South Gloucestershire Core Strategy

Supplement to Forecasting Report

Client: South Gloucestershire Council

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1. Introduction

1.1. Background

This document is a supplement to the South Gloucestershire Core Strategy Forecasting Report (May 2012). The Forecasting Report describes the forecasting of future travel demand in the North Fringe[1] of the Bristol Urban Area and was prepared by Atkins on behalf of South Gloucestershire Council (SGC). This forecasting has been undertaken using a transport model that was developed to support the transport case for the North Fringe element of the detailed spatial strategy for future development in South Gloucestershire to 2026 set out in SGC's Core Strategy[2].

The model is referred to as the Core Strategy Model (CSM). The CSM has been developed following the Department for Transport's transport modelling guidance[3] and is constructed using SATURN highway assignment modelling software. The process of developing the CSM is documented separately in the Local Model Validation Report[4].

This supplementary note provides further detailed information on the traffic forecasts relating to Cribbs/Patchway New Neighbourhood (CPNN) as follows:

- The level of development assumed in the modelling of CPNN
- The forecast distribution of trips to and from CPNN;
- Forecast traffic flows at key junctions in the highway network in the vicinity of the CPNN; and
- Forecast public transport demand to/from CPNN.

The modelling approach is defined in the forecasting report. It is noted that the CSM is a strategic multi-modal model designed to assess the overall levels of demand in the North Fringe and has been used to inform SGC's position on Core Strategy and the measures expected to be required to support the sustainable development of CPNN. Developers of sites would be expected to submit evidence within their Transport Assessments to fully support their assumptions on factors that influence travel demand at the site.

2. Development Assumptions

Table 1 below summarises the level of development assumed in forecasting CPNN traffic. The table shows the additional housing and employment assumed in the 'Do-something' scenario (i.e. with CPNN) relative to the 'Reference' scenario (i.e. without CPNN). It is noted that the Core Strategy's estimates of households planned to be delivered in CPNN by 2026 were revised after the modelling was undertaken and reduced to 5700 (as defined by Policy CS26). The model forecasts therefore represent a 'worst case' scenario in transport terms.

Table 1. CPNN Development Assumptions

Land use	Location	Quantity	
Housing	South of Airfield	1200	Dwellings
	Cribbs Causeway	1000	Dwellings
	Airfield (West)	750	Dwellings

[1] The North Fringe of the Bristol Urban Area is within South Gloucestershire and comprises the communities of Filton, Patchway, Bradley Stoke, Stoke Gifford, Harry Stoke, Frenchay and the surrounding areas.
[2] South Gloucestershire Core Strategy: December 2011. Core Strategy incorporating Post-Submission Changes
[3] Transport Analysis Guidance (TAG), Department for Transport, www.dft.gov.uk/webtag
[4] South Gloucestershire Core Strategy: Local Model Validation Report, Atkins, May 2012.

	Airfield (East)	2250	Dwellings
	Haw Wood	1250	Dwellings
	Housing Total	***6450***	***Dwellings***
Employment	Airfield (East)	128000	sqm
	Airfield (East)	96000	sqm
	Employment Total	***224000***	***Sqm***

3. Trip Distribution

3.1. Approach to Estimation of Initial Trip Distribution

The future land use in the area covered by the CPNN will be very different from that currently. As such the existing distribution of trips to, from and within the area covered by the CPNN does not provide a suitably robust base from which to estimate future trip patterns to, from and within the CPNN. For locations in the North Fringe which are already substantially developed the model estimates changes in trip patterns as an increment from the existing trip distribution taking into account other changes including travel times and costs. However, where there is a substantial change in land use it is inappropriate to forecast the change in travel patterns from a trip distribution that will not be representative of the new land use; an alternative approach is required.

In line with the Department for Transport's guidance (TAG Unit 3.10.3) a gravity modelling approach was applied to estimate a trip distribution for the CPNN development area. The CPNN area was divided into four zones. A gravity model was used to generate a forecast of the 12 hour trip distribution between each CPNN zone and all other zones within and outside CPNN. The estimates for total movements to and from each CPNN zone obtained from the gravity model were constrained to the total number of trips attracted to or produced by that zone as estimated by the land use (trip end) model. This trip distribution was then incorporated into the initial trip matrices used in the demand model; the initial matrices are used by the demand model in an incremental forecasting approach to forecast changes in travel demand and travel behaviours with reference to changes in times and costs (e.g. due to the impact of transport measures) of travel to different zones by different modes in different time periods. The same approach was adopted for other new development areas in South Gloucestershire.

