DirectRoute User Guide (v25.3)

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Introduction

DirectRoute is an automated fleet routing program with intuitive design, powerful mapping insight and drag-and-drop functionality. DirectRoute easily interfaces with most existing accounting or ERP software and allows the user to build fixed or dynamic daily routes. Capabilities include single or multi-day routes, one-way deliveries or backhaul pickups, multi-depot planning, financial analysis of routes and fleet operations, customizable reporting, interface to real-time vehicle tracking, street level turn-by-turn driving directions, and more.

This file serves as a reference to help with the necessary steps involved in building optimal routes and the more common processes involved. While working in the DirectRoute program, the DirectRoute User Guide Help File can be accessed using the F1 key or select **Help > Contents** from the DirectRoute menu. For assistance, contact Trimble MAPS Support, **support@trimblemaps.com,** US (toll free): phone **1-800-663-0626**, Monday-Friday, 7am-5pm CST.

DirectRoute installation

For local machine installation, the DirectRoute install files, and any subsequent update files, are generally downloaded by licensed users from the **Trimble ClientCenter**.

In addition to DirectRoute, licensing and access for additional Appian software modules (if purchased) will be included in the installation download. If the user system or network prevents the download and/or installation, a request should be made to provide an alternate installation method. Alternate methods may include mailing a copy of the installation (certified, registered mail) or onsite installation by an assigned Appian Implementation and Training Consultant.

Each licensed customer (primary contact) will receive an email with specific instructions on how to access the download, installation instructions, and the product code/license number.

It is important to note that the install cannot be done remotely, and one must have administrative rights on the machine to perform the DirectRoute installation.

The download file generally includes the DirectRoute program and component files, including:

- .NET 4.5
- Crystal reports
- PC*Miler embedded Map/Mileage System
- Address Cleanup File
- Zip9 Data File
- Help File
- ResourcePro Module*
- SchedulePro Module*
- TerritoryPro Module*
- Transportation Modeler Module*

*Note: *Additional Appian software modules, if licensed for use.*

Assistance during the download and/or installation is available, if needed, by contacting Trimble MAPS Support, **support@trimblemaps.com,** Phone: (800) 663-0626.

DirectRoute Updates

DirectRoute software updates, or releases, are issued to update or add/delete new, improved, or corrected features and functions. These updates usually occur a few times each year.

When updates are released, customers will be notified via email with a brief description of what is included in the updated release and instructions on how to retrieve and install the update. Each release update will also include an updated Help File.

System Requirements

System requirements may vary depending on which software modules have been licensed for use, the number of licensed users, and the types of operating systems being used.

The following table lists the standard requirements for operating DirectRoute from various platforms. Separate requirements are listed for PC standalone connections and server connections.

PC Standalone System		
	Min Requirements	**Recommended**
OS	Windows 11 / Windows Server 2022	Windows 11 / Windows Server 2022
Processor	4 cores	4+ cores
Memory	8 GB	16+ GB
Hard Disk	125 GB	250 GB
User Permissions	Full control of DirectRoute folder, subfolder, and data directory (if not in the subfolder)	Full control of DirectRoute folder, subfolder, and data directory (if not in the subfolder)
Internet Access	Required on startup and periodically	

Server			
	1–5 Users	**6–15 Users**	**16+ Users**
OS	Windows 2016 Server w/MS .NET 4.5/ newer	Windows 2016 Server w/MS .NET 4.5/ newer	Windows 2016 Server w/MS .NET 4.5/ newer
Processor	Quad core 2.8 GHz or higher	Quad Core 2.8 GHz or higher	Quad Core 2.8 GHz or higher
Memory	4 GB	8 GB+	16 GB+
Hard Disk	80 GB	160 GB+	220 GB+
Network Card	1 GB dedicated NIC for Terminal Services	1 GB dedicated NIC for Terminal Services	1 GB+ dedicated NIC for Terminal Services

Figure 1–Systems Requirements Table

1. DirectRoute Components

This section will help to familiarize you with the basic components of DirectRoute, including window tabs, map functions, customizations, menus and toolbars, and mouse pointers.

1.1. DirectRoute Menu

The DirectRoute menu contains numerous sub-menu items that, when chosen, present a dropdown list of action-based options. These items include:

- **File Menu**
- **Edit Menu**
- **Map Menu**
- **ResourcePro Menu**
- **Analysis Menu**
- **DRTrack Menu**
- **Window Menu**
- **Help Menu**

And on the far-right side of the DirectRoute menu is the Module Menu, a drop-down list of add-on software modules available for use with DirectRoute, if licensed.

Directly below the menu is the toolbar, containing various icons used to perform specific functions, each of which is explained later in this section.

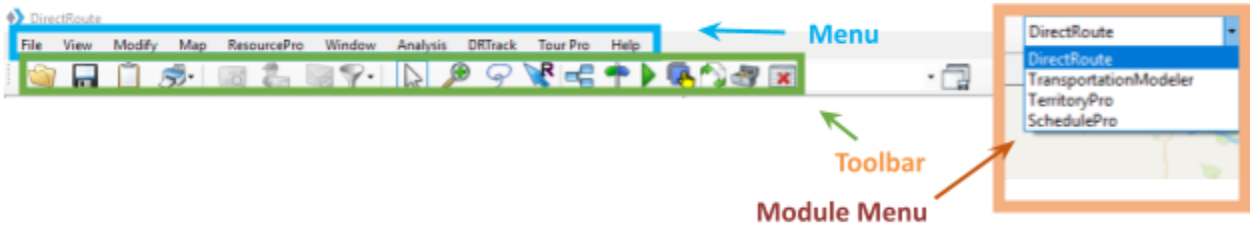


Figure 2–DirectRoute Menu

Tip: If a menu or toolbar option is gray/faded rather than colored/clear, it is not accessible at that time. You may need to have specific files open and/or be in the routing mode to access certain functions, or it may be accessible only if licensed for additional Appian software modules (ResourcePro, TerritoryPro, etc.).

1.1.1. File Menu

The File Menu (Alt+F) contains commands for opening, closing and saving files in DirectRoute, as well as creating Upload and Extract Files, and generating Distance Files.

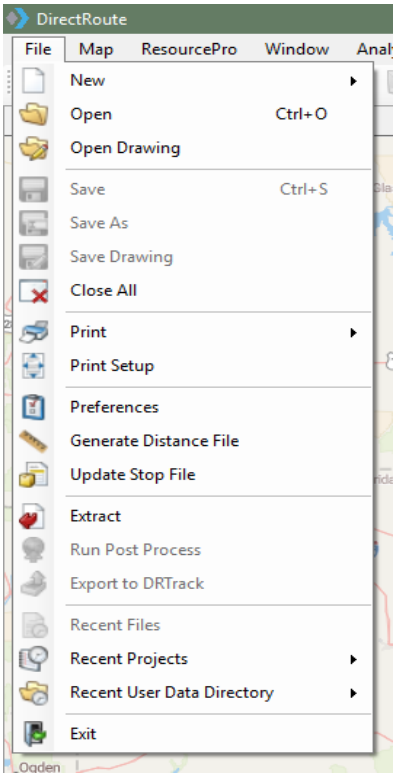


Figure 3–File Menu

New (ALT+F+N)–Open and create new files. Choose Route File, Stop File, Truck File, or Distance File. When using modules other than DirectRoute, additional options may be present (i.e. Schedule, Shipment File, Solution, Pool Point File, etc.).

Open (Ctrl+O)–Open any existing or previously saved DirectRoute file. The file type, directory location, and file name can be chosen from the dialog box that appears.

Open Drawing–Open any drawing files that were previously created and saved in DirectRoute.

Save/Save As (Ctrl+S)–Save any open file. To save as a new file or assign a new name, select Save As.

Save Drawing–Map drawings can be created to set boundaries, territories, or assign drivers, etc., then saved (with a .DRW file extension) to use during the routing process. They can be used with more than one route file, and are editable.

Close All–Close all open files with one action.

Print (Ctrl+P)–Print the Route Book, Map, Stop File, or Truck File. Select the file using the expanded menu (arrow).

Print Setup–Set up a printer/directory (print to file) to use with DirectRoute, change settings.

Preferences–Change program settings/configuration of data files. See **Routing Preferences** for additional information.

Generate Distance File–Without a Distance File, the software will use a straight-line distance and scale factor to calculate distances between stops. When a Distance File is generated, the miles calculated from the available mileage system will be used instead. See **Generate a New Distance File** for additional information.

Update Stop File–Update the Stop File with data from another Stop File.

Extract–Create a Stop File with an extract from an order management system.

Upload–When the routes have been finalized, create an Upload File that can be sent back to the order entry system for processing. See **Creating Upload Files** for additional information and instructions.

Upload to PeopleNet–Send stop, vehicle, and route information to the internet for use with an active PeopleNet license.

Export to DRTrack–Send route information to the internet for tracking of vehicles and routes through the DRTrack module (additional license required).

Recent Files/Recent Projects–Select recently viewed files and/or projects.

Recent User Data Directory–Quickly switch to and use another data directory that has been used recently, instead of switching via *File* > *Preferences* > *File Names/Paths*.

Exit (Alt+F4)–Exit and close the program.

1.1.2. Edit Menu

The Edit Menu (Alt+E) is only displayed and available when one or more spreadsheet files (Stop or Truck File) are open. The options included in this menu are used to manipulate and edit the spreadsheet files, and for plotting (Geocoding) records on the map.

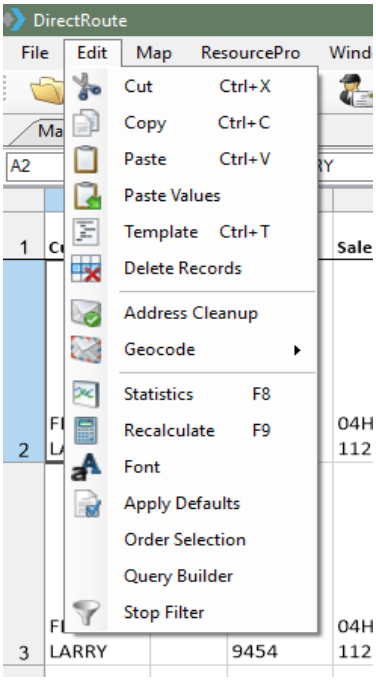


Figure 4–Edit Menu

Cut (Ctrl+X)–Move cells or cell content to another cell or spreadsheet; places cut data in the clipboard until it is pasted into another cell or discarded.

Copy (Ctrl+C)–Copy cells or portions of cells from a spreadsheet to another cell or spreadsheet.

Paste/Paste Values (Ctrl+V)–Paste cut or copied content into cells; use *Paste Values* to paste formula results (sums).

Template–Paste values or formulas into multiple cells within a spreadsheet; enables set up of *Apply Defaults* (enter changes in the sample spreadsheet, select *Apply Defaults*, then enter *To Row* and *From Row* to apply the new data).

Delete Records–Delete data from cells or rows.

Address Cleanup–Correct addresses and/or locate 9-digit Zip Codes; prepares records for Geocoding.

Geocode–Shortcut to the Geocode process; uses the address fields to locate Lat/Long coordinates of each record.

Statistics–Calculates summary statistics for records within the spreadsheet, or to records within drawings on the map.

Recalculate–Recalculate statistics. Use after changes have been made to valued cells.

Font–Select font style and size.

Apply Defaults–Sets default status for *Time Windows, EqCodes, Unload Rates, Fixed Time*, and *Zone* to a range of records on a Stop File.

Order Selection–Select and apply priority routing/delivery to records within the Stop File.

Query Builder–Build and save queried searches for records in the Stop File spreadsheet based on content values in the selected Stop Fields.

Stop Filter–Apply a temporary or permanent mass update to a selected Stop Field column on records found by a saved query.

1.1.3. ResourcePro Menu

The ResourcePro Menu provides access to functions using the ResourcePro Module (ref: **ResourcePro Module**) (additional license may be required).

1.1.4. Analysis Menu

The Analysis Menu launches the **Cross doc vs DC** (Distributions Center) tool and corresponding statistics as well as the **Scenario Manager** tool which is utilized in DirectRoute while engaging in the review of a .ROUTE project.

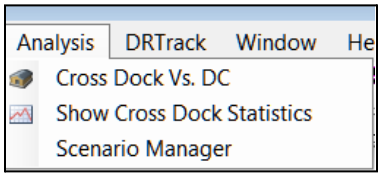


Figure 5–Analysis

1.1.5. DRTrack Menu

DRTrack is an optional Appian web-based GPS tracking program. If you have a DRTrack site, the DRTrack Menu provides several options to upload and download information from DirectRoute.

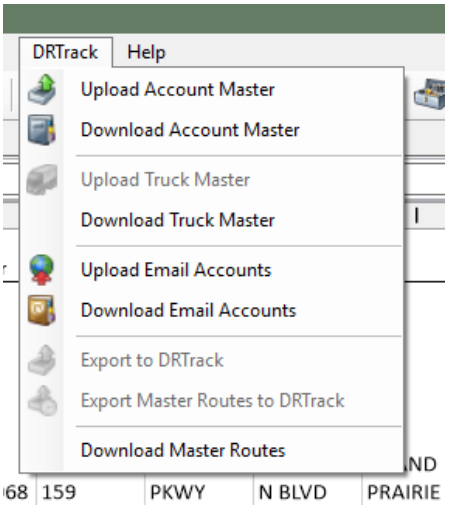


Figure 6–DRTrack Menu

Upload/Download Account Master–Upload or download an Account Master File to/from DRTrack.

Upload/Download Truck Master–Upload or download a Truck Master File to/from DRTrack.

Upload/Download Email Accounts–Upload or download email accounts to/from DRTrack (If Email Manager is configured in DRTrack).

Export to DRTrack–Export a routing solution to DRTrack; routing solutions can be sent from DRTrack via web services to an ERP/WMS/OMS.

Export Master Routes to DRTrack–Enables the exporting of Master Routes to DRTrack. Uncheck the **Skip Empty Routes** box in the dialog if you want to also export empty routes/trucks.

Download Master Routes–Download Master Routes from DRTrack.

Note: See **Import and Extract Records** *and* **Routing Preferences and Options Table** *for more info.*

1.1.6. Window Menu

The Window Menu (Alt+W) enables switching between open files. A check mark identifies the current window view; select a window number to switch to another open window or use the shortcut, Ctrl+F6.

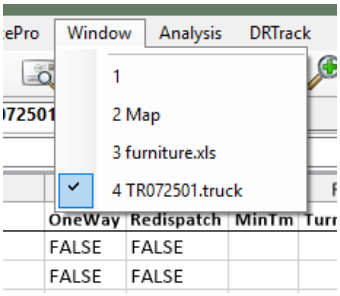


Figure 7–Window

DirectRoute allows single or multiple files to be opened at any one time. Each open file will produce a labeled window tab. When multiple files are open, the active window will appear layered over the inactive windows.

To view one of the inactive window tabs, simply select the tab to bring it forward.

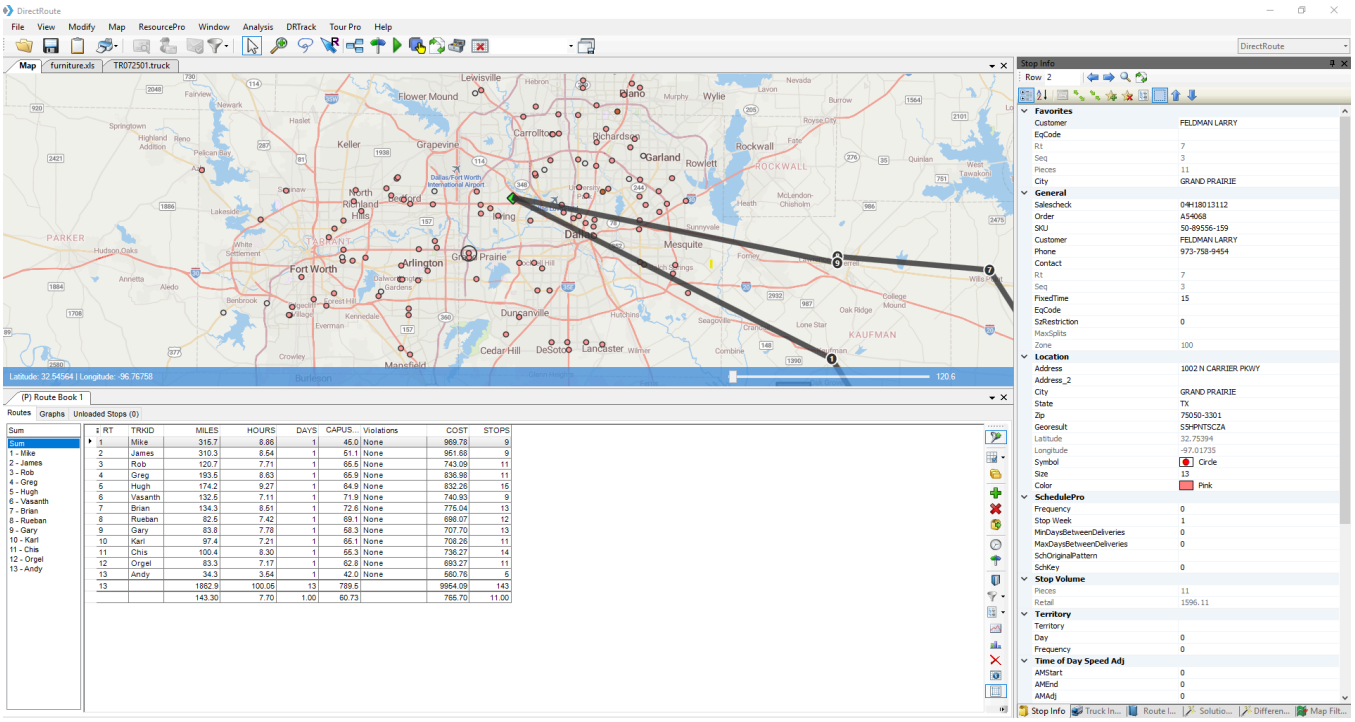


Figure 8–DirectRoute Map Screen View

The software also enables alternate positioning of multiple windows/files when more than one is opened. As an example, when in the routing mode, with the Route Book, Stop File, and Truck File all open at the same time, you can position the various window tabs to enable viewing three or more files on the screen together.

Alternate positioning is simple to do; just grab the tab (with the mouse) of the window you want to move and drag it into the desired location.

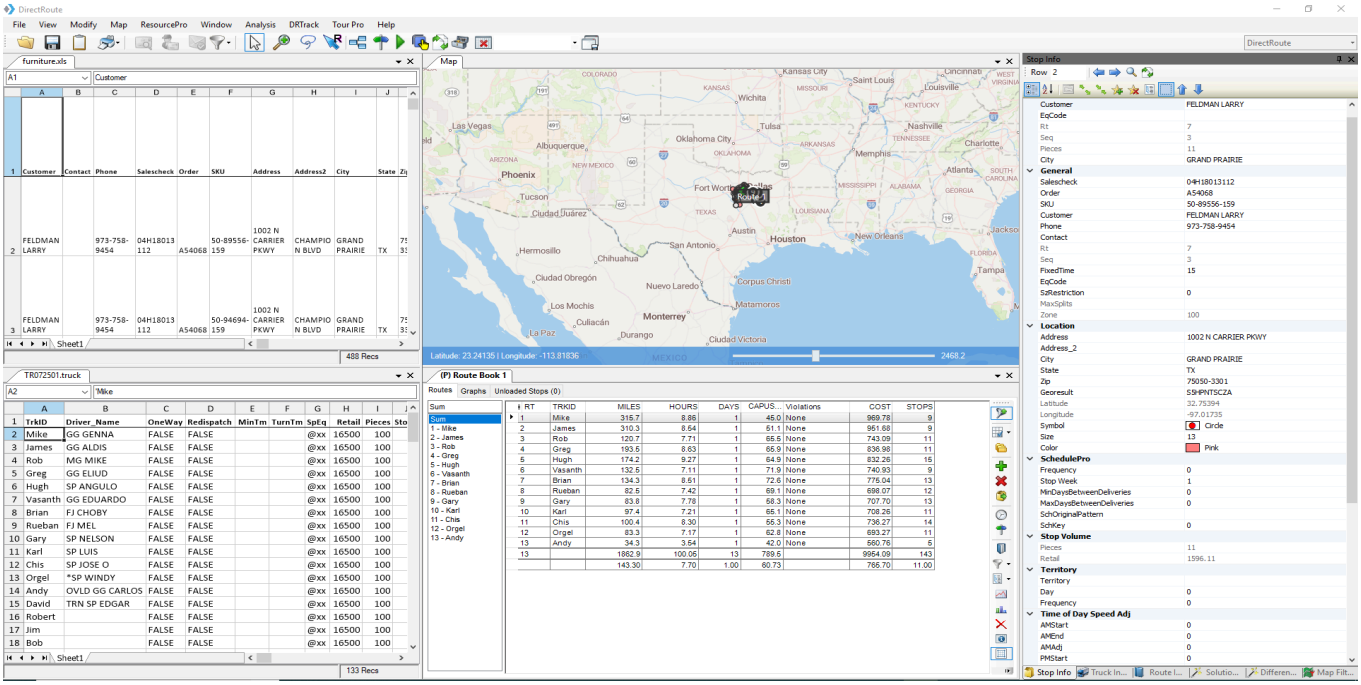


Figure 9–Alternate Positioning of Open Windows

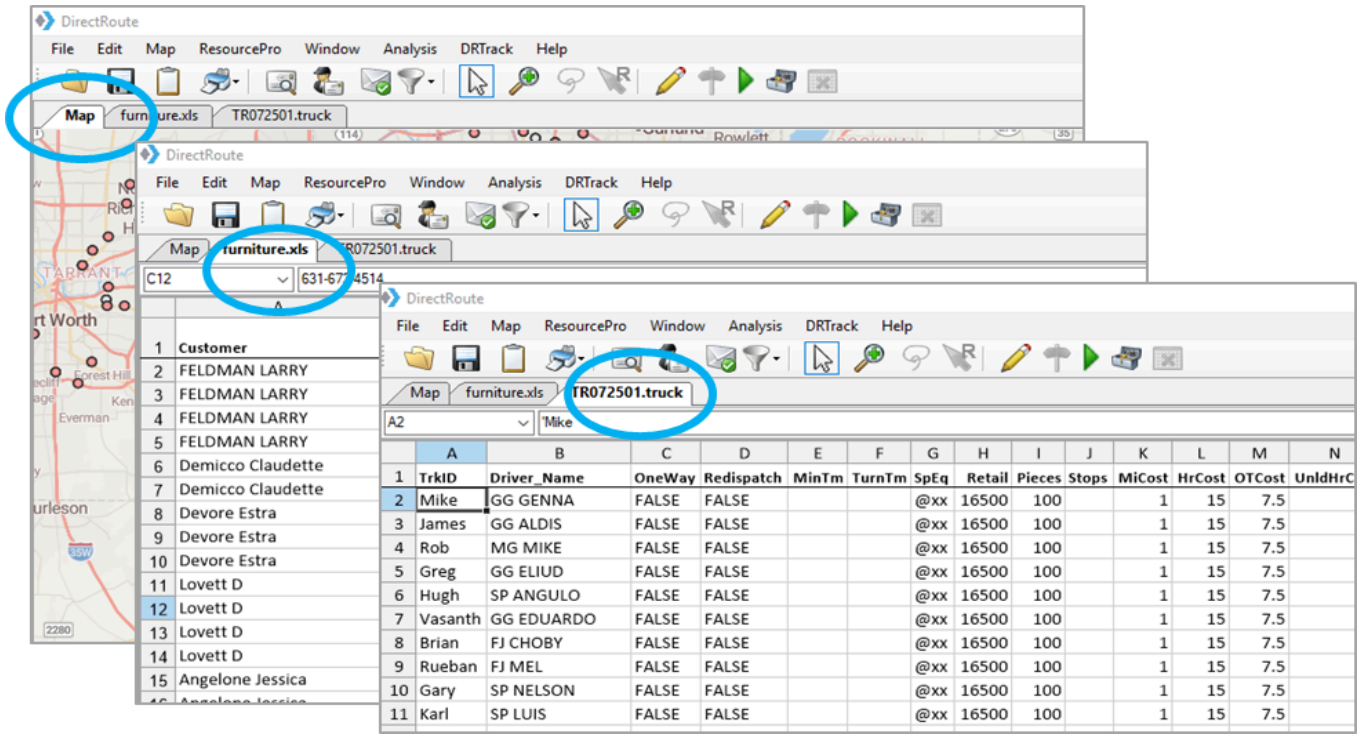


Figure 10–DirectRoute Multiple Window View

Tip: Use Ctrl+F6 shortcut to move between windows.

1.1.7. Help Menu

The Help Menu (Alt+H) can be accessed at any time, from any screen, while using the software. Options listed provide valuable access to guidance and instructions, and important information concerning the software program and system in use.

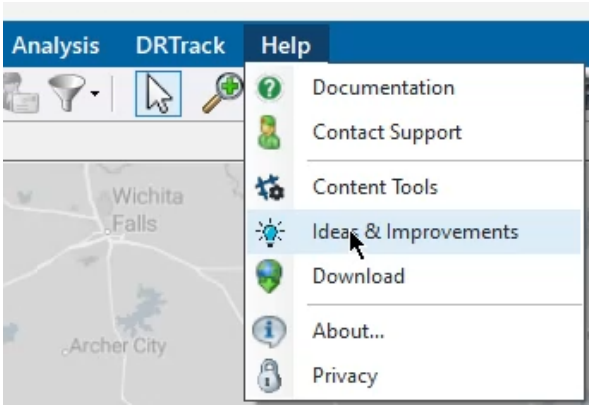


Figure 11–Help Menu

Documentation – Link to DirectRoute support documents.

Contact Support – Contact information for Trimble MAPS Support, **support@trimblemaps.com**.

Content tools – Access the HTML Help File, for guidance and instructions on using DirectRoute.

Ideas & Improvements – Link to a customer feedback portal to share ideas for improvements or identify pain points.

1. Select the Application from the drop down menu at the bottom of the page.
2. Enter suggestions and submit for consideration.

About – Identifies the DirectRoute (software) license #, version # and date, and primary application path in use by the operating system, and easy links to important resources.

- **API Key** (Previously known as Serial number) – Click on the Copy button for copy / paste purposes (See figure 12 below).
- **Lease Expiration** – Indicates when the next authentication is required (generally every 24 hrs).

Licenses – Displays all of the account's active licenses

Tip: During Customer Support calls, users may be asked for the license# and version# installed on the system, to emulate operating environment and/or enable faster, more accurate resolution of issues.

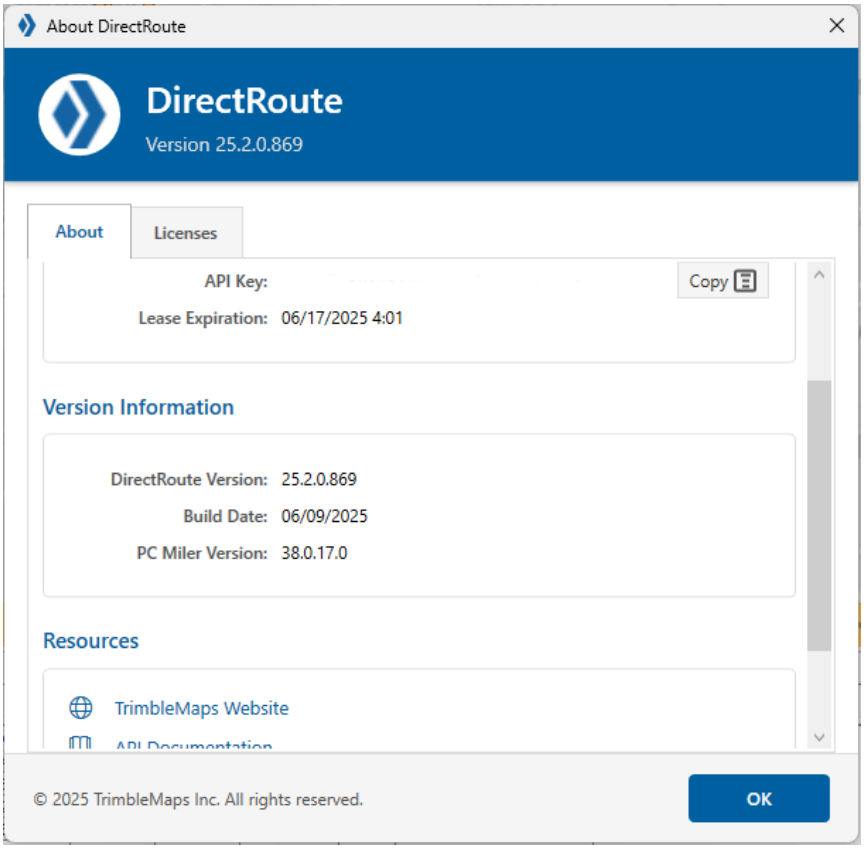


Figure 12–DirectRoute License & Version

1.2. Map Menu and Map Tools

Trimble maps provided by PC*Miler Web Services replace the older PC*Miler maps. These maps are provided via an active internet connection each time a new DirectRoute session is started. DirectRoute calls the web service to locate and retrieve the most current maps.

If an active internet connection is not available, DirectRoute will display a gray screen with no map, as it will not be able to retrieve any map data. However, all routing functions remain available without the maps or an internet connection, if the mileage system selected for routing is set to PC*Miler Direct (**Preferences > Other > Mileage System > PC*Miler Direct**).

DirectRoute does not cache maps, except those used during a working session. If the internet connection is lost during a session, the maps in use at that time will be cached and remain available for use if the session itself is not terminated. If the internet connection is restored before the session ends, the maps will refresh automatically; if the session ends/is restarted before an internet connection is restored, a gray screen will appear in place of the maps, since any cached maps were deleted when the original session ended.

The Map Menu (Alt+M) contains linked actions that can be performed while working in the map window. Additional functions within the map menu allow for customizing the map view and certain map zoom functions.

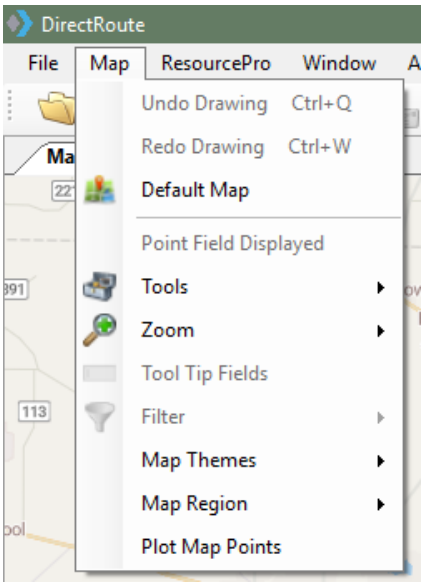


Figure 13–Map Menu

1.2.1. Default Map

Select a custom Default Map (area and zoom level) to be displayed each time a DirectRoute session is started. The installed default view is set to show the entire United States.

Example: If you work mostly with the eastern half of the USA, and most routes only span part of this area, then zoom in to the specific area and set the default map to this area.

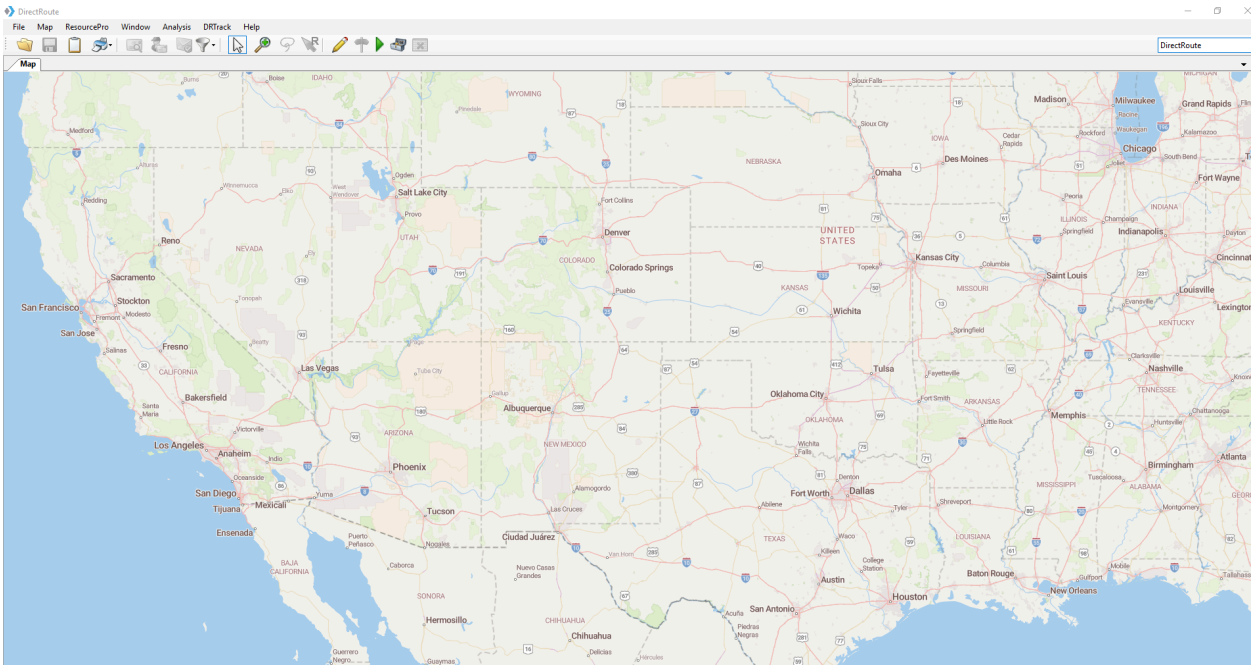


Figure 14–Default Map View

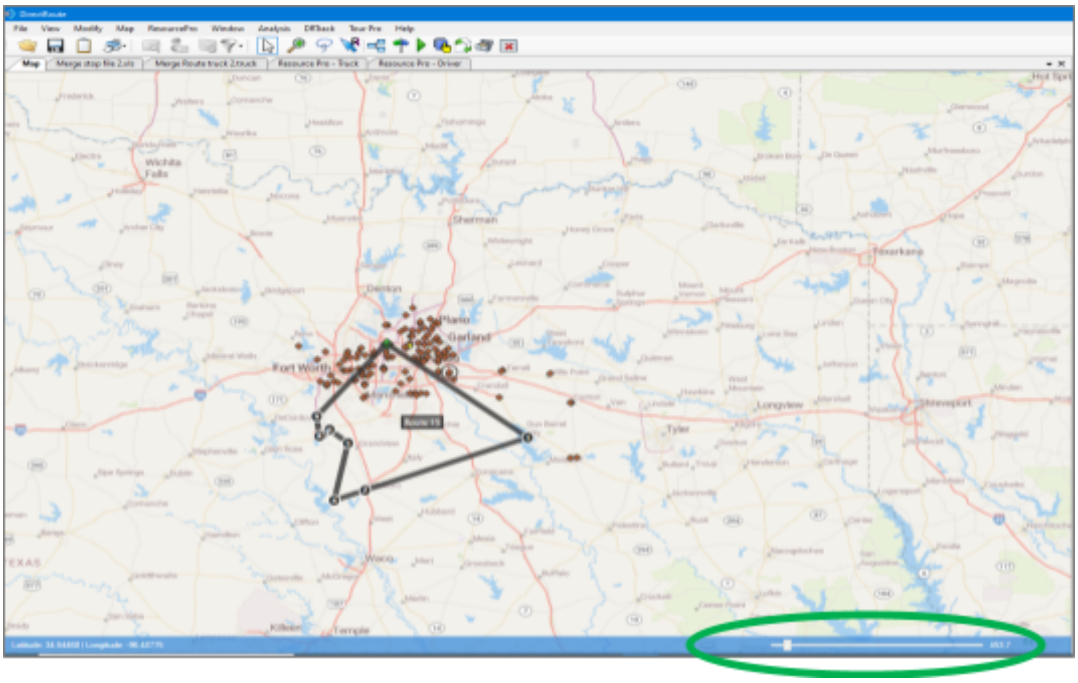


Figure 15–Customized Default View

To reset the default view to a new area or region:

- Zoom to the desired location/zoom level (closer in, farther out).
- Select **Map > Default Map** from the menu bar.

After moving about the map, and/or while zooming in/out of locations, use **Map > Zoom > Restore** (CTR+R) to return the screen to the default map.

You can also use the zoom control bar in the bottom right corner of the map to control your zoom level. Simply grab the bar with your mouse and slide it left or right to zoom in/out.

1.2.2. Point Field Displayed

Set and/or change the information displayed on the map for each stop that is geocoded when the zoom level is 100 miles or closer. Any record column heading from the Stop File can be selected to display on the map. Includes option to choose which records are displayed (i.e. Display all, Display routed stops only, etc.).

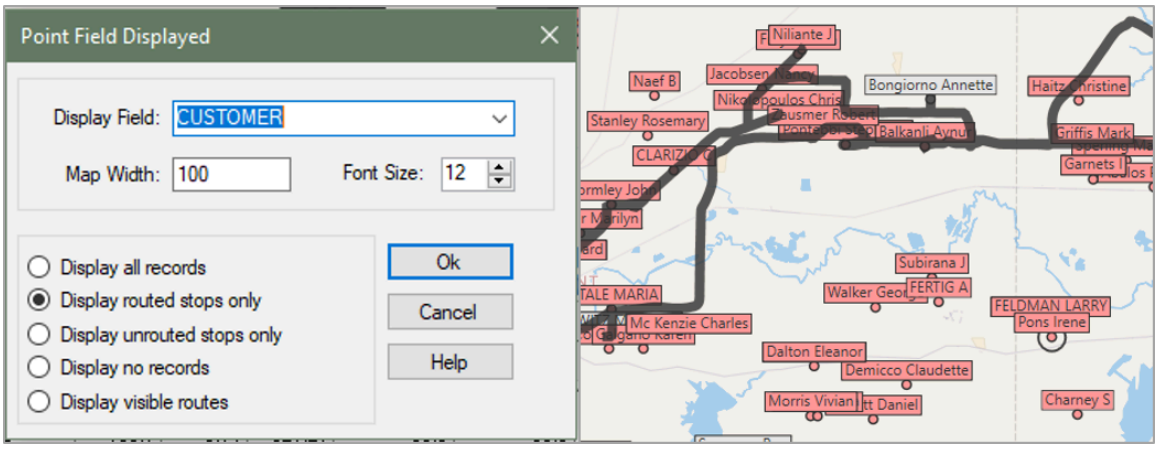


Figure 16–Point Field Displayed

1.2.3. Map Tools

Map Tools include functions for analyzing and displaying data, Drawing Tools to define boundaries or territories, and filter actions to search for specific records and streets.

- **Build to Value**–Color-code locations based upon geographical area and a volume criterion (i.e. build a route based on area and volume). DirectRoute will apply a color and symbol to locations that fall within the criteria chosen. The software searches in concentric circles from the starting point.
- **Draw/Clear Drawings**–Used to enable the Drawing Tools, which are used to place objects, boundaries, and text boxes on the map; use Clear Drawings to erase drawings from the map.
- **Find Streets/Clear Streets**–Use Find Streets to search for or locate a street name on the map; use Clear Streets to remove the search results from view.
- **Unique Value**–Assign a different color symbol to each unique value within a spreadsheet column. Quickly color code records based upon unique criteria (*TerritoryID*, *Driver Name*, etc.)
- **Select–**Select specific records from the Stop File to plot on the map.

Tip: Drawing Tools can also be activated by using the Drawing Tools icon on the toolbar.

1.2.4. Zoom

DirectRoute offers predefined zoom options as well as the ability to customize the zoom function. Select one of the predefined areas listed to set as the default zoom range, or customize with by changing the Settings.

- USA.

- Region.
- City.
- 5 Digit Zip.
- Settings to control quick zoom features.
  - **Zoom Percent**–Control zoom level (Zoom In %, Zoom Out %) applied when the (+plus) and (- minus) keyboard keys are used.
  - **Zoom To**–Set a specific map width to zoom to when you left click the mouse.
  - **Double-click**–Select the type of action that occurs when you double-click the primary mouse button.

Tip: Select Restore (Ctrl+R) to return to the default map view.

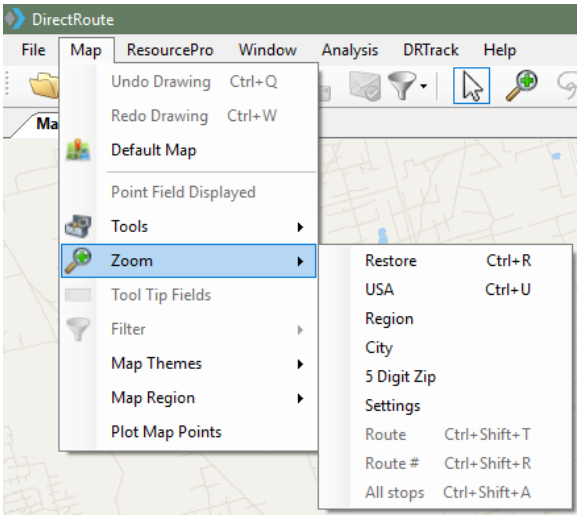


Figure 17–Predefined Zoom Areas

Tip: Availability of cities is limited only by the types of maps installed on your system. If you do not have maps of other countries installed, this will not work for any city listed in those countries.

Tool Tip Fields – Map Tool Tip (Stop Info Box) provides color coded results for quick identification. Detailed info related to each stop can be seen in the Stop Info box that appears on the screen when the mouse cursor is positioned/hovers over the stop. Any data column from the Stop File spreadsheet can be chosen to display on the screen in an info box that appears above the stop point on the map as the mouse cursor rolls over it.

Filter–Use a map filter to isolate specific stops on the map. Filters can be identified using any Stop File field from the spreadsheet.

- Select **Map > Filter > Show Filter**; use the *Saved Queries* drop down menu to select the saved filter.
- Stop Filters applied and saved in the primary Route Book will also be available for use in any additionally opened Route Books (Route Book 2, Route Book 3, etc.).
- Any saved filter can be accessed from any open file, as well as from the map.

Map Themes–Map Themes provide options for the type of map to use/display. Several options are provided, including *Transportation, Datalight, Datadark, Terrain,* and *Satellite*.

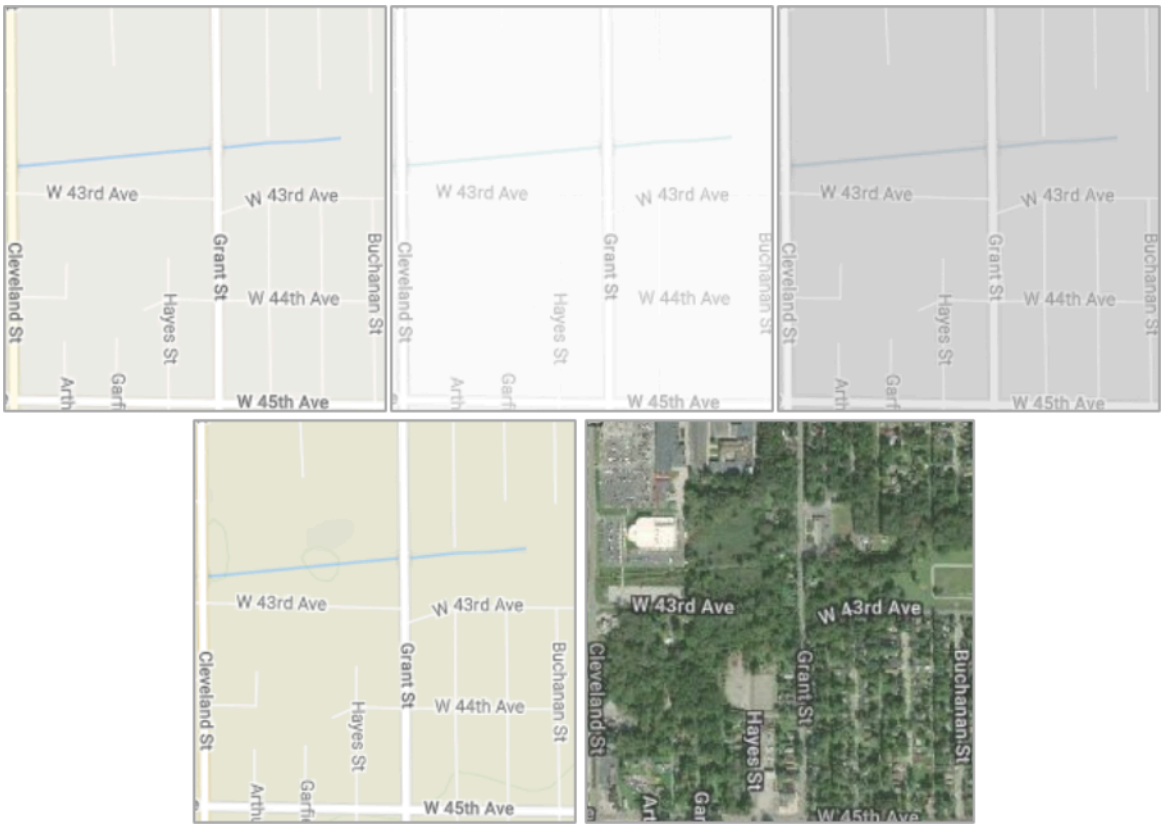


Figure 18–Map Themes

Map Region–Select from 9 specific map regions. When a region is selected/changed from the available drop-down menu, DR will automatically call web services (requires internet connection) to retrieve the most current map data available for the selected region.

The 9 new options available from which to select include:

- PCM_NA = North America
- PCM_EU = Europe
- PCM_OC = Oceanic
- PCM_SA = South America
- PCM_ME = Middle East
- PCM_AS = Australia
- PCM_AF = Africa
- PCM_WW = Worldwide
- PCM_GT = GeoTrack/Energy (oil site roads, mostly dirt roads)

A related setting in **Preferences > Trimble Maps > Data Version**, enables selecting the map data version (PC*Miler 18 and later);

Note: GeoTrack/Energy maps are not regularly available on normal versions of mapping data.

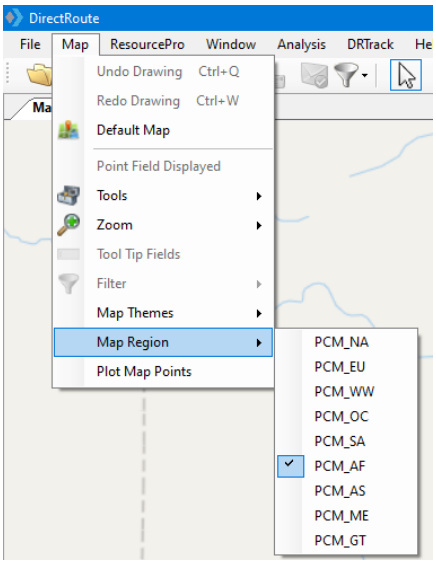


Figure 19–Map Region

Plot Map Points–Opens a control box in which a specific address can be input to geocode, or just enter the Lat/Long coordinates to plot that point on the map. From the main Menu, select **Map > Plot Map Points**.

- **Add New Point**–Add additional lines to the info box to enter additional addresses.
- **Clear All**–Clear all the stops from the map and from the list of stops.
- **Zoom to All Stops**–Zoom the map to all the stops.
- **Close**–Close the Map Point info box.
- **Geocode–**Geocode the address entered in the control.
- **Add Stop**–Add the stop(s) to the map.

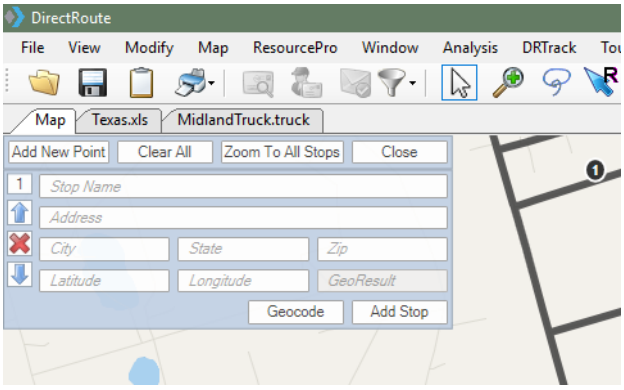


Figure 20–Map Region

1.2.5. Additional Assorted Map Features

Unlike other programs that have rigid zoom settings, DirectRoute's map features assorted tools to enhance or define the map viewing area. In addition to the Map Menu options, the following map tools are also available.

Map Scroll Bar–Located on the bottom of the map, the scroll bar can be used to zoom in or out on the map. Grab the cursor with the mouse and manually move it left (zoom in) or right (zoom out). Or left click and hold on the scroll arrows (on either side of the cursor) to zoom.

Zoom to Selected Spreadsheet Record–Click once on a stop record in the spreadsheet to select it, then right click once and select *Zoom To*; the screen will switch to the map window, zoomed in to the stop.

***Note:** If a stop is not geocoded, this function will zoom to the selected record's Zip Code, instead. If no Zip Code is listed for the record, the Zoom To function will not work.*

Map Zoom Icon  –Located on the DirectRoute Toolbar, use the Zoom icon to zoom in closer on a selected area. Select the icon from the toolbar, then left click and hold the mouse button and drag the mouse outward to encapsulate the desired area. When the mouse button is released, the screen will jump to the area that was selected.

Zoom Using Mouse Double-click–Double-click the mouse over any area to zoom in or out (percentage setting defined in **Map > Zoom > Settings**).

Cursor Panning–To pan the map left, right, up or down, Click and hold on the mouse, moving the cursor to the location you want to view, then release.

Locate Latitude/Longitude–Lat/Long coordinates are always displayed in the bottom left corner of the map. As you move about the map with the cursor, the coordinates change and will display the coordinates at which the cursor is located. To search for coordinates without a specific address, zoom to a level that enables viewing the point of interest, then glide the cursor into position to display the coordinates for that location.

1.3. Map Symbols and Color Chart

Symbols and colors are chosen and saved in the Stop File to represent stops as they are displayed on the map with the Stop File open. There are several ways to use symbols and colors to quickly identify types of stops. Use colors and/or symbols to identify customers who receive deliveries on specific days of the week (red for Mondays, yellow for Tuesdays, etc.) or a circle for convenience store deliveries and a square for grocery store deliveries. With 30+ symbols and 40+ colors to choose from, numerous combinations can be used to customize the map display.

Symbols–Symbols are used to represent each stop (or Truck) displayed on the map when the Stop File (Truck File) is open. The symbols are chosen from within the file during the edit process.

To change or add a symbol type for any record:

- Double click on any cell or column within the Stop File to open the Stop Dialog box.
- On the right side of the Stop Dialog box under Location, locate the Symbol box and use the drop-down arrow to select from the options listed.

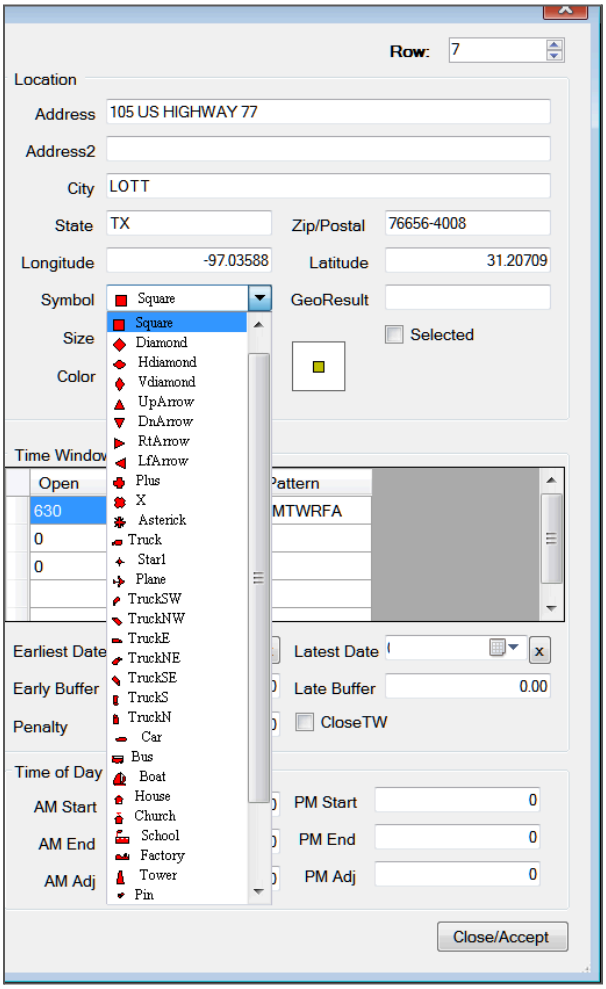


Figure 21–Symbol Chart

1.3.1. Color Chart

The map symbol color chart lists the various colors available to assign to each symbol chosen for display on the map. To choose or change the symbol color:

- Double-click any cell on the line of the record to be edited to open the Stop Dialog box.
- On the right-hand side of the dialog box under Location, locate the Color box and use the drop-down arrow to select from the options listed.

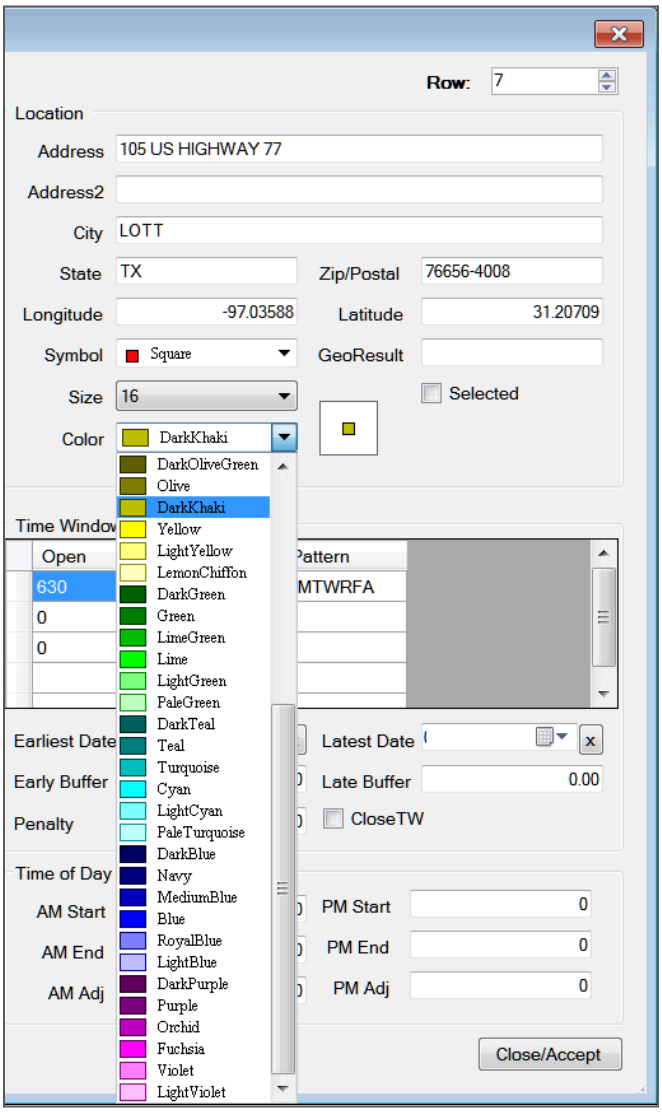


Figure 22–Color Coding Chart

1.3.2. Display/Edit Stop Info on the Map

DirectRoute allows you to display and edit the spreadsheet data for a symbol that you point to on the map. The Stop Info box displays the spreadsheet row and focuses the corresponding symbol on the map.

Detailed info related to each stop can be seen in the Stop Info Box that appears on the screen when the mouse cursor is positioned/hovers over the stop (Ctrl+click).
Info in the center of the box (custom user defined fields) will always be white text on black background.
Header color indicates a stop's status.

- **Yellow** = unloaded stop prior to routing; no footer.
- **Red** = unloaded stop in routing mode; footer reads Unloaded.
- **Blue** = loaded stop in the routing mode; footer message reads Route, Leg, and Sequence #.

When stops (routing mode) are tightly grouped on the map, all stop info is displayed in one box; the footer lists the number of stops loaded vs. total stops displayed.

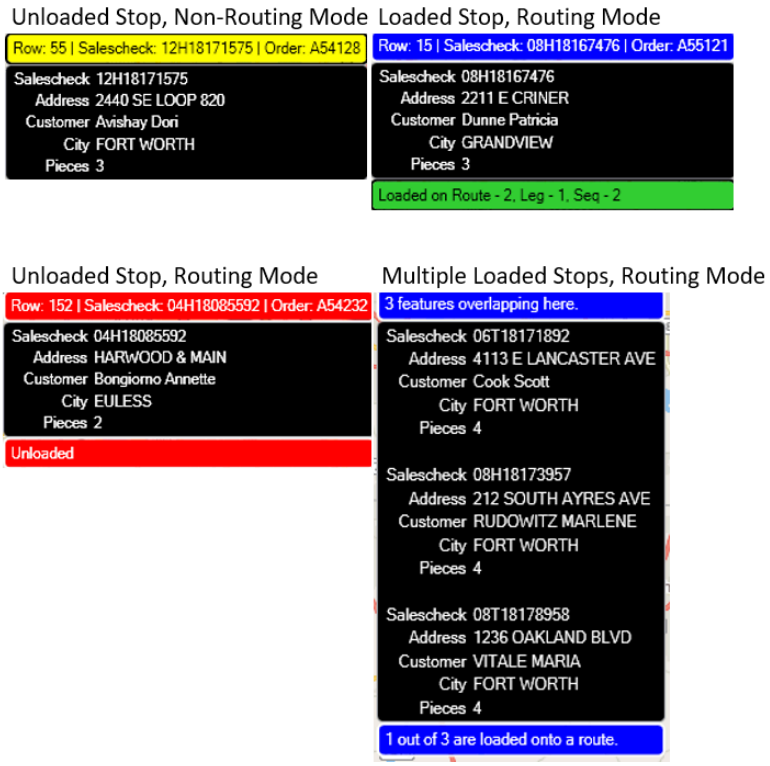


Figure 23–Display Stop Info on the Map

Tip: While we use the Stop File as our example in this section, the same can be applied to the Truck File and/or Route File (Truck Info box, Route Info box), as this option is available for any spreadsheet record.

1.4. Toolbar and Icons

The DirectRoute toolbar contains shortcut icons for performing frequent or critical tasks. Some of the icons will not be active or cannot be used unless specific files are open, certain actions have already been completed, or one of the additional software modules has been installed and is in use.

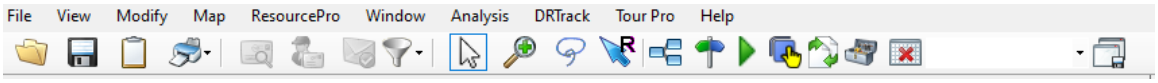


Figure 24–DirectRoute Toolbar

Tip: If a menu or toolbar option is gray/faded rather than colored/clear, it is not accessible at that time. You may need to have specific files open and/or be in the routing mode to access certain functions, or it may be accessible only if licensed for additional Appian software modules (ResourcePro, TerritoryPro, etc.).

File Open–  Use to open a spreadsheet, data, or Route File. The file type, directory location, and file name can be chosen from the dialog box that appears.

File Save–  Use to save an active spreadsheet and/or route.

Clipboard–  Enables copying a portion of the map and drawings you are viewing to the Windows clipboard. Click/drag the mouse in the map window to copy a portion of the Map window to a photo image program (Microsoft Paint, Paintbrush, etc.) or to a Word application.

Print–  Print the map (active), records from your spreadsheets, or routes.

Geocode by Zip–  Locates the Lat/Long of records within the Stop File and Truck File, and updates the records according to their 5-digit Zip Code centroid.

Geocode by Address–  A shortcut to geocoding, which locates the Lat/Long of records within the Stop File and Truck File according to their exact address and ZIP+4.

Address Cleanup–  Provides a quick and easy means for correcting address information and attaching the 4-digit extension (ZIP+4) to the Zip Code. Address Cleanup should be used prior to Geocoding records.

Stop Filter–  Enables selection and separation of unique records from the Stop File to display on the map alone (without all others). The clear function allows the filter to be cleared when done. When filters are used and saved in the Primary (P) Route Book, the filter becomes available for use in each additional Route Book, as well as in any other open file, and from the map. To access a saved filter:

- While viewing the map, select **Map > Filter > Show Filter**; select the saved filter from the drop-down menu.
- While in the Stop File and/or Truck File, select **View > Stop Filter**; select the saved filter from the drop-down menu.

Additionally, Stop Filters can be applied and used in the Preprocess function (route selected records only, versus all records in the entire Stop File). See **Routing Preferences and Options Table** for additional information on how to use a Stop Filter in the Preprocess function.

Normal Cursor–  Used to cancel a DirectRoute action. For instance, to end a drawing tool action such as the circle-drawing tool, select the normal cursor icon on the toolbar.

Tip: Can also be used to cancel the Zoom or Pan Map function.

Map Zoom–  Use to zoom in closer on a selected area. Select the icon from the toolbar, then left click and hold the mouse button and drag the mouse outward to encapsulate the desired area; when the mouse button is released, the screen will jump to the selected area.

Lasso–  Use to encircle (select) a group of stops on the map. Can be used to select and edit stops, load or unload stops, move stops to additional routes, etc. See **Using the Lasso Tool** for additional information.

Manual Routing –  Selects specific stops to route.

Drawing Tools–  Activates the tool bar, enabling the drawing of shapes, selection of records, and placement of text boxes on the map.

Get Directions –  Provides turn by turn directions for each selected route, while in the routing mode.

Generate Route Directions on Route Edit–  Regenerates new directions if routes are edited after directions were initially produced. When Generate Route Direction on Route Edit is selected on the DirectRoute menu, the button will be outlined in black ink. When a stop on any route is edited or modified, as soon as that action occurs, the Generating Route Directions info box should appear in the lower left side of the screen, indicating new directions are being generated.

Priority Routing–  Used to activate Priority Routing, a tool used to build routes manually.

Selective Routing–  Used to reopen the Truck and Stop Grids when working with routes created with Selective Routing.

Sync Map–Sync with other windows. When in the routing mode, use this after editing any data to sync all open windows.

External Utilities–  Provides additional configuration utilities for some users. Options are defined in "utils.config."

Minimize All Info Grids–  Will minimize all info panels that are open in the Route Book and create a tab to each on the left side of the screen.

Rate Orders–  Used with Transportation Modeler to apply rates from a designated Rate File to a Shipment File (this icon is normally only visible when using the TM module).

1.5. Mouse Pointer Symbols

The Mouse Pointer assumes different shapes and sizes to let you know what functions are currently being performed.

Unlike your PC's theme options, the Mouse Pointer symbols in DirectRoute are not interchangeable or customizable. In other words, you cannot select which pointer you would like to use while working in DirectRoute. The types of pointers available while working in DirectRoute are dependent on the module and/or process that are currently activated.

Arrow Pointer–  Pointing to the toolbar, menus, scroll bars, mini-map, spreadsheet, or status bar.

Map Pointer–  Working in the Map window; used to point at symbols displayed on the map. Lat/Long coordinates, in relation to the pointer's location, are displayed in the bottom left corner of the status bar.

Spreadsheet Pointer–  Pointing at spreadsheet cells. Click on any cell or use the keyboard arrow keys to move between cells.

Frame Hand Pointer–  Indicates that the Pan Map icon is active. To cancel, select the normal cursor icon.

Hourglass Pointer–  DirectRoute is performing a task.

Magnifying Glass Pointer–  Use to zoom in on an area. To cancel, select the normal cursor icon.

I-Beam Pointer–  Mouse is positioned over a selected cell, or mouse is over the formula bar (just below the toolbar, while a spreadsheet file is active.)

Two-Headed Arrow Pointer– Resizing drawings, spreadsheet cells, or windows.

Four-Headed Arrow Pointer–  Moving a drawing or text box.

Clipboard Pointer–  The clipboard icon is active.

Manual Routing Pointer–  When the Manual Routing icon is active.

2. Routing Overview

DirectRoute's routing technology provides one of the fastest optimal route planning algorithms now available in routing solutions on the market today. Utilizing DirectRoute to plan and develop routes can improve efficient workflows in every step of the logistical arena, from planning and analysis to dispatch, tracking and reporting.

- Improve capacity usage.
- Reduce empty miles.
- Less manual routing through advanced algorithms.
- Save time planning/routing.
- Build various routing scenarios with the **Scenario Manager** tool.
- Automate load and optimization of routes.
- Download order and customer files.
- Route modifications from the map screen.
- Route modifications from the Route Book.

As each stop is loaded, DirectRoute uses the routing parameters defined in each project to determine truck departure and arrival times, and distances between stops and depot. As the routes are built, key statistical data pertaining to each route is summarized and provided with each routing solution, including:

- The total miles driven on each route and time required to complete.
- Total volume (i.e. weight, cube, etc.) and cost.
- Combined totals (all the above) of all routes and averages.

Once routes have been established, DirectRoute provides several options that allow routes to be immediately viewed, modified, printed, and saved. Additional options include:

- Maintain key route statistics (total drive time, work time, miles driven, capacity utilization, costs, etc.
- Display and print detailed delivery schedules with arrival/departure time.
- Upload routes to an Order Management System, GPS tracking system, or other.
- Download orders from an Order Management System to update or build additional routes.

DirectRoute utilizes a few primary components to develop an effective routing solution.

