MetroCount®
traffic data specialists

Report Profiles

MTE User Manual

4.03

MetroCount

Australia
15 O'Connor Close
North Coogee WA 6163
Ph: 08 9430 6164
Fax: 08 9430 6187
Email: sales@metrocount.com

United Kingdom
Unit 15, Oliver Business Park
Oliver Road
Park Royal, London NW10 7JB
Ph: 020 8782 8999
Fax: 020 8782 8737
Email: uksales@metrocount.com

United States
11820 West Market Place, Suite M
Fulton MD 20759
Ph: 800 576 5692
Fax: 301 490 3521
Email: usasales@metrocount.com

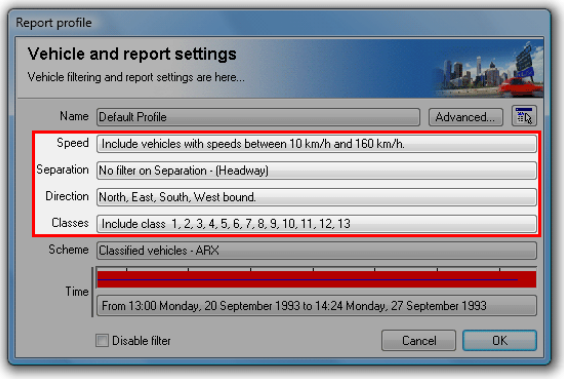
www.metrocount.com

Vehicle Filter Settings

Overview

Profile vehicle filtering is used to exclude certain vehicles from a report and specifically target others, based on the key vehicle filtering criteria of class, speed, separation and direction. For example, the direction filter is used for bidirectional sites to give separate reports for each direction.

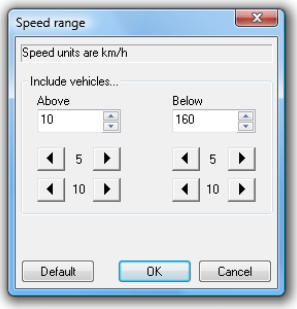
These settings are grouped into the main Profile dialog box, where each is a clickable button that leads to the available settings for that criteria. Note that these settings are only relevant for Classification reports, and are disabled for Event Count reports. Time filtering is covered in detail in its own section.



Profile vehicle filter settings

Speed Filter

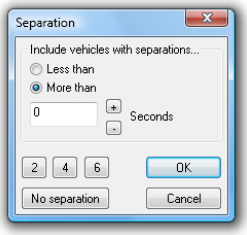
The Speed filter excludes vehicles outside the specified range. The default range is 10 to 160 km/hr, or 10 to 100 mph. This may need to be changed for sites with an expectation of significant numbers outside of this range. The upper limit is 200 km/h or 140 mph.



Speed filter range

Separation Filter

Separation for a vehicle is the time since the last vehicle travelling in the same direction. Separation can be defined as Headway (first axle to first axle) or Gap (last axle to first axle) in the Advanced Profile options. For example, a separation of "more than four seconds" will only include vehicles with more than four seconds in front of them.

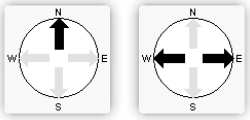


Separation filter

Direction Filter

Manual Setting

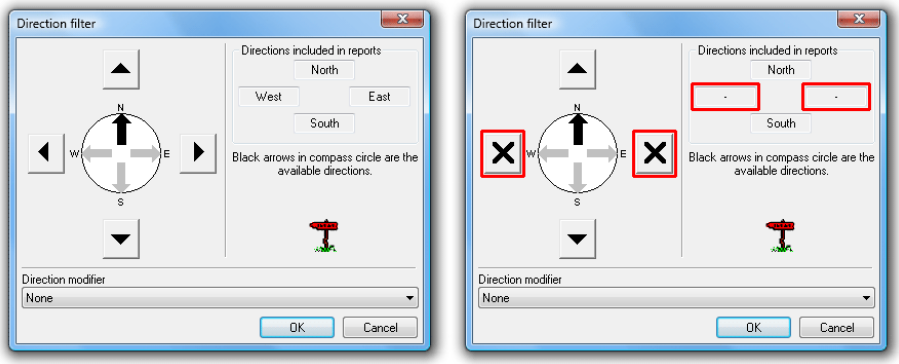
The Direction filter includes and excludes vehicles based on their direction of travel, derived from the direction specified in a dataset's header. The default setting is all directions included.



Direction filter compass examples

The black arrows in the compass indicate the combined direction codes of the tagged datasets. The first example above indicates at least one tagged dataset with a unidirectional code of North-bound. The second example indicates data is available for both East and West-bound traffic. This may be from a bidirectional dataset, or separate east and west datasets.

Remember, the direction code specified when a RSU was setup is simply a descriptive field. Data may still be available for directions other than those indicated by the compass.

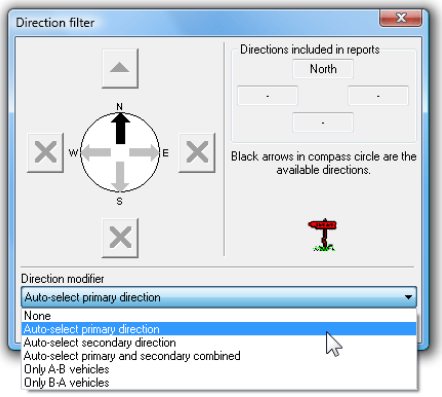


Toggling included directions

Directions are included and excluded by toggling the four buttons around the compass, the effect of which can be seen in the **Directions included in reports** box at the top. A black cross in a button indicates that direction will be excluded from the report.