The modelling of demand used production and attraction (PA) values for a 12-hour period. This demand was then factored to produce values for each time period (AM peak, Inter peak, PM peak) using global factors. The forecast trip distribution was then reviewed and compared with adjacent (existing) zones to ensure that the pattern of movements included in the initial trip matrices forecasts were consistent with those elsewhere in the North Fringe. Two checks were undertaken: examining average trip lengths to ensure that those for the initial distribution for CPNN were consistent with those for other parts of the North Fringe; and the pattern of movements based on an analysis of sector to sector movements.

3.2. Trip Lengths

Table 2 shows the average trip lengths for motorised journeys (i.e. car and public transport but excluding walking and cycling) for the Do-Something scenario reported in the Forecasting Report; this includes the forecast impacts of changes in travel times and costs as a result of the development of the CPNN and including the impacts of the CPNN transport package and other transport measures. This shows that the average trip length for CPNN is similar for the CPNN and the rest of the North Fringe.

Table 2. Forecast Average Trip Length (2031 Do Something Scenario, motorised modes only)

Average trip length (km)	CPNN	North Fringe
AM peak	15 km	14 km
Inter peak	15 km	16 km
PM peak	14 km	20 km

3.3. Sector Analysis

An analysis of the distribution of trips to/from the CPNN has been undertaken using the same sector (i.e. aggregation of traffic zones) used in the validation analysis described in Section 8 (paragraphs 8.14 to 8.16) and Appendix F of the Local Model Validation Report.

Table 3 presents the distribution of trips **from CPNN to other areas** during the three time periods for the 2031 Do-Something scenario. The distribution of trips from the rest of the North Fringe is shown for comparison. This includes the forecast impacts of changes in travel times and costs as a result of the development of the CPNN and including the impacts of the CPNN transport package and other transport measures. Table 4 presents equivalent information for trips from CPNN (and from rest of North Fringe). The analysis shows that those areas of large population and/or those located close by attract the most trips. For example the largest number of trips are predicted to travel to and from areas within Bristol and the North Fringe and more remote locations with smaller populations such as North Somerset attract fewer trips. New development is assumed at Severnside (employment) and CPNN (both housing and employment) and the two zones are approximately 7km distance apart. The demand model predicts travel demand between these two areas. Conversely, the East Fringe is located further away and hence there is a lower forecast of trip-making between CPNN and the East Fringe.

Table 3. Trips from CPNN to other areas

From/To	CPNN	EHSNN	Rest of North Fringe	East Fringe	Severnside	Rest of South Gloucs	Bristol (excl Avonmouth)	Avonmouth	North Somerset	B&NES	External
	AM Peak Hour										
CPNN	6%	1%	20%	3%	7%	13%	32%	5%	7%	2%	3%
Rest of N Fringe	3%	1%	41%	3%	2%	12%	25%	2%	3%	2%	6%
	Average IP Hour										
CPNN	6%	1%	20%	4%	6%	12%	35%	4%	7%	3%	3%
Rest of N Fringe	3%	1%	36%	4%	2%	12%	23%	2%	5%	2%	11%
	PM Peak Hour										
CPNN	6%	1%	20%	4%	7%	13%	34%	3%	7%	2%	2%
Rest of N Fringe	2%	0%	34%	4%	2%	14%	21%	2%	5%	2%	14%

Table 4. Trips to CPNN from other areas

To/From	CPNN	EHSNN	Rest of North Fringe	East Fringe	Severnside	Rest of South Gloucs	Bristol (excl Avonmouth)	Avonmouth	North Somerset	B&NES	External
	AM Peak Hour										
CPNN	6%	1%	20%	4%	7%	12%	34%	4%	7%	2%	3%
Rest of N Fringe	2%	0%	32%	4%	2%	14%	22%	2%	4%	2%	15%
	Average IP Hour										
CPNN	6%	1%	19%	4%	6%	12%	36%	4%	7%	3%	3%
Rest of N Fringe	3%	0%	38%	4%	2%	12%	23%	2%	5%	2%	8%
	PM Peak Hour										
CPNN	6%	1%	20%	4%	7%	13%	34%	4%	7%	3%	2%
Rest of N Fringe	3%	1%	39%	3%	3%	12%	24%	2%	4%	2%	8%

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4. Traffic flows at key junctions

4.1. Approach to Modelling of Traffic Flows

Traffic routeing on the highway network has been modelled using capacity constrained highway assignment techniques in line with DfT guidance (TAG 3.19). This takes into account driver behaviour in which they seek to find the 'lowest cost' route through the network, based on minimising journey times and vehicle operating costs (fuel etc).

