Storm Sync Time Area Comparison with MSMA2 Appendix 2.F2

MSMA 2nd Edition · https://mes100.com/docs/storm-sync-time-area-msma2-appendix-2-f2-comparison/

This article compares Storm Sync Time Area calculations with the worked example in MSMA2 Appendix 2.F2, Tables 2.F5–2.F7. The sample project is MSMA2_TimeArea_StormSync. For the input workflow and other outputs, see the Storm Sync Time Area hydrology guide and Storm Sync Time Area Results guide.

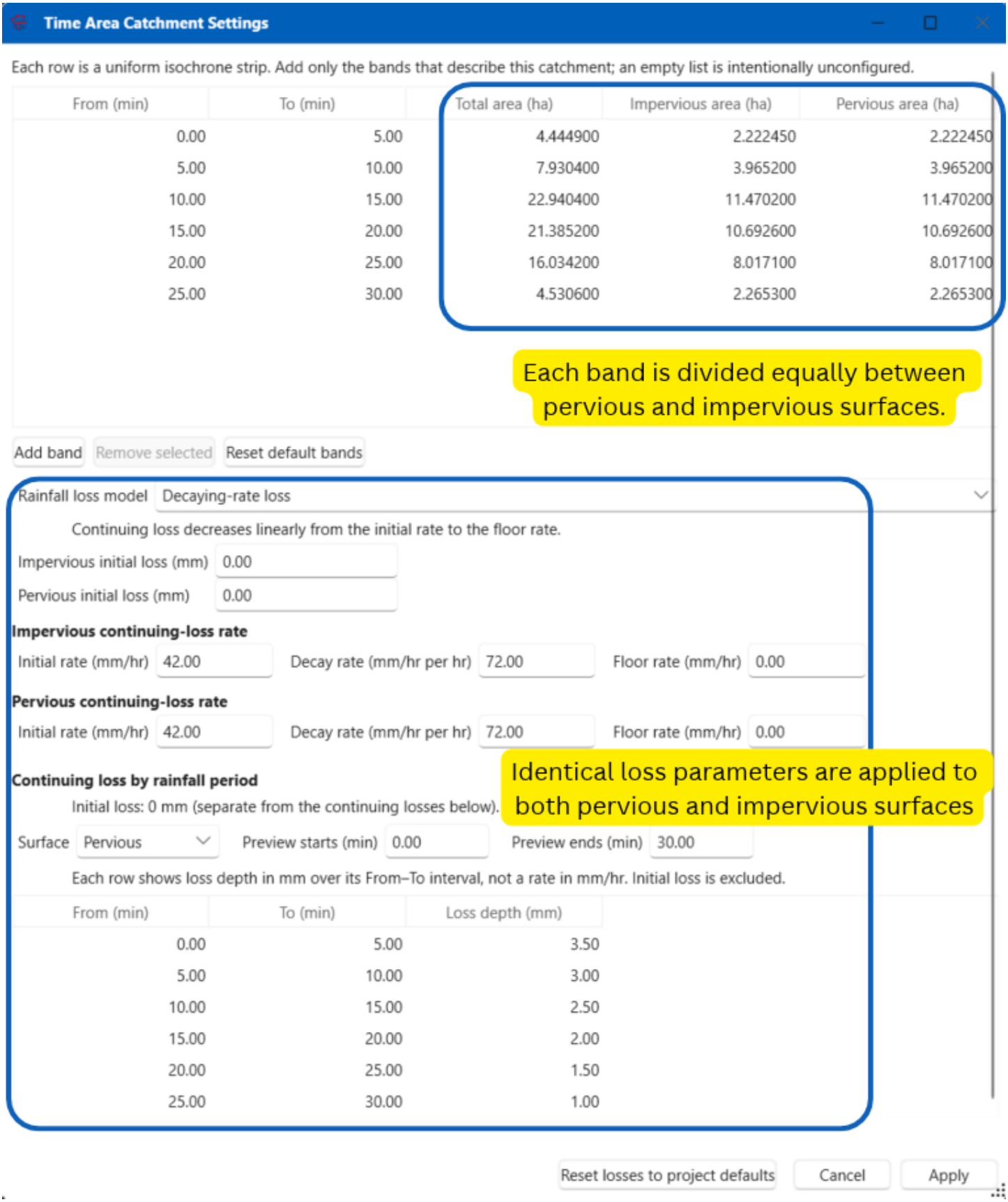
Reference inputs and Storm Sync setup

In the supplied sample project, catchment C2 is configured with six Time Area bands using the band areas specified in MSMA2 Appendix 2.F2, Table 2.F5. The corresponding six 5-minute rainfall depths from Table 2.F6 are supplied directly as rainfall inputs.