- Routing data provided in the form of Route Files determines the 'who', 'what', 'when' and 'where' of routing.
- Types of routes, or the type of results expected, in the routing solution (fixed, skeletal, zone based, or dynamic).
- Routing Parameters, or Routing Preferences, help DirectRoute determine the 'how' to route, or routing environment, which may include various constraints (work rules, travel restrictions, delivery windows, available equipment, etc.) that must be followed.

2.1. Routing Data

Before DirectRoute can assist in developing routes, it must know something about your routing environment and the deliveries to be made (routing data). This routing data (fleet and customer delivery information) is provided within Route Files (Stop File, Truck File, Distance File, etc.). The more you understand the way DirectRoute uses the data you provide, the more effective you will be in using DirectRoute.

Some of the data fields in the Stop File relate to data fields in other files, and vice versa. For instance, the Truck File contains a data field that relays vehicle capacity information to DirectRoute for use during the routing process.

Example: Assume that each truck has a capacity of 45,000lbs. For DirectRoute to know when the truck is full, it must also know the delivery quantity (weight) assigned on each Stop Record. Therefore, the Stop File must include a data field that indicates the quantity (weight) of each delivery.

The Quantity Fields in DirectRoute can be used for any Quantity Value (weight, cube, pallets, etc.).

- Users assign the type(s) of Quantity Fields that will be used (**Routing Preferences,** next section).
- More than one (additional) Quantity Fields can be used together (weight, cube, pallets, etc.).
- Remember to use the same Quantity Value in both the Truck and Stop Files.

2.2. Types of Routes

Typically, the most common types of routes used are Fixed, Dynamic, Skeletal, and Zoned. The type of routing you perform will depend largely on your type of operation and may include more than one of these, or a combination of these, to get the optimal results for your business.

- **Fixed Routes**–Fixed Routes are performed when all customers are pre-assigned to a route and the number of routes run each day is pre-determined; the customer base is very static, and order patterns are very predictable with only occasional fluctuations. Fixed Routes are also used when drivers also perform sales functions or a two-step delivery process with merchandisers following the delivery route.
- **Skeletal Routes**–Skeletal Routes are performed when primary customers are pre-assigned routes and typically have very tight delivery times so routes can only be run a certain way, and the number of routes run each day is pre-determined. Skeletal Routes are used to keep primary customer deliveries very consistent and non-primary customers will be routed within their time window, but not always at the same time. This type of routing requires a core set of customers, generally 80%, all with very predictable order patterns.
- **Zone Based Routes**–Zone Based Routes are performed when routing is based on geographically set areas, or zones, and driver assignment is by zone/area. Areas can be defined as small as one truck or larger, with multiple trucks assigned, and user set rules and constraints are set to enforce assignments (hard or soft time windows, length of workday, etc.). This encourages driver familiarity with route and clients, and aides in focusing on managing cost and customer service. While similar to Dynamic Routing, it facilitates a first shift picking before final order cutoff, and can be used for jobsite type deliveries while still keeping drivers in zones Depending on how the zones are created, there is opportunity to reduce the number of routes required.
- **Dynamic Routes**–Dynamic Routes are performed when routes vary from day to day, with ability to adapt to a very dynamically changing customer base with the greatest customer flexibility. Routes are

built based on the lowest overall cost without violating any delivery rules associated with customer requirements. This type of routing can offer improved customer service through flexibility, offers the highest reduction in transportation costs, and works best when used in conjunction with DRTrack for schedule visibility and re-time tracking.

2.3. Routing Preferences

Routing Preferences, or parameters, help DirectRoute determine the 'how' to route, or routing environment, which may include various constraints (work rules, travel restrictions, delivery windows, available equipment, etc.) that must be followed.

Routing Preferences are used to supply the software with necessary information about your routing environment and the type of results expected in the routing solution. These settings help DirectRoute identify specific data fields, volume types, and delivery windows used in the Truck File and Stop File, and direct specific actions, behaviors, or special considerations that the software should perform or consider when building routes.

Tip: Upon initial installation of the DirectRoute software program, the assigned Appian Implementation and Training Consultant will help identify and update all settings that best fit your specific routing environment.

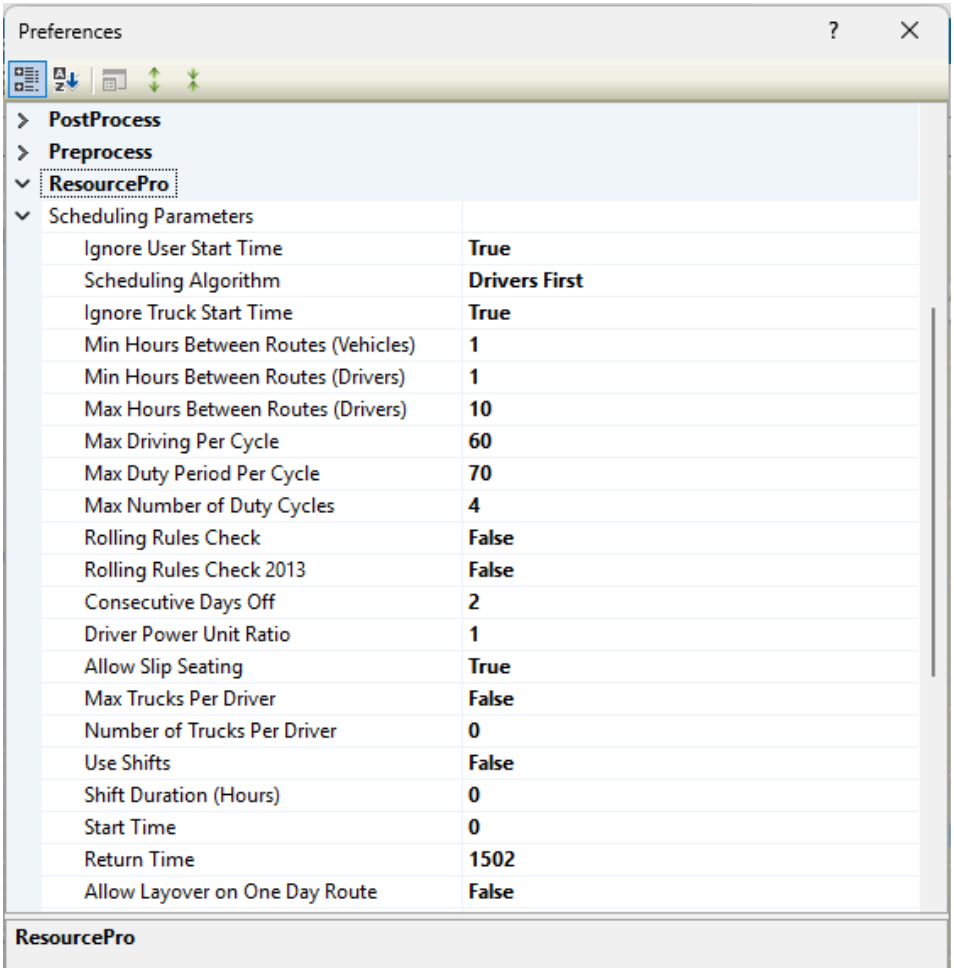
Routing Preference and Option Table identifies and explains each setting and available options more completely. To access and update Routing Preferences in DirectRoute, select **File > Preferences** from the main menu.

While all the preference settings are important to each routing solution, some settings are more critical, and depending on your routing environment, some settings may not be used at all. Preference settings are divided into multiple sections, as briefly identified below.

- **Configuration –** Settings specific to the Truck and Stop Files.
- **Defaults –** Default options applied during the extract process.
- **DRTrack –** For DRTrack users; identify URL path and IDs for uploading routes.
- **ETS Provider** – For users of TMW ETS or TMW Innovative services.
- **Extract –** Extract settings for use with an Order Management/Host system.
- **File Names/Paths –** Identifies location paths of key files used in the routing process.
- **Geocode Options –** Select Secondary Geocode processes and options (ex. Google).
- **Import –** Settings used to import XML Files from integrated TMW Systems software.
- **Mode Selection –** Options used in conjunction with Transportation Modeler software.
- **Other –** Identify mileage system and custom Geocode Files or special Map Files to use.
- **PC*Miler–** Routing and vehicle options for use WITH a PC*Miler license.
- **PC*Miler Direct –** Routing and vehicle options for use WITHOUT a PC*Miler license.
- **PostProcess –** Accelerates after-routing processes when Upload Files is used.
- **Preprocess –** Accelerates routing process with selected automatic actions.
- **ResourcePro -** Licensed ResourcePro users can set their ResourcePro Scheduling Parameters to override the DirectRoute factory default settings.

- *Consecutive Days Off* used in conjunction with *Max Number of Duty Cycles* allows the scheduler to ensure 2 or 3 days of consecutive off-duty time during the *Scheduling Period* (e.g., 2 consecutive days off during a 7 or 8 day cycle).
- *Consecutive Days Off* are measured in hours - 48 hrs or 72 hrs.
- Users can also adjust the settings for a single use, save the adjustments to Preferences, or toggle between your preferences and the Factory Defaults.
- Changes made in DirectRoute are reflected in ResourcePro and vice versa.

- **Routing –** Options used in the automatic load building and optimization processes.
- **Tanker –** Load building options for compartments, used with the Tanker Algorithm.
- **Trimble Maps –** Route and Distance File options for use with PC*Miler Web Services.
- **Update Stop File –** Select Stop Fields to update automatically during the Upload process.
- **Upload –** Upload settings for export to an Order Management/Host system.



Scheduling Parameters dropdown

2.3.1. Routing Preferences and Options Table

FIELD	SAMPLE ENTRY	EXPLANATION
CONFIGURATION		Config settings applied to the Stop and Truck Files
ID1	Acct#	A unique field to identify a stop (customer#, account#, invoice#, etc).
ID2	Order#	Optional secondary field identifying a stop (order#, SKU#, etc.)
ID3	ID3	Optional tertiary field (item#, etc.)
Name	Name	Customer name, Account#, etc.
Address 2	Addr2	Optional secondary address info (bldg#, dock#, door#, etc.)
Contact	Tom Jones	Contact info for delivery
Phone	516-222-1234	Contact info for delivery
Volumes	(Collection) (weight, cases, pallets, units, etc.)	Volume type used in the Stop File
Stop User Fields	(Collection) Ex: Comments, Style, Descript, Order Status, etc.	Optional additional fields to list in the Stop File; use to collect info for reports, display in Route File, etc.
Truck User Fields	(Collection) Ex: Driver, Shift, Maint. Cat, etc.	Optional additional fields to display in the Truck File; use to collect info for reports, display in Route File, etc.
Number of Time Windows	2	Number of delivery time windows (1 thru 10)
DEFAULTS		Applied to all stops
Time Window	(Collection)	Default delivery time window applied to ALL stops
Fixed Time	15	Standard fixed time (minutes) applied to ALL vehicles at each delivery
EQ Code	LG-BH-002 See 9.1. Special Equipment Codes for more information.	Special identifier for vehicles and/or requirements (lift gate, backhauls, priority codes, OD Pairs, etc.)
Unload Rates	(Collection) weight, #cases, #pallets, etc.	Standard number of Volume quantity unloaded per hour

FIELD	SAMPLE ENTRY	EXPLANATION
Zone	100 Note: Increase or decrease applied as percentage to drive time to affect speed of vehicle Ex: 110 = increase drive time by 10%, decreases speed; 90 = reduce drive time by 10%, increases speed	Zone, when applied in the stop file affects a stop 24 hours a day and adjusts truck speed as that truck approaches that specific stop when it crosses over the 8 mile radius threshold. Zone when applied to the truck file affects a truck 24 hours a day and adjusts truck speed as that truck departs or arrives at the depot within the 8 mile radius.
Earliest Date	1 Jan 2016	Earliest date of delivery
Latest Date	3 Jan 2016	Latest date of delivery
Early Buffer	.25 Ex: 1.00 = 1 hour, 0.25 = 15 min, 0.5 = 30 min, 0.75 = 45 min	Time before the actual delivery window allowed for early delivery. The penalty cost applies when the delivery is within the early or late buffer period. The penalty is prorated and a value of 60 is suggested, equaling $1 per minute of buffer time used.
Late Buffer	.25 Ex: 1.00 = 1 hour, 0.25 = 15 min, 0.5 = 30 min, 0.75 = 45 min	Time after the actual delivery window allowed for late delivery. The penalty cost applies when the delivery is within the early or late buffer period. The penalty is prorated and a value of 60 is suggested, equaling $1 per minute of buffer time used.
Penalty Cost	50 (50 = $50)	Fee ($) assessed when delivery Time Window is violated
Max Splits	2 Note: When Apply Defaults is set to TRUE, then Max Splits value is applied to each stop	Maximum # of times any stop (volume) can be split
DRTRACK		Use with DRTrack license
DRTrack URL	http://companyname.routetracking.com/Login.aspx	URL to DRTrack site; used for uploading data/files
Company Name	Johnson Tile	Used for importing and exporting
DRTrack Username		Username for DRTrack. We recommend setting a Username and Password to help ensure only authorized users pass data to and from DRTrack.
DRTrack Password	Enter DRTrack password	Password for DRTrack. We recommend setting a Username and Password to help ensure only authorized users pass data to and from DRTrack.
DRTrack Proxy Server	(If used to filter internet traffic)	Name of the proxy server

FIELD	SAMPLE ENTRY	EXPLANATION
DRTrack Proxy Port		Port for proxy server
DRTrack Proxy Username		Proxy Username
DRTrack Proxy Password		Proxy password
DRTrack Timeout	10	System time-out value, in minutes
Branch	(Collection)	Branch names, if used
Default Branch		Default branch name
Profiles	(Collection)	Truck profiles, if used for different routing days
Route Upload Version	5	Upload version#
Master Profiles		Master Profile names. More than one can be recorded and used
Shift	(Collection) (Shift name, From time, To time, Truck Profile)	Enter Time Shifts when routing occurs (if used)
Account Master Upload Version	1	Upload version#, if more than one is used
Use LoadID From Stop File	TRUE (FALSE)	Default is FALSE
Compression Method	None (Zip)	File compression method
Manage Master Profile Routes		Set the start and end dates for each Master Profile
ETSPROVIDER		Interface settings for additional TMW software modules
TMW ETS	Truckmate	Select product family for interface
TMW INNOVATIVE LOGIN	Username	Login credentials (requires additional license)
	Password	Enter Password
	SCAC code	Enter SCAC code
	Service Version	Version 1
EXTRACT		Use with OMS to extract data for Route Files
Account Master File	Master.xls	Master File name
Append New Accounts to Account Master	TRUE (FALSE)	Set to TRUE, will append (add to) the Master File with new account data found in the Extract File.

FIELD	SAMPLE ENTRY	EXPLANATION
Extract Option	CreateStopFile	Creates a Stop File from the Master File with all account information, or Update Account Master File
Get Address from Account Master	TRUE (FALSE)	Gets address information from the Master File
Overwrite Address in Account Master	TRUE (FALSE)	Overwrites address in the Master File with address from Extract File
Primary Identifier	ID1	ID1 from Configuration setting
Secondary Identifier	None	ID2, if used
Tertiary Identifier	None	ID3, if used
Update Blank Account Master Fields	TRUE (FALSE)	If TRUE, will update blank fields (existing customers only) in the Master File with data from the Extract File.
Use Defaults for New Accounts	TRUE (FALSE)	If TRUE, will populate the default field settings (Time Windows, Unload Rates, etc.) to any new accounts in the Master File.
Zero Coordinates if Address doesn't match	TRUE (FALSE)	If TRUE, will clear the Lat/Long from the Stop File if the address in both the Master File and Extract File does not match
Populate LoadID in Truck File	TRUE (FALSE) Note: Applies when an Extract is performed with a new Route Build, and LoadID columns are populated	If TRUE, copies LoadID from Extract File to Truck File when routes are initialized
LoadID Column Name		Column that contains LoadID in Extract File
Interface		Interface
FILE NAMES AND PATHS		Identifies location of files used in the routing process
User Data Directory	C:\Program Files\Appian\DirectRoute\Data	Location of the User or project DirectRoute Data Folder
9-Digit Zip Directory	C:\Program Files\Appian\DirectRoute\ ZIP9 Data Note: Should be in the DirectRoute folder that was created during the installation process	Name and location of the ZIP9 Data File

FIELD	SAMPLE ENTRY	EXPLANATION
Account Master File	C:\Program Files\Appian\DirectRoute\Data\ Acct Master File.xls	Location and name of the Account Master File
Base Map Directory	C:\Program Files\Appian\DirectRoute\ Base Maps Note: Should be in the DirectRoute Data Folder that was created during the installation process	Location of the Map File
Cross Dock File Path	C:\Program Files\Appian\Direct Route\Data\Cross Dock.xls	Location and name of Cross Dock File
Custom Geocode File Path	C:\Program Files\Appian\Direct Route\Data\Geo File.xls	The path to the Custom Geocode File
Drawing File Name	C:\Program Files\Appian\Direct Route\Data\ Drawing File.drw	The path of the Drawing File
Geoset	C:\Program Files\Appian\Direct Route\BASEMAPS\USA\USA.GST	The location of the .gst File
OBC Folder Path		OBC upload output folder path
Product Family File Path (*.xls)	C:\Program Files\Appian\DirectRoute\PFFP File.xls Note: File should contain populated ProductFamilyName column {mapped with TankSpEq column in Truck File} and populated ProductName column	Select Product Family File for Tanker Algorithm
Relay File Path	C:\Program Files\Appian\DirectRoute\Data\ Relay File	Enter the path name to the Relay Truck File
Upload File Name	Upload File	Enter the name of the Upload File
Upload File Path	C:\Program Files\Appian\DirectRoute\Data\ Upload File	Enter the path to the Upload File

FIELD	SAMPLE ENTRY	EXPLANATION
Upload Format File (*urp)		URP File name and location; input here will remove prompt during every upload session
Z1 Path	C:\Program Files\Appian\ DirectRoute\Address Cleanup\Z1.DAT Note: Should be in DirectRoute\Address Cleanup folder	Name and location of the Z1 File
Z8 Path	C:\Program Files\Appian\ DirectRoute\Address Cleanup\Z8.DAT Note: Should be in DirectRoute\Address Cleanup folder	Name and location of the Z8 File
GEOCODE OPTIONS		Used to find and validate location coordinates
Secondary Geocoder	None, Google Note: Limited to 2,500 requests per 24hr period, and 10 requests per second.	Use Google to validate geocode results, or to obtain Canada or Australia geocode results.
Fallback to secondary geocoding after	Always, Never, Level 1, Level 2 *Level 1*: Recheck if result = other than Level 1 *Level 2*: Recheck if result = other than Level 1 or 2 *Never*: Never recheck addresses *Always*: Always recheck addresses	Default is Always
GOOGLE SETTINGS		Required when Google is Secondary Geocoder
Google API Key	800900700601 (Alphanumeric key issued when User initiates a Google Maps account)	Google API address
Google Geocode Accuracy Level	Rooftop	Default is Rooftop

FIELD	SAMPLE ENTRY	EXPLANATION
	Rooftop–(High Accuracy) Precise down to street address precision *RangeInterpolated*–(Same Street) Reflects an approximation (usually on a road) interpolated between two precise points (such as intersections); *Geometric Center*–(Same Region) Result is the geometric center of a result such as a polyline (ex. a street) or polygon (region); *Approximate*–(Approximate) Indicates the result is approximate	
IMPORT		Use with Integrated TMW Systems to Import files
Enable Order Selection	TRUE (FALSE)	Set to TRUE if downloading orders for next dispatch date + additional days
Overwrite Quantity Fields	TRUE (FALSE)	Set to TRUE if not passing required fields
Overwrite User Fields	TRUE (FALSE)	Set to TRUE if not passing User Fields
Ignore Trucks passed in XML	TRUE (FALSE)	If FALSE, will prompt the user to pick a Truck File
Enable Preprocess	TRUE (FALSE)	If set to TRUE, enables Preprocess to run when importing from an XML File
MODE SELECTION		For use with Transportation Modeler, identifies mode types available, files, costs, and limitations
MaxRoutesPerShipment	3	Max# of routes per shipment; default is 3
Rate File	C:\Program Files\Appian\DirectRoute\Data\Rate Table	Path to Rate File
Distance File	C:\Program Files\Appian\DirectRoute\Data\Data.dist	Distance File name/path; usually the DirectRoute Data Folder
Default TLRate	1.5	Default truckload rate
Weight (Primary Qty Field)	Weight	Primary Qty field used

FIELD	SAMPLE ENTRY	EXPLANATION
Volume (Secondary Qty Field)	Cube	Volume field used
Count (Trichiary Qty Field)	Skids	Quantity count (WT, Cube, Skids, etc.)
SECURITY CREDENTIALS	USER CREDENTIALS	Use with Rateware, UPS
FEDEXCONFIGURATION	SERVICE TYPE	Use with FEDEX service
Wait cost in LTL shipments	150.5	Wait cost in LTL shipments
Border crossing delay	90	Border crossing delay (minutes)
Max Allowed Work Hours in DOT Cycle	0	Max allowed work time on multi-day route (ex. 60 hrs)
Team Rate Premium	890	Team Rate Premium
Aggregate LTLCost on Consolidate	TRUE (FALSE)	Default is FALSE
LTL Consolidation Type	Costs or Miles	Consolidation type for LTL Shipments
LTL COST ADJUSTMENT		Cost adjustments (LTL Rate)
Quantity Name	Weight	Volume type
Quantity Over	0	Threshold after which LTL Cost Adjustment is added
Additional Cost	0	Additional cost when threshold is reached
OTHER		Mileage System and Map Files
Mileage System	Trimble Maps (PC*Miler Direct, PC*Miler, MapInfo, MapInfoCV, or None)	Name of the Mileage System to be used with the software. Trimble Maps is the default and recommended setting. PC*MilerDirect is used for offline DirectRoute. PC*Miler can be used if the user is licensed for the PCM Connect utility and wants to connect DirectRoute to a stand-alone version of DirectRoute.
Date Format		MM/dd/yyyy, dd/MM/yyyy, MMMM dd yyyy, or yyyy-MM-dd
Time Format		Time format used when passed to a primary business system using an Upload File and also used to specify whether times displayed in the Route Book include seconds.

FIELD	SAMPLE ENTRY	EXPLANATION
Custom Geocode File Path	C:\Program Files\Appian\DirectRoute\Data\Geo File.xls	Location of custom Geocode File, if used
Geocode File Col Identifier	CTY	Name of the column in custom Geocode File, to be examined when applying custom geocoding
Distance Options	Miles	Miles or Kilometers, used in map bar display
Coordinate Option	Decimal Degrees	Decimal degrees, (Degree:Minute:Seconds) used in the map status bar
Convert STP/xls File	TRUE (FALSE)	If TRUE, converts .STP and older .xls Files to newer format
FIND STREET LAYER		Designation of street level GST layer used in Find Street utility
Major Road	Main Street	Name of the road
Street 1	Usa_dap	
Street 2		
Country	En-AU (English) Australia	For use with Google Maps API Geocoding, select applicable country code, if needed
Company Name	Parks	Name
Auto-save solution after generating directions	TRUE (FALSE)	If TRUE, saves solution after direction generation
Auto-save Route Book layout files	TRUE (FALSE)	If TRUE, saves Route Book layout (F8 key) when the Route Book is closed
Clone Stop and Truck File while saving Route File with Save As option	TRUE (FALSE)	If TRUE, saves and copies Stop, Truck, and Route File, when using Save As option to close files; copied files are assigned a new (same) name as the Route File, while original Route Files are left intact and unchanged
Store distance entries in:	File Note: If entries are stored in Database {Db}, use the following app settings in the exe.config File: Use Database for DistanceEntries =TRUE ConnectionStringName = Name of the string configured	Select File or Database (PC*Miler route type)

FIELD	SAMPLE ENTRY	EXPLANATION
	{Connection Strings section} CompanyID =1 {default})	
ORDER CRITERIA		Enables Order Selection Filter for DRTrack download, and Selective Routing
Query by User Field	Status	Enter each Stop User Field (*Configuration* > *Stop User Fields*) to enable use as a filter for stop selection
Query by Values	Ready / Not Ready Ex: Stop User Field chosen is Status. Values found in the Stop File (in this field) are Ready and Not Ready	Enter all Values separately, as found in the selected Stop User Field
Stop Selection Color	Choose color for stop selection	Blue
Auto open Stop Grid on Routing	TRUE (FALSE)	When set to TRUE, automatically opens the Stop Grip in a routing solution
Replenishment Point Name	Default TruckID	Choose refuel point name to be displayed
PC*Miler	Use with a PC*Miler license	PC*Miler routing options
Route across borders	TRUE (FALSE)	If TRUE, will allow routes to cross international borders; default is FALSE
Route Type	Practical	Practical, Shortest or Fastest
Route Type option	Default	Default, National, Avoid Toll, or Fifty Three
Hazardous option	None	None, General, Explosive, Inhalant, Radioactive, Corrosive, or Flammable
Thread	Single	For use when generating Distance File, for multi-core CPU, set threading to Multiple; otherwise set to Single
PC*Miler DIRECT	Use without a PC*Miler license	PC*Miler routing options
Route across borders	TRUE (FALSE)	If TRUE, will allow routes to cross international borders; default is FALSE
Route Type	Practical	Practical, Shortest or Fastest
Avoid Toll	TRUE (FALSE)	If TRUE, will avoid toll roads when possible during the routing process; default is FALSE
Hazardous option	None	None, General, Explosive, Inhalant, Radioactive, Corrosive, or Flammable
Thread Count	0	16 max threads

FIELD	SAMPLE ENTRY	EXPLANATION
Distance Generation Mode	Pair	Option to change how PC*Miler generates distance entries. Default is Pair
Vehicle Profiles	(Collection) Profile allows edit of vehicle height, length, width, weight limit, and # of axles (no less than 2). Ex: Light Assets, Full Sized Van, Double Trailers, Straight Truck, 48' Semi Trailer, 53' Semi Trailer, or Custom (PC*Miler Direct/Vehicle Profiles). Add additional if necessary, under 'Custom'.	Add/Enter all vehicle profiles used in the Truck File. Only those profiles entered will be available for selection as a Default Vehicle Profile.
Default Vehicle Profile	Only vehicles entered in Vehicle Profiles will be available for selection.	Select the default vehicle profile to use during the route building process.
Map Region	Default Map Region	N/A (not used at this time)
Use Historical Traffic Data	Requires additional Appian licensing. When not used, the system will default to DirectRoute Drive Time (or other installed Mileage System).	If TRUE, generates drive times and distances based on historic traffic time estimates and collected real-time traffic data, instead of DirectRoute's calculated drive time/distances.
POSTPROCESS		Use to accelerate additional processes after routing
Upload	TRUE (FALSE)	If TRUE, will pass orders/routes in an upload file (UPL) after routing
Upload DRTrack	TRUE (FALSE)	Set to TRUE, will pass orders/routes to DRTrack after routing
Print Route Book	TRUE (FALSE)	If TRUE, will automatically print the Route Book upon completion of the routing process
PREPROCESS		Use to accelerate the routing process
GENERATE DISTANCE FILE		
Generate Distance File	TRUE (FALSE)	If TRUE, generates Distance File during Preprocess
Minimum Distance Between Stops	0	Minimum distance the software will compute distance between stops

FIELD	SAMPLE ENTRY	EXPLANATION
Maximum Distance Between Stops	800	Maximum distance the software will compute distance between stops
Speed Adjustment	100	Adjust drive time by this factor (100 is baseline, 120 increases drive time by 20%, etc.)
Maximum Speed	60	Maximum allowable speed by vehicle on a route
Generate 2-way entries for stops less than (x miles)	5	Add a return distance, between two stops within X miles of each other
Generate 2-way distance entries	TRUE (FALSE)	If TRUE, will calculate distances To and From stops
Stem Distances Only	TRUE (FALSE)	If TRUE, will calculate distance between the Terminal and City where the stop is located (not the stop itself)
In Cone	TRUE (FALSE) (Angle and radius created from the terminal, defaulting to 57º)	If TRUE, only stops within the Angle or Radius may be added to the selected route
Overwriting Existing Entries	TRUE (FALSE)	If TRUE, will overwrite any Distance File in the DirectRoute Data Folder
Within Territories	TRUE (FALSE)	Set to TRUE, will generate a Distance File with distances listed between EqCodes of the same type
Route Across National Border	TRUE (FALSE)	If TRUE, will allow route to cross Canada and/or Mexico borders; if FALSE, will prevent routes from crossing borders (may result in more miles)
Commercial Restrictions	TRUE (FALSE)	Option for Prophesy to use only roads permitted for commercial vehicles
Avoid Toll Roads	TRUE (FALSE)	If TRUE, keeps trucks from using toll roads
Use DirectRoute Drive Time	TRUE (FALSE)	If TRUE, will generate distances and drive times using DirectRoute calculations (instead of any optionally installed Mileage System or Historic Traffic Data.
Threading	Single Thread	For use when generating Distance File, multi-core CPU = set threading to Multiple, otherwise set to Single
Distance File		Location to save Distance File, generated during pre-process
Use Mileage System Drv Time if it is > DirectRoute Drv Time	TRUE (FALSE)	If TRUE and an optional Mileage System is installed, it will use the optional Mileage System's drive times when generating the Distance File if those drive times are greater than DirectRoute's calculated drive times.
GEOCODING		

FIELD	SAMPLE ENTRY	EXPLANATION
Geocode Stops	TRUE (FALSE)	If TRUE, will Geocode Stop File before routing
Clean Address	TRUE (FALSE)	If TRUE, calls the Address Clean up module to clean the records prior to Geocoding
Skip Geocoded Records	TRUE (FALSE)	If TRUE, will skip any records that have been previously Geocoded
Color Code Stops	TRUE (FALSE)	If TRUE, color codes stops
Update Address, City, and Zip	TRUE (FALSE)	If TRUE, updates corrected Address, City and Zip
APPLY BOUNDARY		
Apply EqCodes to stops	TRUE (FALSE)	If TRUE, applies EqCodes to stops
Drawing File Name		Name of the Drawing File (if used)
Overwrite Existing EqCodes	TRUE (FALSE)	If TRUE, overwrites existing EqCodes
APPLY DEFAULTS		
Apply Defaults	TRUE (FALSE)	If TRUE, enables the Stop Filter selection during the routing process (activates the Stop Filter Pop-up menu).
Overwrite Existing Entries	TRUE (FALSE)	If TRUE, overwrites existing entries in Stop File
FIXED ROUTE		
Run Fixed Routes	TRUE (FALSE)	If TRUE, stops are matched to trucks based on the fields selected to get route assignments
Truck File Matching Field	Trk ID	Select a field from the Truck File
Stop File Primary Matching Field	Trk ID	Select field in the Stop File that corresponds to the field in the Truck File
Stop File Secondary Matching Field	Driver	Select the field in the Stop File that corresponds to the field in the Truck File
Copy Sequence	TRUE (FALSE)	If TRUE, sequence number will be copied from the selected field to the SEQ field
Stop File Sequence Field		Select the field that has the sequence number
Get DOW Sequence Code Based Upon Pattern 1	TRUE (FALSE)	For fuel-specific functions

FIELD	SAMPLE ENTRY	EXPLANATION
Overwrite Route and Sequence	TRUE (FALSE)	If TRUE, will overwrite existing Route and Sequence, if any, already in the Stop File
Generate Route Directions	TRUE (FALSE)	If TRUE, will generate route directions after routes are built
Enable Stop Filter	TRUE (FALSE) (Applies to selected records only, versus all records in the Stop File)	If TRUE, will enable the Stop Filter during the route building process
ROUTING		Options for Automatic Load Building and Optimization
ALGORITHM SETTINGS		
Add Turn Time	TRUE (FALSE)	If TRUE, and redispatch is selected in the Truck File, DirectRoute will add the specified turn time to the route work time
Algorithm	REGULAR–Normal two-way routes DOW–Day of Week, for fuel specific functions INBOUND–Route from stops back to depot, similar to a one-way inverted route FARTHESTIN–Two-way routes from the farthest stop back to the depot OUTBOUND–Farthest stop is the last stop, with return to the depot	Select the desired Algorithm type to use
Box Expand	5 Note: When optimizing, the software constructs the smallest box that will contain all the stops on a route; parameters affect the optimization process.	Number of miles (size of box around stops); default is 1
Check In Cone	TRUE (FALSE) (Not recommended for One-way routing)	If TRUE, forces the software to select and group stops in a geographical direction
Cone Angle	55	Angle of cone, with depot at center; default is 55
Depot Radius	10	Radius around depot (miles) to which stops can be loaded on same route out of cone; default is 10

FIELD	SAMPLE ENTRY	EXPLANATION
Lambda	2 (Determines how much weight to give cone expansion vs. distance from depot)	Used by Algorithm when deciding which stop to load on a route next. Lambda should never be less than 0.1 or greater than 2.0.
Lambda Increments	0.2 Ex: If Lambda is = .6, increments = .2, and iterations = 4, the software will construct routes four times (iterations) in increments of .2, starting at .6 (ex .8, 1, 1.2)	Incremental value added to LAMBDA for each iteration, when constructing routes
Lambda Iterations	1 (To find which value yields the lowest cost solution, run several routes using 1 thru 4)	The number of times the software will build routes using the Lambda Values
Max Redispatch Iterations	4 (How the software determines the feasibility of redispatching a route)	If set to 4, the software creates up to 4 load passes to determine the best scenario
Max Wait Time	2	Maximum amount of time in hours a vehicle will be allowed to stay at a stop
Max Dist Between Stops	250	Prevents stops that are more than X miles apart from loading on the same route
Optimize Stops After Loading	TRUE (FALSE)	If TRUE, moves stops between and within routes to minimize cost
Optimize Trucks After Loading	TRUE (FALSE) **Cost must be lower in the Truck file for these smaller assets in order for optimization to occur	If TRUE, moves loads from bigger to smaller trucks to minimize cost; if using various vehicle sizes in the Truck File, set to TRUE
TW Gap For Buffers	1.75	If early and late buffer overlaps the gap between time windows, then they are adjusted to have the specified amount as gap between time windows. Value is entered as decimal miles.
Load Backhaul Stop on Empty Truck	TRUE (FALSE)	If TRUE, loads backhaul stop on empty trucks
Max Out of Route Miles For Backhaul	1000	Set max miles to consider for backhaul route; if stop is farther than this, it will not be considered for backhaul

FIELD	SAMPLE ENTRY	EXPLANATION
Max Percent Out of Route Miles for Backhaul	50	Set max percentage of route miles, instead of distance, to consider for backhaul
Max Closest Stops	200	After the Route seeding process by the algorithm, it will analyze this number of the closest stops to determine which are candidates to load next onto the same route
Refuel Algorithm	Original, Distance Based *Original* - Default option, works using the existing algorithm; will insert refuel points based on location, in reference to stop locations. *Distance Based* - Will keep track of route capacity and adds refuel points only when capacity is available and still 30% of work time left in a route. This option will also remove refuel points when not needed.	Select which algorithm to apply during routing.
Add Pre-Post time on redispatch	TRUE	When TRUE, adds Pre/Post time on all legs. When FALSE, adds only for the starting and ending terminal on the whole route.
Use Terminal as Refuel Point	TRUE	When TRUE, considers the terminal as a refuel point. If false, DR does not consider the terminal as a refuel point.
Max Routes Per ID1	-1	Max number of routes for which 1 unique ID1 could be placed onto separate routes if multiple orders exist for the same ID1. Less than 1 will disable this feature.
GENERAL		
Enable Start Time Column	TRUE (FALSE) Using this function removes the necessity to edit individual routes each time a change is needed to the actual route start time.	When TRUE and Start Time column is added to the Stop File, DirectRoute will use the Start Time listed in the Stop File as a route dispatch time when initializing routes.
Allowing Logging	TRUE (FALSE)	If TRUE, sets tracking mechanism for algorithm xml
Display Build Route File tab option	TRUE (FALSE) (For DRTrack users)	Show/Hide Build Route File tab on New Route dialogue box
Distance Cache	1000000000	Max size of cache used for Distance File records

FIELD	SAMPLE ENTRY	EXPLANATION
Drop Count	0	The Drop Count setting affects the DropCost calculation for each route by reducing the number of stops on each route that will incur a DropCost. Route DropCost = (number of stops on route – Drop Count setting) x DropCost from the TruckFile. Note that if the number of stops on a route is less than the Drop Count setting, then that route's DropCost will be negative.
Field used in Distance File	Lat/Lon	Field other than city (account, zip, etc) to use in Distance File
Lock on Init and Load		Options are: No lock, Prevent removal, Prevent addition, Prevent removal and addition, Prevent any changes. Read more about Init and Load and Lock Routes.
Make Empty Trucks Unavailable after loading	TRUE (FALSE)	If FALSE, allows empty trucks to be loaded during the Modify Load process
Maximum Stops Per Route	50	Set max number of stops per route. Affects Load algorithm, not Optimization
Mileage Adjustment	100	Percentage to adjust calculated mileage; default is baseline 100. Ignored if distance entries are used.
Minimum Time Between stops (minutes)	0	Minimum time between stops; overrides drive time calculations if calculated time is less than this number
Apply Min Time Between Stops after directions	TRUE (FALSE)	If TRUE, will automatically apply the Min Time Between Stops (Min)
Route Colors	(Collection)	Define colors for each route
Route Line Width		Use the dropdown menu to select the width of the line displayed on the map (planned routes on the map)
Color Empty Miles		Use the dropdown menu to select a color to apply on the map to portions of a route performed by an empty vehicle
Scale Factor	0	Used to increase miles on a route using percentages. Ex: 1.1 = 110%
Secondary Route Identifier	TrkID	Secondary Identifier for a Route
Speed	50 (50 =50 mph)	Sets an average speed on a route
Speed Adjustment (Drive Time)	95	% to increase or decrease Drive Time; default is 100. 10% increase = 110 10% decrease = 90

FIELD	SAMPLE ENTRY	EXPLANATION
	Increase drive time = decreases vehicle speed Decrease drive time = increases vehicle speed *Ex:* 95 = Decreases drive time 5% by increasing vehicle speed by 5%	
Use DirectRoute Drive Time	TRUE (FALSE)	If TRUE, used DirectRoute drive times instead of other installed Mileage System
Rush Hour Distance	0 *Required if the user is attempting to use AM/PM Speed Adjustments as found in either the Truck File or Stop File. Sets a radius around either the Truck originating point or the stop location*	Distance in which adjusted speed is implemented to account for traffic delays; used in conjunction with Speed Adjustment and AM/PM Adj fields in the Stop File and/or Truck File.
Dispatch Date Offset	1	Number of days out from the date routes are run, to begin dispatch/delivery
CONSOLIDATE SETTINGS	Note: Consolidation settings are validated each time the settings are updated	If TRUE, consolidates stops with same settings (Time Windows, EqCodes, Lat/Long, Size Restrictions, etc.)
Consolidate by ID1	TRUE (FALSE)	If TRUE, consolidates stops by value in ID1
Consolidate by ID2	TRUE (FALSE) Note: An error message will be generated if Consolidate by ID2 is set to TRUE and both Consolidate by ID1 & Consolidate by Address is set to FALSE; this setting must be corrected to save/close the dialog box, or select Cancel to exit without saving the erroneous setting changes)	If TRUE, consolidates stops by value in ID2; set to FALSE if Consolidate by ID1 and Consolidate by Address are both set to FALSE
Consolidate by Address	TRUE (FALSE)	If TRUE, consolidate stops by address
Consolidate (Sum) Fixed Times	TRUE (FALSE)	If TRUE, will consolidate all stops to the Fixed Time of first stop in the group
Consolidate on Initialize	TRUE (FALSE)	If TRUE, consolidates routes upon initialization

FIELD	SAMPLE ENTRY	EXPLANATION
STATIC SPLITTING		Restrictions for Split Loads
Split Size	0	Sets minimum size of load to split. Generally, set with split stops 'TRUE' and split orders 'FALSE'
Split Stops	TRUE (FALSE)	If TRUE, allows splitting a stop between routes
Split Orders	TRUE (FALSE)	If TRUE, allows splitting an order (by line item) between stops
Split Line Items	TRUE (FALSE)	If TRUE, allows splitting of line items between stops
Quantity Field To Split	None	Qty field used to calculate splits (i.e. weight, cube, Pallets, etc.)
DYNAMIC SPLITTING		Restrictions for Routes with low stop counts
Split Stops While Loading	TRUE (FALSE)	If TRUE, will split the load to ensure delivery of the product; if FALSE, the remaining parameters for Dynamic Splitting are inconsequential
Split Orders	TRUE (FALSE)	If TRUE, software will consider splitting an order by line item, between routes; if FALSE, will only split stops by full orders
Split Line Items	TRUE (FALSE)	If TRUE, software will consider splitting stops at the line item level; only valid for stops that have just one order with one Line Item
Evaluate All Splitting Options	TRUE (FALSE)	Evaluates splitting options during optimization process
Max Splits Per Stop	0 (generally, just 1 or 2 times)	Max number of splits per stop
Min Split Size	0	Minimum size (Quantity 1 field) for a split order
Splits-Truck Full	0	Used in conjunction with Min Split Size; determines vehicle capacity percentage used for split loads
GRAPH		Fields from the Truck File, to appear on the Graph Chart in the Route Book
Route Identifier 1	None	Route identifier, from the Stop File
Route Identifier 2	None	Route identifier, from the Stop File
Route Identifier 3	None	Route identifier, from the Stop File
Route Identifier 4	None	Route identifier, from the Stop File
Route Identifier 5	None	Route identifier, from the Stop File
Route Identifier 6	None	Route identifier, from the Stop File

FIELD	SAMPLE ENTRY	EXPLANATION
STOP CAPACITY ADJUSTMENT		Allows lowered vehicle capacity based on the number of stops
Capacity Field	None	Qty field to use for stop capacity adjustment
Stop Adjustment	0	Amount of Qty to reduce capacity
CROSS DOCK/RELAY ROUTES		Use with Relay and Cross Dock Files
Cross Dock Col Identifier		Column heading in Cross Dock File to identify cross dock location
Cross Dock File Path		Location of the Cross Dock File
Relay File Col Identifier		Column heading in the Truck File that identifies a Relay Route
Relay File Path (*.xls*, **.xlsx*)		Location of the Relay Truck File
PASSWORD PROTECTION		Pswd protection for Routing Category
Enable	TRUE (FALSE)	Default is FALSE
Password	TRUE (FALSE)	Add/Edit password
TANKER		Used for load building compartmentalized vehicles
Weight		Choose from Volume fields
Volume		Choose from Volume fields
Count		Choose from Volume fields
Tote File Name	C:\Program Files\Appian\ DirectRoute\Data\ Tote.xls	Name and path of the Tote File, typically found in the DirectRoute Data Folder
Product Ratio File Name	C:\Program Files\Appian\DirectRoute\Data\ Ratio.xls	Name and path of the Ratio File, typically found in the DirectRoute Data Folder
Use Tanker Algorithm for Product Assignment	TRUE (FALSE)	If TRUE, uses tanker algorithm to ensure products loaded on trucks are placed in designated compartments
Max Number of Totes Per Order	10	Max number of totes allowed on each order
Split Orders to Totes	TRUE (FALSE)	If TRUE, allow splitting of orders into totes; if FALSE, attempts to split the order will only be done on tanks

FIELD	SAMPLE ENTRY	EXPLANATION
Split unloaded stops and try loading	FALSE	Split unloaded stops and try loading
Trimble Maps		
Thread Count	8	Sets the number of threads to use during the distance generation process. Max threads = 16. Enter 0 to use all threads possible. This can slow down your computer during processing.
Elevation	30000	Sets the elevation limit for routing. The unit of measure is based on **Other** > **Distance Options**. If the Distance Option is set to Miles, elevation is entered as feet. If set to KM, elevation is entered as meters.
Route Across National Border	TRUE (FALSE)	If TRUE, will allow route to cross Canada and/or Mexico borders; if FALSE, will prevent routes from crossing borders (may result in more miles)
Route Type	Practical, Shortest, or Fastest	Sets the routing type when getting directions
Avoid Toll	Avoid	Options are Avoid, Discourage, or Use
Hazardous Option	None	Indicates the directions hazard options
Vehicle Profiles	(Collection)	Vehicle profiles (sizes)
Distance Generation Mode	Pair (Matrix)	Option to change how Trimble MAPS generates distance entries
Default Vehicle Profile	Select one from Vehicle Profiles (above)	Default vehicle profile to use
Use Historical Traffic Data	FALSE (TRUE)	Use historical traffic data
Highway Only	FALSE (TRUE)	Indicated if the route should travel on highways and/or primary roads only.
Data Version	Current	The PC*Miler version to use for route calculations. Options are **PCM18** to **Current**
UPDATE STOP FILE		
Primary Identifier	ID1	Primary Stop File field
Secondary Identifier	ID2	Secondary Stop File field
Third Identifier	ID3	Tertiary Stop File field
Convert TW	TRUE (FALSE)	Convert old style time windows to new
UPLOAD		Options for uploading Route Files to OBCs, terminal systems, etc.

FIELD	SAMPLE ENTRY	EXPLANATION
Upload Consolidated	TRUE (FALSE)	If TRUE, consolidated orders will be uploaded in consolidated format
Upload Displayed Only	TRUE (FALSE)	If TRUE, will write (to the Upload File) only those routes that are locked and displayed on the map; if FALSE, will write ALL routes
Upload Header Record	TRUE (FALSE)	If TRUE, adds Header row at top of the Upload File
Upload Starting Terminal	TRUE (FALSE)	If TRUE, adds the beginning terminal/distribution center to the Upload File
Upload Ending Terminal	TRUE (FALSE)	If TRUE, adds the ending terminal/distribution center to the Upload File
Upload Date Format	MM/DD/YYYY	Choose date format
Upload Format File (*urp)		Enter path and file name of URP File; If used, system will not prompt for the info during upload process
Upload File Name	RTUPLOAD	Default name for the file it can be changed later in the Data Folder)
Upload File Path	(Blank)	Location of the Upload File, if different than current Data Folder
Upload File Type	*.UPL	Enter type (Upload File) used
Upload XML Version	5	XML version number used
Upload Sequence	TRUE (FALSE)	Set to TRUE, will list the route and sequence number
OBC Upload	None	Allows choice of onboard computer system (XATA, PeopleNet, etc.) to Upload File format for OBC File
OBC Folder Path		Path to OBC File
OBC Upload File Name	RTUPLOAD	OBC Upload File name
Upload Time Format	Hmm, HHmm, H:mm, HH:mm	Choose time format
V8 Compatible	TRUE (FALSE)	Backwards compatibility with DR Version 8
Display Arrival and Departure Time on Consolidated Order	TRUE (FALSE)	If TRUE, will display the same arrival and depart time for consolidated orders on the same stop
Display Miles on Consolidated Order	TRUE (FALSE)	If TRUE, will display the same miles for consolidated orders on the same stop
Display Unload Time on Consolidated Order	TRUE (FALSE)	If TRUE, will display the same unload time for consolidated orders on same stop

FIELD	SAMPLE ENTRY	EXPLANATION
Ignore Terminal in XML Upload	TRUE (FALSE)	If TRUE, ignores the terminal stop in the Upload File when appropriate
Display Drive and Work Time on Consolidate	FALSE (TRUE)	Displays drive and work time on consolidated orders
Abbreviate Rt Violation	FALSE (TRUE)	Abbreviate Route Violation
Display Total Distance on Consolidated Orders	FALSE (TRUE)	Display route total distance on consolidated orders

Figure 25–Routing Preferences and Options Table

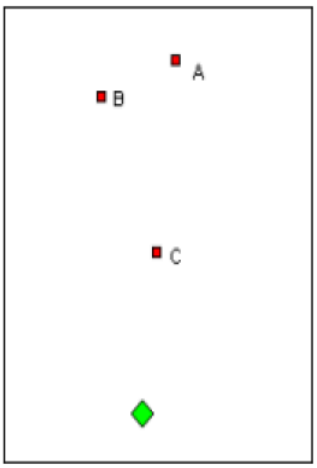
2.3.2. Lambda and Lambda Values

Lambda is a variable factor that controls how much weight to give a potential stop based on how far it is away from a depot (cone expansion vs. distance from the depot) during the loading phase of the algorithm. The routing algorithm uses lambda when it is deciding on which stop to load on a route next.

Lambda Values are typically between 0.5 and 2.0, depending on the density of the stops in your delivery area (a high density of stops usually calls for a lower Lambda value).

- The default setting for Lambda is 2, which provides the best results over a large range of problem types.
- Setting Lambda Value to less than 2 will cause DirectRoute to build tighter routes (less expanded cones) but might result in an overall increase in miles.
- For high stop count routes (very dense), you might consider lowering the Lambda Value, but it would be best to run a few scenarios with various Lambda Values (1 thru 1.5) to determine the right number.

Example: Assume that the depot is represented by the green diamond and the three red dots are stops to be routed. Each stop has a volume equal to one half of a vehicle's capacity. Given this set of facts, it will require two vehicles to service the three stops. The algorithm will typically load the farthest stop from the depot first, in this case that is Stop A. The next decision is to determine which of the remaining stops to load. This decision is based on a combination of how much mileage the prospective stop will add to a route and how far the stop is from the depot times the Lambda factor.



If Lambda were set to zero (thereby giving no weight to how far the stop is from the depot) the stop selected to be loaded next would be Stop C, since it adds almost no additional mileage to a route already going to Stop A. This vehicle would now be full and require the second route to service Stop B. This solution would have higher miles than the solution that paired Stops A and B, and a second route containing Stop C.

The following (High Lambda, Low Lambda) depict two sets of routes running the same stops with a low and high Lambda Values.

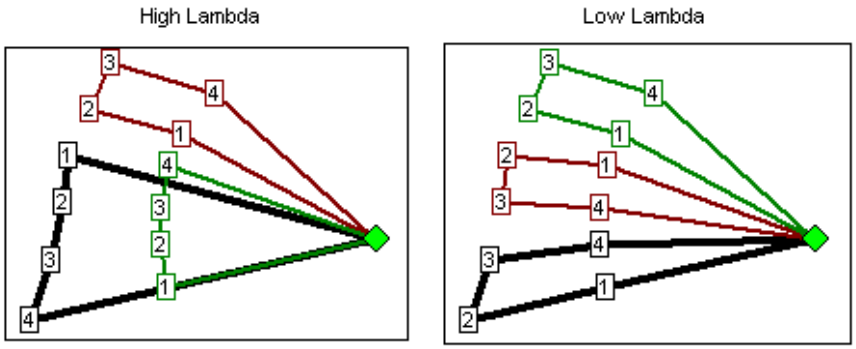


Figure 26–Lambda

You can see that the routes ran with the higher Lambda attempt to pick up the stops farther away from the depot. Although the high Lambda routes may not look as good as the low Lambda routes they are actually 3% fewer miles because they are only running two trucks to the outer perimeter stops (the red and black routes) versus three routes in the low Lambda scenario.

To edit Lambda settings, select from the DirectRoute menu: **File > Preferences > Other**. There are three values to set; experiment with the value of Lambda and decide which setting is best for your routing environment:

- **Lambda Setting**–Specifies the initial value of Lambda, or the value of Lambda to use for running Iteration 1; default value is 2 and ranges can vary from .1 up thru 2.0.
- **Lambda Iterations**–Number of times to calculate routes using increments.
- **Lambda Increments**–Value used to increase Lambda while calculating routes; allows several attempts at a routing solution that yields the lowest cost.

Example: Suppose Lambda is set to 0.6 and Lambda Increments and Iterations were set to 0.2 and 4, respectively. DirectRoute will construct routes four times using Lambda Values of 0.6, 0.8, 1.0, and 1.2 and display the solution that yielded the lowest cost.

Tip: Once the best settings are discovered, the Iterations should be set back to 1. Keeping a higher iteration setting will cause the route to be re-run several times, even once the best Lambda Settings have been found.

Note: When using Redispatch, it is recommended that Lambda Iteration 1 be used.

Caution: When using Lambda with Iterations, and cancel is pressed, the user must cancel each of the iterations as they begin. When one is canceled, the next route begins to load.

2.3.3. Box Expand and Box Expand Values

Box Expand is a parameter that defines which routes are considered for between route optimization. During optimization, DirectRoute constructs the smallest box that will contain all the stops on a route. When DirectRoute considers making moves, the logic does not consider moving stops between routes, unless their boxes intersect. This includes routes that are in the same vicinity.

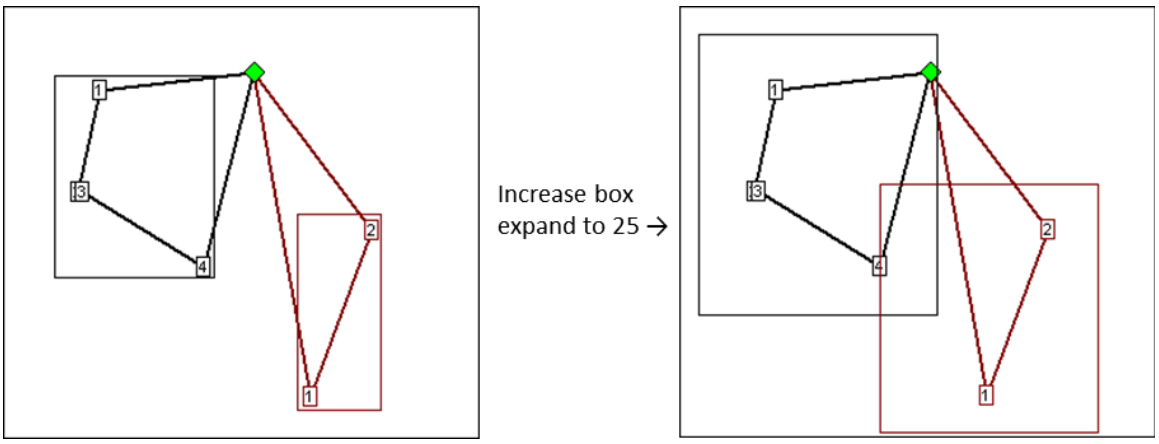


Figure 27–Box Expand

The Box Expand Value is represented in miles and determines how far to expand the box. Larger numbers increase the time it takes for the system to complete optimization; adjusting the parameter allows the system to consider more routes during optimization.

The miles would be saved if Stop 4 (black route) was placed on the red route. By increasing the parameter to 25, the boxes now intersect, thus allowing more moves to be evaluated. The increased value of Box Expand will also increase the amount of time the system takes to complete the optimization process.

To edit Box Expand Values, select from the DirectRoute menu: **File > Preferences > Other**. Enter the number of miles to identify how far to expand the box.

3. Route Files

The Route Files are used primarily to provide fleet (truck) and customer delivery information to DirectRoute. While directions for creating these files are covered in the following section (**Creating Route Files**), below is a brief description of each of the files used.

- **Account Master File**–The Account Master File, sometimes referred to as the Customer File, is an Excel spreadsheet, an .xls file, with all of the standard information about each of your customers, and their locations. This is not an order file, but more of a contact list, with static information that does not change with each order received by the customer (i.e. point of contact, address, account number, etc.). Each location you deliver to for each customer will have a record entry in the spreadsheet, containing all permanent information about the customer location; address, Lat/Long coordinates, time windows, time at the stops, and any other pertinent info necessary for delivery to each location. The data for this file is usually exported from an Order Management/Host system (OMS) or ERP/WMS and copied into or formatted as .xls spreadsheet. Each location will have a record entry in the spreadsheet, containing all permanent information about the customer location; address, Lat/Long coordinates, time windows, time at the stops, and any other pertinent info necessary for delivery to each location.
- **Stop File** (Daily Order File)–The Daily Order File, also referred to as the Stop File, is used in the extract process, along with the Customer Master File, to correctly set up orders to Route. It too is normally extracted from an Order Management/Host system (OMS) and copied into or formatted as .xls spreadsheet. It may come out of the OMS as a tab delimited text file, with an .xls extension, or a comma delimited file with a .csv file extension. It is not as detailed as the Customer Master File and will only contain the current order info (order quantities, loading instructions, etc.) for each customer that will be used to create routes for the day.
- **Truck File**–The Truck File is a spreadsheet that will contain all the information about each truck in your fleet, and the drivers to whom routes will be assigned. In the Truck File, every row represents one Truck/Driver combination to which stops can be assigned/loaded. The key fields in the Truck File are truck availability, driver availability, vehicle start time and end times, truck capacity, variable cost factors, and work rules for both the trucks and drivers.
- **Distance File** – The Distance File contains a record of distances and drive times between the pickup point and every city in the Stop File, and/or pick up every Stop, to include from, to, and in between. When a Distance File is used in the routing process, DirectRoute will calculate the distances and times between each stop location based on the entries in this file. If a Distance File is not used, DirectRoute will calculate distance and drive times using an adjusted straight-line distance between locations.

3.1. Creating Route Files

The Route File used to provide DirectRoute specifics concerning your customers and fleets are necessary to create any route. Creating and/or updating these files are key steps that must be done to initiate a routing project. The following sections will guide you through the process of creating and or updating the regular used files.

3.2. The Stop File

The Stop File is a spreadsheet that contains the customers' order and delivery information. Key fields represented in the Stop File include order volume, required delivery dates, customer address, and any special delivery rules; all critical information the software needs to build the routes. Optional data fields can also be used to manage

customer schedules and territories, provide statistical data, or generate reports, and/or generate additional Route Files.

If you already have a Stop File, or a spreadsheet with the required customer information, it can be used in the project so long as it contains the required data columns. If you do not already have a Stop File, a new one can be created that will automatically populate the necessary header columns and allow manual input of all customer data.

3.2.1. Create a New Stop File

- From the menu, select **File > Open > Stop, or File > New > Stop**.
- Enter each customer's data directly into each column of the spreadsheet, or double-click each row to launch the Stop Dialog box and enter all the data for each customer in one window.
- **Stop File Fields and Descriptions Table** identifies and explains each field that is required or recommended to be used in each Stop File.

The Stop Dialog box is divided into five sections:

- **General**–Add the General information, including customer name, account number (unique identifiers), address, type of symbol, route and stop numbers (if predetermined), fixed time, EqCodes, and truck size restriction.
- **Location**–Add Location information, symbol, and color code options. Long/Lat will be added later when the completed Stop File is geocoded.
- **Stop Volume**–Add Volumes and unload rate information.
- **Time Windows**–Add Time Windows (Open/Close) and pattern (days of the week); use military time (1:30PM = 1330), and enter Earliest/Latest Date, Buffers and Penalty (if used).
- **User Fields**–Add the field data for each field listed (*Preferences* > *Configuration*).

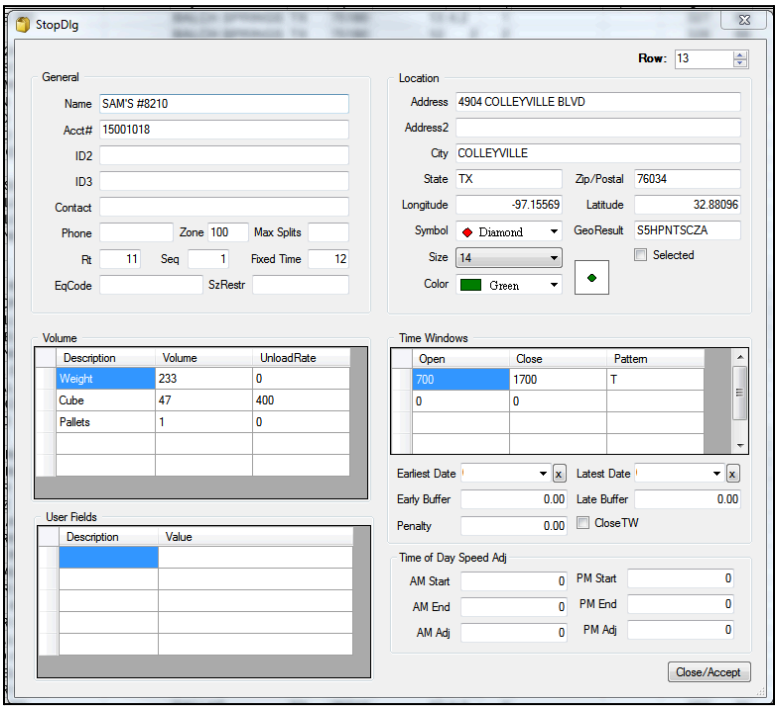


Figure 28–Stop File Dialog Box

When all entries have been completed for the customer, select *Close* > *Accept* to close the box.
Repeat as necessary for each individual record.

After all customer data has been entered into the Stop File:

- Geocode the Stop File to locate the correct Lat/Long for each record in the file (see **Geocoding Records**).
- Save the updated Stop File in the DirectRoute Data Folder.
- Select *File* > *Save*, or *File* > *Save As*, and assign a name to the file.

