

**NOTICE TO SETTLEMENT ACCOUNTHOLDERS PURSUANT TO CLAUSE 4.1 OF  
ESAS TERMS AND CONDITIONS:**

**CHANGES TO SETTLEMENT SUBMISSION MECHANISM: FIFO BYPASS,  
GRIDLOCK BUSTER: MULTILATERAL OFFSETTING AND GRIDLOCK BUSTER:  
BILATERAL OFFSETTING**

1. This notice is given by the Reserve Bank of New Zealand (the “**Bank**”) to Settlement Accountholders under clause 4.1 of the ESAS Terms and Conditions. In accordance with that clause, the operation of the Settlement Submission Mechanisms described in this notice shall become effective on 24 February 2020 (or such later date as notified by the Bank under clause 4.1(a)). This notice replaces all previous notices issued under clause 4.1.
2. This notice sets out the operation of the Liquidity Optimisation Mechanism (LOM) for settling transactions in ESAS. In order to settle a transaction on the LOM both Settlement Accountholders must have a LOM account. A LOM account is a Settlement Account configured in the System as a LOM account.
3. The attachments to this notice do not form part of this notice. Attachment One is provided by the system application vendor and depicts in flow chart format the Gridlock Buster mechanism described in paragraphs 10-18 of this notice. Attachment Two provides examples of how the Gridlock Buster mechanism operates.
4. Capitalised terms which are defined in the ESAS Terms and Conditions have the same meaning where used in this notice.
5. All Authorised Payment Instructions will be recorded in the Payment Instruction Queue once they are Authorised.
6. Whenever there is a change to the Payment Instruction Queue (e.g. a new Payment Instruction is received, an existing Payment Instruction is Settled, the priority or sequence number of a queued Payment Instruction has changed, a queued Payment Instruction has been removed) the System will immediately undertake the Settlement Tests specified in clause 4.3 of the ESAS Terms and Conditions for the Payment Instructions in the Payment Instruction Queue.
7. The System will order Authorised Payment Instructions on the accountholder’s LOM account for a payor according to a priority ranking specified for the Authorised Payment Instruction by either the Accountholder

or using settings in the System and then by the internal sequence number generated by the System and then by the date and time that the Payment Instruction was Authorised .

### **FIFO BYPASS**

8. The System will perform Settlement Tests on Authorised Payment Instructions according to a First In First Out Bypass (FIFO Bypass) sequencing methodology. Under this sequencing methodology it is possible that an Authorised Payment Instruction which is Authorised after other Authorised Payment Instructions may be Settled by the System before those earlier-Authorised Payment Instructions.
9. The first Authorised Payment Instruction in the sequence determined in paragraph 7 will be subjected to the Settlement Tests. If the first Authorised Payment Instruction satisfies the Settlement Tests, it will be Settled and will be removed from the Payment Instruction Queue. The System will then recalculate the sequence of Authorised Payment Instructions in the Payment Instruction Queue in accordance with paragraph 7 above. If an Authorised Payment Instruction does not satisfy all the Settlement Tests, FIFO Bypass will be applied so that the next Authorised Payment Instruction of the highest priority ranking in the Payment Instruction Queue for that Accountholder at that time (the Next Payment Instruction) as determined under paragraph 7 above will then be subjected to Settlement Tests and if the Settlement Tests are satisfied the Next Payment Instruction will be Settled and removed from the Payment Instruction Queue and the Payment Instruction Queue will be recalculated in accordance with paragraph 7. If the Next Payment Instruction does not satisfy the Settlement Tests then the System will Test the next Authorised Payment Instruction of the highest priority ranking in the Payment Instruction Queue for that Accountholder at that time in the sequence determined in paragraph 7. If the System is unable to Settle any of the highest priority ranking in the Payment Instruction Queue for that Accountholder at that time it will not attempt to Settle any instructions of a lower priority ranking in the Payment Instruction Queue for that Accountholder at that time. This process will be repeated for all Authorised Payment Instruction of the highest priority ranking in the Payment Instruction Queue for that Accountholder at that time and once all such Authorised Payment Instruments have been tested the System will recommence testing from the start of the sequence of the Payment Instruction Queue as determined in paragraph 7 once there has been a change to the Payment Instruction Queue.

