

LA County Procedure - F0601

The application offers you the ability to use the Los Angeles County Modified Rational Method (F0601). This has been a primary method in use since the 1930's for hydrologic studies within LA county.

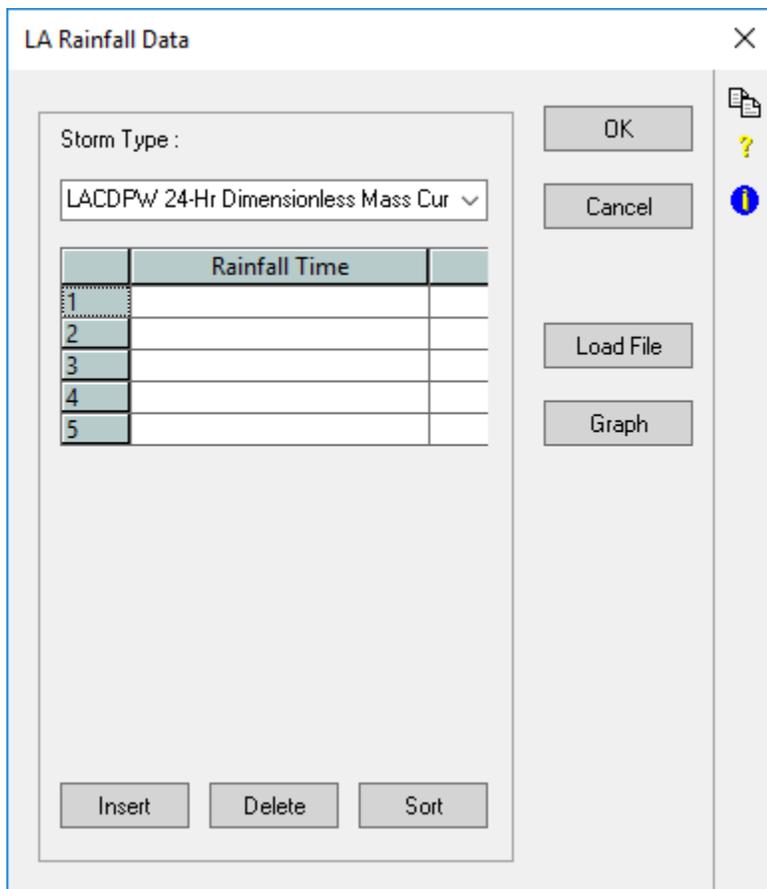
The LA County MODRAT is based on the Rational Method, which produces a peak flow rate and is only applicable to small areas when no storage volume information is required and overland flow is the primary collection method. MODRAT, on the other hand, uses a time of concentration and a design storm to determine intensities throughout the storm period; these are then used to determine the soil runoff coefficient. The rational formula provides a flow rate for a specific time. Plotting the time-specific flow rate provides a hydrograph and an associated flow volume. MODRAT is the standard method for hydrologic studies within the county.

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LA County 24 Hr Rainfall Template

A dimensionless (normalized) rainfall pattern is entered in this dialog. A default sample rainfall file (LARAIN.DAT) is included in the "Templates" sub-directory of the XPSWMM/XPStorm install folder.



Rainfall Mass Curve Header Card (See Figure D-3 of LA County Hydrology Manual)

