On SIDRA INTERSECTION Model Calibration

Rahmi Akçelik

Presentation at the SIDRA USER GROUP MEETING

Melbourne, Nov 2019

Updated: 17 Nov 2019

SIDRA SOLUTIONS
CELEBRATING 20 YEARS

SIDRA SOLUTIONS

Model Calibration

- Key model calibration parameters
- Principle for software model calibration: adjust basic parameters
- Calibration in oversaturated cases
- Local modelling guideline examples

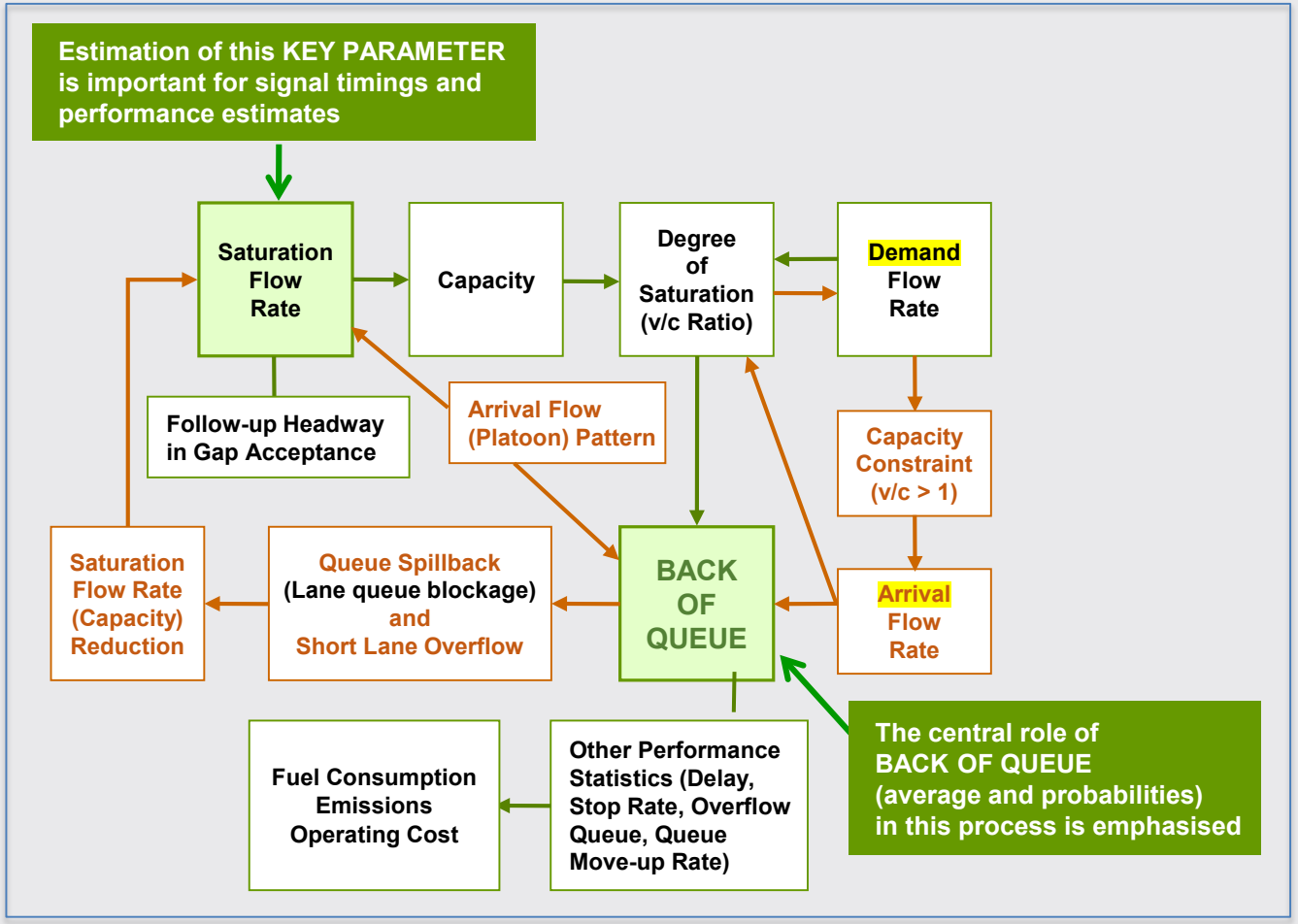
Key Model Calibration Parameters

MODEL CALIBRATION: Key Elements		
Site Type	**Key parameters used in the capacity model**	**Recommended key calibration parameter**
Signals	Saturation Flow Rate	Area Type Factor (per approach)
		Basic Saturation Flow (per lane)
Roundabouts	Follow-up Headway and Critical Gap	Environment Factor (per approach)
Two-Way Sign Control	Follow-up Headway and Critical Gap	Base Follow-up Headway and Critical Gap (per movement)

QUEUE SPACE (Jam Density) as a key parameter:

- Underlying parameter for Saturation Flow Rate (signals) and Follow-up Headway (gap acceptance).
- Key parameter in estimating Queue Distance, Short Lane Capacity, Upstream Lane Blockage and Capacity Reduction, therefore a key performance parameter for intersections and networks.

Modelling of a complex system:
SIDRA INTERSECTION Lane-based NETWORK model (iterative method)