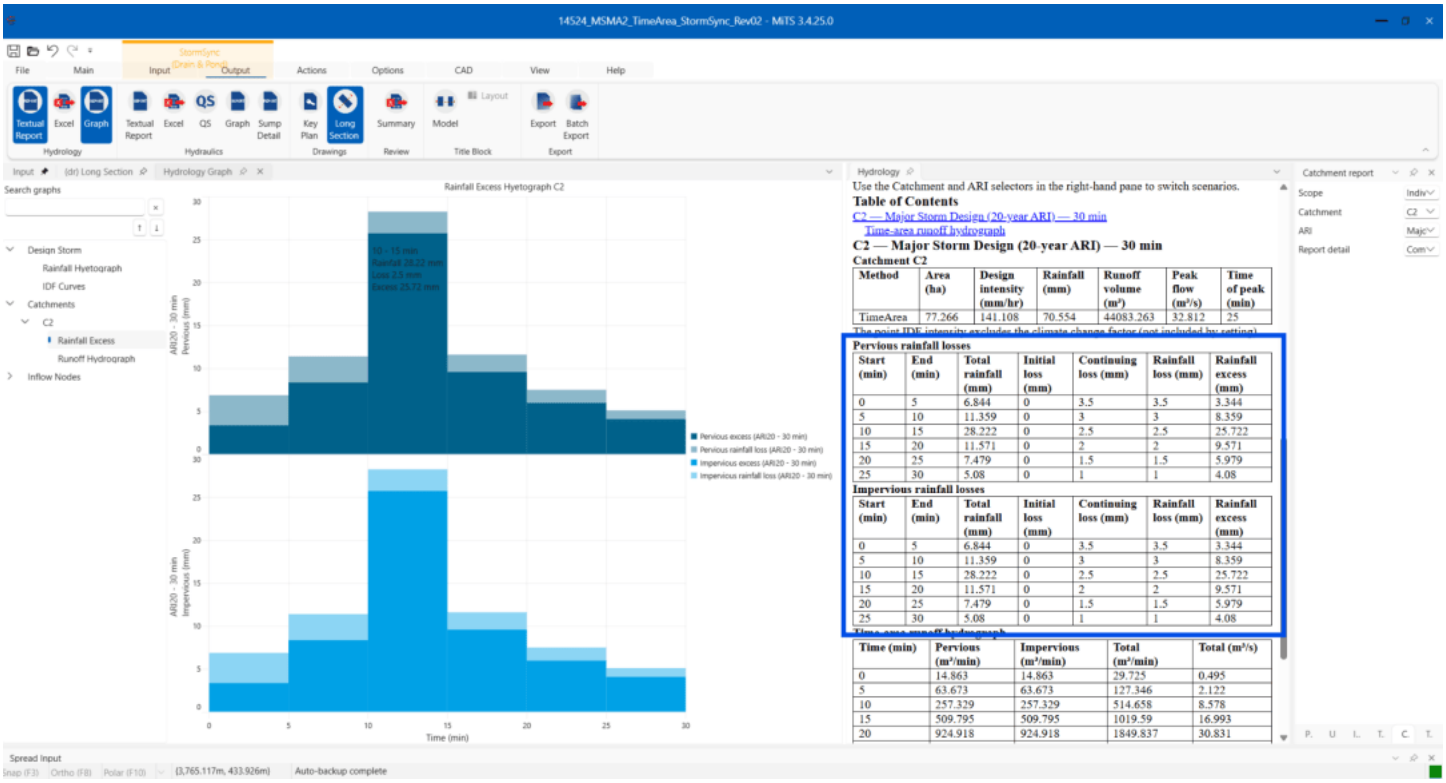
The Decaying-rate loss model is selected, with an initial loss of 0 mm, a starting loss rate of 42 mm/h, a decay rate of 72 mm/h per hour, and a floor rate of 0 mm/h. The same loss parameters are applied to both pervious and impervious surfaces.

5-minute interval	Table 2.F5 band area (m²)	Table 2.F6 rainfall (mm)	Table 2.F6 rainfall excess (mm)
0–5 min	44,449	6.84	3.34
5–10 min	79,304	11.36	8.36
10–15 min	229,404	28.22	25.72
15–20 min	213,852	11.57	9.57
20–25 min	160,342	7.48	5.98
25–30 min	45,306	5.08	4.08

MSMA2 Appendix 2.F2 specifies the total area of each Time Area band but does not provide a breakdown between pervious and impervious areas. For this comparison, each band is divided equally between the two surfaces, with identical loss parameters applied to both. This configuration allows both surface calculations to be evaluated while maintaining the same total catchment area. The equal area distribution is an assumption for this comparison and is not specified in the MSMA2 example.



Input Catchment bands and rainfall-loss parameters based on MSMA2 Appendix 2.F2



Stormsync Rainfall Excess Histogram and Table for 20-year ARI of 30 mins storm duration