The base year of the model is 2011, with assessments undertaken for the AM peak (08:00-09:00), inter peak (10:00-16:00) and PM peak (17:00-18:00) periods. The approach to the building of the 2011 base year model is described in the Local Model Validation Report. Forecasts were then developed for 2031: a Reference Case that excludes development at the New Neighbourhood, and a 'Do Something' that includes development at the New Neighbourhood, supported by the transport strategy for the North Fringe. The approach to the forecasting of future traffic demand is described in the Forecasting Report.

4.2. Presentation of Traffic Flows

Turning flows at key junctions within the North Fringe are provided in **Appendix A** for the following:

- 2011 **AM** base flows;
- 2011 **PM** base flows;
- 2031 **AM** Reference Case (ie excluding development at the New Neighbourhood);
- 2031 **PM** Reference Case (ie excluding development at the New Neighbourhood);

- 2031 **AM** Do Something (ie including development at the New Neighbourhood + transport strategy);

- 2031 **PM** Do Something (ie including development at the New Neighbourhood + transport strategy);

These flows demonstrate growth in background traffic between 2011 and 2031 in both the AM and PM peaks. The effect of the transport strategy is to help deliver mode shift within the wider North Fringe area, which helps to reduce background traffic, hence enabling capacity to be unlocked for the New Neighbourhood.

5. Public Transport forecasts

5.1. Approach to Forecasting of Public Transport Demand

The forecasting of future public transport demand uses a Public Transport Assignment Model (PTAM) and a Demand Model. These models have been developed following the Department for Transport's modelling guidance. Together, these models enable forecasts to be made of transport demand and the corresponding highway and public transport flows in the North Fringe. Further detail on the approach taken is provided in the Forecasting Report.

5.2. Overview of Forecast Public Transport Demand

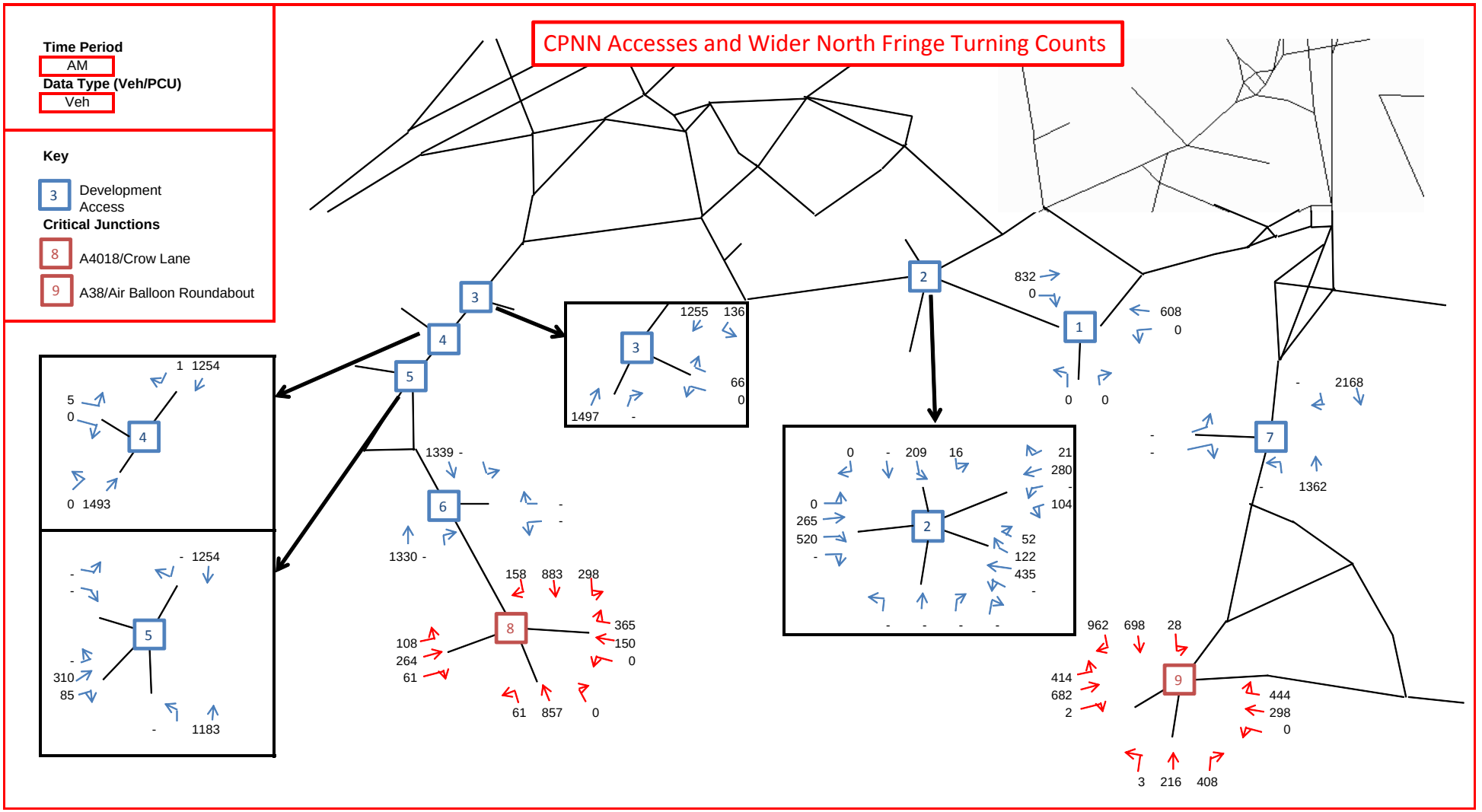
Table 13 of the Forecasting Report indicates that the daily total number of public transport trips in the GBATS model area would increase from 197,735 trips to 227,012 trips, an increase of 34,277 trips during a 12-hour period. Trips to, from and within the North Fringe are forecast to increase by 31,759 trips over the 12 hour period, with almost a 2,900 increase in public transport trips in each of the AM and PM peak hours.