Summary of the effects of the main features of the SIDRA INTERSECTION network model on the saturation flow rate and back of queue as key parameters in the iterative capacity and performance estimation process.

The orange-coloured boxes and lines in this flow chart show the unique aspects of the SIDRA INTERSECTION network model.

SIDRA SOLUTIONS

Calibration principle

Calibrate the key model parameters (second column in the table) by modifying the recommended **key calibration parameters** (third column in the table).

This will **keep variability as a function of other geometry and traffic parameters**.

Signals	Saturation Flow Rate	Basic Saturation Flow
Roundabouts	Follow-up Headway and Critical Gap	Environment Factor
Two-Way Sign Control	Follow-up Headway and Critical Gap	Base Follow-up Headway and Critical Gap

Calibration in oversaturated cases with unknown demand volumes

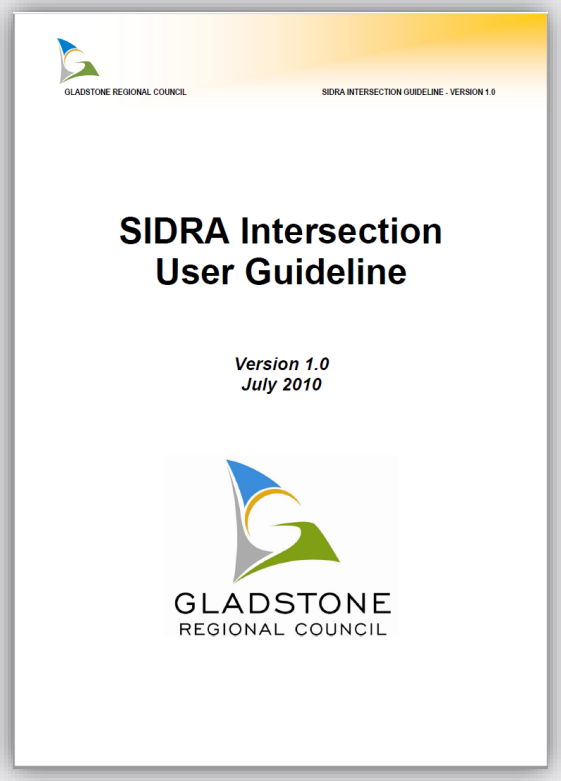
In oversaturated cases, demand exceeds capacity, i.e. the degree of saturation is expected to be larger than 1.0. However, when only stop or give-way / yield line volume counts have been used as input to the model since the demand volumes as measured at the back of queue are not available, the estimation of performance statistics (delay, queue length, etc) is problematic. The following method is recommended in this case.

