### CREST VERTICAL CURVE DESIGN GUIDANCE FOR BIKEWAYS (20 mph)

<table>
<thead>
<tr>
<th>V = speed, mph</th>
<th>20</th>
<th>20</th>
<th>20</th>
<th>20</th>
<th>20</th>
<th>20</th>
<th>20</th>
<th>20</th>
<th>20</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>f = .25 due to braking</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>g = grade decending</td>
<td>0</td>
<td>-0.01</td>
<td>-0.02</td>
<td>-0.03</td>
<td>-0.04</td>
<td>-0.05</td>
<td>-0.06</td>
<td>-0.07</td>
<td>-0.08</td>
<td>-0.083</td>
</tr>
<tr>
<td>f + g</td>
<td>0.25</td>
<td>0.24</td>
<td>0.23</td>
<td>0.22</td>
<td>0.21</td>
<td>0.2</td>
<td>0.19</td>
<td>0.18</td>
<td>0.17</td>
<td>0.167</td>
</tr>
<tr>
<td>V^2/[30(0.25+g)]</td>
<td>53.33</td>
<td>55.56</td>
<td>57.97</td>
<td>60.61</td>
<td>63.49</td>
<td>66.67</td>
<td>70.18</td>
<td>74.07</td>
<td>78.43</td>
<td>79.84</td>
</tr>
<tr>
<td>3.67V</td>
<td>73.40</td>
<td>73.40</td>
<td>73.40</td>
<td>73.40</td>
<td>73.40</td>
<td>73.40</td>
<td>73.40</td>
<td>73.40</td>
<td>73.40</td>
<td>73.40</td>
</tr>
<tr>
<td>S = V^2/[30(0.25+g)] + 3.67V</td>
<td>126.73</td>
<td>128.96</td>
<td>131.37</td>
<td>134.01</td>
<td>136.89</td>
<td>140.07</td>
<td>143.58</td>
<td>147.47</td>
<td>151.83</td>
<td>153.24</td>
</tr>
</tbody>
</table>

| 2S | 253.47 | 257.91 | 262.74 | 268.01 | 273.78 | 280.13 | 287.15 | 294.95 | 303.66 | 306.48 |
| (S * S) / 900 | 17.85 | 18.48 | 19.18 | 19.95 | 20.82 | 21.80 | 22.90 | 24.17 | 25.61 | 26.09 |

<table>
<thead>
<tr>
<th>A* = algebraic difference between grades</th>
<th>A*</th>
<th>Length of Curve (minimum 40 feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>2.5</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>3.5</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>When S&gt;L, L = 2S - 900 / A</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>4.5</td>
<td>53</td>
<td>58</td>
</tr>
<tr>
<td>5</td>
<td>73</td>
<td>78</td>
</tr>
<tr>
<td>5.5</td>
<td>90</td>
<td>94</td>
</tr>
<tr>
<td>6.00</td>
<td>103</td>
<td>108</td>
</tr>
<tr>
<td>6.5</td>
<td>115</td>
<td>119</td>
</tr>
<tr>
<td>7</td>
<td>125</td>
<td>129</td>
</tr>
<tr>
<td>When L&gt;S, L = A<em>S</em>S / 900</td>
<td>7.5</td>
<td>134</td>
</tr>
<tr>
<td>8</td>
<td>143</td>
<td>148</td>
</tr>
<tr>
<td>8.5</td>
<td>152</td>
<td>157</td>
</tr>
<tr>
<td>9</td>
<td>161</td>
<td>166</td>
</tr>
<tr>
<td>9.5</td>
<td>170</td>
<td>176</td>
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<tr>
<td>10</td>
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<td>185</td>
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<td>11</td>
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<td>12</td>
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<td>222</td>
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<tr>
<td>13</td>
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<td>240</td>
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<td>14</td>
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<td>259</td>
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<tr>
<td>15</td>
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<td>277</td>
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<tr>
<td>16</td>
<td>286</td>
<td>296</td>
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<tr>
<td>16.6</td>
<td>296</td>
<td>307</td>
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</table>