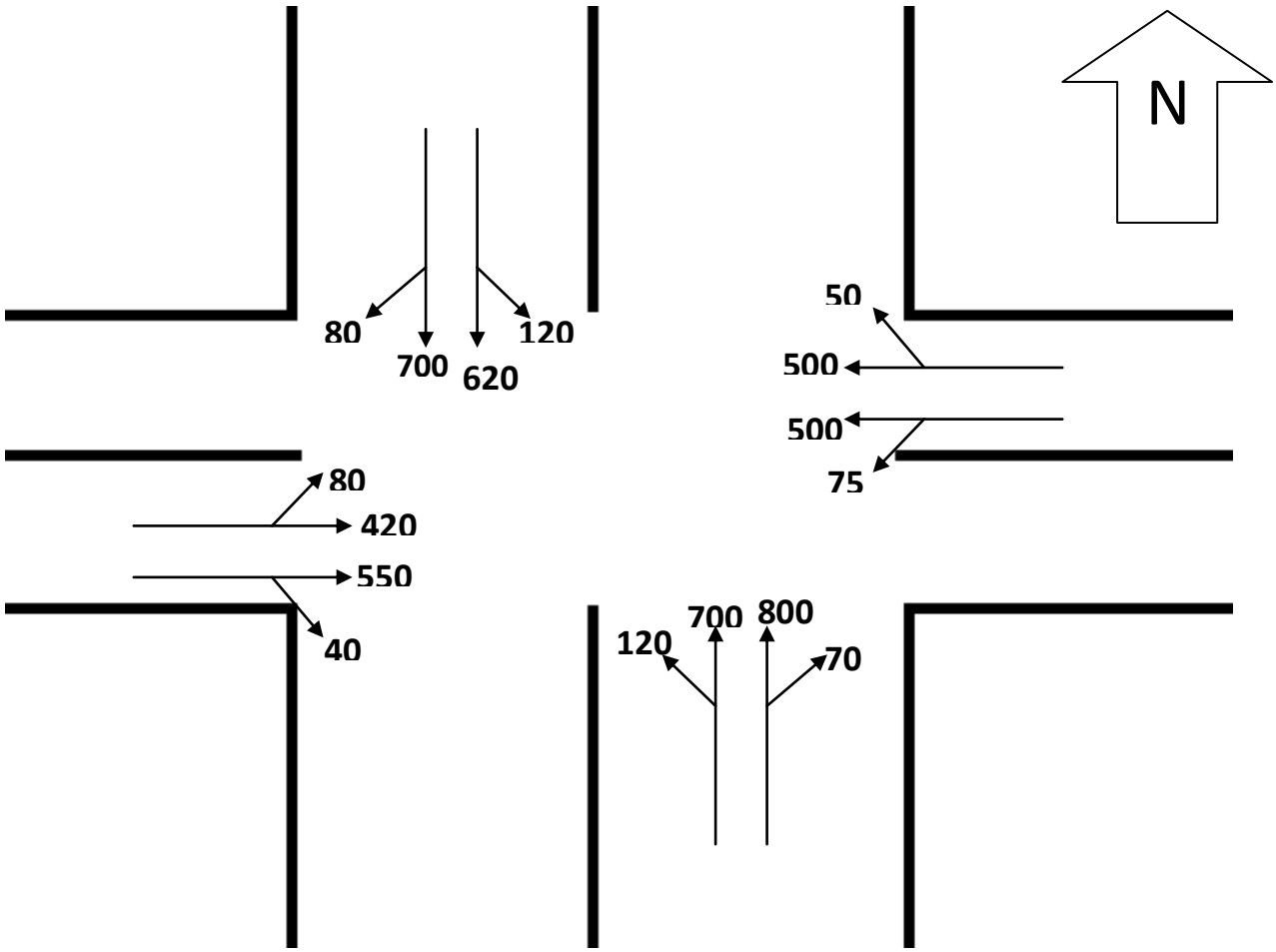
Assumptions:

1. Headway = 1.9 so that the Saturation Flow=1900 pcphpln.
2. Lost time = 2 sec/phase and 2 sec for All Red.
3. The land is available to add another lane And Use Channelization.
4. Throughput : The Green for the first six vehicle takes 18 sec.

