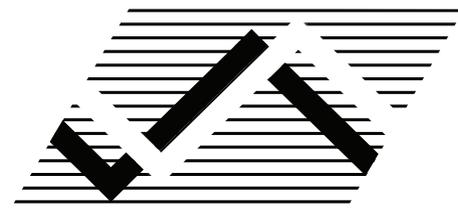


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# THE NSW CRIMINAL JUSTICE SYSTEM SIMULATION MODEL

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NSW Bureau of Crime Statistics and Research

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## ABSTRACT

In 2017 the NSW Bureau of Crime Statistics and Research (BOCSAR) completed an activity-based simulation model of the NSW adult criminal justice system (JUSTSIMTWO). The model follows an earlier stock and flow model of the NSW Criminal Justice system (Clark & Lind 2003). JUSTSIMTWO allows BOCSAR to estimate the impact of prospective policy interventions and changes to the criminal justice system workload and correctional system. It follows defendants from police charge, through bail decision, to court resolution and sentence, followed by custody where relevant. It also outputs time and workload volumes at critical nodes through the criminal justice journey. This report describes JUSTSIMTWO and how it operates.

## **ACKNOWLEDGEMENTS**

We are grateful for the support provided by the Department of Justice, Criminal Court Staff, Corrective Services NSW and NSW Police for supplying the data required to create this model. We would also like to thank Adel Azzi, Don Weatherburn, Emma Koh, Kayla Jones, Josh Shrubbs and Malindi Sayle for their valuable input throughout the development of the model.

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# INTRODUCTION

In 2017 the NSW Bureau of Crime Statistics and Research (BOCSAR) completed an activity-based simulation model of the NSW adult criminal justice system (JUSTSIMTWO). The model follows an earlier stock and flow model of the NSW Criminal Justice system (Clark & Lind 2003). JUSTSIMTWO allows BOCSAR to estimate the impact of prospective policy interventions and changes to the criminal justice system workload and correctional system. JUSTSIMTWO follows defendants from police charge, through bail decision, to court resolution and sentence, followed by custody where relevant. JUSTSIMTWO outputs time and workload volumes at critical nodes through the criminal justice journey. This report describes JUSTSIMTWO and how it operates.

## THE STRUCTURE OF JUSTSIMTWO

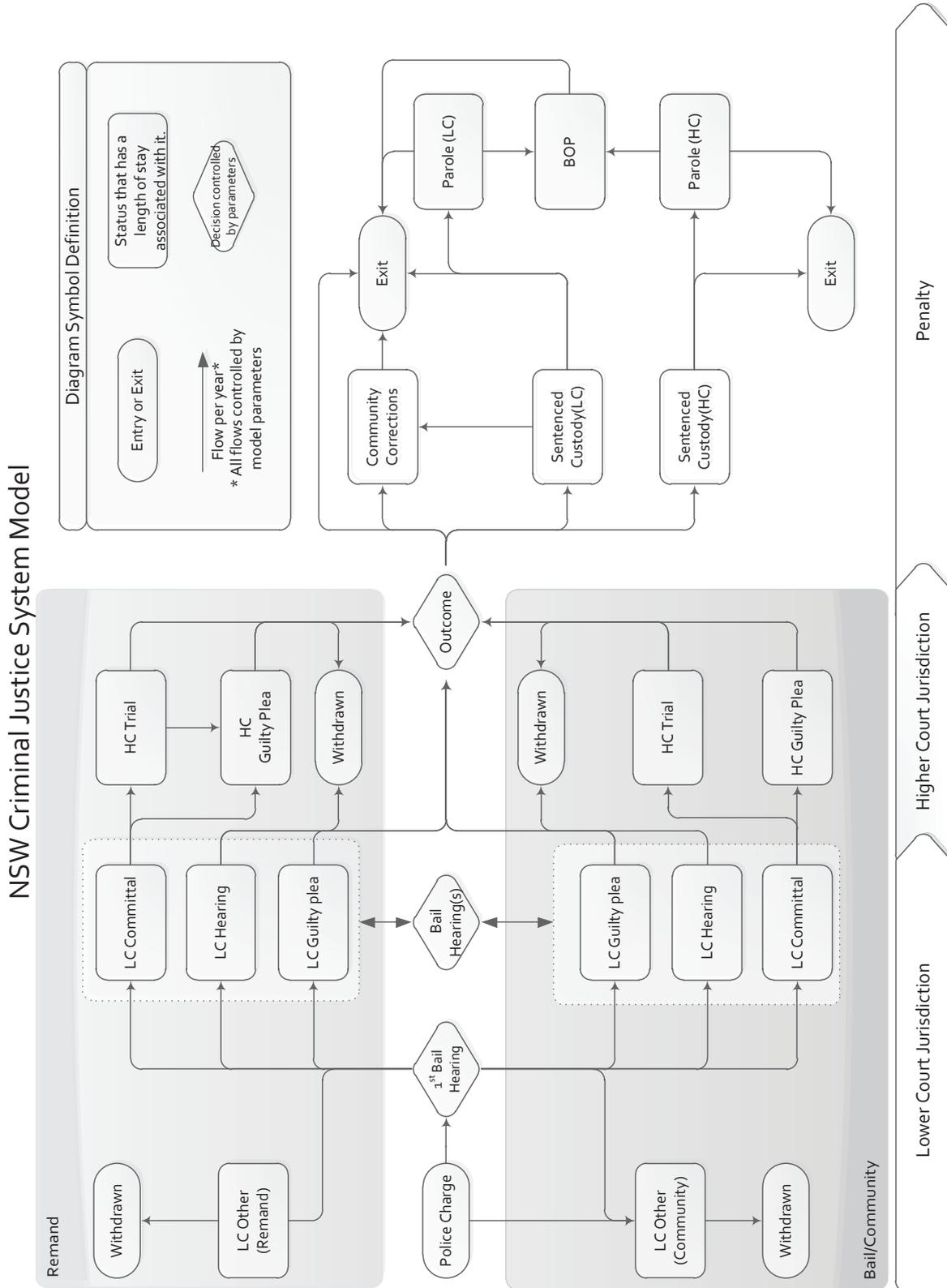
The schema for JUSTSIMTWO is shown in Figure 1. JUSTSIMTWO is structured around its critical functions, which are to output:

