C | over cap | F | 28 | C |
| Exit 34-35: I-495 at Route 110-Route 3 | | | | | | | | |
| I-495 NB weave to Route 110-Route 3 | >43 | F | >43 | F | >43 | F | No Change- Not widening | |
| Exit 35: I-495 at 495 NB C-D | | | | | | | | |
| I-495 NB C-D off-ramp to Route 3 SB | 21 | C | No Change- Not widening | | 21 | C | No Change- Not widening | |
| I-495 NB C-D weave to Route 3 | >43 | F | No Change- Not widening | | >43 | F | No Change- Not widening | |
| I-495 SB C-D off-ramp to Route 3 NB | 11 | B | No Change- Not widening | | 11 | B | No Change- Not widening | |
| I-495 SB C-D weave to Route 3 | >43 | F | No Change- Not widening | | >43 | F | No Change- Not widening | |
| I-495 SB C-D on-ramp to Route 3 SB | 17 | B | No Change- Not widening | | 17 | B | No Change- Not widening | |
| Exit 36: I-495 at Lowell Connector SB | | | | | | | | |
| I-495 NB C-D on-ramp to Lowell Connector SB | 16 | B | No Change- Not widening | | 14 | B | No Change- Not widening | |
| I-495 NB C-D on-ramp to Lowell Connector NB | 21 | C | No Change- Not widening | | 21 | C | No Change- Not widening | |
| I-495 NB on-ramp to 495 NB C-D | over cap | F | No Change- Not widening | | over cap | F | No Change- Not widening | |
| I-495 SB off-ramp to 495 SB C-D | 33 | D | No Change- Not widening | | over cap | F | No Change- Not widening | |
| I-495 SB C-D off-ramp to Lowell Connector NB | 20 | C | No Change- Not widening | | 18 | B | No Change- Not widening | |
| Exit 37: I-495 at Woburn St. | | | | | | | | |
| I-495 NB off-ramp to Woburn St. | over cap | F | 31 | D | over cap | F | 25 | C |
| I-495 NB on-ramp to Woburn St. | over cap | F | 27 | C | 33 | D | 24 | C |
| I-495 SB off-ramp to Woburn St. | 28 | D | 18 | B | 29 | D | 18 | B |
| I-495 SB on-ramp to Woburn St. | over cap | F | 25 | C | over cap | F | 26 | C |
| Exit 38: I-495 at Route 38 | | | | | | | | |
| I-495 NB off-ramp to Route 38 | over cap | F | 28 | D | 32 | D | 26 | C |
| I-495 NB on-ramp to Route 38 | 30 | D | 25 | C | 29 | D | 23 | C |
| I-495 SB off-ramp to Route 38 | 26 | C | 17 | B | 27 | C | 17 | B |
| I-495 SB on-ramp to Route 38 | 35 | E | 22 | C | 36 | E | 22 | C |

Table D-5 Long-Term Ramp Operation Improvements

| Interchange | 2030 AM No-Build | | 2030 AM Build | | 2030 PM No-Build | | 2030 PM Build | |
|---|-----------------------|-----|-------------------------|-----|-----------------------|-----|-------------------------|-----|
| | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS |
| Exit 39: I-495 at Route 133 | | | | | | | | |
| I-495 NB off-ramp to Route 133 | 34 | D | 29 | D | 31 | D | 24 | C |
| I-495 NB on-ramp to Route 133 | 27 | C | 21 | C | 32 | D | 24 | C |
| I-495 SB off-ramp to Route 133 | 35 | D | 29 | D | 30 | D | | |
| I-495 SB on-ramp to Route 133 | 31 | D | 25 | C | 33 | D | 24 | C |
| Exit 40: I-495 at I-93 SB | | | | | | | | |
| I-495 NB off-ramp to I-93 SB | 31 | D | 26 | C | 33 | D | 27 | C |
| I-495 NB weave to I-93 | 30 | D | 30 | D | 39 | E | 39 | E |
| I-495 NB on-ramp to I-93 NB | 23 | C | 16 | B | 34 | D | 22 | C |
| I-495 SB off-ramp to I-93 NB | 32 | D | 24 | D | 24 | C | 17 | B |
| I-495 SB weave to I-93 | >43 | F | >43 | F | >43 | F | >43 | F |
| I-495 SB on-ramp to I-93 SB | over cap | F | 26 | C | over cap | F | 22 | C |
