References


Smith, Brian L. 2004. Email Correspondence. 16 Aug. 2004. Information on Dr. Smith can be found at [http://ce.virginia.edu/people/smithbl.html](http://ce.virginia.edu/people/smithbl.html)


Appendix A. Virginia Law Regarding Speed limits

§ 46.2-870. Maximum speed limits generally.

Except as otherwise provided in this article, the maximum speed limit shall be 55 miles per hour on interstate highways or other limited access highways with divided roadways, nonlimited access highways having four or more lanes, and all state primary highways.

The maximum speed limit on all other highways shall be 55 miles per hour if the vehicle is a passenger motor vehicle, bus, pickup or panel truck, or a motorcycle, but 45 miles per hour on such highways if the vehicle is a truck, tractor truck, or combination of vehicles designed to transport property, or is a motor vehicle being used to tow a vehicle designed for self-propulsion, or a house trailer.

Notwithstanding the foregoing provisions of this section, the maximum speed limit shall be 65 miles per hour where indicated by lawfully placed signs, erected subsequent to a traffic engineering study, on: (i) interstate highways, (ii) multilane, divided, limited access highways, and (iii) high-occupancy vehicle lanes if such lanes are physically separated from regular travel lanes. The maximum speed limit shall be 60 miles per hour where indicated by lawfully placed signs, erected subsequent to a traffic engineering study, on U.S. Route 360 where it is a nonlimited access, multilane, divided highway.


Available at http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+46.2-870

§ 46.2-873.1. Maximum speed limit on nonsurface treated highways for certain counties.

The maximum speed limit on nonsurface treated highways, which are roads that are comprised of an earth-aggregate or aggregate surface (i.e., dirt and gravel) that have not been stabilized with a bituminous or cementitious material, shall be 35 miles per hour. The maximum speed limit upon such highways may be increased or decreased by the Commonwealth Transportation Commissioner or other authority having jurisdiction over highways. However, such increased or decreased maximum speed limit shall be effective only when indicated by sign on the highway. For such highways upon which maximum speed limit is not indicated by sign, the maximum speed limit shall be 35 miles per hour.

The provisions of this section shall apply only in the Counties of Clarke, Fauquier, Frederick, Loudoun, Warren, and Wythe.
§ 46.2-874. Maximum speed limit in business and residence districts.

The maximum speed shall be twenty-five miles per hour on highways in business or residential districts, except on interstate or other limited access highways with divided roadways.


Available at http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+46.2-874

§ 46.2-875. Maximum speed limit on certain other highways in cities and towns.

The maximum speed limit shall be thirty-five miles per hour on highways in any city or town, except on interstate or other limited access highways with divided roadways and in business or residence districts.


Available at http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+46.2-875

§ 46.2-878. Authority to change speed limits.

Notwithstanding the other provisions of this article, the Commonwealth Transportation Commissioner or other authority having jurisdiction over highways may decrease the speed limits set forth in § 46.2-870 and may increase or decrease the speed limits set forth in §§ 46.2-873 through 46.2-875 on any highway under its jurisdiction; and may establish differentiated speed limits for daytime and nighttime by decreasing for nighttime driving the speed limits set forth in § 46.2-870 and by increasing for daytime or decreasing for nighttime the speed limits set forth in §§ 46.2-873 through 46.2-875 on any highway under his jurisdiction. Such increased or decreased speed limits and such differentiated speed limits for daytime and nighttime driving shall be effective only when prescribed after a traffic engineering investigation and when indicated on the highway by signs. It shall be unlawful to operate any motor vehicle in excess of speed limits established and posted as provided in this section. The increased or decreased speed limits over highways under the control of the Commonwealth Transportation Commissioner shall be effective only when prescribed in writing by the Transportation Commissioner and kept on file in the Central Office of the Department of Transportation. Whenever the speed limit on
any highway has been increased or decreased or a differential speed limit has been established and such speed limit is properly posted, there shall be a rebuttable presumption that the change in speed was properly established in accordance with the provisions of this section.


http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+46.2-878
Table A.1. Fire Truck travel speeds assigned each CFCC in urban and non-urban areas.