- (1) The number of people at any of 21 nodes within the system, and
- (2) The number of people who travel between the nodes throughout the simulation.

In JUSTSIMTWO, a node is a location or state where defendants can stay for a defined period of time. An example of a node is ‘Local Court defended hearings where the defendant is on remand’. Downstream nodes which connect or flow from this one are Local Court prison sentences (i.e. for the case where a person receives a custodial penalty from the Local Court) and Local Court community supervision sentences (i.e. for the case where a person receives a community supervision penalty from the Local Court). A full list of nodes in JUSTSIMTWO appears in Table A1 in Appendix A. Paths join two nodes together and define the possible ways a defendant can travel through JUSTSIMTWO. A full list of paths can be found in Appendix B.

Input parameters govern the likelihood that defendants will follow any given path (i.e. travel between connected nodes) and the length of time one stays at a particular node. The parameters represent things like the likelihood of having bail refused or the likelihood and length of a custodial sentence.

FIGURE 1: SCHEMA OF THE CRIMINAL JUSTICE SYSTEM MODEL



JUSTSIMTWO includes baseline parameter estimates which reflect current stocks and flows through the criminal justice system. To run a simulation, the parameters are adjusted to reflect the policy changes to be simulated. For instance, we can decide to make it less likely that defendants will be sentenced to prison, or we can change the length of prison sentences.

Alleged offenders (defendants) enter the court system following a police charge at a user-defined rate per simulated day. JUSTSIMTWO has a single entry point, which is a police court proceeding. On entering the Justice system, defendants are immediately split into those refused bail and those granted bail (including bail dispensed with). Defendants on remand (refused bail) are considered separately throughout the model to defendants in the community (granted bail). JUSTSIMTWO however, does allow defendants to move between remand and community and vice versa.

Following the initial bail determination, the defendant moves to the Local Court (LC) component of JUSTSIMTWO. Defendants proceed through the Local Court in one of three ways: they are finalised after a defended hearing, they are finalised by sentence after pleading guilty or they have their matter committed to the Higher Courts (HC). Those committed move to the Higher Court component of JUSTSIMTWO where they are finalised by either trial or sentence. Note that JUSTSIMTWO is based on the finalisation method in the Higher Courts and does not explicitly capture defendants committed for trial but finalised by sentence (late guilty pleas). While in the court's component of JUSTSIMTWO, individuals continue to have bail hearings and can move between bail and remand.