| Exit 41: I-495 at Route 28 SB | | | | | | | | |
| I-495 NB off-ramp to Route 28 SB | 23 | C | 16 | B | 31 | D | 23 | C |
| I-495 NB off-ramp to Route 28 NB | 19 | B | 12 | B | 28 | D | 21 | C |
| I-495 SB off-ramp to Route 28 | over cap | F | 28 | D | 29 | D | 16 | B |
| I-495 SB on-ramp to Route 28 | 32 | D | 23 | C | 24 | C | 17 | B |
| Exit 41-42: I-495 at Route 28-Route 114 | | | | | | | | |
| I-495 NB weave to Route 28-Route 114 | 18 | B | 18 | B | 34 | D | 34 | D |
| Exit 42: I-495 at Route 114 EB | | | | | | | | |
| I-495 NB off-ramp to Route 114 WB | 19 | B | 12 | B | 30 | D | 21 | C |
| I-495 NB on-ramp to Route 114 | 19 | B | 15 | B | 34 | D | 24 | C |
| I-495 SB off-ramp to Route 114 EB | 31 | D | 25 | C | 19 | B | 12 | B |
| I-495 SB on-ramp to Route 114 | over cap | F | 25 | C | 22 | C | 16 | B |
| Exit 43-42: I-495 at Loring St.-Route 114 WB | | | | | | | | |
| I-495 SB weave to Loring St.-Route 114 WB | 34 | D | 34 | D | 16 | B | 16 | B |
| Exit 43: I-495 at Mass. Ave. | | | | | | | | |
| I-495 NB off-ramp to Mass. Ave. | 29 | D | No Change- Not widening | | over cap | F | No Change- Not widening | |
| I-495 NB C-D on-ramp to Mass. Ave. | 4 | A | No Change- Not widening | | 14 | B | No Change- Not widening | |
| I-495 SB C-D off-ramp to Loring St. | 8 | A | No Change- Not widening | | 7 | A | No Change- Not widening | |
| I-495 SB on-ramp to 495 SB C-D | 31 | D | No Change- Not widening | | 19 | B | No Change- Not widening | |
| Exit 44: I-495 at 495 NB C-D | | | | | | | | |
| I-495 NB C-D off-ramp to 495 NB C-D | 19 | B | No Change- Not widening | | 33 | D | No Change- Not widening | |
| I-495 SB off-ramp to 495 SB C-D | over cap | F | No Change- Not widening | | 26 | C | No Change- Not widening | |

Table D-5 Long-Term Ramp Operation Improvements

| Interchange | 2030 AM No-Build | | 2030 AM Build | | 2030 PM No-Build | | 2030 PM Build | |
|--|-----------------------|-----|-------------------------|-----|-----------------------|-----|-------------------------|-----|
| | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS |
| Exit 44-45: I-495 at Sutton St.-Marston St. | | | | | | | | |
| I-495 NB C-D weave to Sutton St.-Marston St. | 21 | B | No Change- Not widening | | >43 | F | No Change- Not widening | |
| I-495 SB C-D weave to Marston St.-Merrimack St. | 27 | C | No Change- Not widening | | 23 | B | No Change- Not widening | |
| Exit 45: I-495 at Marston St. | | | | | | | | |
| I-495 NB C-D on-ramp to Marston St. | 8 | A | No Change- Not widening | | 14 | B | No Change- Not widening | |
| I-495 NB on-ramp to 495 NB C-D | 20 | B | No Change- Not widening | | over cap | F | No Change- Not widening | |
| I-495 SB off-ramp to Marston St. | over cap | F | No Change- Not widening | | 25 | C | No Change- Not widening | |
| Exit 46: I-495 at Route 110 | | | | | | | | |
| I-495 NB weave to Route 110 | 23 | B | 23 | B | >43 | F | >43 | F |
| I-495 SB off-ramp to Route 110 | over cap | F | 24 | C | 34 | D | 15 | B |
| I-495 SB on-ramp to Route 110 | over cap | F | 26 | C | 23 | C | 18 | B |
| Exit 47: I-495 at Route 213 | | | | | | | | |
| I-495 NB off-ramp to Route 213 | 23 | C | 18 | B | 36 | E | 32 | D |
| I-495 NB on-ramp to Route 213 | 25 | C | 18 | B | over cap | F | 24 | C |
| I-495 SB off-ramp to Route 213 | over cap | F | 31 | D | 26 | C | 23 | C |