Equations:

1. Right Direction * 1.4
2. Left Direction * 1.6
3. $C. = \frac{1.5L+5}{1-\sum_{i=1}^{n}\frac{Vi}{SC}}$



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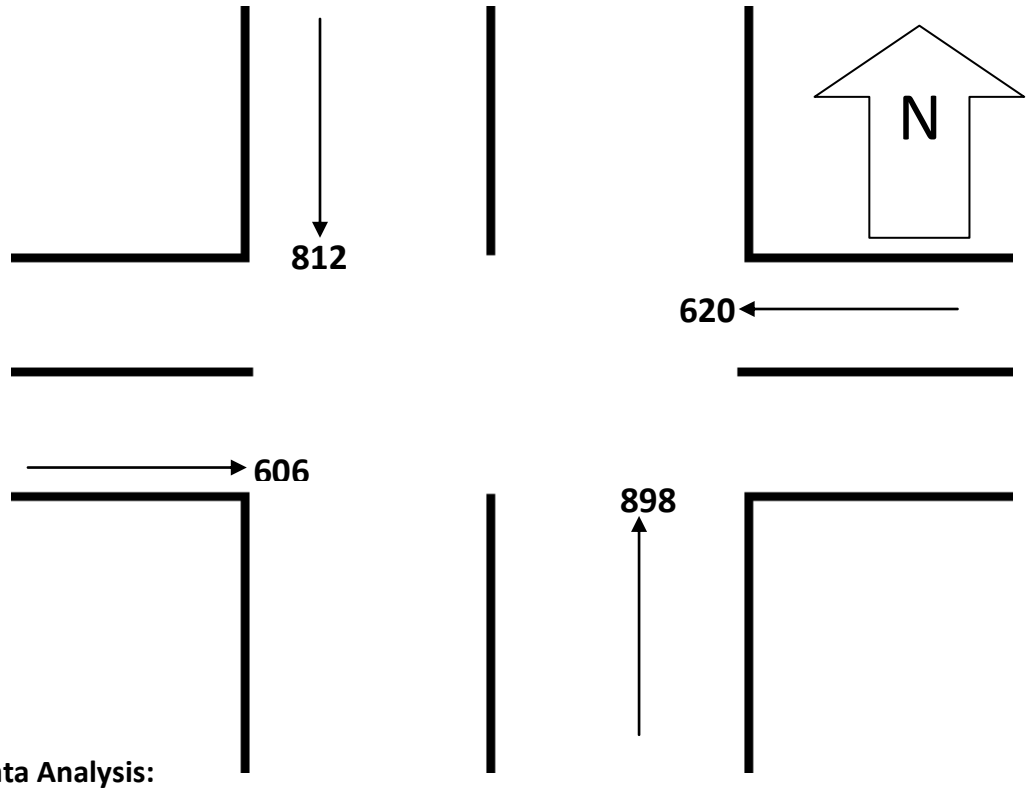
Trail 1 (Spilt):-



- **Intersection Data Analysis:**

Direction	NB	SB	EB	WB
R_1	70	0	40	50
T_1	800	620	550	500
L_1	0	120	0	0
R_2	0	80	0	0
T_2	700	700	420	500
L_2	120	0	80	75
$v1=(1.4R_1+T_1+1.6L_1)$	**898**	**812**	**606**	570
$v2=(1.4R_2+T_2+1.6L_2)$	892	812	548	**620**
Vi/S	.472	.427	.318	**.326**
$C.=\frac{1.5L+5}{1-\sum_{i=1}^{n}\frac{Vi}{S}}$ L=(4*2 + 2)=10 Sec	**Cycle Length= -36.67 Sec (Refuse), See Comment**			

Comment: Generally a split-phase design is recommended only under one or more of these conditions:

1. The left turns are the dominant movement.
2. The left turns share a lane with the through movement.
3. There is a large difference in the total approach volumes.
4. There are unusual opposing approach geometrics.

All These Condition not Available in this Intersection.