Based on an assumed rapid transit vehicle or double-decker capacity of 70 persons this means that to accommodate this additional demand would require 42 additional vehicles. These could feasibly be delivered through the bus, bus rapid transit and rail provision that is proposed as part of the North Fringe transport package.

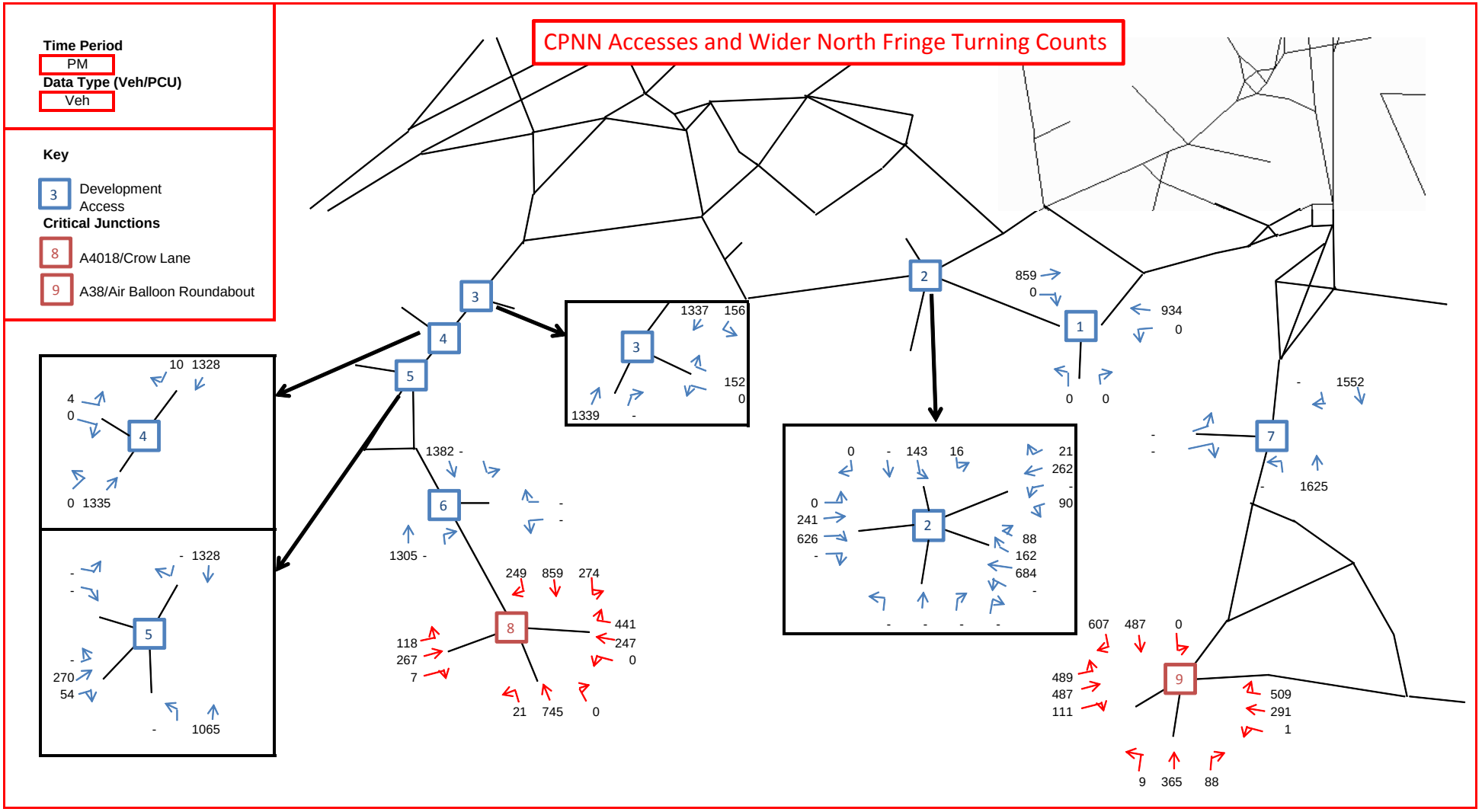
Appendices

Appendix A. Turning Flows (Vehicles) at Key Junctions

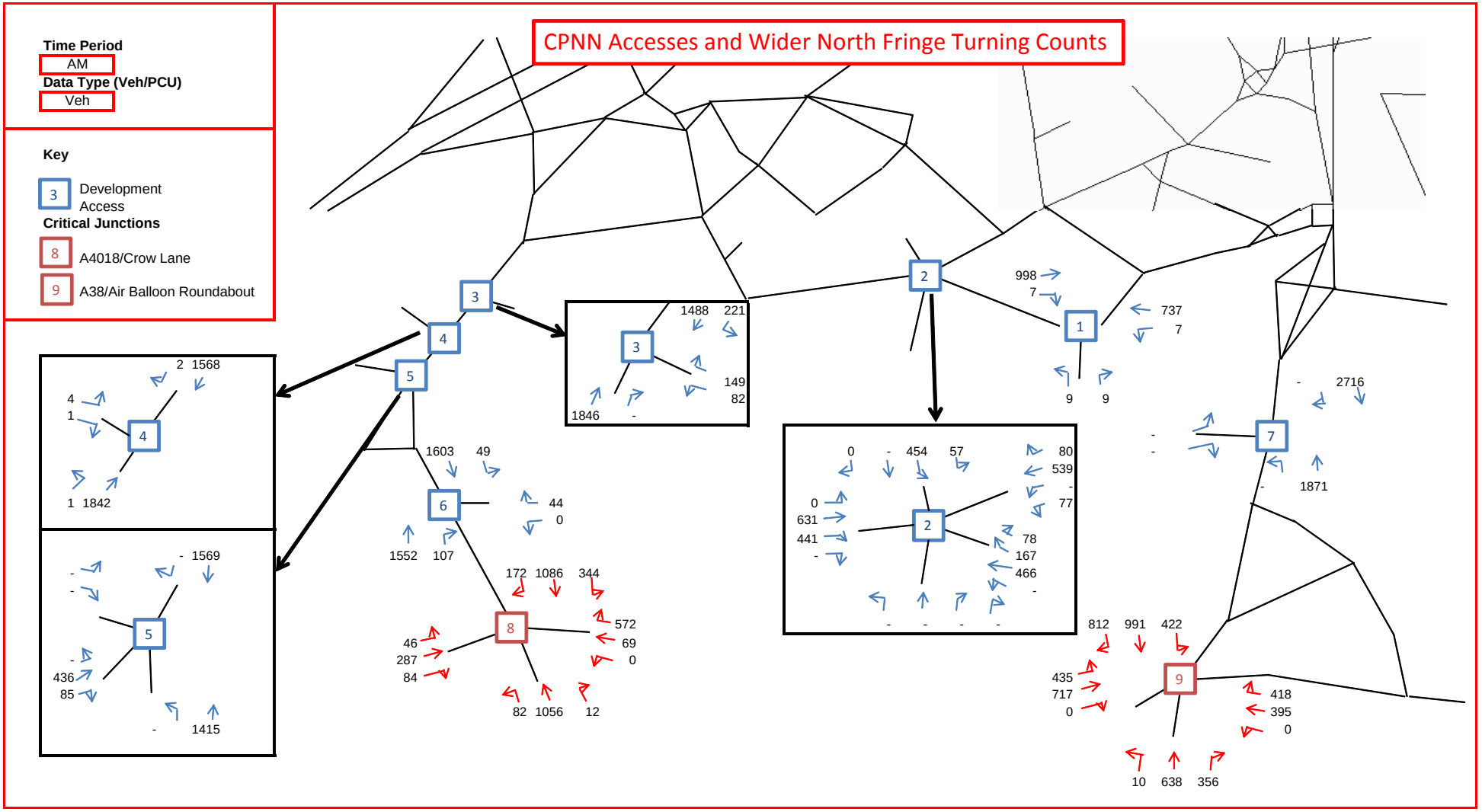
Base Year AM Vehicle Turning Flows