After a defendant's matter is finalised in the Local or Higher Courts, he or she moves to the penalty component of JUSTSIMTWO. Again, there are three options: they can move to sentenced custody, community corrections or they can exit the system (after receiving a non-supervised penalty). Custodial penalties are split by finalising jurisdiction because this has an impact on the duration of prison sentences (Higher Court penalties are typically longer than Lower Court penalties).

At the conclusion of a custodial penalty a person can either exit the system (sentence expired), move to parole (again split by jurisdiction because of significantly different parole lengths) or move on to a community supervised order. Parole can be exited, either by completing parole and exiting the system or by breaching and moving to the breach of parole node. Individuals in the breach of parole node are actually in sentenced custody but, again because of the different lengths of stay involved, they are separated in JUSTSIMTWO. It is assumed that a person can only breach parole once, so those exiting after a parole breach exit the system.

The length of time each individual spends at a node is governed by the input parameters that relate specifically to the baseline or scenario being run. The input parameters can be varied to reflect the changes that we want to simulate. These parameters are discussed in the next section.

## DATA SOURCES AND PARAMETER ESTIMATION

We turn our attention in this section to the sources of data and methods used to estimate the parameters. The section that follows explains the model validation process.

Three data sources were used to estimate JUSTSIMTWO parameters:

- Computerised Operational Policing System (COPS)
- JusticeLink (Courts)
- Custody (Corrective Services New South Wales [CSNSW])

Data required for JUSTSIMTWO was extracted in 2016, however the model can be refreshed to reflect later data as required for the baseline representation of the criminal justice system.

Appendices A and B describe the parameters, the data source(s) involved in their estimation and the operational definition of the parameters.

Rather than estimating model parameters by following a cohort of offenders from entry until exit from the criminal justice system, parameters were estimated by examining various groups as they move from state to state over the particular period of interest. Appendix C includes a description of the main data sources and how they were used to populate the model parameters.

## ACTIVITY-BASED SIMULATIONS

JUSTSIMTWO is an activity-based simulation which allows individuals to pass from one state to another with a certain probability. Repeated runs of JUSTSIMTWO are necessary to determine the average number of people in various states of the system. This allows the user to determine the likelihood that any given number of people will be in any one of the states of JUSTSIMTWO at any particular point in time. It also allows the user to determine how long it will take after one of the model parameters is changed for the full effects of that change to pass through the system. The probabilistic nature of this approach allows confidence intervals to be calculated for results. This type of simulation also caters for complex policy scenarios where multiple parameter changes are made at different points in time. The activity-based model depicts the outcome events in the Criminal Justice System (CJS) on a daily basis. The nature of the model can best be understood by examining the three operations that happen on a simulated day within the model.

**New Arrivals:** A number of new arrivals enter the system. This number represents the number of people entering the court system each day.

**Daily Movements:** All defendants in JUSTSIMTWO who are scheduled to move to a new state on this particular day (this will always include all new arrivals) are assigned a new state based on their current state and input parameters relevant to that state. For example those in the “LC committal” node are assigned to either HC trial or HC guilty plea, It is important to note that the input parameter determines which location the person will move to, not the likelihood of them moving (as this was already established when they were assigned a length of stay on arrival described below). It is also important to understand that the parameters in the agent based model are probabilities, not proportions. The path a defendant takes through Figure 1 will vary between simulations. That is why multiple simulations must be conducted to obtain estimates of the mean effects of changes in any of the parameters

**Length of Stay:** Once arriving at the new location, each person is assigned a length of stay. The length of time each individual spends in each state is determined by a random draw from the empirical distributions associated with that state. These empirical distributions of lengths of stay are drawn from actual data or data that has been constructed to represent a particular scenario.

Whenever activity based simulations are run, both the number of people at each node and the movements along each path are recorded at regular intervals (often monthly) for the duration a simulation. This information is then used to understand the impact of policy changes over time.

## MODEL VALIDATION

The model was validated by independently calibrating the input parameters to 2016 values, entering them into JUSTSIMTWO and then recording the output stocks and flows for each path and node. These values were then compared to the actual stocks and flows at the same period. The real CJS is in a constant state of change and has many factors impacting it that cannot be captured in a static set of 77 parameters. It follows that JUSTSIMTWO will only ever be approximately correct. However Table 1 shows the values produced by JUSTSIMTWO are fairly close to the actuals over the same period in the key areas.