Runoff hydrograph comparison

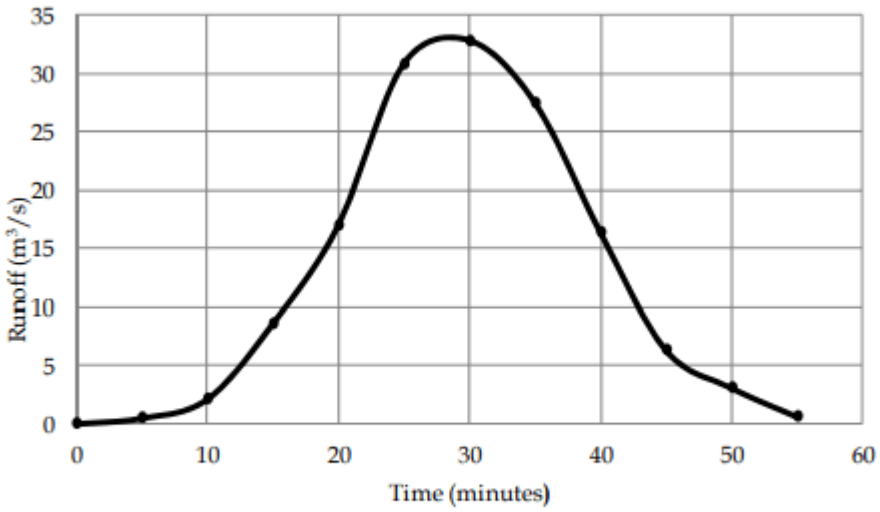
The following compares the Table 2.F7 ordinates with the Storm Sync result. The manual labels each ordinate at the end of its five-minute interval; Storm Sync timestamps the same rate at the start of its output interval.

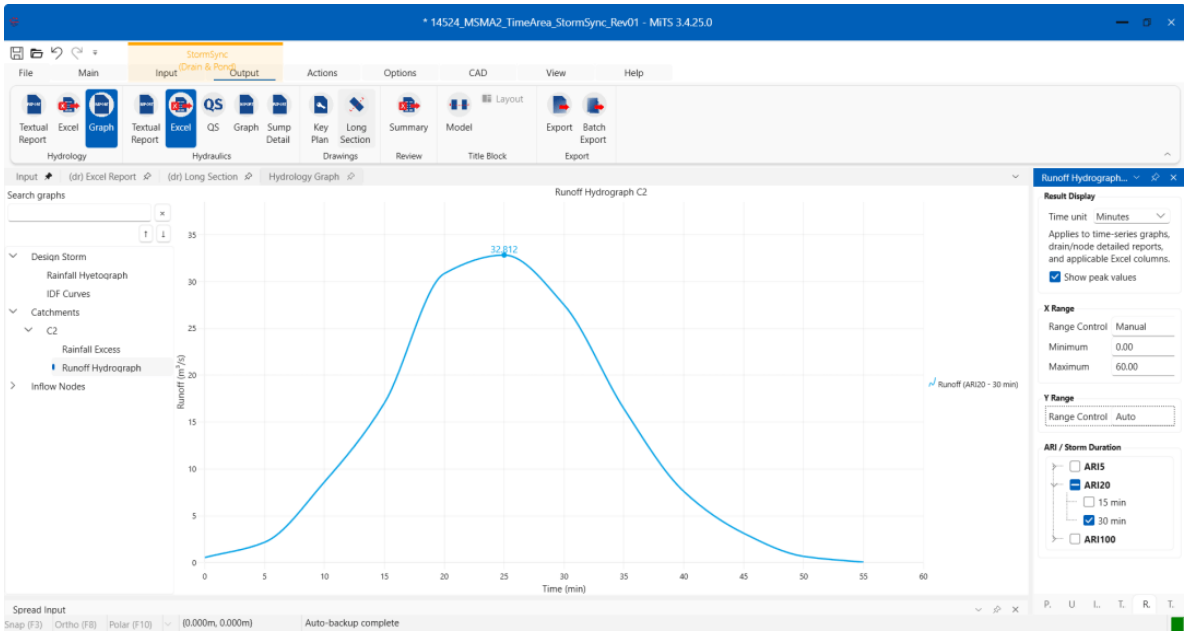
MSMA2 Table 2.F7 time (min)	Storm Sync time (min)	Storm Sync Flow (m³/s)
5	0	0.49
10	5	2.12
15	10	8.57
20	15	16.99
25	20	30.83
30	25	32.81
35	30	27.48

MSMA2 Table 2.F7 time (min)	Storm Sync time (min)	Storm Sync Flow (m³/s)
40	35	16.38
45	40	7.55
50	45	3.08
55	50	0.62

The regression accepts each flow within 0.01 m³/s of the printed two-decimal value. The peak is 32.81 m³/s at the manual's 30-minute label (Storm Sync time 25 minutes).

At the 45-minute row, the three band contributions printed in Table 2.F7 are 1.45, 3.20, and 2.91 m³/s. They sum to 7.55 m³/s, while the printed total cell says 6.32 m³/s. The comparison follows the displayed contributions and the independently calculated 7.55 m³/s result rather than the inconsistent total cell.

	Runoff Hydrograph
MSMA2	 Figure 2.F6: Runoff Hydrograph

	Runoff Hydrograph
StormSync Time Area Method	

Conclusion

The Storm Sync Time Area calculation successfully reproduces the runoff hydrograph presented in MSMA2 Appendix 2.F2, Tables 2.F5-2.F7, using the specified band areas, rainfall inputs and Decaying-rate loss parameters.

The calculated flow ordinates agree with the manual's published values within the accepted tolerance of 0.01 m³/s, including the peak flow of 32.81 m³/s. The comparison also confirms that the rainfall loss and runoff convolution calculations produce results consistent with the worked example.

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