Automatic Setting

The **Direction modifier** drop-down list at the bottom provides a number of automatic direction filtering options. The **Auto-select** options automatically set the four direction buttons per the compass directions. The **Primary** direction is the **A>B** direction, and **Secondary** is **B>A.** Where multiple datasets are tagged, the **A>B** direction of the first tagged dataset is used. Note that the four buttons are disabled when using these options.



Auto-selecting the primary direction

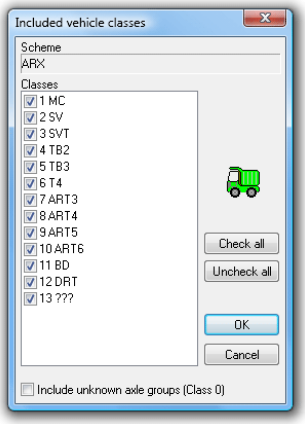
The last two options in the list filter vehicles based on their **A>B** or **B>A** direction of travel, before the normal compass direction filtering is applied. This can be used for entering and exiting filtering where several RSUs are used to cover a site, and a consistent **A>B** layout is used for each RSU.

Class Filter

The Class filter lists the vehicle classes for the classification scheme selected in the Advanced Profile options, with a check box to include or exclude each class.

Each classification scheme specifies the classes that are included by default. For example, schemes normally exclude the *unclassifiable* vehicle class by default. This is usually the last class in a scheme (designated **???**).

Class zero is a special class, which consists of groups of hits that can not form a vehicle (usually fewer than four hits), such as hits detected while the sensors are being setup. This class is for diagnostics only.

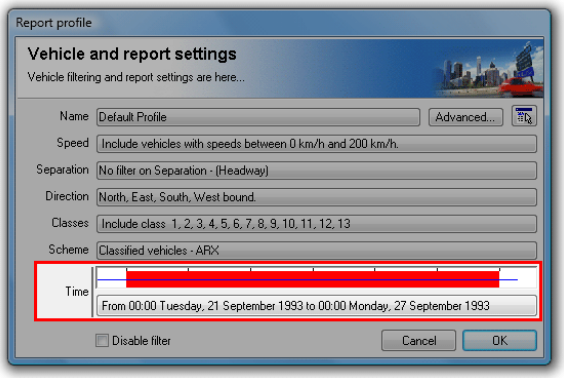


Class filter

Time Filtering

Overview

Profile time filtering controls the start and finish time of a report, with a range of options to automatically set common time filtering requirements. Selected periods can also be excluded based on time of day, and day of the week. All adjustments can be made to any 15-minute boundary.



Profile time filter settings

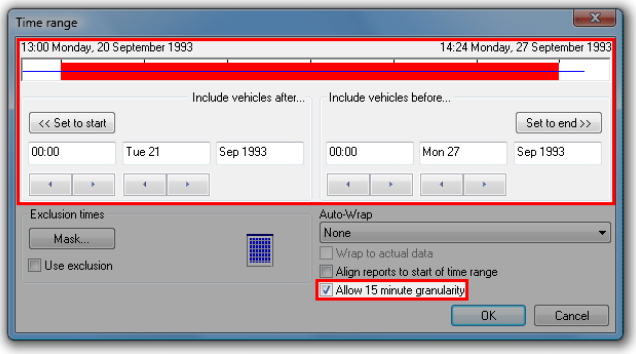
The time filter options are accessed by clicking the button showing the currently selected time range. The chart above the button represents the available time range for the tagged datasets. The blue line in the centre represents the range of actual data, from the start time to the last detected sensor hit. The red bar represents the selected time range.

The default behaviour of a Local Profile is to select the entire time range. Time filtering is primarily used to avoid partial time bins at the start and finish of reports, and for including integral numbers of complete hours or days for statistical analysis.

Time Range

Manual Setting

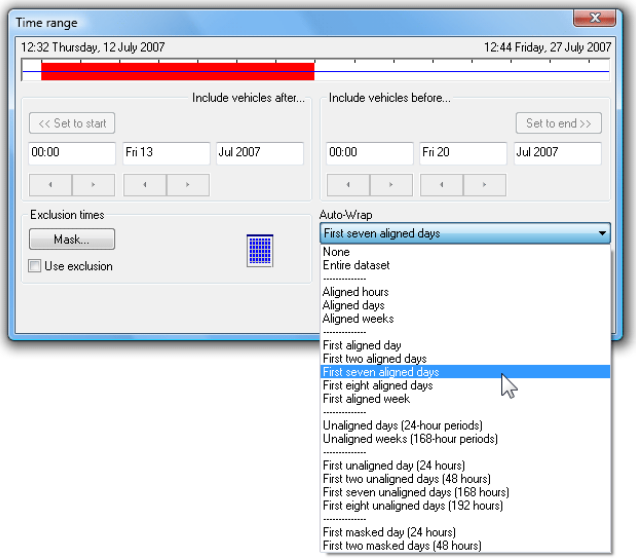
The time range of a report can be manually set using the controls in the **Include vehicles after (start)** and **Include vehicles before (finish)** blocks. The buttons, or spin control under the time adjust the time in hourly steps, or 15 minute steps if the **Allow 15 minute granularity** option is checked. The date spin control steps in days.