**Table 1: Model validation against 2016 actuals**

<i>Output</i>	<i>Actual</i>	<i>Model</i>	<i>% Error</i>
Remand admissions	14381	13537	-5.9%
On remand then granted bail	4361	4357	-0.1%
Sentence Admissions	11750	10535	-10.3%
Higher Court Finalisations	3191	3303	3.5%
Lower Court finalisations	127862	126847	-0.8%
Total trial/hearing matters	17000	15876	-6.6%
Community orders (bond, community service order, Intensive Correct Order)	12524	12634	0.9%
Total average sent length (custody in BOP)	275	275	0.0%
Total remand population	4388	4349	-0.9%
Total sentenced population	8341	7948	-4.7%
Estimated bail/community population	37000	38238	3.3%
<b>Total parole population</b>	<b>5670</b>	<b>5474</b>	<b>-3.5%</b>

## FUTURE DEVELOPMENTS

The model just described is simple enough to be readily understood but complex enough to allow some quite sophisticated policy simulations. This said; there are a number of ways in which the model could to be improved. Three changes are particularly important. The first is to update the model so that it can handle the underlying data changes which accompany the NSW sentencing reforms commencing in September 2018. The second is an automated system for estimating and updating model parameters based on offence or offender characteristics pertaining to the scenario to be simulated. At present the process for sourcing, estimating and updating parameters is labour intensive. The last is a reliable basis on which to forecast changes in the number of people coming before the criminal courts. This is critical because it provides the baseline from which all policy simulation effects are estimated.

One of the limitations of the model at present is the assumption that model parameters are independent of each other. For example, an increase in the number of people committed to the higher criminal courts has no effect on the length of stay on remand. Likewise, an increase in the proportion refused bail has no effect on the proportion given a custodial sentence. This is unrealistic. If the number committed to a court exceeds the court's capacity, the effect will be a growth in the length of stay on remand for those refused bail and in custody awaiting trial. Similarly, if an increase in bail refusal means less serious offenders are being remanded in custody, the proportion ending up with a custodial penalty may be expected to fall. The model can be adjusted to deal with these problems but the optimal solution requires a better understanding of the way in which different processes within the criminal justice system interact with one another.

Another limitation in the model is its implicit assumption that the way a case is finalised in court (guilty plea or trial) is fully determined by the way the case was lodged. This greatly simplifies the modelling process. In practice, however, we know many people enter the system pleading not guilty but exit the system on a guilty plea. In the current model the only way to estimate the number of late guilty pleas is to apply historic averages to the outputs from the model. This is not ideal and we are exploring ways in which the model can be modified (without adding too much complexity) to capture changes of plea.

The scope of the model could also be enhanced by adding an appeals module. At the moment, appeals against conviction and/or sentence are not included in the model. Sentence and conviction appeals, however, are a significant component of the work of the District and Supreme Court. They have not been included up to this point because it is difficult to obtain reliable and timely data on the number and outcome of appeals. If this data could be obtained, an appeals component could be added. The model would also be more useful if it included a module dealing with juveniles. Juveniles have been excluded because they do not follow the same process as adults in the actual CJS. Model parameters are therefore not shared between adults and juveniles and it is currently not possible to simulate the effect of policies involving the juvenile justice system.

All these changes are desirable but it is important to remember that each increase on model capacity comes at the cost of having to source additional (reliable) data. At some point, the additional policy analysis capacity conferred by a more complex model is outweighed by the additional cost and effort required to estimate and update model parameters. We will wait to see how the current model is used before deciding on what additional modules to include.

## REFERENCES

Clark, Jonathan & Lind, Bronwyn & New South Wales. Bureau of Crime Statistics and Research (2003). *The New South Wales Criminal Justice System simulation model: further developments*. NSW Bureau of Crime Statistics and Research, Sydney, N.S.W.



## APPENDIX A

The key output of JUSTSIMTWO is the number of defendants at each of these nodes. In the model a node is a location or state where defendants can stay for a defined period of time.