3.2.2. Stop File Fields and Descriptions Table

FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
Name	The name of the customer/business (stop) to be delivered.	Required
Contact	The name of a contact at the customer stop.	Optional
Phone	Telephone number at the stop location. If the Area code is included, the software can use it for geocoding.	Optional
ID1	Primary unique identifier for the customer/stop. Ex:: Account#, Customer#. User defined field in **Preferences > Configuration**. Used in the extract files process.	Required
ID2	Secondary unique identifier for the customer/stop. Ex: Store#, Stop#. User defined field *in* **Preferences > Configuration**.	Optional
ID3	Tertiary unique identifier for the customer/stop. Ex: Line Item, SKU. User defined field in **Preferences > Configuration**.	Optional
Address	Street Address for the customer. Address, along with City, State, and Zip are used to geocode by address. Also used by the Address Cleanup module.	Required
Address2	Additional Address information. Ex: Suite#, building#, Door#, Dock#.	Optional
City	Name of the city (Address). This field can be used in conjunction with the Distance File to determine distances and drive time. Required to geocode.	Required
State	2 letter state (Address) abbreviation. Ex: WA, CA, OR. Required to geocode.	Required
Zip	The zip code (Address). Can be used for geocoding in conjunction with the Address field or geocoding by 5-Digit or 9-Digit Zip.	Required
Country	This column will be used during the geocoding process for passing country code to the mileage system. If no value is present in this	USA/US

FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
	column, the country code set in the Preferences will be used. The value in this column should be ISO2 or ISO3 country code format (i.e. valid country code for the US is USA/US and for Canada CAN/CA). If no address information is given in the file, DR will try to geocode the stops using City, State, and Zip.	
FixedTime	Used to identify a required/mandatory time that all vehicles must spend at the stop (in addition to unload rate/time). Can be used to account for completing required paperwork. Input Fixed Time in minutes; may be different for each customer. Ex: An entry of 15 would require the truck to be at the stop for 15 minutes, in addition to the time calculated by the UnldRate. Total time at the stop will be calculated by the software by adding these two fields together. Note: DR will route without this field, but in practice a Fixed Time is needed as the truck will have to stop for a certain amount of time to unload (and perform other activities). Typical range is 15-45 (15 to 45 minutes). Enter the number in minutes.	Optional
SzRestriction	Size Restriction will inform the software that this is the maximum size or volume for a vehicle that may deliver to this stop. Using a size restriction will limit which truck size the customer load can be put on. Ex: A quantity of 20,000 would mean that the customer load could only be put on trucks with a capacity of 20,000 or less in (Volume 1 field) the Truck File.	Optional
EqCode	An alphanumeric code used to designate special equipment or requirements for a stop (lift gate, refrigerated compartment, etc.). Corresponding Truck File field: SpEq. When EqCodes are used, the software will only load the stops on a vehicle with a matching SpEq code listed in the Truck File. Ex: If a stop requires a lift gate in order to complete delivery, place a code in the EqCode field that designates lift gate, and use the same code in the SpEq field on a truck in the Truck File. It is possible to combine the use of several EqCodes, but each code should be separated by a dash (i.e. AJ-BH-HH-XX). If there are no special requirements for a stop, this field should be blank. Note: There are also special EqCodes that can be utilized for Back Hauls, prioritizing and sequencing of stops, territory codes and exclusion codes. See 9.1. Special Equipment Codes for more information.	Optional
Volume1	The volume to be delivered; user defined field (**Preferences > Configuration**) can be any quantity type (weight, cube, pallets, cases, etc.). If no volume type is entered, the software will load all stops on one route, or until it reaches the maximum stops per route,	Optional

FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
	as defined by the user. The capacity fields in the Truck File correspond to the volume fields in the Stop File. Ex: Volume used is Cases; the column heading appears in the Stop File as Cases. Capacity 1 column heading in the Truck File will also appear as Cases. Note: Must be at least one (1) volume field in use, even if left blank.	
UnldRate (UnldVol1)	Identifies the amount of time it takes to unload Volume1 value, in hrs. Ex: Volume1 = Cases. The field appears in the Stop File as UnldCases. It takes one hour to unload 1000 cases. A truck that carries 2000 cases would have an unload rate of 2 (2000 ÷ 1000/per hr.). The UnldRate time is added to the Fixed Time. The UnldRate heading will mirror the volume name defined in the **Preferences > Configuration > Volumes** (Weight = UnldWeight, Cases = UnldCases).	Optional
CloseTW	TRUE or FALSE. When this option is set to TRUE, a vehicle must reach the stop, deliver, and complete unloading before the Time Window closes (including Fixed Time plus UnldRate).	Optional
Zone	A percentage adjustment to the drive time. Default is 100 = normal rate of speed. An increase to the drive time will lower speed; a decrease to drive time will increase speed. Zone is hard coded to **eight miles**. Ex (Truck File): A value of 110 would increase the drive time by 10%, hence lowering the speed by 10%. A value of 90 would decrease drive time by 10%, increasing speed by 10%. The speed adjustment is only applied to the first 8 miles of each route segment (from Depot). Ex (Stop File): If all customers in downtown Chicago have a value of 110 in this field, the software will increase drive time for the stops in downtown Chicago (within the 8 mile radius), while lowering the speed of travel.	Optional
AMStart	Set AM start time to adjust speed to account for heavier/lighter traffic.	Optional
AMEnd	Set AM end time to adjust speed to account for heavier/lighter traffic.	Optional
AMAdj	Set drive time adjustment for AMStart and AMEnd. AM/PM Adjust works the same as Zone; increase the number (110) to increase the drive time by 10 percent. In turn the speed is decreased by 10 percent. The radius is based on the rush hour distance setting (**Preferences > Routing > General**). Zone is hard coded to eight miles, while AM/PM Adjust is based on the rush hour distance.	Optional
PMStart	Set PMStart to adjust speed to account for heavier or lighter traffic.	Optional
PMEnd	Set PMEnd to adjust speed to account for heavier or lighter traffic.	Optional

FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
PMAdj	Set drive time adjustment for PMStart and PMEnd. See AMAdj for additional info.	Optional
Open1	Earliest time of day delivery can be made. Using Military Time format (0000-2400), delivery time windows are entered in the Open1 and Close1 fields. Multiple Time Windows can be established (up to ten), and are defined as Open1, Close1, Pattern1; Open2, Close2, Pattern2; Open3, Close3, Pattern3 and so forth. Ex: Customer can receive deliveries between 800 and 1130 on Sunday, Wednesday, and Saturday. This corresponds to Open1=0800, Close1=1130, and Pattern1=SWA.	Required
Close1	The latest time a delivery can be made. See Open1 for additional info.	Required
Pattern1	Days of the week when the customer will accept deliveries. Time Windows are entered as patterns of opening and closing times and days of the week (SMTWRFA) that define when the customer will accept deliveries. Ex: Customer can receive deliveries between 800 and 1130 on Sunday, Wednesday, and Saturday. This corresponds to Open1=0800, Close1=1130, and Pattern1=SWA. S=Sunday, M=Monday, T=Tuesday, W=Wednesday, R=Thursday, F=Friday, A=Saturday	Required
EarliestDate	(MM/DD/YY). May be used to ensure that a stop is not serviced before a specific date, or when used in combination with LatestDate, used to ensure the stop is delivered within a specific time window, and can allow multi-day/week deliveries based on date versus time window only. If this column is blank, it will be ignored.	Optional
LatestDate	(MM/DD/YY) Used in conjunction with EarliestDate; determines the latest the date that the stop may be serviced. May be the same date as EarliestDate if there is only one day in which the stop may be serviced. If this column is blank it will be ignored.	Optional
EarlyBuffer	Additional time before Open1 that a stop could be serviced - in Hours (Ex. .25, .5, 1, 2 or 3). Used to activate the Soft TimeWindows function within the software, allowing stops to be delivered outside of the hard time window. A penalty cost should also be used in conjunction as it guards against the use of the buffers when they are not needed. Note: EarlyBuffers and LateBuffers are used to expand time windows.	Optional
LateBuffer	Additional time after Close1 that a stop could be serviced - in Hours (Ex. .25, .5, 1, 2 or 3). Used to activate the Soft TimeWindows function within the software, allowing stops to be delivered outside of the hard time window. A penalty cost should also be used in conjunction as it guards against the uses of the buffers when they	Optional

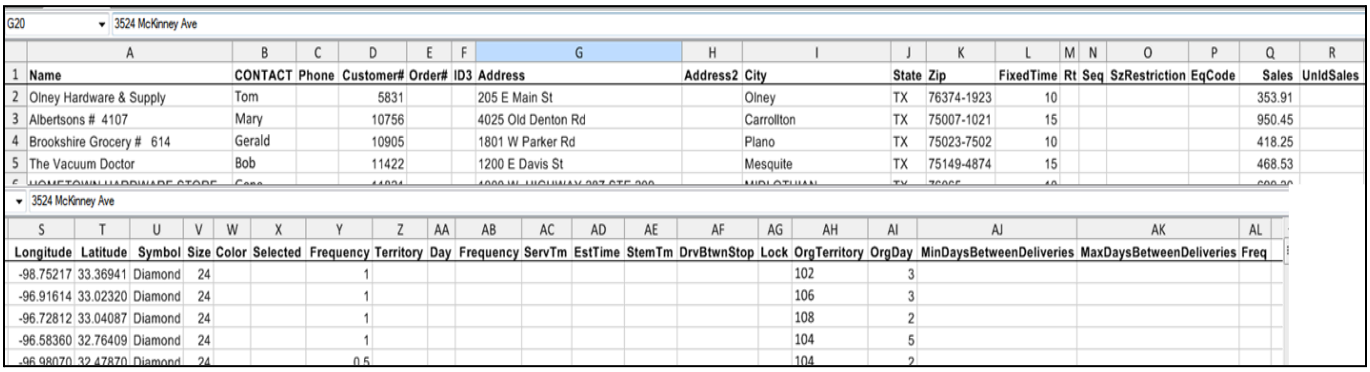
FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
	are not needed. Note: EarlyBuffers and LateBuffers are used to expand time windows.	
PenaltyCost	The penalty cost applies only when the delivery is within the early or late buffer period. The penalty is prorated, and a value of 60 is suggested, equal to $1 per minute of buffer time used. Without a PenaltyCost the algorithm interprets the Buffer Time as “free” and will use it to a larger degree.	Optional
MaxSplits	Max number of splits allowed for a stop	Optional
Rt	Route Number will be populated when the Stop File is routed. If there is already a value in this field, the software will automatically place the stop on this route. When Redispatching is used, the entry may have two numbers, separated by a comma. Ex: 3, 1. The first will denote the Route Number, and the second will be the Leg Number on that route.	System Defined
Rt2	(Transportation Modeler) The Destination Route#, populated by the system during the shipment building phase. (Rt1 will be OriginRt #)	System defined
Seq	Sequence Number (the order of loading on the route) will be populated by the software during the routing process and refers to the order of the stop on the route. If there’s already a value in the field, the system will automatically place the stop in this sequence Ex: If the value is 3, indicates the customer is the third stop on the route.	System Defined
Seq2	(Transportation Modeler) The Destination Sequence#, populated by the system during the shipment building phase. (Seq1 will be the OriginSeq#)	System defined
Priority	Used with the Priority Routing Tool, to apply and adjust appropriate weight factors for prioritization during the routing process.	Any number (1–9999)
Longitude	Coordinates that define where a customer is located. Geocoding is the process used to identify these coordinates.	System Defined
Latitude	See Longitude.	System Defined
AddressErr	Error description, if any, assigned by system when the record is geocoded.	System Defined
GeoResult	Results received when the geocode process concludes. Indicates level of accuracy match to the address. Level 1–An exact match was made; for street addresses, trust is 95% or greater AND if address is outside the range listed in the database, the top match is within 100 address units of input address; OR for any other match level if there are multiple matches they are all within 1 air mile of each other.	System Defined

FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
	Ex: “100 Main Street” was input; the best match in the database is “150-250 Main Street”. Level 2–Inexact match but unique result (i.e. there is only one match).For street addresses, trust is 85% or greater AND if address is outside the range listed in the database, the top match is within 500 address units of input address*; OR for any other match level if there are multiple matches they are all within .5 air miles of each other. Ex: “100 Main Street” was input and the best match in the database is “450-550 Main Street”. Level 0–Inexact match and there is more than one match in the database. For street addresses, trust is 50% or greater. Z1–Zip5 match. Z3–ZIP9 match. No results found–Record not geocoded (results column blank).	
Symbol	Specifies the symbol used to represent a stop when displayed on the map (Stop File is open). Symbols are chosen in the Stop File; double click on the Symbol column/field to open the dialog box; make the selection, then select the OK button.	Optional
Size	Specifies size of the symbol to be displayed on the map. Default is 8.	Optional
Color	Specifies the color of the chosen symbol. Select colors in the same fashion/at the same time as selecting symbols.	Optional
Selected	TRUE or FALSE; displays the selected stop on the map. This field is not used when routing but is useful for performing various operations when editing and modifying routes.	Optional
MinDaysBetween Deliveries	(SchedulePro) The minimum number of days required between deliveries to the customer. Ex: A customer requires deliveries to occur no more than once a week, then input 7 (number of days) in MinDaysBetweenDeliveries column.	Optional
MaxDaysBetween Deliveries	(SchedulePro) The max number of days allowed between deliveries. Ex: If a customer requires deliveries at least every two weeks, then input 14 (14 days) in the column.	Optional
Frequency	(SchedulePro/TerritoryPro) Number of times a stop is serviced during a schedule period. Enter the number conversion for the frequency pattern. 1 = 1x a week 2 = 2x a week 3 = 3x a week 5 = 5x a week (daily, weekdays) 0.5 = 1x every 2 weeks (14 day cycle) 0.33 = 1x every 3 weeks (21 day cycle) 0.25 = 1x every 4 weeks (28 day cycle) 0.125 = 1x every 8 weeks (56 day cycle)	Optional

FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
StemTm	(SchedulePro/TerritoryPro) Calculated value of Distance File fields (FromDrvTm/ToDist/NumStops), Frequency, and Cycle; populated automatically when Territories are built.	System Defined
Day	(TerritoryPro) Day of the week that a Territory is to be serviced; if a Territory covers five days, then five days may be created to reflect each day's routes.	Required
OrgDay	(TerritoryPro) Original Day. The previous Day the territory was assigned for service, if included in the data file; leave blank if not used.	Optional
Territory	(TerritoryPro) Name or Number designation of the Territory. When the Territories are built, TerritoryPro will assign the Territory designation based on the TrkID field in the Truck File.	Required
OrgTerritory	(TerritoryPro) Original territory. Used to list previous Territory designations, if included in the data file; leave blank if not used.	Optional
Locked	(TerritoryPro) TRUE or FALSE. Indicates if column Territory should be locked to editing; if existing Territories are in the file, it can be locked so as not to overwrite what was designated. If not populated, TerritoryPro will return a value of FALSE when Territories are built.	Required
EstTime	(SchedulePro/TerritoryPro) The sum of StemTm, DrvBtwnStop, and ServTm; populated automatically when Territories are built.	System Defined
ServTm	(SchedulePro/TerritoryPro) Calculated sum of FixedTime, UnldRate, Frequency, Cycle; populated automatically when Territories are built.	System Defined
ForcedMode	(Transportation Modeler) Designates if a shipment should be routed using a pre-designated mode (TL, LTL, etc.).	Optional
DropCharge	Cost added as a drop charge for each shipment; input in **File > Preferences > Routing > General (DropCount)**	Optional
TLMinCharge	(Transportation Modeler) Minimum charge applied for shipment by Truckload; populated by the Rate Orders function	System Defined
TLTeamRate	(Transportation Modeler) The rate used for Team Drivers, if used in the Rate File.	Optional
TLTeamMinCharge	(Transportation Modeler) The minimum charge for Team Drivers on Truckload shipments when used in the Rate File.	Optional
TLRate	(Transportation Modeler) The Truckload rate per mile (ex. $2.5/mile is input as 2.5); populated by the Rate Orders function.	System Defined
LTLCost	(Transportation Modeler) Cost per pound to ship via LTL; populated by the Rate Orders function.	System Defined
Distance	(Transportation Modeler) The distance in miles between the Origin and Destination points; populated by the Rate Orders function.	System Defined

FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
ItineraryID	(Transportation Modeler) The ID assigned to the shipment (automatically) during the Shipment Solution building phase.	System Defined
OID	(Transportation Modeler) The origin point ID.	Required
DID	(Transportation Modeler) The Destination point ID.	Required

Figure 29–Stop File Fields and Descriptions Table



Name	CONTACT	Phone	Customer#	Order#	ID3	Address	Address2	City	State	Zip	FixedTime	Rt	Seq	SzRestriction	EqCode	Sales	UnldSales
Olney Hardware & Supply	Tom		5831			205 E Main St		Olney	TX	76374-1923	10					353.91	
Albertsons # 4107	Mary		10756			4025 Old Denton Rd		Carrollton	TX	75007-1021	15					950.45	
Brookshire Grocery # 614	Gerald		10905			1801 W Parker Rd		Plano	TX	75023-7502	10					418.25	
The Vacuum Doctor	Bob		11422			1200 E Davis St		Mesquite	TX	75149-4874	15					468.53	

Longitude	Latitude	Symbol	Size	Color	Selected	Frequency	Territory	Day	Frequency	ServTm	EstTime	StemTm	DrvBtwnStop	Lock	OrgTerritory	OrgDay	MinDaysBetweenDeliveries	MaxDaysBetweenDeliveries	Freq
-98.75217	33.36941	Diamond	24			1									102	3			
-96.91614	33.02320	Diamond	24			1									106	3			
-96.72812	33.04087	Diamond	24			1									108	2			
-96.58360	32.76409	Diamond	24			1									104	5			

Figure 30–Layout of Stop File

3.2.3. Time Windows

Soft Time Windows allow the stops to deliver/unload before or after the actual windows, in exchange for a penalty cost. These are standard Time Windows, used in conjunction with Early and Late Buffers as well as the Penalty Cost calculations. The Penalty Cost is judged against the use of the buffers.

Example: Early/Late Buffers = one hour, and Penalty Cost is $20/hr. Time Windows are Open1/Close1 = 0700-1000, and Open2/Close2 = 1300-1700. The truck arrives at the stop at 0645 (early, but within the one-hour buffer period). Though no Window Violation is generated, a penalty is assessed against the stop: 15 min (.25) x $20 = $5.

Tip: Only use for customers that allow early/late delivery.

Time Window Gap Buffer

The Time Window Gap Buffer should not be confused with Time Window Buffers. Time Window Gap Buffer is used to determine if a buffer can be used. The Gap Buffer, default 1.75hrs, will determine if Buffers can be used.

Example 1: Gap Buffer ignored; Buffers used; Early/Late Buffers set to .5 (Half-an-hour). Time Windows are set to 0700-1100 and 1300-1700. There is a two-hour gap between the latest window of the first set, and the early window of the second set of windows. This is larger than the Gap Buffer (1.75). In this case, the Gap Buffer would be ignored, and the Soft Time Windows would be used.

Example 2: Gap Buffer used; buffers ignored; Early/Late Buffers are set to .5 (30 min). First Time Window: Open1 = 0700 and Close1 = 1230. Second Time Window: Open2 = 1330 and Close2 = 1700.

There is only a one-hour gap between the two Time Windows. Since the Gap Buffer was set at 1.75 (# is greater than the one-hour gap between the two Time Windows), the Gap Buffer would be used, instead of the Buffers (would close the window into a solid block).

Example 3: Delivery time = 2100 until 0300. First Time Window: Open1 = 0 and Close1 = 0300. Second Time Window: Open2 = 2100 and Close2 = 2400.

The earliest period (midnight to morning) must be placed first. Ensure the midnight Time Window is covered on the proper day.

Caution: Reversing Time Windows may cause Window Violations or failure of any stops to load.

3.3. Account Master File

You may already have an Account Master File (spreadsheet or database file) that contains customer data information that is used regularly in a Stop File. If it is not already in a worksheet (.xls) or ASCII (.csv) format, it will need to be converted by importing the data into a spreadsheet, or by using the Extract process in DirectRoute.

You can use the Master File exactly as the name implies; as a Master File in which information is copied from to input into a daily Stop File or you can use the Master File as your daily Stop File. It all depends on your business needs, whether your daily orders from each customer are always the same, or always different. In the following sections, we will run through three different methods for creating this file.

Tip: The ASCII format can be fixed length delimited or comma delimited.

```
Acct#,Name,Order,Address,City,State,Zip,Weight,Revenue,Cube,Pallets
95609022,TOM THUMB #39,CONSO47   ,1616 W HENDERSON,CLEBURNE,TX,76031,441,75,88.25,2
35609021,KROGER #191         ,605000,HWY 174 917,JOSHUA,TX,76058,172,75,34.32,1
35609019,FOOD LION #1034,1045000,600 W HENDERSON ST ,CLEBURNE,TX,76031,166,75,33.24,1
35609006,TEXAS WHOLESALE,1274000,326 S COVINGTON ST,HILLSBORO,TX,76645,304,75,60.74,1
35609004,BROOKSHIRE #73      ,599000,2211 E CRINER,GRANDVIEW,TX,76050,210,75,41.98,1
35603605,ALBERTSONS #4114,2169000,HIWAY 22 WEST,WHITNEY,TX,76692,150,75,29.94,0
35603602,K-MART #4733,2171000,HWY 22 SOUTH,WHITNEY,TX,76692,174,75,34.79,1
35109606,WINN DIXIE #2563    ,CONSO46   ,905 W CORSICANA,ATHENS ,TX,75751,186,75,37.14,1
35109002,KROGER #433         ,CONSO45   ,1405 E TYLER,ATHENS,TX,75751,355,75,71.1,2
35103008,KROGER #423         ,2838000,201 E HWY 243,CANTON ,TX,75103,220,75,44.1,1
35103005,CARNIVAL #109,CONSO44   ,603 HWY 243 EAST,CANTON ,TX,75103,613,75,122.57,3
15031042,MASS DISCOUNT MERCH,CONSO43   ,3770 BELTLINE RD,ADDISON ,TX,75001,555,75,111.05,2
15031039,BROOKSHIRE #47,3009000,1305 S HWY 121      ,LEWISVILLE,TX,75067,209,75,41.87,1
15031038,KROGER #204         ,3010000,121 AND CORPORATE,LEWISVILLE,TX,75067,242,75,48.49,1
15031011,TX DRUG WHSE #3     ,CONSO42   ,3616 FOREST LANE    ,DALLAS ,TX,75234,190,75,37.97,1
15029101,SAMS #6376,3008000,7201 GRAPEVINE HWY  ,FORT WORTH,TX,76180,235,75,46.93,1
15029039,WINN DIXIE #2458    ,3005000,6537 NORTHEAST LP 820,FORT WORTH,TX,76180,236,75,47.15,1
15029029,SACK N SAVE #211    ,3007000,5650 BROADWAY AVE   ,HALTOM CITY,TX,76117,206,75,41.21,1
15029020,ALBERTSONS #4160,2805000,6246 RUFE SNOW RD,N RCHLND HLS,TX,76148,229,75,45.7,1
15015034,ALBERTSONS #4163,CONSO41   ,2661 MIDWAY RD,CARROLLTON,TX,75006,227,75,45.46,1
15015032,DAVIDS #1,CONSO40   ,17194 PRESTON RD    ,DALLAS ,TX,75248,523,75,104.51,2
15015022,BROOKSHIRE #32,3180000,4150 BELTLINE ROAD,ADDISON ,TX,75244,2846,75,569.25,7
```

Figure 31–Comma Delimited (.csv) File

Regardless of the method used to create the Account Master File, it should generally contain the data columns listed here; each item listed is either required or recommended for use in the Stop File.

- **Name**–Name of the customer; DirectRoute will add as new if not already in the file (Recommended).
- **Contact**–Customer contact (name) at delivery location (Recommended).
- **Phone–**Telephone number at the delivery location; can be used to geocode the record location (Recommended).
- **ID1**–A unique primary identifier, ex: Account Number (Required).

- **ID2**–A secondary unique identifier, ex: Store#, Stop#, etc. (Recommended).
- **ID3**–A tertiary unique identifier, ex: Line item, SKU, etc. (Recommended).
- **Qty1–**Measured volume quantity of an order, as set/selected in Routing Preferences. (**File > Preferences > Configuration > Volumes**) (Required).
- **Address**–Street address for the customer (Recommended).
- **Address2–**Additional address information, ex: Suite #, building#, etc. (Recommended).
- **City**–Name of the city (can be used by DirectRoute to determine distances/drive times) (Recommended).
- **State–**Two letter abbreviation for the state, ex: CA, AZ, NM, etc. (Recommended).
- **Zip**–The zip code (Recommended).
- **User Fields**–Any additional fields (optional, up to 20); create/select the fields in Routing Preferences (**File > Preferences > Configuration > Stop User Fields**) (Recommended).
- **Latitude–**The GPS coordinates for the latitude of the delivery location (Required).
- **Longitude**–The GPS coordinates for the longitude of the delivery location (Required).

Note: DirectRoute can use an Address, City, State, Zip, or Phone Number to geocode the stop locations for each record in the Stop File. If Geocoding is to be used, at least one or more of these fields are required to be used.

3.3.1. Import/Extract an Account Master

Import current account records (Account Master File) for use by DirectRoute.

- Create an Account Master File with the required column headings (ref. **Account Master File**).
- Save the edited file as an ASCII (.csv) or spreadsheet (*.xls*) file in the DirectRoute Data folder; rename it as something you will remember.
- Open DirectRoute and (from the menu) select **File > Open**; select Stop Files from the drop-down menu in the bottom right corner of the info box, then select the new master file you just created and saved (from the step above).
- Select the Open button to open this file.

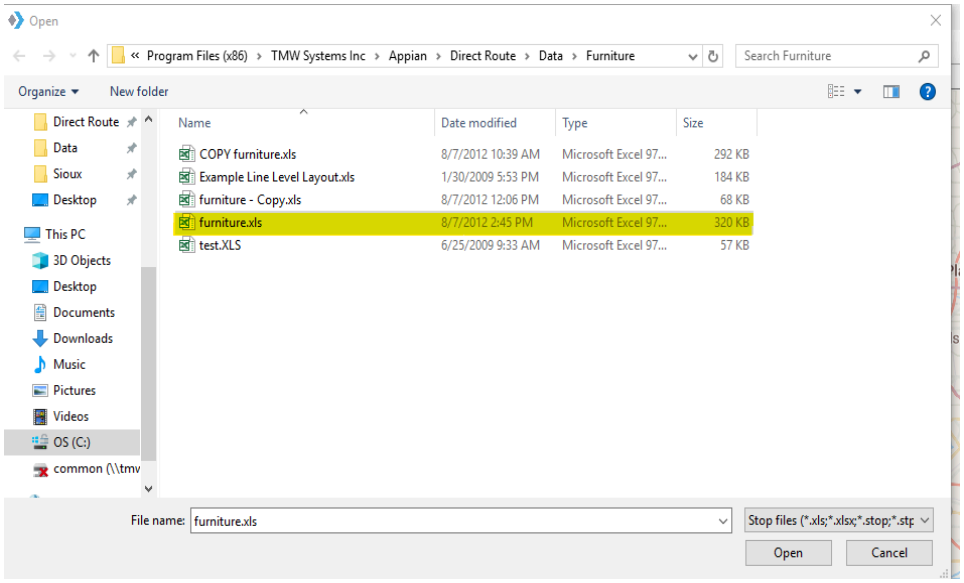


Figure 32–Open Stop File

This new master file can be used to copy/paste into a daily Stop File. Remember to save the file again after any further editing is done.

- Open DirectRoute and (from the menu) select **File > New > Stop**; a new Stop File will be created and open; it will be blank, except for the column headings.
- Return to the other file you opened (the file created in the steps above, from the Account Master).
- Copy/paste the data from that file into the new Stop File, in the matching columns.
- When all data has been copied to the new Stop File, save the file (*File* > *Save As*) with a new name.

Note: When completed, the new file(s) should always be saved to the DirectRoute Data folder, located in the directory where DirectRoute is installed.

3.3.2. Extract a Daily Order File

This method is used when the customer base is steady and new customers are added infrequently. The process uses an Account Master File (maintained and updated by DirectRoute during the extraction process) to create a Daily Order File.

A Daily Order File extracted from your ERP/WMS system, is typically a tab delimited (.ext) or comma delimited (.csv) file, and contains only new orders (Account ID, Order Number, Quantity, etc.) associated with a customer that is listed within the Account Master File. Once extracted, the Daily Order File is converted into a Stop File for use in the route building process.

DirectRoute will match the ID1 field in the Extract File (Daily Order File) to the ID1 field in the Account Master File, and will then edit the appropriate Stop File fields (Account ID, Order Number, Quantity, etc.) with the values from the Extract File. At the end of the process, you will have a Stop File containing only new orders for current customers, ready to route.

- Using your ERP/WMS systems normal extract process, extract the Daily Order File, then edit the file to add the required Stop File column headings (ref. **Import and Extract Records**).
- After editing the Extract File (Daily Order File), save it as an ASCII (.csv) or spreadsheet (.xls) file in the DirectRoute Data folder.
- From the menu, select **File > Open**; select Stop files from the drop-down menu in the bottom right corner of the info box, then select the saved Extract File (Daily Order File).
- Select the Open button to open the file.

The file will now open as a Stop File that can be used in the route building process. Remember to save the file again if any further editing is done.

Note: To simplify the daily process, create a custom extract (if possible) with the required Stop File column headings that can be used to extract the data from your ERP/WMS.

3.3.3. Extract to Create a New Stop File

This method is used when new customers are added frequently and is the most common method for creating a Stop File. The process uses an Account Master File maintained and updated by DirectRoute and ensures that static account data (Long/Lat, Time Windows, Unload Times, etc.) remains as accurate as possible. The column headings used in the Extract File must be identical to those used in the Account Master File.

- Using your ERP/WMS systems normal extract process, extract the Daily Order File, then edit the file to add the required Stop File column headings (ref. **Import and Extract Records**).
- After editing the Extract File (Daily Order File), save it as an ASCII (.csv) or spreadsheet (*.xls*) file in the DirectRoute Data folder.
- From the menu, select **File > Extract**.
- In the Extract box, choose the appropriate files for the extract process
    - **Master File**–Select the *Master File* button, the *Account Master File*, and then the *Open* button.
    - **Extract File**–Select the *Extract File* button, the *Daily Order File*, and then the *Open* button.
    - **Stop File**–The file name will auto-fill (same name as Daily Order File) with an *.xls* extension.

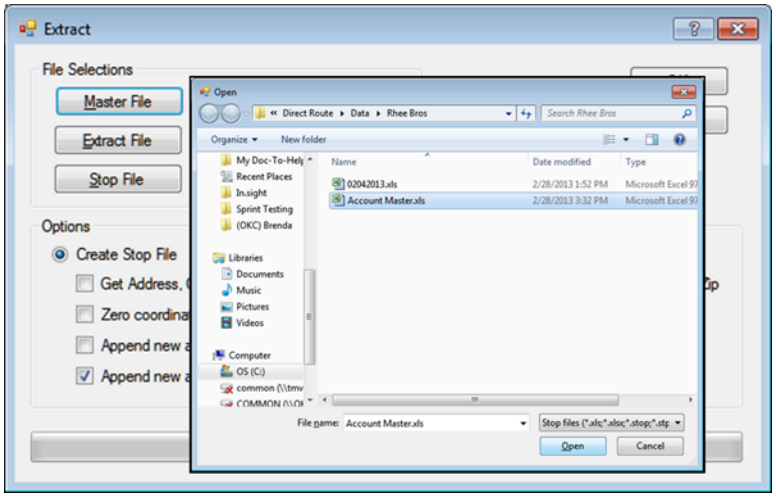


Figure 33–Extract Dialog Box

In the Options section of the Extract box, select the specific functions that should be performed during the extract process (click on the box to select).

- **Create Stop File**–Selected by default.
    - **Get Address, City, State and Zip from Master**–Will use the address, city, state and zip data listed in the Account Master File for each customer.
    - **Zero coordinates if addresses don't match**–Will update the Lat/Long column (Stop File) to all zeros if the addresses in the Daily Order File and Account Master File don't match.
    - **Append new accounts to Stop File**–Appends new customer stop info from the Daily Order (Extract) File to the Stop File only (does not update or append the Account Master File).
    - **Append new accounts to Master**–Appends new customer stop info from the Daily Order (Extract) File to the Account Master File only (does not update or append the Stop File).
- **Update Master File**–Select to perform any of the following (not selected by default).
    - **Overwrite Address, City, State, and Zip**–Overwrite the address, city, state and zip data in the Account Master File with the address, city, state, and zip data from the Daily Order File.
    - **Update Blank Fields**–Will append blank fields in the Account Master File for existing customers only, with data from the Daily Order (Extract) File.
    - Select the OK button.

Note: Review and edit the Extract options in Routing Preferences (File > Preferences > Extract) before initiating the Extract process.

When the extract process has completed, a dialog box will appear to display the results.

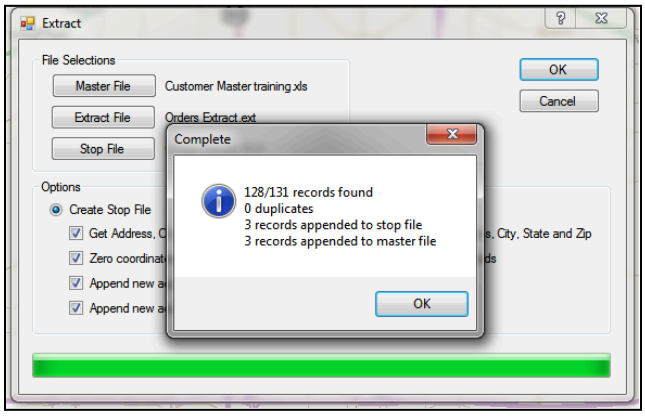


Figure 34–Extract Complete

3.4. Truck File

The Truck File is a spreadsheet that contains all the information about the fleet that will be used to make deliveries. Each row in the file represents a Truck on which the Stops can be loaded. Key fields represented in the Truck File include **Capacity, Availability**, and **Costs**.

If you already have a Truck File, or a spreadsheet with the required fleet information, it can be used in the project if it contains the required data columns. If you do not already have a Truck File, a new one can be created that will automatically populate the necessary header columns and allow manual input of all customer data.

3.4.1. Create a New Truck File

A new Truck File can be created that will automatically populate the necessary header columns and allow manual input of all necessary data. Or, if you already have a spreadsheet file with current fleet information, it can be used by copying the information into the Truck File.

- From the menu, select **File > Open > Truck or File > New > Truck**.
- Update, or enter (copy/paste) each vehicle's data directly into each column of the spreadsheet; or double-click each row to open the Truck Dialog box and update/enter all the data for each vehicle in one window.
- The **Truck File Fields and Descriptions Table** identifies and explains each field that is required or recommended to be used in each Truck File.

The Truck Dialog box is divided into the following six sections:

- **General–**Includes Truck ID, special equipment codes , and availability (if the One-way route box is marked, the Redispatch feature is not used; if Redispatch is required, set to TRUE, enter minimum time and turnaround time); change Zone if you wish to adjust the speed for this truck.
- **Location**–Add location information, symbol, and color code options; Long/Lat for the depot or dispatch start point can be added later, during the Geocode process.

- **Costs–**Enter any known fixed costs for each vehicle.
- **Work Rules**–Enter all restrictive work rules for each vehicle, including start times and dates (Day 1 is the first day of the routing scenario) (LatStart should be left blank to allow DirectRoute to best calculate time required to meet Time Windows).
- **Time of Day Speed Adjustments**–Enter any, if needed.
- **Capacity–**Enter capacities in the volume fields; should match those in the Stop File.
- **User Fields**–Add any fields/entries needed; see **Routing Preferences and Options Table** for additional information.
    - In order to export to DRTrack, you must have a DayCode user field in the Truck File. DayCode informs DRTrack what day it should clone a Master Route, with values ranging from 1-7 representing the day of the week beginning on Sunday and ending on Saturday, respectively:
        - Sunday = 1
        - Monday = 2
        - Saturday = 7

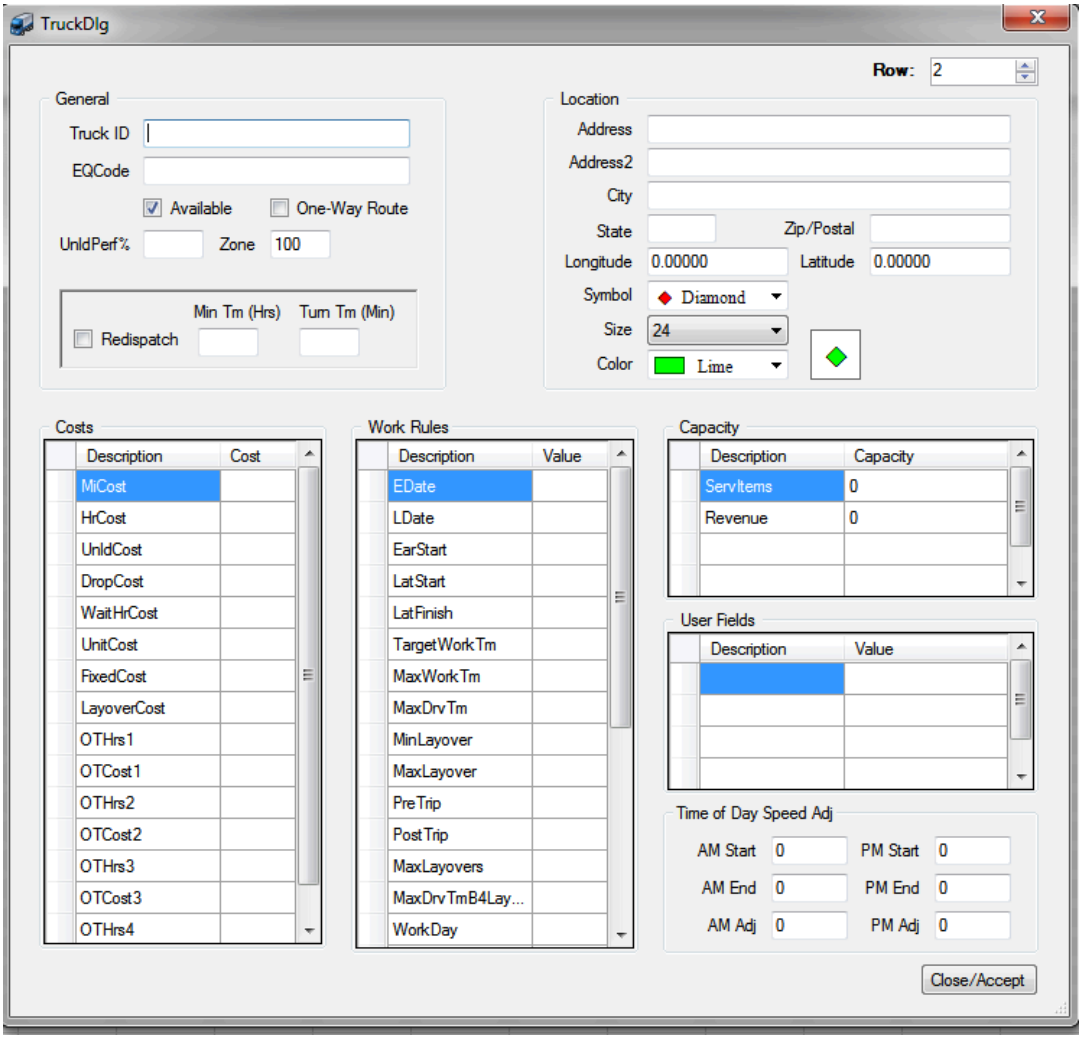


Figure 35–Truck File Record

When all entries have been completed, select **Close > Accept**, and then repeat as necessary for each additional vehicle.

After all vehicle data has been entered into the Truck File:

- Geocode the Truck File to find Lat/Long for each record in the file, see **Geocoding Records**).
- Finally, save the updated Truck File in the DirectRoute Data Folder).
- Select **File > Save**, or **File > Save As**, and assign a name to the file.

3.4.2. Truck File Fields and Descriptions Table

FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
TrkID	Truck ID entry may be a number, truck name, driver name, or what is of most importance to the router.	Required
Territory	(TerritoryPro) The Territory ID will represent the name of each Territory. It can be any number in length, an alpha name, or alphanumeric. When Territories are built, this ID will be passed to the Stop File column named Territory, to identify the Territory that each Stop has been assigned. The number of unique Territory IDs used in the Truck File will determine how many Territories will actually be built. Ex: TrkID's 101, 102, and 103 are all assigned to Territory 10000. TrkID's 201, 202, 203 are all assigned to Territory 20000.	Required
Available	This must be set to TRUE in order to make the vehicle available for use in the route build.	Required
One-way	Set to TRUE for vehicles that will be routed out, but not returned to the depot. Set to FALSE if the vehicle will return to the depot upon completion of the route.	Required
SpEq	Special Equipment Codes, used to identify special designations for the vehicle (Lift Gate, Refrig compartment, etc.); must have coordinating EqCode in the Stop File. Note: If using refuel points, insert 'REFUELPOINT' in this field (no corresponding EqCode necessary in Stop File) to designate the refuel location.	Optional
Volume1	The maximum quantity of Volume1 (Stop File) that the vehicle can carry (vehicle capacity). Use the same *Volume1* type used in the Stop File.	Required
UnldPerf%	Unload Performance regulates changes to the UnldRate. When a value is entered into this field, the unload rate will either increase or decrease. 100% is the default value. An increase to 110 will increase the Unload Rate by 10% (shorter time to unload). A decrease to 90 will decrease in the Unload Rate by 10% (increase the time to unload).	Required
Redispatch	Set to TRUE if the vehicle will be sent back out on another route, if time remains in the workday; FALSE if Redispatching is not used.	Optional

FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
MinTm	Minimum Time; used with Redispatching. Reflects amount of time (hours) that must remain in a workday upon return to depot, in order to redispatch the vehicle.	Optional
TurnTm	Turn Time is used with Redispatching; the amount of time (minutes) it takes to reload or any required time at the depot, between routes, before Redispatching.	Optional
MiCost	Mileage Cost is cost per mile to operate this vehicle.	Required
HrCost	Hourly Cost is the hourly cost of the driver for this vehicle.	Required
OTCost1	Overtime Costs is the cost per hour added if the time to complete the route exceeds the time set for WorkDay. Ex: If the cost for the first two hours of overtime is $5, then OTCost1 = 5.	Optional
OTHrs1	The level at which overtime hours are calculated; used with OTCost1. Ex: If OT costs are paid in 2 hr. increments, then OTHrs1 = 2.	Optional
FixedCost	Costs that don't change (tractor rental, maintenance, etc.)	Optional
UnldHrCost	Cost to unload per hour.	Optional
DropCost	Drop Cost is the drop cost for each stop. User input, **File > Preferences > Routing > General (Drop Count)**. A number in this section will add a drop cost to each stop on the route.	Optional
WaitHrCost	The cost per hour if a vehicle must wait at the stop before making its delivery.	Optional
UnitCost	The cost of each unit delivered (volume).	Optional
LayoverCost	The cost applied when a vehicle must layover before completing its route and returning to the terminal.	Optional
EarStart	The earliest time a vehicle may leave the terminal to begin a route; enter in military time format (2400).	Optional
EDate	The earliest day, from the dispatch date, a vehicle may depart. The Date of Dispatch is DAY 1. A one (1) would be entered in this field if the trucks could leave on the first day of dispatch. One day vehicles may have an Edate of 1-7, depending on which day of the Dispatch cycle they are released to proceed.	Required
LatStart	The latest time a vehicle can leave out of the terminal; enter in military time format (2400).	Optional
LatFinish	The latest time a vehicle must return to the depot; enter in military time format (2400).	Optional

FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
LDate	The latest date a vehicle must return to the terminal. This day is calculated from the dispatch date. A one-day route may have an Edate of 1, but also a Ldate of 1, while a weekly route may have an Edate of 1 and an Ldate of 7.	Required
WorkDay	The number of hours in a normal workday, OTCosts are incurred if the Workday hours are exceeded to complete the route (required if OTCost1 is used)	Optional
NormalStart	The normal daily start time of the vehicle. The Load algorithm will obey this setting, but when Between Route Optimization is run, that algorithm may adjust the start time to a more cost effective time.	Optional
Brk1Start	How far into the shift/route a mandatory break should start; if the driver should take a break four hours into the route, then Brk1Start = 4. Note: Up to five break fields can be used.	Optional
Brk1Duration	The duration of the break; entered in decimal or whole number format (30 min = .5, 15 minutes = .25, etc.). Each numbered Break Start field must have a corresponding numbered Break Duration field.	Optional
MaxWorkTm	The max time a vehicle can be out before returning to the depot (per day)	Required
TargetWrkTm	The target work time (shift) for each vehicle. The Load algorithm will obey this setting, but when Between Route Optimization is run, that algorithm may adjust the Total Work Time on each route to a more cost effective amount.	Optional
MaxDriveTm	The max drive time per shift on a route before a layover is implemented; entered in hours.	Optional
MinLayover	The minimum number of hours a vehicle can layover. Required if using ResourcePro in conjunction with DirectRoute.	Optional
MaxLayover	The maximum number of hours a vehicle can layover. Required if using ResourcePro in conjunction with DirectRoute.	Optional
MaxDrvTmB4Layover	Lowers the Max Drive Time for the first driving segment of the route (the stem distance) *if* there are no stops serviced prior to the 1st layover event. This field will never be used for routes which have stops before the layover event and would only be used on day 1 of any multi-day route.	Optional
MaxLayovers	The maximum number of layovers allowed per route.	Optional
Max Miles	Enter the number of miles by which to limit the vehicle. When used, DirectRoute will not attempt to build routes that exceed the number of miles set in the field. Field is considered during the optimization process; moves or swaps will not be made if the total route miles will	Optional

FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
	exceed this setting. If a route is manually edited to go over the Max Miles set in this field, DR will return a MaxMiles route level violation.	
PreTrip	In accordance with DOT rules, time added (in minutes) at the start of each route.	Optional
PostTrip	In accordance with DOT rules, time added (in minutes) at the end of each route.	Optional
Origin	Name of the Depot	Optional
Address	Address where the vehicle (Depot) is located.	Required
City	City where address is located; used to geocode and used in the Distance File.	Required
State	2 letter state abbreviation for the address; used to geocode.	Required
Zip	Zip Code of the address; used to geocode.	Required
Country	This column will be used during the geocoding process for passing country code to the mileage system. If no value is present in this column, the country code set in the Preferences will be used. The value in this column should be ISO2 or ISO3 country code format (i.e. valid country code for the US is USA/US and for Canada CAN/CA). If no address information is given in the file, DR will try to geocode the stops using City, State, and Zip.	USA/US
Longitude	The Depot's longitude coordinate, discovered during the geocode process.	Required
Latitude	The Depot's latitude coordinate, discovered during the geocode process.	Required
Zone	A percentage adjustment to the drive time. Default is 100 = normal rate of speed. An increase to the drive time will lower speed; a decrease to drive time will increase speed. Zone is hard coded to eight miles. Ex: (Truck File) A value of 110 would increase the drive time by 10%, hence lowering the speed by 10%. A value of 90 would decrease drive time by 10%, increasing speed by 10%. The speed adjustment is only applied to the first 8 miles of each route segment (from Depot). Ex: (Stop File) If all customers in downtown Chicago have a value of 110 in this field, the software will increase drive time for the stops in downtown Chicago (within the 8 mile radius), while lowering the speed of travel.	Optional
AMStart	Set AM start time to adjust speed to account for heavier/lighter traffic.	Optional
AMEnd	Set AM end time to adjust speed to account for heavier/lighter traffic.	Optional

FIELD NAME	DESCRIPTION	REQUIRED OR OPTIONAL
AMAdj	Set drive time adjustment for AMStart and AMEnd. AM/PM Adjust works the same as Zone; increase the number (110) to increase the drive time by 10 percent. In turn the speed is decreased by 10 percent. The radius is based on the rush hour distance setting (**Preferences > Routing > General**). Zone is hard coded to eight miles, while AM/PM Adjust is based on the rush hour distance. Ex: If rush hour distance is set to 30 miles, it will apply to the truck for a 30mile radius from the depot. If it is set on the customer in the Stop File, it will be a 30mile radius from the customer.	Optional
PMStart	Set PMStart to adjust speed to account for heavier or lighter traffic.	Optional
PMEnd	Set PMEnd to adjust speed to account for heavier or lighter traffic.	Optional
PMAdj	Set drive time adjustment for PMStart and PMEnd. See AMAdj for additional info.	Optional
Symbol	The symbol (size and color) that is displayed on the map, to represent the Stop. Symbols are chosen from the Stop File; Double+Click on the customer record to open the dialog box; select the symbol, size and color, then select on OK.	Optional
Size	Specifies the size of the symbol to be displayed on the map. Default size is 8.	Optional
Color	Specifies the color of the chosen symbol. Select colors in the same fashion/at the same time as selecting symbols.	Optional
Georesult	Georesult will display the results received when records are geocoded.	Automatic

Figure 36–Truck File Fields and Descriptions Table

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
TrkID	Available	OneWay	Redispatch	MinTm	TurnTm	SpEq	Weight	Volume	Pieces/Rolls	UnldPerf%	MiCost	HrCost	OTCost1	OTCost2	OTCost3

Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
OTHrs1	OTHrs2	OTHrs3	UnldHrCost	DropCost	WaitHrCost	UnitCost	FixedCost	LayoverCost	EarStart	EDate	LatStart	LatFinish	LDate	WorkDay

AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
NormalStart	Brk1Start	Brk1Duration	Brk2Start	Brk2Duration	Brk3Start	Brk3Duration	Brk4Start	Brk4Duration	Brk5Start	Brk5Duration	MaxWorkTm

AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE
TargetWrkTm	MaxDriveTm	MinLayover	MaxLayover	MaxDrvTmB4Layover	MaxLayovers	Longitude	Latitude	Address	City	State	Zip	Zone	Symbol

BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO
Size	Color	PreTrip	PostTrip	AMStart	AMEnd	AMAdj	PMStart	PMEnd	PMAdj

Figure 37–Layout of Truck File

3.5. Distance File

The Distance File is a spreadsheet that contains a record of distances and drive times between the pick-up point (terminal, DC, etc.) and every city in the Stop File (stem distance), and/or pick-up point to every stop, and from stop to stop. When a Distance File is used in the routing process, DirectRoute will calculate the distances and drive times between each stop location based on the entries in this file.

The software provides three options to calculating and/or collecting distances and drive times:

- **DirectRoute Drive Time**–Uses DirectRoute's internal algorithm settings and map files.
- **Optional Mileage System**–Uses any optionally installed (by the user) Mileage System.
- **Highway Only when Get Directions is used**–Default option in **Preferences > Trimble Maps > Highway Only**, Highway Only means local streets are not considered when running a route; vehicles are restricted to primary roads and highways only, regardless of vehicle profile.
- **Elevation Limit** (**Preferences > Trimble Maps > Elevation Limit**)–DirectRoute will look for an alternate route to avoid roads that would exceed the set limit.
    - The unit of measure chosen (Feet, Meters) should be the same unit of measure chosen for Distance Option (**Preferences > Other > Distance Options**).
    - If the Distance Option is set to Miles, then set Elevation to Miles.
    - If set to Meters, then set Elevation to Meters.

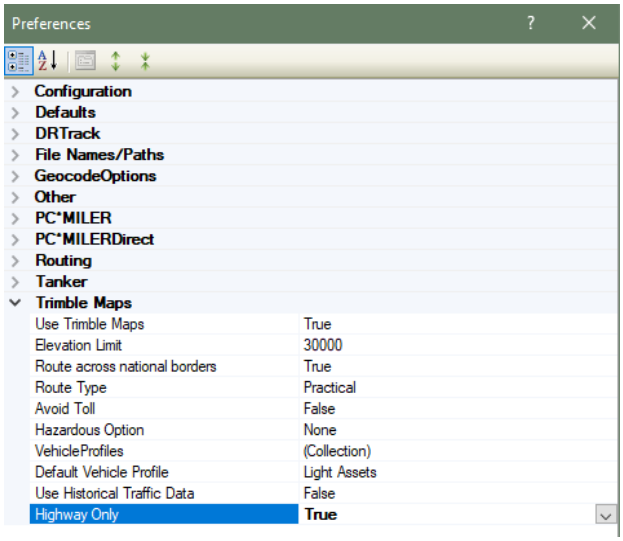


Figure 38–Layout of Truck File

If a Distance File is not used, DirectRoute will calculate distances and drive times using an adjusted straight-line distance (as the crow flies) between locations. When there is a Distance entry for a pair of Stops, the software will use the Distance and Drive Time listed in the file, instead of calculating distances based on Lat/Long Coordinates, or other barriers that may be present.

A Distance File can also be generated to record Stem mileage, the Distance between the terminal and each city listed in the Stop File.

The software uses the Min/Max Distance settings to calculate the Distance entries in the Distance File. Min/Max Distance refers to the minimum and maximum distance between stops, using straight line distance. If the stops fall within the Min/Max Distance setting, the distance and drive Times will be calculated using the road network.

Using the road network will sometimes return a distance result above the Max Distance setting chosen; this does not indicate an error, as it is only the result of converting a straight-line distance to a road network distance.

Example: If the Min Distance is set at 40 miles and the Max Distance is set at 500 miles, the system will generate an entry for every city that is between 40 and 500 air miles (straight line distance) from each city listed in the Stop File.

Tip: A good rule of thumb for the max distance setting is one half to one times more the distance to the farthest stop in the delivery area.

Before beginning any type of routing project, or generating a new Distance File, it is a good idea to review and edit, if necessary, the current Distance File settings in use by the software.

- From the menu, select **File > Preferences > PreProcess > Generate Distance File**.
- Use the **Distance File Settings Table** to assist in updating each item, as necessary.
- Select *OK* when all selections are completed to exit the Preferences screen.

3.5.1. Get Distance Entries from Database (Db)

The following app settings are needed in DirectRoute.exe config for this to work.

- **UseDatabaseForDistanceEntries**–Set to TRUE (default value).
- **ConnectionStringName** –Connection string name configured in Connection Strings section.
- **CompanyID–**1 (default value) (setting does not have any impact for now).

In Preferences, choose either the Distance File, or the Database for distance entries (downloaded entries will be saved to a file).

3.5.2. Distance File Settings Table

Distance File settings are found in various sections of the DirectRoute Preferences table. When updating or changing any of these settings, it is a good idea to review all the sections to ensure that all the necessary settings match when necessary and are accurate.

- **Preferences > PreProcess > Generate Distance File**.
- **Preferences > PC*Miler (or PC*Miler Direct)** if the appropriate license has been purchased.
- **Preferences > Routing > General**.
- **Preferences > Other** (set distance options, mileage system, etc.).

The following settings can be found at Preferences > PreProcess > Generate Distance File:

FIELD	SAMPLE ENTRY	EXPLANATION
Generate Distance File	TRUE (FALSE)	If TRUE, generates Distance File during Preprocess

Minimum Distance Between Stops	0	Minimum distance the software will compute distance between stops
Maximum Distance Between Stops	800	Maximum distance the software will compute distance between stops
Speed Adjustment	100	Adjust drive time by this factor (100 is baseline, 120 increases drive time by 20%, etc.)
Maximum Speed	60	Maximum allowable speed by vehicle on a route
Generate 2-way entries for stops less than (x miles)	5	Add a return distance, between two stops within X miles of each other
Generate 2-way distance entries	TRUE (FALSE)	If TRUE, will calculate distances To and From stops
Stem Distances Only	TRUE (FALSE)	If TRUE, will calculate distance between the Terminal and City where the stop is located (not the stop itself)
In Cone	TRUE (FALSE) (Angle and radius created from the terminal, defaulting to 57º)	If TRUE, only stops within the Angle or Radius may be added to the selected route
Overwriting Existing Entries	TRUE (FALSE)	If TRUE, will overwrite any Distance File in the DirectRoute Data Folder
Within Territories	TRUE (FALSE)	Set to TRUE, will generate a Distance File with distances listed between EqCodes of the same type
Route Across National Border	TRUE (FALSE)	If TRUE, will allow route to cross Canada and/or Mexico borders; if FALSE, will prevent routes from crossing borders (may result in more miles)
Commercial Restrictions	TRUE (FALSE)	Option for Prophesy to use only roads permitted for commercial vehicles
Avoid Toll Roads	TRUE (FALSE)	If TRUE, keeps trucks from using toll roads
Use DirectRoute Drive Time	TRUE (FALSE)	If TRUE, will generate distances and drive times using DirectRoute's calculations (instead of any optionally installed Mileage System or Historic Traffic Data.
Threading	Single Thread	For use when generating Distance File, multi-core CPU = set threading to Multiple, otherwise set to Single

Distance File	C:\Program Files (x86) \Appian\DirectRoute\Data\ xxxx\xxxx.dist	Enter the path to the existing Distance File
Use Mileage System Drive Time if it is > DirectRoute Drive Time	TRUE (FALSE) When an additional mileage system is installed and used, and the calculated drive time is greater than the drive time calculated by DirectRoute, adjust this setting to use the greater (longer) drive time (TRUE), or use the DirectRoute calculated drive time (FALSE).	Only set to TRUE if an additional mileage system is installed and/or used (PC*Miler, etc.).
Preferences > PC*Miler Direct		
FIELD	**SAMPLE ENTRY**	**EXPLANATION**
Route Across National Border	TRUE (FALSE)	If TRUE, will allow route to cross Canada and/or Mexico borders; if FALSE, will prevent routes from crossing borders (may result in more miles)
Route Type	Practical Practical Routes - distances and driving routes that a driver would normally take to minimize time and cost. Shortest Routes - distances and driving routes that a vehicle would take to minimize total distance traveled while still following a reasonable route.	Choose from Practical, Shortest, or Fastest. Practical considers distance, road quality, terrain, urban/rural classifications, truck-restricted roads, and designated principal and secondary through routes. Shortest will avoid truck-restricted roads and, in some cases, may favor a beltway rather than traveling directly through a city.
Avoid Toll	TRUE (FALSE)	
Hazardous Option	None General, Radioactive Explosive, Inhalant Corrosive, Flammable	
Thread Count	0	Number of thread counts to use in Matrix Mode (see Distance Generation Mode below)
Distance Generation Mode	Pair Matrix	Changes how distance entries are generated
Vehicle Profiles	48' Semi Trailer Ex: Double Trailers, Straight Truck 53' Semi Trailer, Full Sized Van Light Assets, Custom, etc.	Edit/Add all vehicle types/options available from your vehicle fleet using the VehicleProfile Collection Editor.
Default Vehicle Profile		Choose the default vehicle type for each new routing project.

Map Region	NA	Map Region option is not provided at this time. Default is set to NA.
Use Historical Traffic Date	TRUE (FALSE)	Calculates drive times and distances based on historical traffic data (requires additional Appian licensing).

Figure 39–Distance File Settings Table

Note: When using Historic Traffic Data to generate distances/drive times, ensure the appropriate settings are edited in Preferences.
*PC*Miler Direct > Use Historical Traffic Data = TRUE.*
Routing > General > Use DirectRoute Drive Time = FALSE.
And, if using Preprocess, set PreProcess > Generate Distance File > Use DirectRoute Drive Time = FALSE.

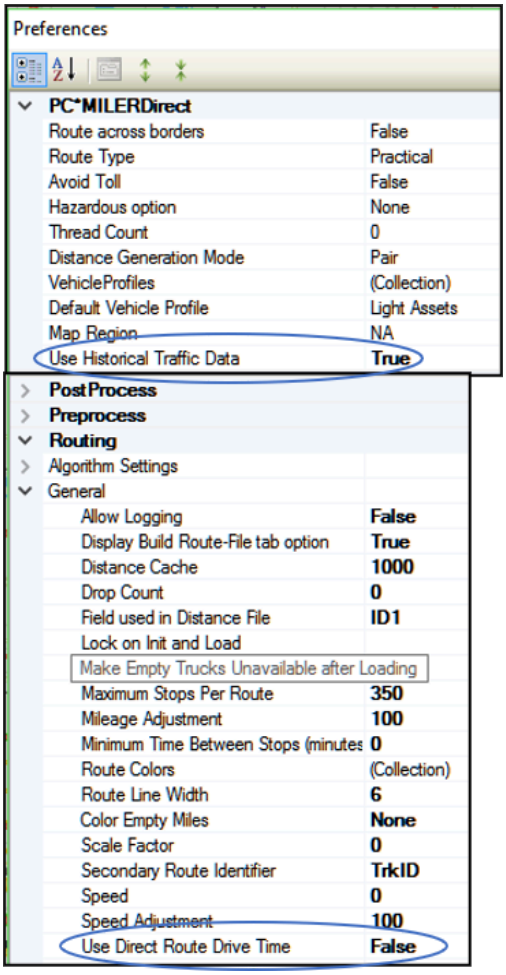


Figure 40–Distance File Settings Table

3.5.3. Generate a Distance File

To generate a Distance File, first geocode both the Stop and Truck files, then save the files.

- From the menu, select **File > Generate Distance File**.

- Edit the distance settings *From* and *To* (Min and Max distance between stops), *Speed Adj* and *Max Speed.*
- Select *Use DirectRoute Drive Time* unless using an alternate mileage system.
- Select any other options appropriate: Stem Distance (distance between Terminal and city only in the Stop File), in Cone (angle and radius created from the terminal), Overwrite existing entries (in current Distance File), Within Territory (generate a Distance File with distances listed between the same EQ codes), and Two Way Distance Lesser than (computes the distance between 2 points with a return distance added).
- Select the Stop, Truck, and Distance File names/path (to create a new Distance File, do not select a Distance File name).
- Select the second tab (mileage system, i.e. Trimble MAPS, PC*Miler, etc.) to review/edit vehicle profiles that will be used in the routing project.
- When all options from both tabs have been updated, select the *OK* button to generate the Distance File.

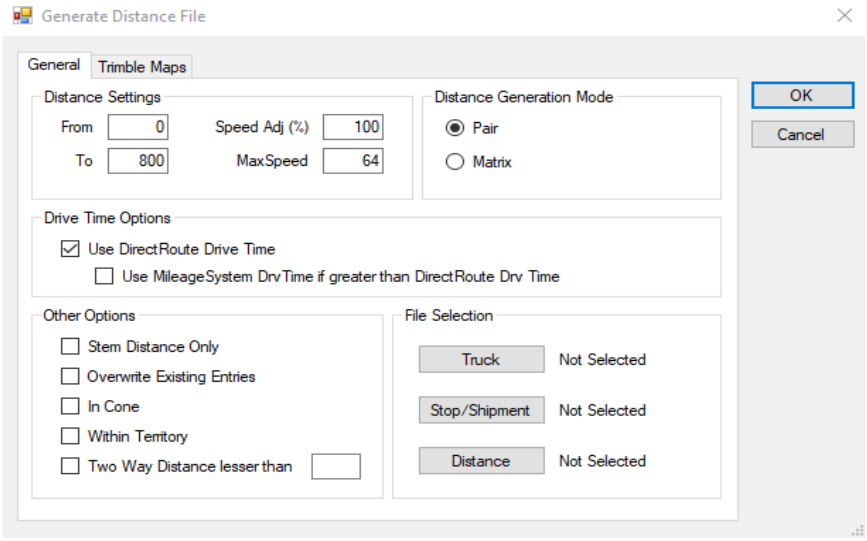


Figure 41–Generate a Distance File

Tip: If an optional mileage system is installed and selected in Preferences→Other→Mileage System to generate a Distance File, only the General tab will appear/be available from which to choose distance and drive time options.

3.5.4. Use Ultrafast Distance Matrix

UltraFast Distance Matrix (UFDM) allows users to generate distances and drive times in near real-time between millions of combinations of locations. See What is the Ultrafast Distance Matrix for more details.

Create a Distance file using the Ultrafast Distance Matrix. Internet connection required.

- There can be up to a 5% discrepancy from actual distance when using the UFDM.
- Does not support time-based restrictions, or Ferry links.
- Can only be used when leveraging Preprocessing while in route-building mode using either DirectRoute or TransportationModeler.

- Preference changes must be defined and options enabled prior to creating routes.

To enable UFDM, complete the steps below:

1. Set Preferences.
   a. Click on *File* and select *Preferences.*
   b. Scroll down to *Preprocess* and click on *Generate Distance File.*
   c. Select Ultrafast from the *Generate Distance File* drop down menu.

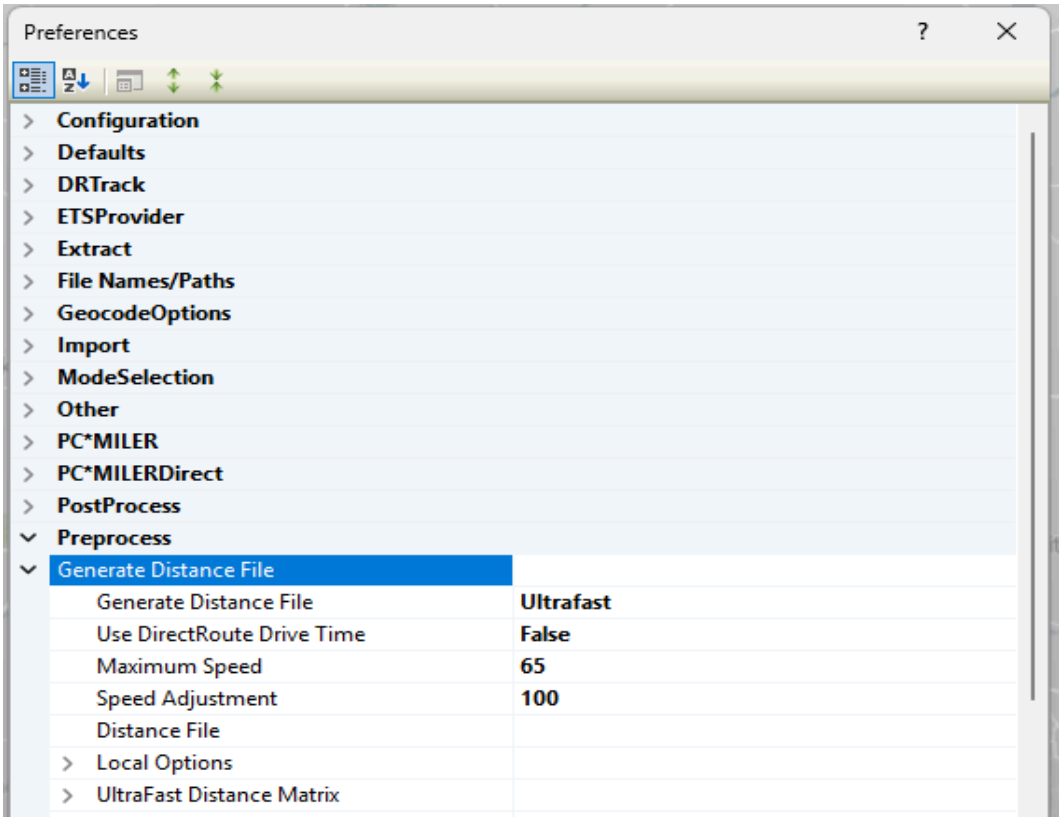


Figure 42 - Generate Distance File Preference

   d. Set the Use DirectRoute Drive Time to *True* or *False*.
   e. Set the Maximum Speed and Speed Adjustment percentage fields.
   f. Select the correct vehicle size for the project by editing the Profile name from the Ultrafast Distance Matrix drop-down.
      - If you have a mixed fleet of different sizes, select the larger sized asset from the list of choices.
      - EU vehicle profile options only work with EU geocoded stops.

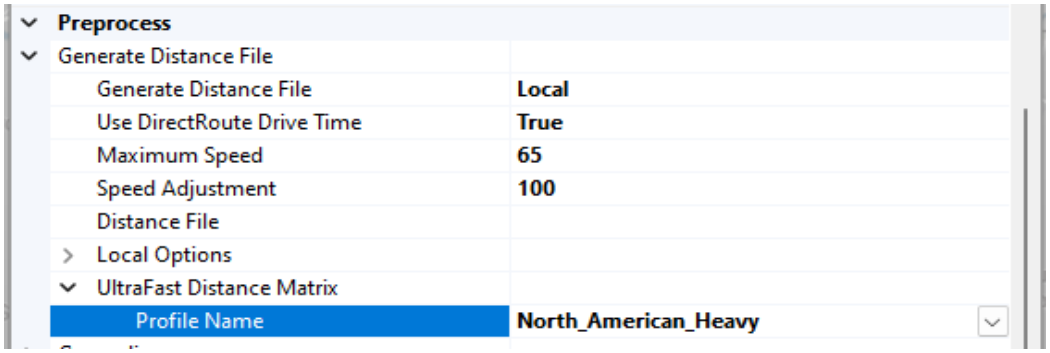


Figure 43 - Generate Distance File preferences

g. Click on *OK* or ensure the *Save Preferences on Close* option is selected.