| I-495 SB on-ramp to Route 213 | over cap | F | 30 | D | 23 | C | 18 | B |
| Exit 48: I-495 at Route 125 Connector SB | | | | | | | | |
| I-495 NB off-ramp to Route 125 Connector SB | 23 | C | 18 | B | over cap | F | 27 | C |
| I-495 NB on-ramp to Route 125 Connector NB | 20 | B | 16 | B | over cap | F | 27 | C |
| I-495 SB weave to Route 125 Connector | >43 | F | >43 | F | 35 | D | 35 | D |
| Exit 49: I-495 at Route 113 | | | | | | | | |
| I-495 NB off-ramp to Route 113 | 26 | C | 17 | B | over cap | F | 31 | D |
| I-495 NB off-ramp to 495 NB C-D | 23 | C | | | 37 | E | | |
| I-495 SB C-D off-ramp to Route 113 | 16 | B | 13 | B | 9 | A | 8 | A |
| I-495 SB C-D on-ramp to Route 113 | 22 | C | 13 | B | 15 | B | 13 | B |
| Exit 49-50: I-495 at Route 113-Route 97 | | | | | | | | |
| I-495 NB C-D weave to Route 113-Route 97 | 10 | A | 10 | A | 40 | E | 40 | E |
| Exit 50: I-495 at Route 97 | | | | | | | | |
| I-495 NB C-D on-ramp to Route 97 | 9 | A | No Change- Not widening | | 11 | B | No Change- Not widening | |
| I-495 NB on-ramp to 495 NB C-D | 18 | B | No Change- Not widening | | 29 | D | No Change- Not widening | |
| I-495 SB off-ramp to 495 SB C-D | over cap | F | No Change- Not widening | | 25 | C | No Change- Not widening | |
| I-495 SB C-D off-ramp to Route 97 | 9 | A | No Change- Not widening | | 11 | B | No Change- Not widening | |
| I-495 SB C-D on-ramp to Route 97 | 14 | B | No Change- Not widening | | 9 | A | No Change- Not widening | |

Table D-5 Long-Term Ramp Operation Improvements

| Interchange | 2030 AM No-Build | | 2030 AM Build | | 2030 PM No-Build | | 2030 PM Build | |
|---------------------------------------|-----------------------|-----|-------------------------|-----|-----------------------|-----|-------------------------|-----|
| | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS |
| Exit 51: I-495 at Route 125 SB | | | | | | | | |
| I-495 NB off-ramp to Route 125 SB | 17 | B | No Change- Not widening | | 29 | D | No Change- Not widening | |
| I-495 NB weave to Route 125 | 18 | B | No Change- Not widening | | 27 | C | No Change- Not widening | |
| I-495 NB on-ramp to Route 125 NB | 15 | B | No Change- Not widening | | 20 | B | No Change- Not widening | |
| I-495 SB off-ramp to 495 SB C-D | 18 | B | No Change- Not widening | | 16 | B | No Change- Not widening | |
| I-495 SB C-D off-ramp to Route 125 NB | 6 | A | No Change- Not widening | | 8 | A | No Change- Not widening | |
| I-495 SB C-D weave to Route 125 | 32 | C | No Change- Not widening | | 9 | A | No Change- Not widening | |
| I-495 SB C-D on-ramp to Route 125 SB | 24 | C | No Change- Not widening | | 13 | B | No Change- Not widening | |
| I-495 SB on-ramp to 495 SB C-D | over cap | F | No Change- Not widening | | 22 | C | No Change- Not widening | |
| Exit 52: I-495 at Route 110 | | | | | | | | |
| I-495 NB off-ramp to Route 110 | 17 | B | No Change- Not widening | | 22 | C | No Change- Not widening | |
| I-495 NB on-ramp to Route 110 | 14 | B | No Change- Not widening | | 16 | B | No Change- Not widening | |
| I-495 SB off-ramp to Route 110 | 17 | B | No Change- Not widening | | 16 | B | No Change- Not widening | |
| I-495 SB on-ramp to Route 110 | 19 | B | No Change- Not widening | | 17 | B | No Change- Not widening | |