**Table A1. List of model nodes**

<i>Nodes - (Length of stay parameter)</i>	<i>Length of stay data source</i>	<i>Description</i>
HC Remand - Other finalisation	JusticeLink	Defendants on remand whose matter was committed to the Higher Court and finalised by all charges being withdrawn (includes drug court & mental health finalisations). The length of stay in this node is measured from committal to finalisation.
HC Remand - Sentence finalisation	JusticeLink	Defendants on remand whose matter was committed to the Higher Court and finalised by sentence after a guilty plea. The length of stay is measured from committal to finalisation. It is important to note that this includes late guilty pleas.
HC Remand - Trial finalisation	JusticeLink	Defendants on remand whose matter was committed to the Higher Court and finalised by trial. The length of stay is measured from committal to finalisation.
LC Remand - Committal	JusticeLink	Defendants on remand whose matter was committed by the Local Court to be heard in the Higher Courts. Length of stay is measured from first appearance of any case in the disposal to the Local Court finalisation of the disposal.
LC Remand - Other finalisation	JusticeLink	Defendants who are on remand and whose matter was finalised in the Local Court by all charges being withdrawn (inc. drug court & mental health finalisations). Length of stay is measured from first appearance of any case in the disposal to the Local Court finalisation of the disposal.
LC Remand - Guilty plea finalisation	JusticeLink	Defendants on remand whose matter was finalised by sentence in the Local Court after a guilty plea. Length of stay is measured from first appearance of any case in the disposal to the Local Court finalisation of the disposal.

**Table A1. List of model nodes (*continued*)**

<i>Nodes - (Length of stay parameter)</i>	<i>Length of stay data source</i>	<i>Description</i>
LC Remand - Defended Hearing finalisation	JusticeLink	Defendants on remand whose matter was finalised in the Local Court by defended hearing. Length of stay is measured from first appearance of any case in the disposal to the Local Court finalisation of the disposal.
HC Bail/ Community - Other finalisation	JusticeLink	Defendants NOT on remand and their matter was committed to the Higher Court and finalised by all charges being withdrawn (includes drug court & mental health finalisations). Length of stay is measured from committal to finalisation.
HC Bail/ Community - Sentence finalisation	JusticeLink	Defendants NOT on remand and their matter was committed to the Higher Court and finalised by sentence after a guilty plea. Length of stay is measured from committal to finalisation.
HC Bail/ Community - Trial finalisation	JusticeLink	Defendants NOT on remand and their matter was committed to the Higher Court and finalised by trial. Length of stay is measured from committal to finalisation.
LC Bail/ Community - Committal	JusticeLink	Defendants NOT on remand and their matter was committed by the Local Court to be heard in the Higher Courts. Length of stay is measured from first appearance of any case in the disposal to the Local Court finalisation of the disposal.
LC Bail/ Community - Other finalisation	JusticeLink	Defendants NOT on remand and their matter was finalised in the Local Court by all charges being withdrawn (Inc. drug court & mental health finalisations). Length of stay is measured from first appearance of any case in the disposal to the Local Court finalisation of the disposal.
LC Bail/ Community -Guilty Plea finalisation	JusticeLink	Defendants NOT on remand and their matter was finalised by sentence in the Local Court after a guilty plea. Length of stay is measured from first appearance of any case in the disposal to the Local Court finalisation of the disposal.
LC Bail/ Community - Defended Hearing finalisation	JusticeLink	Defendants NOT on remand and their matter was finalised in the Local Court by defended hearing. Length of stay is measured from first appearance of any case in the disposal to the Local Court finalisation of the disposal.

**Table A1. List of model nodes (*continued*)**

<i>Nodes - (Length of stay parameter)</i>	<i>Length of stay data source</i>	<i>Description</i>
HC - Community Order	JusticeLink	Defendants finalised in the Higher Courts who received a supervised community order as their penalty or who have an existing penalty to be served at the completion of a custodial sentence. Duration is the minimum sentence length.
LC - Community Order	JusticeLink	Defendants finalised in the Local Courts who received a supervised community order as their principal penalty. Duration is the minimum sentence length.
HC - Custodial Sentence	JusticeLink	Defendants finalised in the Higher Courts who received a custodial/prison sentence as their principal penalty. Duration is the minimum sentence length.
LC - Custodial Sentence	JusticeLink	Defendants finalised in the Local Courts who received a custodial/prison sentence as their principal penalty. Duration is the minimum sentence length.
Breach of Parole	Custody	Defendants who returned to prison having breached their parole. The length of time these people spend in prison is a fitted value based on the average custody duration of the known population that meet these conditions.
LC - Parole	Custody	Defendants released from sentenced custody on parole. The length of time on parole is a fitted value based on the known parole population and the flow of people discharged from sentenced custody onto parole.
HC - Parole	Custody	Those who are released from sentenced custody on parole. The length of time on parole is a fitted value based on the known parole population and the flow of people discharged from sentenced custody onto parole.