Manually setting the Profile time range

Auto-Wrap

The Auto-wrap options automatically adjust the time range to a selection of common filtering requirements. If the selected wrap type cannot be applied to the available data, the time range chart will flash.



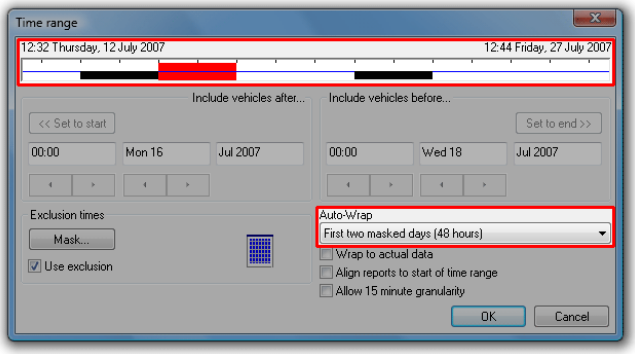
Time Filter Auto-Wrap options

Aligned Auto-wrap options adjust the time filter to the maximum number of the selected time increment (hour, day or week), aligned to the selected time increment. Put simply:

- Aligned Hours wraps to complete hours.
- Aligned Days wraps to complete days, starting at midnight.
- Aligned Weeks wraps to complete weeks, starting midnight Monday (or Saturday for alternate weekends).

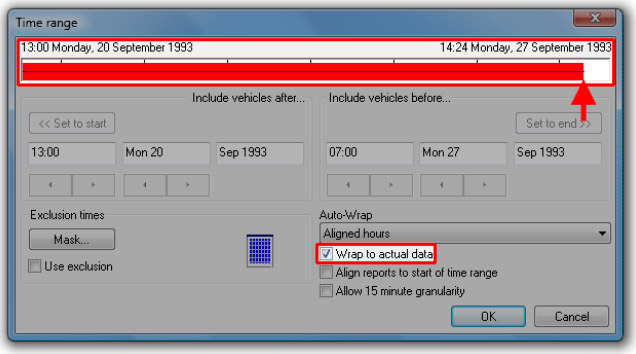
Unaligned Auto-wrap options adjust the time filter to the maximum number of the selected time increment (hour, day or week), but only aligned to hours. For example, **First two unaligned days (48 hours)** will select the first two days of data, aligned to the first complete hour.

Masked Auto-wrap options select the maximum number of contiguous time increments not masked by the Time Mask. For example, the first 48 hours of *weekday* data can be selected by masking weekends with the Time Mask, then selecting **First two masked days (48 hours).**



Auto-wrap with weekends masked

The **Wrap to actual data** option aligns the Auto-wrap options to the last hour, day or week containing sensor hits, as represented by the blue line. The time of the last sensor hit may differ from the dataset finish time if the RSU was removed from the field before unloading.



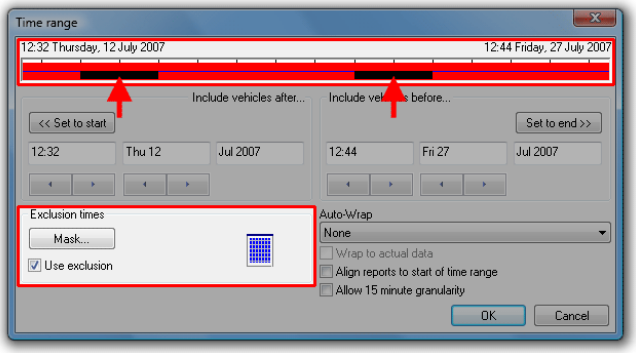
Wrap to actual data option aligns to last sensor hit

Time Exclusions

The **Time Mask** is used to exclude particular times of the week (with 15 minute resolution), or selected dates from the time range of the tagged datasets. Some common uses for the Time Mask:

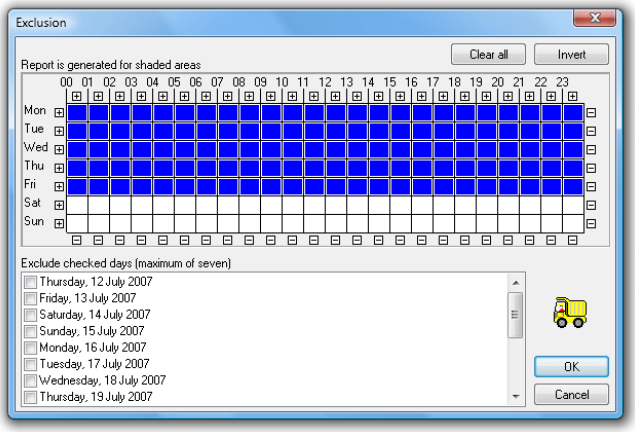
- Excluding weekends.
- Targeting "school hours" for variable speed limits.
- Excluding holidays.

The Time Mask settings are accessed by clicking the **Mask** button. Note that the **Use exclusion** option *must* be checked for the Time Mask to take effect. The masked times will be represented by black regions in the time range chart.



Excluding time using the Time Mask

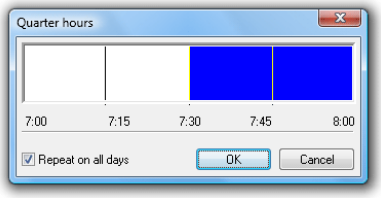
The Time Mask uses a grid representing a week divided into hours. Shaded hours will be included in the report, and white hours excluded. Each hour can be toggled by clicking on it, or rapidly toggled by clicking and dragging. Entire rows and columns can be toggled using the **+** and **-** buttons.



