Setting Up a New Count Location

The following steps walk a user through **the process of setting up a new or existing count location**.

1. **Navigate to the "Upload Station Locations" tab** from the *Import* module on the left of the screen by clicking on "Import" and then "Upload Station Locations." This opens the "Import New Station Location" screen with a form for entering in station meta data.

2. **Fill out each screen of the form** as completely as possible. Some fields required by TxDOT or FHWA are noted with an asterisk (*). Clicking in each box will reveal general instructions about filling in each field. The form contains nine tabs; the following will discuss each tab and the required fields. More information about the fields can be found in Chapter 9. Appendix A: Station Location Fields.

    a. **Name and Location tab:** Requires information about the station's name, location (including county, city, special area or district, latitude, and longitude), and the year the station was established or discontinued. Agency Station ID refers to any internal name or code unique to the agency entering the information.

    b. **Direction and Types tab:** Requires information about the travel mode (pedestrian, bicycling, all nonmotorized traffic, or other types), direction of travel, and sensor type **matched to a particular channel from the counter**. For multi-channel counters (like many Eco-Counters or count technology that differentiates direction and mode), **one row must be filled out for each channel**. This step is crucial for connecting the counter information with the counts.

    To enter channel information, click "Add Row" and enter the information for one channel at a time. Add additional rows for each channel in the counter. If possible, match the Channel ID with the channel ID number in the count data file.

    c. **Count Information tab:** Requires general information about how the count took place, the counter vendor, and count purpose. A Notes field allows the input of comments about the location, such as unique conditions, adjustment factors, and other pertinent information.

    d. **Station and Facility Details tab:** Requires a detailed description of where the count equipment was located and the facility type and functional classification of the count location. When entering the description, provide enough detail to allow someone to locate and replace the counter if necessary.

    e. **Count Direction and Orientation tab:** Requires additional information about **how the count equipment was oriented to the facility and traffic on the facility**. This does not refer to what direction of travel the equipment was capturing. These fields are complicated and may be confusing to enter; please see Section 9.2, "Required Station Attributes" for additional details about each.

f. **Roadway Characteristics tab:** Requests information about the roadway **if the counter was placed on or near a roadway** (such as on a bike lane, cycletrack, or roadway-adjacent sidewalk). Details include roadway width in feet, posted speed limit, posted route signing and number, and if the roadway is part of the National Highway System.

g. **Non-Motor Facility Design tab:** Requests design information about the nonmotorized facility being counted, such as width, if there is a buffer between the facility and if so, the width of the buffer, surface type, and condition.

h. **Additional Features tab:** Requests ancillary condition information, such as the presence of parking, shade, transit options, street lighting, ADA ramps, surrounding land use, and traffic volume.

i. **Contact Details tab:** Requests information about data providers or data requesters, if applicable. A data provider is an agency other than the data owner that performed and provided the count data on behalf of the data owner. An example would be a consulting firm or research agency under contract to provide counts to an agency. A data requester is an agency separate from the data owner that requested the counts be performed.

3. **Click the "Add Station" button** in the bottom righthand corner of the form after filling out each screen of the new station input form.

Once the form has been successfully completed, a new count station will be created in the BP|CX for that agency. The name of this station will now be viewable when uploading count data and the location will be noted on the map of stations and table in the *Dashboard*.

Validity Flags and Definitions

During the quality control review process, users must use their best professional judgment to determine if count values are good or bad; however, in many cases it may be difficult to determine if the count actually occurred or the counter is in error. This section describes the different validity flags and their definitions.

Count values fall into one of three categories:

- **Valid:** The count appears to be normal, realistic, and acceptable given the facility's history and could have reasonably occurred for that time period.
- **Invalid:** The count appears to be in error, not representative of reality, or is unlikely to have occurred for that time period.
- **Abnormal but valid (ABV):** The count appears to be in error but is actually valid and did occur.