<table>
<thead>
<tr>
<th>CFCC</th>
<th>CFCC Description</th>
<th>Assigned Speed, Urban Areas</th>
<th>Assigned Speed, Non-Urban Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>A11</td>
<td>Primary road, interstate highway and limited access road, undivided</td>
<td>55</td>
<td>65</td>
</tr>
<tr>
<td>A12</td>
<td>Primary road, interstate highway and limited access road, undivided, in tunnel</td>
<td>55</td>
<td>65</td>
</tr>
<tr>
<td>A13</td>
<td>Primary road, interstate highway and limited access road, undivided, rail line in center</td>
<td>55</td>
<td>65</td>
</tr>
<tr>
<td>A14</td>
<td>Primary road, interstate highway and limited access road, undivided, rail line in center</td>
<td>55</td>
<td>65</td>
</tr>
<tr>
<td>A15</td>
<td>Primary road, interstate highway and limited access road, divided</td>
<td>55</td>
<td>65</td>
</tr>
<tr>
<td>A17</td>
<td>Primary road, interstate highway and limited access road, divided, underpassing</td>
<td>55</td>
<td>65</td>
</tr>
<tr>
<td>A21</td>
<td>Secondary road, U.S. highway not classified A10, and state roads, undivided</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>A22</td>
<td>Secondary road, U.S. highway not classified A10, and state roads, undivided, in tunnel</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>A23</td>
<td>Secondary road, U.S. highway not classified A10, and state roads, undivided, underpassing</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>A25</td>
<td>Secondary road, U.S. highway not classified A10, and state roads, divided</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>A27</td>
<td>Secondary road, U.S. highway not classified A10, and state roads, divided, underpassing</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>A31</td>
<td>Connecting road, county roads, and roads not classified as A10 or A20, undivided</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>A33</td>
<td>Connecting road, county roads, and roads not classified as A10 or A20, undivided, underpassing</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>A35</td>
<td>Connecting road, county roads, and roads not classified as A10 or A20, divided</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>A38</td>
<td>Connecting road, county roads, and roads not classified as A10 or A20, divided, rail line in center</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>A41</td>
<td>Neighborhood roads, city streets and unimproved roads, undivided</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>A42</td>
<td>Neighborhood roads, city streets and unimproved roads, undivided, in tunnel</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>A43</td>
<td>Neighborhood roads, city streets and unimproved roads, undivided, underpassing</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>A44</td>
<td>Neighborhood roads, city streets and unimproved roads, undivided, rail line in center</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>A45</td>
<td>Neighborhood roads, city streets and unimproved roads, divided</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>A47</td>
<td>Neighborhood roads, city streets and unimproved roads, divided, underpassing</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>A51</td>
<td>Jeep trail, passable only by four-wheel drive (4WD) vehicle, undivided</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>A60</td>
<td>Special Road Feature</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>A62</td>
<td>Traffic circle</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>A63</td>
<td>Cloverleaf or interchange</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>A64</td>
<td>Service drive</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>A65</td>
<td>Ferry crossing</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>A70</td>
<td>Other Thoroughfare</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>A71</td>
<td>Walkway</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>A73</td>
<td>Alley</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>A74</td>
<td>Driveway or service road, usually privately owned and unnamed, used as access to residences, trailer parks, and apartment complexes, or as access to logging areas, oil rigs, ranches, farms, and park lands</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>
Appendix B. This code is used in section 4.5 of this thesis to determine the minimum number of new water sources needed to serve the “unservable WHCs”.

Option Compare Database

Private Sub Command0_Click()

'OVERVIEW: This code determines the minimum number of new water sources needed to serve the otherwise “unservable WHCs”.

'To run this code use this code in Microsoft Access 2000:
'1) Create a new form in Access 2000 and add a single command button
'   with the name 'Command0' (the default name). Right click the button in
'   design view and choose 'code builder'. Paste this code into the VBA editor

'2) make sure that the following references are set in the visual basic editor:
'   VBA
'   'Microsoft Access 9.0 object library
'   'OLE Automation
'   'Microsoft DAO 3.6 Object library
'   'Also make sure that an Microsoft ActiveX Data Objects x.x library reference is NOT set

'3) A table listing all of the WHC nodes that need to be covered must be present
'   in the database and have the name "WHCnodes"

'4) The database must also contain all of the output allocation tables that are to be
'   searched. Their titles must be in the form of "allomaxcov9", where
'   the 9 is the number hydrants.

'5) The coverage from which these nodes and allocation tables originated was named ROADS. The
   ROADS# identifier field was truncated to ROADS_. This ROADS_ field serves as
   common field or link between the WHCnodes table and the allocation tables.

Dim blAllCovered As Boolean  'will be set to true when all WHC nodes are covered
                           'will also terminate the loop
Dim strSQLunder6 As String   'a SQL string to create the 'Temp Table' which stores all
                            'records from the allocation table where distancel <= 6
Dim strSQLwhc As String      'the SQL statement that queries for WHC nodes not covered
Dim i As Integer             'counter variable
Dim rsWHC As DAO.Recordset   'recordset that will represent the records returned by
                           'strSQLwhc statement
i = 1 'initialize counter variable

Do Until blAllCovered

'insert all records from current allocation table where the distance is less than
' or equal to six into a new table named 'TempTable'
strSQLunder6 = "SELECT allomaxcov" & i & ".ROADS_, allomaxcov" & i & ".DISTANCE1 INTO TempTable " & _
"FROM allomaxcov" & i & " " & _
"WHERE {{(allomaxcov" & i & ".DISTANCE1)=6 Or (allomaxcov" & i & ".DISTANCE1)<6}};"
CurrentDb.Execute strSQLunder6

'SQL statement that returns null records if not all records in WHCnode have matches
strSQLwhc = "SELECT TempTable.DISTANCE1 " & _
"FROM WHCnodes LEFT JOIN TempTable ON WHCnodes.ROADS_ = TempTable.ROADS_ " & _
"WHERE TempTable.DISTANCE1 is null;"

'open recordset based on above SQL statement
Set rsWHC = CurrentDb.OpenRecordset(strSQLwhc, dbOpenDynaset)

If rsWHC.RecordCount = 0 Then 'no null results - all WHCs covered
    blAllCovered = True 'this will terminate the loop
    MsgBox "The number of new hydrants needed to cover the unservable WHCs is " & i
End If

rsWHC.Close 'close the recordset
Set rsWHC = Nothing 'release memory

'delete the temporary table
CurrentDb.TableDefs.Delete "TempTable"

i = i + 1
Loop