**GRIDLOCK BUSTER: MULTI-LATERAL OFFSETTING**

10. The System will Settle Authorised Payment Instructions in accordance with the Gridlock Buster methodology described below when Gridlock Buster is initiated by the Bank.
11. The Bank may initiate operation of Gridlock Buster:
  - A) manually at any time as appropriate (eg when larger than usual volumes are submitted and/or gridlock occurs)
  - B) automatically by the System at a specified elapsed time since the last change to the Payment Instruction Queue. The interval for automatic initiation of Gridlock Buster at the time this notice becomes effective will be set at 10 minutes. The Bank may make changes to the interval and will immediately notify Accountholders of any changes to the elapsed time or intervals at which Gridlock Buster will be automatically initiated.
12. Upon initiation of Gridlock Buster, the System will perform the Settlement Tests on all unsettled Authorised Payment Instructions in the Payment Instruction Queue and determine whether all unsettled Authorised Payment Instructions will satisfy the Settlement Tests if they are processed simultaneously.
13. If simultaneous processing of all the Authorised Payment Instructions in the Payment Instruction Queue using the Gridlock Buster would result in the balance in each LOM account being equal to or more than its Minimum Account Balance, the Gridlock Buster mechanism will Settle all those Authorised Payment Instructions and all Settled Authorised Payment Instructions will be removed from the Payment Instruction Queue.
14. If simultaneous processing of all the Authorised Payment Instructions in the Payment Instruction Queue would result in the balance of one or more LOM accounts being below the relevant Minimum Account Balance, the System will not Settle any of those Authorised Payment Instructions. Instead, the System will undertake further Settlement Tests using a subset of transactions in accordance with paragraph 15 below.
15. If at the first attempt Gridlock Buster fails to Settle Authorised Payment Instructions, the System will perform the Settlement Tests multiple times by sequentially determining Accountholders' expected LOM account balances by adding one Authorised Payment Instruction at a time in the order

determined in paragraph 7 and after each Authorised Payment Instruction is added performing the Settlement Tests. If one or more such calculation results in the Settlement Tests being satisfied for all Accountholders, then the system will Settle the combination of Authorised Payment Instructions that results in the most Authorised Payment Instructions satisfying the Settlement Tests. Those Authorised Payment Instructions which are Settled will be removed from the Payment Instruction Queue.

16. If Authorised Payment Instructions remain on the Payment Instruction Queue, the System will then perform a series of Settlement Tests involving a subset of Authorised Payment Instructions on the Payment Instruction Queue by:

A) Calculating the LOM account balances if all Authorised Payment Instructions on the Payment Instruction Queue are Settled then

B) Recalculating Settlement Account balances after removing one by one from the Settlement Test Authorised Payment Instructions for Accountholders who failed the Settlement Tests in A), the Authorised Payment Instructions being removed in the reverse order determined in Paragraph 7.

If any Tests in B) result in the Settlement Tests being satisfied for all Accountholders, the System will Settle all Authorised Payment Instructions included in the Settlement Tests in paragraph 16B. Any such Authorised Payment Instructions which are included in the Settlement Tests and those Tests are satisfied will be Settled and will be removed from the Payment Instruction Queue.

**GRIDLOCK BUSTER: BILATERAL OFFSETTING (including simultaneous settlement of multiple bilateral pairs of Accountholders)**

17. If, having attempted Settlement by applying Gridlock Buster as described in paragraphs 10 to 16 above, unsettled Authorised Payment Instructions remain on the Payment Instruction Queue, the system will test to see if it can meet the Settle Tests for Authorised Payment Instructions for bilateral pairs of Accountholders. If all bilateral pairs of Accountholders' Authorised Payment Instructions meet the Settlement Tests the Authorised Payment Instructions included in the Settlement Tests will be Settled and removed from the Payment Instruction Queue. If the Settlement Tests are not satisfied, Authorised Payment Instructions in the reverse of the order determined in Paragraph 7 (ie the lowest priority Authorised Payment Instruction) will be removed from bilateral pairs providing its removal does not put the

beneficiary accountholder's balance into a negative position. If no such Authorised Payment Instructions exist the latest queued Authorised Payment Instruction of this accountholder is removed

18. If, having found a combination of Authorised Payment Instructions for a bilateral pair of Accountholders which satisfy the Settlement Tests by being settled simultaneously, that subset of Authorised Payment Instructions will be Settled and removed from the Payment Instruction Queue.

