

Character:	A string of alphanumeric characters that are bracketed by single quotes (e.g., 'SR 1 – NB Lanes')
Integer:	A number with no decimal point (e.g., 12)
Real:	A number with a decimal point separating the whole number portion from the fractional number portion (e.g., 234.16)

File Management		
MET:	-	Pathway label
'*.met'	Character	Name of file containing preprocessed meteorology ^a
OUT:	-	Pathway label
'*.out'	Character	Name of file containing model printout ^b
ETS:	-	Pathway label
'*.ets'	Character	Name of file containing ETS data ^b
MSG:	-	Pathway label
'*.msg'	Character	Name of file containing simulation errors and other messages ^b
PST1	-	Pathway label
'*.pst'	Character	Name of file containing concurrent model results in post format of 24-hour averages for PM _{2.5} , PM ₁₀ , and OTHER or 1-hour averages for CO and NO ₂ ^b
PST2	-	Pathway label
'*.pst'	Character	Name of file containing concurrent model results in post format of annual averages for PM _{2.5} , PM ₁₀ , NO ₂ , and OTHER or 8-hour averages for CO ^b
PLT1	-	Pathway label
'*.plt'	Character	Name of file containing high value model results in plot format of average quarterly 24-hour for PM _{2.5} ; 6 th highest 24-hour for PM-10; 24-hour for OTHER; 2 nd highest 1-hour for CO; or average 8 th highest 1-hour for NO ₂ ^b
PLT2	-	Pathway label
'*.plt'	Character	Name of file containing high value model results in plot format of average annual for PM _{2.5} , PM-10, and OTHER or 2 nd highest 8-hour for CO ^b
^a User-created file; ^b CAL3QHCR-generated file – distinct file names including the extension must be used for the CAL3QHCR-generated files or the model run will end in error		

NOTES:

- File Management
 - Use a descriptive root file name
 - Enter the full name of the path for files outside the CAL3QHCR application folder (e.g., C:\DIR\SUBDIR\NAME.EXT)
 - The full path name is optional for files within the CAL3QHCR application folder
 - To instruct the program not to produce a specific post or plot file, specify ' ' as the name

Program Control & Site Variables		
#1:	-	Pathway label
'JOB'	Character	Job title/description, up to 40 characters
ATIM	Real	Run averaging time (min)
Z0	Real	Surface roughness (or roughness length) (cm)
VS	Real	Settling velocity (cm/s)
VD	Real	Deposition velocity (cm/s)
NR	Integer	Number of receptors
SCAL	Real	Scale conversion factor, user units to meters
IOPT	Integer	Output units, 1 = feet; 0 = meters
#2:	-	Pathway label
'RUN'	Character	Run title/description, up to 40 characters
NL	Integer	Number of links
JTIER	Integer	Tier approach, 1 = Tier I; 2 = Tier II
'MODE'	Character	Pollutant (units), 'CO' = CO (ppm); 'PM2.5' = PM _{2.5} (µg/m ³); 'PM-10' = PM ₁₀ (µg/m ³); 'NO2' = NO ₂ (µg/m ³); 'OTHER' = OTHER (µg/m ³)
FLINK	Integer	Print link contributions, 1 = YES; 0 = NO
FAMB	Integer	Include background concentrations in results, 1 = YES; 0 = NO
'RU'	Character	Land use selection, 'R' = Rural; 'U' = Urban
#3:	-	Pathway label
STRMO	Integer	Processing start month
STRDY	Integer	Processing start day
STRYR	Integer	Processing start year
ENDMO	Integer	Processing end month
ENDDY	Integer	Processing end day
ENDYR	Integer	Processing end year

NOTES:

- Pathway #1:
 - Averaging time should be 60 min, since predictions are performed for a 1-hour period
 - Surface roughness should be within the range of 3 cm to 400 cm
 - Settling velocity should be 0 cm/s to reflect negligible gravitational settling
 - Deposition velocity should be 0 cm/s to reflect negligible deposition effects

Pathway #2:

- Specify a Tier II approach (JTIER = 2) to account for hourly variations in emissions and meteorology
- Specify MODE = 'PM2.5' for PM_{2.5} analysis or 'PM-10' for PM₁₀ analyses
- Do not include background PM concentrations in the model runs
- Background concentrations are determined separately as described in Module 6
- Background concentrations are then added to model results to calculate design values
- For determining whether land use is rural or urban, refer to PM Hot-spot Guidance, Section 7.5.5
- Pathway #3:
 - Processing start and end dates should match the start and end dates of the preprocessed meteorology
 - Typically, the start month and day are January 1 (01,01) and the end month and day are December 31 (12,31)
 - 5 years of off-site meteorology are generally required, which can be processed in a single simulation (e.g., 01,01,06,12,31,10)
 - If available, use met files prepared for regulatory applications by the air agency
 - Wind speeds should be at least 1 m/s

Receptor Locations		
#4:	-	Pathway label
'RCP'	Character	Receptor name, up to 20 characters
XR	Real	X-coordinate of receptor (user units)
YR	Real	Y-coordinate of receptor (user units)
ZR	Real	Z-coordinate of receptor (user units)
*** Repeat in succession for each Receptor = 1 to NR ***		

NOTES:

- Pathway #4:
 - User units are defined by the SCAL parameter entered on the Pathway #1 record
 - Receptors should always be located outside of the mixing zone (link width)
 - Receptor height should represent the typical ground-level breathing height of 1.8 m (5.9 ft) or less
 - Guidance on the placement of receptors is described in Module 3

Emissions, Traffic, & Signalization Patterns		
#5:	-	Pathway label
PMOY1 to PMOY12	Integer	Month of year patterns for ETS values; assigned in the order: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec An example distinguishing four seasonal patterns by quarter: 1,1,1,2,2,2,3,3,3,4,4,4 Up to 12 monthly patterns may be assigned
#6:	-	Pathway label
PHOD1 to PHOD24	Integer	Hour of day patterns for ETS values; assigned in the order: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 An example distinguishing four hourly patterns to represent the morning peak, midday, afternoon peak, and overnight: 1,1,1,1,1,2,2,2,3,3,3,3,3,3,3,4,4,4,1,1,1,1,1 Up to 24 hourly patterns may be assigned
#7:	-	Pathway label
PDOW1 to PDOW7	Integer	Day of week patterns for ETS values; assigned in the order: Mon Tue Wed Thu Fri Sat Sun An example distinguishing weekday and weekend travel: 1,1,1,1,1,2,2 Up to 7 daily patterns may be assigned

NOTES:

- Pathway #5:
 - For PM hot-spot analyses, quarterly emissions and traffic activities are generally defined; e.g., MOVES output for:

MOVES Month	MOVES monthID	CAL3QHCR PMOY Range
January	1	PMOY1 – PMOY3
April	4	PHOD4 – PMOY6
July	7	PMOY7 – PMOY9
October	10	PMOY10 – PMOY12

- If MOVES was run for more than the four representative months for each calendar quarter as suggested in the PM Hot-spot Guidance, the data should be assigned to the appropriate months using PMOY

- Pathway #6:
 - For PM hot-spot analyses, morning peak, midday, afternoon peak, and overnight emissions and traffic activities are generally defined; e.g., MOVES output for:

MOVES Hour Beginning	MOVES hourID	CAL3QHCR PHOD Range
12 am	1	PHOD1 – PHOD6; PHOD20 – PHOD24
6 am	7	PHOD7 – PHOD9
12 pm	13	PHOD10 – PHOD16
6 pm	19	PHOD17 – PHOD19

- If MOVES was run for more than the four representative hours for each different time period as suggested in the PM Hot-spot Guidance, the data should be assigned to the appropriate hours using PHOD
- Pathway #7:
 - For PM hot-spot analyses, emissions and traffic activities are generally defined for a typical weekday; i.e., one pattern for all seven days
 - If MOVES was run to differentiate weekday and weekend emissions, the data should be assigned to the appropriate days using PDOW

Background Concentrations		
#8:	-	Pathway label
BKG	Real	Hourly ambient background concentrations (ppm for CO; $\mu\text{g}/\text{m}^3$ for $\text{PM}_{2.5}$, PM_{10} , NO_2 , and OTHER) for each month of year ETS pattern
*** Repeat in succession for each of hour of day ETS pattern, then for each day of week ETS pattern ***		