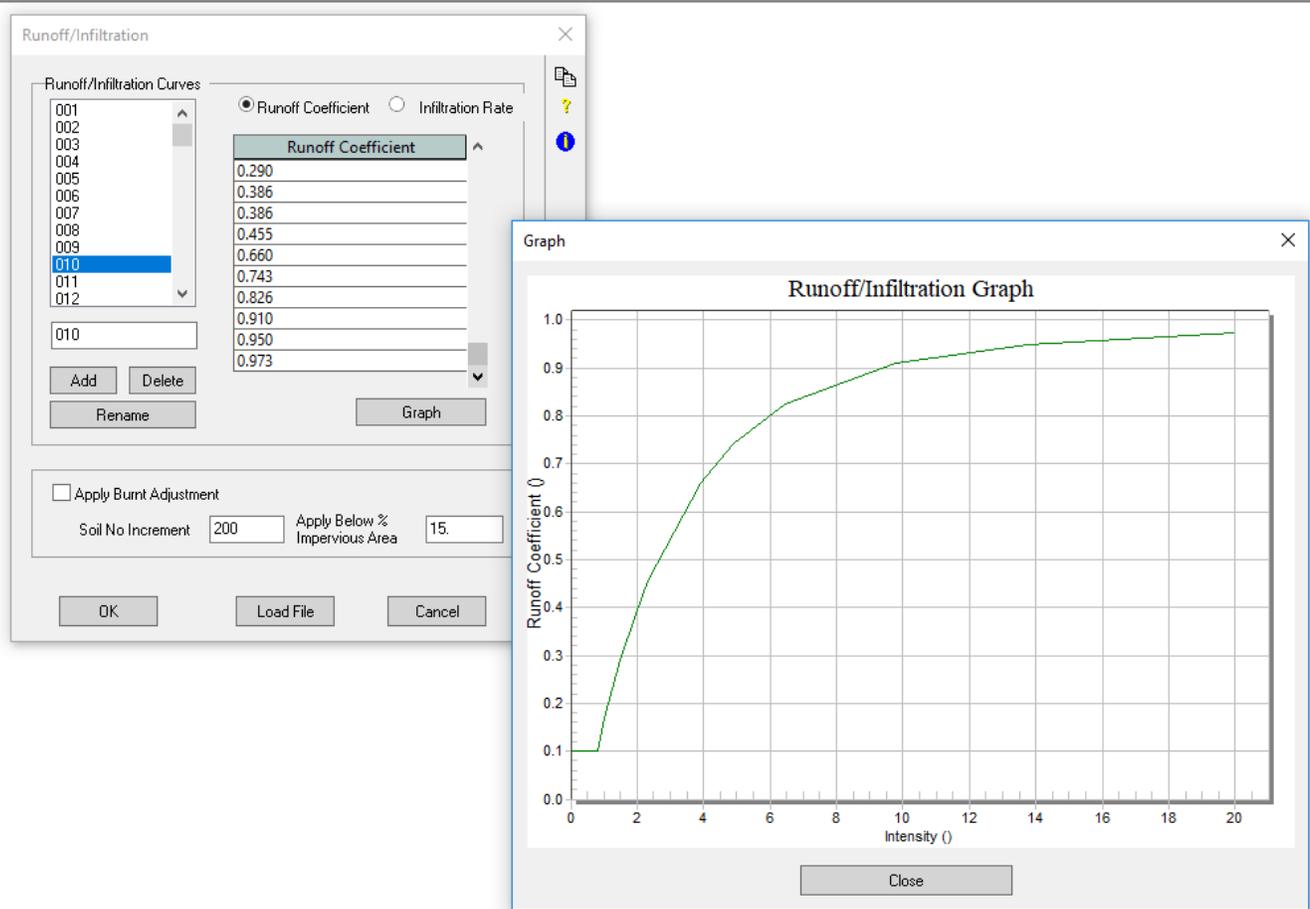
Column	Entry	Description
1-3	010	Card code number.

4	alphanumeric	<ul style="list-style-type: none"> • If storm pattern A through I to be used for storm of record or other various storm patterns (other than J, K, L, M, and T standard design storm rainfall patterns). • J If J zone design storm rainfall pattern to be used. (See Figure C-3.1. of LA County Hydrology Manual) • K If K zone design storm rainfall pattern to be used. (See Figure C-3.2. of LA County Hydrology Manual) • L If L zone design storm rainfall pattern to be used. (See Figure C-3.3. of LA County Hydrology Manual) • M if M zone design storm rainfall pattern to be used. (See Figure C-3.4. of LA County Hydrology Manual) • T If thunderstorm (convective storm) design rainfall pattern to be used.
5-6	numeric	<ul style="list-style-type: none"> • If A through I storm pattern to be used, an identification number between 1 and 99 must also be used. • 01 If thunderstorm (convective storm) design rainfall pattern to be used. • 10 If 10-year frequency rainfall for J, K, L, M zone rainfall to be used. • 25 If 25-year frequency rainfall for J, K, L, M zone rainfall to be used. • 50 If 50-year frequency rainfall for J, K, L, M zone rainfall to be used. • If J, K, L, M zone design storm rainfall pattern is specified in Column 4, either 10, 25, or 50 year frequency rainfall must be specified in Column 5-6.
7		<ul style="list-style-type: none"> • 3 if J through M zone rainfall is used. • 4 If T01 storm pattern is used. • 5 If A02 through A99 storm pattern is used. • 8-10 40 If J10 through M50 storm patterns are used. <p>Numeric Total number of points (maximum of 200) used to define the rainfall mass curve of all other storm patterns.</p>

Rainfall Mass Curve Data Cards (See Figure D-3. of LA County Hydrology Manual)

