Assignment 5

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Introduction

This report illustrated the analysis of traffic flow with location of Moycullen Rd(N59), there are totally 4 intersections, I majorly analyse four parts: firstly , visualize the periods of traffic congestion, the secondly is the vehicle types distributions, next are case analysis for time and frequency of bus, car and cycle.

Data Processing

1. Combination of eastbound and westbound

For the table eastbound and westbound, here majorly processing way is remove all col name and total value of 7:00-19:00,6:00-22:00,6:00-0:00 for each day and some useless value, then combine eastbound and westbound to one sheet and then using tableau to visualize it. The code shown as figure

```
  dates<-c(rep('18/11/2016',96),rep('19/11/2016',96),rep('2
)
  need_remove<-which(df$Time=='Time')
  for (i in (1:length(need_remove))){
     df<-df[-((need_remove[i]-(i-1)*8-5):(need_remove[i]-(i
  }
  df<-df[-c(1:2),]
  df<-df[-c((nrow(df)-3):(nrow(df))),]
  df<-cbind(df,dates)
  df$Time<-as.character(df$Time)
  df$Time<-sapply(df$Time,function(x){
      first<-substring(x,1,2)
      last<-substring(x,3,4)
      x<-paste(first,last,sep=":")
  })
  return (df)
}
```

Figure 1.1

The second sheet need to be processing is junction turning sheet, this is traffic number of one day from 8:00 to 18:00, the processing way shown as Figure 1.2, here I generate two tables, first is the traffic number every 15 minutes and another is traffic number every hour, combine each junction vehicle number to a table and add a new attribute for type of junction, then move total count of each hour and 12 hour, then generate a new table of this total count per hour.

```
example2<-read.csv('example.csv')
need_remove4<-which(example2$TIME=='12 TOT')
for (i in (1:length(need_remove4))){
    print(need_remove4[i]-(i-1))
    example2<-example2[-(need_remove4[i]-(i-1)),]
}
need_remove3<-which(example2$TIME=='H/TOT')
for (i in (1:length(need_remove3))){
    example2<-example2[-(need_remove3[i]-(i-1)),]
}
example3<-example2[c(193:384),]
```

Figure 1.2

Visualization of the periods of traffic congestion

The figure 1 below show the traffic flow per day for eastbound and westbound, the x axis describes time and date for traffic flow, the y axis is traffic number, the yellow line is westbound and the blue line is eastbound. On figure 1, we can see that firstly the traffic peak is 7-8 am and 17-18 pm for each day, because during this of period, people always go to work or school or get off work or school. The second point is that compare with first five days, the traffic flow for Saturday and Sunday obviously declined and the traffic peak extends from 7-8 to 9-10 and in the afternoon the peak time earlier 2 hours than Monday to Friday.