NOTES:

- Pathway #8:
 - Hourly ambient background concentration should be set to zero
 - Background concentrations are determined separately as described in Module 6
 - Background concentrations are then added to model results to calculate design values as described in Module 7

Link Configurations		
#9:	-	Pathway label
'LNK'	Character	Link name, up to 20 characters
'IQ'	Character	Traffic flow, 'F' = free-flow link; 'Q' = queue link
'TYP'	Character	Link type, 'AG' = at-grade; 'FL' = fill; 'BR' = bridge; and 'DP' = depressed
XL1	Real	Link X-coordinate start point (user units)
YL1	Real	Link Y-coordinate start point (user units)
XL2	Real	Link X-coordinate end point (user units)
YL2	Real	Link Y-coordinate end point (user units)
SH	Real	Source height (user units)
WL	Real	Mixing zone width (user units)
NLANES	Integer	Number of travel lanes for queue link (required only if IQ = 'Q')
#10:	-	Pathway label
VPHL	Real	Hourly traffic volume (veh/hr) for each month of year ETS pattern
EFL	Real	Hourly emission factor (g/veh-mi) for each month of ETS pattern
*** Repeat in succession for each of hour of day ETS pattern, then for each day of week ETS pattern ***		
#11:	-	Pathway label (required only if IQ = 'Q')
CAVG	Real	Average total signal cycle length (s) for each month of year ETS pattern
RAVG	Real	Average red signal cycle length (s) for each month of ETS pattern
YFAC	Real	Clearance lost time (s) for each month of ETS pattern
*** Repeat in succession for each of hour of day ETS pattern, then for each day of week ETS pattern ***		
#12:	-	Pathway label (required only if IQ = 'Q')
SFR	Real	Saturation flow rate (vphpl) for each month of year ETS pattern
ST	Real	Signal type for each month of ETS pattern, 1 = pre-timed; 2 = average; and 3 = semi-actuated
AT	Real	Arrival rate for each month of ETS pattern, 1 = worst; 2 = below average; 3 = average; 4 = above average; and 5 = best
*** Repeat in succession for each of hour of day ETS pattern, then for each day of week ETS pattern ***		
*** Repeat #9 & #10 in succession for each Link = 1 to NL; include #11 & #12 in the sequence for queue links ***		

NOTES:

- Pathway #9:
 - A new link is required when there is a change in link width, link orientation, traffic volume, travel speed, or emission factor
 - For a succession of links, the start coordinates of the next link usually equals the end coordinates of the prior link, i.e., no gaps or overlaps
 - In most cases, a link type of at-grade ('AG') and a source height of 0 m should be used
 - Source height should be within ± 10 m (± 32 ft)
 - Mixing zone width is defined as the width of the travelled roadway plus 3 m (10 ft) on either side
 - Link length must always be greater than the mixing zone width
 - Specify free-flow link traffic flow (IQ = 'F')
 - Do not specify queue link traffic flow (IQ = 'Q') as the queuing algorithm in CAL3QHCR should not be used for PM hot-spot analyses
 - Idling vehicles should be accounted for by reflecting idle activity patterns in the MOVES modeling
- Pathway #10:
 - Hourly traffic volume and emission factors are applied uniformly to the entire link length
 - Emission factors are defined as g/veh-mi
 - Use the latest version of MOVES; specify the "Emission Rates" option
 - All relevant pollutants and processes should be summed for a single "rateperdistance" emission factor per link
 - MOVES post-processing scripts are available to complete this step as described in Module 2
- Pathway #11 (not recommended for PM hot-spot analyses):
 - For clearance lost time, a default value of 2 s may be used in the absence of locally derived values
- Pathway #12 (not recommended for PM hot-spot analyses):
 - For saturation flow rate, a default value of ~1800 vehicles per hour (based on the *Highway Capacity Manual 2010* for an urban intersection) may be used in the absence of locally derived values
 - For signal type, a default value of 1 (pre-timed) may be used in the absence of locally derived values
 - For arrival rate, a default value of 3 (average progression) may be used in the absence of locally derived values