Time Mask with weekends excluded

Right-clicking on any hour displays a dialog box with 15 minute resolution. The **Repeat on all days** option will copy the selected hour across the entire week.

Note: For reports where data is binned into hours, excluding part of an hour in the Time Mask will exclude the entire hour.

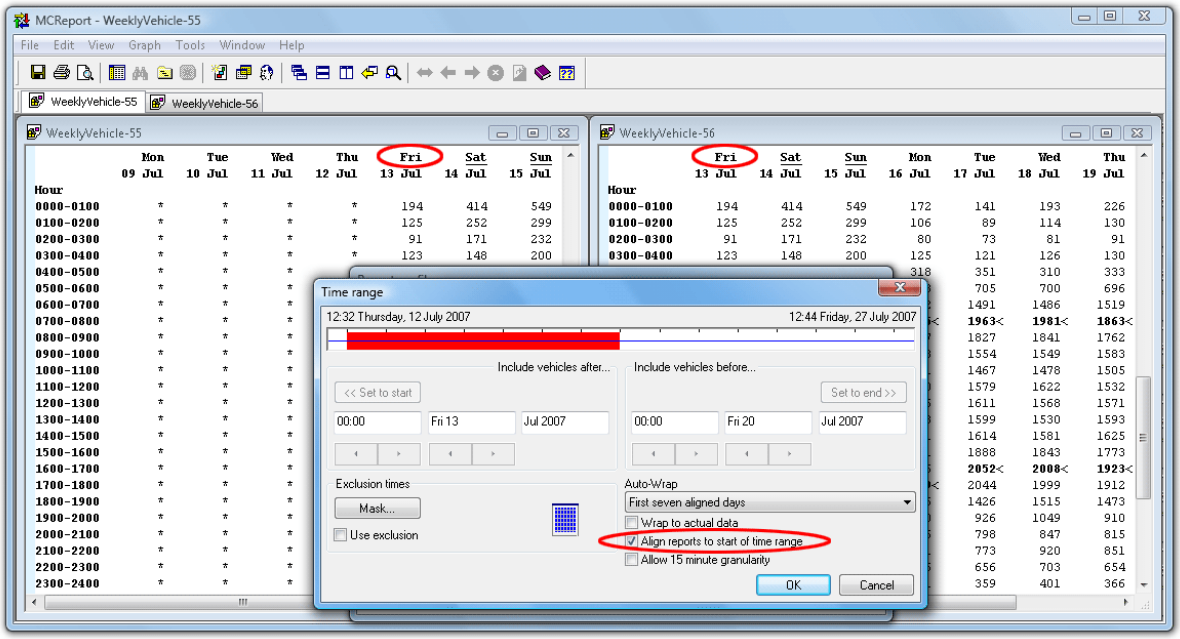


Setting partial hours

Specific dates can be excluded from a report by checking them in the **Exclude checked days** list at the bottom, up to a maximum of five. Use this feature for excluding dates that may adversely affect statistics, such as holidays.

Time Alignment

The **Align reports to start of time range** option changes the beginning of reports to the first time step (option checked), or the *natural* division (default unchecked). Take for example the Weekly Vehicle or Daily Classes reports. The natural division of these reports is weeks, starting at Monday (or Saturday for alternate weekends). Checking this option will start the report at the first day in the selected time range. This is extremely useful for printing a complete week of data on a single page.

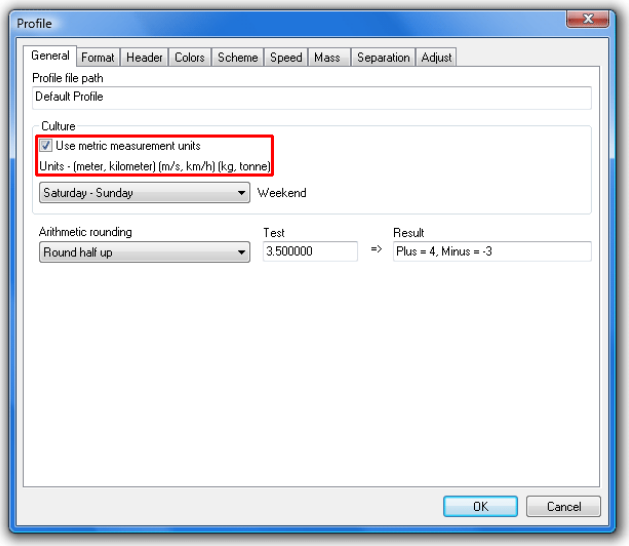


A Weekly Vehicle Report, aligned to the first day (weekends underlined)

Units of Measurement

MCReport can display reports in either metric or non-metric units. MetroCount RSUs simply time-stamp sensor hits, so the raw data has no concept of units of speed or length. MCReport performs all internal calculations using SI units, and a report's Profile determines the units to be displayed.

The option to use metric or non-metric units can be found in a Profile's Advanced options, under the **General** page. The various units of measurement that will be used are displayed immediately below.



Selecting units of measurement

The units of measurement option also affects other options in a Profile, such as the speed range filter and speed bins. When the units of measurement are set via MCReport's **New user options** these other settings will be set to standard values in the Default Profile.

When toggling the units of measurement in a Profile as described above, other settings will be directly converted between metric and non-metric, which may result in non-standard values. Most options have a **Default** button available to quickly return to standard values.