## APPENDIX B

Paths join two nodes together and represent the possible ways a defendant can travel through the model.

**Table B: List of parameters/paths in JUSTSIMTWO**

<i>Path from</i>	<i>Path to</i>	<i>Data Source (for input parameters)</i>	<i>Description</i>
Police Charges (Matters)	LC Remand -Committal	JusticeLink/ Cops	Matters finalised in the Local Court as a committal to the Higher Courts. The baseline parameter uses COPS first bail to determine bail refusal
	LC Remand - defended Hearing finalisation	JusticeLink/ Cops	Matters finalised in the Local Court as a defended hearing. The baseline parameter uses COPS first bail decision to determine bail refusal.
	LC Remand - Guilty Plea finalisation	JusticeLink/ Cops	Matters finalised in the Local Court as a plea. The baseline parameter uses COPS first bail decision to determine bail refusal.
	LC Remand Other- finalisation	JusticeLink/ Cops	Matters finalised in the Local Court where the matter is withdrawn (Inc. drug court and metal health). Uses COPS first bail decision to determine bail refusal.
	LC Bail/ Community - finalised by guilty plea	JusticeLink/ Cops	Matters finalised in the Local Court by sentence after a guilty plea. The baseline parameter uses COPS first bail to determine the granting of bail.
	LC Bail/ Community - Defended Hearing finalisation	JusticeLink/ Cops	Matters finalised in the Local Court as a defended hearing. The baseline parameter uses COPS first bail decision to determine the granting of bail.

**Table B: List of parameters/paths in JUSTSIMTWO (continued)**

<i>Path from</i>	<i>Path to</i>	<i>Data Source (for input parameters)</i>	<i>Description</i>
Police Charges (Matters) - <i>continued</i>	LC Bail/ Community-Committal	JusticeLink/ Cops	Matters finalised in the Local Court as a committal to the Higher Court. The baseline parameter uses COPS first bail decision to determine the granting of bail.
	LC Bail/ Community-Other finalisation	JusticeLink/ Cops	Matters finalised in the Local Court where the matter is withdrawn (Inc. drug court and metal health). Uses COPS first bail decision to determine the granting of bail.
LC Remand -Committal	HC Remand - Trial finalisation	JusticeLink	Defendants on remand who are committed in the Local Court and finalised by trial in the Higher Court. Note this path is determined by the Higher Court finalisation not how the matter was registered.
	HC Remand Sentence - finalisation	JusticeLink	Defendants on remand who are committed in the Local Court and finalised by sentence in the Higher Court. Note this path is determined by the Higher Court finalisation not how the matter was registered.
	HC Other -finalisation	JusticeLink	Defendants on remand who are committed in the Local Court and dismissed in the Higher Court.
	LC Bail/ Community - Committal	JusticeLink	Defendants who are in the committal process (not yet finalised) in the Local Court who were on remand but are then granted bail.

**Table B: List of parameters/paths in JUSTSIMTWO (continued)**

<i>Path from</i>	<i>Path to</i>	<i>Data Source (for input parameters)</i>	<i>Description</i>
LC Remand - defended Hearing finalisation	LC Community Order	JusticeLink	Defendants who are on remand, have their case finalised in the Local Court by defended hearing and who go on to receive a penalty of community supervision penalty.
	LC Custodial Sentence	JusticeLink	Defendants who are on remand, have their case finalised in the Local Court by defended hearing and who go on to receive a custodial sentence.
	LC Fine/ other finalisation	JusticeLink	Defendants who are on remand, have their case finalised in the Local Court by defended hearing and who go on to be acquitted or receive an unsupervised penalty.
	LC Bail/ Community Hearing	JusticeLink	People who are in the process of having a Local Court defended hearing (not yet finalised) that were on remand but are then granted bail.
LC Remand -Guilty Plea finalisation	LC Custodial Sentence	JusticeLink	Defendants on remand whose Local Court guilty plea results in a custodial sentence.
	LC Community Order	JusticeLink	Defendants on remand whose Local Court guilty plea results in a supervised community penalty.
	LC Fine/ other finalisation	JusticeLink	Defendants on remand whose Local Court guilty plea results in an unsupervised penalty.
	LC Bail/ Community Guilty Plea	JusticeLink	People who have entered a guilty plea in the Local Court (not yet finalised) who were on remand but are then granted bail.