| Exit 53: I-495 at Broad St. | | | | | | | | |
| I-495 NB off-ramp to Broad St. | 18 | B | No Change- Not widening | | 21 | C | No Change- Not widening | |
| I-495 NB on-ramp to Broad St. | 14 | B | No Change- Not widening | | 15 | B | No Change- Not widening | |
| I-495 SB off-ramp to Broad St. | 16 | B | No Change- Not widening | | 16 | B | No Change- Not widening | |
| I-495 SB on-ramp to Broad St. | 16 | B | No Change- Not widening | | 15 | B | No Change- Not widening | |
| Exit 54: I-495 at Route 150 | | | | | | | | |
| I-495 NB off-ramp to Route 150 | 18 | B | No Change- Not widening | | 20 | B | No Change- Not widening | |
| I-495 NB on-ramp to Route 150 | 15 | B | No Change- Not widening | | 17 | B | No Change- Not widening | |
| I-495 SB off-ramp to Route 150 | 17 | B | No Change- Not widening | | 20 | C | No Change- Not widening | |
| I-495 SB on-ramp to Route 150 | 16 | B | No Change- Not widening | | 15 | B | No Change- Not widening | |
| Exit 55: I-495 at Route 110 | | | | | | | | |
| I-495 NB off-ramp to Route 110 | 20 | B | No Change- Not widening | | 23 | C | No Change- Not widening | |
| I-495 SB on-ramp to Route 110 | 23 | C | No Change- Not widening | | 24 | C | No Change- Not widening | |

Table D-6 Long-Term Link Operation Improvements

| | | | 2030 AM No-Build | | | 2030 AM Build | | | 2030 PM No-Build | | | 2030 PM Build | | |
|------|------|------------------------|------------------|-----------------------|-----|-------------------------|-----------------------|-----|------------------|-----------------------|-----|-------------------------|-----------------------|-----|
| Dir. | Link | Location | Volume | Density (pc/mi/ln) | LOS | Volume | Density (pc/mi/ln) | LOS | Volume | Density (pc/mi/ln) | LOS | Volume | Density (pc/mi/ln) | LOS |
| NB | 32 | 33 Westford-Chelmsford | 6580 | >45 | F | 6580 | 28 | D | 5650 | 34 | D | 5650 | 23 | C |
| NB | 33 | 34 Chelmsford | 5920 | 39 | E | 5920 | 25 | C | 5180 | 30 | D | 5180 | 21 | C |
| NB | 34 | 35 Chelmsford | 6460 | >45 | F | 6460 | 28 | D | 5590 | 34 | D | 5590 | 27 | D |
| NB | 35 | 36 Lowell | 4350 | 24 | C | No Change- Not widening | | | 3450 | 19 | C | No Change- Not widening | | |
| NB | 36 | 37 Chelmsford-Lowell | 6580 | >45 | F | 6580 | 28 | D | 5690 | 35 | D | 5690 | 23 | C |
| NB | 37 | 38 Lowell-Tewksbury | 6140 | 43 | E | 6140 | 26 | C | 5760 | 35 | E | 5760 | 23 | C |
| NB | 38 | 39 Tewksbury | 5690 | 36 | E | 5690 | 24 | C | 5510 | 33 | D | 5510 | 22 | C |
| NB | 39 | 40 Tewksbury-Andover | 4800 | 27 | D | 4800 | 20 | C | 5680 | 35 | D | 5680 | 23 | C |
| NB | 40 | 41 Andover | 3670 | 20 | C | 3670 | 15 | B | 5530 | 33 | D | 5530 | 22 | C |
| NB | 41 | 42 Andover | 3360 | 18 | B | 3360 | 14 | B | 5770 | 36 | E | 5770 | 25 | C |
| NB | 42 | 43 Methuen | 3210 | 18 | B | 3210 | 13 | B | 6040 | >45 | F | 6040 | 25 | C |
| NB | 43 | 44 N. Andover-Lawrence | 2520 | 14 | B | No Change- Not widening | | | 4840 | 27 | D | No Change- Not widening | | |
| NB | 44 | 45 Lawrence | 2520 | 14 | B | No Change- Not widening | | | 4840 | 27 | D | No Change- Not widening | | |
| NB | 45 | 46 Lawrence-Methuen | 3380 | 19 | C | 3380 | 14 | B | 6600 | >45 | F | 6600 | 28 | D |
| NB | 46 | 47 Methuen | 3530 | 19 | C | 3530 | 15 | B | 6170 | 41 | E | 6170 | 25 | C |