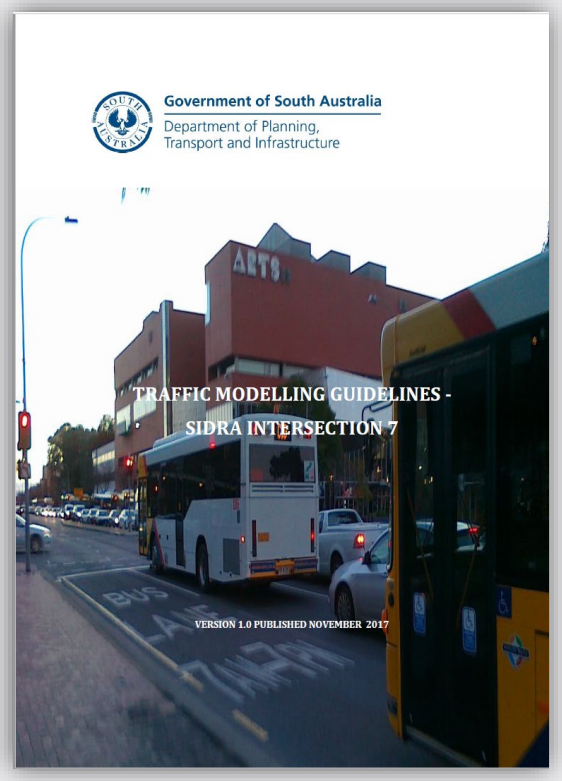
- Firstly, adjust the key calibration parameters in order to obtain lane degrees of saturation that equal 1.0 approximately, i.e. lane capacities equal observed lane flows based on stop or give-way / yield line counts specified as input.

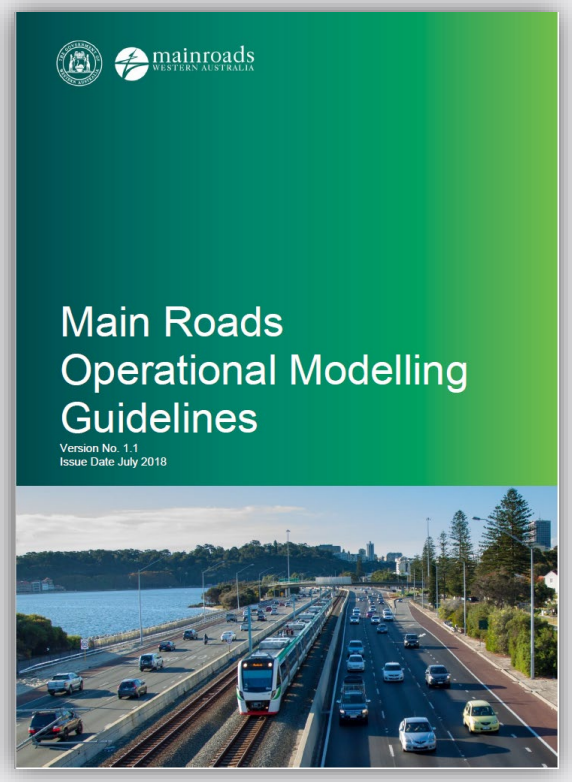
  With this calibration, the queue lengths, therefore probabilities of blockage, and delays will be underestimated since the stop or give-way / yield line volume counts are lower than the actual demand volumes.

- Use the Flow Scale parameter in the Volumes dialog, Volume Factors tab to estimate the demand flow rates. Select Flow Scale values that reflect the observed queue and delay conditions. As a result, the lane flow rates will be higher than those based on input volumes.

Local modelling guideline examples







SIDRA SOLUTIONS

END OF PRESENTATION

SIDRA SOLUTIONS