2. Click on *File* from the Toolbar and select *New*.

3. Click on *Route* then select the appropriate routing method: *Regular*, *Priority*, or *Selective*.

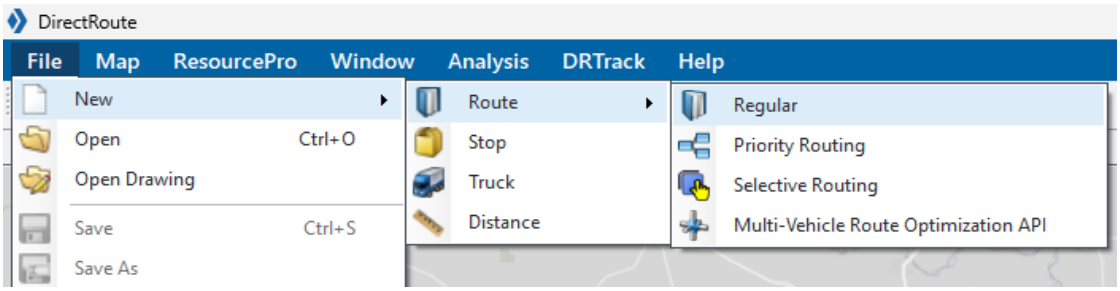


Figure 44 - Routing method for new Routes

4. Set the Dispatch Date in the drop down calendar.

5. Click on the Enable Pre-Processing box.

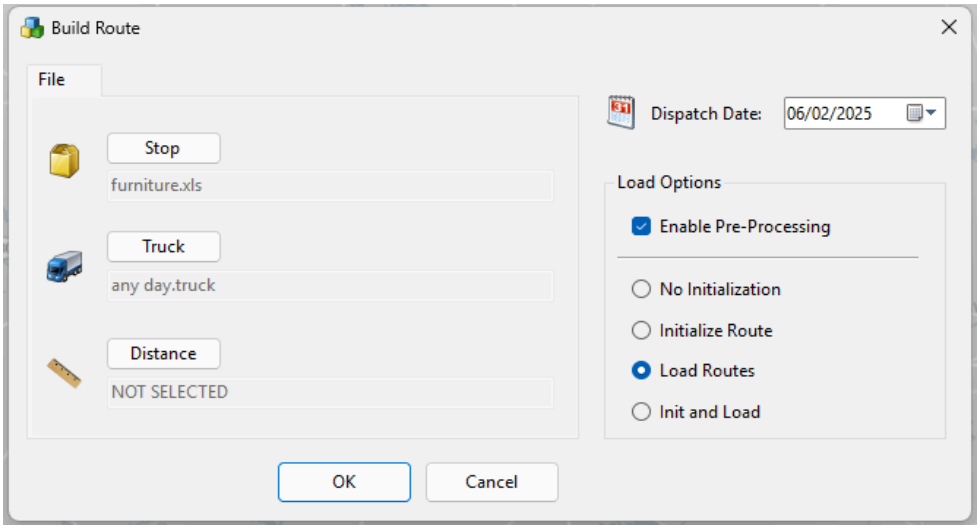


Figure 45 - Build Route Window

6. Click OK to start the file generation and view the project in routing mode.

- The UDFM-created Distance Files are saved to your current User Data Directory as stop-file-name_vehicle-profile-name_date-stamp.

- Distance Files created during Preprocessing are used by the algorithm during route construction. There is no need to run the solution again with the newly created distance file.
- It's advised to **disable Pre-Processing and not create multiple distance files** for the same project on subsequent runs and project variations.

3.5.5. Add New Entries to a Distance File

New entries can be added to the Distance File when adding new stop records to a Stop without having to generate a whole new Distance File. DirectRoute can calculate and update the file by adding an entry for any new stops that do not already have an entry listed.

To enable adding new entries as they occur, ensure the *Preprocess* setting is enabled in the Distance File settings, and always select the preprocess option when creating new routes. (**Routing Preferences and Options Table**, and **Distance File Settings Table.**)

- Select **File > Preferences > Preprocess > Generate Distance File = TRUE**.

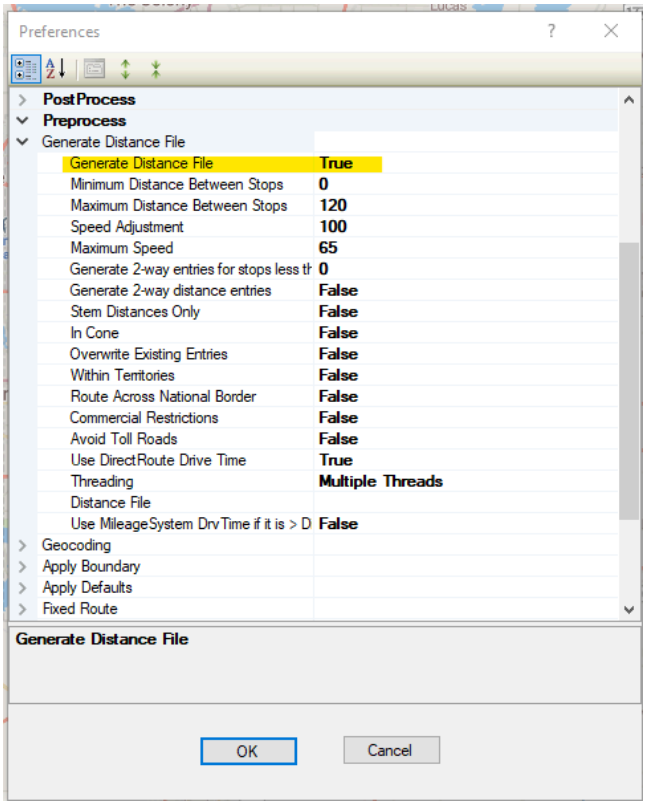


Figure 46–Preferences Preprocess Options

When creating new routes, always select the Load Option *Enable Preprocess*.

- Select **File > New > Route**.
- Under Load Options, select *Enable Preprocess*.

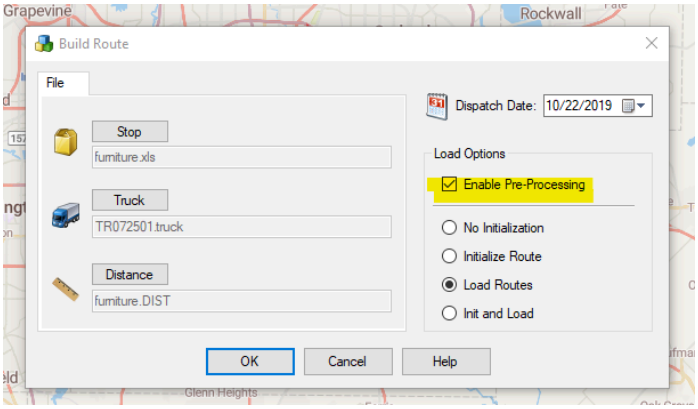


Figure 47 – Build Route Load Options

In the event that multiple new accounts must be added, it is recommended that a new Distance File be generated.

3.5.6. View, Edit, Save, or Export a Distance File

The Distance File can be opened within DirectRoute, and individual entries edited when necessary. The opened file will resemble an Excel spreadsheet, with a file extension type of *.dist*. Once opened, the file can be saved as an Excel spreadsheet and viewed (exported) outside of DirectRoute.

4. Geocoding Records

Geocoding is the process of finding associated geographic coordinates, expressed as Latitude and Longitude, from the address data provided in the Stop File, Master File, and Truck File. This step in the routing process is required, as it enables the locations to be mapped and used to establish appropriate routes. All addresses in the Stop File and Truck File must have a Lat/Long attached for the routing process to work correctly.

DirectRoute can use an Address, City, State, Zip, or Phone Number to geocode your spreadsheet records. Once a record has been geocoded, you can manually move the record anywhere on the map using DirectRoute shortcuts. (This will change your longitude and latitude in the stop file.) In addition, to keep track of the method used to geocode different records, you can select a color to assign to the stop symbols as they are placed on the map. This option can be turned on via the geocoding tab.

If the file you are using already has the coordinates (Lat/Long) for each stop, the stops will automatically be placed on the map when the file is opened in DirectRoute. For new files that have not been geocoded, this function will need to be performed. The methods for geocoding your records are contained in the next sections.

Before geocoding any records, it is important to ensure the addresses in each file are accurate. If unsure, or if any part of the address is missing, select Update/Address/City/Zip from the geocoding tab and DirectRoute updates your entry with the cleaned up or correct address information. It also identifies 5-digit Zip Codes and updates the record to a 9-digit Zip Code as needed, which provides better geocode results.

The following sections provide easy instruction for completing the geocode process.

- Clean up addresses with **Address Cleanup.**
- **Assign colors** to the different geocode options.
- Select a **Geocode Option** (Address, City, State, Zip, or Phone Number) to geocode your records.
- Review the **geocode results** and validate, if necessary.

- Create a **custom geocode file.**
- Geocoding with **Google Maps API.**

4.1. Address Cleanup

Using the Address Cleanup feature can help verify the Street, City and Zip match, and correct any records that do not match. In addition, Address Cleanup can also identify 5-digit Zip Codes and update the record to a 9-digit Zip Code, which provides better geocode results. The ZIP9 Data folder, included with the DirectRoute install, is used by Address Cleanup to locate, and attach the Zip+4 to the records.

Open the Stop File and review the Address column. Look for items that should be moved to a secondary address column (Address 2):

- Suite, Ste, Room, Rm, Apartment, Apt, Building, Bldg, Floor, Unit, etc.
- #, -, /, ½ or letters following the address number range (ex. 3217B, 3217-B or 3217 ½)

Select the Address Cleanup icon  from the toolbar or select *Edit* > *Address Cleanup* from the menu.

The Address Cleanup dialog box will open, displaying the first record in the spreadsheet file (Row 2).

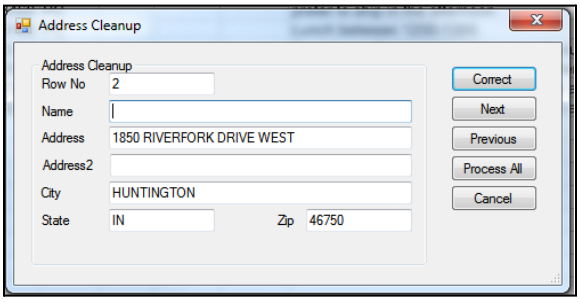


Figure 48 – Address Cleanup

It is possible at this point to review and correct each record in the spreadsheet individually or allow Address Cleanup to review and correct all the records more quickly.

To review and correct each record individually:

- Select the Correct button, or
- Type the Row # (from the spreadsheet file) of the record to check then select **Correct**.

The results will appear immediately at the bottom of the info box, with the corrections listed. In the example below (Figure 46), the street name was corrected.

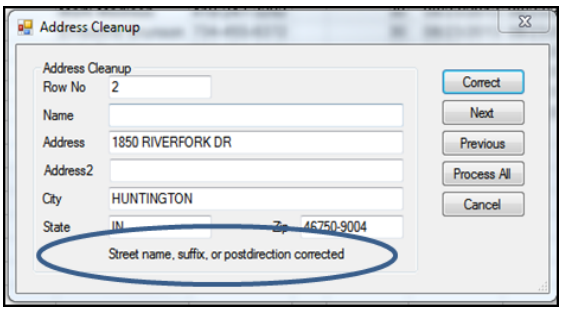


Figure 49 – Address Cleanup Corrections

To review and correct all records:

- Select the *Process All* button.

The results returned identify the number of records corrected.

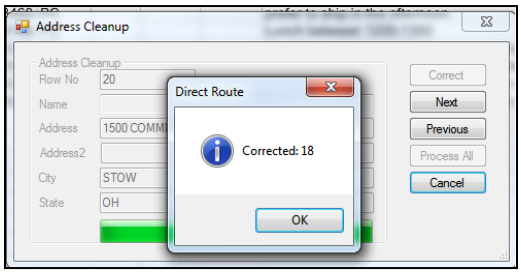


Figure 50 – Address Cleanup Results Count

During the cleanup process, an "AddrErr" (address error) column is added to the spreadsheet. Any records that could not be corrected automatically will contain information in this column explaining why this record was not corrected. These records can usually be corrected manually.

Color Coding and Symbols

Each record (stop) in the spreadsheet (Stop File, Truck File) is represented by a symbol. When the spreadsheet is opened in DirectRoute, the symbols appear on the map to identify the location of that stop. To keep track of the different methods used to geocode the spreadsheet records (Address, City, State, Zip, or Phone Number), select a color to assign to the method; as the symbols (stops) are displayed on the map, their color on the map will indicate how the record was geocoded.

To select the colors for each geocoding method, open the spreadsheet file (Stop File).

- Select **Edit > Geocode > Color Code Options**.

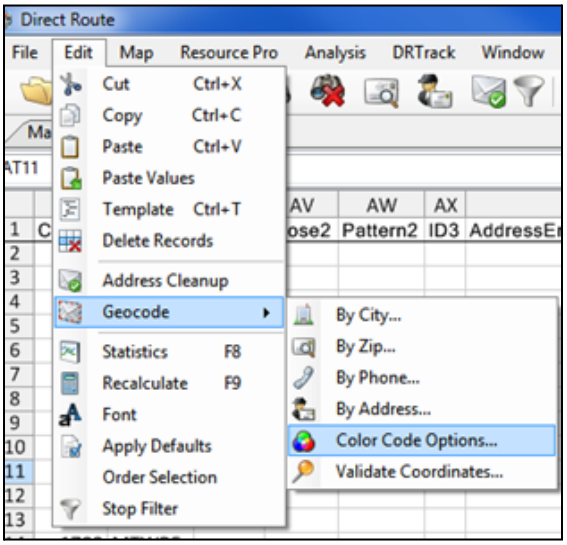


Figure 51 – Color Code

- Default colors will appear in the color code options box; use the dropdown arrow adjacent to each geocode method and select a color.

- Select OK to close the dialog box.

Once the color coding options have been set, ensure you have set the scatter radius for matching records.

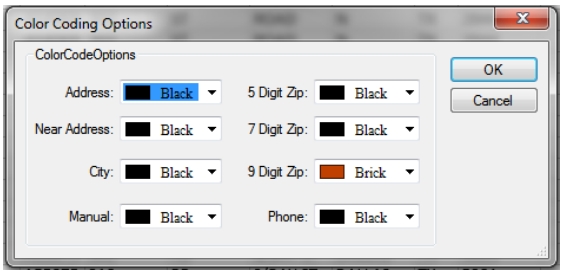


Figure 52 – Color Coding Options

4.2. Geocode Options

Geocoding by Address is the most accurate and frequently used option when geocoding records. However, using other available geocode options in DirectRoute can help identify and record missing components of an address. While geocoding with other options is not ideal for actual routing purposes, it can be helpful for other reasons, including as an alternate means to locate a record when the full address is not available. The additional options available in DirectRoute include:

- **Geocode by City**–Geocode by City looks for a matching City name and State to correctly place records on the map. This process will return the Lat/Long for the centroid of the City, and will place the record on the map at the center of each City.
- **Geocode by Zip**–Geocode by Zip locates the Lat/Long for the centroid of the Zip Code, and will place the record on the map at that location.
- **Geocode by Phone** – Geocode by Phone looks for the matching Area Code; the process will return the Lat/Long for the centroid of the Area Code, and will place the record on the map at that location.
    - Select **Edit > Geocode > City > Phone > Zip** from the menu.
    - Select the record range by typing the first and last record numbers into the respective fields (the default selection includes all records in the file).
    - For a single record, use the same number in both the first and last row fields.
    - Specify the Scatter Radius for separating identical entries on the map.
    - Do not select the Skip Non-Zero option if the record was previously geocoded (ex. Lat/Long cells contain a number other than zero).
    - Select Color Code if you want to assign the color code option previously selected for Geocoding by this option.
    - Select the OK button.
- **Geocode a Single Record**–Geocode a single record or selected records in a Stop File.

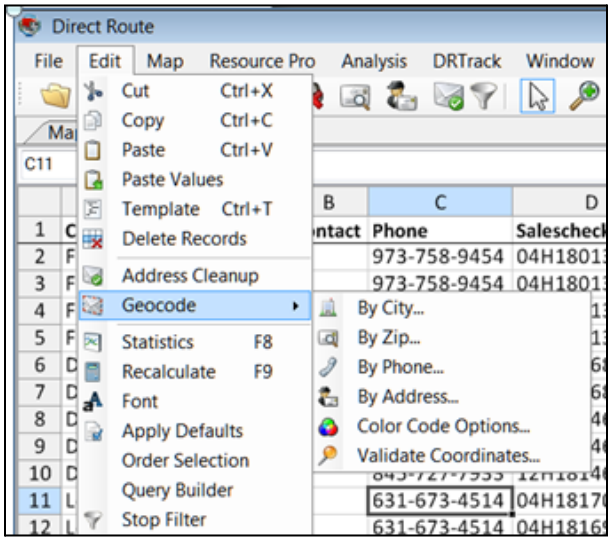


Figure 53 – Geocode Options

Additional geocode settings (options):

- **Scatter Radius**–Geocoding by City, Zip, and Phone Number have a scatter radius option. The Scatter Radius is the distance by which multiple matching records will be separated on the map during the geocoding process. For instance, if records are geocoded by Zip Code, they can be separated by a Scatter Radius so that multiple matching entries are not placed on top of one another on the map. An entry of 1 will place matching records randomly scattered within 1 mile of the centroid point (or KM, depending on distance type set in **Preferences > Other > Distance Option**).
- **Skip Non-Zero**–All geocoding options include a *Skip Non-Zero* option. This is used to skip over records that were previously geocoded (already assigned Lat/Long coordinates in the spreadsheet) and will only geocode records that have zero's in those two fields.

4.2.1. Geocode by Address

DirectRoute looks at a record's Address and Zip to geocode the record by address. Each type of data must be placed in the proper spreadsheet column with the correct heading. For example, street addresses should be contained within the Address column and cities should be contained within the City column, etc.

The address is broken down into segments.

- Prefix
- Suffix
- Street name
- Address number
- Street type
- Zip Code

If the address components do not match completely, DirectRoute will not attach the coordinates to the record during the process. This can be corrected by carefully editing your address records and making them as complete as possible, and or use Address Cleanup.

Geocode by Address enables the geocoding of single or multiple records at one time. Use the Geocode By Address icon , or select **Edit > Geocode > Address**.

- Either selection will open the Geocode by Address dialog box.
- Select the options for geocoding.
- Select the Color Code option to assign a specific color to records that are geocoded.
- Select Skip Geocoded to skip over records previously geocoded.
- Select Zip Fallback to Zip if no address information is located.
- Select Update **Address > City > Zip** and DirectRoute will correct addresses as they are found.
- Select Correct to geocode a selected record, or
- Select Process All to geocode an entire file.

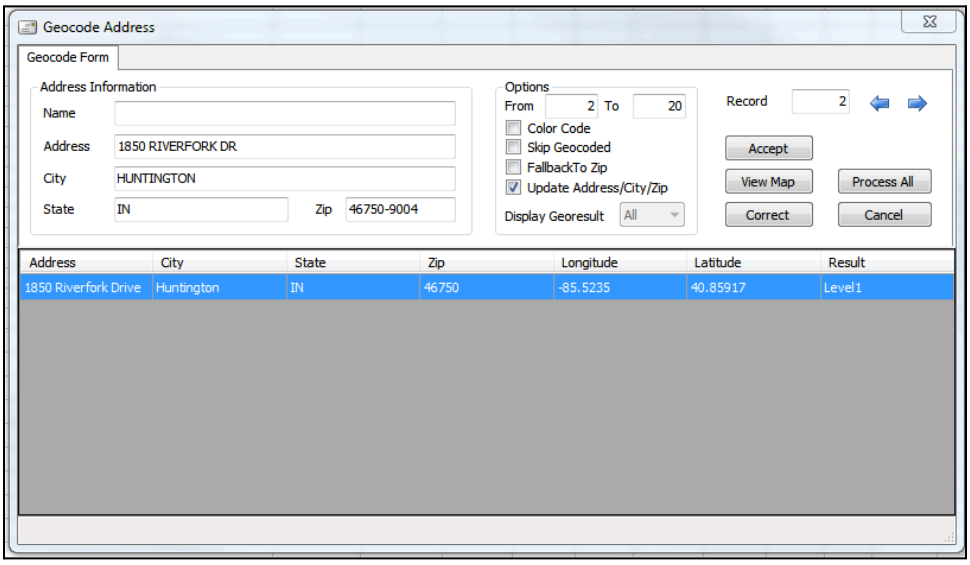


Figure 54 – Geocode by Address

Once the process is complete, a dialog box will display the number of records geocoded, and how (by address, number of records geocoded by 9-Digit Zip, etc.). If you check the color code option, the geocoded records will be assigned the chosen color (Color Code Options dialog box).

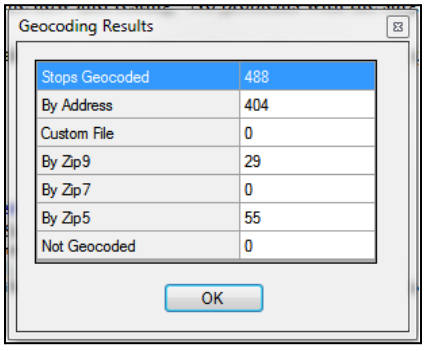


Figure 55 – Geocoding Results

It is possible that not all addresses will be found during the process (address coverage is best in metro areas). Geocoding individual records allows you to identify errors and plot a record at a near address if the record does not have an exact address match.

To geocode the remaining addresses individually:

- Select the Geocode by Address icon from the toolbar.
- Select the record by typing the record number in the Record field.
- The geocoding engine will display the address selected.
- The information box at the bottom will show available addresses.
- Find and select the correct or nearest address to the selected location.
- Select Correct to change the address to match the selected entry.

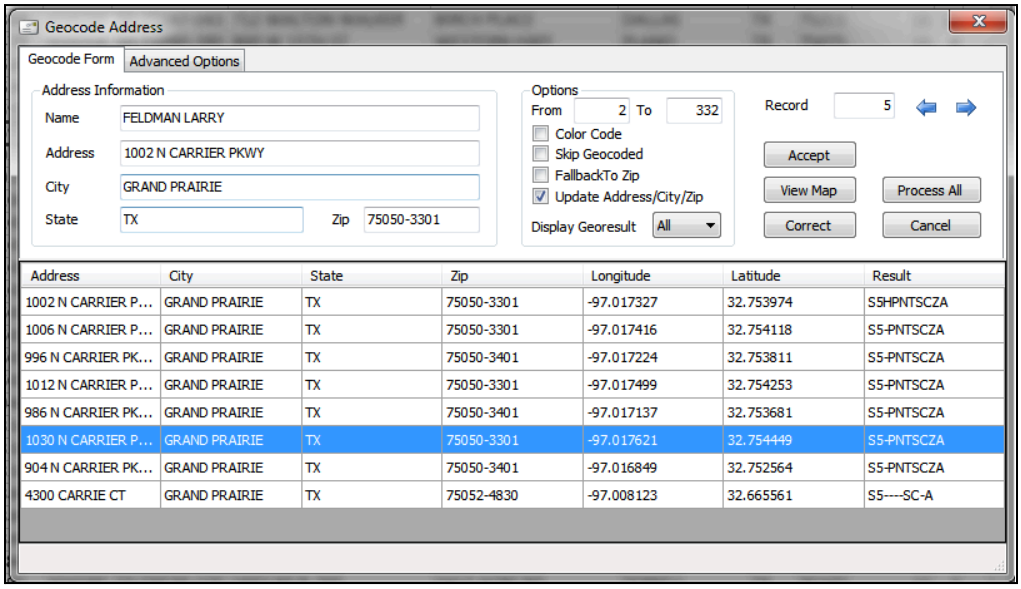


Figure 56 – Near Address Geocoding

4.3. Geocode Results

When the geocode process concludes, the results are presented to explain how the record has been geocoded. Four possible results can be received.

- ***Level 1***–An exact match was made; for street addresses, trust is 95% or greater AND if address is outside the range listed in the database, the top match is within 100 address units of input address; or for any other match level if there are multiple matches they are all within .1 air miles of each other.

Example: *"100 Main Street" was input; best match in database is "150-250 Main Street"*

- ***Level 2***–Inexact match but unique result (only one match); for street addresses, trust is 85% or greater AND if address is outside the range listed in the database, the top match is within 500 address units of input address*; or if there are multiple matches, they are all within .5 air miles of each other.

Example: *"100 Main Street" was input and the best match in the database is "450-550 Main Street"*

- ***Level 0***–Inexact match and there is more than one match in the database; for street addresses, trust is 50% or greater.
- ***Z1***–Zip5 match.

- ***Z3***–ZIP9 match.
- ***No Results Found***–Record not geocoded (column will be blank).

Tip: All records must be geocoded for the routing process to be completed. If there are records without geocoding, the process will be aborted.

If a stop receives a poor match, you may need to edit its location and/or address. Edits can be made to a stop's coordinates via the map (by moving the stop), or edit the stop's Lat/Long directly in the Stop File, all while the Geocode info box is still open.

4.3.1. Validate Coordinates

Use this command to double check the geocoding results and find any errors that may have occurred during the data entry process, such as transposed digits in a Zip Code entry. To validate, a geocoded Stop File must be open.

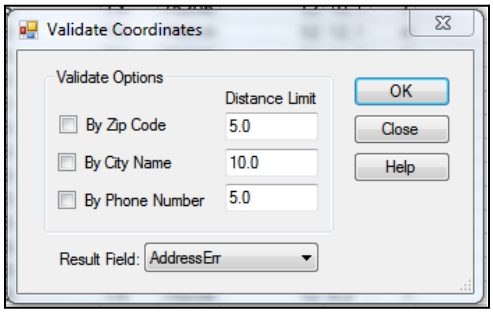
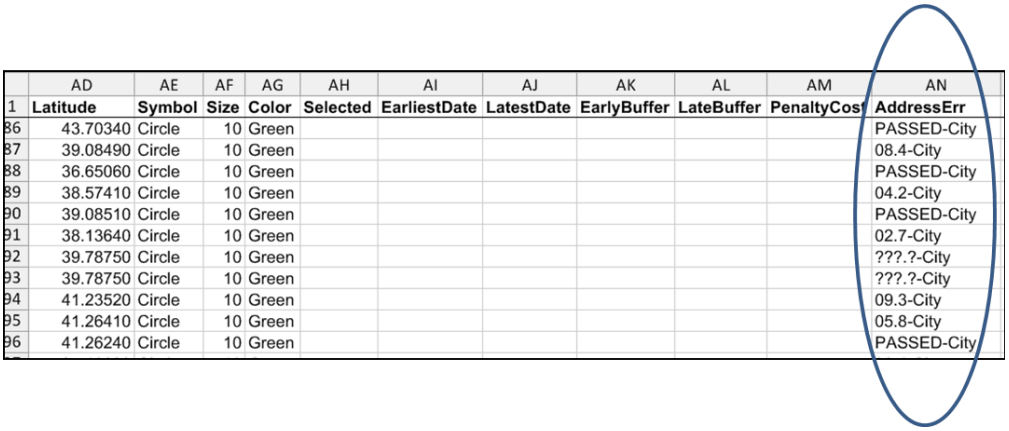


Figure 57 – Validate Coordinates

- Select **Edit > Geocode > Validate Coordinates** from the main menu.
- Choose which item(s) to validate and enter the distance limits in miles.
- Select any column on the spreadsheet as the Result Field where the results will be displayed (select a field not being used, or insert a blank column in the spreadsheet).
- Select the OK button to run.

Records that meet the validation criteria chosen will display the results in the AddressErr column (ex. PASSED–Zip, PASSED–City, etc.). If the record entry is PASSED, then the location of that point is within the specified number of miles from that field. If the results returned are question marks, this indicates incorrect data that prevents this record from being validated, such as misspelled or duplicate cities, abbreviations or invalid numbers in the Zip Code or phone number fields. If the results show a number, such as 08.8-City, this indicates the location of that point is within .08 miles from that field.



	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN
1	Latitude	Symbol	Size	Color	Selected	EarliestDate	LatestDate	EarlyBuffer	LateBuffer	PenaltyCost	AddressErr
86	43.70340	Circle	10	Green							PASSED-City
87	39.08490	Circle	10	Green							08.4-City
88	36.65060	Circle	10	Green							PASSED-City
89	38.57410	Circle	10	Green							04.2-City
90	39.08510	Circle	10	Green							PASSED-City
91	38.13640	Circle	10	Green							02.7-City
92	39.78750	Circle	10	Green							???.?-City
93	39.78750	Circle	10	Green							???.?-City
94	41.23520	Circle	10	Green							09.3-City
95	41.26410	Circle	10	Green							05.8-City
96	41.26240	Circle	10	Green							PASSED-City

Figure 58 – Validate Coordinates Result Sample

4.4. Custom Geocode File

The *Custom Geocode File* is a separate File from the Stop File or Master File. It is a spreadsheet containing special locations that are hard to geocode or cannot be geocoded normally, such as new housing developments, apartments, or other locations.

The Custom Geocode File contains a *SiteID* (User defined) and the Longitude and Latitude of the stop. Only one Custom Geocode File is necessary if one is being used.

The *SiteID* is a unique name or string identifier, established by the user, to identify a specific location. This *SiteID* will be used to identify the Longitude and Latitude of the location and will allow DirectRoute to determine if a stop in the Stop File is available for geocoding through the Custom Geocode File.

Separate SiteIDs allow any number of locations to be entered, even if not all the locations appear in each Stop File. The file will use only those locations it finds in the Stop File.

When geocoding records, DirectRoute will first attempt to geocode the records by Address, ZIP+4, and then by the Custom Geocode File. Stops with matching identifiers (*SiteID*) used in the Custom Geocode File will be geocoded using the coordinates from that file.

4.4.1. Creating a Custom Geocode File

Before a Custom Geocode File can be used in DirectRoute, it must be created.

- Create a new spreadsheet with three columns: *SiteID*, Longitude, and Latitude
- Enter the unique identifiers (*SiteID*) for each location to be geocoded using this file

Once created, the *Custom Geocode File* must be geocoded. This can be done either by copy/paste from the Stop File, or manually. If the Stop File already contains the Lat/Long coordinates, copy them to this new file. If the information is not available, you will need to manually locate them.

- Zoom to the location on the map where the stop is located and place the cursor over it; the Lat/Long Coordinates will appear in the lower left-hand corner of the map screen.
- Copy the coordinates into the Lat/Long columns of the Custom Geocode File.

Tip: To ensure the coordinates are placed in the correct column, remember that the Longitude is the negative number (ex. -96.91080) and the Latitude is the positive number (ex. 32.98247).

4.4.2. Preparations for Using Custom Geocode File

After the file has been geocoded properly, save the file to the DirectRoute/Data folder. Once the *Custom* Geocode File is prepared, DirectRoute Preferences and the Stop File must also be updated and prepared.

- In the Stop File:
  - Create a column called SiteID.
  - Locate the stops that will be affected and used by the Custom Geocode File, and enter the *SiteID* s from *the Custom Geocode File.*
  - Save the file changes.
- In Preferences:
  - From the menu, navigate to **File > Preferences > Other**.
  - Locate the Custom Geocode File Path.
  - Manually type in the file path location or, select the button that appears on the right. side of this line and navigate to where the Custom Geocode File was saved.
  - Double click the file name to capture the path location.
  - Locate the Geocode File Col Identifier line and enter the column header name used in both the Custom Geocode File and the Stop File as your unique identifier column (SiteID).
  - Select OK and close the Preference dialog box.

4.5. Geocoding with Google Maps API

Geocoding with Google Maps API is available to check the validity of DirectRoute geocode results, or to obtain Canada or Australia geocode results. The service is available as a limited alternative to DirectRoute's built-in geocoding capabilities, provided by Google without cost. Google Maps API uses an API Key, a unique key that is generated when using the Google APIs Console, to identify your application. When the application needs to call an API that is enabled in this project, the application passes this key into all API requests as a key=API key parameter. Use of this key doesn't require any user action or consent, it doesn't grant access to any account information, and it is not used for authorization.

The free API provides:

- 2,500 requests per 24 hr. period.
- 5 - 10 requests per second.

Google Maps API does provide additional, increased usage for a fee. Users who may be interested in these additional paid options can explore Google Maps API for Work, Google Places API or Google Geolocation API. Additional information on these and other Google services can be found at **Google Maps API for Work Web Services**.

4.5.1. Create a Google Maps API Key

To create your key:

- Login to the Google Account (create a free Google Account/Login if you do not already have one).

- Navigate to **Google Developers Console.**
  - Create or select a project.
  - Select Credentials, the select API Key.
  - Create a new key by selecting get a *Server key.*

Note: If you have an existing Server key, you may use that key.

  - Apply a *Name* to the *Server Key* then select *Create.*
  - When the API Key window opens, use your mouse to copy the *Key,* then select *OK.*

To prevent quota theft, **secure your API key** following these best practices.

- Paste the copied API key into **Preferences > GeocodeOptions > Google API Key**.

Tip: By default, a key can be used from any server, though it is recommended that you restrict the use of your key by IP address to servers that you administer.

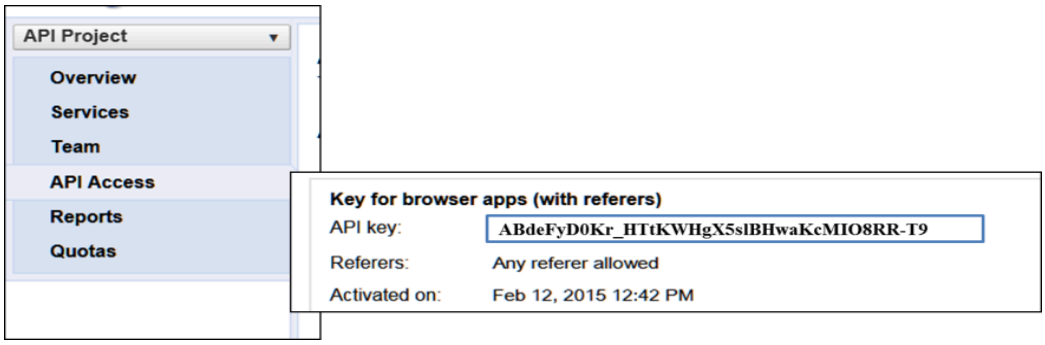


Figure 59 – Google API Console

4.5.2. Google Geocode Settings

DirectRoute **Routing Preferences** should be updated to enable the Google Geocode service. To update, select **File > Preferences > Geocode Options** from the menu.

- Secondary Geocoder
  - Select *Google* or *None*; default is *None.*
- Fallback to Secondary Geocoding after…
  - If *Secondary Geocoder 'None'* is selected, ensure *Fallback to secondary geocoding after* is set to *Never.*
  - If Secondary Geocoder 'Google' is selected, ensure Fallback to secondary geocoding after is set to other than 'Never'.
  - *Level 1*–Will recheck addresses with geocode result level less than 1 (Level 2 or Level 0).
  - *Level 2*–Will recheck addresses with geocode result level less than 2 (Level 0).
  - *Always*–Will recheck all addresses every time, regardless of geocode result.
- Google API Key
  - Assigned through the *Google Console.*

- Google Geocode Accuracy Level
  - *Rooftop*–Default; (High Accuracy) precise down to the street address.
  - *RangeInterpolated*–(Same Street) An approximation, usually on a road, interpolated between two precise points, such as intersections.
  - *Geometric Center*–(Same Region) The geometric center of a street (polyline) or region (polygon).
  - *Approximate*–(Approximate) The result is approximate.

To geocode internationally (Australia and Canada only, at this time), the appropriate country code will need to be set in Routing Preferences (**Routing Preferences and Options Table**).

- Select **File > Preferences > Other > Country**.
- Use the drop-down menu to select the country code.
  - En-US-English (Australia), or
  - En-US-English (Canada).
  - En-US-English (United States).

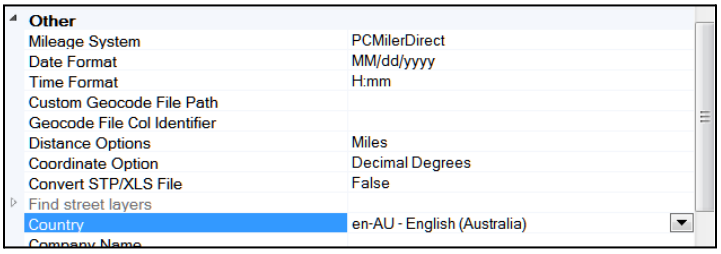


Figure 60 – Country Code

When geocoding files with both US and international addresses, reset the country code to En-US-English (United States) after geocoding international addresses.

4.5.3. Google Geocoding Results

Generally, only one entry in the results array is returned for address lookups, though the geocoder may return several results when address queries are ambiguous.

- **Rooftop**–High accuracy; indicates the result is precise down to the street address.
- **Range Interpolated**–Same street; indicates the result is an approximation, usually on a road, interpolated between two precise points, such as intersections.
- **Geometric Center**–Same region; indicates the result is the geometric center of a street (polyline) or region (polygon).
- **Approximate**–Approximate; indicates the result is approximate.

When the Geocode function is used, the results will be displayed for each stop in the Stop File under the column heading Geo Result, as well as in the Geocoding Results info box.

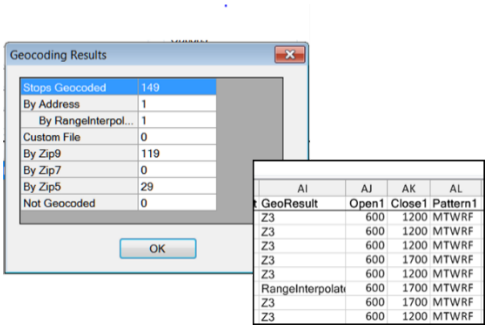


Figure 61 – Google Geocode Results

4.6. Geocoding with PC*Miler Web Services

Geocoding with PC*Miler Web Services requires an active internet connection. Currently, only three methods are available to geocode: City, Zip, and Address.

To ensure your geocoding results are the most accurate possible, edit your Routing Preferences (**Preferences > Other > Mileage System***)* to select mileage system *Trimble Maps*, and make sure your Data Version under Trimble MAPS is set to Current for best results. (Available versions are PCM18 - Current.)

5. Building Routes

DirectRoute provides several tools to enable the quick and efficient building of routes. Which tool you use will depend on your routing environment and the type of results expected.

There are two primary stages to building successful routes:

- The initial route construction is called 'Load'
- The fine-tuning of routes using cost is called 'Optimization'

Initial route construction requires preparing the route files (Creating Route Files), a review, updating Routing Preferences, and loading/building routes.

Optimizing routes enables DirectRoute to review how the routes were loaded and the factors used to determine the load sequence and evaluate the feasibility of making moves. Several factors can affect this process, but results can offer cost savings and/or decreased miles.

5.1. Create a New Route

After preparing the Route Files and reviewing/updating the Routing Preferences, the loading and route build can be initiated.

1. From the DirectRoute menu, click **New > Route > Regular**, and the ***Build Route*** dialog box will open.

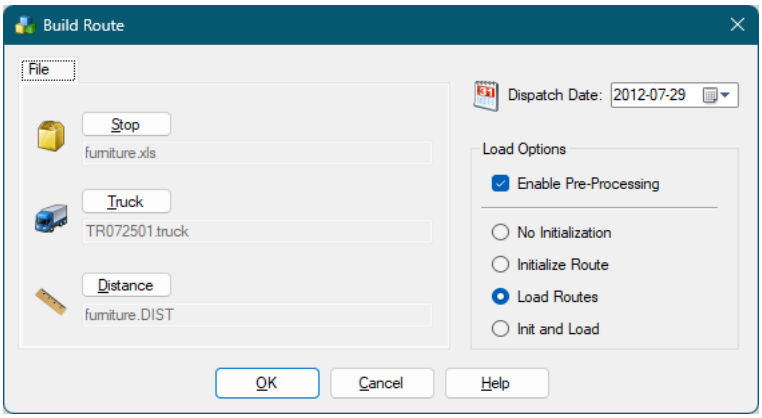


Figure 62 – Build Route dialog

2. Select the files that will be used to build the routes:
    a. Click the **Stop** button, then select your Stop File.
    b. Click the **Truck** button, then select your Truck File.
    c. Click the **Distance** button, then select a Distance File (if one is being used).
3. Select a Dispatch Date from the date picker.
4. Select load options to direct how the routes will be built:
    a. **No Initialization**: No route construction will occur automatically and instead allows the user to manually lasso all stops onto the route(s).
    b. **Initialize Routes**: Use this option if your Stop File has predetermined routes and you wish to display them in the Route Book. For example, the Rt & Seq columns are populated in the Stop File.

c. **Load Routes***:* Automatically creates routes using the DirectRoute path-finding algorithm.

d. **Init and Load**: This function honors any Rt and Seq numbers contained in the stop file and secondarily Loads all stops without a Route identifier.

e. **Enable Preprocess**: This check box enables one or more procedural steps to occur automatically without user input, such as generating a Distance File and/or Geocoding all stops to create Lat/Long coordinates.

5. Click **OK** to begin routing.

When the routing has been completed, the first route will be visible on the Map.

5.2. Inbound Routes

Inbound Routes are routes that begin at the furthest stop and route back to the depot. The distance from the depot to the first stop (Farthest stop) is not calculated. This mode of routing may be completed without using One Way Routes, and then inverting the route. Inbound Routes are calculated when using the Inbound Algorithm setting (**File > Preferences > Routing > Algorithm Settings > Algorithm**). Options are:

- Regular–Normal two-way routes
- DOW–Day of Week, for fuel specific functions
- Inbound–Route from stops back to depot, similar to a one-way inverted route
- FarthestIn–Two-way routes from the farthest stop back to the depot
- OutBound–Farthest stop is the last stop, with return to the depot

When building Inbound Routes, all routes are calculated as Inbound Routes; standard two-way routes cannot be completed within the same Stop File.

5.2.1. Set up Inbound Routes

1. From ***Algorithm Settings*** (**File > Preferences > Routing > Algorithm Settings**) select **Inbound Algorithm** from the dropdown.
2. Ensure the ***One Way*** column is set to FALSE for all vehicles in the Truck File.
3. Build your routes using the process outlined under Create a New Route.

When the build is complete, the routes will look the same as One Way routes, but each route will begin at the furthest stop and route back toward the depot. To resume building Two Way routes, change the **Algorithm** setting in ***Routing Preferences*** back to **Regular**.

5.3. Manual Route Building Tool

Routes can be built manually while viewing the stops on the map and selecting only the stops desired. This can be done using the ***Manual Route Tool***  , located on the DirectRoute toolbar. To get started, ensure the Stop and Truck Files are updated as needed and saved in the DirectRoute Data Folder.

1. Build your routes using the process outlined under Create a New Route.
2. Click the radio button next to ***No Initialization*** and select the Dispatch Date.
3. Click **OK** to begin building.

4. When the build process has been completed, select the Map tab to view the stops on the map.
5. Click the ***Manual Route Tool*** on the toolbar. This opens the Route Building dialog.

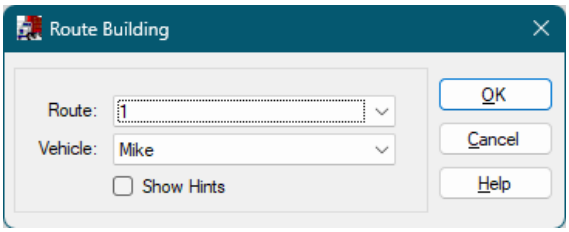


Figure 63 - Manual Route Building Tool

   5.1. Use the dropdowns to select the first Route number to apply to the new route, and the vehicle (TruckID) to use on the new route.

   5.2. To color code stops which will not exceed vehicle capacity, check the box next to **Show Hints**.

   5.3. Click **OK** when you are done.

6. To select a stop to add to the route, position the cursor over the stop and use the Shift key and click to select; repeat for each additional stop to add it to the new route. Click the stops you wish to add to the route. When you are done, click the Normal Cursor Tool from the toolbar. This will end the build process for the route. To build additional routes, repeat Steps 5 and 6.

Complete routes can be viewed by selecting the Route Book tab from the top of the screen (additional editing can be performed in the Route Book as well, if needed).

***TIP**: Manual Route Building can also be accomplished using the Lasso Tool.*

5.4. Optimization Options

During the route build phase, DirectRoute considers truck availability time, travel time, receiving time, unload time, and distance; all the parameters set within the Truck File, Stop File, and Routing Preferences. When optimizing, DirectRoute is performing additional passes over the routing data, while considering penalty factors, time windows, work time, etc., to look for options that would allow stops to be moved either within each route or between routes, to return a lower-cost routing solution. Additional options can be selected to attempt loading any unloaded stops at the same time.

The following optimization options are available:

- Optimize Trucks After Loading: This Preference setting will automatically engage Truck Optimization, which looks to minimize costs by moving stops from an underutilized, more expensive asset to a cheaper asset using the costs found in the Truck file.
- Optimize Stops After Loading: This preference setting automatically engages Between Route Optimization after route construction is complete. It aims to minimize costs by moving stops between and within routes.
- Optimize Within Routes: Found under the Modify menu while the user is in Routing Mode, this function attempts to re-order the stops within a route to lower the overall cost.
- Optimize Between Routes: Found under the Modify menu while the user is in Routing Mode, this function evaluates the effects of moving one or more stop(s) to other routes to lower the overall cost.

Optimization settings can be chosen before the load/route process begins:

- Review/update selections in Routing Preferences (**Preferences > Routing > Algorithm**), or

- Choose and apply Optimization preferences to routes already built; with the Route Book open, select **Modify > Optimize** from the menu.

Regardless of the option chosen, for optimization to work effectively, all necessary cost fields within the Truck File must be updated accurately.

- Set the mileage cost, fixed cost, and hourly cost to a higher cost value for those vehicles that should be used only as a last resort (prevent them from being used until necessary).

5.4.1. Optimize Trucks After Loading

Optimize Trucks After Loading is designed to let DirectRoute choose the right vehicle for each route, when there is a mixed fleet of different types/sizes of equipment. DirectRoute will move loads from larger trucks (higher costs) to smaller trucks (lower costs) to minimize cost.

Use Optimize Trucks After Loading when:

- There is a mix of vehicle types in the Truck File.
- Some vehicles should be used as a last resort (rentals).
- Some stops did not load because there were no available vehicles of the type needed.

The algorithm needs different costs assigned to these assets, reflecting a higher amount for the larger assets and a lower amount for the smaller assets.

5.4.2. Optimize Stops After Loading

Optimize Stops After Loading looks to minimize costs by moving stops between routes and within routes. DirectRoute will evaluate the effects of moving one or more stops to other routes, and/or changing the sequence of stops within the routes. Each route is viewed and modified individually. See Optimize Routes for additional information.

5.4.3. Optimize Within Routes

Optimize Within Routes attempts to re-order the stops within a route to lower the overall cost. When selecting *Optimize Within Routes*, the info display box will display fields To and From, providing Users the option to select a range of routes.

***EXAMPLE**: Input the number 2 in the To field and the number 10 in the From field, and Optimization Within Routes will be performed for all routes 2 through 10 (2, 3, 4, 5, 6, 7, 8, 9, and 10).*

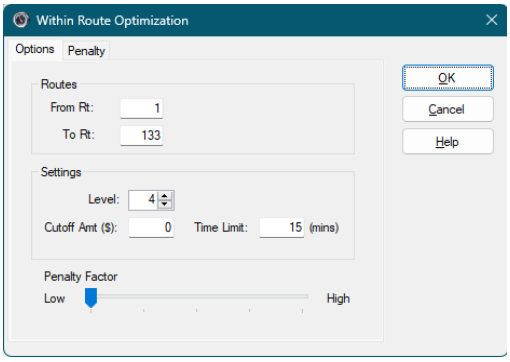


Figure 64 – Optimize Within Routes

- **From RT**: The first route to be optimized. While in the Route Book, the From/To Rt defaults to the route selected (if any). For example, if Route 6 is currently selected and being viewed in the Route Book when the user selects *Modify* > *Optimize Routes*, the From/To Rt will be prepopulated with the number 6.
- **To RT**: Last route to be optimized (only stops within each of the selected routes will be looked at for optimization).
- **Level:** the number of stops that will be reviewed at one time to determine if they can be moved to another position or another route (4 is the recommended Level).
- **Cutoff Amt**: the minimum cost savings incurred to evaluate moving a stop or leaving it in its current order.
- **Time Limit:** the max amount of time you want the optimization routines to run.

  ***EXAMPLE:** If '5' is entered as the Cutoff, DirectRoute will not change a route unless at least $5 will be saved by moving the stop*
- **Penalty Amount**: This applies an arbitrary dollar amount to stops that are moved within a route (this dollar amount does not affect the cost of the route, but only counts as a penalty against the move). The Penalty factor allows more control over reasons for applied penalties. There are several options to choose from, but the application of a penalty on this tab has the same effect as the *Penalty Amount* slider on the previous tab.

See Optimization Options for additional information.

5.4.4. Optimize Between Routes

Optimize Between Routes (**Shift+Ctrl+O**) evaluates the effects of moving a group of stops to other routes. The feature will move from depot to depot (if the multi-depot version is in use), adjusting the stops between the routes within each depot. Moves are made when a lower-cost alternative is identified.

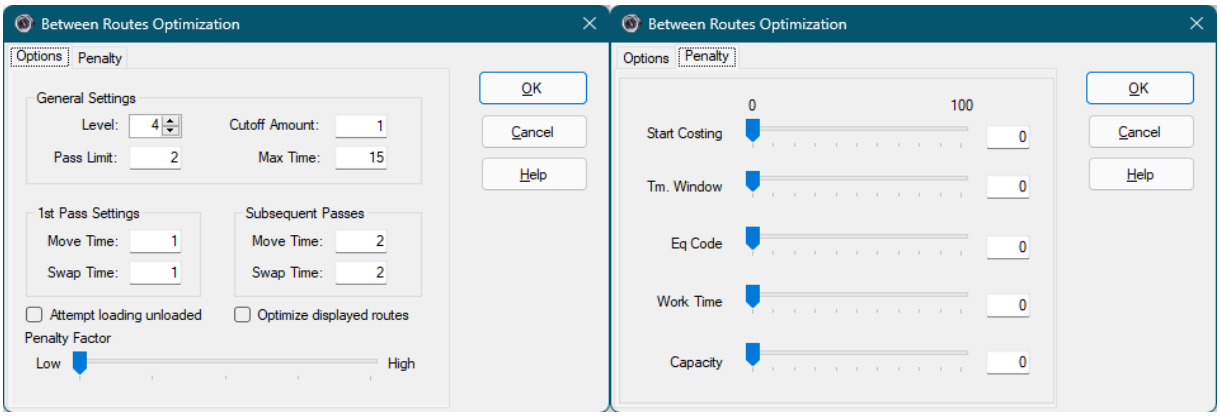


Figure 65 - Optimize Between Routes Window

The following options can be modified:

- **General Settings**:
  - **Level**: The number of stops that will be reviewed at one time to determine if they can be moved to another position or another route. This should be set based on the number that is 50% of the average stops per route in each specific project. 4 is the Default, meaning that 8 stops per route is also the average between all customers and projects seen within DirectRoute to date.

    ***EXAMPLE**: If DirectRoute is set to level four, it will evaluate moving a cluster of four stops to another route. If the level number is higher, then DirectRoute will review more than four stops at a time and will*

take longer to process. A lower level setting may result in fewer cost savings. In the diagram below, we see two routes. DirectRoute will evaluate moving stops #1, #2, and #3 from Route #1 to determine if there is a potential cost savings. If the level number were set to 1 or 2, then only the first two stops would be reviewed. Moving only one or two of the stops would save no incremental cost because all three stops are in the same area.

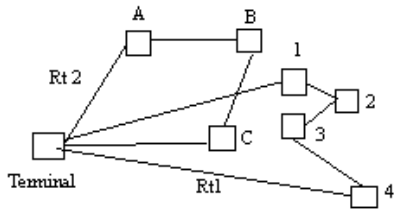


Figure 66 – Optimization Level

- **Pass Limit**: Limits the number of times the routes will "pass" through the optimization process. The default is 2. Two passes will only find up to 95% of the potential savings, three or more passes are required to find the theoretical 100% of savings in a given project.
- **Cutoff Amount**: The minimum cost savings incurred to evaluate moving a stop or leaving it in its current order (enter 5 as the Cutoff Amount, DirectRoute will not change a route unless at least $5 will be saved by moving the stop).

  ***EXAMPLE:** DirectRoute determines if a stop is to be evaluated for movement to another position on the route or to a completely different route. For the move to occur, there must be savings of at least that dollar amount. If the amount of money saved for a stop or group of stops to be moved is equal to or greater than this value (the Cutoff Amount), DirectRoute will move the stop.*

- **Max Time**: Maximum time that you want the optimization routines to run. This does not mean the optimization will always run the maximum time. Generally, DirectRoute will complete optimization before the maximum time has elapsed. DirectRoute reviews the highest marginal cost stops first. This means that most cost savings will occur early in the optimization process.

- **1st Pass and Subsequent Passes**: Designates the time spent on each pass for making moves or swaps. These times are combined to make up the total time allowed for optimization. If these are less than the Max Time, optimization will halt when the pass settings are met.
  - **Move Time**: The time DirectRoute will attempt to make moves within the first pass (in minutes). Moves are defined as stops changing from one route to another, not sequence moves within the same route.
  - **Swap Time**: The time DirectRoute will attempt to make swaps between one route and another during the first pass (in minutes). Swaps are defined as an equal number of stops exchanged between two routes.

  ***TIP**: To automatically perform both optimizations (within and between routes) after a new route has been loaded, select "Optimize after loading" within the Load Options, **File > Preferences > Routing > Algorithm Settings > Optimize Stops After Loading**.*

- **Attempt loading unloaded**: This check box will attempt to load any stops that have appeared on the unloaded stops page in the Route Book.
- **Optimize displayed routes**: Much like ***Optimize Within Routes***, this option also has the Penalty tab, and functions the same way. The check box will cause DirectRoute to only optimize routes that have been locked on the screen. Routes that have not been locked will be ignored.

- **Penalty Factor**: A multiplier for the individual penalties seen on the Penalty tab. The ***Penalty*** tab allows for more granular control over the individual penalties applied where any occurrence of these violations has been counted. The Optimization algorithm would add to the route cost using the following formula: Total Penalty Cost = # of Violations * Penalty Factor * Cost Per Stop * Violation Penalty Weight
    - Individual penalties that can be applied are:
        - **Start Costing**: Modifies the starting time of a route
            - Total Penalty Cost = Arrival Time - Open Time * Penalty Factor * TruckHourCost * Start Costing Penalty Weight
        - **Time Window (TW)**: Modifies routes with a Time Window violation
            - Total Penalty Cost = # of TW Violations * Penalty Factor * Cost Per Stop * TW Penalty Weight
        - **Eq Code**: Modifies routes with an EqCode violation
            - Total Penalty Cost = # of EqCode Violations * Penalty Factor * Cost Per Stop * EqCode Penalty Weight
        - **Work Time (WT)**: Modifies routes with a Work Time violation
            - Total Penalty Cost = # of WT Violations * Penalty Factor * Cost Per Stop * WT Penalty Weight
        - **Capacity (Cap)**: Modifies routes with a Capacity violation
            - Total Penalty Cost = # of Cap Violations * Penalty Factor * Cost Per Stop * Capacity Penalty Weight

5.4.5. Box Expand and Values

Box Expand is a parameter that defines which routes are considered for Between Route Optimization. During optimization, DirectRoute constructs the smallest box that will contain all the stops on a route. When DirectRoute considers making moves, the logic does not consider moving stops between routes, unless their boxes intersect. This includes routes that are in the same vicinity.

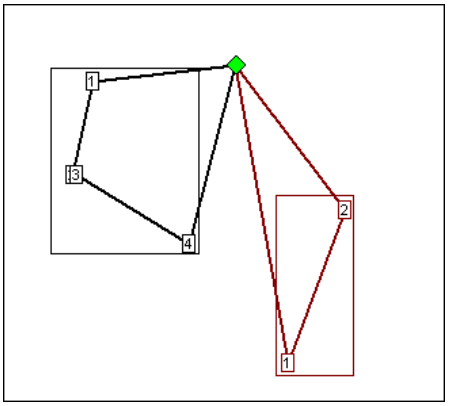


Figure 67 – Box Expand

The Box Expand value is represented in miles and determines how far to expand the box. Larger numbers increase the time it takes for the system to complete optimization; adjusting the parameter allows the system to consider more routes during optimization. Depicted in this example are the results if Box Expand is increased to 25.

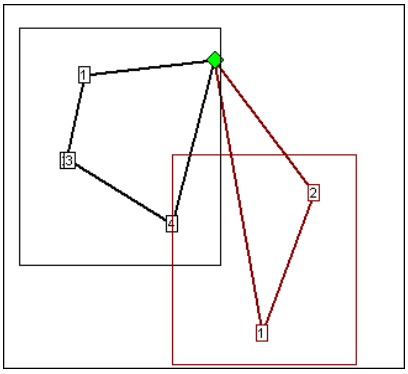


Figure 68 – Box Expand Results

The miles would be saved if Stop 4 (black route) was placed on the red route. By increasing the parameter to 25, the boxes now intersect, thus allowing more moves to be evaluated. The increased value of Box Expand will also increase the amount of time the system takes to complete the optimization process.

To edit Box Expand values, select from the DirectRoute menu: **File > Preferences > Routing > Algorithm > Box Expand**, then enter the number of miles to identify how far to expand the box.

5.5. Priority Routing Tool

Priority Routing Tool is a manual route building tool that provides greater control and flexibility when building routes, and provides a simple format from which edits and adjustments can be made during the building process.

Key components are:

- Route building options not normally available for selection (selected internally by the Algorithm).
- Stop Grid view of valuable information pertaining to each stop.
- Preview the routing solution (statistics) prior to committing to changes.
- Import orders (stops) directly from DRTrack™ to create manual routes.

Priority Route Building can be accessed from the DirectRoute menu, or toolbar.

- From the menu, select **File > New > Priority Routing**, or
- Select the Priority Routing icon from the tool bar  .

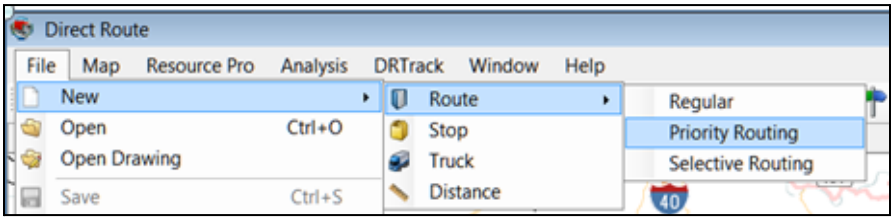


Figure 69 – Priority Route Building From the Menu

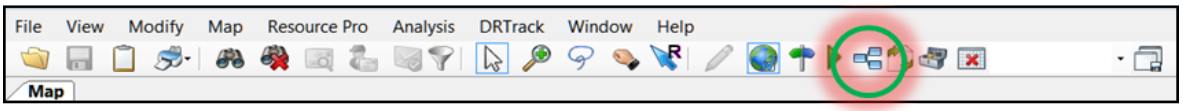


Figure 70 – Priority Routing Icon

***TIP**: If the Priority Routing Info box opens too large to see or access the action buttons on the bottom of the box, resize the box by using the mouse to drag the right side wall inward, or the top wall downward, then reposition the box on the screen, as needed.*

5.5.1. Priority Route File Selection

Select the Route Files to be used to build routes.

- Select the Stop, Truck, and Distance File by clicking on the dotted box next to each item.
- Edit the Dispatch Date or use the calendar icon to select a date.
- Select the Enable Preprocess box, to apply parameters already preselected in Routing Preferences, if desired.
- Select the Next button on the bottom of the box.

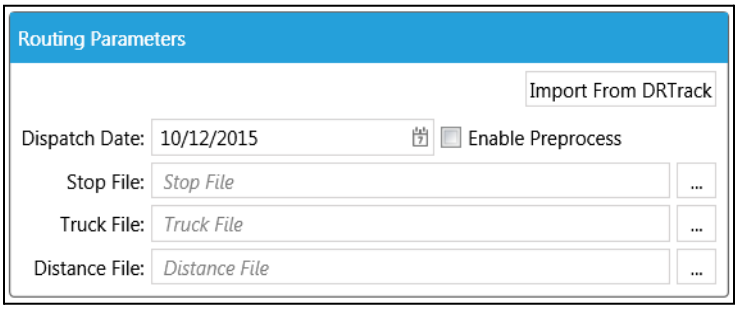


Figure 71 – Priority Route File Selection

In addition to using a Stop File from within the DirectRoute Data Directory, stops/orders can be imported directly from DRTrack, for use in building routes.

5.5.2. Import Records From DRTrack

To import orders from DRTrack to use in building routes:

- Select the *Import From DRTrack* button.
  - Select the Branch, Shift, and Truck Profile using the drop-down arrow on each line.
  - Select the Distance File by clicking on the adjacent dotted box.
  - Edit the *Start/End Dates* or use the calendar icon to select a date.
  - Edit the Start/End Time.
  - Select *Enable Preprocess* to apply parameters preselected in *Routing Preferences.*
  - Select the *Next* button on the bottom of the box.

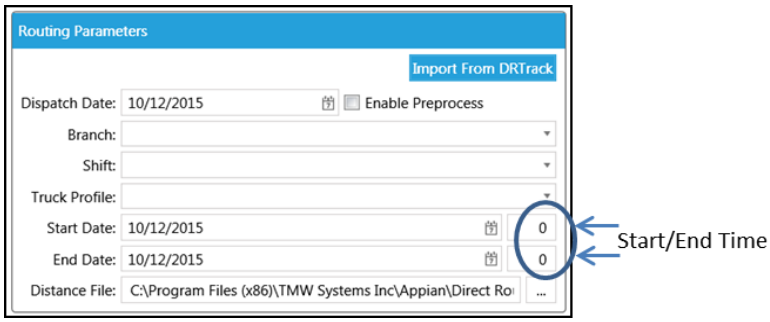


Figure 72 – DRTrack Import

5.5.3. Preview Selected Stop Records

After the appropriate files have been selected, available stops can be viewed from the Stop Grid, in the lower half of the screen of the info box.

Available trucks (routes) are viewed from the Route Grid, the upper half of the box.

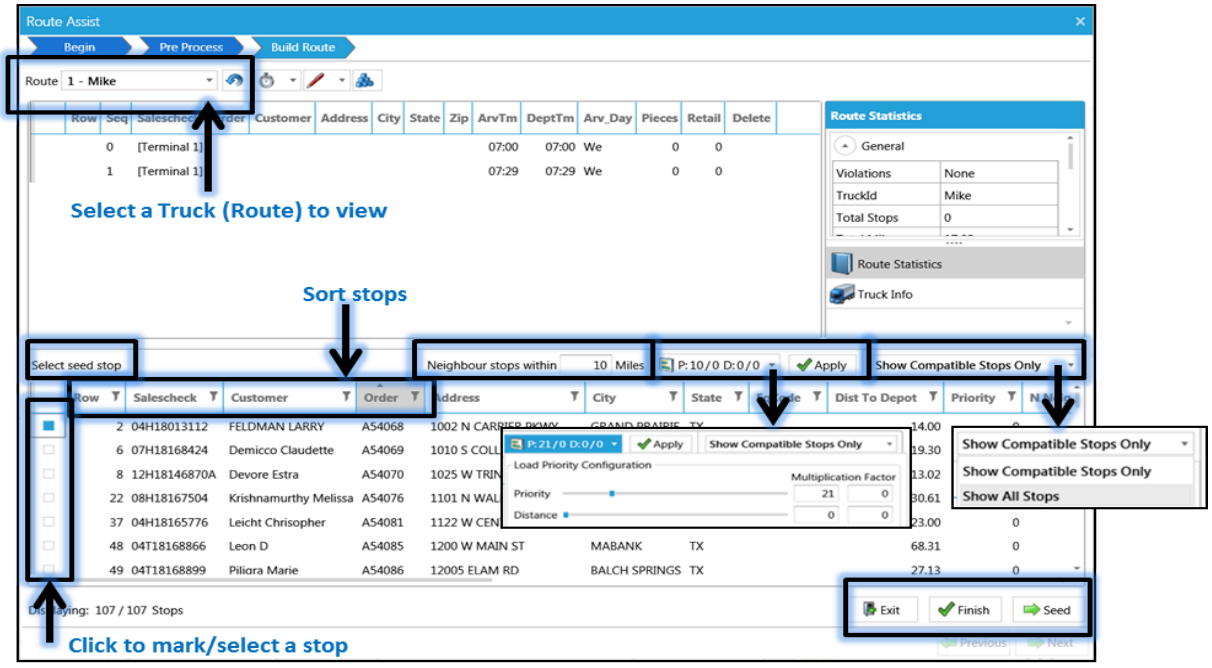


Figure 73 – Stop Grid

The Stop Grid provides a preview of valuable information on each stop, prior to selection for loading. Some Stop Fields included are not currently found in the Route Book (Nearest Neighbors, Dist. to Centroid, etc.). Use the scroll button on the bottom of the grid to reveal additional Stop Fields to the right or left.

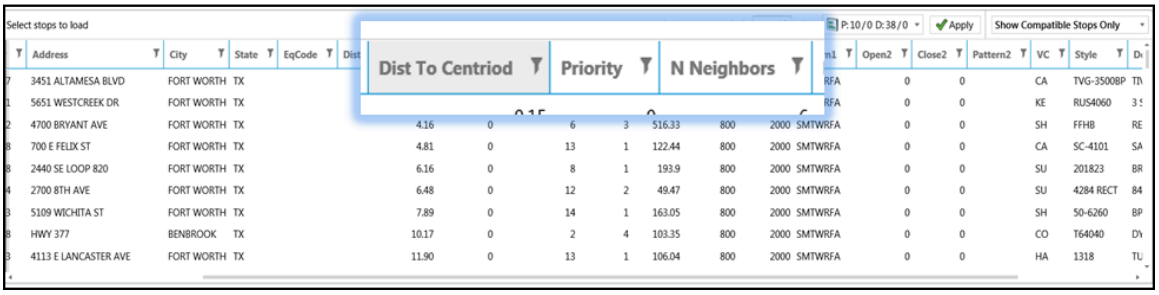


Figure 74 – Stop Fields

Stops in the grid can be filtered by any Stop Field listed; click on the Filter icon to activate and select the filter options. Additional Stop Fields can be viewed by sliding the scroll bar left/right, at the bottom of the grid.