**Table B: List of parameters/paths in JUSTSIMTWO (continued)**

<i>Path from</i>	<i>Path to</i>	<i>Data Source (for input parameters)</i>	<i>Description</i>
LC Bail/ Community -Guilty Plea finalisation	LC Community Order	JusticeLink	Defendants NOT on remand whose Local Court guilty plea results in a custodial sentence.
	LC Custodial Sentence	JusticeLink	Defendants NOT on remand whose Local Court guilty plea results in a supervised community penalty.
	LC Fine/ other finalisation	JusticeLink	Defendants NOT on remand whose Local Court guilty plea results in an unsupervised penalty.
	LC Remand Guilty Plea	JusticeLink	Defendants in the sentencing process (but not yet finalised ) in the Local Court who were on bail but are then refused bail.
LC Bail/ Community -defended Hearing finalisation	LC Community Order	JusticeLink	Defendants who are NOT on remand, have their case finalised in the Local Court by defended hearing and who go on to receive a penalty of community supervision.
	LC Custodial Sentence	JusticeLink	Defendants who are NOT on remand, have their case finalised in the Local Court by defended hearing and who go on to receive a custodial sentence.
	LC Fine/ other finalisation	JusticeLink	Defendants who are NOT on remand, have their case finalised in the Local Court by defended hearing and who go on to be acquitted or receive an unsupervised penalty.
	LC Remand Hearing	JusticeLink	Defendants in the process of going to defended hearing (not finalised) in the Local Court who are currently on bail are refused bail.

**Table B: List of parameters/paths in JUSTSIMTWO (continued)**

<i>Path from</i>	<i>Path to</i>	<i>Data Source (for input parameters)</i>	<i>Description</i>
LC Bail/ Community - Committal	HC Bail/ Community - Sentence finalisation	JusticeLink	Defendants NOT on remand who are committed in the Local Court and finalised by sentence in the Higher Court. Note this path is determined by the Higher Court finalisation not how the matter was registered.
	HC Bail/ Community - Trial finalisation	JusticeLink	Defendants NOT on remand who are committed in the Local Court and finalised by trial in the Higher Court. Note this path is determined by the Higher Court finalisation not how the matter was registered.
	HC Fine/ other finalisation	JusticeLink	Defendants NOT on remand who are committed in the Local Court and dismissed in the Higher Court.
	LC Remand Committal	JusticeLink	People who are on that are in the committal process (not finalised) in the Local Court who are currently not on remand but are then refused bail.
HC Remand - Trial finalisation	HC Community Order	JusticeLink	Defendants with Higher Court trial finalisations while on remand who receive a penalty of community supervision.
	HC Custodial Sentence	JusticeLink	Defendants with Higher Court trial finalisation while on remand who receive a custodial/prison penalty.
	HC Fine/ other finalisation	JusticeLink	Defendants with Higher Court trial finalisations while on remand who receive a non-supervised penalty or acquittal.
	HC Bail/ Community Trial	JusticeLink	People whose trial matter is not yet finalised and who were on remand but are then released on bail.

**Table B: List of parameters/paths in JUSTSIMTWO (continued)**

<i>Path from</i>	<i>Path to</i>	<i>Data Source (for input parameters)</i>	<i>Description</i>
HC Remand - Sentence finalisation	HC Community Order	JusticeLink	Defendants with Higher Court sentence finalisations while on remand who receive a penalty of community supervision.
	HC Custodial Sentence	JusticeLink	Defendants with Higher Court sentence finalisations while on remand who receive a custodial/prison penalty.
	HC Fine/ other finalisation	JusticeLink	Defendants with Higher Court sentence finalisations while on remand who receive a non-supervised penalty or acquittal.
	HC Bail/ Community Sentencing	JusticeLink	People whose sentencing matter is not finalised and who are currently on remand are released on bail.
HC Bail/ Community - Trial finalisation	HC Community Order	JusticeLink	Defendants with Higher Court trial finalisations while NOT on remand who receive a penalty of community supervision.
	HC Custodial Sentence	JusticeLink	Defendants with Higher Court trial finalisation while NOT on remand who receive a custodial/prison penalty.
	HC Fine/ other finalisation	JusticeLink	Defendants with Higher Court trial finalisations while NOT on remand who receive a non-supervised penalty or acquittal.
	HC Remand Trial	JusticeLink	People whose trial matter is not finalised and who are currently on bail are refused bail.