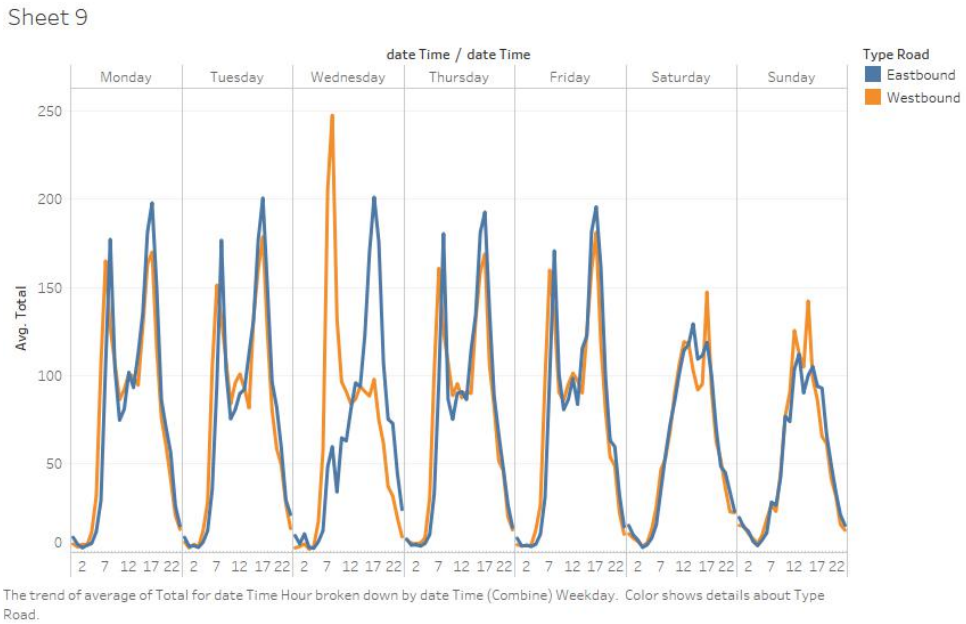

Figure 1 Traffic flow distribution for each day

Vehicle types Distributions

This part majorly described the vehicle type distribution, the figure 2.1 is showing the vehicle types distribution in each day and the figure 2.2 below shows the vehicle types distribution in each hour, it's obviously represent that the car and van account for a large percents, almost 3-4 thousands each day, while other vehicle account for a small part. Same to figure 2.2, for each hour, averagely, there are almost 150-300 cars or vans pass this intersection per hour while others type only 0-30 per hour.

Figure 2.1 Car distribution for each day

Figure 2.2 Car Distribution for each hour

Service of Frequency and Time for Bus

For this part I visualize the bus number for each junction turning, From B->A, B->C, B->D, the figure 3.1 and 3.2 below shows that the bus Eireen bus line is only from some big towns(B) to the northern part of the university campus at Corrib village(D). And some of other buses can from B to D or from B to C which passing the university and go to city centre,and there are not bus that from B to IDA (A). firstly, for B->C, there are no bus from 10.00 to 12.00 and after 16.00, however, on the 8:00-9:00, there are 3 bus, others time here are 1 bus passing per hour. For B->D junction, there are lots of buses, particularly from 7:30 to 8:30, there are 8 bus passing, and from 15:00-16:15 there are 8 buses passing as well, If we see the figure 3.3 and 3.4, it is a visualization of other vehicle type, for the junction B->C and B->D, there are on average 150 vehicle passing from 7:30-9:00, which may lead traffic jam. and from the figure 3.3 and 3.4 we can see 80% vehicle are cars, I think one of reasons is that students or workers go to university or city centre by car. Thus, for the service, the first thing is reschedule the bus time for junction B->C and B->D, because these two road lines is passing university to city center,I think there must have lots of students go to university,thus,here should keep at least one bus every hour from B to C and D, and for the period of 7:30-9:00, it's better one or two bus passing for every 15 minute.Let more staff or students to go to school or company by taking bus instead of driving. In this way I think increasing the bus frequency during this period can reduce the number of cars and reduce the total number so that reducing traffic congestion.