Some of the key fields and functions available in the Stop Grid prior to loading stops:

- **Seed Stop:** A specific stop to build routes around, like a centroid.
  - Click the box to the left of the chosen stop.
  - Click on the *Seed* button in the bottom left corner; the stop will move to the *Route Grid* box.

- **Neighbor Stops Within ( ) Miles:** Select the number of miles from the Seed Stop by which to consider neighboring stops for loading on the Route.
- **Load Priority Configuration**: Use the slide bars to apply appropriate weight factor for prioritization and/or distance, or edit the multiplication factor.
- **Apply Changes**: Select this button to apply the changes/selections to Load Priority.
- **Show Compatible/All Stops:** Use the drop-down arrow to show only compatible stops, or show all stops.

5.6. New Routes with Priority Routing

To build a new route, select the first Truck or Route to build, using the drop-down arrow in Route Grid.

- Select Seed Stop:
    - Locate the specific stop in the *Stop Grid*; select the box left of the stop and click on the *Seed* button on the bottom of the screen (the stop will appear on the grid).

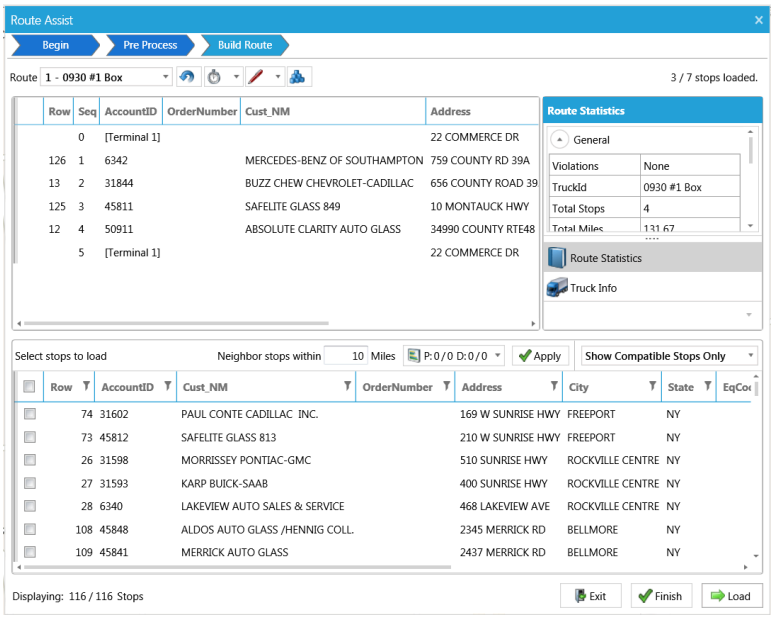


Figure 75 – Route Grid

To load available stops on a route, locate each stop (Stop Grid) and select the box to the left of the stop.

- Select one stop at a time and Load, select several stops then Load the group, or select ALL stops then Load.
    - Use the *Load* button on the bottom of the screen.

Continue selecting and/or making changes to the route, as needed. As each stop is loaded, it will appear listed in the Route Grid.

- To unload a stop from the route:
    - Select the red X, to the right of the stop.
    - Select the Unload button.
- To insert a Refuel Point:
    - Select (highlight) the stop in the Route Grid.
    - Select Insert Refuel Point.

- Choose the Refuel Point Name from the Info box.
    - Select OK.

Use the toolbar icons at the top of the screen to set/change the Route Start Time, edit a leg/route, or invert a route.

- **Invert Route** will reverse the order of stops on the route.
- **Set/Change Route Start Time** to edit or change the start time of a route (or group/range of routes).
- **Edit Leg/Route** to add/delete/edit any leg on the route.
- **Build Routes** performs Initialize/Load function (loads unloaded stops).

When the build has been completed and no additional changes appear needed, left click on the Finish button on the bottom of the screen.

5.7. Priority Routing Results

Finished routes will open in the DirectRoute Route Book. If additional edits or changes are needed, they can be completed in the Route Book, or select the Priority Routing icon from the toolbar .

Unloaded Stops

To load or build routes for any remaining unloaded stops, select the *Build Routes* icon on the toolbar.

- The *Build Routes* icon performs the same function as *Initialize/Load* during the route building process in DirectRoute.
- The DR Algorithm will attempt to load any unloaded stops on existing routes, if feasible, or build a new route(s).

Statistics

When using Priority Routing to manually build routes, statistical boxes are displayed for each route and truck, on the right side of the Route Grid. During the route building process, as changes are made to the route, the statistics will automatically update to reveal the effects of each change. In addition, any violations will also be displayed.

- Select the *Route Book* Icon to view *Route Statistics.*
- Select the *Truck* Icon to view *Truck Statistics*.

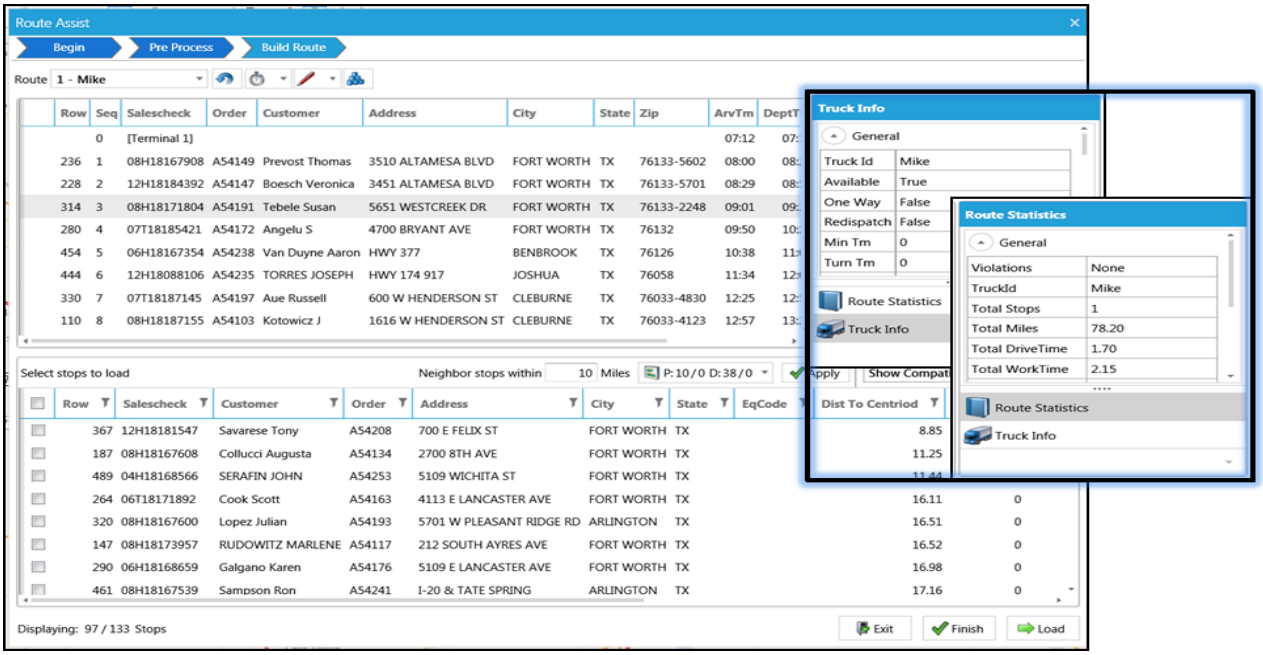


Figure 76 – Priority Routing Statistics Boxes

5.8. Selective Routing Tool

Similar to the Priority Routing Tool, the *Selective Routing Tool* provides an optional order selection filter that can be applied when selecting orders for routing, enabling greater control and flexibility of stop and vehicle selection when building routes manually. Key components:

- Stop User Field filter, to select orders to route.
- Apply load adjustments to vehicles; sliding meter enables adjustment of vehicle *Capacities (Volumes), Work Time, Target Time*, and *Max Drive Time*.
- Import orders (stops) directly from DRTrack™ into *Selective Routing* to create manual routes.

Before using the Selective Routing Tool, *Stop User Fields* and *Order Criteria Fields* should be updated.

- Review and update Stop User Fields options (Preferences > Configuration > Stop User Fields)
  - Edit/add all *Stop User Fields* that are used in the *Stop File.*
- Review and update Order Criteria options (File > Preferences > Other > Order Criteria > Query by User Field).
  - Use the dropdown arrow to select a *Stop User Field* from the list; fields populated based on the inputs in *Configuration > Stop User Fields.*
- Review and update Query by Values option (File > Preferences > Other > Order Criteria > Query by Values).
  - Left click *Collection* to see the available values.
  - Use the … button to add/edit the *Values* for the *Stop User Field* (*Values* found in *Stop File*).
  - Select the + button for each *Value* input.
  - Add as many *Values* as needed; use the ✕ button to delete *Values* if necessary.

Figure 77 – Order Criteria Preference Setting

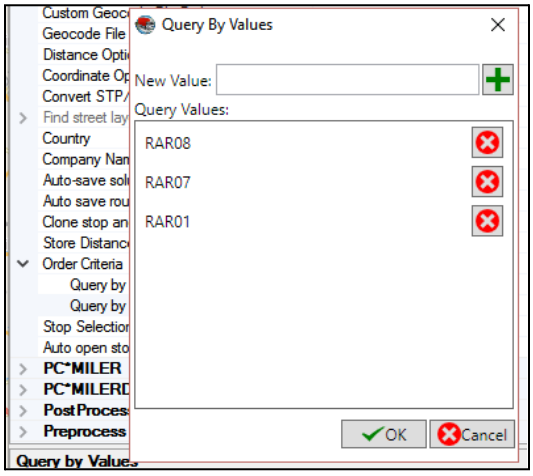


Figure 78 – Order Criteria Values

- Review and update the Stop Selection Color options (selected stops will be color-coded on the map).
- After all updates have been completed, close the Preferences dialogue box.

Now the Selective Routing Tool can be initiated.

- Select **File > New > Route > Selective Routing**.

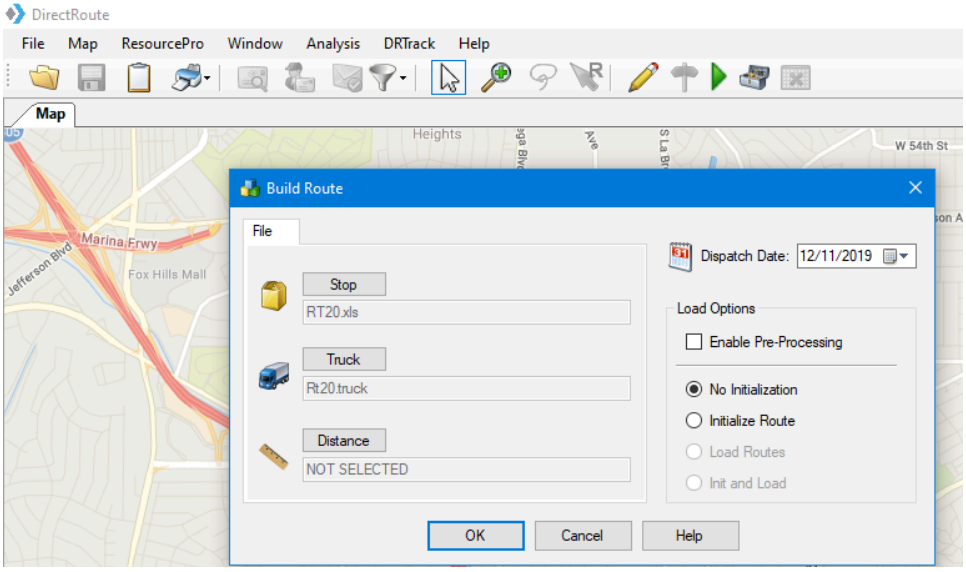


Figure 79 – Start Selective Routing

5.8.1. Selective Route File Selection

Use the Stop and Truck buttons to select the appropriate files to use (Distance File is optional).

- Select *Enable Preprocess* settings to apply Preprocess settings (Preferences), if desired.
- Ensure *No Initialization* is selected.
- Edit the Dispatch Date.
- DRTrack Users: To import and use DRTrack orders/files, select the *Import from DRTrack* tab.
    - Select the Branch and Truck File.
    - Edit dates to select ALL orders within the date range.
    - After all selections have been completed, select the OK button.

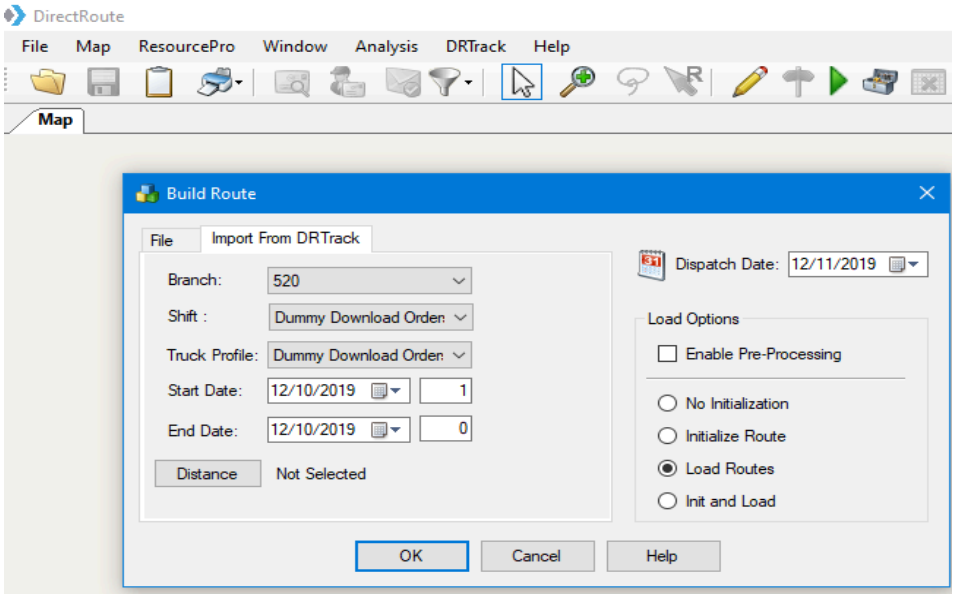


Figure 80 – Selective Routing DRTrack Options

Note for DRTrack Users: When using Order Criteria selection fields, only orders with matching values will be included in the download file. To remove the filter and enable download of ALL orders, simply clear these entries from Preferences.

DirectRoute will initialize the selected files automatically and when complete, the Selective Routing dialogue box will open.

The *Selective Routing* dialogue box contains two grids; Trucks in the top half of the box (Truck grid) and stops from the Stop File in the bottom half of the box (Stop Grid). Both grids will list the available resources and the number of each on the tab button {i.e. Empty Trucks (15), Unloaded Stops (138)}.

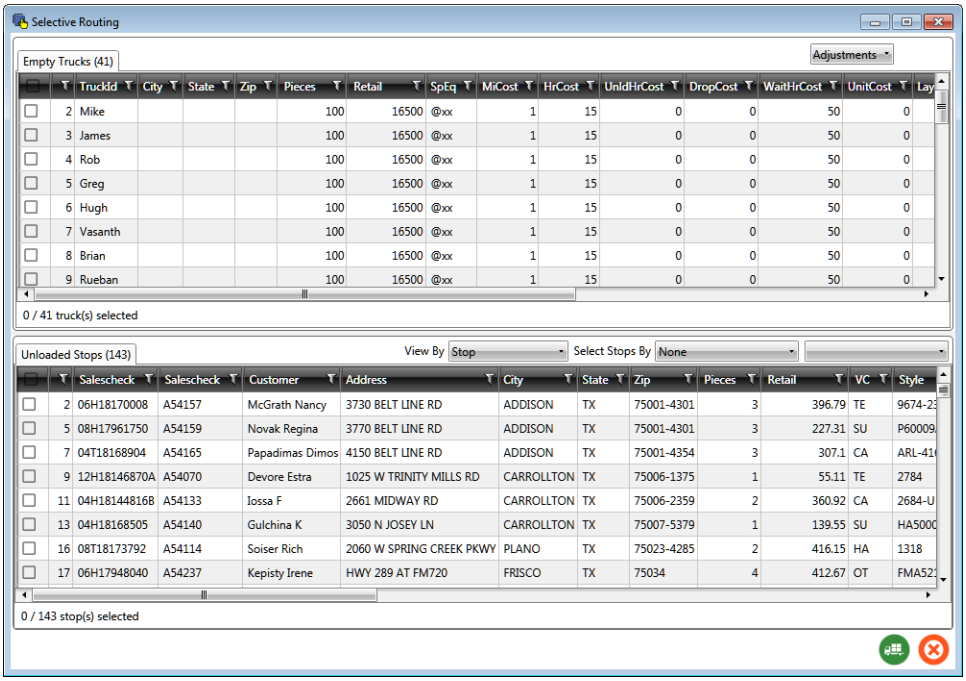


Figure 81 – Selective Routing Info Box

The columns in both grids can be sorted, filtered, and moved (re-ordered).

- To move a column, drag the column heading and drag/drop in the desired location.
- To sort a column, click the column heading title.
- To filter a column, click the filter icon adjacent to the column heading title, then select a field option from the Filter dialogue box.

5.8.2. Selecting Stops

There are several ways to select stops for use in the routing solution, but this section will focus on selecting stops during *Selective Routing*.

- To select stops individually, place a check mark in the box (left of the stop#), or
- Select *ALL*; check the box located in the very top row (with column headings), or
- Filter the list of stops by using the *Select Stops by Filter* in the top right corner of the stop grid (*Order Criteria* options must be set in Preferences).
    - When used, only stops that meet that the selection criteria will be returned and shown in the stop grid.
    - Click the dropdown arrow to select the field.
    - Click the box to the right of the field to display and select from the list of values associated with this field (values displayed are those used in this column in the *Stop File*).

Example: Company A performs daily routing functions for shipment the next day. The availability status of each item ordered is annotated with a 'X' in the Stop File, in the column 'Available' (a Stop User Field). Using the Order Criteria settings, and the Selective Routing tool, orders can be filtered, and routes built to include only the orders with an 'X' in the 'Available' column.

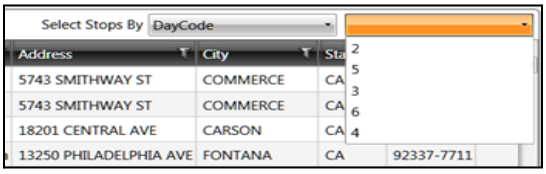


Figure 82 – Selective Routing Stop Filter

- If any of the selected stops did not load, the grid will remain open and a message will display to indicate how many stops were not loaded.

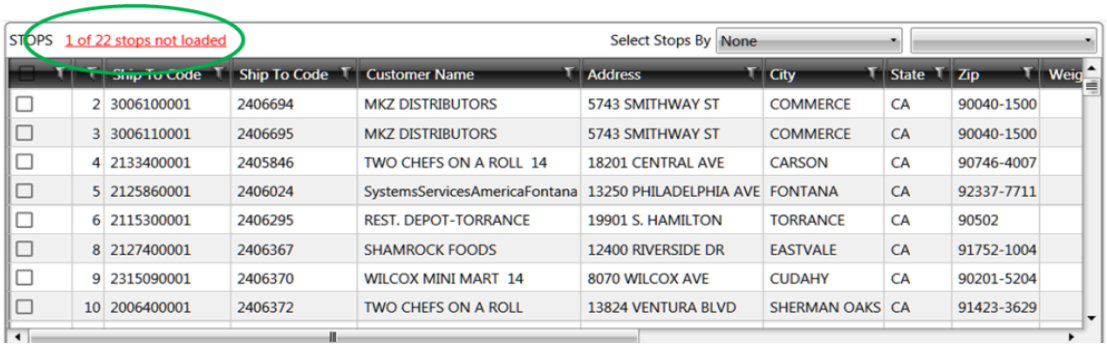


Figure 83 – Selective Routing Stops Not Loaded

Additional stops can be selected from any remaining unloaded stops on the Unloaded Stops tab, repeating the steps to select and load, until all desired stops have been loaded.

From the *Unloaded Stops* list, a counter at the bottom of the grid keeps count of the number of stops selected. Sort stops in the grid by Stop, Order, or Line Item number.

- Use the *View By* box's dropdown arrow to make the selection option.
- *View by Stop* will return the fewest records in the Stop Grid, as orders are consolidated at the stop level.
- *View by Order* will show all orders (unconsolidated) for every stop.
- *View by Line Item* may return the most results, as one stop may include several orders, and each order may include multiple line items.
- Once selected, the records will sort automatically according to the option chosen.

Select stops by choosing any of the configured Stop User Fields.

- Use the *Select Stops by* box's drop-down arrow to select an option.
- Once a selection option has been made, use the dropdown arrow in the next box to choose from the list of data values found within the record's selected *Stop User Field*.

You can also edit any of the *Stop User Fields* in the grid.

- Locate the desired record and *Stop User Field* then double click on the box to edit.

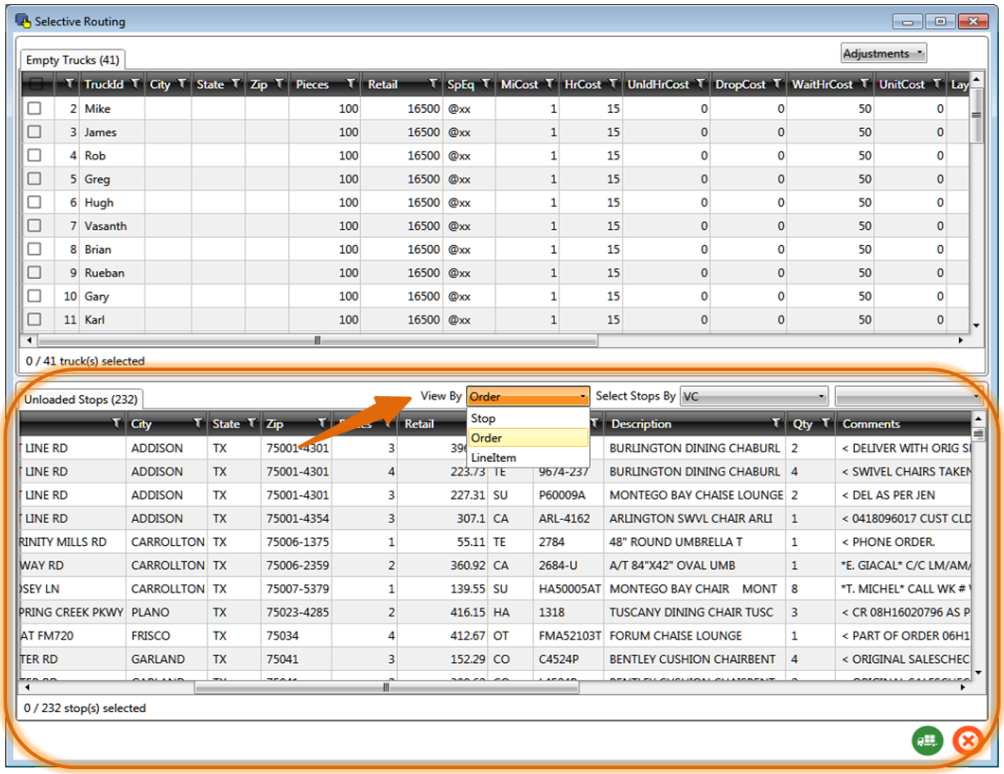


Figure 84 – Selective Routing Stop View

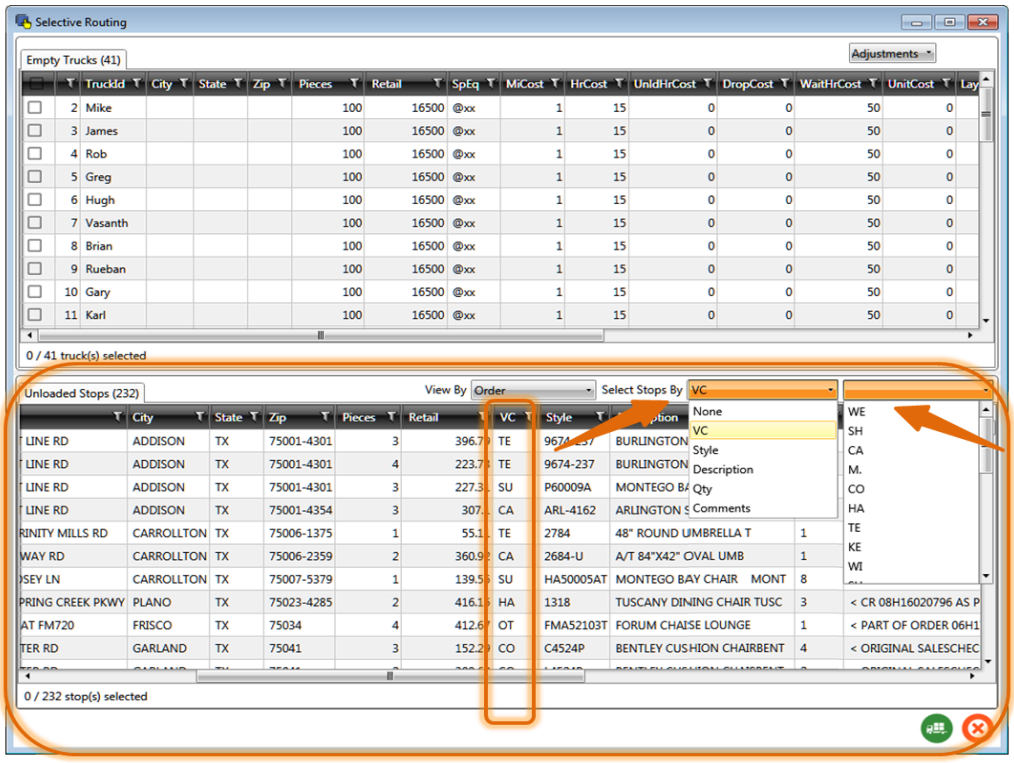


Figure 85 – Selective Routing Stop Selection

After stops are loaded/routed, they'll be removed from the *Unloaded Stops* tab and moved to the *Routed Stops* tab.

After the selection(s) have been made, click *Load Stops* in the bottom right corner next to the red **X**, to route the selections.

- *The Routed Stops* tab will appear in the stop grid and list all stops that were routed.
- A message in the bottom left corner will indicate how many stops were routed.

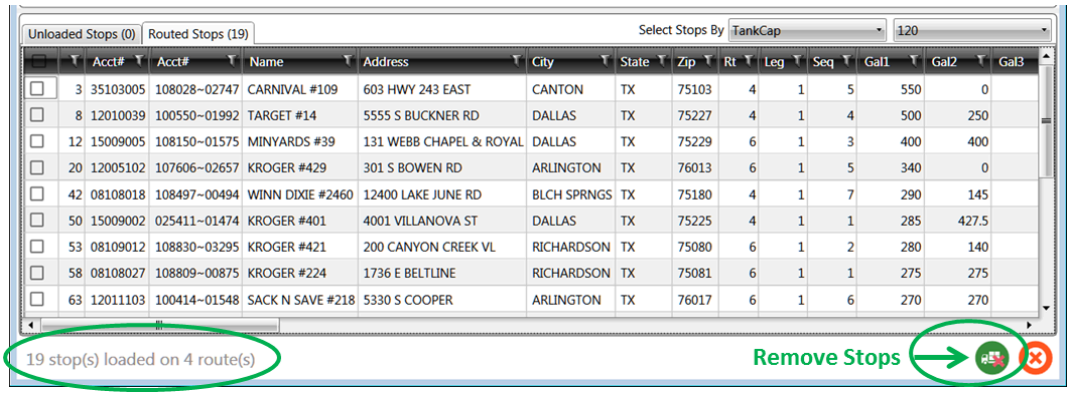


Figure 86 – Selective Routing Loaded Stops

5.8.3. Loading Trucks

Trucks can be selected for routing using any of the methods listed below. After the stops are loaded, the loaded trucks will be removed from the *Empty Trucks* tab and reappear in the *Loaded Trucks* tab.

Selecting Trucks

Select the trucks to load from the list of *Empty Trucks*. A counter at the bottom of the Truck grid keeps count of the number as vehicles are selected.

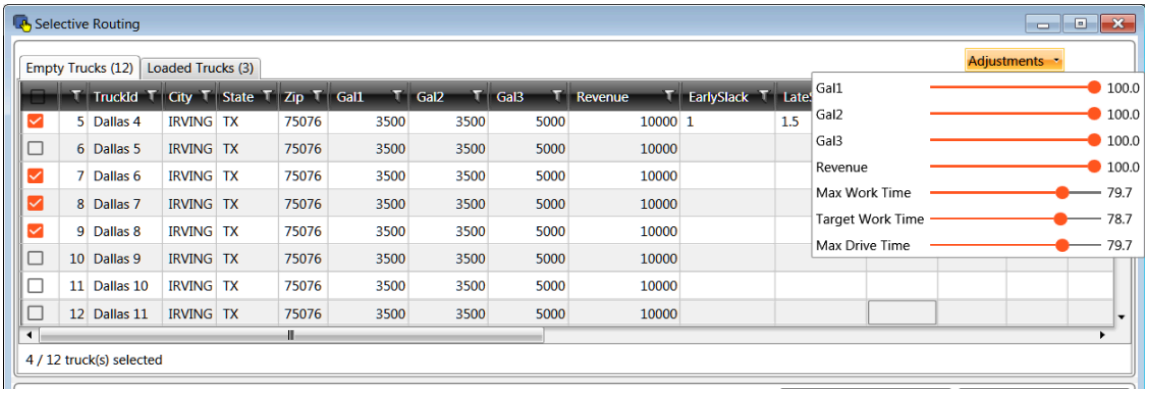


Figure 87 – Selective Routing Truck Grid

- To select vehicles individually, check (left of the *Truck ID*), or select ALL; check the box located in the very top row (with column headings).
- *Truck Adjustments* enables adjusting vehicle load capacity or adjusting the level at which work rules are filled (default levels = 100%).
    - Drag the orange slider button to adjust levels {left (-), right (+)}, or
    - Click the red dot and use the keyboard arrow keys (>) to move the slider left or right in small increments.

5.8.4. Using the Lasso to Select Stops

The *Lasso Tool* can also be used to select stops to load or unload.

- Select the *Lasso Tool* from the menu then use the mouse pointer to draw an image around the desired stops.

The Selective Routing dialogue box will open to display the selected stop(s) in the Stop Grid.

- If a stop is loaded on a route, it will appear on the *Routed Stops* tab.
- To unload the stop, select it from the list (*Routed Stops* tab) then select the button.
- If a stop is unloaded, it will appear on the *Unloaded Stops* tab.
- To load the stop, select it from the list (*Unloaded Stops* tab) then select the button.

Close the Selective Routing dialogue box to view the adjusted routes.

- The map screen will show the new routes, adjusted based on the changes made.
- The *Detail* and *Summary Reports* will show the refreshed route info.
- The *Differential Info* box will show the stats for the adjusted routes.

Additional route edits can also be completed using the traditional methods (*Modify* menu, or *Route Book* menu).

Note: For more information on using the Lasso tool, see **Using the Lasso Tool***.*

5.8.5. Selective Routing Results

Routes created with the *Selective Routing Tool*, as well as any unloaded stops, can be viewed and modified in the Route Book.

- Both routed and unloaded stops are displayed on the map (red–unloaded, green–routed)
- In the *Unloaded Stops* section of the *Map Filter Info* box, will be a drop-down list of the *Stop User Fields*, and the number of unloaded stops remaining for each value.
- Check or uncheck the *Stop User Field* values to see or remove the stops from view on the map.
- In the Routes section of the *Map Filter Info* box, use the check mark to toggle on/off the view of the routes on the map.
- Selected stops and routes can be edited within the Route Book.
- *Unloaded Stops* can be viewed and/or loaded from the *Unloaded Stops* tab.

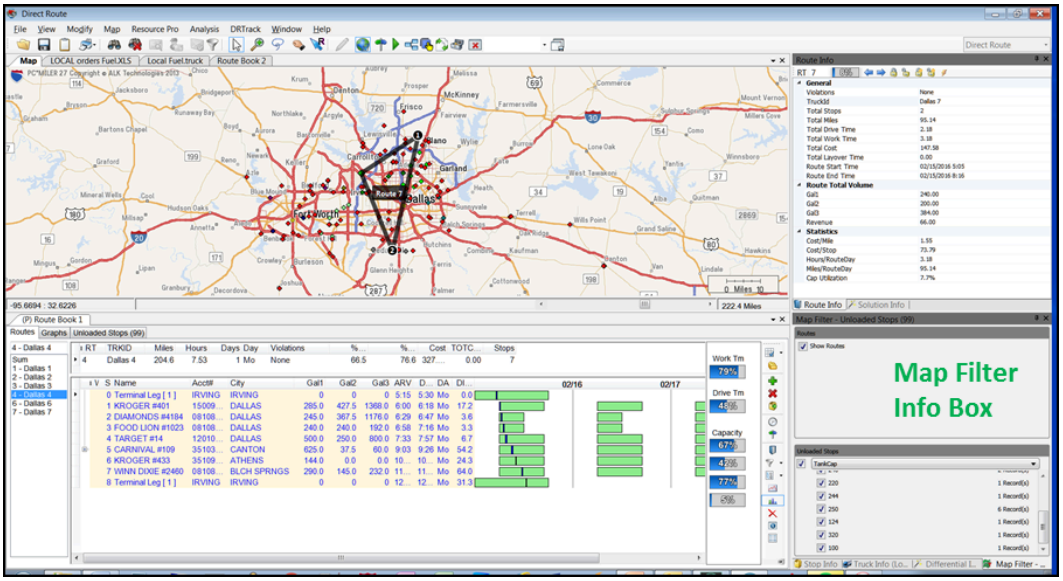


Figure 88 – Selective Routing Results

5.9. Apply Minimum Time Between Stops After Directions

DirectRoute enables the automatic addition of minimum time between stops during the route-building process. When used, the *Apply Min Time Between Stops After Directions* option will tell DirectRoute to apply the designated time (*Minimum Time Between Stops*) during the route-building phase, eliminating the need to add additional time to stops when needed. The result is more accurate planned stop arrival times. This new option can be used with any existing Route File or applied when creating new routes.

To enable the Apply Min Time Between Stops After Directions option, edit DirectRoute Preferences (Routing > General).

- Select *TRUE* and edit the designated time (minutes) in *Minimum Time Between Stops*, or
- Select *FALSE* and no other action is required.

***NOTE**: Minimum Time Between Stops (minutes) = The number of minutes DirectRoute should apply between stops. This is required when Apply Min Time Between Stops After Directions is set to TRUE.*

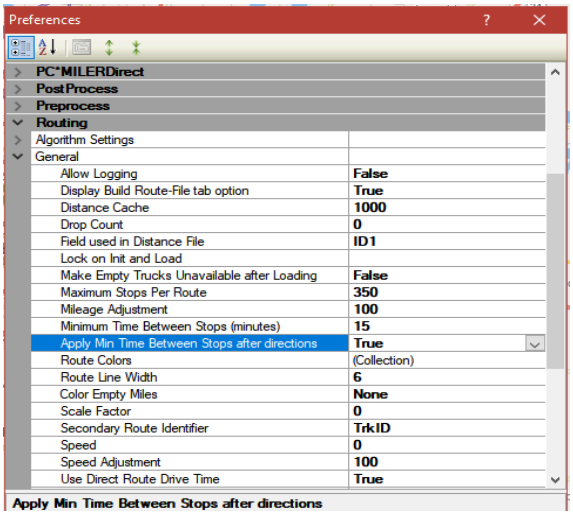


Figure 89 – Apply Min Time Between Stops

From the DirectRoute toolbar, select the *Get Directions* icon .

- In the Route Directions dialog box, click *Apply Min Time Between Stops*.
- To limit which routes this option is applied to, edit *From Route* and *To Route* with the appropriate route numbers.
- Select *OK* when all options have been chosen.

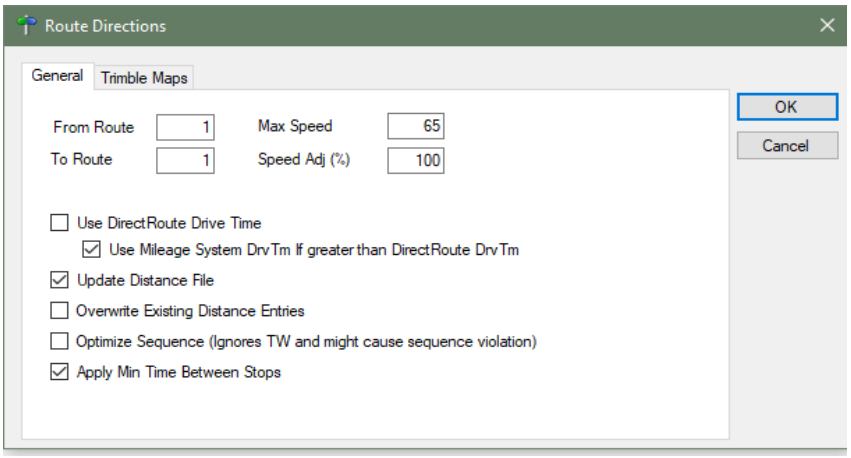


Figure 90 – Get Directions/Apply Min Time Between Stops

DirectRoute will recalculate the estimated arrival times for affected stops and update the Route Book accordingly.

When *Apply Min Time Between Stops* is not needed on every route all the time, but when it is needed, the amount of time (minutes) added is standard for all stops, the Preferences can be set in a manner that will allow it to be turned 'on' within the Route Book, without needing to re-edit Preferences each time.

- Set Apply Min Time Between Stops After Directions to FALSE.
- Update the *Minimum Time Between Stops* (minutes) with the number of minutes commonly (standard) used.

The next time the function is needed, all actions can be completed from within the Route Book.

- From the DirectRoute toolbar, select the *Get Directions* icon .
- In the Route Directions dialog box, click Apply Min Time Between Stops.
- To limit which routes this option is applied to, edit *From Route* and *To Route* with the appropriate route numbers.
- Select *OK* when all options have been selected.

DirectRoute will recalculate the estimated arrival times for affected stops and update the Route Book accordingly.

6. Speed Adjustments

DirectRoute provides a wide-range of optional speed settings that can help you build routes that take into account many real-world factors drivers might encounter.

6.1 Speed Adjustments at Project-level

If one chooses not to use a Distance file, they can set a speed and speed adjustment in their Routing Preferences for the algorithm to use with every routing solution. See **Preferences> Routing> General> Speed**

The *Speed* field indicates the average speed for all vehicles included in the routing solution (e.g, 60).

- A *Speed* entry of 0 means the user is opting for the proprietary Route speed calculation rather than a user-defined value.

The *Speed Adjustment* is the percentage increase or decrease on top of the average speed entered.

- A speed adjustment entry of 100% means no adjustments are made.

  For example, a Speed adjustment of 120% decreases the speed of the Route because it increases the time by 20%. An 80% adjustment increases the speed because it decreases the time by 20%.

  (.5 hrs x .80 = .4 30 mins x .80 = 24 mins — The Route went from 30 mins to 24 mins)

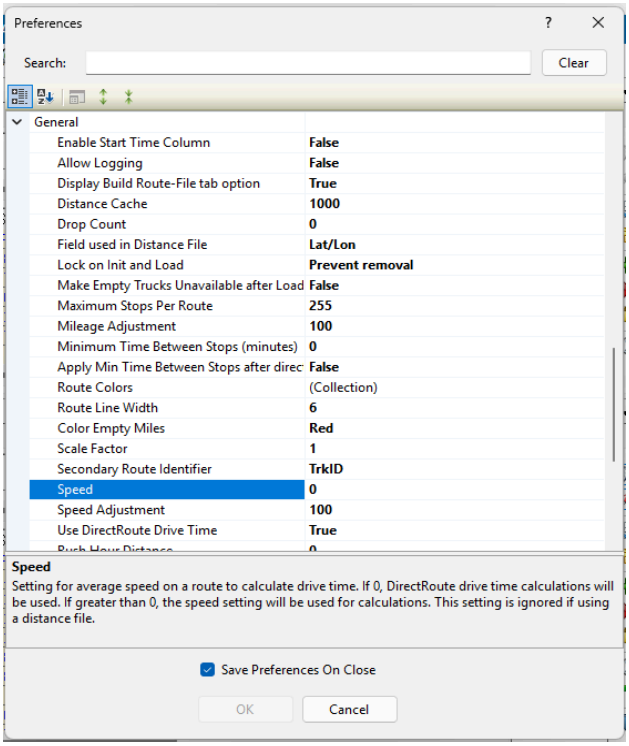


Figure 91 - Speed and Speed Adjustments Preferences

6.2 Speed Adjustments for Stop / Truck File

In addition to project-level speed settings, adjustments can be defined to accommodate known occurrences such as traffic slow-downs in construction zones or a rush hour traffic influx. These are included in calculations using optional fields in the Stop and Truck files. The distance of the radius at which a slower speed is applied is described in the table below.

- Project-level and Stop/ Truck file speed adjustments are compounded when used together.

Zone Speed Adjustments

File	Field	Distance (Radius)	Center of Radius
Stop	Zone	8 miles, 24 hours a day	Next stop in sequence
Truck	Zone	8 miles, 24 hours a day	Depot

Rush Hour Speed Adjustments

File	Fields	Distance (Radius)	Center of Radius
Stop	AMAdj, PMAdj %Adj	The **Rush Hour Distance** set in Preferences.	Next stop in sequence
Truck	AMAdj, PMAdj %Adj	The **Rush Hour Distance** set in Preferences.	Depot

7. The Route Book

A new Route Book is created each time a new routing solution is completed. It provides a detailed picture of each individual route, as well as summarized data (route report) for the entire routing solution.

- Customized summary information about the routing solution.
- Customized view of individual routes and stops.
- Modify routes by adding or deleting stops.
- Display capacity, drive time, and work time gauges for each route.
- Generate turn by turn directions for each route.

The Route Book contains a summary of all routes, as well as detailed information for each individual route. The Route Book also provides the opportunity to review and experiment with making your own "what if" changes to the routes.

When the route building process completes, the Route Book becomes available for view.

- Select *View* > *Route Book* from the menu, or use Ctrl+B.
- To open a previously saved Route Book (Route File), select *File* > *Open* > *Route*, and select the file name to open.

When the Route Book opens, the Route Book tab appears (just below the toolbar) adjacent to the Stop and Truck File tabs.

- The first Route Book opened will appear as (P) Route Book 1 (on the tab); this identifies it as the primary Route Book.
- If a second or subsequent Route Book(s) are opened at the same time, each additional Route Book will be numbered as Route Book 2, Route Book 3, etc.

Included in the Route Book view are the solution *Info boxes*. The Route Info, Stop Info, Truck Info, Solution Info, and Differential Info boxes all display various information pertaining to the individual routes and/or stops that are present in the Route Book.

7.1. Route Book Tools

The Route Book tool bar is located on the right side of the Route Book. It provides shortcuts to common route modification actions and tools to alter the Route Book views.

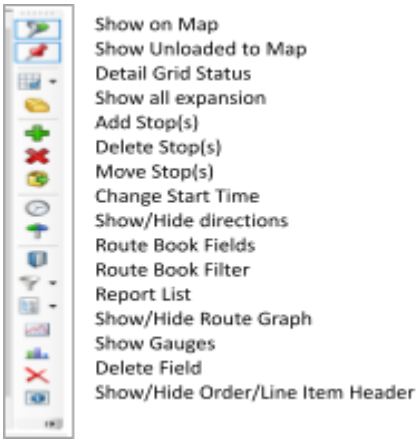


Figure 92 – Route Book Tool Bar

Use the Route Book filter to filter results in the Route Book. Let the filter tool help you select route info fields and field results to filter, or you can use free-form text, without navigating through the entire filter workflow.
The Route Book properties include settings for column width, font, and color; or adjust view by hiding or showing grid lines, etc.

- To adjust any of the settings, right click within the Route Book to open the Route Book menu.
- Select *RT Book Properties* then select the item that requires modification from the extended menu.

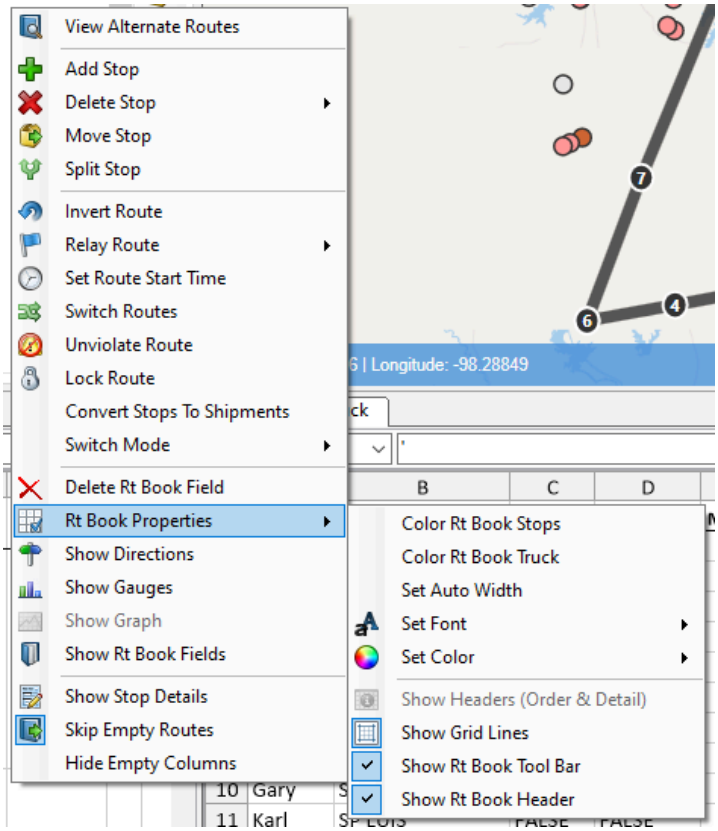


Figure 93 – Route Book Properties

Tip: The Route Book contains several tools to enable editing of the stops, routes, and final route results. Editing can be done within the Route Book, on the map, and even within the Solution Info panels. See **Route Modifications** *for additional information and instructions on these options.*

7.1.1. Show Gauges

Gauges are available to provide a quick view of total work time, drive time and capacity levels on each route. This can be useful when needing to add and/or delete stops, as you can quickly see when a vehicle and/or route are close to maximum capacity. If a route capacity is exceeded, the gauge color will immediately change from blue to red.

The gauges, when used, will appear adjacent to the Route Book toolbar on the right side of the screen.

- Right click anywhere in the Route Book and select Show Gauges from the menu, or
- Select the Show Gauges icon  from the Route Book toolbar.

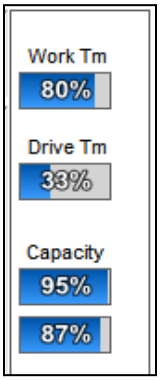


Figure 94 – Route Gauges

7.1.2. Show or Hide Details, Directions

Additional tools available for selection from the Route Book menu.

Skip Empty Routes –Dependent on the size of the fleet in your Truck File, the routing solution may include empty routes and vehicles that have not had any stops loaded on them. The empty routes/vehicles can be skipped so they are not visible. This is especially helpful when viewing and/or printing any of the route reports.

- Right click from within the Route Book to display the menu and select Skip Empty Routes.

Show Stop Detail–Review detailed stop data for any stop, on any route.

- Select the specific stop in the Route Book to highlight the stop.
- Right click and select Show Stop Detail from the Route Book menu.

Show Directions–This command allows you to view the detailed turn by turn driving instructions for the route you have selected. See **Generate Driving Directions** for more information on generating directions.

When directions have been generated, select the Show Directions icon  (located on both the DirectRoute toolbar and the Route Book toolbar). To remove the directions from view, select the Show Directions icon again.

7.2. Route Book Reports

DirectRoute provides a great deal of flexibility for presenting and viewing route information. The Route Book reports are broken down into three areas, each having different formats that can easily be customized.

- Summary Report–Pertains to the summary page of the Route Book.
- **Detail Report**–This is the body of the report, and lists all the individual route details.
- Header Report–Contains the Column headings information.
- **Solution Statistics**–Contains statistical data for the current routing solution.
  - Select *View* > *Solution* Statistics from the main menu.
  - This report can be exported (saved) to a .csv, .tab, or .xls file.
- **Miles by State**–Displays the total miles by state for all routes (requires Generate Route Directions be set to TRUE in Preferences).

The *Summary*, *Detail*, and *Header Reports* are offered in three separate pre-defined formats or may be customized. To view the formats for each report, select the *Report List* icon from the Route Book tool bar then select one of the reports listed.

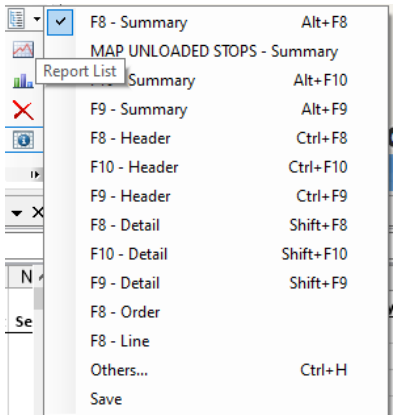


Figure 95 – Predefined Report Formats

7.2.1. Summary Report

To view the Summary Report, open the Route Book (*File* > *Open* > *Route*), or if still in the routing mode, select *View* > *Route Book* from the menu, or use Ctrl+B.

- Displayed when Sum is selected in the column on the left; when the Route Book opens it will usually open to this view.
- The Summary Report displays a list of all the routes created in the project, route numbers, truck IDs, route totals (miles, hours, stops, etc.), cumulative totals, and averages.
- Select the view format you want to use from the Report List on the Route Book toolbar.

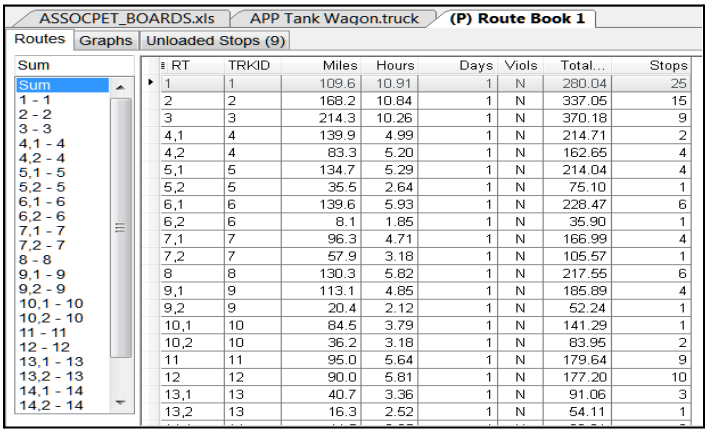


Figure 96 – Route Summary Report

7.2.2. Detail Report

To view the Detail Report for each route, select the Route # from the column on the left.

- Displayed when the route# is selected in the column on the left.
- The Detail Report displays the individual route information.
- Consolidated stops can be exploded to view by selecting the + adjacent to the stop.

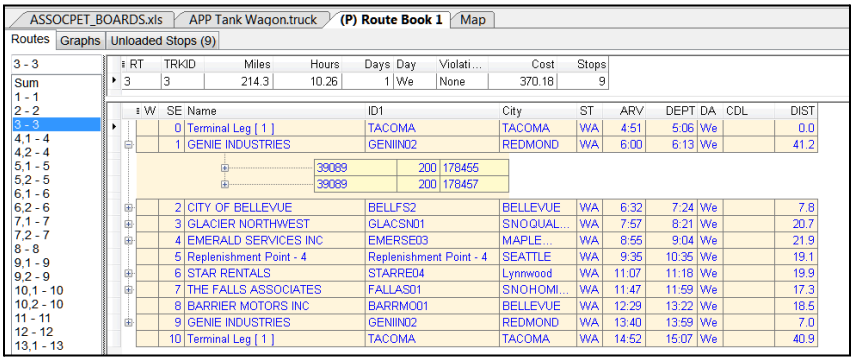


Figure 97 – Detail Report

7.2.3. Header Report

The Header Report appears above the Detailed Report in the Route Book.

- Displayed when the Detailed Report is displayed.
- Contains the route totals for just that route, for each Stop Field column listed in the Detail Report.

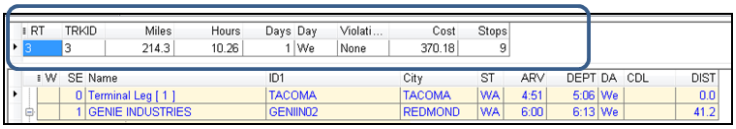


Figure 98 – Header Report

7.2.4. Miles by State Report

The *Miles by State r*eport is generated when *Generate Route Directions* is set to *TRU*E in Preferences. DirectRoute totals the miles by state when generating directions and displays the totals in report format.

The *Route Summary* tab lists the totals for each route separately, while the *State Summary* tab lists the totals by state.

- **Free Miles**–Free miles traveled (non-toll roads) for each state.
- **Toll Miles**–Toll road miles traveled for each state.
- **Toll Cost**–Toll costs for each state.
- **Total Miles**–Total miles for each state.

Ensure Generate Directions is enabled in Preferences > Preprocess > Generate Distance File > Generate Route Directions = TRUE.

- After creating a new routing solution with *Generate Directions* set to TRUE, select *View* > *View Miles by State* from the main menu.
- This report can be exported (saved) to a .csv, .tab, or .xls File.

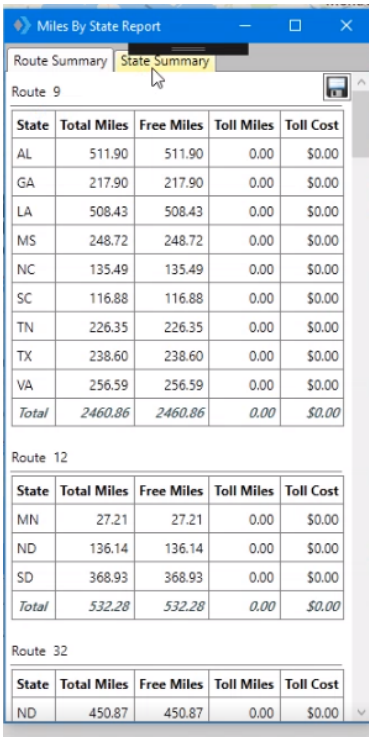
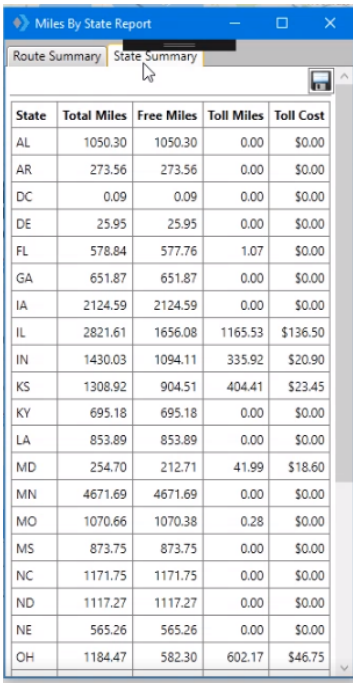


Figure 99 – Miles by State Route Summary



State	Total Miles	Free Miles	Toll Miles	Toll Cost
AL	1050.30	1050.30	0.00	$0.00
AR	273.56	273.56	0.00	$0.00
DC	0.09	0.09	0.00	$0.00
DE	25.95	25.95	0.00	$0.00
FL	578.84	577.76	1.07	$0.00
GA	651.87	651.87	0.00	$0.00
IA	2124.59	2124.59	0.00	$0.00
IL	2821.61	1656.08	1165.53	$136.50
IN	1430.03	1094.11	335.92	$20.90
KS	1308.92	904.51	404.41	$23.45
KY	695.18	695.18	0.00	$0.00
LA	853.89	853.89	0.00	$0.00
MD	254.70	212.71	41.99	$18.60
MN	4671.69	4671.69	0.00	$0.00
MO	1070.66	1070.38	0.28	$0.00
MS	873.75	873.75	0.00	$0.00
NC	1171.75	1171.75	0.00	$0.00
ND	1117.27	1117.27	0.00	$0.00
NE	565.26	565.26	0.00	$0.00
OH	1184.47	582.30	602.17	$46.75

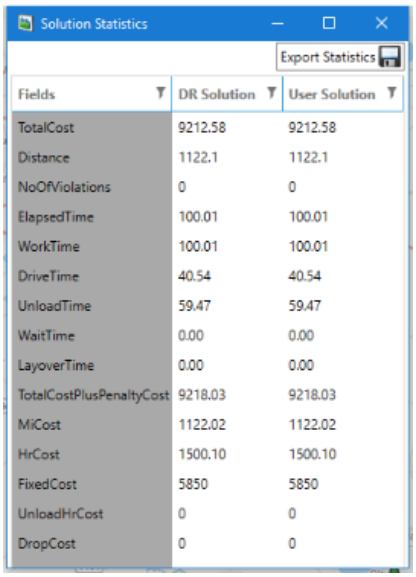
Figure 100 – Miles by State Route Summary

This report can also be downloaded and saved to a .csv, .tab, or .xls File; click the *Save* button, then save the file to a location of your choice.

7.2.5. Solution Statistics

The Solution Statistics report contains statistical data for the routing solution that is currently displayed/ open. The totals listed are calculated for all routes in the current solution.

This report can also be downloaded and saved to a .csv, .tab, or .xls File; click the *Save* button, then save the file to a location of your choice.



Fields	DR Solution	User Solution
TotalCost	9212.58	9212.58
Distance	1122.1	1122.1
NoOfViolations	0	0
ElapsedTime	100.01	100.01
WorkTime	100.01	100.01
DriveTime	40.54	40.54
UnloadTime	59.47	59.47
WaitTime	0.00	0.00
LayoverTime	0.00	0.00
TotalCostPlusPenaltyCost	9218.03	9218.03
MiCost	1122.02	1122.02
HrCost	1500.10	1500.10
FixedCost	5850	5850
UnloadHrCost	0	0
DropCost	0	0

Figure 101 – Solution Statistics

7.3. Customizing Reports

Any of the formatted reports (*Summary Report, Detail Report,* and *Header Report*) can be customized by adding additional columns of information to display.

To add columns to reports:

- Select the Route Book Fields icon  from the toolbar.

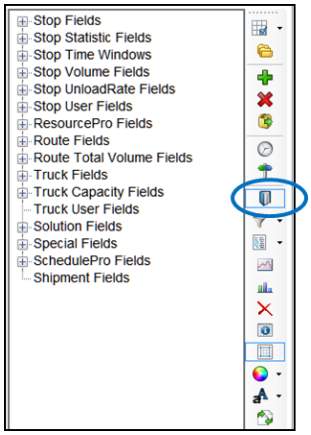


Figure 102 – Route Book Report Fields

- Select the + key next to the Field Type to expand and show available columns
- Drag the selected column and drag it into the header position on the Summary page

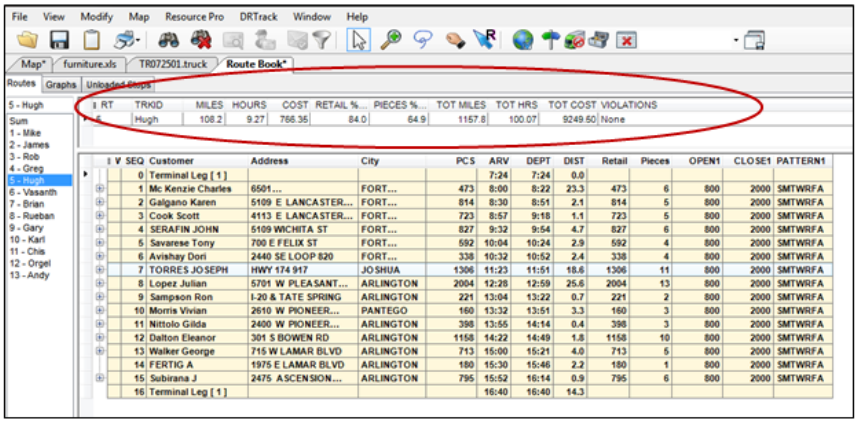


Figure 103 – Detail Report Customization

Once a column is inserted, the software will automatically populate the data into the columns.

- To delete any column, right click on the column to display the Route Book menu, then select *Delete RT Book Field*.

Tip: Column order within the reports can also be changed by selecting a column and drag it to the position desired

7.3.1. Header Report Customization

Each column name can be customized to display any name.

- Click on the column Header Title (to highlight); the Header Edit box should open at the bottom of the report.
- Type the new Display Name in the Display Name box; adjust column width, if desired.
- Select the Save button to save the changes.
- Add a File Name to the Save Info box then select the Save button.
- This will save the new format for use in other Route Books.
- Select the Refresh button and the new Display Name will appear in the header.

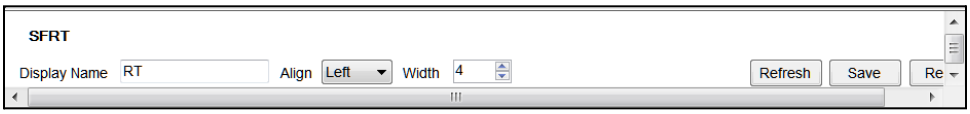


Figure 104 – Header Report Customization

7.3.2. Multiple Report Formats

When multiple report formats for the Route Book are necessary (for multiple DR Users), each differently formatted report can be saved to a User's specific Data Directory. If only the detailed report (F8.DRP) is altered, the SRP and HRP files, even if unchanged, must be copied to the DirectRoute Data Directory.

- Make changes to Route Book format, as required.
- Save the new report to the appropriate user DirectRoute Data Directory.
- Copy the other unchanged reports from the user's Folder, to the DirectRoute Data Folder (not User-specific).
- When a route is opened, the software will look in the DirectRoute Data Folder first.

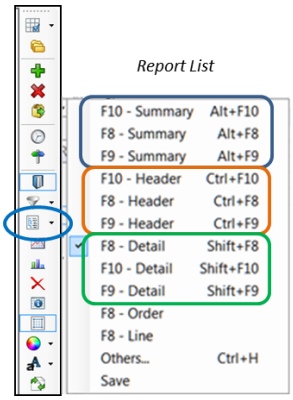


Figure 105 – Route Book Reports

Tip: The DirectRoute Data Directory refers to the location of the DirectRoute Route Files and folders.

Tip: Even if only one report format is changed, all three reports must be copied to the data directory.

7.4. Route Book Info Boxes

The *Stop, Truck, Route, Solution, Differential*, and *User Field Values* info boxes can also be viewed from the on the right side of the screen, adjacent to the Route Book. The Info boxes contain valuable, at-a-glance information, without having to view the actual Route Files.

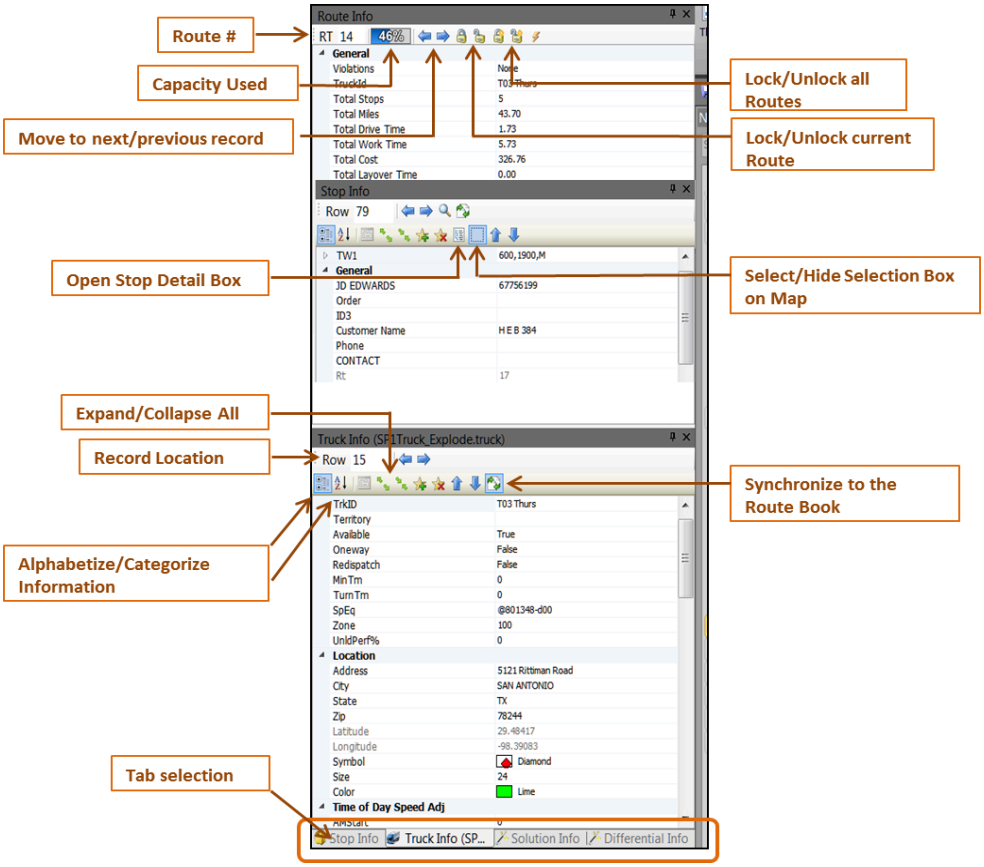


Figure 106–Route Book Info Boxes

- The Stop Info box contains info pertaining to the specific stop record that has been selected.
- The Truck Info box contains info pertaining to the truck used for the selected route and/or stop.
- The Route Info box contains statistics pertaining to the route that is currently selected and displayed in the Route Book; use the lock icons to lock/unlock the route for editing.
- The Solution Info box contains statistical data for the routes. Statistics and totals listed are for all routes combined.
- The User Field Info box displays results of the Order Criteria filter, when the Selective Routing tool is used.
- The Differential Info box displays the differences in values (Miles, Work Time, Cost, etc.) when one or moves are made on a route.
    - *DRStats*–Values achieved immediately after DR completes initial route loading
    - *Transactional*–The difference in values immediately following a move (differences between the last move and current move).
    - *Cumulative*–Adds the value differences of all moves.