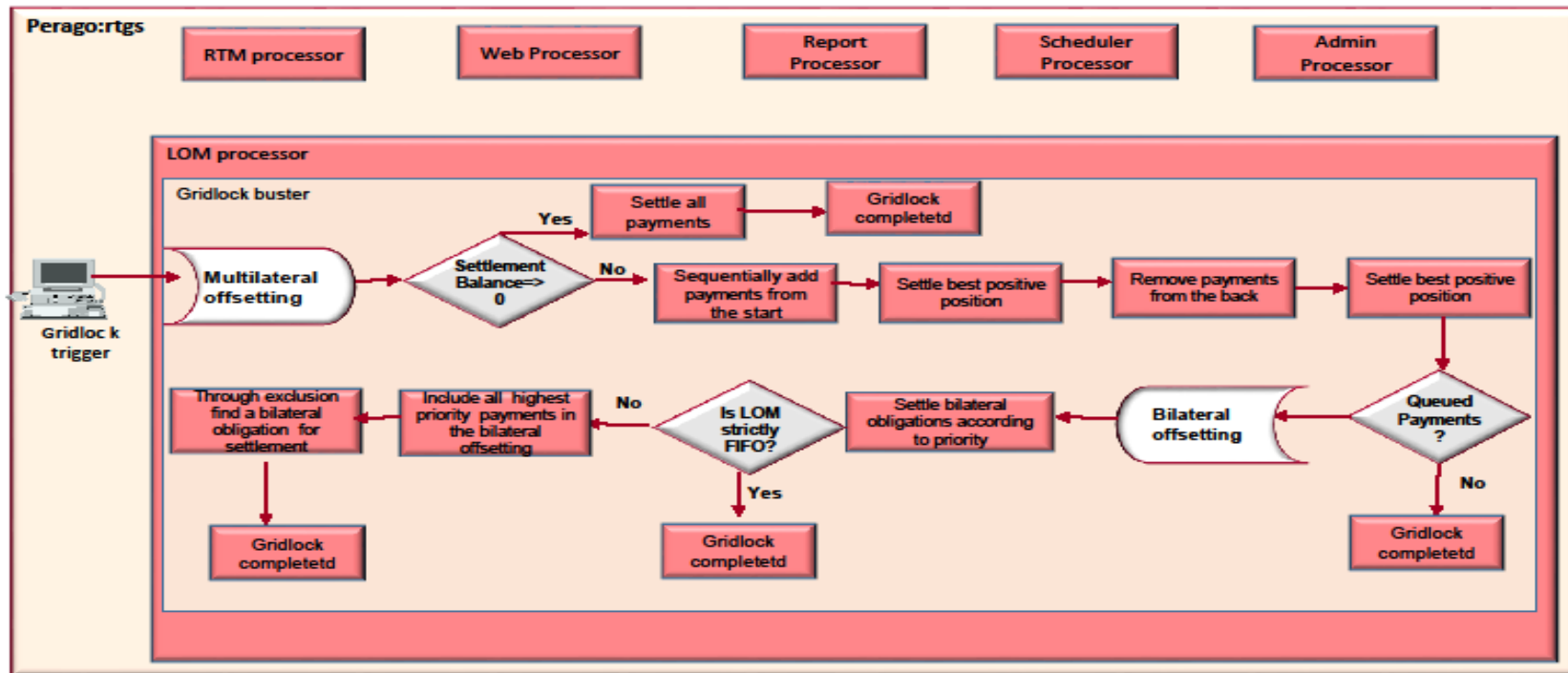
#### **Further Changes to Settlement Submission Mechanisms**

19. Subject to paragraph 20, it is acknowledged that the Bank may only change the operation of the Settlement Submission Mechanisms (as described above) after prior consultation by the Bank with all Settlement Accountholders, in accordance with Schedule B of the ESAS Terms and Conditions.

#### **Temporary Suspension of the Settlement Submission Mechanism**

20. Notwithstanding paragraph 19, the Bank may temporarily suspend the operation of the Settlement Submission Mechanisms in accordance with clauses 4.7 and 4.8 of the ESAS Terms and Conditions.