It is important to mark valid extreme counts as ABV. The BP|CX excludes these counts, either much higher or lower than normal, when calculating certain performance measures about average use throughout the year but includes these in total count summations. For example, counts collected during a hurricane should be flagged as ABV because this is a rare and nonrecurring event that may skew average use even though the counts may be valid.

A gray area for flagging counts as ABV occurs with festivals or other events that happen in the same month every year that produce extremely high count totals. An example of this would be the South by Southwest (SXSW) conference or Austin City Limits (ACL), which both take place in Austin. These festivals produce extremely high counts that could skew numbers for March and October if imputation for other days were needed. In these cases, the agency must determine how to mark these counts as either valid or ABV.

Eight different **types of invalid flags** can be used to mark count data as invalid:

- **Data Gaps:** A date stamp exists, but there are no count data. This discrepancy generally indicates a counter malfunction and is indicated by a gap in the line, null value, or a negative value on a data visualization.
- **Consecutive Zeros:** There are 15 hours (or 60 15-minute periods) worth of zero counts in a row. Generally, this error occurs for multiple days or months, unlike a 1- to 3-day period where weather may be a factor. Do not flag normal rainy or snowy days. Also, this flag should not apply to low-usage count locations because multiple days of zero counts may be normal. FHWA guidance recommends 7 periods, but this may be too short a window on low-use areas.
- **Consecutive Non-zeros:** There are 3 or more periods of the same count. This is only used with counts of 15 or more at the finest level of detail (i.e., by direction or by mode). This discrepancy generally indicates the counter malfunctioned and became stuck with the same count for several periods.

- **Maximum Count Exceeds Limit:** This error occurs if count totals exceed 5,000 per day or 1,500 per hour or time period. Use your best professional judgment if a spike in counts is observed because some recurring and nonrecurring events may create valid count spikes. Understand what is normal for the location, time period, and day to determine if the count that occurred is realistic and feasible. A single small spike (usually under 500) could be a valid occurrence, but more information would need to be gathered and logged in the notes field.

- **Interquartile Range Violation:** This error occurs if the count is outside the 25th and 75th percentile over a rolling average of counts per period (usually ±2 months). This flag is more cautionary and is better used to identify periods that are not normal for a normal period of time rather than invalid data.

- **Adjacent Interval**: A count jumps from 0 to 50 or higher in the adjacent period (or the reverse from 50 or higher to 0). While this could indicate an error, it could also be normal daily count spikes in the morning or late evening periods.

- **Inverted AM/PM:** The ratio of 3:00 a.m. to 3:00 p.m. counts in a day is less than 1. This error usually occurs in the data import process from TRAFx passive infrared counters. Nonmotorized facilities near bars and late-night districts may break this rule. If this principle is understood, clarification can be easily identified by looking at the time with the date stamp in the base data.

- **Invalid for Multiple Inconsistencies (General Error):** At times, none of the previous errors adequately convey what is occurring, or more than one of these errors is happening at once over a span of time. This flag serves as a catch-all for any error or cluster of errors that cannot be adequately identified for a specific cause.

These flags are constantly being developed and refined, so this manual will be updated as needed when new flags are created or definitions significantly change.

FHWA Quality Control Tests and Thresholds

FHWA has developed a series of quality control tests and thresholds for nonmotorized count data submitted to TMAS. While many of the quality control tests in the BP|CX meet or exceed those used by FHWA, users should still be aware of these tests, their default thresholds, and BP|CX recommended threshold values:

- **Historical QC Variance:** Tests how the total count for a day performs in comparison to the same day of the week historically. Variance is set to ±20% from the historical value (variance from the same day of the week data for the day versus the number or weeks back average from the prior month time marker). The test uses 6 weeks from the time marker as a default with a minimum of 2 weeks from the prior month needed to run the test. The threshold value of 200 counts is set to determine if the test uses a percent variance (if over the threshold value), or a count variance (if under the threshold value). For counts under the threshold, use +/− the variance * threshold and calculate the quartiles based on the size of the historical data (100%, 75%, 50%, and 25%).