**Table B: List of parameters/paths in JUSTSIMTWO (continued)**

<i>Path from</i>	<i>Path to</i>	<i>Data Source (for input parameters)</i>	<i>Description</i>
HC Bail/ Community - Sentence finalisation	HC Community Order	JusticeLink	Defendants with Higher Court sentence finalisations while NOT on remand who receive a penalty of community supervision.
	HC Custodial Sentence	JusticeLink	Defendants with Higher Court sentence finalisations while NOT on remand who receive a custodial/prison penalty.
	HC Fine/ other finalisation	JusticeLink	Defendants with Higher Court sentence finalisations while NOT on remand who receive a non-supervised penalty or acquittal.
	HC Remand Sentencing	JusticeLink	People whose sentencing matter is not finalised and who are currently on bail are then refused bail.
LC Custodial Sentence	LC Parole	Custody	People who exit sentenced custody and go on parole. This path is specific to those who received their penalty from the Local Court.
LC Custodial Sentence	LC Community Order	Custody	People who are released from sentenced custody onto a supervised community order. It specifically relates to those who received their penalty in the Local Court.
HC Custodial Sentence	HC Parole	Custody	People who exit sentenced custody and go on parole. This path is specific to those who received their penalty from the Higher Court.

**Table B: List of parameters/paths in JUSTSIMTWO (continued)**

<i>Path from</i>	<i>Path to</i>	<i>Data Source (for input parameters)</i>	<i>Description</i>
HC Custodial Sentence	HC Community Order	Custody	People released from sentenced custody onto a supervised community order. It specifically relates to those who received their penalty in the Higher Court.
LC Parole	Breach of Parole	Custody	People travel that were on parole but breached and went back into custody. They return to the breach of parole node to allow a different distribution of length of stay to regular custody. Note this parameter governs people who received their penalty from the Local Court.
Parole	Breach of Parole	Custody	People travel that were on parole but breached and went back into custody. They return to the breach of parole node to allow a different distribution of length of stay to regular custody. Note this parameter governs people who received their penalty from the Higher Courts.

## APPENDIX C

### METHOD BY WHICH PARAMETERS WERE ESTIMATED

#### *Model Parameters Estimated from COPS*

The daily number of persons whose cases are finalised (disposals) can be obtained from BOCSAR's court database. Information on relevant bail decisions can be obtained from COPS; however COPS records are counts of incidents in which an individual was proceeded against to court, not counts of unique individuals proceeded against. The same person may be proceeded against on two separate occasions in a short period of time. It would be a mistake to treat the bail decisions in each case as belonging to different individuals. In order to estimate bail decisions, therefore, it was necessary to merge COPS data on persons proceeded against to court with JusticeLink data on court finalisations. This combined dataset was then used to estimate 1st bail decisions.

#### *Model Parameters Estimated from JusticeLink*

The majority of parameters in JUSTSIMTWO are estimated using JusticeLink data. The counting unit in JusticeLink data is known as disposals. It represents one or more cases that were finalised in a particular court, per person, per day. JusticeLink data has been used to estimate all movements and lengths of stay throughout the court (higher and lower) components of JUSTSIMTWO. This includes lengths of stay on remand which end either by a person being granted bail, released or sentenced to a supervised penalty (Custody or Community Corrections). JusticeLink data was also used to determine the penalty type and duration for the individual as they move into the penalty component of JUSTSIMTWO.

#### *Model Parameters Estimated from Custody Data*

Custody data has been used to estimate the flow of individuals from sentenced custody to parole, community corrections and exiting the system (sentence expired). It has also been used to estimate the proportion of individuals breaching parole and being returned to custody. Knowing the number of people currently in prison for breaching parole and the number of people arriving for breach of parole allows us to estimate the average length of time a person spends back in prison for breach of parole. While possible to estimate sentenced/remand duration and flows from the custody data doing so would not have allowed the split by jurisdiction or court finalisation types.