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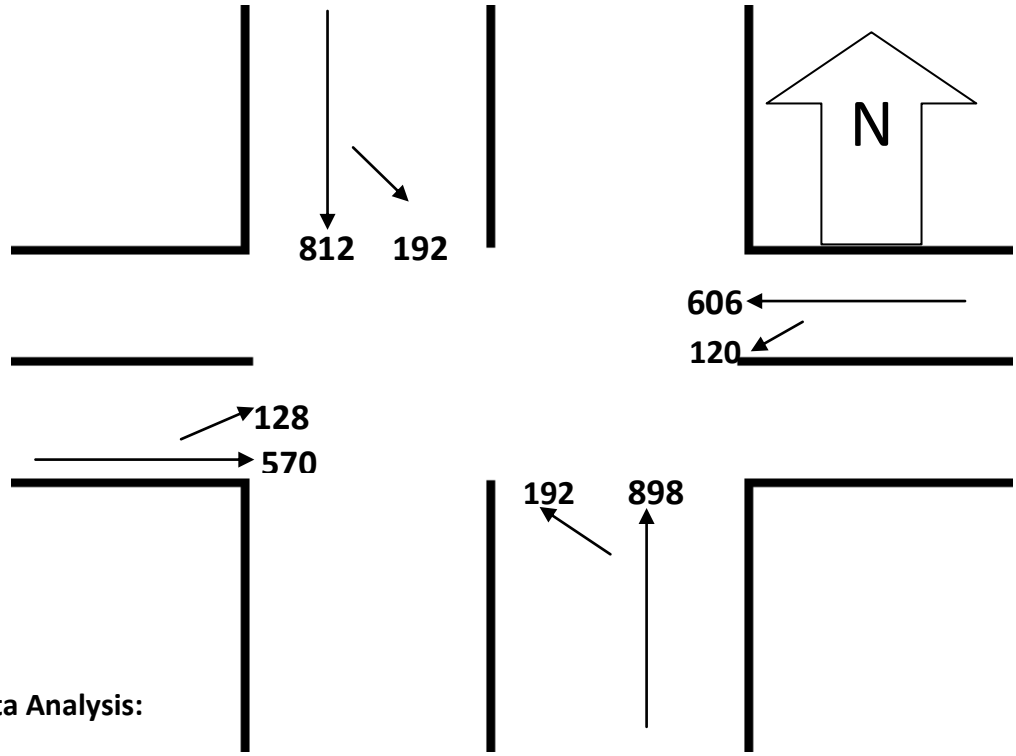
Trail 2:-



- **Intersection Data Analysis:**

	NB	SB	EB	WB
R_1	70	0	40	50
T_1	800	620	550	500
L_1	0	120	0	0
R_2	0	80	0	0
T_2	700	700	420	500
L_2	120	0	80	75
• **Volume For Phases**				
Phase1(Throw NB- Throw SB)	**898**	620		
Vi/S=.472	700	812		
Phase2(Throw EB- Throw WB)			**606**	570
Vi/S=.318			420	500
Phase3(Left SB – Left NB)	0	**192**		
Vi/S=.101	192	0		
Phase4(Left EB – Left WB)			**128**	120
Vi/S=.067			0	0
$C. = \frac{1.5L + 5}{1 - \sum_{i=1}^{n} \frac{Vi}{S}}$ **L=(4*2 + 2)=10 Sec**	**Cycle Length= 500Sec** **(Refuse) ,See Comment**			

- **Comment**: The Cycle length is Too Large = 8.3 min Due to large Volume So This Trail is No a solution For this Intersection.