Classification Schemes

Overview

MetroCount's time-stamped raw data collected using two parallel axle sensors enables MCReport to apply any axle-based classification scheme. Multiple schemes can be applied to the same data for different applications. As new standards and schemes are developed, they can be applied to existing data.

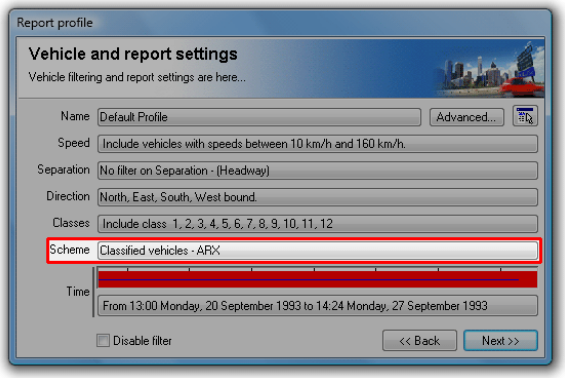
MCReport provides several built-in, highly optimised classification schemes called **OEM Schemes**, which are commonly used around the world. A range of user-defineable **External Schemes** are also provided.

Every scheme has two special classes: an unclassifiable vehicle class, and an unknown axle-group class. The unclassifiable vehicle class, usually designated as the last class, is a group of partitioned sensor hits considered to be a vehicle, but not matching any of the scheme's classes. The unknown axle-group class, designated as class zero, is a group of sensor hits that isn't considered a vehicle - usually fewer than two matching AB sensor hit pairs.

Every scheme has a set of classes that are enabled by default in a Profile's class filter, which usually includes all classes, except the two special classes. The unclassifiable vehicle class may be of interest for checking data quality, or suitability of a particular class scheme. A high percentage in this class may indicate a problem. Class zero can be generally considered as noise, and is only ever used for diagnostic purposes.

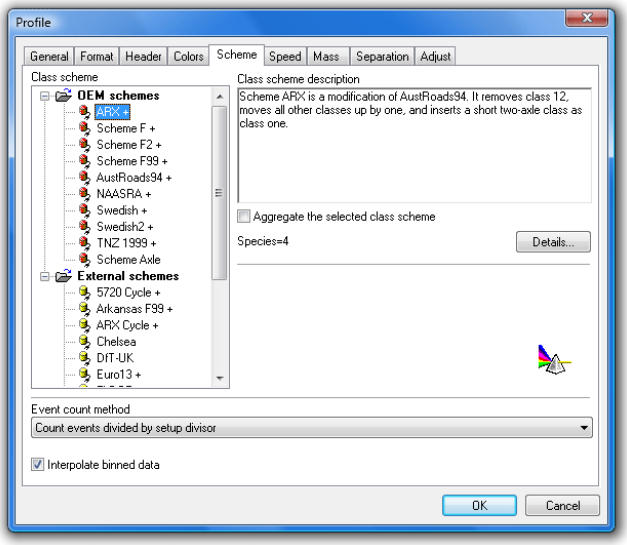
Selecting a Scheme

A classification scheme is selected in the **Scheme** page of a Profile's Advanced options. A shortcut to this page is by clicking on the **Scheme** button in a Profile's main dialog box, where the name of the currently selected scheme is displayed.



Shortcut to the Advanced option's Scheme page

The available schemes are presented in a tree, divided into OEM and External schemes. Selecting a scheme will provide a short description. Note that changing between schemes will reset the Profile's class filter to the selected scheme's default.

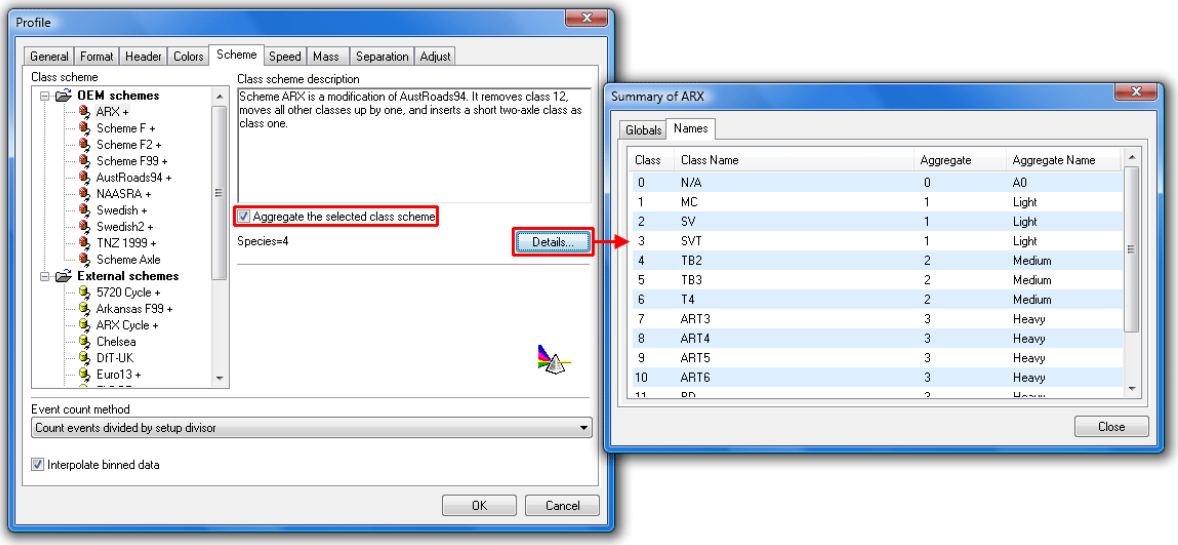


Selecting a Classification Scheme

Aggregating a Scheme

Most classification schemes define a grouping of classes into similar types of vehicles. For example, schemes commonly group passenger vehicles into *light*, rigid trucks and buses into *medium*, and articulated vehicles into *heavy*.