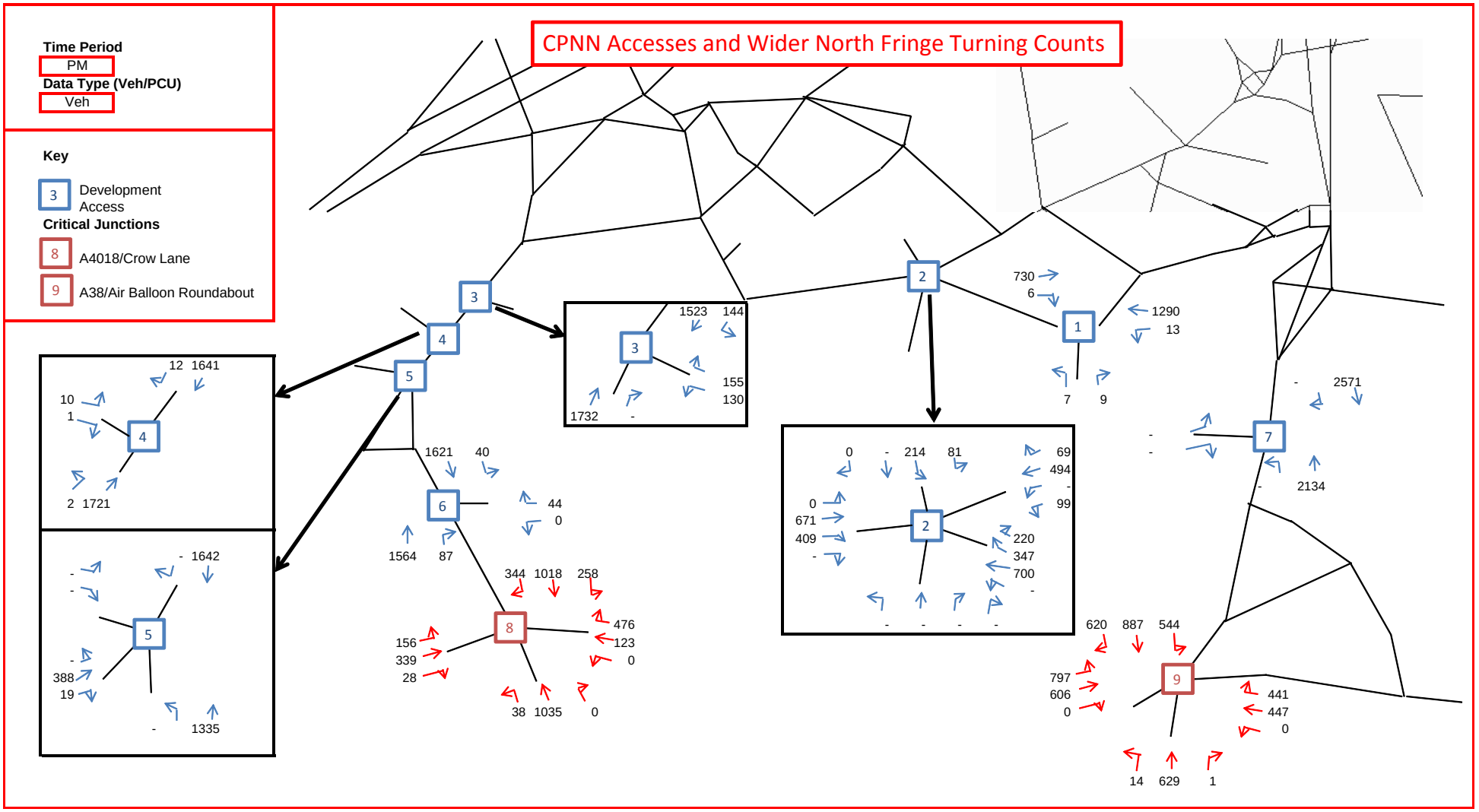
Base Year PM Vehicle Turning Flows



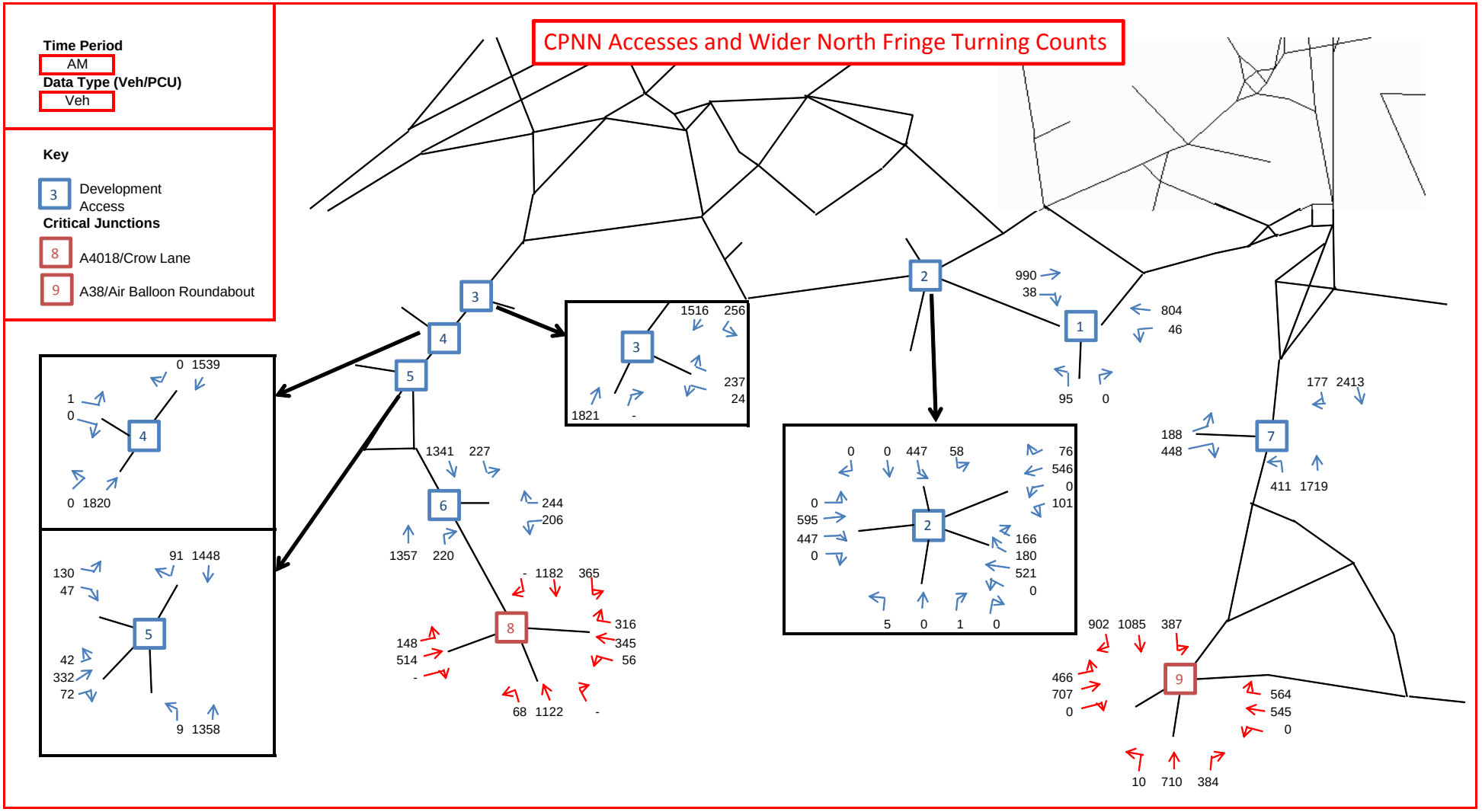
2031 AM Reference Case Vehicle Turning Flows