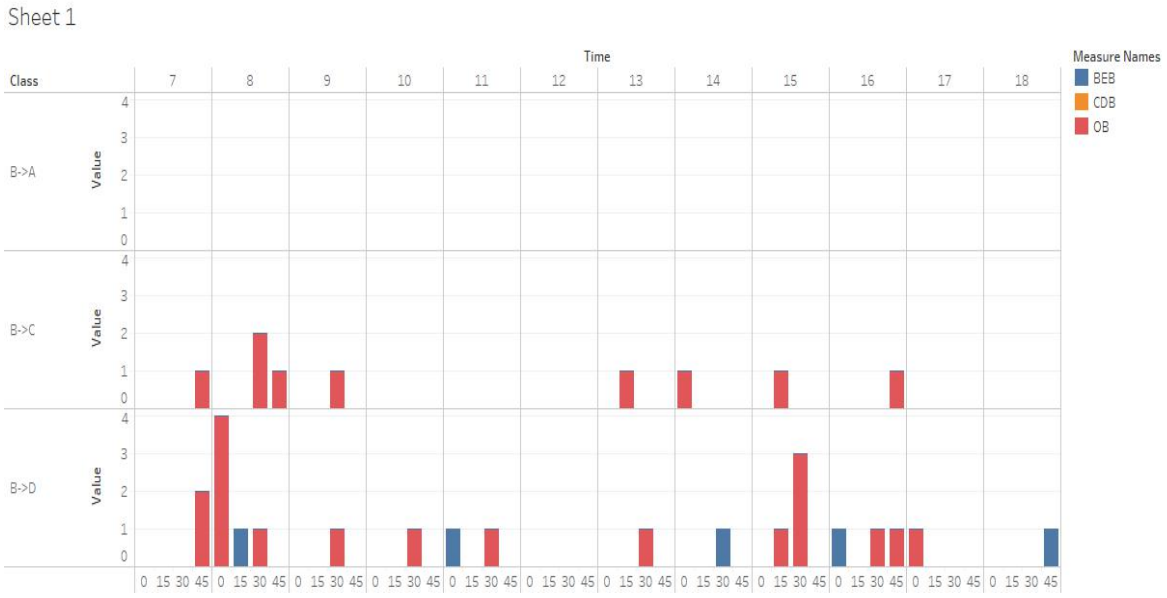

Figure 3.1 Bus Distribution for B->A,B->C and B->D every 15 minutes

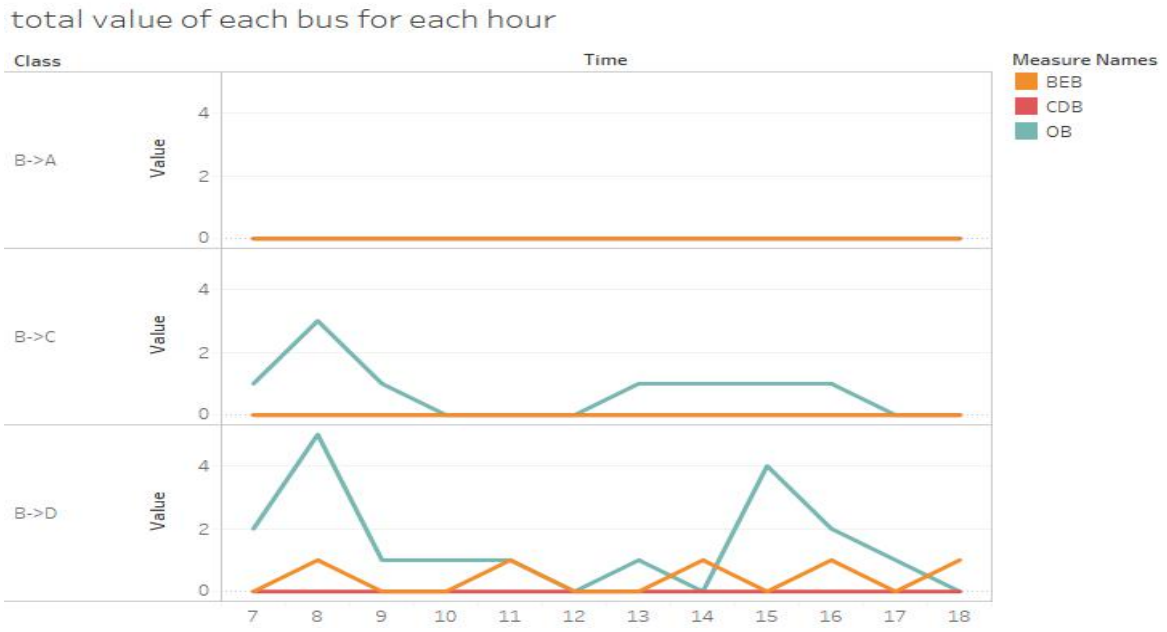

Figure 3.2 Bus Distribution for B->A,B->C and B->D every hour

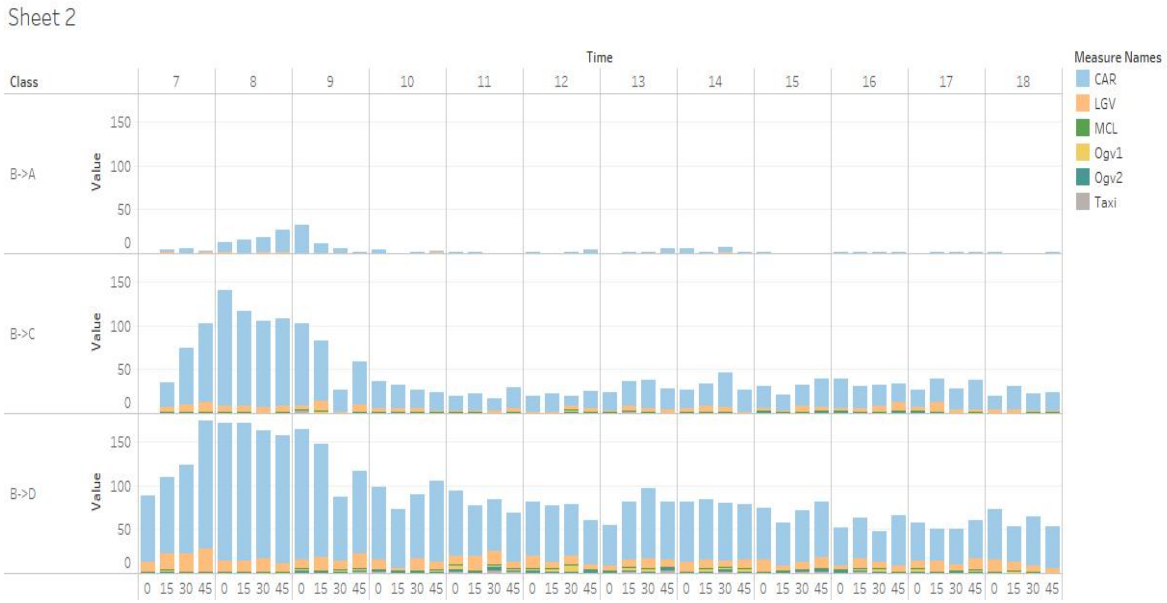

Figure 3.3 Other Vehicle Distribution for B->A,B->C and B->D every 15 minutes

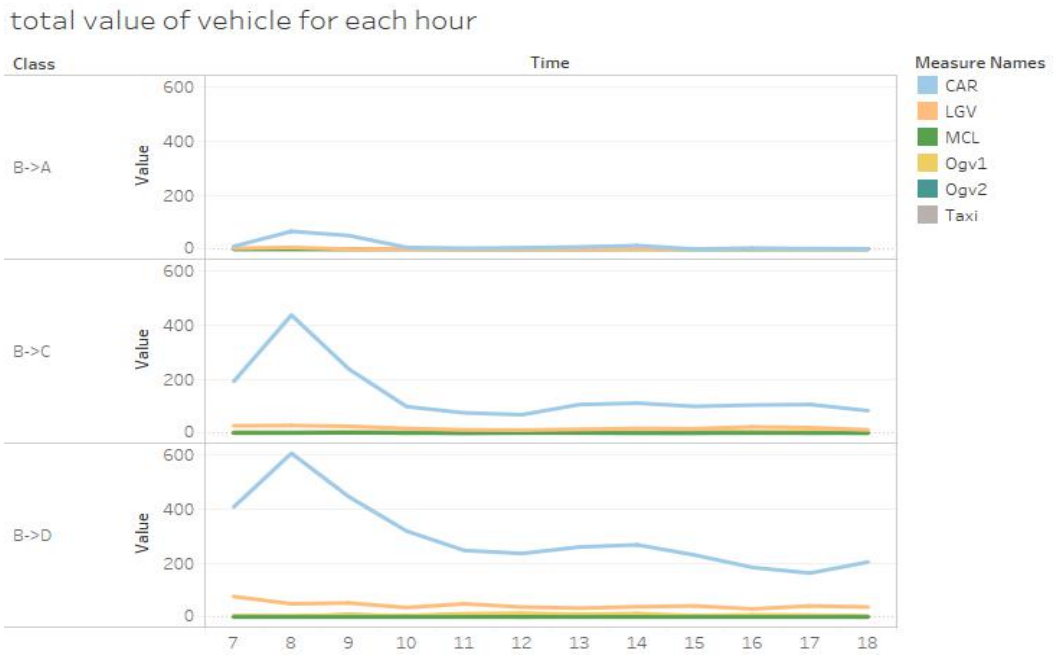

Figure 3.4 Other Vehicle Distribution for B->A,B->C and B->D every hour

Suggestion2:

As we see that here is only small traffic flow from B->A(IDA/insight), and from the figure 3.5 below we also can see there are no any bus from insight to University and City centre, and from figure 3.6 we can got that although there still have a traffic peak from 11:00-12:00 and 17:0-18:00, the car numbers is not high only 15,16 for every 15 minute compare with the B->C and B->D which has more than 100 cars every 15 minute, so here we can add a new route which is from B -> A -> C and B ->A ->D, in this way the bus can be not such busy only on B->C and C->D, and the car number will be reduced as well.