Schemes that define a set of Aggregate classes have a **+** character after their name in the scheme tree. Selecting the **Aggregate the selected scheme** option will produce reports with the Aggregate classes instead of the base classes. The Profile's class filter will be automatically set to the defined aggregate classes.



Combining classes using Aggregates

The mapping of base classes into Aggregate classes can be viewed by clicking the **Details** button. The **Names** page lists all of the base classes for the selected scheme, and the Aggregate classes they map to. For the following example, base classes 1-3 map to Aggregate class 1, base classes 4-6 to Aggregate class 2, and 7-12 to Aggregate class 3. As a general rule, the unclassifiable vehicle class will map to the same Aggregate class number, in this case 13.

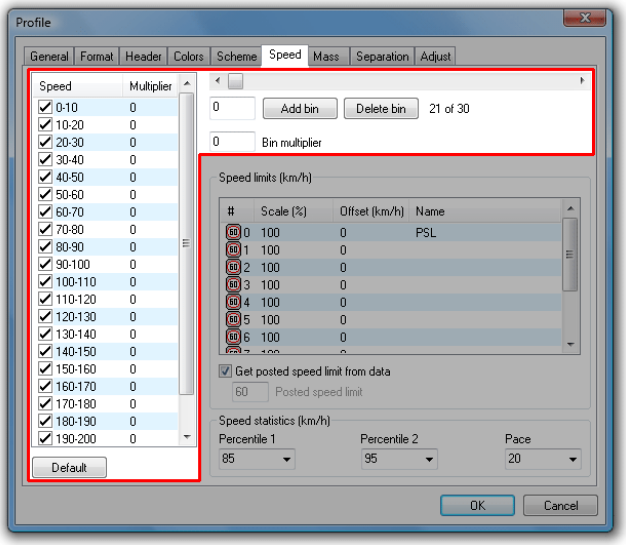
A report's header also displays the Aggregate class map in condensed form. For example, **(ARX Aggregate (0 1 1 1 2 2 2 3 3 3 3 3 3 13))** represents the previous example. Count along for the base class (starting at zero), and the number is the Aggregate class.

Note: The Aggregate mapping for OEM Schemes is not editable. Most classification scheme specifications define the Aggregates, just as they do the individual class rules. External Schemes are user-editable, and contain a section that sets the Aggregate mappings.

Speed Bins

Editing Speed Bins

Speed bins in MCReport are completely flexible. Given the raw data in MetroCount datasets, vehicles are binned during analysis, per the speed bins set in a report's Profile. A maximum of 30 speed bins can be set, and each can be enabled and disabled as required.



Modifying speed bins

Speed bin settings are located in the **Speed** page of the Advanced Profile options. The speed units (km/h or mph) are per the option in the **General** page. Speed bins are defined in the list on the left, with the check-boxes used to determine which bins will appear in reports. Vehicles falling in hidden bins are still included in statistical calculations.

The list of speed bins is contiguous. Each speed bin includes its lower bound, but not its upper bound. For example, the bin **50-60** includes all vehicles travelling 50 and above, but less than 60.

Speed bins are added by using the slider bar at the top. Moving the slider to the desired value and clicking the **Add bin** button will split the bin that contains that value, creating two new bins. For example, given the bin **10-20**, adding a bin at **15** will result in the bins **10-15** and **15-20**.

Selecting a bin and clicking the **Delete bin** button will remove the bin, and join the upper bound of the preceding bin to the lower bound of the following bin. For example, given the bins **10-20**, **20-30** and **30-40**, deleting **20-30** will leave **10-30** and **30-40**.

The **Default** button at the bottom will return the speed bins to a typical set of values.

Speed Bin Multipliers

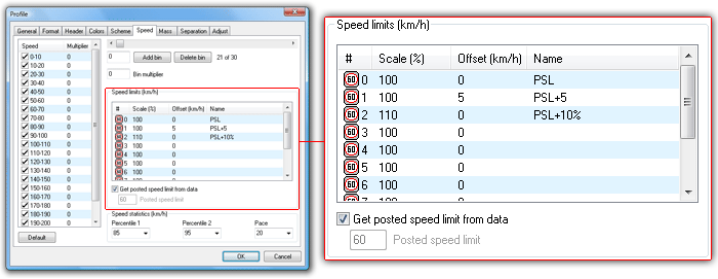
Each speed bin has a user-defined weighting value called a **Multiplier**. Multiplying the total vehicles in each speed bin by the bin's multiplier, and summing the results gives a value called the **Speed Rating**. This value can be used for comparing sites, such as by the severity of speeding.

Changing a bin's multiplier is simply a matter of selecting the bin, and entering a number in the **Bin multiplier** box. The bin's multiplier will automatically update.

Speed Limits and Statistics

Posted Speed Limit

The Posted Speed Limit (PSL) is the speed limit at the site where data was collected, and is used as the basis for speed statistics such as the number of speeding vehicles. The PSL can be settings are located on the **Speed** page of the Advanced Profile options.