| NB | 47 | 48 Methuen-Haverhill | 3960 | 22 | C | 3960 | 17 | B | 6420 | >45 | F | 6420 | 27 | D |
| NB | 48 | 49 Haverhill | 3490 | 19 | C | 3490 | 15 | B | 6610 | >45 | F | 6610 | 28 | D |
| NB | 49 | 50 Haverhill | 3210 | 18 | B | No Change- Not widening | | | 6200 | 42 | E | No Change- Not widening | | |
| NB | 50 | 51 Haverhill | 3120 | 17 | B | No Change- Not widening | | | 5280 | 30 | D | No Change- Not widening | | |
| NB | 51 | 52 Haverhill | 2830 | 16 | B | No Change- Not widening | | | 3700 | 20 | C | No Change- Not widening | | |
| NB | 52 | 53 Haverhill-Merrimac | 2690 | 15 | B | No Change- Not widening | | | 3320 | 18 | B | No Change- Not widening | | |
| NB | 53 | 54 Merrimac-Amesbury | 2750 | 15 | B | No Change- Not widening | | | 3200 | 17 | B | No Change- Not widening | | |
| NB | 54 | 55 Amesbury | 2590 | 14 | B | No Change- Not widening | | | 2980 | 16 | B | No Change- Not widening | | |
| SB | 55 | 54 Amesbury | 2870 | 16 | B | No Change- Not widening | | | 2960 | 16 | B | No Change- Not widening | | |
| SB | 54 | 53 Amesbury-Merrimac | 3100 | 17 | B | No Change- Not widening | | | 2390 | 13 | B | No Change- Not widening | | |
| SB | 53 | 52 Merrimac-Haverhill | 3140 | 17 | B | No Change- Not widening | | | 2870 | 16 | B | No Change- Not widening | | |
| SB | 52 | 51 Haverhill | 3360 | 18 | C | No Change- Not widening | | | 2910 | 16 | B | No Change- Not widening | | |
| SB | 51 | 50 Haverhill | 5370 | 32 | D | No Change- Not widening | | | 3541 | 19 | C | No Change- Not widening | | |
| SB | 50 | 49 Haverhill | 6270 | 44 | E | No Change- Not widening | | | 3510 | 19 | C | No Change- Not widening | | |
| SB | 49 | 48 Haverhill | 6790 | >45 | F | 6790 | 29 | D | 3910 | 21 | C | 3910 | 16 | B |
| SB | 48 | 47 Haverhill-Methuen | 6470 | >45 | F | 6470 | 27 | D | 4530 | 25 | C | 4530 | 18 | C |
| SB | 47 | 46 Methuen | 6080 | 41 | E | 6080 | 25 | C | 3940 | 21 | C | 3940 | 16 | B |
| SB | 46 | 45 Methuen | 6550 | >45 | F | 6550 | 28 | D | 4020 | 22 | C | 4020 | 16 | B |
| SB | 45 | 44 Lawrence | 5320 | 31 | D | No Change- Not widening | | | 2950 | 16 | B | No Change- Not widening | | |
| SB | 44 | 43 Lawrence-N. Andover | 5320 | 31 | D | No Change- Not widening | | | 2950 | 16 | B | No Change- Not widening | | |
| SB | 43 | 42 Lawrence | 6310 | 45 | E | 6310 | 26 | D | 3750 | 20 | C | 3750 | 15 | B |
| SB | 42 | 41 Lawrence-Andover | 5930 | 38 | E | 5930 | 25 | C | 3630 | 20 | C | 3630 | 15 | B |
| SB | 41 | 40 Andover | 5610 | 34 | D | 5610 | 23 | C | 3940 | 21 | C | 3940 | 16 | B |
| SB | 40 | 39 Andover-Tewksbury | 5930 | 38 | E | 6060 | 25 | C | 5100 | 29 | D | 5100 | 21 | C |
| SB | 39 | 38 Tewksbury | 5700 | 35 | E | 5700 | 23 | C | 5690 | 35 | E | 5690 | 23 | C |
| SB | 38 | 37 Tewksbury-Lowell | 5910 | 39 | E | 5910 | 25 | C | 6180 | 42 | E | 6180 | 26 | C |
| SB | 37 | 36 Lowell | 5860 | 37 | E | 5860 | 23 | C | 6580 | >45 | F | 6580 | 28 | D |
| SB | 36 | 35 Lowell | 3820 | 21 | C | No Change- Not widening | | | 3920 | 21 | C | No Change- Not widening | | |
| SB | 35 | 34 Chelmsford | 5590 | 35 | D | 5590 | 23 | C | 6570 | >45 | F | 6570 | 28 | D |
| SB | 34 | 33 Chelmsford | 5460 | 33 | D | 5460 | 22 | C | 6140 | 42 | E | 6140 | 26 | C |
| SB | 33 | 32 Westford | 5950 | 39 | E | 5950 | 25 | C | 6540 | >45 | F | 6540 | 28 | D |