Example: The results displayed in Figure 97 below were received following two separate moves on a Route.

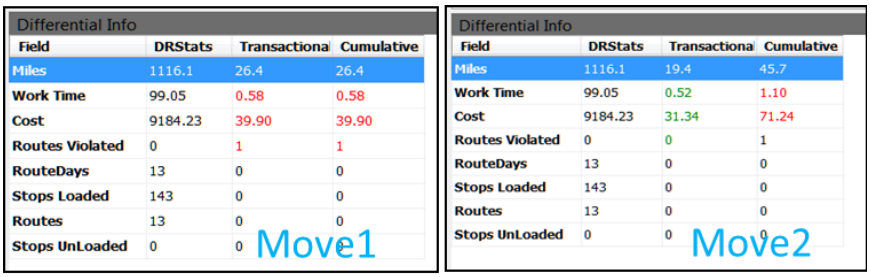


Figure 107 – Differential Info Box

Move 1 resulted in an increase of 26.4 miles to the Route, an increase of .58 hrs., and a cost increase of $39.90.

Move 2 resulted in an increase of 19.4 miles (from the total miles presented as of the last move), an increase of .52 hrs. (from the total hrs. presented as of the last move), and a cost increase of $71.24 (from the total cost presented as of the last move).

Tip: Double-click on any stop or route in the Summary Report or on any stop on the map, to synchronize the Info boxes (Stop, Truck, Route), then select the desired Info tab located in the lower right corner

Tip: Solution Statistics can also be viewed in spreadsheet format by selecting View > Solution Statistics from the menu at the top of the screen.

Tip: The info boxes can be repositioned to view on the top or bottom, right or left side of the screen. Just click and hold the box tab (bottom of the screen) then drag it to the desired location; look for the grey position guide to help place the box in the correct location.

Tip: Data can be edited from the Stop/Truck Info boxes; place the cursor in the box on the line to edit, make necessary changes, and select the F9 key to apply/save updates to the Route Book.

7.5. Selecting Records for Display and Edit

To select a specific record for display and/or editing, use one of these three options to locate and select the record.

- Position the cursor over the top of any stop symbol on the map, Ctrl+Click, or
- Edit the row# in the Info box (type the row # from the spreadsheet of the Truck or Stop File for the desired record, or the route #), or
- Use the arrows adjacent to the Row# to move to the next or previous record in the spreadsheet and/or route.

To edit a record from one of the info boxes:

- Locate the data in the info box to edit, and edit as necessary.
- Press the F9 key to apply and save the updates to the Route File.

The edits will carry/be applied to the spreadsheet column/cell immediately.

7.6. View Route Violations

The following violations are displayed in the Route Book Summary page, on the Route Page, and in the route info box.

- **Window–**Time Window violation; delivery was made outside of the times allowed for the stop.
- **Drv Tm**–Drive Time violation; the Drive Time as set in the Truck File has been exceeded.
- **Wrk Tm**–Work Time violation; the Work Time as set in the Truck File has been exceeded.
- **Rtrn Tm**–The Return Time for a driver to return to the terminal, as set in the Truck File, has been exceeded.
- **Wt Tm**–Wait Time violation; the vehicle has exceeded the time allowed to wait at a stop.
- **Cap–**Capacity, as set in the Truck File, has been exceeded; check *File* > *Preferences* to ensure that another Capacity field has not been entered.
- **EqCode–**EqCode violation; a stop has been loaded which does not meet the EqCodes for the truck.
- **Seq–**Sequence Code previously entered in the Stop File was not followed; check the EqCode field for Sequence Codes.
- **MaxDist**–Maximum distance between stops on a route violation.

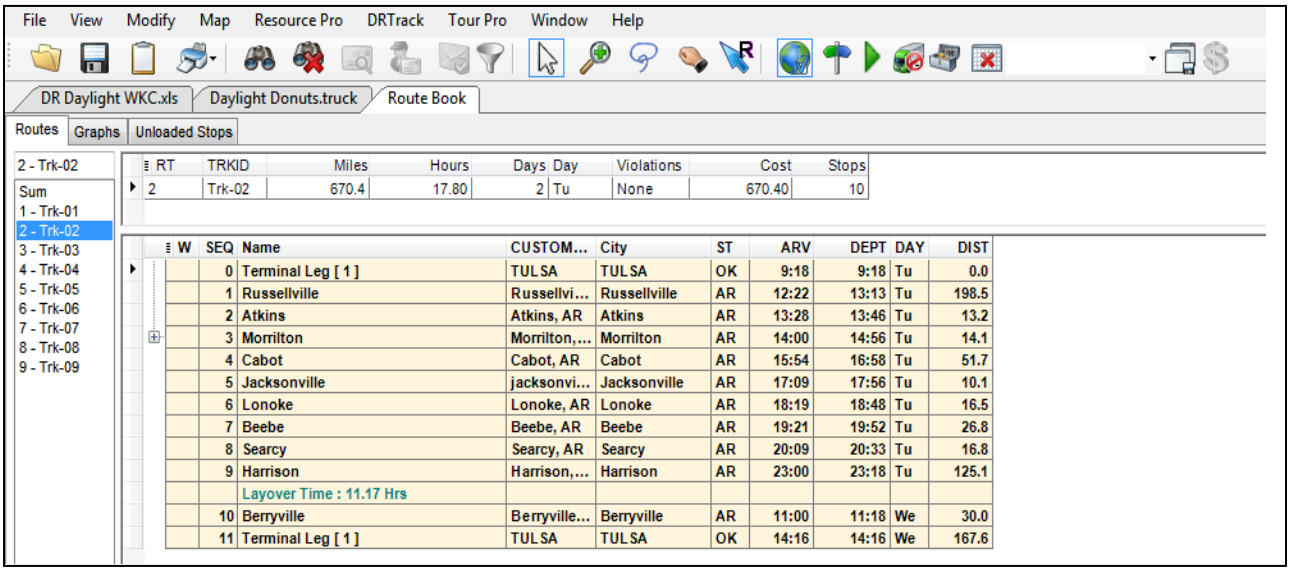


Figure 108 – Show Directions

7.7. Generate Directions

After a route has been created, turn by turn directions can be acquired in DirectRoute leveraging its integration to PC*Miler. Using *Get Directions* updates the Route's given ETAs for all Stops, and, based on the transit time being used, may create Time Windows violations that did not exist prior. Also, the actual transit time may be longer than the algorithm anticipated using either Crow Flies mileage and transit times or an actual Distance file.

- When directions are generated, the route lines on the map will follow the road network as opposed to using straight lines to connect the stops.
- If you normally optimize routes, it is important to do so prior to generating directions. Any changes to a Route (manual or via optimization) resets the Route and directions to the previously calculated mileage, transit time, and Route lines.

- *Get Directions* uses either an API connection to retrieve mileage and transit time from PC*Miler, or information stored locally in the PC*Miler version installed in DirectRoute.
    - *Trimble Maps* (Preferences > Mileage System) is the default setting. It enables the use of several API calls that DirectRoute utilizes to get access to more, actively updated information.
    - If *PCM*Direct* is selected as the Mileage System, all API calls are turned off and PC*Miler is used for all mileage and transit calculations.
- The PCM versions available in the *Trimble Maps* tab drop down are related to the user's Map API key configuration in the Admin Portal.
    - For most current PCM versions, configure with a *Streets* in the name e.g., *Europe Streets*.
        - *Streets* bundles are updated typically every two weeks.
        - *Global* bundles update a few times a year.
    - You can find your API key in the *About DirectRoute* window and *Licenses* tab.

To generate driving directions select *Get Directions* from the main toolbar.

- If your route has already been built and you plan to edit or modify the route, select the *Generate Directions on Route Edit* icon from the toolbar before editing your route. This will ensure directions are regenerated automatically as soon as your edits are made on your route.

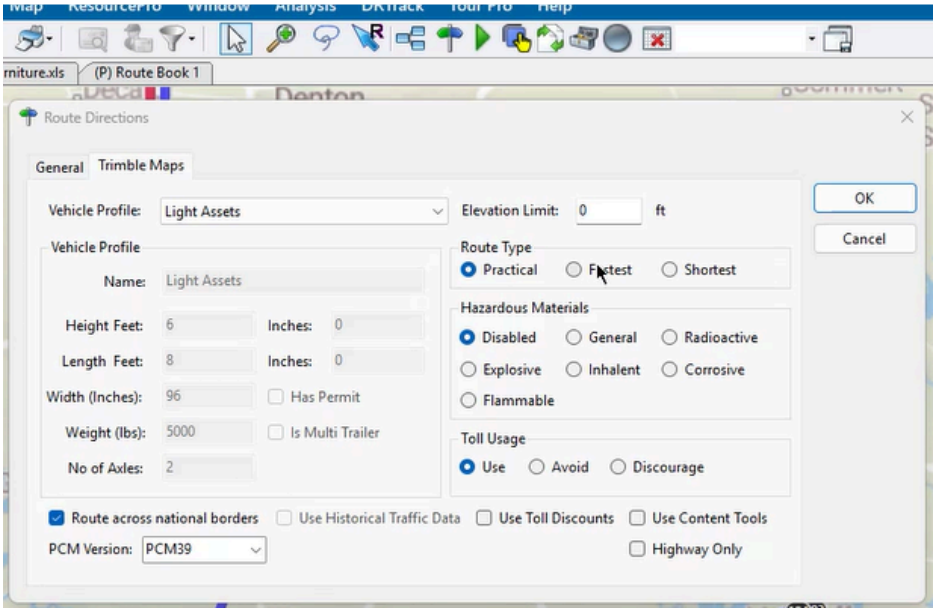


Figure 109 – Trimble Maps Settings

7.7.1. Driving Directions Options

After selecting the Get Directions icon from the main toolbar, select the desired options by placing a check mark in the box next to it the General tab (Route Directions dialogue box).

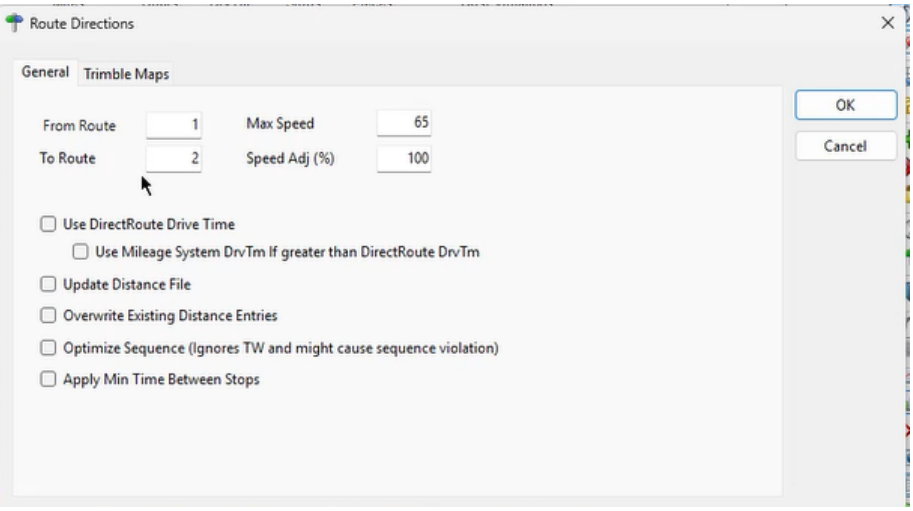


Figure 110 – Driving Directions Options

- Identify the route numbers for which directions are wanted in the From Route and To Route boxes. For example, choosing From Route = 1, To Route = 5 will generate directions for routes 1 thru 5 only.
- **Use DirectRoute Drive Time**–If selected, DirectRoute will generate drive times using proprietary calculations based on time and distance data obtained from PC*Miler (only replaces PC*Miler generated drive times).
- **Use Mileage System Drv Tm if greater than DirectRoute Drv Tm**–If the 'Use DirectRoute Drive Time' option has been selected, this option can be enabled in addition. This option ensures the slowest segment drive time by using PC*Miler segment data if that drive time is greater than the time calculated by DirectRoute.
- **Update Distance File**–Will add new distance entries for any stops in which no current distance entries already exist in the Distance File.
- **Overwrite Existing Distance Entries**–Will overwrite the current Distance File entries, if different from those currently posted in the Distance File.
- **Optimize Sequence**–Will optimize the sequence of stops on each route by the distance between stops and may rearrange stops so that each occurs in order of their location (map point sequence), regardless of any time windows; may cause sequence violations.

If using PC*Miler Web Services and Trimble MAPS mileage system, select the Trimble MAPS tab.

- Select a Vehicle profile from the drop-down menu (most data should auto-populate).
- Enter an Elevation limit (if applicable). The unit (Feet, Meters) should be the same unit of measure chosen for Distance Option (*Preferences* > *Other* > *Distance Options*) (if set to Meters, then set Elevation to Meters, etc.).
    - DirectRoute will look for alternate routes to avoid roads that would exceed the set limit.
- Select the *Route Type* and *Hazardous Materials* options that apply.
- At the bottom of the box, select all options that may apply.
    - **Avoid Tolls** – Will steer the route away from using toll roads.
    - **Use Toll Discounts** – Enables the use of multi-state toll discount programs.
        - Users can set the default Toll Preference under *Preferences* > *Trimble Maps* > *Toll Discounts* and select *All* or *None*.

- **Route Across National Borders** – Enables DirectRoute to plan a route in which one or more trucks may cross the US national borders in pursuit of a customer delivery.
- **Highway Only** – Means local streets are not considered when running a route; vehicles are restricted to primary roads and/or Highways only, regardless of vehicle profile.

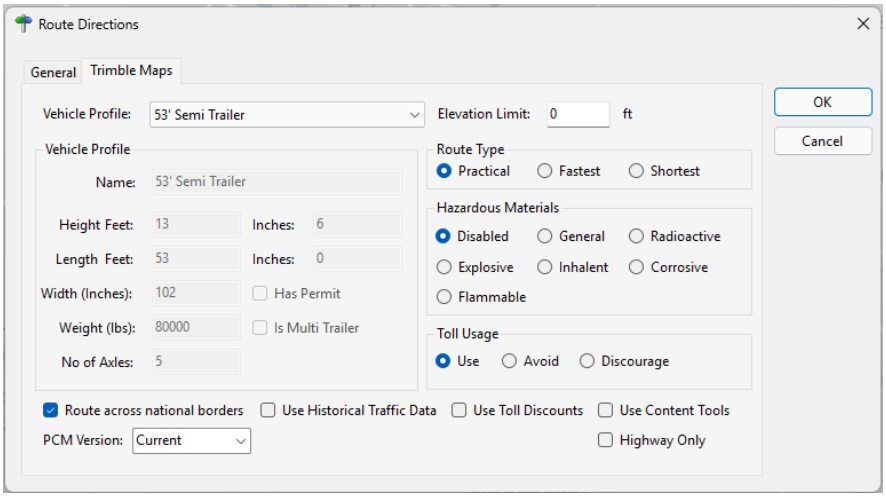


Figure 111 – Driving Directions Options

7.7.2. PC*Miler Direct Driving Directions Options

If using a PC*Miler license, select and change the PC*Miler Direct option, as necessary.

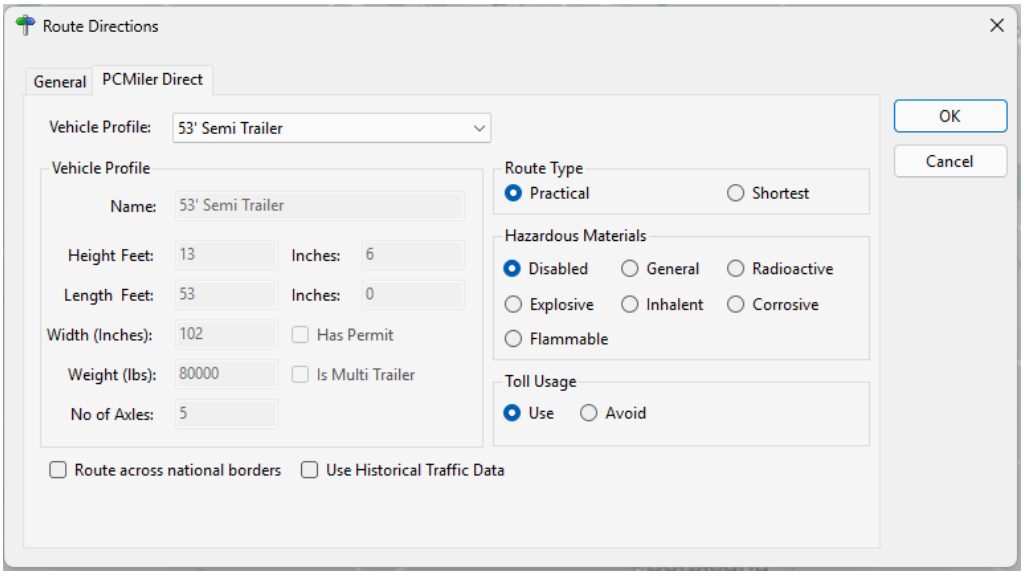


*Figure 112 – PC*Miler Driving Directions*

When all options have been reviewed and selected, click OK to generate the directions.

When the directions have been created, the Route File will include directions from the depot to each stop on the route.

- Select the *Show/Hide Directions* icon  on the Route Book tool bar to remove the directions from view, or return them to view after hiding them, or
- Click on the Route Book and select *Show/Hide Directions.*

When printing the Route File, you can choose to print turn by turn directions, as well. Save the Route Book with the directions, before selecting print options.

Tip: When a Route is saved, the driving directions are saved within the Route File. When the Route File is reopened, the driving directions will be restored.

Tip: When generating directions, if the option Use DirectRoute Drive Time is not selected in the General Tab, DirectRoute may not adhere to the default values and rules that were initially selected to produce the routes. This may cause a change in drive times and distances between stops, minimum times between stops, and other results initially received with the original routes.

8. Route Modifications

At times, it may be necessary to modify routes. There are many reasons in which already built routes may need to be modified, but some of the more common reasons include:

- Loading unloaded stops.
- Optimizing routes.
- Adding new, or deleting stops.
- Changing route start times.
- Moving stops from one route to another.

As varied as the reasons, the options by which to modify the routes and/or stops are just as varied. This section will cover many of the ways and means by which most of the modify options can be completed.

Within the Route Book, there are two ways to access the *Modify* menu when a Route File is open.

- From the menu, select *Modify.*
- While in the Route Book, right-click to open the Route Book menu.

Both menus' offer the same modification options. The main difference is the Route Book menu offers additional tools to show details within the Route Book and tools to alter the fields displayed in the Route Reports.

8.1. Route Book Modify Menu

The *Modify* menu is available only while the Route Book is open. The options listed in this menu provide a means to perform additional actions on the route without having to repeat the entire routing process.

To access any of the modification options, click **Modify** from the DirectRoute menu, then click the appropriate action.

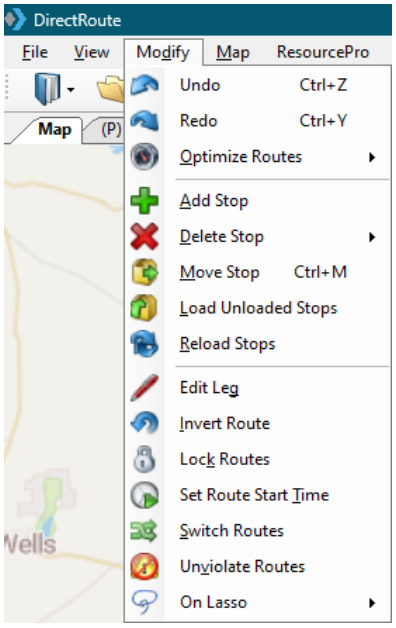


Figure 113 – Modify Menu

8.1.1. Undo/Redo

Undo or redo the last action performed on a route. For instance, if you manually move a stop onto a route and it causes a capacity violation, you can use *Modify* > *Undo* the move and return the route to its previous arrangement. If you have completed several actions within the Route Book and want to undo them all, you may have to select the Undo command several times.

Example: *You completed three different delete actions, to remove three stops from a route, and then changed your mind. Select the Undo command three times to reload the stops onto the route.*

Redo–Reverses the previous Undo action. This command may be used in conjunction with the Undo command to toggle changes.

8.1.2. Optimize Routes

During the route build phase, DirectRoute considers truck availability time, travel time, receiving time, unload time, and distance; all the parameters set within the Truck File, Stop File and Routing Preferences. When optimizing, DirectRoute is performing additional passes over the routing data, while considering penalty factors, time windows, work time, etc., to look for options that would allow stops to be moved either within each route, or between routes, in an effort to return a lower-cost routing solution. Additional options can be selected to attempt loading any unloaded stops at the same time.

- **Optimize Trucks After Loading**–Looks to minimize costs by moving stops between routes and within routes.
- **Optimize Stops After Loading**–Looks to minimize costs by moving stops between routes and within routes.
- **Optimize Within Routes** (SHIFT+Ctrl+W)–Attempts to re-order the stops within a route to lower the overall cost.
- **Optimize Between Routes** (Shift+Ctrl+O)–Evaluates the effects of moving a group of stops to other routes.
- **Optimization settings** can be chosen before the load/route process (*Preferences* > *Routing* > *Algorithm*) or choose and apply Optimization preferences to routes already built (*Modify* > *Optimize*).

See **Optimization Options** for more information.

8.1.3. Add, Delete, Move Stops

Add Stops enables the addition of unloaded stops to a route.

- Select *View* from the dialog box.
- After viewing the unloaded stops, select the *OK* button to return to the dialog box.
- Type in the stop number(s) that you wish to add.
- Type in the route number and position number where the stops are to be added.
- Select the *OK* button.

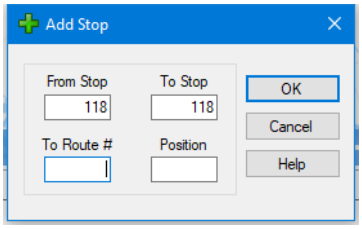


Figure 114 – Add Stop

Delete Stops–The *Delete* command allows you to delete stops from routes.

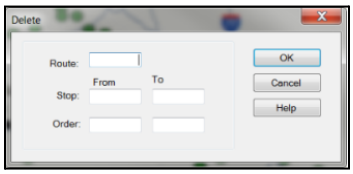


Figure 115 – Delete Stop Range

Delete Range–Allows deletion of a range of stops from one route.

- Type in the route number and the range of stops to be removed.
- Select the *OK* button and the stops will be removed from the route.

Delete All–Allows deletion of all stops on one route or delete all stops on several routes.

- Type in the range of routes you wish to delete (type the same number in the *From Route* and *To Route* boxes if you wish to delete an individual route).
- Select the *OK* button and all the stops on the route(s) will be deleted.

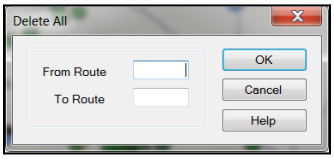


Figure 116 – Delete Route

Move Stop (*Ctrl+M*)–The Move Stop command allows you to move a stop, or a range of stops.

- Type in the route number and the range of stop(s) that are to be moved.
- Type in the route number and stop number where the stops are to be moved.
- After entering all applicable information, select the *OK* button to move the stop(s).

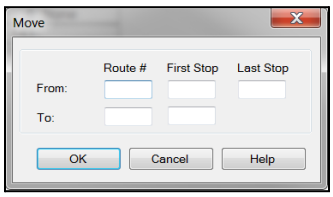


Figure 117 – Modify Move Stop

See **Using the Lasso to Select Stops** for additional information.

8.1.4. Reload or Load Unloaded Stops

Modify Load Unloaded Stops allows DirectRoute to determine the best location to place Unloaded Stops.

- Enter the *From Stop* and *To Stop* record numbers in the dialog box.

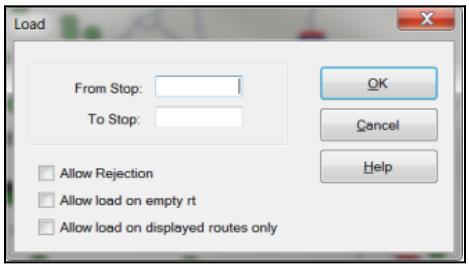


Figure 118 – Modify Load Stop

- **Allow Rejection**–Shows a warning before the move is actually made indicating how much the move will cost; accept or decline the move.
- **Allow load on empty route (Truck)–**Allows the reloaded stop to be placed on an empty route; leave unchecked if you do not want the reloaded stop to load on an empty vehicle.
- **Allow load on displayed routes only**–Allows a stop to be reloaded only to routes that have been displayed and/or locked on the screen; routes that are not visible will be ignored during the reload sequence.

After selecting all applicable options and information, select the *OK* button to load the stops.

Modify Reload Stops–The *Reload Stops* command allows DirectRoute to take stops from an existing route and determine the next best route for the stop.

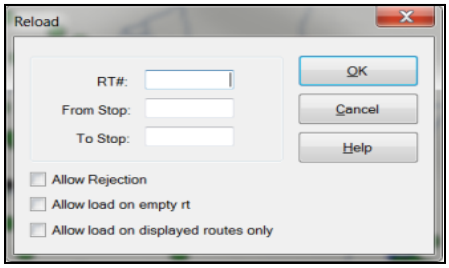


Figure 119 – Modify Reload

- Input Route Options.
  - *Rt #*–The route number to reload.
  - *Fr Stop*–The first stop number of the route to reload.
  - *To Stop*–The last stop number of the route to reload.

- Select Reload Options.
  - **Allow rejection**–Gives a warning before the move is made indicating how much the move will cost you; accept or decline the move.
  - **Allow load on empty route (truck)**–Allows the reloaded stop to be placed on an empty route; leave unchecked if you do not want the reloaded stop to load on an empty vehicle.

- **Allow reload on displayed routes only**–Allows a stop to be reloaded to only look at routes that have been displayed and/or locked on the screen; routes that are not visible will be ignored during the reload sequence.

After selecting all applicable options, select *OK* to reload.

8.1.5. Edit Leg/Invert Route

Modify Edit Leg–Enables deletion or insertion of a leg into the routes. The insert option enables insertion before or after another route and leg.

Modify Invert Route–Reverse the sequence of stops on a route; the first stop will become the last, and the last stop will become the first.

- Type the route number you wish to invert.
- Select the *OK* button.

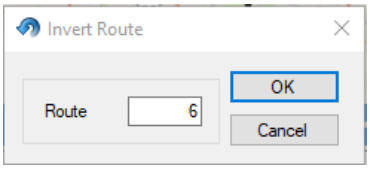


Figure 120 – Invert Route

8.1.6. Lock Routes

Select this option to lock the routes so stops cannot be moved by optimization actions. These options may also be selected in *Preferences* > *Routing* > *General* prior to loading (initializing) a route.

You can limit locking action to groups of routes by selecting one of the following:

- Select and enter the route numbers in *From Route/To Route*, to select a group of routes in sequential order.
- Select *Lock Displayed Routes* to limit locking action to just those routes that are displayed on the map.
- Filter the route book to meet certain criteria, then Select *Lock Filtered in Route Book* to limit locking action to just those routes that were filtered.

Once the routes are selected, choose the type of locking action that should occur.

- **No lock**–Routes are available for adding, deleting, or sequencing again.
- **Prevent Removal**–When optimizing, no stop will be removed from a route; only the re-sequencing and adding stops may take place.
- **Prevent Addition**–Stop may be removed and re-sequenced, but new stops cannot be added.
- **Prevent Removal and Addition**–Stop may only be sequenced again.
- **Prevent Any Changes**–No changes will be made on the locked route.

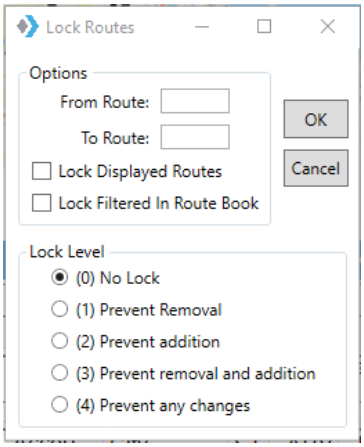


Figure 121 – Lock Routes

Additionally, routes can be locked from within the Route Info box (Route Book) individually or by groups, using the Lock Routes icons.

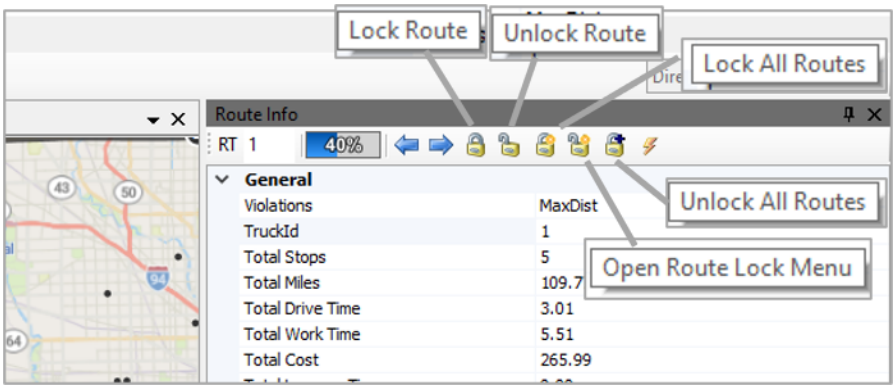


Figure 122 – Lock Routes (Route Info Box)

- **Lock Route**–Locks the current Rt number displayed.
- **Unlock Route**–Unlocks the current Rt number displayed.
- **Lock All Routes**–Locks all routes in the open routing solution.
- **Unlock All Routes**–Unlocks all routes in the open routing solution.
- **Open Route Lock Menu–**Enables selection of specific, non-sequential routes, to lock/unlock; separate route numbers by a comma (no space), i.e. 1,3,5.

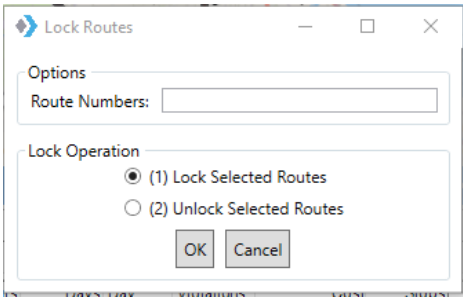


Figure 123 – Open Route Lock Menu

8.1.7. Switch Routes/Trucks, Set Route Start Time

Modify Set Route Start Time–Allows adjustment of the route start time for one or multiple routes.

- Type in the route number (or range of routes to change), new start time, and date for that route.
- Select the OK button and the start time and date will update.

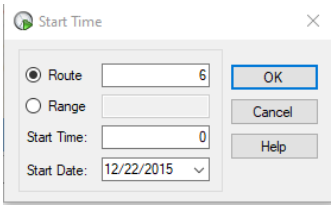


Figure 124 – Modify Start Time

Modify Switch Routes–Switch trucks between routes.

- Type in the route# to switch from, and the new route#, then select the OK button.

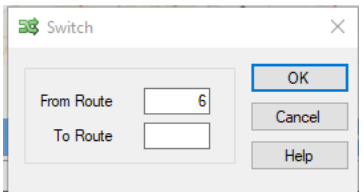


Figure 125 – Modify Switch a Truck

Modify Unviolate Routes–Removes violation flags from stops on a route.

For example, if a stop violates a time window by a short amount of time and you decide to deliver to the stop anyway, you can use the command to remove the violation flag.

- Type the From Route and To Route numbers to specify the range of routes you want to modify.
- Select the type of violation(s) to remove.
- Select the OK button to unviolate the routes.

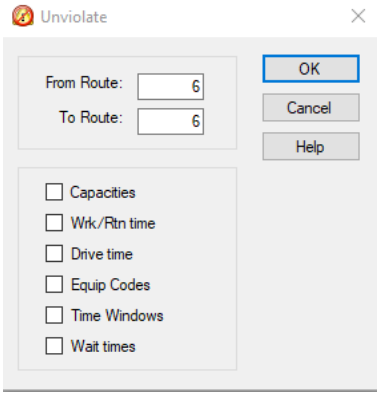


Figure 126 – Modify Unviolate

Tip: Modify Unviolate Routes can change previous settings, for example, Time Windows.

8.2. Change Stop Sequence

To change the sequence of a stop on a route (i.e. make Stop 2 be 4, instead)

- Ctrl+click on the stop that needs to move (Stop 2) to place a circle around the stop.
- Hover the mouse over the location on the route where you want to move the stop (between Stops 3 and 4), then press Ctrl+Shift+click.

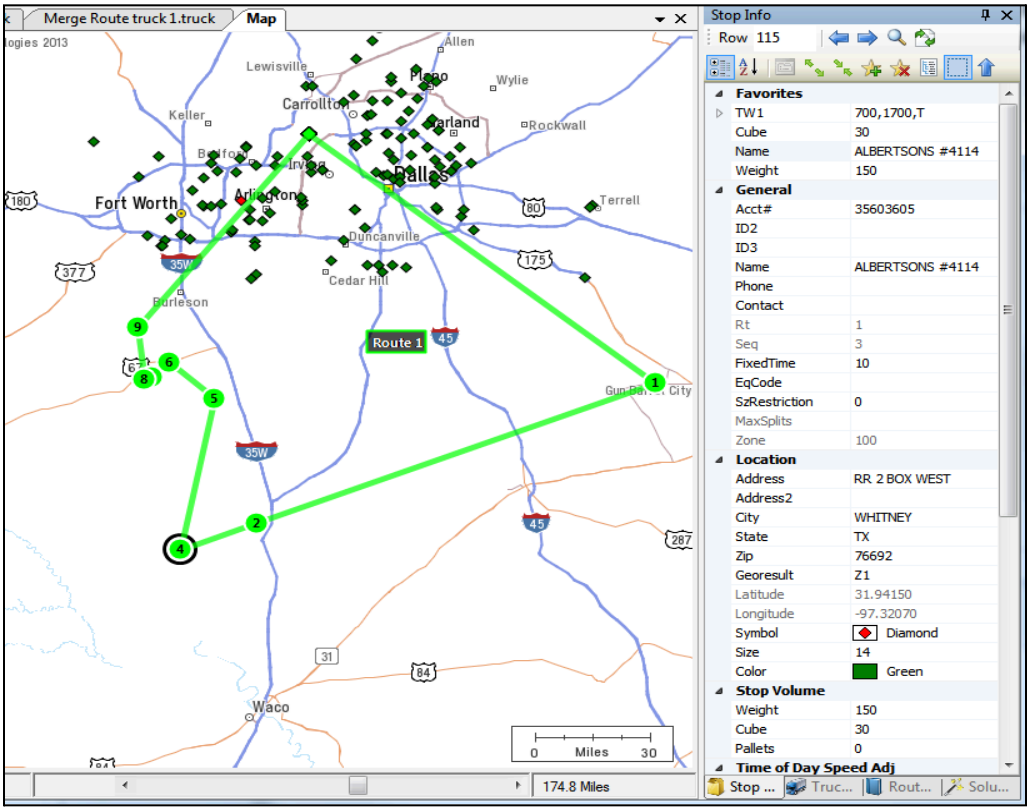


Figure 127 – Change Stop Sequence

8.3. Add Stops from the Map

You can add any unloaded stop to a route from the map screen.

- Ctrl+ click on the stop.
- Ctrl+Shift+click on the route line where the stop should be added.

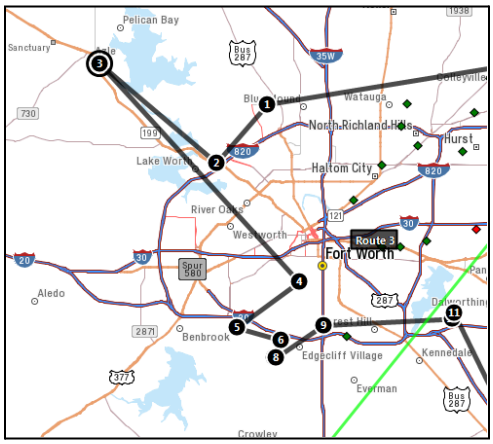


Figure 128 – Add Stop from Map

Note: While in the routing mode, unloaded stops can also be loaded using the Legacy Lasso tool (Modify > Lasso). For more info, see **Move, Delete, or Add Stops** *and* **Add, Delete, and Move Stops**.

8.4. Working with Unloaded Stops

There are several reasons why a stop may not load, including restrictions to *Time Windows, Work Time, Drive Time, Capacity Constraints,* or *EqCodes.*

Before adding unloaded stops to a route, it is important to know why the stop did not load in the original load process. To help discover this, you will first need to view the list of unloaded stops then view each one individually.

Unloaded Stops can be viewed by selecting the Unloaded Stops tab within the Route Book.

- Select any stop listed to highlight it.
- Select View Reason.

Or, toggle the red pin on the route tool bar to show unloaded stops on the map.

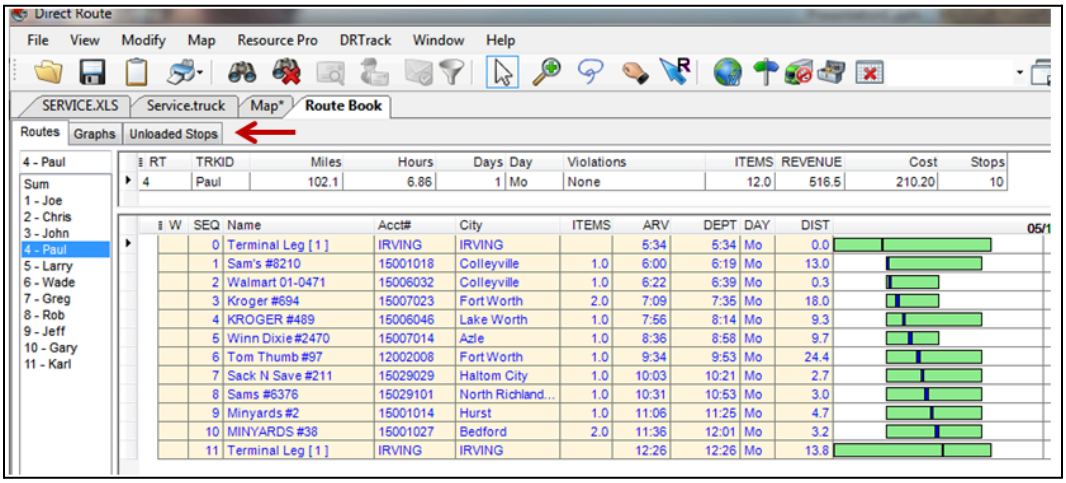
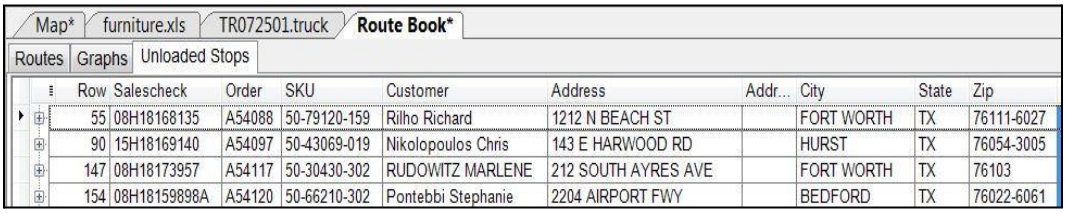


Figure 129 – Unloaded Stops Tab



Row	Salescheck	Order	SKU	Customer	Address	Addr...	City	State	Zip
55	08H18168135	A54088	50-79120-159	Rilho Richard	1212 N BEACH ST		FORT WORTH	TX	76111-6027
90	15H18169140	A54097	50-43069-019	Nikolopoulos Chris	143 E HARWOOD RD		HURST	TX	76054-3005
147	08H18173957	A54117	50-30430-302	RUDOWITZ MARLENE	212 SOUTH AYRES AVE		FORT WORTH	TX	76103
154	08H18159898A	A54120	50-66210-302	Pontebbi Stephanie	2204 AIRPORT FWY		BEDFORD	TX	76022-6061

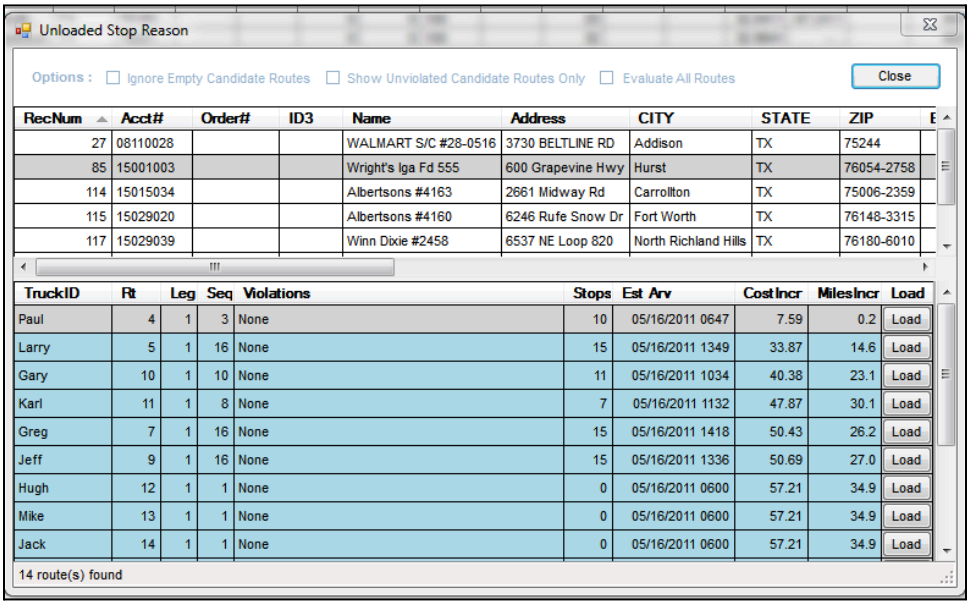
Figure 130 – Unloaded Stops

The top half of the *Unloaded Stop Reason* dialog box lists all unloaded stops. The bottom half shows all available vehicles and current route assignments that could possibly accept the unloaded stop. Additional information is provided for each vehicle and route:

- Leg and Sequence # the stop would be, if added to the current truck/route.
- Any violations that would occur if the stop were added to the current truck/route.
- Total stops for the listed route if the stop were added.
- Estimated arrival date/time if the stop were added.
- Added cost and miles to the route if the stop were added.

These options enable choosing which candidate routes to consider for possible addition of the unloaded stops.

- Select one of the options at the top of the screen to restrict which candidate routes to view, or do not select any options to view and evaluate all routes (default).



RecNum	Acct#	Order#	ID3	Name	Address	CITY	STATE	ZIP
27	08110028			WALMART S/C #28-0516	3730 BELTLINE RD	Addison	TX	75244
85	15001003			Wright's Iga Fd 555	600 Grapevine Hwy	Hurst	TX	76054-2758
114	15015034			Albertsons #4163	2661 Midway Rd	Carrollton	TX	75006-2359
115	15029020			Albertsons #4160	6246 Rufe Snow Dr	Fort Worth	TX	76148-3315
117	15029039			Winn Dixie #2458	6537 NE Loop 820	North Richland Hills	TX	76180-6010

TruckID	Rt	Leg	Seq	Violations	Stops	Est Arv	CostIncr	MilesIncr	Load
Paul	4	1	3	None	10	05/16/2011 0647	7.59	0.2	Load
Larry	5	1	16	None	15	05/16/2011 1349	33.87	14.6	Load
Gary	10	1	10	None	11	05/16/2011 1034	40.38	23.1	Load
Karl	11	1	8	None	7	05/16/2011 1132	47.87	30.1	Load
Greg	7	1	16	None	15	05/16/2011 1418	50.43	26.2	Load
Jeff	9	1	16	None	15	05/16/2011 1336	50.69	27.0	Load
Hugh	12	1	1	None	0	05/16/2011 0600	57.21	34.9	Load
Mike	13	1	1	None	0	05/16/2011 0600	57.21	34.9	Load
Jack	14	1	1	None	0	05/16/2011 0600	57.21	34.9	Load

14 route(s) found

Figure 131 – Unloaded Stop Reason

8.4.1. Sort Unloaded Stops

You can sort unloaded stops before attempting to load/add them to existing routes. Examples of use: sort by cost to select the least costly vehicle/route option, or sort by estimated arrival date/time to find which possible route would deliver the earliest.

- Select the *Unloaded Stops* tab.
- Select which column to use as criteria for the sort.

- Select the column header to sort (alphabetically, numerically); notice the sort arrow appears on the right side of the column selected.
- To reverse the sort, select the arrow.

From the *Unloaded Stops* tab, you could also perform a sort by selecting more than one column of criteria. This may be helpful if necessary, to sort by customer and account number, or sort by zone and EqCode, or some other factors listed in the Stop File.

- Right click and select *Sort.*

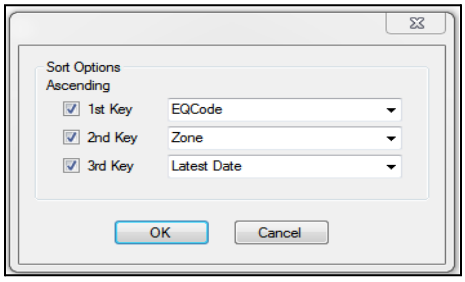


Figure 132 – Unloaded Stop Sort Option

- Select the *1st Key* box and use the dropdown arrow to select a field to sort.
- Choose a 2nd and 3rd Key and sort field, if desired.
- Select the *OK* button to initiate the sorting of the unloaded stops.

8.4.2. Sort from the View Reason Dialog Box

You could also perform a sort while viewing the Unloaded Stops Reason dialog box.

- Select the Unloaded Stops tab.
- Right click any stop and select View Reason.
- Select a column to use as criteria for the sort.
- Any column in top half of the dialog box (unloaded stops), or
- Any column in the lower half of the dialog box (candidate vehicles/routes).
- Select the column header to sort alphabetically or numerically; the sort arrow appears on the right side of the selected column. To reverse the sort, select the arrow button.

8.4.3. Load Unloaded Stops

Load unloaded stops to a route using Unloaded Stop Reason.

- View candidate vehicles and routes to find a suitable position to add the stop.
- Locate and select the stop (ensure the stop shows as highlighted).
- Select the *Load* button.

Tip: It may be necessary to edit specific information about the vehicle or the stop to add the stop to the route or choose to accept the violation displayed and add the stop.

Unloaded stops can also be added without viewing the reason. This should only be done if you are certain as to which route and position the stop should be added.

- Select the unloaded stop you want to add.
- Select *Add;* the stop number will prepopulate, corresponding to the Row number (record number) in the *Stop File* and the *Unloaded Stops* list.
- Type the Route and Position number to which to add the stop.
- Select the *OK* button.

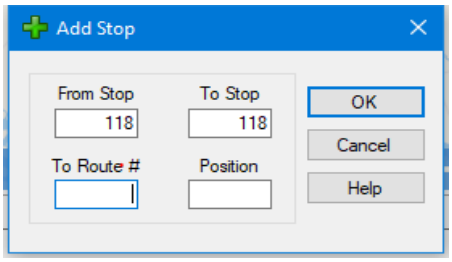


Figure 133 – Adding Unloaded Stops to a Route

8.5. Scenario Manager

The Scenario Manager tool allows the user to run various route scenarios for analysis, without affecting the integrity of the original route or Route Files.

Scenario Manager allows temporary changes to Route Field values and Stop Field values within the Route Files, to determine what affects the changes would have to the overall route solution.

- What is the impact if worktime is reduced from 9 to 8 hours?
- Is there a cost benefit in expanding delivery windows by 30 minutes?
- If service time is reduced by 5%, how much savings would be generated?

Many different scenarios can be built and saved, edited, and used repeatedly with any existing route and corresponding Route Files. If, after running a scenario, it is determined that the scenario results are better than the results obtained with the original route, the scenario results can be applied and saved as a new route (and new Route Files), while still maintaining the integrity of the original route and Route Files used to perform the scenario.

8.5.1. Using Scenario Manager

- Open any existing Route File.
- Select *Analysis* > *Scenario Manager* from the menu at the top of the screen.

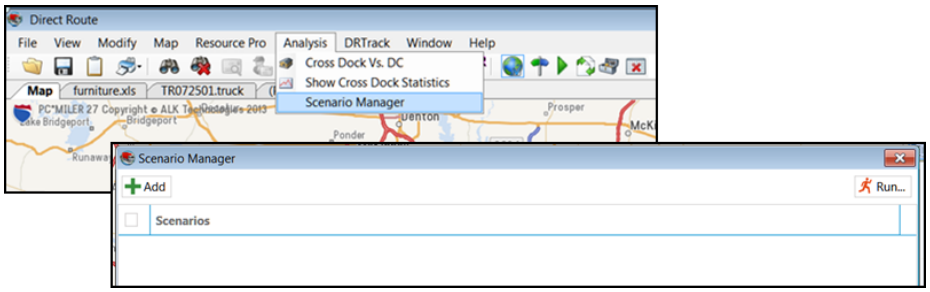


Figure 134 – Scenario Manager Build

- Select the +Add button.
- Select a field (to adjust data) using the dropdown arrow.

- To the left of the field, select how the Field should be adjusted (Increase/Decrease).
- To the right of the field, type the numerical amount by which the Field should be adjusted (number representing an amount).
- To the far right of the field, select the measurement type to apply to the numerical amount, Value or Percent (select Value when the number represents actual hours, miles, cost, etc.).
- After selections have been made, edit the Name box to rename this scenario, if desired.
- To add another field, select the +Add button (no limit to number of Fields that can be used in one scenario).
- To delete a field, select the red **X.**
- Click on the Save button to save the scenario.
- To edit/change a scenario, select the blue pencil icon to the right of the scenario name.
- To delete a scenario, select the red **X** to the right of the scenario name.

Example: *Our current Routes are set with a Max Miles of 250. We want to see the cost results that may be achieved by increasing the Max Miles to 300. Select Max Miles > Increase > 50 > Value (for actual miles).*

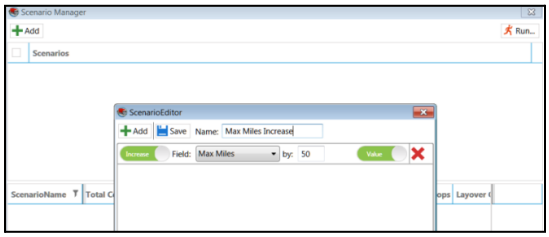


Figure 135 – Scenario Manager Field Selection

After a scenario has been saved, it will appear by Name in the top block of Scenario Manager.

- For a quick reminder of the fields used, select the circled arrow, left of the scenario name.

8.5.2. Scenario Manager Time Windows/Buffers

When altering *Time Windows* and *Buffers*, additional parameter options are presented.

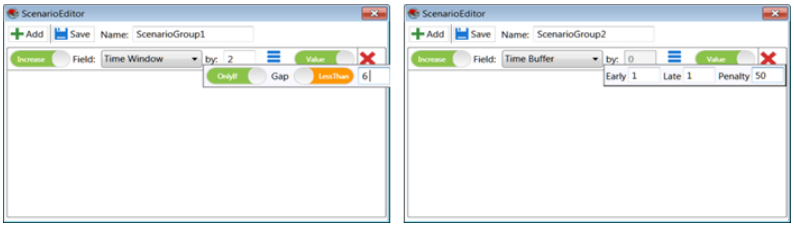


Figure 136 – Scenario Manager, Time Windows

Parameter options for Time Windows:

- **Only If/Always**–Select when the Time Window should be increased or decreased.
- **Gap–**Refers to the number of hours the Time Window is open.

Parameter options for Buffers

- **Early/Late–**Enter the # hours to apply to either or both the Open (Early) and Close (Late) of current Time Windows.

- **Penalty**–Enter a dollar amount to apply as a penalty when/if the buffer is applied.

Example: *Routes feature a mix of Time Windows with open periods of 4 and 6 hours. To see the effect if all the open periods were 6 hours, select: Time Window > Increase > 2 > Value (actual hours) > Only If > Gap (Less Than) > 6.*

8.5.3. Scenario Manager Results

After a scenario has been built and saved, it is ready to run. All scenarios are run from an open Route Book, so ensure the desired Route File is opened. If the Scenario Manager is not currently open, open it by selecting *Analysis > Scenario Manager* from the menu at the top of the screen.

- To select a Scenario from a list of saved scenarios, click on the box to the left of the scenario name to select it (box will appear colored when selected).
- Repeat to de-select any scenario.
- Select the Run button in the top right corner of Scenario Manager.

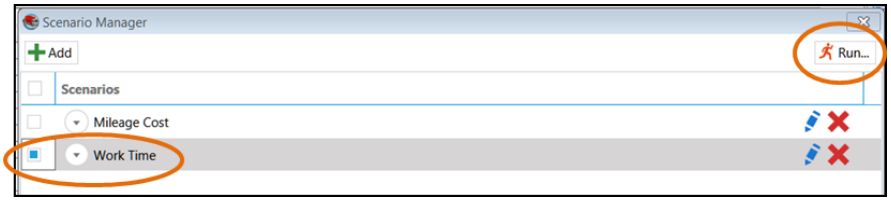


Figure 137 – Run Scenario Manager

As the Scenario Manager is processing, a progress bar will appear. Once the process has completed, the results will be displayed in the bottom half of the Scenario Manager box. The results will include the original values for the route before it was adjusted (BaseResult), and the new values (ScenarioName), as well as the change value (+more or –less).

Example: The Max Drive Time on our current route is 6 hrs. and Max Work Time is 7 hrs. In the Scenario image above, we increased our Max Drive Time by 2 hrs. and our Max Work Time by 2.5 hrs. The results indicate our total cost decreased by ($1583.31), the Distance decreased by (277.87), and Elapsed Time decreased by (5.47).

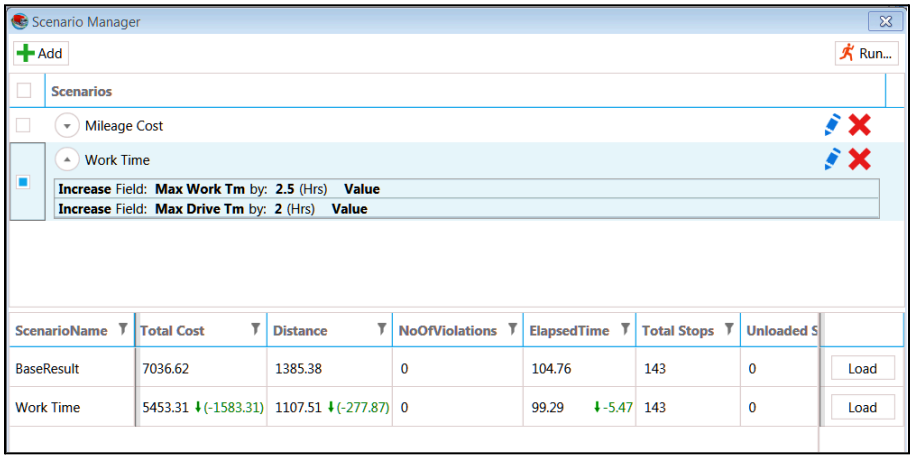


Figure 138 – Scenario Manager Results

Tip: Scenario Manager will apply Optimization if set to TRUE in Preferences > Routing > Algorithm > Optimize Stops After Loading

If the Scenario results are determined to be optimal, the results can be applied (Load) and saved as a new route/files, while still maintaining the integrity of the original route/files used.

- Select the Load button adjacent to the scenario results.

Scenario Manager will save and close the original Route Files (unchanged), and then create and save duplicate files with the change applied. The new files will bear the scenario name as an extension to the original file names.

Example: Original file name = Phx1502, new file name = Phx1502-Mileage Cost.

8.6 Cross Dock vs DC

The *Cross Dock vs DC* (Distribution Center) tool allows users to evaluate customer service areas, where multiple methods for distribution exist, and determine the best network design solution based on cost. E.g., Is it cheaper to ship / service the customer directly from the distribution center or complete a line haul to a local cross-dock or warehouse for final delivery. The generated solution can then be fed to DirectRoute to determine the best Route and Stop sequence.

- The algorithm does not evaluate the feasibility of the Route, driver work rules, or customer-specific time windows and service times.
- The DC is the main hub or manufacturing location for all end-user products. There should only be one DC for the solution.
- The Cross Dock vs DC solution uses the *Stop* and *Truck* files (Distance file is optional).
    - **Stop file**:
        - No required *Stop User* fields.
        - Customer list — Drives the demand for the evaluation
        - Volume displayed — Can be a daily volume or an average weekly amount
    - **Truck file**:
        - Mileage Cost (MiCost) — feeds the cost evaluation
            - ➢ Cost from DC = (Stem Mileage of each stop from DC x 2) x Mileage Cost x (TTL Stop Volume / TTL DC Truck Capacity)
            - ➢ Cost from Crossdock = (Stem Mileage from Cross-Dock x 2) x Mileage Cost x (TTL Stop volume / TTL Cross-Dock Truck Capacity) + (DC to Crossdock Mileage x 2) x Mileage Cost x (TTL Stop Volume / TTL Linehaul Truck Capacity)
            - ➢ Multiplying the Stem Mileage x 2 accounts for round trip mileage. Two columns are inserted in the Stop file for DCCost and CDCost.
        - Must have the *City* name
        - Must have the *TruckType* Truck User field.
            - ➢ There are three different Truck types/ scenarios tied to the TruckType:
                - Blank field = Trucks the main distribution center has for delivery to their local customers.
                - LH = Trucks available for Line Haul deliveries (e.g., DC to Cross Dock).

- CD = Trucks available for Cross Dock deliveries (e.g., Cross Dock to end customer).

➢ The main DC utilizes all the Blank Truck and LH Truck Types.

➢ The Cross Dock facilities utilize CD TruckTypes only.

➢ The number of trucks entered in the *Truck* file represents the typical amount of trucks needed to satisfy the current work load.

8.6.1 Use Cross Dock Tool

To use the Cross Dock vs DC Tool complete the following:

1. Ensure the proper Configurations are set — *TruckType* is required as a Truck User field. To include TruckType, complete the following:
   a. Click on *File* and select *Preferences*.
   b. Navigate to the *Configuration* category and click on the drop down arrow.
   c. Select *Truck User Fields* and click on the three dots to the right.
   d. Click on *Add* and type in the STRING data type named *TruckType.*
   e. Click on *Close* and ensure the *Save Preferences on Close* option is checked.
      - The file must be closed to save any changes.

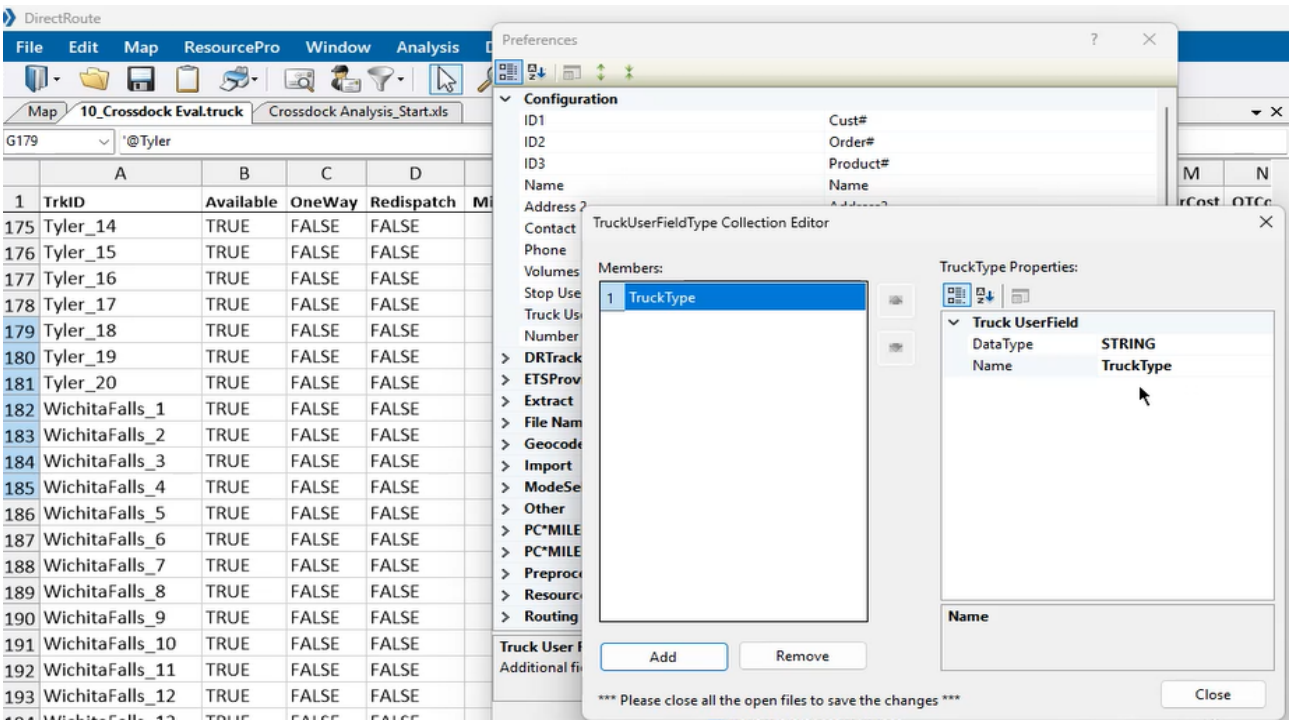


Figure 139 - TruckUserFieldType Collection Editor

2. Include the City name

3. Navigate to the *Analysis* menu and select *Cross Dock vs DC.*

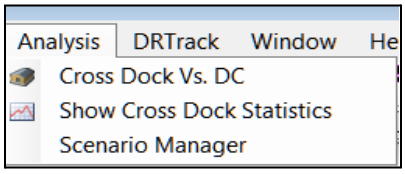


Figure 140 - Analysis Menu

4. Click on each button to add the Stop and Truck files (Distance file is optional).
5. Pick the primary volume for the algorithm to use from the drop down.

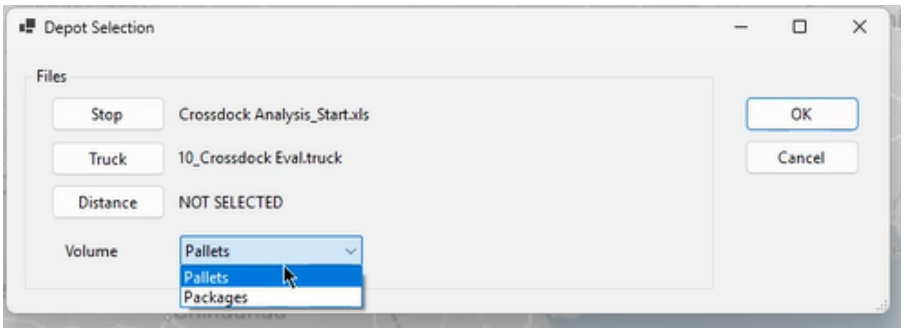


Figure 141 - Depot Selection Window

6. Click on *OK* to launch the algorithm.
7. View the populated map on the *Map* tab to see the Stop assignments.
   - The DC and each warehouse are represented by a diamond shape on the map.
   - Customers are identified by a color-coded dot and zones are outlined with a polygon.
     - Note the DC/ warehouse and its coordinating color for future steps.
     - Colors are populated in the *Color* column of the *Stop* file for reference.
   - Boundaries shown on the Map can be saved or edited using the standard Drawing Tools.
8. Determine if Routes and sequences are required.

If you wish to	Then
Route individually as separate projects	**a.** Split up the *Stop* and *Truck* files - one for each zone. **b.** Route and sequence each individual zone in DirectRoute.
Route all together in one solution	Convert the color that was assigned (Step 6) to an EqCode. **a.** Find the populated *Colors* column in the *Stop* file. **b.** Scroll to the *EQCode* column and enter the DC/ warehouse that identifies with that color. ● E.g., Dallas is assigned the color red. Each red Stop must be EQCoded with *@Dallas.* **c.** Ensure the *SpEq* column in the *Truck* file matches the EQCode entries in the *Stop* file.

9. Run the problem in DirectRoute.

8.6.2 Cross Dock Statistics

1. Navigate to the Analysis Menu and click on *Show Cross Dock Statistics* to view the estimated Linehauls required from the DC to each Cross-Dock.
    - The algorithm must complete its evaluation before statistics are available.