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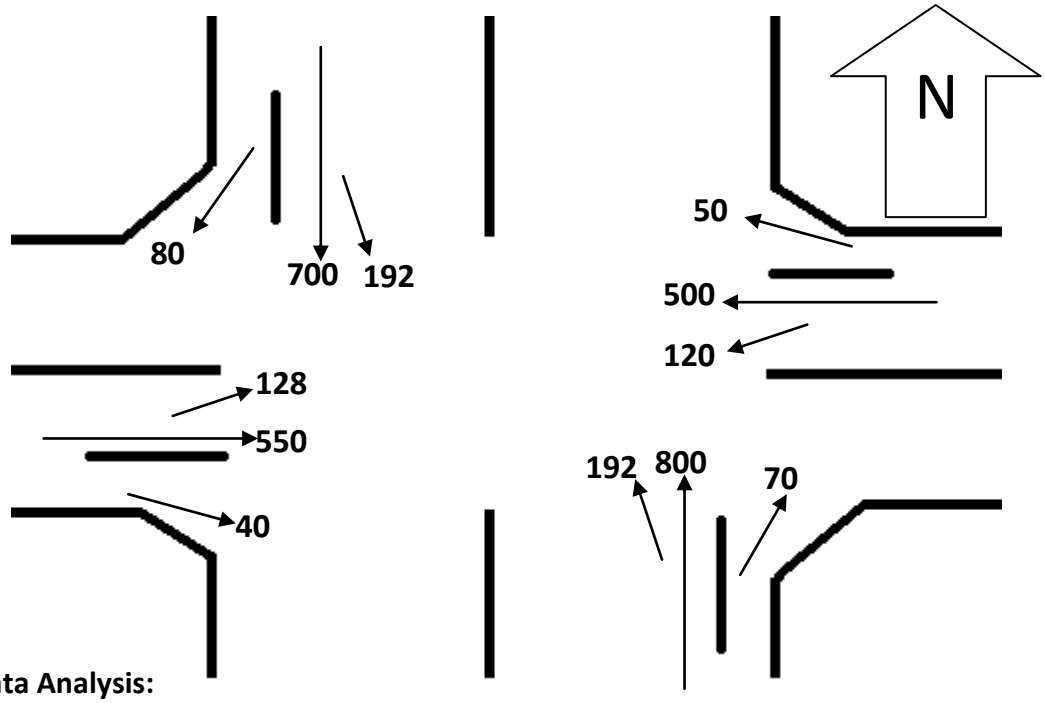
Trail 3:(Add Another Lane for Right Direction and Use Channelization):



- **Intersection Data Analysis:**

	NB	SB	EB	WB
R_1	0	0	0	0
T_1	800	620	550	500
L_1	0	120	0	0
R_2	0	0	0	0
T_2	700	700	420	500
L_2	120	0	80	75
• **Volume For Phases**				
Phase1(Throw NB- Throw SB)	**800**	620		
Vi/S=.421	700	700		
Phase2(Throw EB- Throw WB)			**550**	500
Vi/S=.289			420	500
Phase3(Left SB – Left NB)	0	**192**		
Vi/S=.101	192	0		
Phase4(Left EB – Left WB)			**128**	120
Vi/S=.067			0	0
$C. = \frac{1.5L + 5}{1 - \sum_{i=1}^{n} \frac{Vi}{S}}$ **L=(4*2 + 2)=10 Sec**	**Cycle Length= 165.21 Sec (Acceptable)**			

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<table>
<tr><td colspan="2">

- **Allocated Green = 165-10(Lost Time) = 155**

</td></tr>
<tr><td>Phase1</td><td>$$G = \left(\frac{800}{800+550+192+120}\right) * 155 = 74\ sec$$</td></tr>
<tr><td>Phase2</td><td>$$G = \left(\frac{550}{800+550+192+120}\right) * 155 = 51 sec$$</td></tr>
<tr><td>Phase3</td><td>$$G = \left(\frac{192}{800+550+192+120}\right) * 155 = 17 sec$$</td></tr>
<tr><td>Phase4</td><td>$$G = \left(\frac{120}{800+550+192+120}\right) * 155 = 13 sec$$</td></tr>
<tr><td colspan="2">

- **Throughput:**

Step1:Green $_{\text{after head way stability}}$ = Green – 18 sec (assume for first six veh)

Step2: No. of Veh = Green $_{\text{after head way stability}}$ /headway(1.9)

Step3: Throughput= No. of Veh + 6

</td></tr>
<tr><td>Phase1</td><td>(74-18)= 56 sec , 56/1.9 = 29 Veh ,
Throughput= 29 + 6 =35</td></tr>
<tr><td>Phase2</td><td>(51-18)= 33 sec , 33/1.9 = 17 Veh ,
Throughput= 17 + 6 =23</td></tr>
<tr><td>Phase3</td><td>(17-18)= -1 sec (Green Less than Lost Time Due to First six Veh)
Throughput < 6</td></tr>
<tr><td>Phase4</td><td>(13-18)= -5 sec (Green Less than Lost Time Due to First six Veh)
Throughput < 6</td></tr>
</table>

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