Column	Entry	Description
1-3	011	Card code number.
4	alphanumeric	Must be identical to rainfall mass curve header card Column 4.
5-6	numeric	Must be identical to rainfall mass curve header card Column 5-6.
7	numeric	Must be identical to rainfall mass curve header card Column 7.
8-10	numeric	Must be identical to the rainfall mass curve header card Column 8-10. The maximum point number must be listed on all data cards.
11-13	numeric	Maximum cumulative point number appearing on each card.
14-17	numeric	Selected storm time in minutes. The initial point on the first card must be 0000.
18-22	numeric	Cumulative storm rainfall in inches corresponding to storm time listed in Column 14-17. The initial point on the first card must be 0000.
23-26	numeric	Selected storm time.
27-31	numeric	Cumulative storm rainfall corresponding to storm time listed in Column 23-26.
32-35	numeric	Selected storm time.
36-40	numeric	Cumulative storm rainfall corresponding to storm time listed in Column 32-35.
41-44	numeric	Selected storm time.
45-49	numeric	Cumulative storm rainfall corresponding to storm time listed in Column 41-44
50-53	numeric	Selected storm time.
54-58	numeric	Cumulative storm rainfall corresponding to storm time listed in Column 50-53.
59-62	numeric	Selected storm time.
63-67	numeric	Cumulative storm rainfall corresponding to storm time listed in Column 59-62.
68-71	numeric	Selected storm time.
72-76	numeric	Cumulative storm rainfall corresponding to storm time listed in Column 68-71.

The infiltration data is entered in this dialog. A default sample soil file (LASOIL.DAT) is included in the "Templates" sub-directory. This file provides infiltration data for the standard LA County soil types.



Runoff Coefficient Curve Card(s) (See Figure D-2, LA County Hydrology Manual)

Column	Entry	Description
1-3	009	Card code number.
4-6	numeric	Soil type number specified by Code 002 through 199. (See Figure C-6, LA County Hydrology Manual)
7		<ul style="list-style-type: none"> • 1 If runoff coefficient curve is used. • 2 If infiltration rate (loss rate) curve is used.
8-10	numeric	Total number of points (maximum of 14) used to define runoff coefficient (or infiltration rate) curve. This number must appear on all cards.
11-13	numeric	Maximum cumulative point number appearing on each card.
14-17	numeric	Runoff coefficient as decimal or infiltration rate in inches per hour corresponding to rainfall intensity listed in Column 18-22. The initial point on first card must be 0000.
18-22	numeric	Rainfall intensity in inches per hour corresponding to point value listed in Column 14-17. The initial point on first card must be 0000.
23-26	numeric	Runoff coefficient or infiltration rate point value corresponding to rainfall intensity listed in Column 27-31.
27-31	numeric	Rainfall intensity corresponding to point value listed in Column 23-26.

32-35	numeric	Runoff coefficient or infiltration rate point value corresponding to rainfall intensity listed in Column 36-40.
36-40	numeric	Rainfall intensity corresponding to point value listed in Column 32-35.
41-44	numeric	Runoff coefficient or infiltration rate point value corresponding to rainfall intensity listed in Column 45-49.
45-49	numeric	Rainfall intensity corresponding to point value listed in Column 41-44.
50-53	numeric	Runoff coefficient or infiltration rate point value corresponding to rainfall intensity listed in Column 54-58.
54-58	numeric	Rainfall intensity corresponding to point value listed in Column 50-53.
59-62	numeric	Runoff coefficient or infiltration rate point value corresponding to rainfall intensity listed in Column 63-67.
63-67	numeric	Rainfall intensity corresponding to point value listed in Column 59-62
68-71	numeric	Runoff coefficient or infiltration rate point value corresponding to rainfall intensity listed in Column 72-76.
72-76	numeric	Rainfall intensity corresponding to point value listed in Column 68-71.

LA County Error Codes

Runoff Coefficient Curve and Rainfall Mass Curve Data Editor (Program FO601M)

Error messages produced by this program are of the following form:

CURVE NAME ERROR NO.

Error Number	Description
1	The card code (Column 1-3) on first card of a curve not 009 (runoff coefficient curve) or 010 (rainfall mass curve).
2	Number in Column 7 on the first card outside the range 1-5.
3	Total number of points indicated for the curve exceeds 14 (runoff coefficient curve) or 199 (rainfall mass curve).
4	On cards following the first card of a curve either (a) The card code (Column 1-3) not equal to 009 (runoff coefficient curve) or 011 (rainfall mass curve), (b) The curve number in Column 4-6 does not match or (c) The curve number in Column 7 does not match.
5	The number of points on a card exceeds the total number indicated on the first card.
6	The cards are out of sequence.
7	Initial data card not zero, negative runoff coefficient curve number, or points on rainfall mass curve not in chronological or cumulative sequence.
8	The curve number (Column 4-6) listed on the first card, not (a) 002 through 199 For runoff coefficient curve, (b) A through I in Column 4 and 01 through 99 in Column 5-6, for selected storm rainfall mass curve, (c) J through M in Column 4 and 10, 25, or 50 in Column 5-6 for standard design storm rainfall curve, or (d) T in Column 4 and 01 in Column 5-6 for thunderstorm (convective storm) rainfall mass curve.