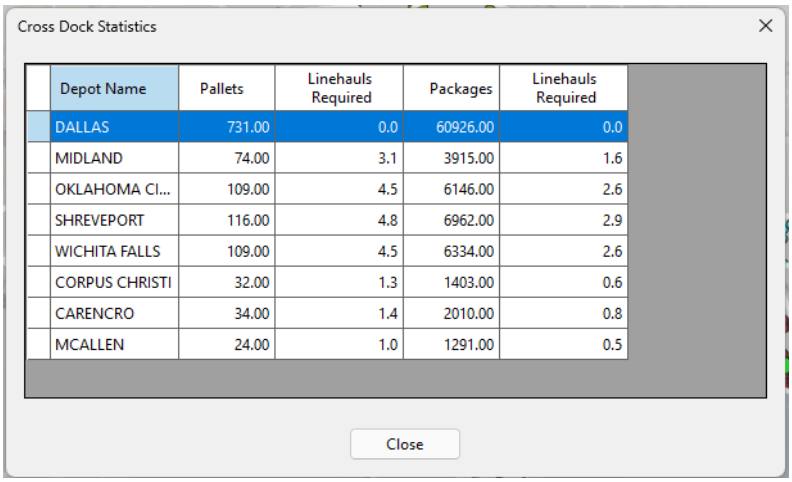


Figure 142 - Cross Doc Statistics

9. Advanced Routing

Once you have mastered the initial building of routes and understand how the software reads your data to create the optimal solutions, you're ready to progress to more advanced methods of routing, as well as using other options to optimize the routing solution even further. Some of these methods may include:

- **Special Equipment Codes**
- **Consolidating stops**
- **Re-dispatching trucks**
- **Splitting stops**
- **Routing with Lasso Tool**
- **Creating inbound routes**
- **Creating relay routes**
- **Tanker routing (Tanker Algorithm)**
- **Using External Utilities**

9.1. Special Equipment Codes

Special equipment codes provide a means to inform DirectRoute to load a stop on a vehicle. If you are routing using a fleet with various special equipment or your customers require special equipment for delivery, there may be a need to use special equipment codes.

Below are seven special equipment codes that can be used to assist with specific routing scenarios, including:

- **Equipment Codes (EqCode)**

- **Back Haul Codes (BH)**
- **Priority Codes**
- **Sequence Codes (Seq Code)**
- **Sequence Preference Codes (SpEq Code)**
- **Territory Codes (Terr Code)**
- **Exclusion Codes (EX Code)**
- **Origin-Destination Pairs (OD Pairs)**

Type	Format	Length	Req'd Truck File
Equipment	Alphanumeric	Any	Yes
Backhaul	BH	2 characters	No
Priority	!1- to !9	2 characters	No
Sequence	00 to 99	2 characters	No
Sequence Preference	1.01 or 25.01	4-6 characters	No
Territory	@Alphanumeric	Any	Yes
Exclusion	^Alphanumeric	Any	No
Inclusion	&Alphanumeric	Any	No
OD Pair	#AA1/#AA2 to #ZZ1/#ZZ2	4 characters	No

The following section provides descriptions and uses for each of these special codes.

9.1.1. Equipment Codes (Eq)

EqCodes are alphanumeric, one to three characters, and user defined; the user determines what characters/numbers will be used to define any requirements that exist. These codes are entered in the EqCode column in the Stop File to identify the specific requirement for that stop. Any number of codes can be used together per stop and are separated by a dash between each.

Example: Sample EqCodes: LG = Lift gate, FB = Flatbed, X3 = 53ft Truck; two or more used = X3-LG-FB

When using an EqCode, one or more trucks in the Truck File must be designated with the same code in the SpEq field to identify it as compatible to load/deliver any stop with this code designation. As many codes as necessary can be added to any stop or truck; use a dash between each code to separate them (ex. X3-LG-FB).

- A stop that is coded in this manner can only be loaded on a truck designated with all three of these codes in the SpEq field in the Truck File.

It's important to remember that the use of SpEq codes on a truck does not preclude the truck from loading or servicing a stop without these codes, but simply identifies the truck as being able to meet the special requirements of some stops.

Example: Figure 125 indicates which trucks can service which stops.

EqCode	SpEqCode	Allowed / Not Allowed
FB	None	Not allowed; truck doesn't have matching SpEq code
FB-X3	FB	Not allowed; truck doesn't have both SpEq codes
FB-X3	FB-X3	Allowed; truck has both SpEq codes
None	FB-X3	Allowed; any truck can service any stop with no EqCode

Figure 143 – SpEq Codes

Note: A truck without a SpEq Code can service any stop without an EqCode, but a stop with an EqCode can only be serviced by a truck with the matching SpEq code. Likewise, a stop without an EqCode can be serviced by any truck, with or without any SpEq Code designation.

Tip: Place vehicles with Special Equipment Codes at the bottom of the Truck File. During the routing process, DirectRoute starts with the first available truck in the Truck File to start loading stops. Stops with no Equipment Codes may go on any vehicle. However, stops with Equipment Codes may only go on those vehicles coded to accept them. By placing vehicles with Equipment Codes on bottom of the Truck File, this ensures that the stops with codes will have vehicles available for loading.

9.1.2. Back Hauls (BH)

A Back Haul is a stop to be picked up (versus delivered) after the truck has been unloaded, and taken back to the terminal; it requires that the truck be empty before it arrives at the stop to be picked up. Back Hauls can be identified in the Stop File using an EqCode of BH. During the routing process, DirectRoute will place these stops at the end of the Route after all other stops have been delivered.

Note: There does not have to be a corresponding BH code in the Truck File. Stops coded as Back Hauls can be loaded on any truck unless the stop has additional constraints, such as size restrictions or other EqCodes.

Tip: When shown in the Route Book, Back Hauls are shown with a negative capacity. A column heading for BH Totals may be added to the Header Report in the Route Book.

Back Hauls should not be confused with a regular pickup for delivery to the Depot. This type of pick up could be at any location between two delivery stops, anywhere on the route. The BH code should not be used for this type of stop. For less than truckloads, set the stop quantity to 30,000 and DirectRoute will include it in the routing process.

9.1.3. Priority Codes

Priority Codes allow the user to change the order in which stops are loaded in the construction phase of route building. Priority Codes are identified using the exclamation symbol (!), followed by a sequence number between 1 and 9, entered in the EqCode field in the Stop File.

Typically, DirectRoute will load the farthest un-routed stop on an empty vehicle and proceed to load additional stops within the same vicinity on the vehicle. Using Priority Codes will change this behavior, giving priority loading, or preference, to stops with a Priority Code, over non-prioritized stops.

A Priority Code does not ensure that a stop will be the first stop on a route, only that the stop gets loaded before all others without a Priority Code (to indicate priority delivery, see **Sequence Codes**. When assigning the sequence number, 1 is used to indicate the highest priority and 9 the lowest.

Example: Priority Code!1 indicates a higher priority than !3.

Note: There doesn't have to be a corresponding Priority Code in the Truck File. Priority stops can be loaded on any truck unless the stop has additional constraints, such as size restrictions or additional EqCodes.

9.1.4. Sequence Codes

When stops require priority delivery over other stops, the use of a Sequence Codes (Seq Code) will force DirectRoute to build the route using the delivery sequence input for each stop.

A Seq Code is a 2-digit number (01 thru 99) used in the EqCode field in the Stop File, to indicate delivery order. Stops with the lowest sequence number (00, 01, 02, etc.) will be loaded before stops with a higher number (10, 23, 99, etc.). Any numerical code (without alpha characters) entered in the EqCode field is assumed to be a Seq Code.

When using Seq Codes, all of the stops must have a Seq Code; blank cells in the EqCode field will be given a null value (00), which will force a first delivery, while a value of 99 will force a last stop, or delivery. When combining Seq Codes with another EqCode, separate the two with a dash.

Example: A 2nd delivery stop (Seq Code 02) requires a lift gate (EqCode LG). EqCode field = LG-02.

The following table represents coded stops in the Stop File. Based on the EqCode field input, can you determine when/how these stops should be loaded/delivered?

Name	EqCode
Stop A	LG-01
Stop B	2
Stop C	FL
Stop D	(blank)
Stop E	FL-LG-03
Stop F	(blank)
Stop G	1

Figure 144 – EQ Codes

- Stops A and G must be delivered before B and E (Seq 01 takes precedence over 02 and 03).
- Stops C, D, and F have no Seq Code assigned, so the software will assign a null value (00). Since 00 indicates the highest precedence, Stops C, D, and F will be forced to deliver first, ahead of stops A, G, B and E, even though they were designated for 1st, 2nd, and 3rd delivery by the Seq Codes 01, 02, and 03.
- To avoid this error, Stops C, D, and F should be assigned a numerical value that will ensure delivery sequence in the proper order.

- Remember, the use of any Seq Code in the Stop File will require that ALL stops be assigned a sequence code.

9.1.5. Sequence Preference Code

A Sequence Preference Code (SpEq Code) is a dollar amount assigned to be multiplied/added to any stop in which delivery preference is requested. The dollar amount is placed/used in the EqCode field, adjacent to any other special code, in the same way that any other special code is used.

Example: $3.25 is assigned for a stop in which preference is required. A stop already assigned an EqCode of RF and requires Seq preference would show the following in the EqCode field: RF-3.25.

When DirectRoute builds and optimizes routes, it will calculate a cost for the route (ref. cost fields in the Truck File). If SpEq Codes are used in the Stop File, the system will add an additional cost to the routes, equal to the assigned value for the preference code multiplied by the stop Seq Code number, minus 1.

Example: If the SpEq Code is 3.25, and a stop's Seq Code is 5, then the added cost to the route would be 3.25 x (5-1), or $13.00.

The earlier in the route the stop is sequenced, the lower the calculated cost; the later in the route, the higher the calculated cost will be. As a result, DirectRoute will attempt to reposition the stop to the first or earliest position on the route. Additionally, it is possible DirectRoute will be able to re-sequence the route without increasing mileage.

Note: It is important to always test values to ensure they do not have an adverse effect on operations.

9.1.6. Territory Codes

Territory Codes, used in both the Stop and Truck File in the EqCode and SpEq fields, will force routes to remain within a certain area. Territory Codes are identified by using the symbol @ with two alphanumeric characters (ex. @A2).

Territories can be as small as one truck, or have multiple routes assigned. If drivers are assigned to a specified territory and their routes should not cross territory lines, then Territory Codes could be used in the Truck File to restrict which stops (Territories) can be loaded on the truck.

The main difference between a Territory Code and a normal EqCode is that the codes on a truck must be a subset of the codes on a stop, whereas with normal EqCodes, the stop codes must be a subset of the codes on the truck.

In the table below, Customer X can only be serviced by drivers assigned to Territories 1, 2, and 3 (@1, @2, @3), but not by the driver assigned to Territory 4 (@4).

Truck Code	Allowed
@1	Yes
@3	Yes
@2-@3	Yes
@4	No

Figure 145 – Territory Codes

Note: Any truck can service a stop without a Territory Code. In most cases, if Territory Codes are used, they are placed on all stops and all trucks.

9.1.7. Exclusion Codes

Exclusion Codes (Ex Code) are used to specify that two or more stops cannot be loaded on the same vehicle. These codes are identified by using the symbol ^ with two alphanumeric characters (ex. ^A2) in the EqCode field of the Stop File. Stops with the same Ex Code will not be loaded on the same vehicle.

NOTE: Exclusion Codes are "hard" rules, meaning the Load algorithm must always exclude stops. The system would leave a stop unloaded versus inserting it onto a route where another stop exists with the same Exclusion Code.

EXAMPLE: A beverage distributor delivers to customers who may receive as many as three deliveries per week. The Stop File used represents deliveries for a typical week. Each stop in the file represents one delivery, so for each customer receiving two, or three deliveries in the week, there are two, or three records in the Stop File. To ensure these deliveries are not all loaded on the same vehicle to deliver all on the same day/time, enter an EX Code on each record, to prevent it from loading with the others on the same vehicle.

Stops coded with an Exclusion Code can be loaded on any truck unless the stop has additional constraints such as size restrictions or additional Equipment Codes. There does not have to be a corresponding Exclusion Code in the Truck File.

9.1.8. Inclusion Codes

Inclusion Codes are used if multiple orders are being delivered to the same area to ensure they are placed on the truck which regularly runs the route in question. These codes are identified using the ampersand symbol (&) in the Equipment Code field of the Stop File.

NOTE: Inclusion Codes are "soft" rules, meaning if the Load algorithm runs into another hard rule such as MaxWorkTm, Capacity, or another EQCode, it has the ability to break up stops with the same Inclusion Code and will place them on another route.

EXAMPLE: A clothing distributor delivers orders to the same outlet mall and wants to ensure all the deliveries to that geographic area are on the same truck. An Equipment Code of &OutletMall ensures all these deliveries will be placed onto the same route.

Stops coded with an Inclusion Code can be loaded on any truck unless the stop has additional constraints such as size restrictions or additional EqCodes. There does not have to be a corresponding Inclusion Code in the Truck File.

9.1.9. Origin-Destination Pairs

Origin-Destination Pairs (OD Pairs) can be used to force DirectRoute to load a pair of stops on the same route, in proper order, as an exception to standard Depot-to-Stop routing.

TIP: For best performance of the software, OD Pairs should account for less than 20% of the total Stops in one routing solution.

OD Pairs include both a pickup and a drop off. The paired stops are identified by using the # symbol with a two-digit alphanumeric code and a sequence number, ex. #AA1 and #AA2.

- The lower sequence number in the pair (#AA1) represents the Origin stop, while the higher sequenced number (#AA2) represents the Destination stop.
- OD Pairs must be used as a pair; if one stop lists an OD Pairs code, there must be another stop at some point in the route with a matching code.

How it works:

- DirectRoute determines the first stop on a route during the construction phase of load building and looks for any stops with OD Pair codes.
- If found, the stop coded with the lowest number is loaded first.

Example 1: #AA1 would load before #AA2, as the number 1 is lower than number 2.
DirectRoute then checks the capacity of the vehicle against the volume to be picked up, ensuring there is enough space on the vehicle when it leaves the terminal to pick up the Origin Stop.

Example 2: #AA1 and #AA2 are assigned for pickup and delivery.
Vehicle capacity is set at 17,000 pounds; 14,000 pounds are loaded at the terminal for various stops on the Route, and an additional 2,200 pounds must be picked up at another location before all deliveries can be made

This would be a valid use of OD Pairs. The stop with the matching OD Pairs code need only be loaded after the pick. The remainder of the route is built in the usual manner, with appropriate consideration given to other equipment or sequence codes.

Note: The first Stop of any OD pair in a route will always display itself in the Route Book as a negative number, representing the Stop as a pickup.

9.2. Consolidating Stops

Options exist in **Preferences > Routing > Consolidate Settings** to enable consolidation of stops. These settings are validated when they are updated.

Several options exist to consolidate orders, but only one option may be chosen:

- Consolidate by ID1
- Consolidate by ID2
- Consolidate by Address
- Consolidate by Fixed Times
- Consolidate on Initialize

Example: Two orders, a Deli order, and a Hardware order, both with unique and separate order numbers, are to be delivered to the same Super Store location. If a consolidation option is not chosen, DirectRoute will consider these two orders as separate stops, and would appear in the Route Book as Rt 3/Stop 1 and Rt 3/Stop 2. However, if you tell DirectRoute to consolidate orders by address, the Route Book result would show both orders as Rt 3/Stop 1.

For the consolidate function to work properly, additional conditions must also exist. To consolidate by address or customer, each record must contain the following:

- Identical Time Windows.
- Identical EqCodes.
- Identical Size Restrictions.
- Lat/Long must be within three decimal places.

When one or more stops have been consolidated, they will appear as one stop on a route, designated with a + symbol, left of the sequence number.

W	SEQ	Cust_NM	Accou...	City	Glass...	Sund...	GrossP...	ARV	DEPT	DAY	DIST
	0	Terminal Leg [1]	HAUP...	HAUPPA...				9:30	9:30	Tu	0.0
	1	STAR AUTO GLASS	45819	ELMONT	1.0	0.0	25.8	10:04	10:11	Tu	26.9
	2	LAKEVIEW AUTO SALES...	6340	ROCKVI...	1.0	12.0	91.3	10:26	10:33	Tu	6.3
	3	ACTIVE AUTO GLASS INC.	45856	EAST...	0.0	2.0	8.5	10:52	10:59	Tu	8.2
	4	Terminal Leg [1]	HAUP...	HAUPPA...				11:27	11:27	Tu	19.9

Figure 146 – Consolidated Stop

- Select the + symbol to explode (expand) the stop detail.

W	SEQ	Cust_NM	Accou...	City	Glass...	Sund...	GrossP...	ARV	DEPT	DAY	DIST
	0	Terminal Leg [1]	HAUP...	HAUPPA...				9:30	9:30	Tu	0.0
	1	STAR AUTO GLASS	45819	ELMONT	1.0	0.0	25.8	10:04	10:11	Tu	26.9
	2	LAKEVIEW AUTO SALES...	6340	ROCKVI...	1.0	12.0	91.3	10:26	10:33	Tu	6.3
		5201021514	0	9:30...							
		5201021514	0	ROCKVILLE CENTRE	9:30...						
		5201021604	1	9:30...							
		5201021604	1	ROCKVILLE CENTRE	9:30...						
	3	ACTIVE AUTO GLASS INC.	45856	EAST...	0.0	2.0	8.5	10:52	10:59	Tu	8.2
	4	Terminal Leg [1]	HAUP...	HAUPPA...				11:27	11:27	Tu	19.9

Figure 147 – Unconsolidated Stop

- To return the view to Consolidated, select the dash (–) symbol.

9.2.1. Consolidate by ID1/ID2

ID1 is reserved for a unique identifier for the stop record (account number). If this option is set to TRUE, DirectRoute will consolidate all records with the same account number (ID1) into one stop record. This option is useful if you have several orders for the same customer.

- ID1 will be displayed as the alias if set in *File > Preferences > Configuration.*
- If the ID1 field Account#, this option will read Consolidate by Account#.
- To consolidate by ID2, the same rules apply.

Note: An error message will be generated if Consolidate by ID2 is set to TRUE and both Consolidate by ID1 & Consolidate by Address is set to FALSE. This setting must be corrected to save/close the dialog box; or select Cancel to exit without saving the erroneous setting changes.

9.2.2. Consolidate by Address

If this option is set to TRUE, DirectRoute will combine records that have identical addresses (Address1 fields match). This option is useful if you have several orders to be delivered to the same address, though the account numbers may be different.

Consolidate (Sum) Fixed times–If this option is set to TRUE, the fixed time for the consolidated stop will be equal to the sum of the fixed times for all the orders that are consolidated into one record. If it is unchecked, the fixed time will be equal to the fixed time of the first order in the consolidated group.
Consolidate on Initialize–If this option is set to TRUE, DirectRoute will consolidate fixed routes based on ID1, ID2, or Address, whichever option is set to TRUE, during the route building process if Initialize Routes is selected.

9.3. Redispatch

Redispatch is used in local delivery situations when the time to deliver a route is short in comparison with the maximum work time set for the truck. The short delivery time allows the truck to be sent out on multiple route legs during a day.

Redispatch is controlled in the Truck File, by the Redispatch column.

- If set to TRUE, the truck is available for Re-dispatch.

*Note: This field will be ignored if the **Oneway** column is also set to TRUE.*

Example: A distributor may deliver to customers in full truckload quantities. This may only require a couple of hours which would allow the driver to return to the depot, reload, and deliver another stop. This process would be repeated until the truck was out of work time.

Redispatch Minimum Time
This indicates the minimum amount of work time remaining (in hours) before considering Redispatching.

Example: If the max work time is set to 10 hours and the minimum time is set to 2 hours, Redispatching will cease if the route has already run more than 8 hours (10-2). If minimum time is set to zero, it is assumed that another driver will be taking the next leg of a route and work time statistics are reset to zero.

Redispatch Turnaround Time
Turnaround time is the amount of time it takes to reload the truck after it has returned to the depot (in minutes). With the Redispatch feature, all dialogs that require a route number (*Modify > Move, Modify > Delete*) also require a leg number. This information is entered into the route field, separated by a comma.

Example: 1, 2 would indicate Route 1, Leg 2. If the leg number is omitted, the system assumes it is Leg 1.

9.4. Splitting Stops

Split Stops allows a user to define where, and by how much, a stop is split after routes have been built, based upon capacities that have been used in the Stop and Truck Files.

- Open the Route Book.
- Select the route containing the stop to split.
- Select the stop to highlight it.
- Right click on the stop and select *Split Stop.*
    - Select *Split by Percentage* to split by a percentage amount and enter the amount in the box to the right.
    - Select *Split by Number* to split by a number (set in the Stop File Field *Split Size*).
- Select OK.

Tip: Stops must be Unconsolidated to split.

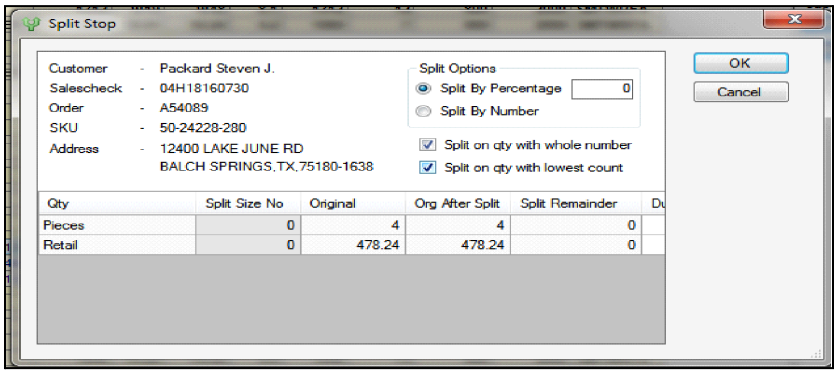


Figure 148 – Split Stops within Route Book

The split will create two stops, each with the selected split quantities. Each stop may be treated independent of each other; they can be moved to another route, unloaded, or any other action that might be necessary.

9.4.1. Dynamic Splitting

Dynamic splitting is intended to be used in routes that have low stop counts (typically 2 to 4 stops per route) and where the vehicle capacity is the primary constraint on the routing problem. For example, assume a truck has a capacity of 100 units and you have 5 stops that have a quantity of 40 units each. If dynamic splitting is not allowed this would produce three routes (two routes with two stops of 40 and one route with one stop of 40). If dynamic splitting is turned on, the system could load the stops on two routes by splitting one of the stops into two 20 unit stops and placing each of those stops on a route with two 40 unit stops.

Dynamic splitting parameters are selected and set in *Preferences* > *Routing* > *Dynamic Splitting*, before route building is initiated.

There are several factors used to determine how dynamic splitting is executed. For example, reference the field in the Stop File called MaxSplits. If this field is set to '1' or higher, the stop can be considered for dynamic splitting, otherwise it will not be considered. Each stop will contain at least one order, and each order will contain at least one line item. If Split Orders is set to TRUE, the system will evaluate pulling some of the line items off an order to make a split; otherwise, it will look at splitting full orders off the stop. Listed below are the parameters that dictate how dynamic order splitting is executed (*Preferences* > *Routing* > *Dynamic Splitting*).

- **Split stops while loading**–Dynamic splitting option is available if set to TRUE. If this parameter is set to FALSE, the remaining parameters under the dynamic splitting section are inconsequential.

- **Split Orders**–If TRUE the system will consider splitting an order by placing some of the line items on one stop and placing the remaining line items for the order on the other stop. If this parameter is set to FALSE, the system will only split stops by placing full orders on the stops created by the split.
- **Split Line Items**–If TRUE the system will consider splitting the stop at the line item level. This option is only valid for stops that contain only one order and one line item on the order.
- **Splits-Max splits per stop**–Indicates the maximum number of times a stop can be split. This is typically 1 or 2 times. This value is only used if there is no entry in the Stop File for MaxSplits.
- **Splits-Min split size**–The minimum size for a split order (based on quantity 1 field). When an order is split into two stops, each stop must have at least the min split size. For example, if the min split size is 2,000 and a stop has 10,000 units, possible splits could be: 2,000 and 8,000; 4,000 and 6,000; 5,000 and 5,000.

Example: You could not have a split of 1,000 and 9,000 since one of the orders would be less than 2,000. This also places a limit on the size of an order that can be split. For example, if you had an order of 3,500, it could not be split since there is no way to split the order where both stops contain at least 2,000 units.

- **Splits-Truck Full**–This parameter determines if the system will try to split a stop based on the user's definition of what a full truck is. Let us take an example where Truck Full is set to 80%. The system will load stops on a route until it runs out of capacity. At that point, we will check the capacity used by the route, if it is less than 80% it will try to find a stop to place on the route by splitting it. It should be noted that *Min split size* and the *Truck Full* parameter have an influence on each other. For example, let assume you have vehicles that have a capacity for 20 pallets, and you set the Truck Full to 90% and min split size to 4. If a route contains 17 pallets, it will be at 85% capacity and will look at splitting a stop to fill the route. But because min split size is set to four, it can't fill the route any further because a 4-pallet stop would exceed the capacity of the vehicle.
- **Splits-Evaluate Split Options**–Setting this parameter to TRUE only comes into play if Split Orders is set to TRUE. When the system evaluates splitting a stop it will first attempt to split the stop by full order. If this is successful, it will not evaluate the possibility of filling the vehicle further by looking at splitting the order if this parameter is set to FALSE. If it is set to TRUE, it will look at splitting orders then select the option which utilized the most capacity of the vehicle.

9.4.2. Stops That Should Not Be Split

For stops that should NOT be split dynamically by DirectRoute during the loading phase of Route building, use the Stop User Field in the Stop File to identify them.

- When used with Dynamic Splitting, orders/line items that DO have a value of TRUE, will not be split.
- When used with Static Splitting, orders/line items that DO NOT have a value of TRUE, will be split first if the order/line item quantity is over the set Static Split size (*Preferences* > *Routing* > *Static Splitting* > *Split Size*).

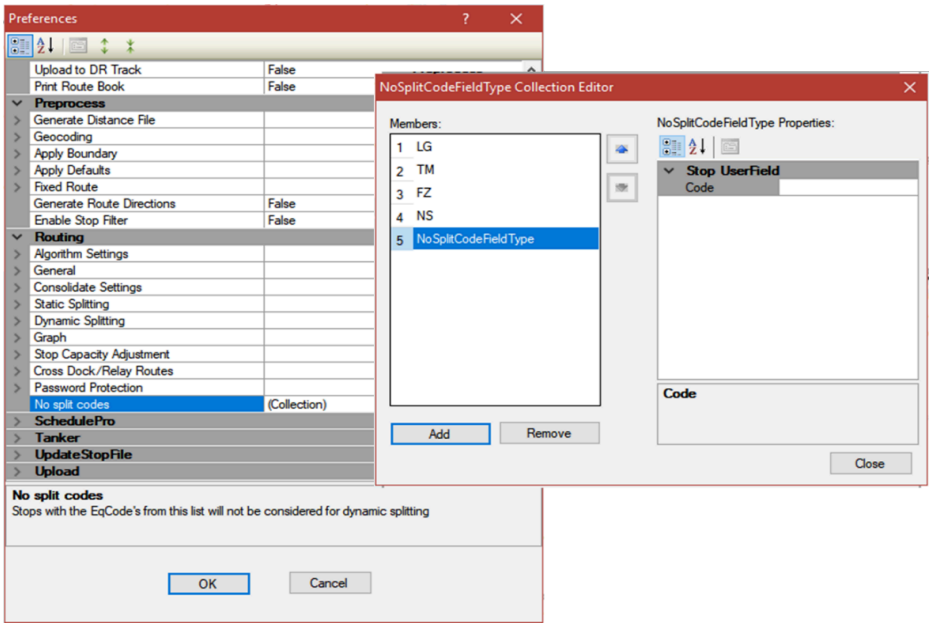


Figure 149 – DoNotSplit

- Use the Add button to add EqCodes, and the Remove button to remove codes from the list.
- Click the Add button and then click the Stop User Field code box and type in the EqCode.
- Repeat to add each subsequent EqCode.
- To remove an EqCode, click the EqCode to select it, and then click the Remove button.
- When all edits have been completed, click the Close button.

9.5. Using the Lasso Tool

The Lasso Tool enables the selection of a group of stops (records) from the map. The stops can be loaded or unloaded stops, and can be used to manually build new routes, moved to other routes, or loaded/unloaded to and from routes, all without leaving the map view.

To access the Lasso Tool option while in the routing mode, select the Lasso icon from the tool bar, or use the menu (*Modify* > *Lasso*) to select one of the actions mentioned above that you want to complete once the stops have been selected on the map.

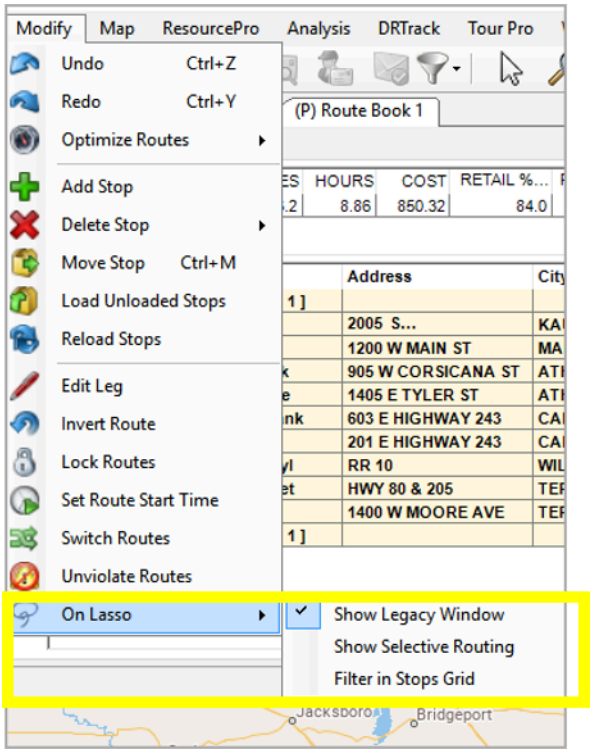


Figure 150 – Lasso Tool Options

- **Show Legacy Window**–When the Lasso tool is used to select stops on the map, the Lassoed Stops info box will open, enabling selection of an action to perform (load stops, delete stops, etc.)

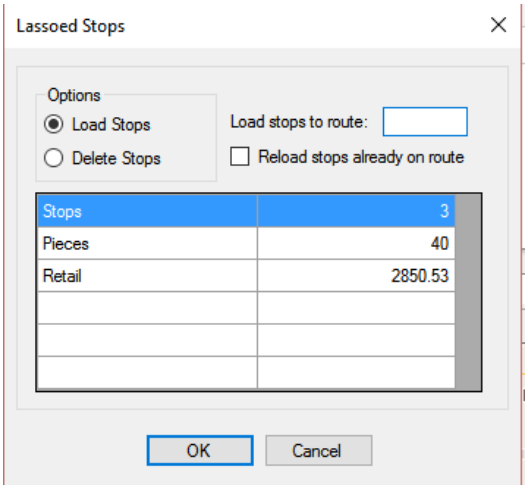


Figure 151 – Lassoed Stops Info Box

- **Show Selective Routing**–When the Lasso tool is used to select stops on the map, the Selective Routing info box will be opened and can be used to assign the selected stops

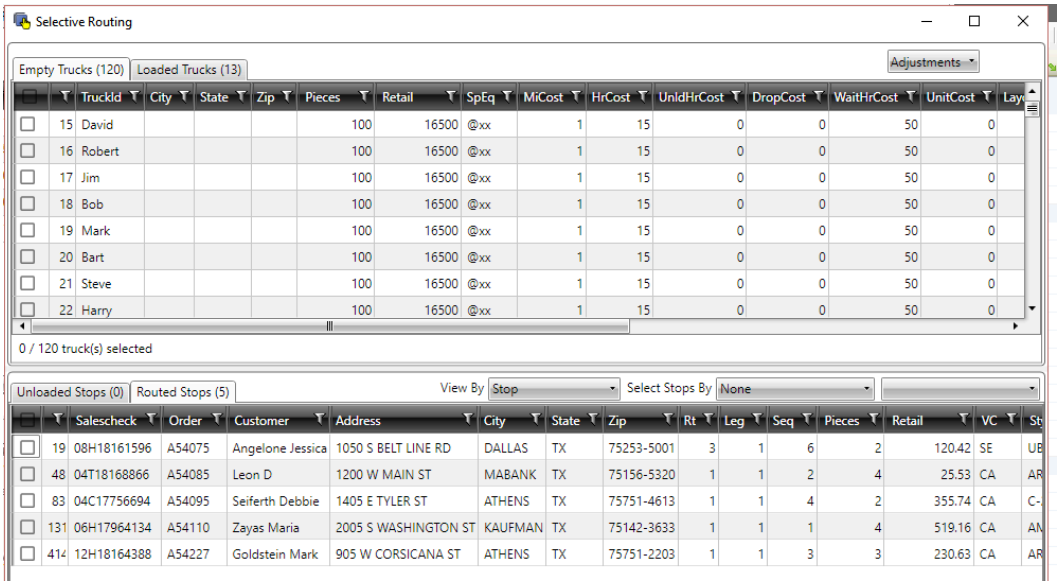


Figure 152 – Selective Routing Info Box

- **Filter in Stops Grid**–When the Lasso tool is used to select stops on the map, the Stops Grid (*Stop File.xls*) will update to show only the stops selected, instead of all stops in the Stop File.

See **Using the Lasso to Select Stops** for additional information.

9.6. Build Manual Routes on the Map

This action is completed in the same way as using the Manual Route Build Tool, except that the Lasso Tool is chosen instead.

To start, ensure the Stop and Truck Files are updated as needed and saved in the DirectRoute Data Folder.

- From the DirectRoute menu, select *File > New Route.*
- Select the Stop File, Truck File, and Distance File (if used) to use in the routing scenario.
- Select No Initialization and select the Dispatch Date (first day vehicles should depart).
- Select the OK button to launch the build process.

When the build process has completed, select the Map tab from the top of the screen to view the stops on the map.

- From the toolbar, select the Lasso Tool; the mouse cursor will change to resemble a pen.
- Left click and hold the mouse, and drag the pen to draw a perimeter around the group of stops to select them, and then release the mouse.

An info box will open to display the number of stops selected and the volume totals of the selected stops. These stops can now be loaded to a route.

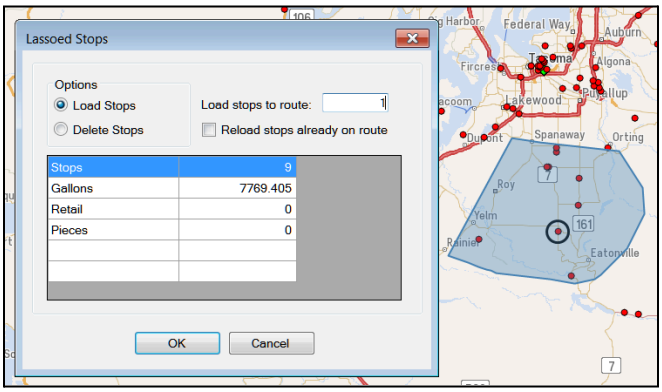


Figure 153 – Lasso Build Routes

- Type the Route# in the *Load Stops to Route* box.
- Select the OK button to complete.
- If the selected action will violate any constraints, a warning notice will be received.

9.7. Move, Delete, or Add Stops

The Lasso Tool enables the selection of a group of stops (records) at one time, while viewing the stops on the map. Various actions can be applied to the selected records as a group. Some of these actions include adding stops to routes, deleting stops from routes, redistributing territories (ref. **TerritoryPro: Redistribute Territories**), or reassign resources (ref. **ResourcePro: Reassign Resources**).

While in the routing mode (Route File open), select the Lasso Tool from the toolbar.

- The mouse cursor will change to resemble a pen; left click and hold the mouse, and drag the pen to draw a perimeter around the group of stops to select them, then release the mouse.

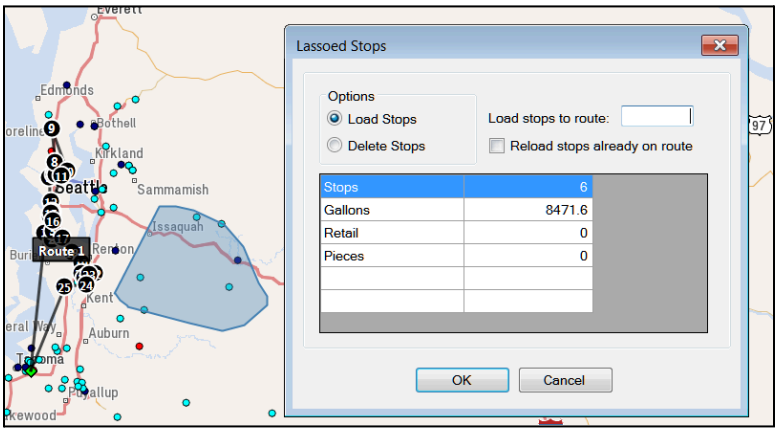


Figure 154 – Lasso Function

An info box will open to display the number of stops selected and the volume totals of the selected stops. These stops can now be loaded to a route, reloaded to another route, or deleted from a route.

- Select the action desired.
- Select OK to complete the action.

- If the selected action will violate any constraints, a warning notice will be received.

See **Using the Lasso to Select Stops** for additional information.

9.8. Inbound Routes

Inbound routes are routes that begin at the furthest stop and route back to the depot. The distance from the depot to the first stop (farthest stop) is not calculated. This mode of routing is an alternative to inverting a completed routing project.

The DirectRoute Algorithm will calculate and build Inbound Routes when the INBOUND option is selected in **Routing Preferences**.

- From the main menu, select *Preferences* > *Routing* > *Algorithm Settings*, and select INBOUND from the drop-down menu.
- Ensure the Truck File column One Way remains set to False.

When INBOUND is selected, all routes will be calculated as Inbound routes; standard routes cannot be completed within the same stop file. To return to building regular two-way routes, edit the Routing Preferences to return the Algorithm Setting to Regular.

9.9. Routing Dense Stops

When routing dense stops, DirectRoute may be slower as it searches for the next stop to load on a route.

During the routing process, as each stop is assigned a stop sequence, DirectRoute then looks through each remaining stop in the Stop File to find and assign the next stop/stop sequence. This works well when stops are generally a few miles from each other. However, in metropolitan areas or areas with a high concentration of stops close to each other (dense stops), this can slow the routing process considerably.

To alleviate this problem, an entry can be made in **Routing Preferences** to limit the number of stops that DirectRoute attempts to sequence to the previous stop, to speed up the routing sequence. When used, DirectRoute will only look to the next (# entered) closest stops from the previous stop. This will prevent the routing sequence from reviewing all available stops for loading while routing very dense stops.

- From the main menu, select Preferences > Routing > Algorithm Settings.
- Scroll down to the last item, *Max Closest Stops*, and enter a number to limit the number of stops, closest to the current stop, that DirectRoute should look at before assigning the next sequence number.

9.10. Relay Routes

The *Cross-Dock* function was used to assign routes to an alternate dock, yard, or domicile. This functionality has been deprecated and replaced with *Relay Routes*. The Relay Route function (in the Route Book) allows the shipper to simulate warehouses where there may only be drop/hook trailer yards. The process creates a line-haul route from the warehouse to the selected drop/hook yard (remote domicile). Routes are run as a multi-depot project, with the remote domicile being the actual warehouse. The routes will be routed from the remote domicile to the delivery point.

Relay Settings

It is recommended that new entries in the Truck File be created to be used specifically for relay routes. For each location you will be creating the relay for, there should be an entry in the Truck File. Each truck should also have the City column populated. It is also recommended that the names of the trucks be such that they are noticeably relay trucks only.

Ensure the values for Edate/Ldate/EarlyStart/LateFinish allow for enough time for the relay to be completed. When the new trucks have been created, the Truck File should be geocoded.

9.10.1. Creating a Relay Route

Create routes using the Stop File and Relay Truck File. When the routing solution has been completed, open the Route Book to view.

- Select the route with the stop that will be relayed to another terminal.
- Select the stop to select it.
- Right click once and select *Relay Route* from the drop-down menu.
- Select Relay by Destination, or Relay by Truck.

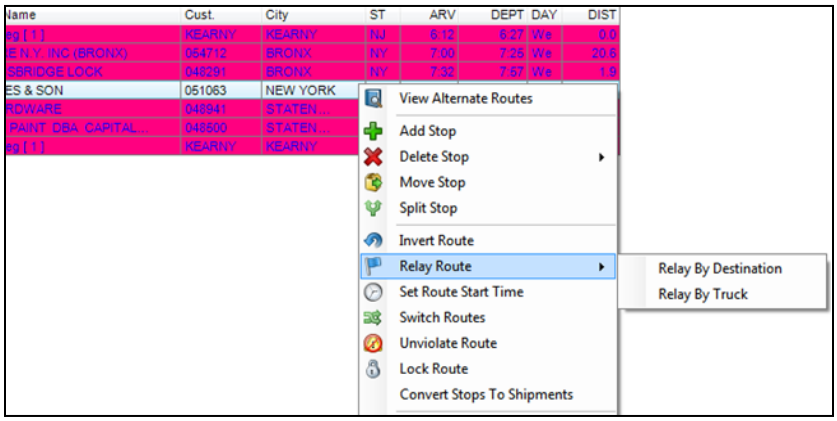


Figure 155 – Relay Routes

9.10.2. Relay by Destination

Relay by destination creates a line haul from the remote domicile to the main depot. The main depot is listed as the destination.

- Right click anywhere in the Route Book to open the Modify menu.
- Select Relay by Destination.
- Pick the relay point from *Relay Point 1*; default is the City location of the first truck in the Truck File that is different from the current truck location.
- Edit *From Route No*/*To Route No*, if necessary; default is the current Route No.
- Edit the *Transfer Time at Pickup/Drop-off* if necessary; default is 15 minutes.
- Edit the *Maximum Speed* if necessary; default is 65 MPH.
- Select OK.

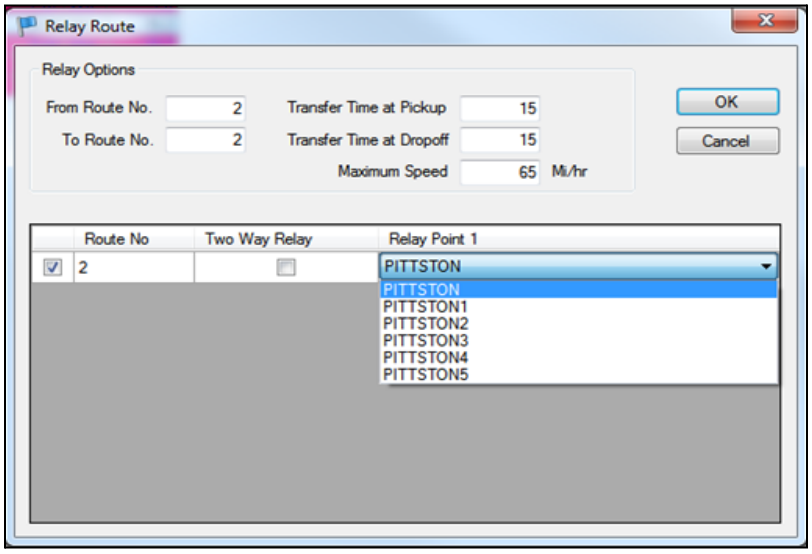


Figure 156 – Relay by Destination

DirectRoute will create a new relay route. The route number created will correspond to the truck's position in the Truck File (ex. if the eighth truck listed in the Truck File is used, Route 8 will be created).

9.10.3. Relay by Truck

Relay by Truck creates a line haul originating from a location other than the remote domicile, or depot. The line haul originates from the truck dispatch location.

- Pick your Relay Truck from the dropdown menu (Relay Truck); default is the first available truck in the Truck File.
- Edit the *From Route/To Route No* if necessary; default is the current Route#.
- Edit the *Transfer Time at Pickup/Drop-off* if necessary; default is 15 minutes.
- Edit the *Maximum Speed* if necessary; default is 65 MPH.
- Select OK.

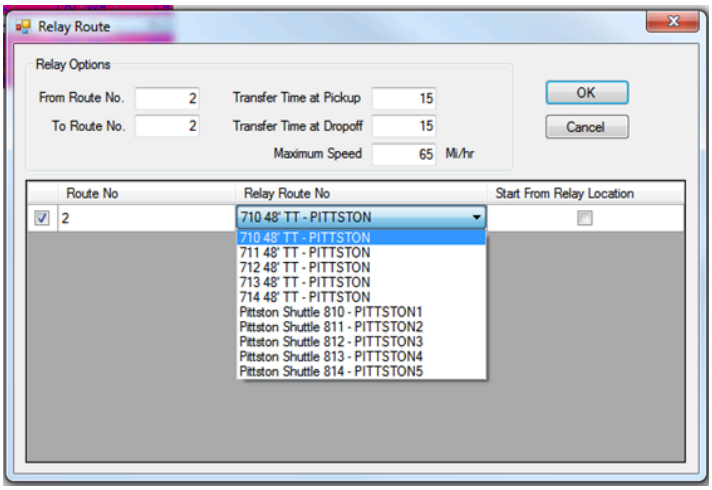


Figure 151 – Relay by Truck

DirectRoute will create a new relay route. The route number created will correspond to the truck's position in the Truck File (ex. if the eighth truck listed in the Truck File is used, Route 8 will be created).

9.11. Tanker Assignments

The Tanker Algorithm and assignment logic is intended to assist with optimized trailer compartment utilization when multiple products in various order quantities have to be planned on compartmentalized trucks together in a pickup or delivery route. The tanker logic considers, in part, volume and weight of loaded totes, tanks, and spaces, and is only applicable if the tanker algorithm is enabled.

The steps to building routes with the Tanker Algorithm are the same steps normally used to build routes in DirectRoute, regardless of the algorithm used. The differences lie in the Tanker Algorithm settings, and the use of two additional files: Tote File, and Product Ratio File. Both files are saved in an *.xls* spreadsheet format, in the DirectRoute/Data Folder, with the Stop and Truck Files.

9.11.1. Tanker Algorithm Settings

The Tanker Algorithm settings identify the options that should be updated to enable the use of the Tanker Algorithm.

To complete the updates, select *File* > *Preferences* > *Tanker* from the main menu.

TANKER	LOAD BUILDING FOR COMPARTMENTS	EXPLANATION
Weight		Choose from Configuration/Volume Fields
Volume		Choose from Configuration/Volume Fields
Count		Choose from Configuration/Volume Fields
Tote File Name	C:\Program Files\Appian\DirectRoute\Data\Tote.xls. File should contain columns: Totaled, Gallons, Weight, Cube, Pallets, and Available	Name and path of the Tote File, typically found in the DirectRoute Data Folder with the Stop and Truck Files.
Product Ratio File Name	C:\Program Files\Appian\DirectRoute\Data\Ratio.xls. File should contain columns: ID, Product Code, Gallons, and quantity fields	Name and path of the Ratio File, typically found in the DirectRoute Data Folder
Use Tanker Algorithm For Product Assignment	TRUE/FALSE	Default is FALSE; if set to TRUE, will use the Tanker Algorithm for product assignment
Max Number of Totes Per Order		Max number of totes allowed on each order
Split Orders to Totes	TRUE/FALSE	Set to TRUE, will split orders down to tote level

Figure 152 – Tanker Algorithm Settings Table

In addition, the Configuration and Default options need to be updated.

- Select File > Preferences > Configuration > Volumes.
- Add quantity field *Gallons* as the first quantity type.

- Add quantity field *Tank*; as many (number/name of Tanks) as necessary.
- Add quantity field *Space*; as many (number/name of Spaces) as necessary.
- Add quantity fields *Weight* and *Volume.*

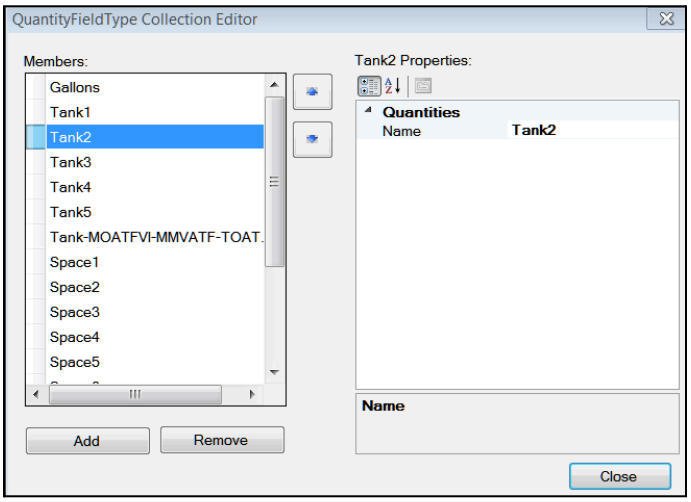


Figure 153 – Tanker Algorithm Volumes

- Select File > Preferences > Defaults > Unload Rates.
- Add the Unld Rates for each of the quantity fields used in Volumes.
- Ensure the same Volume Fields for each item/product listed in the **Product Ratio File** are also used in the Stop File.

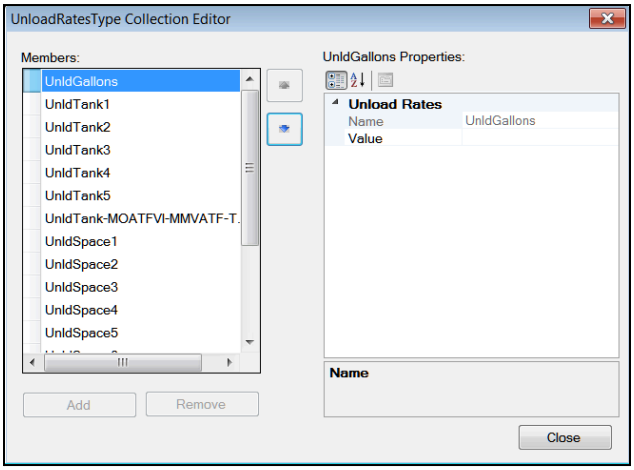


Figure 154 – Tanker Algorithm Unload Rates

	L	M	N	O	P	Q	R	S	T	U	V
	state	zip	COD	item	service code	itemcode	comments	weight	GALLONS	volume	pieces
	AZ	86326	Y	WR520	WR520	WR520	WESTERN REF SAE 5W20 GF5 SN	412.5	0	15	1
	AZ	86326	Y	COMPLIANCE	COMPLIANCE	COMPLIANCE	REGULATORY COMPLIANCE FEE	0	0	1	1
	AZ	86326	Y	ENVFEE	ENVFEE	ENVFEE	ENVIRONMENTAL DRUM FEE	0	0	1	1
	AZ	86326	N	MDEXOS020	MDEXOS020	MDEXOS020	AC DELCO DEX 1 SAE 0W20 GF5 SN	112.5	0	4.166669846	10
	AZ	86326	N	MDEXOS530	MDEXOS530	MDEXOS530	AC DELCO DEX 1 SAE 5W30 GF5 SN	825	0	30	2
	AZ	86326	N	MD1300CJ4	MD1300CJ4	MD1300CJ4	MOBIL D13 SUP SAE 15W40 CJ4 SM	412.5	0	15	1
	AZ	85382	N	MSP520	MSP520	MSP520	MOBIL SPECIAL SAE 5W20 GF5 SN	0	55	0	0

Figure 155 – Tanker Stop File

9.11.2. Product Ratio File

The Product Ratio File is an *.xls* spreadsheet that contains the product data (name or number) for items loaded in Totes, and the corresponding ratio for each (Gallons to Weight, Cube and Pallet, etc.) should be listed. The column headings/fields required in the file are listed below, and once complete, should be saved in the same DirectRoute/Data Folder with the Stop and Truck Files.

- **Product Code**–Code/name assigned to a specific product unit.
- **Gallons–**The number of gallons in one product unit.
- **Weight**–The weight of one product unit.
- **Cube**–The number of cubes in one product unit.
- **Pallet**–The number of pallets assigned to one product unit.

Map | ProductRatio.xlsx

N11

	A	B	C	D	E	F
1	Id	ProductCode	Gallons	Weight	Cube	Pallets
2	1	MDTE24	1	7.5	1	1
3	2	ACDFM	1	7.5	1	1
4	3	KGS530T5	1	7.5	1	1
5	4	KGS520T	1	7.5	1	1
6	5	DRUMPMPOFF	1	7.5	1	1
7	6	CHSB530	1	7.5	1	1
8	7	MJ2	1	7.5	1	1
9	8	MDEXOS020	1	7.5	1	1
10	9	MDSYNATF	1	7.5	1	1
11	10	TO020	1	7.5	1	1
12	11	TO530	1	7.5	1	1
13	12	KGDEXOS530	1	7.5	1	1
14	13	KGS530T	1	7.5	1	1
15	14	KGS530E	1	7.5	1	1
16	15	KGSB020T	1	7.5	1	1
17	16	KGS020T	1	7.5	1	1
18	17	KGHM520T	1	7.5	1	1
19	18	M1040	1	7.5	1	1
20	19	UTSLDO7590	1	7.5	1	1

Figure 156 – Product Ratio File

9.11.3. Tote File

The Tote File is an *.xls* spreadsheet that identifies each Tote in use, and its maximum capacity levels. The volume fields listed must be the same as the volume fields used in the *Product Ratio File*. Once complete, the file should be saved in the same DirectRoute/Data Folder with the Stop and Truck Files.

- **ToteID**–A number ID assigned to a specific tote.
- **Gallons**–The maximum gallon capacity of the tote.
- **Weight**–The maximum weight capacity of the tote.
- **Cube**–The maximum cube capacity of the tote.
- **Pallet**–The maximum pallet capacity of the tote.
- **Available**–Availability status of the tote, entered as TRUE or FALSE.

Map Tote.xlsx

N24

	A	B	C	D	E	F
1	ToteId	Gallons	Weight	Cube	Pallet	Available
2	1	330	500	40	1	TRUE
3	2	330	500	40	1	TRUE
4	3	330	500	40	1	TRUE
5	4	330	500	40	1	TRUE
6	5	330	500	40	1	TRUE
7	6	330	500	40	1	TRUE
8	7	330	500	40	1	TRUE
9	8	330	500	40	1	TRUE
10	9	330	500	40	1	TRUE
11	10	330	500	40	1	TRUE
12	11	330	500	40	1	TRUE
13	12	330	500	40	1	TRUE
14	13	330	500	40	1	TRUE
15	14	330	500	40	1	TRUE
16	15	330	500	40	1	TRUE
17	16	330	500	40	1	TRUE
18	17	330	500	40	1	TRUE
19	18	330	500	40	1	TRUE
20	19	330	500	40	1	TRUE

Figure 157 – Tote File

9.11.4. Tanker Route Results

Tanker route results will be returned in the Route Book. Route totals and statistics can be viewed in the Summary page and individual route pages, as well as in the Info boxes (Route, Stop, Truck, or Solution. In addition, a Tanker Chart is available, presenting a color-coded view of items loaded, including number of tanks and totes filled on each route, and remaining capacity levels. The Tanker Chart is opened in a separate window by selecting the chart icon in the top right corner of the Route Info box.

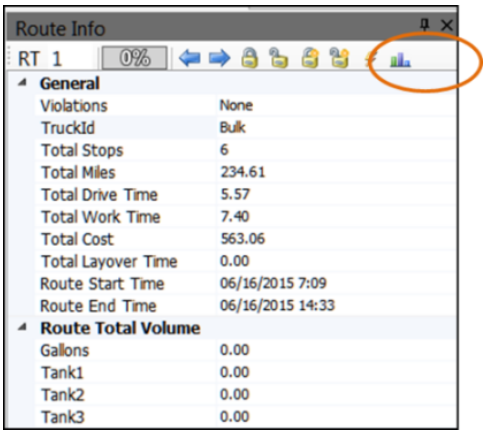


Figure 158–Tanker Chart Icon

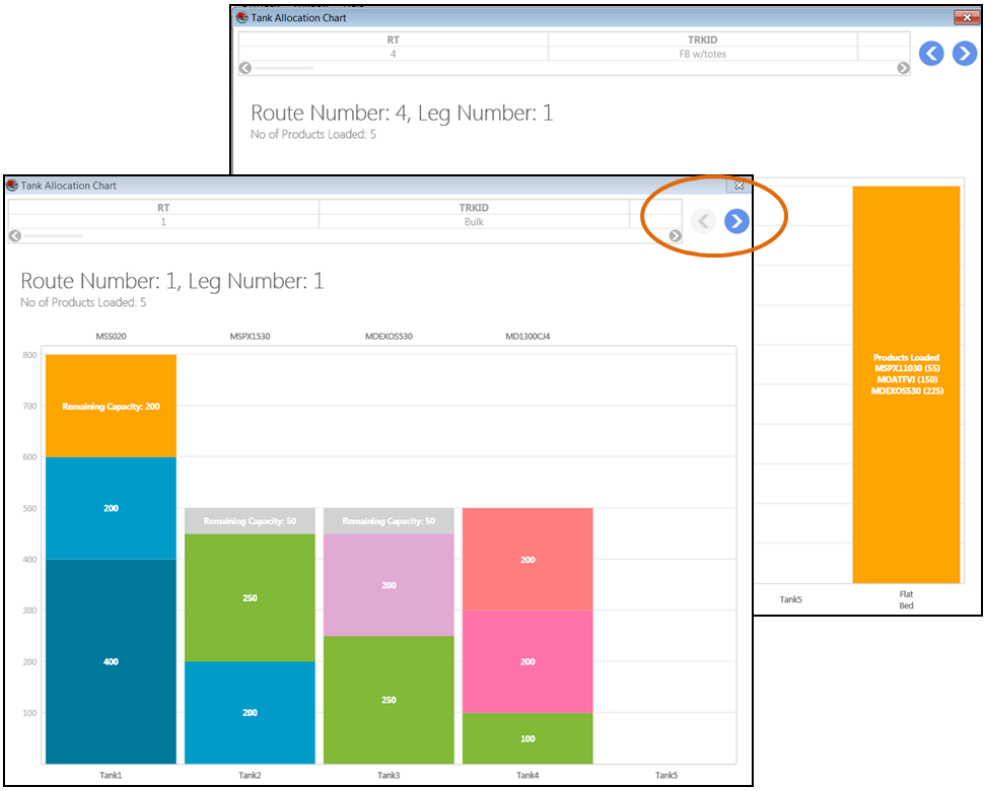


Figure 159 – Tanker Chart View

9.12. External Utilities (Merge Utility)

External Utilities contains an additional tool, the Merge Utility, that enables the merger of two or more Stop Files into one cohesive Stop File, even if all the columns are not the same or do not match. This tool can be extremely helpful, especially for those who use any of the additional add-on programs with DirectRoute (*SchedulePro, TerritoryPro, ResourcePro,* etc.).

To use the Merge Utility, the *Util.config* file (DirectRoute Directory) must be available and configured properly. If you do not have this file, or are not able to access it and would like to use this function, contact Trimble MAPS Support, **support@trimblemaps.com,** Phone: (800) 663-0626.

The External/Merge Utility is accessed by using the  icon on the DirectRoute toolbar. When the Utilities box opens, select the Merge Utility.

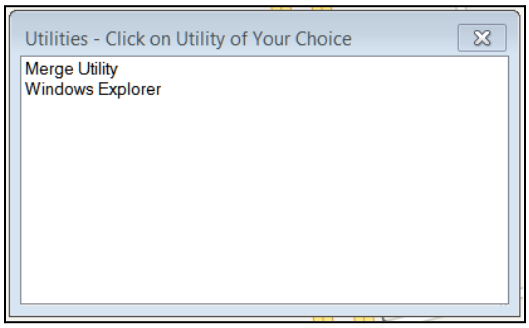


Figure 160 – External Utilities Menu

Note: The Windows Explorer Utility simply provides a shortcut to the computer systems Explorer Window, enabling search/find of files or folders.

9.12.1. Using the Merge Utility

- Select Merge Utility from the listing in the Utilities box.

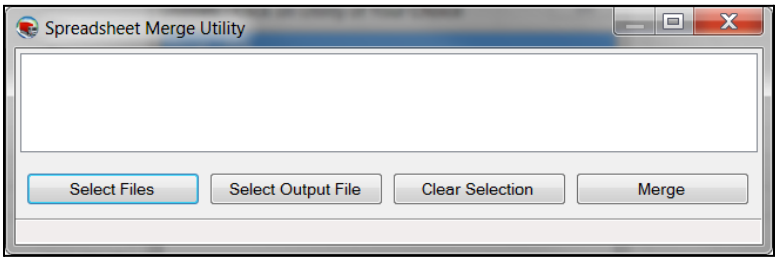


Figure 161 – Merge Utility

- Select the Select Files button to select both of files (one at a time) to be merged
- The file names will be listed in the white space of the box as they are selected
- If you select the wrong file, select the *Clear* button to remove it
- Next, select the *Select Output File* button and assign a name to the new merged file
- Select the *Merge* button, and the new file is created

Note: The Merge Utility will create a new file by copying all the stops from the selected files. The original files used to create the merged file will remain intact and unchanged.

10. Drawings and Boundaries

DirectRoute allows users to add drawings two different ways - draw directly on the map using application tools and upload a drawing file.

10.1. Draw Directly on a Map

DirectRoute contains a set of Drawing Tools that enables you to draw your own boundaries directly on the map, add borders around a group of stops or routes, and add text boxes or labels to shapes or areas on the map.

Drawings and boundaries can be used to define routes or territories, assign vehicles and/or drivers, or view statistical analysis for records within or outside the boundary. The map with drawings can be saved, printed, reused, and edited.

Drawings can be edited at any time on a new or saved drawing file.

Drawing Tools can be enabled in DirectRoute without any files open, or directly within a Stop or Truck File, or a Route File. If you are going to be working with a previously saved Drawing File, open it before attempting to activate the tool bar.

The Drawing Tools tool bar contains several line tools, as well as shape tools, shading tools, and color options for each. These tools can be used for various effects on the map, as well as within any Route File, and all are detailed further in this section.

To activate the toolbar, select *Map* > *Tools* > *Draw* from the menu, or select the Drawing Tools icon from the menu .

The gold padlock icon on the screen enables locking Territories on the map, preventing them from moving during the planning phase, but still enabling them to be edited. When the mouse hovers over the gold padlock, an info box will open and advise whether the current item (s) have been stocked.

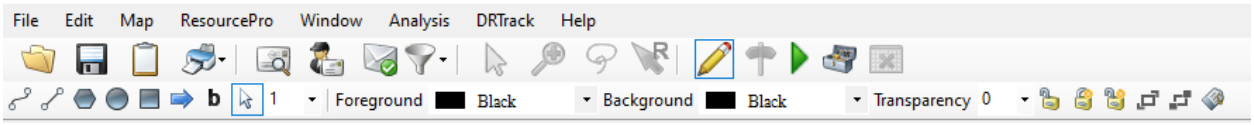


Figure 162 – Drawing Tools Menu

While the tool bar is activated, items from the DirectRoute menu may not be available. To deactivate the tool bar and access the DirectRoute menu or any additional files, select the Drawing Tools icon from the menu.

10.2. Open a Drawing File

This option allows users to open a drawing file to enable boundary visualization during the Route building and editing process (new for v25.2).

View a Drawing file:

1. Click on *File* from the top tool bar and click on *Open Drawings*.
2. Select your drawing file to superimpose the drawings over the map.

Clear a Drawing file:

1. Click on *Map* from the top tool bar then click on *Tools*.
2. Select *Clear Drawings* to remove the drawing file from the map.

10.3. Text Tool

The Text Tool **b** enables placement of a text box on the map, similar to a text box on a presentation. It can be used to label territories, areas, or regions. Select and change font, style, size, color, and patterns, and choose borders around the text box.

- Select the *Text Tool* from the tool bar
- In the text dialog box that appears, type the text you want to appear on the map
- Select *Draw Borders*, to outline the box if desired
- Choose the font type, style, and size
- If you want the size of the text to change with the change in map size (zoom in/out), left click on *Scalable*

- Select the *Fixed Size* if you want the size to remain the same regardless of the map position/size

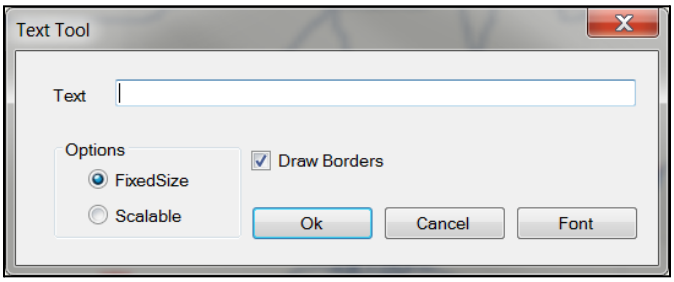


Figure 163 – Text Tool Dialog Box

- When all options have been chosen, select OK
- Position the mouse cursor over location on the map to place the text and left click once, then type the text
- To reposition the text, left click and hold the text box and move to desired location; release the mouse button to set in place

To clear the text box from the map, select *Map* > *Tools* > *Clear Drawings* from the tool bar and left click once on the text box.

10.4. Line Tools

Line tools can be used to draw your own boundaries directly on the map, add borders around a group of stops or routes, or define routes or territories.

Figure 164 – Line Tools

After drawing a line, the total distance can be displayed on the map. This can be useful to determine the distance between two or more points.

- Select the normal cursor icon (arrowhead) from the tool bar
- Position the mouse pointer over the line and left click (frame handles surround the line that is selected)
- The status bar, located in the lower left part of window, will display the total distance of the line

10.4.1. Polyline Tool

The Polyline Tool enables drawing multiple connecting line segments on the map. As each line segment is drawn, the status bar shows the length of the current line segment and the total length of the polyline. After drawing the line, the total distance of the polyline can be displayed. This tool is also especially useful for displaying cumulative distances between areas on the map.

- Select the *Polyline Tool* from the tool bar.

- Select the map to indicate your start point.
- Move the mouse to the next point and left click; a drawn line will appear.
- Move the mouse to the next point and left click again.
- Continue repeating until your drawing is complete.
- Lines can reconnect at another point in the drawing and/or cross another.
- To end the polyline, press Ctrl+ left click.
- To stop the *Polyline Tool* and return to the normal cursor, select the arrowhead icon on the tool bar.