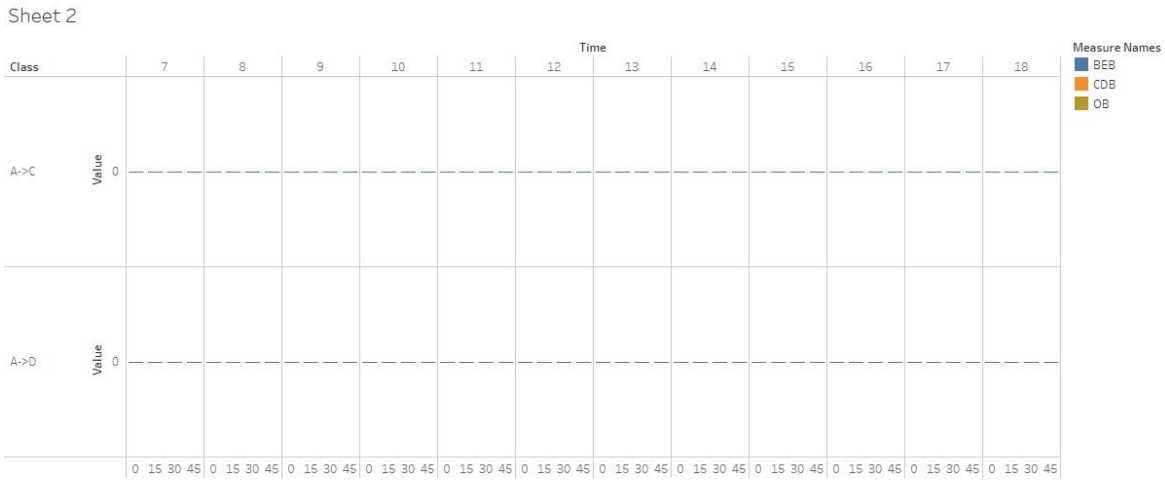

Figure 3.5 bus number from insight to University and city centre

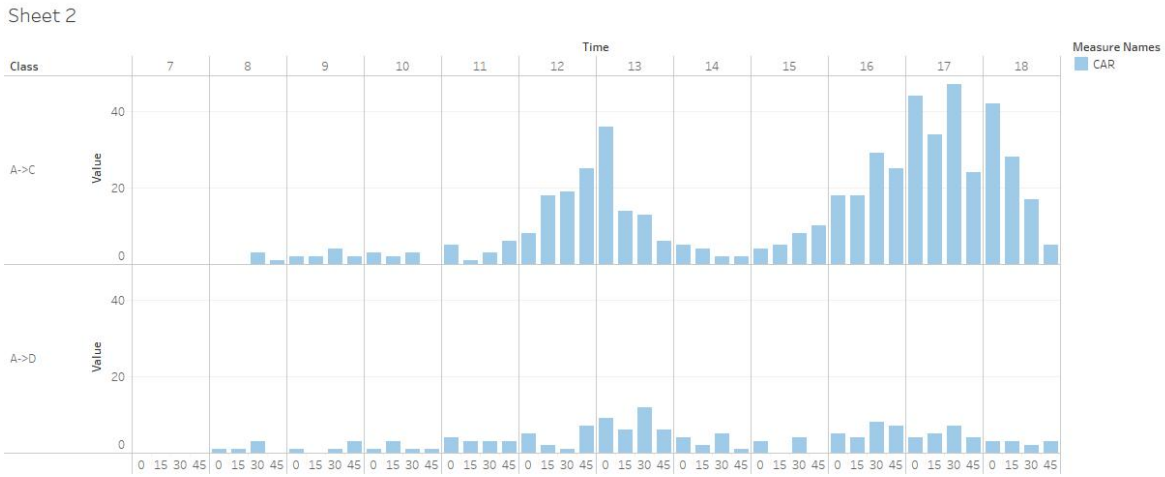

Figure 3.6 car number from Insight to University and City centre

Visualization of green-way cycle

The introduction and google map has introduced that from Moycullen(B) to IDA(A) and University & city centre(C) does not have a bicycle path, so there are few bicycle passing, only B-D has bicycle, so here is more than 5 bicycles passing this junction per 15 minutes from 7:30 to 9:00, and other time the bicycle numbers are fine, because both of B-> C and B->D pass University and go to city centre, the B->C should building the green-way cycle as well and reducing the bicycle number in junction of B->D.