  For example, a count of 1,750 would use the variance of 20% of the historical average as the threshold. If the historical average is 1,250, the threshold would be 250 (1250 * 20%) plus the historical average (1,500). A count of 1,750 would fail this test.

  Alternately, a count of 115 would require the use of a count based on the variance (20%) of the threshold (200). The threshold to use for the test would be ±30 (200 * 20% = 40; 40 * 75% quartile = 30). If the historical average is 150, the count of 115 would fail because 115 is less than 150 − 30. If the count was 175, the count would pass because 175 is less than 180 (150 + 30).

- **Year-over-Year MADT:** The monthly average daily traffic (MADT) for the same month from the prior does not exceed ±20%.

- **Consecutive Zeros:** There are 7 time periods of zero counts in a row with no overlapping days.

- **Any Zero-Adjacent Hour**: A count jumps from 0 to 50 or higher in the adjacent period (or the reverse from 50 or higher to 0) unless the count is the first of the day.

- **Total Maximum Hourly Count:** The sum of all count intervals for all lanes and directions for the hour exceeds 4,000.

- **Total Minimum Daily Counts:** The sum of all count intervals for all lanes and directions for the day is less than 100. Applies only to a full day of counts.

- **Total Maximum Daily Count:** The sum of all count intervals for all lanes and directions for the day exceeds 5,000. Applies only to a full day of counts.

- **Multiple Identical Counts:** Any consecutive N intervals with identical counts, independent of the time interval counted.

- **Inverted AM/PM:** The 3:00 a.m. hour is greater than the 3:00 p.m. hour.

Tips for Reviewing Data: What to Look For

This section provides tips and things to look for in the data—based on researchers' experiences reviewing millions of data points—to ensure the highest quality review. These suggestions are not mandatory but are recommended to streamline the review process and maximize accuracy.

- **Start with the whole picture and then zoom:** Always begin by looking at the daily subtotals for the entire period and then zoom in to the data and scan through the entire data for anomalies. This practice allows reporting agencies to quickly spot potential issues or events that occur on an annual basis. Do a web search on days where a dramatic spike in counts has been registered.

- **Connect behavior with the count:** Sometimes it may be difficult to look at numbers and tests to determine whether the data are valid or not. Try to imagine the time of day in question and how many users the count represents. For example, go outside and count in person if needed to visualize what 25 users looks like in a 15-minute period.

- **Look for rainy or snowy days:** If a count has a stable pattern and then suddenly drops to a low or zero number for a day or two, check the historical weather record. Sometimes a rainy day can look very similar to an error in the data. Consult Weather Underground (www.wunderground.com) for easy-to-read historical weather information.

- **Look for overnight count spikes:** Counts can dramatically elevate from 0 to over 100 as early as 5:00 a.m. These spikes are usually normal and represent an exercise group or early commuters. Counts may again elevate in the later afternoon and evenings. As a general rule, do not mark these as abnormal. Instead, look for dramatic spikes during overnight periods because these are less likely to occur. Be sure the facility in question is not near a bar district or commercial businesses open late that might cause the spike.

- **Be aware of wrong-way riders:** For bicycle counts on on-street bikeways that measure direction, beware of counts showing a stable pattern in one direction and showing incredibly low and unstable counts in the other direction. These unstable patterns are the result of wrong-way riders. When calculating performance measures, those riders must be added to the correct direction on another count location.

- **Pay attention to directional splits:** In general, the count in one direction should be close to or related to the count in the other direction. A sudden departure from this pattern may indicate counter error. Counters that determine directionality are generally set to default indeterminable counts to a northbound or eastbound direction. If either of those two directions becomes abnormally high, that period may be in error.

- **Look for spikes after or before null or zero values:** One pattern sometimes seen occurs immediately before or after a counter begins to show an error. Sudden spikes may likely occur and should be flagged as invalid. The spike is likely the counter catching up with all the counts it missed over the error period, but there is no way to ensure the count validity.