## ASSIGNMENT 1: PROBLEM 1: 8-LANE FREEWAY (**LOS AND CAPACITY**)

**Step 1: Input Data**

* Peak hour, peak direction demand volume: 5000 (veh/h)
* Traffic composition: 6% trucks (30% SUTs, 70% TTs)
* Terrain: Rolling
* lanes in each direction: 4
* Lane Width: 12 ft
* Right-shoulder lateral clearance: 3 ft
* One cloverleaf interchange per mile
* Peak hour factor (PHF) = 0.90
* Mostly unfamiliar drivers.

**Step 2: Estimate and Adjust FFS**

We calculate FFS Using Equation 12-2

|  |  |
| --- | --- |
|  | (12-2) |

But, first:

1. Exhibit 12-20
2. Exhibit 12-21
3. = 4 ramps/mi. Then

|  |
| --- |
|  |

mostly unfamiliar drivers, the SAF=0.975 Exhibit 26-9, and

|  |  |
| --- | --- |
| = FFS SAF = 64.5 0.975 =62.9 | (12-5) |

**Step 3: Estimate and Adjust Capacity**

Using Equation 12-6, The capacity as follows:

|  |  |
| --- | --- |
|  | (12-6) |
|  | (12-6) |

Because mostly unfamiliar drivers, CAF=0.968 Exhibit 26-9, and

|  |  |
| --- | --- |
|  | (12-8) |

**Step 4: Adjust Demand Volume**

using Equation 12-9, demand volume adjusts:

|  |  |
| --- | --- |
|  | (12-9) |

First, = 5,000 veh/h. PHF = 0.90, and N= 4-lanes in each direction.

Then must be determined with Equation 12-10. Where Exhibit 12-25, and trucks in the traffic . then

|  |  |
| --- | --- |
|  | (12-10 |

Then,

|  |  |
| --- | --- |
|  | (12-9) |

Because this value base capacity with FFS = 62.9 mi/h, LOS F does not exist.

**Step 5: Estimate Speed and Density**

Using the equations provided in Exhibit 12-6, the breakpoint for a 63.16 mi/h FFS speed–flow curve is

|  |
| --- |
|  |

As 1,556 pc/h/ln 1,391 pc/h/ln.

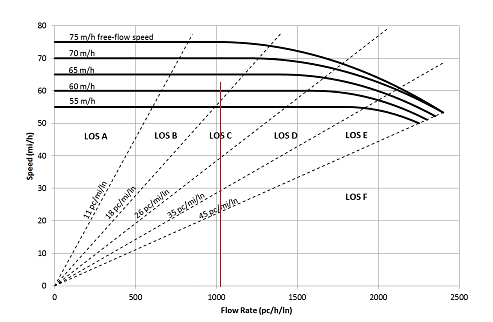
|  |
| --- |
|  |

The density of the traffic stream may now be computed from Equation 12-11.

|  |  |
| --- | --- |
|  | (12-11) |

**Step 6: Determine LOS**

From Exhibit 12-15, 24.9 pc/mi/ln corresponds to LOS C. This solution could also be calculated graphically from Exhibit 12-16

**`**

**Basic Segment (Service Flow)**

|  |  |  |
| --- | --- | --- |
| LOS | Vp (pc/h/ln) | Service Vol (Veh/h) |
| A | 691.9 | 691.9(.90)(4)(.893) = 2224 |
| B | 1107.3 | 1107.3(.90)(4)(.893) = 3560 |
| C | 1613 | 1613.3(.90)(4)(.893) = 5186 |
| D | 1987.4 | 1987.4(.90)(4)(.893) = 6389 |
| E | 2254 | 2254(.90)(4)(.893) =7246 |
|  |  |  |

1. LOS A

62.9 mi/h, pc/h/ln

Vp 691.9 pc/h/ln

1. LOS B

S

D pc/h/ln

1. LOS C

S

D pc/h/ln

1. LOS D

S

D pc/h/ln

1. LOS E

S

D pc/h/ln

From HCM-Calc