Speed limits

The PSL can be automatically derived from the tagged datasets. With the **Get posted speed limit from data** option checked, MCReport will scan the **Description** field of the tagged datasets' headers, looking for a PSL in the following form:

- Must be enclosed in angle brackets **< >**
- Default is km/h. Append an 'm' or 'M' for mph.
- The PSL can appear anywhere in the description, but other angle brackets cannot be inserted when using this feature.

Example Site Descriptions	
km/h	**mph**
Hay St <60>	<40 mph> Speed test, Euston Road
<60km/h> Hay Street	ACPO test, Harrow Road <40m>
Hay St, <50 km/h> study	Harrow Road, PSL=<40 MPH>

With this option checked, if MCReport does not find a valid speed limit, or there are multiple tagged datasets with conflicting PSLs, the PSL will be set to zero.

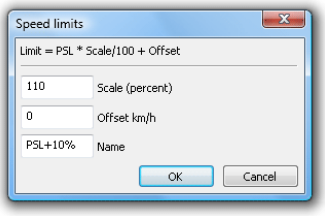
The best time to insert the PSL into the Description field is when a RSU is setup, and when creating Site Lists. For existing datasets the PSL can be inserted into the description using the **Transform data file** feature in MCReport's File Tree.

When the automatic PSL option is unchecked, the PSL can be manually entered in the **Posted speed limit** box provided.

Speed Limits

The **Speed limits** list allows up to 10 additional speed thresholds to be set based on the PSL, using the formula **(PSL * Scale/100) + Offset**. The **Scale** column is a percentage, and **Offset** can be a positive or negative amount, in the same units as the PSL. Each additional limit can also be uniquely named.

To edit a speed threshold, simply double-click. Note that the first limit in the list is always the PSL, and cannot be changed.



Editing speed limit thresholds

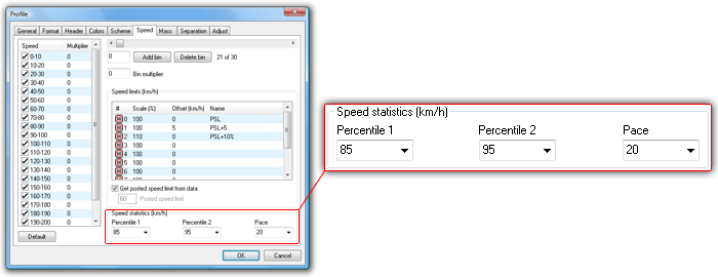
For example, given a PSL of 80, a scaling percentage of 110 will result in a speed threshold of 88. For a simple offset, leave the scaling percentage at 100 and use the Offset field.

Thresholds which are left as the same as the PSL (100% + 0) will not be displayed in reports.

Speed Percentiles and Pace

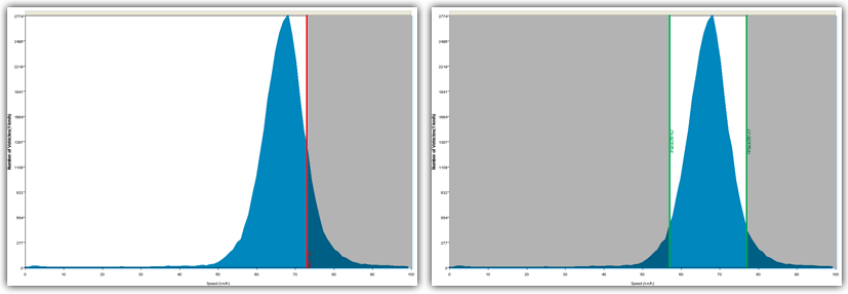
The **nth speed percentile** is the speed below which **n%** of vehicles were travelling. For example, the commonly used 85th percentile is the speed below which 85% of vehicles were travelling. MCReport supports two speed percentiles, which can be set in 5% steps.

The **speed pace** is a continuous band of speeds **n km/h** or **mph** wide that contains the largest number of vehicles. The speed pace is a measure of the dispersion of speeds at a site, based on the number and percentage of vehicles within the pace. The speed pace can be set in 5 km/h or mph increments.



Speed statistics

For example, given a speed histogram, the 85th speed percentile will be a vertical line, with 85% of vehicles to the left. A 20km/h pace is a band 20km/h wide that contains the most vehicles.



Conceptual speed histogram examples showing 85th percentile, and 20km/h pace

Speed Statistics Block

Many speed-related reports combine the above speed limits and statistics into a compact block. An example of the form of this is provided below.

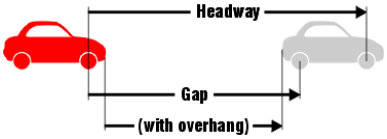
Vehicles = 125765
Posted speed limit= 80 km/h, Exceeding = 84352 (67.07%), Mean Exceeding = 86.88 km/h
Limit 1 (PSL+10%) (80 * 110%) + 0 = 88 km/h, Exceeding = 27223 (21.65%)
Maximum = 174.7 km/h, **Minimum** = 0.0 km/h, **Mean** = 83.2 km/h
85% Speed = 90.0 km/h, **95% Speed** = 95.8 km/h, **Median** = 82.4 km/h
20 km/h Pace = 73 - 93, **Number in Pace** = 107015 (85.09%)
Variance = 60.72, **Standard Deviation** = 7.79 km/h