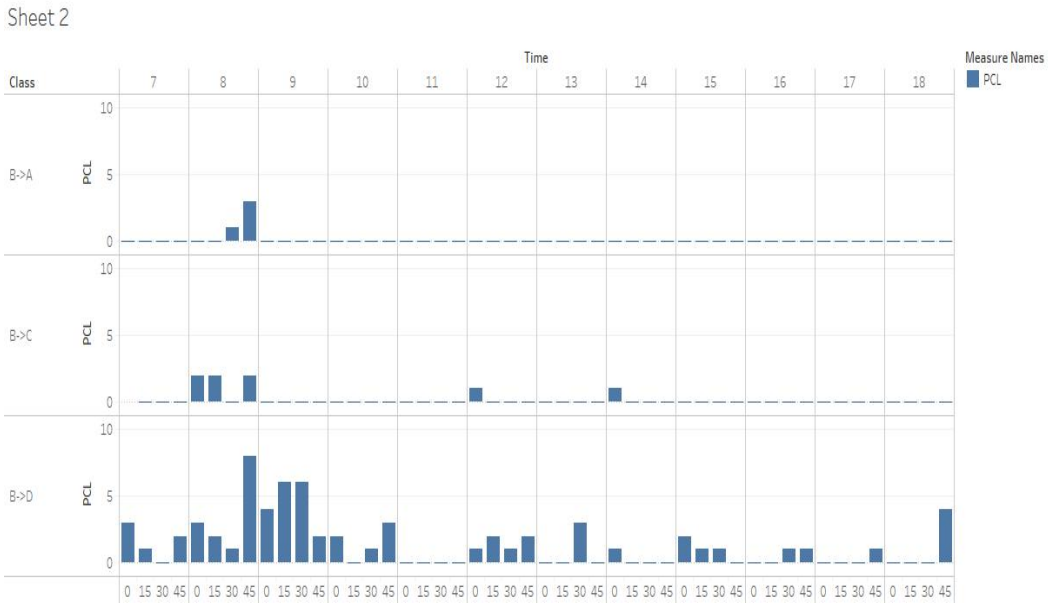

Figure 4.1 Bicycle distribution for every 15 minutes

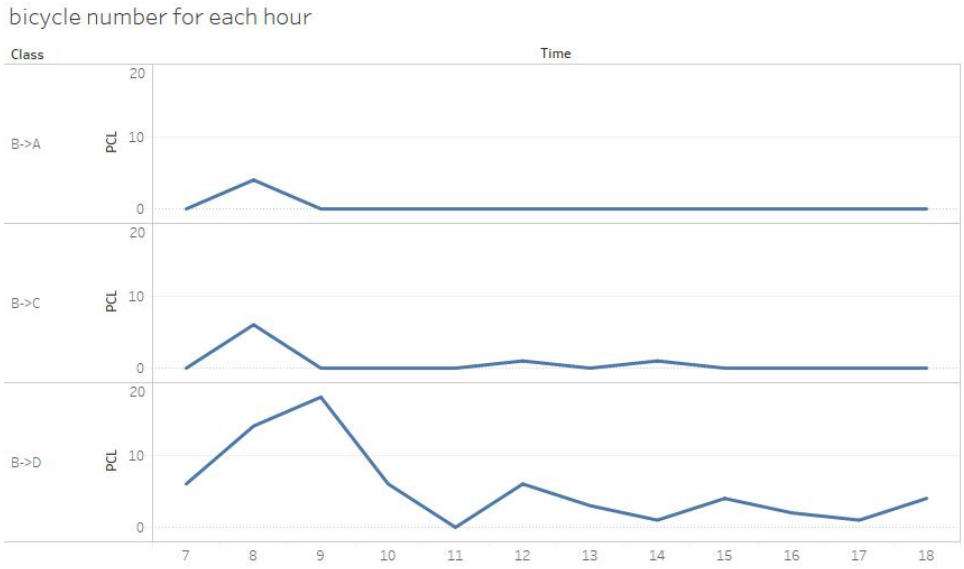

Figure 4.1 Bicycle distribution for every hour

In conclusion, the traffic jam period is from 7:30 to 9:00 and from 5:00 to 6:00 , and the traffic number in week is smaller than in weekend. Secondly, from the visualization, we can see from B->D and B->C there has a traffic jam so that using two way to solve it, firstly improve the bus frequency so that let the people who take car to take bus and another way is that add more route like bus routine is B->A->C and B->A->D, for the bicycle, the best way is create new green path from B->C, using both ways to reduce the car or bicycle number.

Reference:

tool-tableau