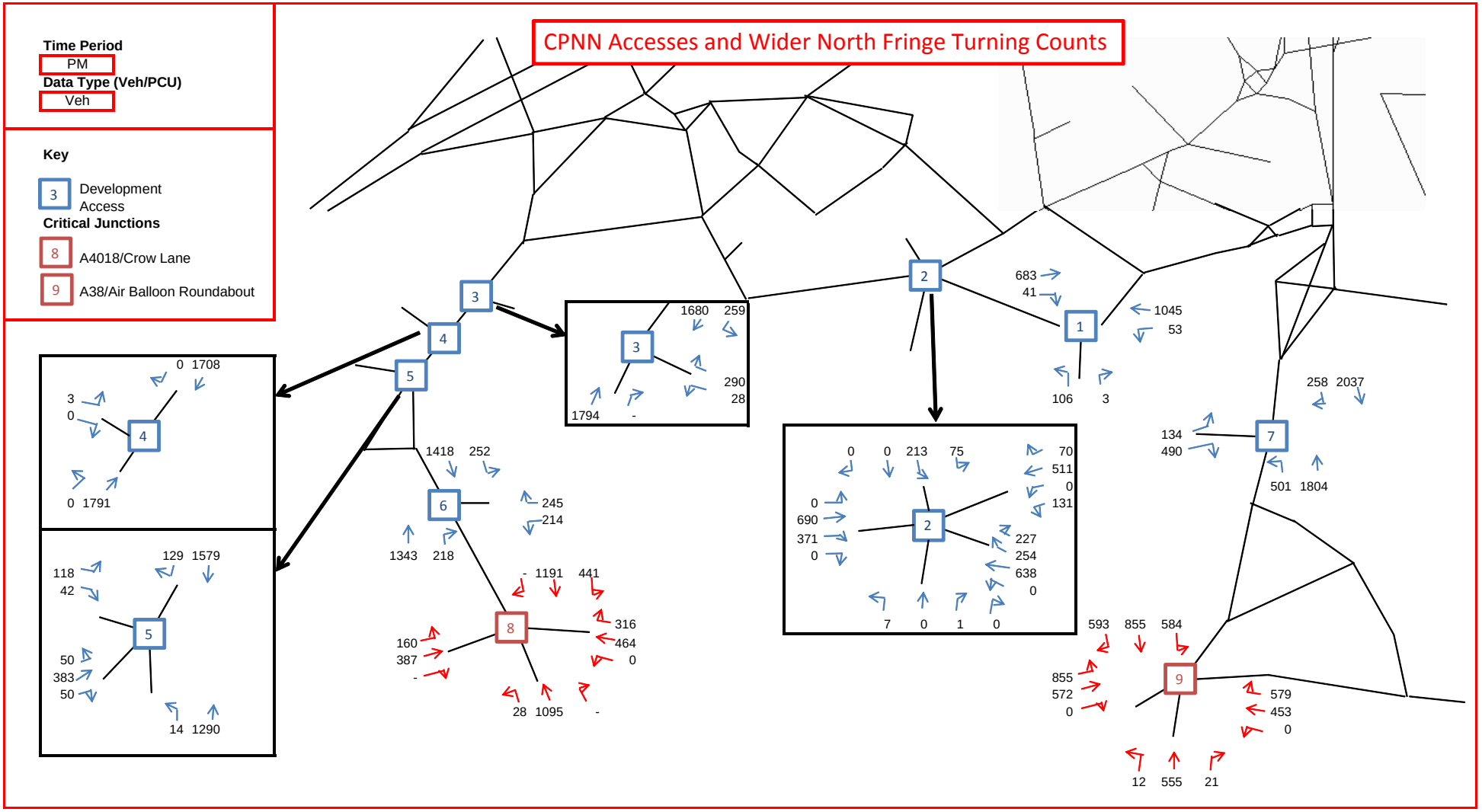
2031 PM Reference Case Vehicle Turning Flows



2031 AM Do Something Vehicle Turning Flows



2031 PM Do Something Vehicle Turning Flows



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