Separation

Headway vs Gap

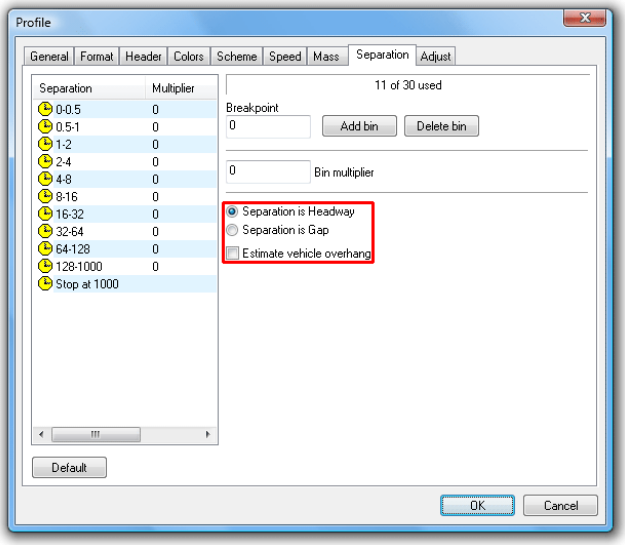
Separation is the *time* in front of a vehicle to the last vehicle travelling in the same direction. The **Separation** page in the Advanced Profile options provides the option to define separation as:

- **Headway** - time between the first axles of two vehicles.
- **Gap** - time between the last axle and first axle of two vehicles.



Separation definitions

When using gap, the **Estimate vehicle overhang** option makes a reasonable adjustment to the actual value to account for the distance between the detected axle and the physical end of the vehicle.



Separation definition

Separation Bins

Editing Separation Bins

Separation bins, like speed bins, are user-definable up to a maximum of 30 bins. The separation unit is seconds, and uses the separation definition option described above.

The list of separation bins is contiguous. Each separation bin includes its lower bound, but not its upper bound. For example, the bin **1-2** includes all vehicles with a separation of one second and above, but less than two.

Separation bins are added by entering a value in the **Breakpoint** box, and clicking the **Add bin** button. This will split the bin that contains the entered value, creating two new bins. For example, given the bin **0-0.5** adding a bin at **0.25** will result in the bins **0-0.25** and **0.25-0.5**.

Selecting a bin and clicking the **Delete bin** button will remove the bin, and join the upper bound of the preceding bin to the lower bound of the following bin. For example, given the bins **1-2**, **2-4** and **4-8**, deleting **2-4** will leave **1-4** and **4-8**.

The **Default** button at the bottom will return the separation bins to a typical set of values.

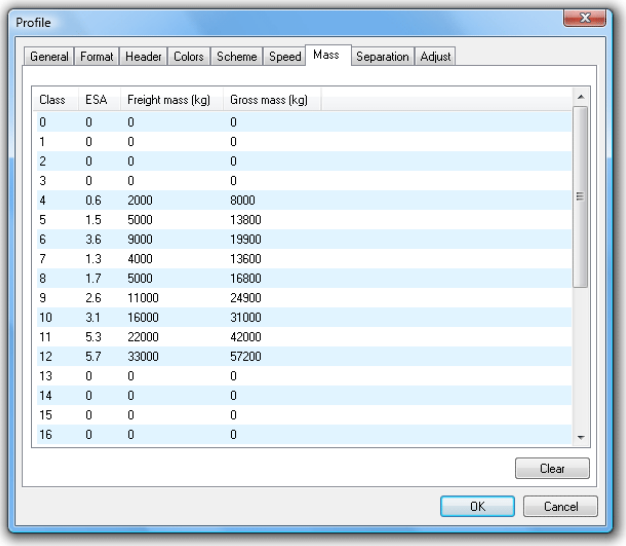
Separation Bin Multipliers

Each separation bin has a user-defined weighting value called a **Multiplier**. Multiplying the total vehicles in each separation bin by the bin's multiplier, and summing the results gives a value called the **Separation Rating**.

Changing a bin's multiplier is simply a matter of selecting the bin, and entering a number in the **Bin multiplier** box. The bin's multiplier will automatically update.

Estimated Mass

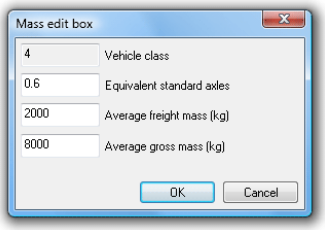
MCReport provides basic support for estimated pavement loading calculations, based on the volume and class distribution of traffic. The **Mass** page of the Advanced Profile options provides a table to enter estimated standard axles, freight mass and gross mass, per class of vehicle.



Class	ESA	Freight mass (kg)	Gross mass (kg)
0	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	0.6	2000	8000
5	1.5	5000	13800
6	3.6	9000	19900
7	1.3	4000	13600
8	1.7	5000	16800
9	2.6	11000	24900
10	3.1	16000	31000
11	5.3	22000	42000
12	5.7	33000	57200
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0

Estimated Mass table

To edit a row in the table, simply double-click. Units will be kilograms (kg) or pounds (lb) per the units option in the Advanced Profile's **General** page.



Editing mass table rows

Note that this table is closely linked to the selected classification scheme, and may differ between regions and counties that use the same classification scheme. Values are normally derived from weigh-station data of regional vehicle types, and their freight and gross mass.

Reports that use the Estimated Mass table include the **Custom List** report, and **Daily Classes (Estimated Mass)**.

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