Subarea and Hydrograph Data Editor (Program FO6010)

Error messages produced by this program are of the following Form:

LOCATION NAME ERROR NO.

Error Number	Description
1	The card code (Column 1-3) of a subarea card not 006.

2	Subarea data not in ascending sequence (hydrograph input may be specified on the same card, and hydrograph modification may be specified on the preceding card), or a thunderstorm specified in Column 67 and Line A not specified in Column 15.
3	Column 15 (primary storage location), Column 17-19 (runoff coefficient curve) or Column 29-31 rainfall mass curve contains all blanks or an invalid value.
4	Secondary hydrograph is specified and (a) alphameric character other than A through F listed in Column 16, (b) hydrograph computation is also specified, (c) read hydrograph also specified, (d) number in Column 60 outside the range 0-4, (e) number in Column 63 outside range 0-1, or (f) negative number in Column 53-59.
5	Hydrograph input and hydrograph computation both indicated.
6	Hydrograph computation specified and (a) time of concentration not listed in Column 27-28 or hydrograph input, (b) confluence output also specified, (c) hydrograph modification also specified, (d) control Q also specified, or (e) negative number in Column 20-28. Read hydrograph specified with confluence output, hydrograph modification or control Q specified also results in error 6 printout.
7	Routing errors with (a) number in Column 32 outside range 0-6, (b) 1-6 specified in Column 32 with slope and channel length not specified in Column 33-43 or, (c) 6 specified in Column 32 and combination of Column 47-52 and Column 74-75, Column 47-52 and Column 76-77, or Column 74-75 and Column 76-77 not specified, (d) number specified in Column 74-73 outside range 0-29, or (e) negative number in Column 33-52 or Column 68-77.
8	Location card instruction errors with (a) number in Column 61 inconsistent or outside range 0-3, (b) number in both Column 61 and Column 67 other than 0, 1, 2, 3, 4, 5, 7 specified in Column 67, (c) other than alphabetic code A through G specified in Column 64, or (d) negative number in Column 65.
9	Hydrograph header card errors with (a) card code (Column 1-3) not 007, (b) missing job or location number in Column 4-14, (c) drain A through F not specified in Column 15, (d) number in Column 24-26 outside range 1-200, (e) number in Column 27-30 outside range 1-1500, (f) negative number in Column 16-23 or Column 31-38, (g) number in Column 39-41 outside range 1-200, or (h) number in Column 42-44 outside range 1-4.
10	Hydrograph data card errors with (a) card code (Column 1-3) not 008, (b) number of points on card less or greater than total number indicated on header card, or (c) data cards not in sequence.
11	Hydrograph error affecting the associated subarea data set.
12	Initial hydrograph data card not zero, or points on hydrograph not in chronological sequence.
13	Total hydrograph data points not equal to number of points specified on header card.
14	The card code (Column 1-3) not 005 on first page heading card.
15	Hydrograph output specified and (a) the associated page heading card is missing, (b) the card code (Column 1-3) not 005 on associated page heading card, or (c) the location name on the associated page heading card and location point card not identical.
16	More than 1000 cards submitted for job.
18	End of job not specified by number 2 in Column 65.

Hydrologic Computation (Program FO601A)

Error messages produced by this program are of the following form:

PAGE HEADING

PROCESSING DISCONTINUED AT LOCATION NAME

Error Number	Description
2	Device failure has occurred while reading from direct or magnetic tape. Job should be resubmitted.
3	The name on a runoff coefficient curve or rainfall mass curve does not match the one called for on a location point card or the number of points exceeds the maximum allowable points.
4	Failure in search of table for partially full pipe sections when computing wave velocities. 5 Hydrograph input indicated and the referenced hydrograph not in the input stream.
6	The number or time of points for an input hydrograph not identical with points used in job.
7	The specified time of concentration is greater than the interval between zero time and the first time specified on the rainfall mass curve.
8	Failure in search for bottom width of trapezoidal channel.
9	Failure in search for depth while computing wave velocities in trapezoidal channel.
10	Failure in search for area reduction factor during computation of subarea hydrograph.

11	Failure in search for runoff rate during computation of subarea hydrograph.
12	Failure in hydrograph routing due to magnitude of channel flow rate.
99	Recycle past the beginning of the job during thunderstorm computations attempted, or more than 1000 location point and page heading cards were submitted.