### Gridlock Buster Process



## Attachment Two- Examples of how the Settlement Submission Mechanism in the Notice operates

### FIRST EXAMPLE -MULTILATERAL SETTLEMENT

#	PRI	Instruction			Status	Settle	Bank A #	Bank B #	Bank C #	Bank D #
							LOM bal	LOM bal	LOM bal	LOM bal
		Starting LOM account balance					0	0	0	0
1	1	D	->	A	300	queued				
2	1	A	->	B	300	queued				
3	1	A	->	B	100	queued				
4	1	A	->	B	150	queued				
5	1	B	->	A	50	queued				
6	1	B	->	A	170	queued				
7	1	B	->	A	80	queued				
8	1	B	->	A	120	queued				
9	1	B	->	A	180	queued				
10	1	A	->	B	50	queued				
11	1	C	->	A	300	queued				
12	1	C	->	A	100	queued				
13	1	C	->	A	150	queued				
14	1	A	->	C	50	queued				
15	1	A	->	C	170	queued				
16	1	A	->	C	80	queued				
17	1	A	->	C	120	queued				
18	1	A	->	C	180	queued				
19	1	C	->	A	50	queued				
20	1	B	->	C	300	queued				
21	1	B	->	C	100	queued				
22	1	B	->	C	150	queued				
23	1	C	->	B	50	queued				
24	1	C	->	B	170	queued				
25	1	C	->	B	80	queued				
26	1	C	->	B	120	queued				
27	1	C	->	B	180	queued				
28	1	B	->	C	50	queued				

1. None of the banks has liquidity, so no transactions will settle individually.

2. The system will then test Gridlock Buster multilateral settlement for all transactions. This fails because bank D will have a negative balance.

3. The system will retry Gridlock Buster from the start adding transactions one transaction at a time in sequence. None of these will settle because all calculated account balances show bank D with a negative balance as a result of transaction #1.

4. The system will retry Gridlock Buster by removing transactions from the rear of the queue for all banks with a negative projected balance. The only bank with a negative projected balance is bank D, and once transaction 1 is removed, all other transactions will settle with Gridlock buster as those transactions (#s 2 to 28) result in a nil balance for all account holders when settled simultaneously.

5. Transactions #2 to #28 settle and transaction #1 remains queued.

## SECOND EXAMPLE- BILATERAL SETTLEMENT

#	PRI	Instruction			Status	Settle	Bank A #	Bank B #	Bank C #	Bank D #	Bilateral positions		
							LOM bal	LOM bal	LOM bal	LOM bal	AB	AC	BC
		Starting LOM account balance					0	0	0	0	0	0	0
1	1	D	->	A	300	queued							
2	1	A	->	B	300	queued							
3	1	A	->	B	100	queued							
4	1	A	->	B	150	queued							
5	1	B	->	A	50	queued							
6	1	B	->	A	170	queued							
7	1	B	->	A	80	queued							
8	1	B	->	A	120	queued							
9	1	B	->	A	180	queued							
10	1	A	->	B	50	queued							
11	1	A	->	B	333	queued							
12	1	C	->	A	300	queued							
13	1	C	->	A	100	queued							
14	1	C	->	A	150	queued							
15	1	A	->	C	50	queued							
16	1	A	->	C	170	queued							
17	1	A	->	C	80	queued							
18	1	A	->	C	120	queued							
19	1	A	->	C	180	queued							
20	1	C	->	A	50	queued							
21	1	C	->	A	222	queued							
22	1	B	->	C	300	queued							
23	1	B	->	C	100	queued							
24	1	B	->	C	150	queued							
25	1	C	->	B	50	queued							
26	1	C	->	B	170	queued							
27	1	C	->	B	80	queued							
28	1	C	->	B	120	queued							
29	1	C	->	B	180	queued							
30	1	B	->	C	50	queued							
31	1	B	->	C	123	queued							

1. None of the banks has liquidity, so no transactions will settle individually.

2. The system will then test Gridlock Buster for multilateral settlement of all transactions. This fails because bank D will have a negative balance.

3. The system will retry Gridlock Buster from the start of the queue adding transactions one at a time in sequence. None of these combinations will settle as all calculated account balances show bank D with a negative balance as a result of transaction #1.

4. The system will retry Gridlock Buster by starting from the end of the queue and removing transactions from the rear for all banks with a negative projected balance. This does not generate a scenario where all the banks' account balances are nil or positive.

5. Multilateral gridlock fails, so the system attempts to find bilateral pairs which will satisfy the settlement tests. The columns on the right show the bilateral net value of transactions for each pair of banks (pairs involving bank D is ignored as it is always negative). The last transaction for each pair gives a negative balance for one bank (the 3 brown cells). The system then removes the last transaction for each pair and this gives a nil balance for each pair (the 3 green cells). The system then settles all the transactions except the 3 excluded (numbers 11, 21, 31) and also 1. These 4 transactions #1, 11, 21, and 31 remains queued.