To clear the drawing and start new, select *Map* > *Tools* > *Clear Drawings* from the menu and select the drawn object.

10.4.2. Line Tool

The Line Tool  enables drawing a single line segment on the map. This tool can also be used to display the distance between two areas on the map.

- Select the *Line Tool* from the tool bar.
- Left click on the map to indicate your start point.
- Left click and hold to move the mouse towards your endpoint; notice the distance is displayed in the status bar as you move the line.
- When you reach the point at which you want to end the line, click again.
- To stop the *Line Tool*, select the normal cursor icon (arrowhead) from the tool bar.

To clear the drawing and start new, select *Map* > *Tools* > *Clear Drawings* from the menu and select the drawn object.

10.4.3. Arrow Tool

The Arrow Tool  enables drawing a line with an arrowhead at the end, or drops a triangle on the map to mark a spot. The arrow line is useful in pointing to objects or areas on the map. The distance of the arrow (line) is also displayed in the status bar.

- Select the *Arrow Tool* from the tool bar.
- left click on the map to indicate your start point, or drop point.
- If dropping a triangle to mark the spot, left click one more time to set.
- If drawing an arrow line, left click, hold and drag to the end of your line.
- To end the arrow line, click again.
- To stop the Arrow Tool, select the normal cursor icon (arrowhead) from the tool bar.

To clear the drawing and start new, select *Map* > *Tools* > *Clear Drawings* from the menu and left click once on the drawn object.

10.5. Boundary Tools

A boundary is a completely enclosed shape. The boundary tools available include a circle, rectangle, and a polygon, and displayed with various patterns and colors. Boundaries can be used to:

- Denote a special attribute about an area using colors and patterns.
- Calculate the statistics of records within an area.
- Select records within a boundary for analysis.

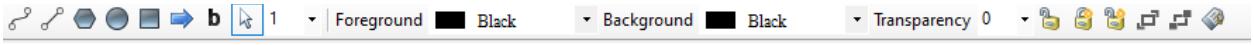


Figure 165 – Activate Boundary Tools

10.6. Polygon

The Polygon Tool enables drawing a boundary of any shape on the map. In addition, the polygon can be edited and sized by dragging the frame handles on the polygon.

- Select the *Polygon Tool* from the tool bar
- left click on the map to indicate your start point
- Move the mouse to the next point and left click; the drawn line will appear
- Move the mouse to the next point and left click again
- Continue repeating until your drawing is complete
- Press Ctrl+ left click to end drawing the lines and your drawn shape will appear on the map
- To add a pattern inside the shape, left click inside the shape once, then left click on the chosen pattern
- To add or change background and/or foreground color, left click inside the shape once
- Select a Foreground/Background color using the drop-down arrow to choose
- Select the Color drop down arrow to choose color
- To end the Polygon Tool, select the normal cursor icon (arrowhead) from the tool bar.

To clear the drawing and start new, select *Map* > *Tools* > *Clear Drawings* from the menu and select the drawn object.

10.6.1. Circle Tool

The Circle Tool enables drawing a circle on the map. The circle can be drawn to a specific radius, which is displayed, on the status bar at the bottom of the screen.

- Select the *Circle Tool* from the tool bar.
- left click on the map to indicate your start point.
- left click and hold while moving the mouse outward to expand the size of the circle; release when the desired size is achieved.
- To add a pattern inside the shape, left click inside the shape once, then left click on the chosen pattern.
- To add or change background and/or foreground color, left click inside the shape once.
- Select a Foreground/Background color using the drop-down arrow to choose.
- Select the color drop down arrow to choose color.

- To adjust the position of the circle, left click, hold and drag to correct position location; release the mouse button to set it in place.
- To end the Circle Tool, select the normal cursor icon (arrowhead) from the tool bar.

To clear the drawing and start new, select **Map > Tools > Clear Drawings** from the menu and select the drawn object.

To display the radius of a circle:

- Once a circle is drawn, you can display the radius in the status bar on the bottom left side of the map. Select the normal cursor icon (arrowhead) from the tool bar and click once within the shape.

10.6.2. Rectangle Tool

The Rectangle Tool enables drawing a rectangle on the map. As the rectangle is drawn, the width and length of the boundary is shown on the status bar at the bottom of the screen. These dimensions can also be displayed later.

- Select the *Rectangle Tool* from the tool bar
- Left click on the map to indicate your start point
- Left click and hold while moving the mouse outward to expand the size of the rectangle; release when the desired size is achieved
- To add pattern inside a shape, left click inside the shape, then left click on the chosen pattern
- To add/change background and/or foreground color, left click inside the shape once
- Select a Foreground/Background color using the dropdown arrow to choose
- To adjust the position of the rectangle, left click, hold and drag to correct position location, then release to set in place

To end the *Rectangle Tool*, select the normal cursor icon (arrowhead) from the tool bar.
To clear the drawing and start new, select *Map* > *Tools* > *Clear Drawings* from the menu and select the drawn object.

To display the dimensions of a rectangle:

- Once a rectangle has been drawn on the map, you can display the dimensions in the status bar on the bottom left side of the map. Select the normal cursor icon (arrowhead) from the tool bar and click once within the shape.

10.6.3. Lock Tool

The Lock Tool provides the ability to lock and unlock shapes on the map to prevent them from being moved while working with stops on the map. When the mouse hovers over the lock icon on the tool bar, a dialog box will open and indicate whether the drawings can be locked or unlocked. The three locking tools available are Lock Selected Shape, Lock All Shapes, and Unlock All Shapes.

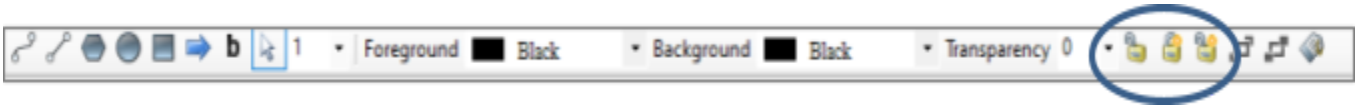


Figure 166 – Territory Lock Tool

10.6.4. Hide Labels

While working in the Drawing File, toggle the Hide Labels icon to show or hide the labels or text boxes attached to drawn objects on the map.

10.7. Using Boundaries

Boundaries can be used to analyze the information in a data table and view the results on the map. The three main functions used with boundaries include:

- **Template Overlay**–Denote a special attribute about an area using colors and patterns
- **Statistics Calculation**–Calculate the statistics of records within an area
- **Build to Value**–Select records within a boundary for analysis

To use boundaries for any analytical function, the boundary must first be drawn (**Boundary Tools**).
Ensure the file to be analyzed is open as well.

10.7.1. Overlay Template

The Template function enables pasting data into records that exist either inside, or outside of the boundary.

Example: The boundary may represent a sales territory. By using the template overlay, you can change the symbol of all the customers within that sales territory, and not affect any records outside of that territory.

To select all the records within a boundary:

- Select the *Drawing Tools* icon from the menu 
- Select the *Normal Cursor* icon (arrowhead) from the tool bar
- Left click within the drawn boundary
- Select *Edit* > *Template* from the menu

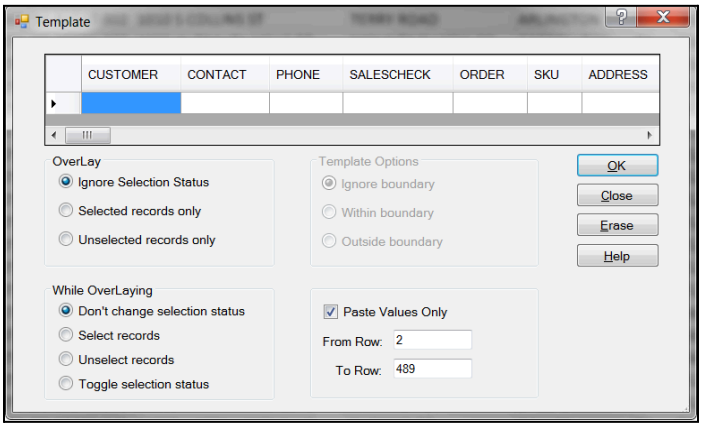


Figure 167 – Template Dialog Box

Select the Template Options to apply.

- **Overlay**–Selection status refers to records marked as TRUE in the Stop File; to select records within the boundary regardless of their selection status, check *Ignore Selection Status*
- **While Overlaying**–To change the selection status of the chosen records in the Stop File, choose *Select Records*
- Select OK

Select the Stop File tab to review the selection status of the records (should now reflect TRUE in the column labeled Selected).

- Select the F8 key to display statistical data for the selected records

To unselect and begin a new template overlay, select *Edit* > *Template* from the menu.

- Select Selected Records Only
- Select Unselect Records
- Select OK

Repeat the process to select new records for any further analytical review.

10.7.2. Statistics Inside a Boundary

View summary statistics for records inside a selected boundary.

- Open the spreadsheet
- Position the cursor over the drawn boundary and left click once to select it
- Select *Edit* > *Statistics* from the menu, or press the F8 key

The Statistics Info box will include two additional columns, *In Boundary* and *Out Boundary*, with the applicable statistical results displayed in each.

Use the Drawing Tools to define or alter the boundaries, as needed.

10.8. Build to Value

The Build to Value function color-codes locations based upon the geographical area and a volume criterion. DirectRoute will search in concentric circles from the starting point and apply a color and symbol to locations that fall within the criteria you establish.

The *Build to Value* function can be used for a variety of applications, including:

- Building a skeletal route based upon area and delivery quantities
- Build a sales territory based upon area and sales quantities
- Site location analysis (which customers can be serviced based upon warehouse capacity)

To use the *Build to Value* function:

- Review the Stop File and ensure that all stops are of the same symbol, color, and size
- Select the map tab to active the window if not already

- Zoom to the desired geographical area
- Select Map > Tools > Build to Value from the menu
- left click on the map where the geographical center of the territory will be located
- Select Build by Symbols

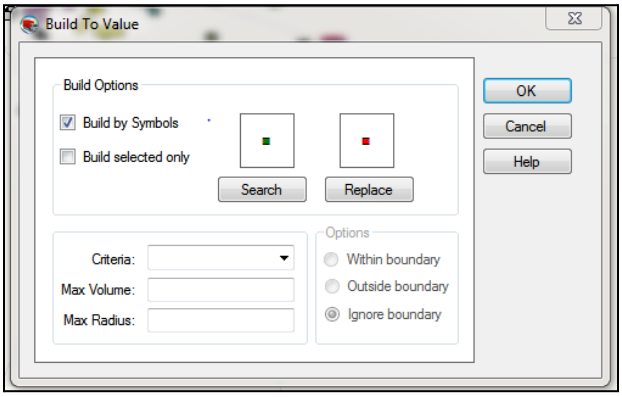


Figure 168 – Build to Value Dialog Box

- Select the *Search* button; ensure *Symbol, Color*, and *Size* are the same as the current selections.
- Select the *Replace* button; select *Symbol, Color*, and *Size* to apply to locations in the new territory.
- Select the applicable boundary option: *Within, Outside, Ignore.*
- Use the *Criteria* drop-down button to select the column from the Stop File from which to choose.
- Select the *Max Volume* the territory will contain (volume of the criteria chosen).
- Select the *Max radius* that the search will include.
- Select OK to begin the *Build to Value* function.

Note: If the radius field contains a value, DirectRoute will search records in concentric circles until it reaches the first of the two value limitations; if the radius field is blank, DirectRoute will continue to search records until the maximum volume value is reached, or until boundary limitations are reached.

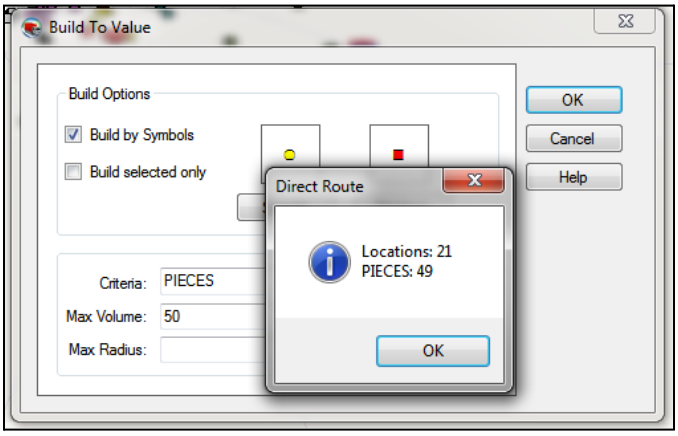


Figure 169 – Build to Value Results

DirectRoute marks all selected records with the color and symbol chosen with the Replace Option.

11. Exporting Route Info To ERP/WMS/OMS

When a routing solution has been completed, the results can be exported to your ERP/WMS/OMS for processing. The primary options used to retrieve this data are:

The primary options used to retrieve this data are:

- **Web Services**–Automatically pull order and account information from our software applications (DRTrack) in real time or in a daily/batch process.
- **XML File**–A simple, standard text file that contains a specific set of data fields, enables sharing pertinent information that multiple interchanges can.
- **Upload File (UPL)**–An Upload File (UPL) in standard text format, customizable to allow selection of desired data fields, while omitting data not needed. (Requires an Upload Format File (URP) be created).

11.1. Export with Web Services

Exporting a routing solution from DirectRoute using web services requires the use of DRTrack, our web-based GPS tracking program. The info is exported and then uploaded to DRTrack from DirectRoute, where DRTrack can automatically send the info via web services to your ERP/WMS/OMS when a request is received for the info. The request/response via systems can be scheduled to occur automatically on a recurring basis.

Before attempting to export the routing solution, ensure Preferences have been updated to include all necessary information.

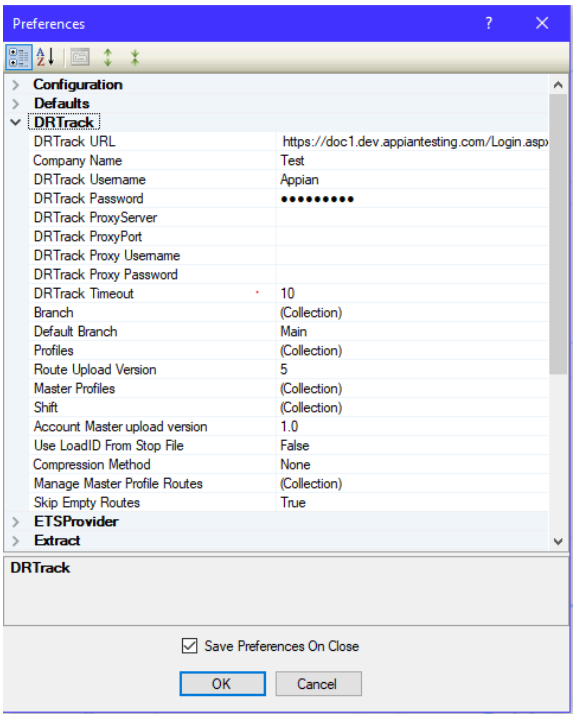


Figure 170 – DRTrack Preference Settings

DRTrack URL–Your DRTrack URL address, to which routes and/or Master Accounts will be uploaded.

Company Name–Your Company name.

DRTrack Username–Your DRTrack username.

DRTrack Password–Your DRTrack password.

DRTrack Proxy Server–If applicable.

DRTrack Proxy Port–If applicable.

DRTrack Proxy Username–If applicable.

DRTrack Proxy Password–If applicable.

DRTrack Timeout–Set timeout value in minutes.

Branch–Use the drop down menu to select Branch name or add names (requires at least one).

Default Branch–Select the Default Branch name from the drop down menu (entered in Branch).

Profiles–Leave blank for all, or use the drop down menu to select (add Profile names, if used).

Route Upload Version–Enter the number 5, or other number for older versions of DRTrack.

Master Profiles–Leave blank or select from the drop down menu (add Profile names, if used).

Shift–Leave blank or select from the drop down menu (add Shift info, if used).

Account Master Upload Version–Select 1.0 or 2.0.

Use LoadID from Stop File–Select TRUE or FALSE.

Compression Method–Select none or Gzip.

Manage Master Profile Routes–Leave blank or select from the drop down menu (add Profile names, if used).

Skip Empty Routes–Select TRUE or FALSE to skip empty routes on upload.

To export a routing solution to DRTrack you will need to be in the routing mode.

- With the routing solution open, click on *DRTrack* on the menu and then click *Export to DRTrack*.

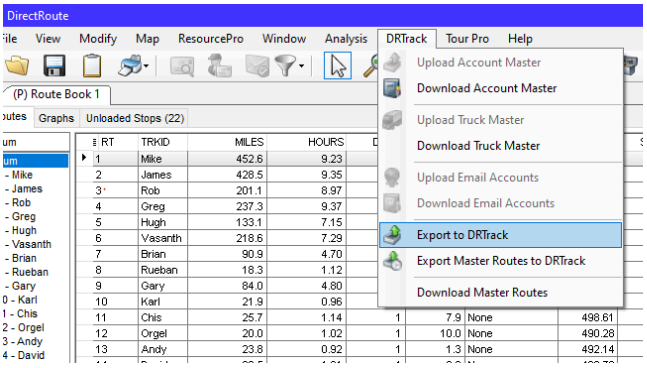


Figure 171 – Export to DRTrack

- Click to add a check mark to select *Skip Empty Routes* and/or *Overwrite Existing Entries* and then click the Export button.
- When the Export info box opens indicating a successful export, click on *OK*.
- Click *Yes* or *No* to close the Route Files when the next info box opens.

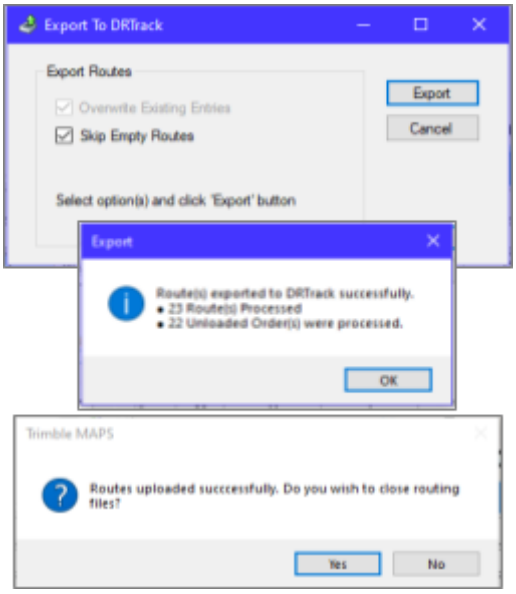


Figure 172 – Successful Export to DRTrack

11.2. Export an XML or Upload (UPL) File

DirectRoute can export an XML File or Upload (UPL) File to relay order and route information directly to your ERP/WMS/OMS. Both files are created in simple text format and can easily be consumed by most applications.

The primary difference between an XML File export and a UPL File export is that the XML File is a fixed-data field file, and it will contain all data fields available with no ability to limit the amount of data passed, whereas a UPL File can be customized to limit the fields passed by selecting only the information needed. The UPL File also requires the creation and use of a Format File (UPF), to determine which data fields will be relayed during the export.

- XML File
  - Fixed-data fields; includes all available order, account, and route fields.
  - Cannot be customized to limit the type of data passed in the export.

- UPL Upload File
  - Can customize to include only fields of data needed, and exclude unwanted data.
  - Can be created/saved in various file formats, i.e. UPL, xls, CSV, TXT, and XML.
  - Requires the use of a Format (UPF) File to determine which fields of info to include.

When creating an XML or UPL File, you will first need to ensure that Preferences have been updated and set to specify upload and export options.

- Select *File* > *Preferences* > *Upload* from the main menu.

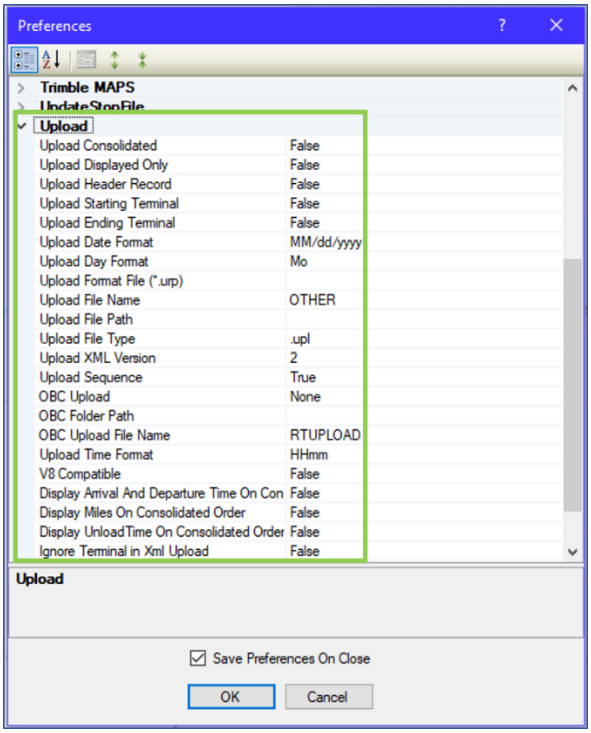


Figure 173 – Upload Options

The following options should be reviewed and selected as needed.

Upload Consolidated–By default, the UPL File will list each order separately regardless of whether or not consolidate stops (Load tab) is chosen.

- If **Upload Consolidated** = TRUE, the orders/stops will be passed in a consolidated format in the UPL File; this is most useful when you do not require each order to be listed separately.

Upload Displayed Only–Set this option to TRUE to include only those routes that are displayed on the map (locked). If FALSE, the file will include all routes for that routing session.

Upload Header Record–Places a header row at top of the UPL File, with the number of routed orders.

Upload Starting Terminal–If TRUE, the starting terminal/distribution center will pass in the UPL File.

Upload Ending Terminal–If TRUE, the ending terminal/distribution center will pass in the UPL File.

Upload Date Format–Select the date format to be used, i.e. MM/DD/YYYY.

Upload Day Format–Select how the day of the week should be displayed; (ex. Monday, Mo or Mon).

Upload Format File (URP)–Enter the file name and path of the Format (URP) File that will be used; when updated here, the software will not ask for this during the upload process, it will only ask for the Upload File name. (Leave blank if using the XML Upload File option)

Upload File Name–The default file name is RTUPLOAD, or use the drop-down arrow to select another name for the file (the file name can be changed after it is created).

Upload File Path–Enter the location (Path) to save the UPL File, if different from the current DirectRoute Data folder location.

Upload File Type–Choose the file type you would like produced (UPL, XML, TXT, CVS, or xls)

Upload XML Version–Enter the XML version number (2 or 5).

Upload Sequence–If TRUE, the UPL will display orders by route and stop sequence numerically, same as it is displayed in the Route Book.

OBC Upload–Enables Onboard Computer System Upload File (OBC Upload File) format for PeopleNet, XATA, etc.

OBC Folder Path–The path to the OBC File.

OBC Upload File Name–OBC Upload File name.

Upload Time Format–Select the time format to be used (ex. H:mm).

V8 Compatible–TRUE or FALSE; enables backwards compatibility with DirectRoute Version 8.

Display Arrival and Departure Time on Consolidated Order–When TRUE, will display the same arrival/departure date for each order on the same stop (consolidated order).

Display Miles on Consolidated Order–When TRUE, will display the same miles for each individual order on the same stop (consolidated order).

Display Unload Time on Consolidated Order–When TRUE, will display the same unload time for each individual order on the same stop (consolidated order).

Ignore Terminal in XML Upload–When TRUE, will ignore the terminal, and only display orders.

Display Drive and Work Time on Consolidation–When TRUE, will display Drive Time and Work Time on consolidated orders.

Abbreviate Rt Violation–When TRUE, will abbreviate all route violations.

Display Total Distance on Consolidated Orders–When TRUE, will display the total distance on consolidated orders.

After all options have been reviewed and/or selected, ensure the file names/paths have also been updated in *File > Preferences > File Names/Paths.* This information will normally pass automatically when entered under the Upload options, but it's a good idea to check anyway.

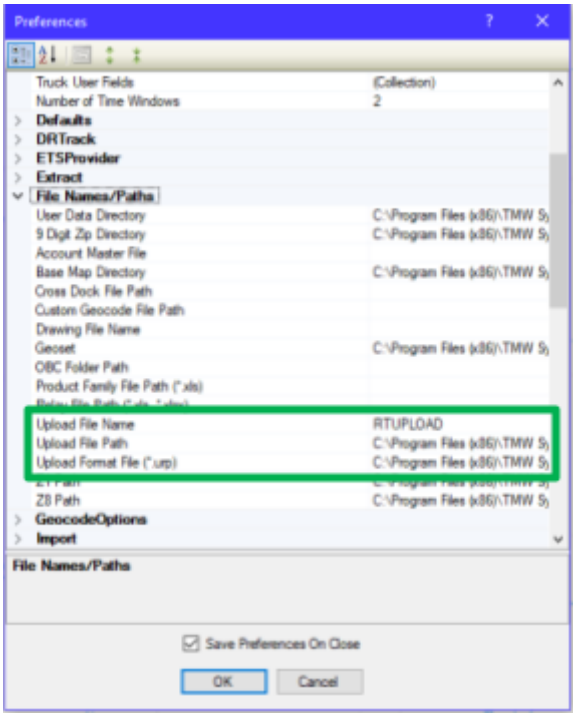


Figure 174 – Upload File Name/Path

11.2.1. Create an XML Upload File

An XML Upload File is created while in the routing mode, after the routing project has been completed and saved. The data fields passed in the file are fixed, and cannot be customized.

- With the Route Book open, select *File* > *Run Post Process* from the menu.

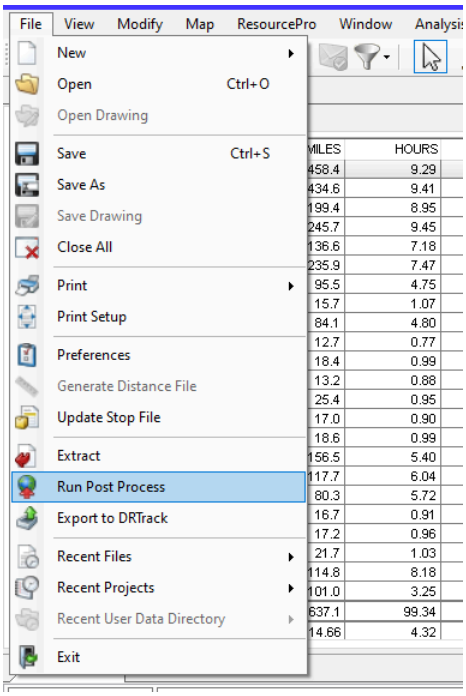


Figure 175 – Run Post Process

If you did not previously enter a file name/path in the Upload section of Preferences, you will be prompted to select a file name and path, and then click the Save button.

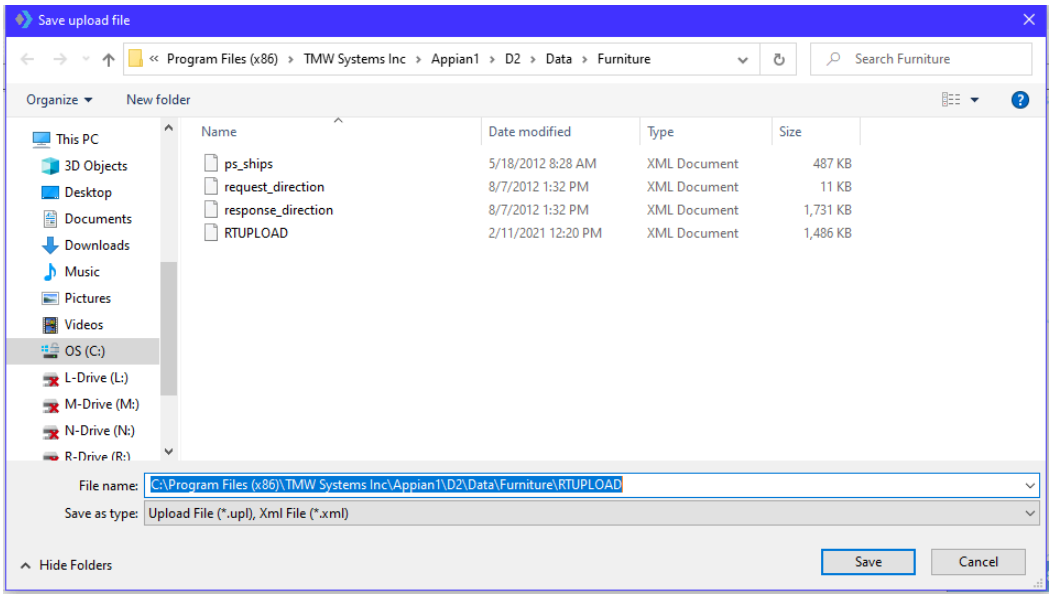


Figure 176 – File/Upload

When the file has been created successfully, an info box will appear with the file name and location of the saved file. If a previously produced upload file already exists, the info box that appears will ask if you want to overwrite the one that exists already.

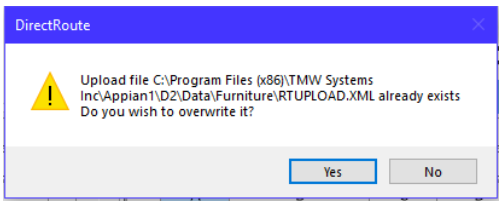


Figure 177 – Overwrite Existing Upload File

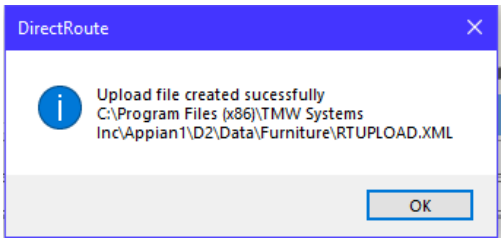


Figure 178 – XML File Created Successfully

You can open and view the saved Export File at the path specified. The file is now ready to copy over to the ERP/WMS/OMS.

Figure 179 – Sample XML File Sample

11.2.2. Create a URP Format File

The URP File is a text formatted file that lists the data fields that should be exported in the Upload File. Using a URP File enables customization of the output data that will be in your Export File; you get only the information you want, while excluding all other unnecessary data.

The URP File requires a specific header line, with the data fields listed below it. Each data field parameter is separated by a comma with no spaces. List each field in the order in which you want it produced, the same order in which it will be passed to the ERP/WMS/OMS.

To create a customized URP File, it's probably easiest to ask for a sample file and then edit that file to include/exclude the fields you want. However, you can create one from using Notepad or similar text program

- Open a new file and type the header line (including brackets): [Detail Section].
- Open the **URP Field Names Table** and copy/paste each field you want, directly below the header line.
- Add an equal sign (=) after each one, no space between.

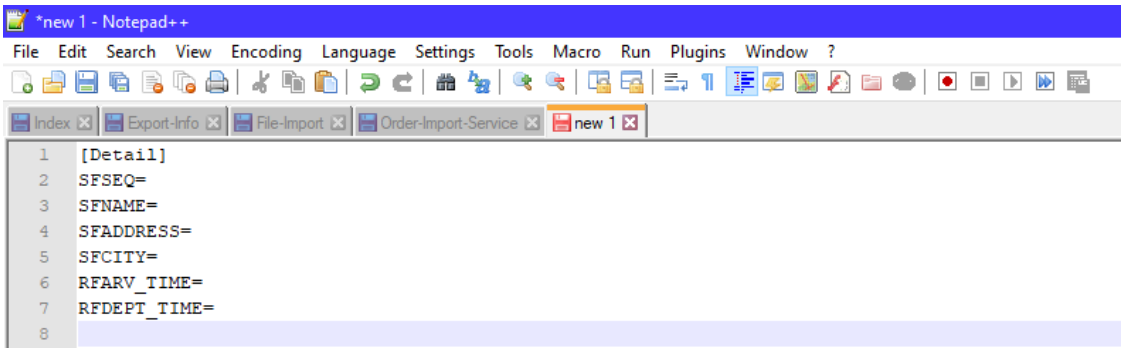


Figure 180 – Sample URP File

After you've copied all of the fields you want, add the five parameters for each field. Each parameter should be separated by a comma with no spacing between.

For example:

[Detail Section]

SFSEQ=1,2644,4,L,0

SFNAME=1,2356,30,L,0

SFADDRESS=1,1775,30,L,0

SFCITY=1,1839,30,L,0

RFARV_TIME=1,16,5,L,0

RFDEPT_TIME=1,172,5,L,0

Here is the same example, with a breakdown of the five parameters:

URP Field	Column#	Position#	# of characters	Left/Right justified	# of decimals
SFSEQ=	1	2644	4	L	0
SFNAME=	1	2356	2356	L	0
SFADDRESS=	1	1775	30	L	0
SFCITY=	1	1839	30	L	0
RFARV_TIME=	1	16	5	L	0
RFDEPT_TIME=	1	172	5	L	0

Figure 181 – URP Field Entry Format

- Field names must be *capitalized* (all letters).

- The first and second entries reflect the starting *Column* and *Position* of the data.
- The third entry is the *Number of Characters* used for data in the field.
- The fourth position is for *Text Justification* within the cell (L = Left, R = Right).
- The last entry number is the *Number of Decimals* allowed to follow any given number in the field.

Once all entries have been added, save the file as *.URP in the DirectRoute Data Folder and then update Preferences with the URP file name/path, *Preference* > *File Names/Paths*, and *Preference* > *Upload*.

11.2.3. Create a UPL Upload File

When creating a UPL file, you will first need to ensure that Preferences have been updated and set to specify upload options, and that you have created and saved an URP Upload Format File. Follow the directions for option entries in **Section 11.2** and **Section 11.2.2** to create a format file.

To create the UPL Upload File,

- With the Route Book open, select *File* > *Run Post Process* from the menu.

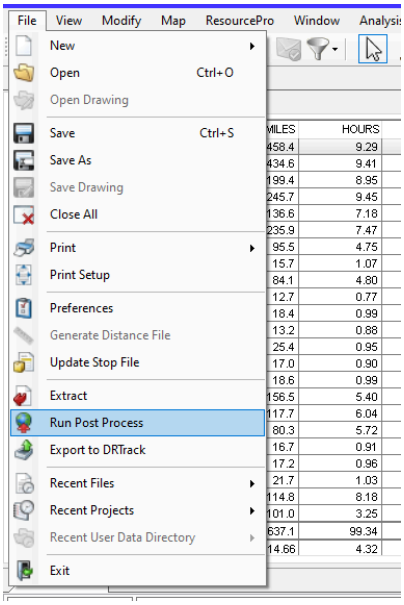


Figure 182 – Run Post Process

You may be asked if you want to upload displayed routes only (versus all routes in the Route Book)

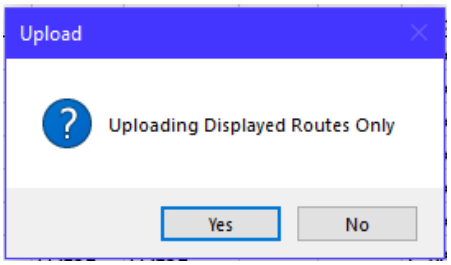


Figure 183 – Upload Displayed Routes Only

You should receive a notification box when the UPL has been created successfully.

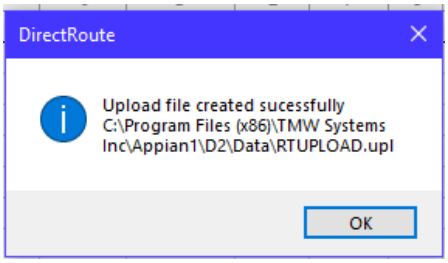


Figure 184 – UPL Created Successfully

To view the newly created UPL File, navigate to the location where the file was saved.

Below is a sample UPL File output. A few things to note:

- Header information will not be passed in the upload information.
- If there are ### in any field, there was an error in the processing.
  - Ensure a period has not been placed in the parameters, in the place of a comma.
- If there are *** in the UPL, the fields are too small to hold the requested data.

```
1    1 06H17964134          Zayas Maria          KAUFMAN          TX  0829 0829 04/08/2013
1    1 06H17969133          Zayas Maria          KAUFMAN          TX  0829 0829 04/08/2013
1    1 06H17964117          Zayas Maria          KAUFMAN          TX  0829 0853 04/08/2013
1    2 04T18168866          Leon D               GUNBARREL        TX  0930 0954 04/08/2013
1    2 04T18168866          Leon D               GUNBARREL        TX  0930 0954 04/08/2013
1    3 12H18164388          Goldstein Mark       ATHENS           TX  1025 1025 04/08/2013
1    3 12H18164388          Goldstein Mark       ATHENS           TX  1025 1025 04/08/2013
1    3 12H18164388          Goldstein Mark       ATHENS           TX  1025 1025 04/08/2013
1    3 12H18164388          Goldstein Mark       ATHENS           TX  1025 1058 04/08/2013
1    3 12H18164388          Goldstein Mark       ATHENS           TX  1025 1058 04/08/2013
1    3 12H18164388          Goldstein Mark       ATHENS           TX  1025 1058 04/08/2013
1    4 04C17756694          Seiferth Debbie      ATHENS           TX  1106 1106 04/08/2013
1    4 04C17756642          Seiferth Debbie      ATHENS           TX  1106 1106 04/08/2013
1    4 04C17756642          Seiferth Debbie      ATHENS           TX  1106 1106 04/08/2013
1    4 04C17756642          Seiferth Debbie      ATHENS           TX  1106 1106 04/08/2013
1    4 04C17756642          Seiferth Debbie      ATHENS           TX  1106 1141 04/08/2013
1    4 04C17756642          Seiferth Debbie      ATHENS           TX  1106 1141 04/08/2013
1    4 04C17756642          Seiferth Debbie      ATHENS           TX  1106 1141 04/08/2013
```

*Figure 185 – Sample *.UPL Upload File*

11.2.4. URP Field Names Table

ROUTE FIELDS	DESCRIPTION
RFARV_DATE	Arrival date at delivery location
RFARV_DAY	Arrival day at delivery location
RFARV_TIME	Arrival time at delivery location
RFARVTM_WITH_TZ	Arrival time at delivery locale w/Time Zone
RFBREAKTM	Break time for driver
RFCUM_DRV_TM	Cumulative drive time
RFCUM_WRK_TM	Cumulative work time on route

ROUTE FIELDS	DESCRIPTION
RFCUMQTY001	Cumulative Quantity1 of Order
RFCUMQTY002	Cumulative Quantity2 of Order
RFCUMQTY003	Cumulative Quantity3 of Order
RFCUMQTY004	Cumulative Quantity4 of Order
RFCUMQTY005	Cumulative Quantity5 of Order
RFCUMQTY006	Cumulative Quantity6 of Order
RFCUMQTY007	Cumulative Quantity7 of Order
RFCUMQTY008	Cumulative Quantity8 of Order
RFCUMQTY009	Cumulative Quantity9 of Order
RFCUMQTY010	Cumulative Quantity10 of Order
RFDEPDAY	Day of departure/dispatch day
RFDEPT_DATE	Route departure date
RFDEPT_TIME	Time of route departure
RFDEPTTM_WITH_TZ	Time of route departure with Time Zone
RFDIST_TO_PREV_STOP	Distance from previous stop
RFINCR_COST	Incremental cost of a stop. Calculates difference in miles, drvtm; if stop was added, applies mileage and hr cost
RFLAYOVER_TM	Overnight layover time within a route
RFREMAINCAP001	Remaining Capacity1
RFREMAINCAP002	Remaining Capacity2
RFREMAINCAP003	Remaining Capacity3
RFREMAINCAP004	Remaining Capacity4
RFREMAINCAP005	Remaining Capacity5
RFREMAINCAP006	Remaining Capacity6
RFREMAINCAP007	Remaining Capacity7
RFREMAINCAP008	Remaining Capacity8
RFREMAINCAP009	Remaining Capacity9
RFREMAINCAP010	Remaining Capacity10
RFSEQ_NO	Sequence number of stop within a route
RFTIME_TO_PREV_STOP	Time to Previous Stop

ROUTE FIELDS	DESCRIPTION
RFUNLOAD_TIME	Unload Time
RFWAIT_TM_AT_STOP	Wait time at stop
RFWINDOW_VIOLATION	Window Violation
RT_NUM	Route Number
RT%_ABSCAP001_USED	Absolute value of Qty1 for each stop on route divided by Trk capacity * 2 (pickup, delivery)
RT%_ABSCAP002_USED	Absolute value of Qty2 for each stop on route divided by Trk capacity * 2
RT%_ABSCAP003_USED	Absolute value of Qty3 for each stop on route divided by Trk capacity * 2
RT%_ABSCAP004_USED	Absolute value of Qty4 for each stop on route divided by Trk capacity * 2
RT%_ABSCAP005_USED	Absolute value of Qty5 for each stop on route divided by Trk capacity * 2
RT%_ABSCAP006_USED	Absolute value of Qty6 for each stop on route divided by Trk capacity * 2
RT%_ABSCAP007_USED	Absolute value of Qty7 for each stop on route divided by Trk capacity * 2
RT%_ABSCAP008_USED	Absolute value of Qty8 for each stop on route divided by Trk capacity * 2
RT%_ABSCAP009_USED	Absolute value of Qty9 for each stop on route divided by Trk capacity * 2
RT%_ABSCAP010_USED	Absolute value of Qty10 for each stop on route divided by Trk capacity * 2
RT%_CAP001_USED	Percent of cap1 used on route (10 cap fields avail)
RT%_CAP002_USED	Percent of cap2 used on route
RT%_CAP003_USED	Percent of cap3 used on route
RT%_CAP004_USED	Percent of cap4 used on route
RT%_CAP005_USED	Percent of cap5 used on route
RT%_CAP006_USED	Percent of cap6 used on route
RT%_CAP007_USED	Percent of cap7 used on route
RT%_CAP008_USED	Percent of cap8 used on route
RT%_CAP009_USED	Percent of cap9 used on route (
RT%_CAP010_USED	Percent of cap10 used on route

ROUTE FIELDS	DESCRIPTION
RTCAP001_USED	Route capacity1 used (10 cap fields avail)
RTCAP002_USED	Route capacity2 used
RTCAP003_USED	Route capacity3 used
RTCAP004_USED	Route capacity4 used
RTCAP005_USED	Route capacity5 used
RTCAP006_USED	Route capacity6 used
RTCAP007_USED	Route capacity7 used
RTCAP008_USED	Route capacity8 used
RTCAP009_USED	Route capacity9 used
RTCAP010_USED	Route capacity10 used
RTBACKHAUL001	Backhaul1
RTBACKHAUL002	Backhaul2
RTBACKHAUL003	Backhaul3
RTBACKHAUL004	Backhaul4
RTBACKHAUL005	Backhaul5
RTBACKHAUL006	Backhaul6
RTBACKHAUL007	Backhaul7
RTBACKHAUL008	Backhaul8
RTBACKHAUL009	Backhaul9
RTBACKHAUL010	Backhaul10
RTCOSTPERSTOP	Cost per Stop
RTDEL001	Total value of Qty1 delivered (Non negative quanties and excludes backhauls)
RTDEL002	Total value of Qty2 delivered
RTDEL003	Total value of Qty3 delivered
RTDEL004	Total value of Qty4 delivered
RTDEL005	Total value of Qty5 delivered
RTDEL006	Total value of Qty6 delivered
RTDEL007	Total value of Qty7 delivered
RTDEL008	Total value of Qty8 delivered

ROUTE FIELDS	DESCRIPTION
RTDEL009	Total value of Qty9 delivered
RTDEL010	Total value of Qty10 delivered.
RTCOSTPERQTY001	Cost per Quantity1
RTCOSTPERQTY002	Cost per Quantity2
RTCOSTPERQTY003	Cost per Quantity3
RTCOSTPERQTY004	Cost per Quantity4
RTCOSTPERQTY005	Cost per Quantity5
RTCOSTPERQTY006	Cost per Quantity6
RTCOSTPERQTY007	Cost per Quantity7
RTCOSTPERQTY008	Cost per Quantity8
RTCOSTPERQTY009	Cost per Quantity9
RTCOSTPERQTY010	Cost per Quantity10
RTEARLIESTLATEDATE	Shows the critical latest delivery date when Earliest/Latest Date is used.
RTENDDATE	End date of route
RTENDDAY	End day of route
RTENDTIME	Time route ends
RTSTARTDATE	Date route starts
RTSTART_DAY	Day route starts
RTSTARTTIME	Time route starts
RTFARTHESTSTOP	Distance to the farthest stop on the route
RTJULIANPLUSRT	Generate rt # for PeopleNet day of year +Rt# i.e. 050012 is rt 12 on the 50th day of the year
RTNONSTEMDIST	Non-Stem distance
RTPENALTYCOST	Penalty Cost
RTPICKUP001	Total value of Qty1 delivered (shown as negative quantities)
RTPICKUP002	Total value of Qty2 delivered
RTPICKUP003	Total value of Qty3 delivered
RTPICKUP004	Total value of Qty4 delivered
RTPICKUP005	Total value of Qty5 delivered
RTPICKUP006	Total value of Qty6 delivered

ROUTE FIELDS	DESCRIPTION
RTPICKUP007	Total value of Qty7 delivered
RTPICKUP008	Total value of Qty8 delivered
RTPICKUP009	Total value of Qty9 delivered
RTPICKUP010	Total value of Qty10 delivered
RTQTYPERHR001	Quantity1 per hour
RTQTYPERHR002	Quantity2 per hour
RTQTYPERHR003	Quantity3 per hour
RTQTYPERHR004	Quantity4 per hour
RTQTYPERHR005	Quantity5 per hour
RTQTYPERHR006	Quantity6 per hour
RTQTYPERHR007	Quantity7 per hour
RTQTYPERHR008	Quantity8 per hour
RTQTYPERHR009	Quantity9 per hour
RTQTYPERHR010	Quantity10 per hour
RTQTYPERMI001	Quantity1 per mile
RTQTYPERMI002	Quantity2 per mile
RTQTYPERMI003	Quantity3 per mile
RTQTYPERMI004	Quantity4 per mile
RTQTYPERMI005	Quantity5 per mile
RTQTYPERMI006	Quantity6 per mile
RTQTYPERMI007	Quantity7 per mile
RTQTYPERMI008	Quantity8 per mile
RTQTYPERMI009	Quantity9 per mile
RTQTYPERMI010	Quantity10 per mile
RTSTEMDIST	Route stem distance
RTSTOPSPERHR	Stops per hour on route
RTSTOPSPERMI	Stops per mile on route
RTTOAT_UNLD_TM	Route total unload time
RTTOT_DAYS	Total number of days on a route
RTTOT_DIST	Total distance of a route

ROUTE FIELDS	DESCRIPTION
RTTOT_DROPCOST	Total drop cost of a route
RTTOT_ELAPSED_TIME	Total elapsed time of a route
RTTOT_FIXEDCOST	Total fixed cost of a route
RTTOT_HRCOST	Total hourly pay cost of route
RTTOT_LAYOVERCOST	Total cost of layovers on a route
RTTOT_MICOST	Total mileage cost of a route
RTTOT_OTCOST	Total overtime cost of a route
RTTOT_PREPOST	Total pre and post time for a route
RTTOT_UNITCOST	Total unit cost on a route
RTTOT_UNLDHRCOST	Total unload hour cost on a route
RTTOT_WAITHRCOST	Total wait hour cost of a route
RTTOTAL_COST	Total cost of a route
RTTOTAL_DRV_TM	Total drive time
RTTOTAL_STOPS	Total stops serviced
RTTOTAL_WAIT_TM	Total wait time on a route
RTTOTAL_WRK_TM	Total work time on a route
RTVIOLATIONSYN	Violations yes or no
RTVIOLATIONSFULL	Violations (equip/capacity) on a route-Full
RTVIOLATIONSBRIEF	Violations (equip/capacity) on a route-Brief
RFEMPTYMILES	Empty Miles
RTTOTAL_HOURS_PERROUTEDAY	Total hours per route day
RTTOT_LAYOVERTIME	Total layover time of a route
RTTOTAL_MILES_PERROUTEDAY	Total miles per route day
RTTOT_LAYOVERS	Total no of layovers on a route
RTTOLLCOST	Toll cost per route
RTQTY001	Total Qty1 per route
RTQTY002	Total Qty2 per route
RTMILESPERQTY001	Route miles per QTY1
RTMILESPERQTY002	Route miles per QTY2
Stop Fields	Description of Field Info

ROUTE FIELDS	DESCRIPTION
SFADDRESS	Address of stop
SFADDRESS2	Extra address information
SFAMADJ	AM Rush Hour Speed Adjustment
RFBUFFERUSED	Total untilized buffer time
SFCITY	City the stop is located in
SFCOLOR	Color of stop displayed on the map
SFCONTACT	Contact name for stop
SFOPEN1	Earliest time for 1st delivery Time Window
SFCLOSE1	Latest time for 1st delivery Time Window
SFPATTERN1	Avail Del Days for first set of Time Windows
SFOPEN2	Earliest time for 2nd delivery Time Window
SFCLOSE2	Latest time for 2nd delivery Time Window
SFPATTERN2	Avail Del Days for 2nd set of Time Windows
SFDELQTY001	Quantity1 delivered to stop
SFDELQTY002	Quantity2 delivered to stop
SFDELQTY003	Quantity3 delivered to stop
SFDELQTY004	Quantity4 delivered to stop
SFDELQTY005	Quantity5 delivered to stop
SFDELQTY006	Quantity6 delivered to stop
SFDELQTY007	Quantity7 delivered to stop
SFDELQTY008	Quantity8 delivered to stop
SFDELQTY009	Quantity9 delivered to stop
SFDELQTY010	Quantity10 delivered to stop
SFEQCODE	Equipment code
SFFIXEDTIME	Fixed time for stop
SFEARLIESTDATE	EarliestDate for stop
SFID1	First Identifier for Customer/Acct (Account#)
SFID2	Second Identifier for Customer/Acct (Order#)
SFID3	Third Identifier for Customer/Acct (LineItem)
SFLATITUDE	Latitude coordinates of stop

ROUTE FIELDS	DESCRIPTION
SFLONGITUDE	Longitude coordinates of stop
SFLATESTDATE	LatestDate
SFNAME	Customer name
SFOUTPFROUTECOST	Out of Route cost for Stop
SFPHONE	Customer phone number
RFPENALTYCOST	Cost incurred for utilizing Early/Late Buffer
SFPICKUPQTY001	Pickup quantity1 (negative number)
SFPICKUPQTY002	Pickup quantity2 (negative number)
SFPICKUPQTY003	Pickup quantity3 (negative number)
SFPICKUPQTY004	Pickup quantity4 (negative number)
SFPICKUPQTY005	Pickup quantity5 (negative number)
SFPICKUPQTY006	Pickup quantity6 (negative number)
SFPICKUPQTY007	Pickup quantity7 (negative number)
SFPICKUPQTY008	Pickup quantity8 (negative number)
SFPICKUPQTY009	Pickup quantity9 (negative number)
SFPICKUPQTY010	Pickup quantity10 (negative number)
SFQTY001	Quantity1 of order
SFQTY002	Quantity2 of order
SFQTY003	Quantity3 of order
SFQTY004	Quantity4 of order
SFQTY005	Quantity5 of order
SFQTY006	Quantity6 of order
SFQTY007	Quantity7 of order
SFQTY008	Quantity8 of order
SFQTY009	Quantity9 of order
SFQTY010	Quantity10 of order
SFROW	Row # in the spreadsheet for the stop
SFRT	Route number
SFRTONLY	Displays only the Rt#, not Rt and Leg
SFSELECTED	Stop selected

ROUTE FIELDS	DESCRIPTION
SFSEQ	Sequence number of stop
SFSIZE	Size restriction
SFSTATE	State where stop is located
SFSYMBOL	Symbol assigned to the Stop
SFUNLDRATE001	Unload rate1
SFUNLDRATE002	Unload rate2
SFUNLDRATE003	Unload rate3
SFUNLDRATE004	Unload rate4
SFUNLDRATE005	Unload rate5
SFUNLDRATE006	Unload rate6
SFUNLDRATE007	Unload rate7
SFUNLDRATE008	Unload rate8
SFUNLDRATE009	Unload rate9
SFUNLDRATE010	Unload rate10
SFUSERFLD001	Stop File user field1 (20 fields available)
SFUSERFLD002	Stop File user field2
SFUSERFLD003	Stop File user field3
SFUSERFLD004	Stop File user field4
SFUSERFLD005	Stop File user field5
SFUSERFLD006	Stop File user field6
SFUSERFLD007	Stop File user field7
SFUSERFLD008	Stop File user field8
SFUSERFLD009	Stop File user field9
SFUSERFLD010	Stop File user field10
SFUSERFLD011	Stop File user field11
SFUSERFLD012	Stop File user field12
SFUSERFLD013	Stop File user field13
SFUSERFLD014	Stop File user field14
SFUSERFLD015	Stop File user field15
SFUSERFLD016	Stop File user field16

ROUTE FIELDS	DESCRIPTION
SFUSERFLD017	Stop File user field17
SFUSERFLD018	Stop File user field18
SFUSERFLD019	Stop File user field19
SFUSERFLD020	Stop File user field20
SFZIP	Zip code where stop is located
SFZONE	user defined zone of stop
SPDISTTODEPOT	dist from stop to depot
SPDISTTODEPOTSUM	sum of distance from stops to depot
SFDAYSBETWEENROUTES	Days between routes
SFFREQUENCY	Frequency for stop
SFGEORESULT	Geocode results
SFLEG	Leg number for stop
SFLTLCOST	LTL cost for the stop
SFMAXSPLITS	Max number of splits allowed per stop
SFAMSTART	Specifies start time of AM rush hour
SFAMEND	Specifies end time of AM rush hour
SFPMSTART	Specifies start time of PM rush hour
SFPMEND	Specifies end time of PM rush hour
SFPMADJ	Amount to adjust PM drive time
SFAMADJ	Amount to adjust AM drive time
RFTOLLCOST	Cost of toll for a stop
TW_GRAPH	Time window graph
RFCAPUSED001	Capacity1 used per stop (10 cap fields avail)
RFCAPUSED002	Capacity2 used per stop
RFCAPUSED003	Capacity3 used per stop
RFCAPUSED004	Capacity4 used per stop
RFCAPUSED005	Capacity5 used per stop
RFCAPUSED006	Capacity6 used per stop
RFCAPUSED007	Capacity7 used per stop
RFCAPUSED008	Capacity8 used per stop

ROUTE FIELDS	DESCRIPTION
RFCAPUSED009	Capacity9 used per stop
RFCAPUSED010	Capacity10 used per stop
Truck Fields	Description of Field Info
TFCAP001	Vehicle capacity1
TFCAP002	Vehicle capacity2
TFCAP003	Vehicle capacity3
TFCAP004	Vehicle capacity4
TFCAP005	Vehicle capacity5
TFCAP006	Vehicle capacity6
TFCAP007	Vehicle capacity7
TFCAP008	Vehicle capacity8
TFCAP009	Vehicle capacity9
TFCAP010	Vehicle capacity10
TFDROPCOST	Drop Cost
TFEARSTART	Earliest time vehicle can be dispatched
TFEDATE	Earliest date vehicle may be dispatched
TFFIXEDCOST	Fixed cost for operating vehicle
TFHRCOST	Cost per hour to operate the vehicle
TFLATFINISH	Latest time vehicle can finish the route
TFLAYOVERCOST	Cost per layover of vehicle
TFLDATE	Latest date vehicle may be dispatched
TFLOCK	Lock route
TFMAXDRIVETM	Maximum drive time for the vehicle/driver
TFMAXLAYOVER	Maximum layover allowed
TFMAXWORKTM	Maximum work time for vehicle/driver
TFMICOST	Cost per mile to operate the vehicle
TFMINLAYOVER	Minimum layover required
TFOTCOST	Over time cost
TFSPEQ	Special equipment identifier (corresponds to equipment code in Stop File)

ROUTE FIELDS	DESCRIPTION
TFSTATUS	Vehicle utilized (Y or N)
TFTRKID	Unique identifier for vehicle
TFUNITCOST	Cost per unit on vehicle
TFUSERFLD001	user defined field1
TFUSERFLD002	user defined field2
TFUSERFLD003	user defined field3
TFUSERFLD004	user defined field4
TFUSERFLD005	user defined field5
TFUSERFLD006	user defined field6
TFUSERFLD007	user defined field7
TFUSERFLD008	user defined field8
TFUSERFLD009	user defined field9
TFUSERFLD010	user defined field10
TFUNLDHRCOST	Unload hour cost
TFWAITHRCOST	Wait time cost per hour
TFBREAKTM	Break time for driver
TRDIST	Total distance driven (all routes)
TRDROPCOST	Total drop cost
TRDRV_TM	Total drive time
TRELAPSED_TIME	Total elapsed time
TRFIXEDCOST	Total fixed cost
TRHRCOST	Total hourly pay cost
TRLAYOVERCOST	Total layover cost
TRMICOST	Total mileage cost
TROTCOST	Total over time cost
TRSTOPS	Total stops serviced
TRTOTCOST	Total overall cost
TRTOTTM	Total time used
TRUNITCOST	Total unit costs
TRUNLD_TM	Total unload time

ROUTE FIELDS	DESCRIPTION
TRUNLDHRCOST	Total unload hour cost
TRWAIT_TM	Total wait time
TRWAITHRCOST	Total wait time cost
TRWRK_TM	Total work time
TFCITY	City the truck is located in
TFLATITUDE	Truck latitude
TFLONGITUDE	Truck longitude
TFPRETRIP	Pre Trip
TFPOSTTRIP	Post trip
TFUNLDPERF	Unload performance
ResourcePro Fields	Description of Field Info
RPDRIVER	Driver assigend to route in ResourcePro
RPTRUCK	Truck assigned in ResourcePro
RPTRAILER	Trailer assigned in ResourcePro
RPSTARTINGDRIVETIME	Drive Time Start in ResourcePro
RPSTARTINGWORKTIME	Work Time Start in ResourcePro
RPWORKHOURSBEFORE	Work Hours Before Next Route (Hours Between Routes)

Figure 186 – URP Field Names Table

12. Custom Road Edits

PC*Miler provides a number of ways to customize routing, including avoid and favor preference designations, that can be saved and used while generating routes and/or Distance Files in DirectRoute. To use these road edits in DirectRoute, the saved file (flattened_af.dat) can be copied from PC*Miler to the user's DirectRoute Data folder (ex. Program Files (x86)\TMW Systems Inc.\Appian\ALK\Data\File Name), where DirectRoute can access it.

Additionally, if PC*Miler Tolls was purchased with PC*Miler, you can generate accurate, up-to-date toll costs for U.S. and Canadian lanes with these costs integrated directly into the routing database and reported turn-by-turn per trip. Columns for toll costs appear in the PC*Miler Detailed Route Report, the State/Country Summary Report, and the Comparison Report, and tolls can be reported in either U.S. or Canadian dollars–using the current conversion rate.

For more information on using PC*Miler customized road edits, visit the PC*Miler Solutions web page, **PC*Miler User Guide**. PC*Miler is a registered trademark of Trimble MAPS.

13. DirectRoute Use Cases

This section includes examples of ways you can use DirectRoute to enhance your fleet's operations.

Should your fleet deliver an order or hire someone else to deliver it?

When you have a single item or a small order you need to deliver to a customer, DirectRoute can help you decide whether it is more cost effective to deliver it with your private fleet or ship it via LTL/third party.

To calculate and start to understand the cheapest mode of transport for a given delivery:

Step 1: Create an LTLCost field for your stop files

In order for DirectRoute to decide on the cost effectiveness of using an LTL/third party carrier, you need to provide the algorithm with the cost for a particular order to be shipped in this manner. To do this, a new field titled **LTLCost** needs to be added to Preferences and to your Stop files.

1. Close any open files in DirectRoute.
2. Go to **File** > **Preferences** > **Configuration** > **Stop User Fields**.
3. Click the three dots at the end of the row. The **StopUserFieldType Collection Editor** dialog opens.

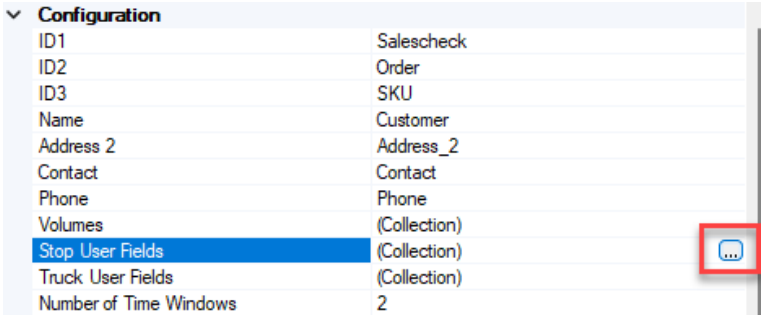


Figure 187 - Stop User Field Configuration

4. Select **Add** to add a new custom field.
5. In the **Name** field, enter **LTLCost**, with no spaces. **This feature will not work if spaces are added.**

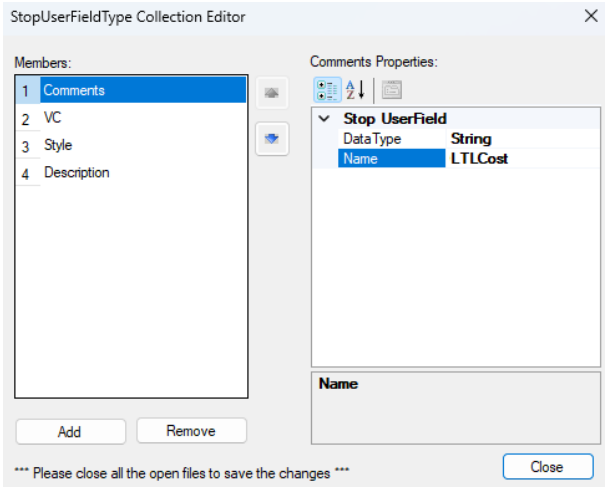


Figure 188 - Stop User Field Type Collection Editor

6. Set the **Data Type** field to **Numeric**.
7. Select **Close** to finish, and select **OK** to exit the Preferences dialog.
8. **LTLCost** is added among the user fields when you create a new Stop file.

AQ	AR	AS	AT
VC	Style	Description	LTLCost

Figure 189 - LTL Cost in a new Stop file

Other Preferences

In Preferences, you must also tell DirectRoute to not **Optimize Stops After Loading**. (After DirectRoute builds the routes and makes modal decisions, you can manually optimize the private fleet assets, if necessary.)

1. Go to **File** > **Preferences** > **Routing** > **Algorithm Settings.**
2. Be sure **Optimize Stops After Loading** is set to **False**, which is the default value.

Algorithm Settings	
Add Turn Time	True
Algorithm	Regular
Box Expand	10
Check In Cone	True
Cone Angle	55
Depot Radius	10
Lambda	1
Lambda Increments	0.2
Lambda Iterations	1
Max Redispatch Iterations	4
Max Wait Time	2
Max Dist Between Stops	55
Max Work Time LO	0
Optimize Stops After Loading	False
Optimize Trucks After Loading	False
TW Gap For Buffers	1.75

Figure 190 - Optimized Stops after Loading

Step 2: Populate LTLCost

Once you have added the LTLCost field to your Stop file, it must be manually populated with values. LTLCost is the flat rate in dollars for delivering an item via an LTL/third-party service.

When DirectRoute builds a route, it compares the LTLCost value to your fleet's cost to deliver that item. Your cost is calculated and based on a number of factors, including the **MiCost** and **HrCost** fields in your Stop file.

Step 3: Build a route

Build a route as you normally would but with a Stop file that includes the LTLCost field. After the routes are built, DirectRoute returns an info box that shows the total number of orders loaded out of the total number of orders.

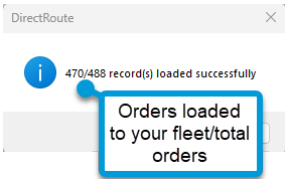


Figure 200 - Number of Orders loaded

Step 4: View and compare costs in the Route Book

You can view the list of unloaded orders in the **Route Book** > **Unloaded Stops** tab. Right click on one of the unloaded orders and select **View Reason** to see why the order was not loaded on a truck.

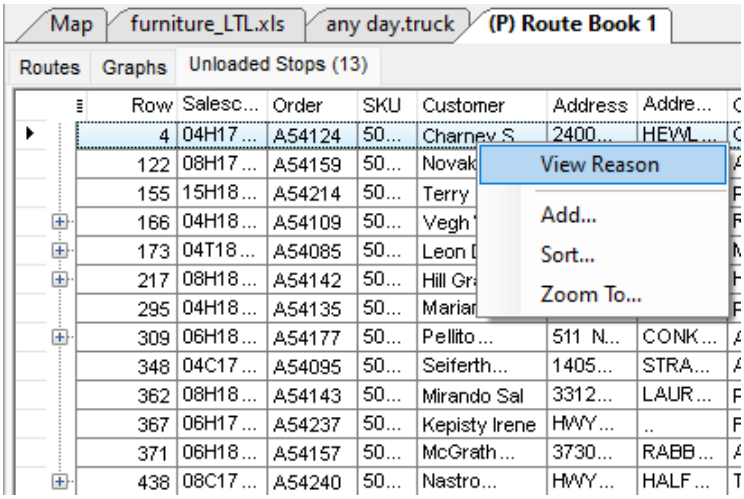


Figure 201 - Route Book 1 View Reason

If you see **LTLCost** under the **Violations** row, it means DirectRoute has determined it is cheaper to ship that order via LTL. Scroll to the right in the **Unload Stop Reason** dialog if you want to view the LTLCost for that stop.

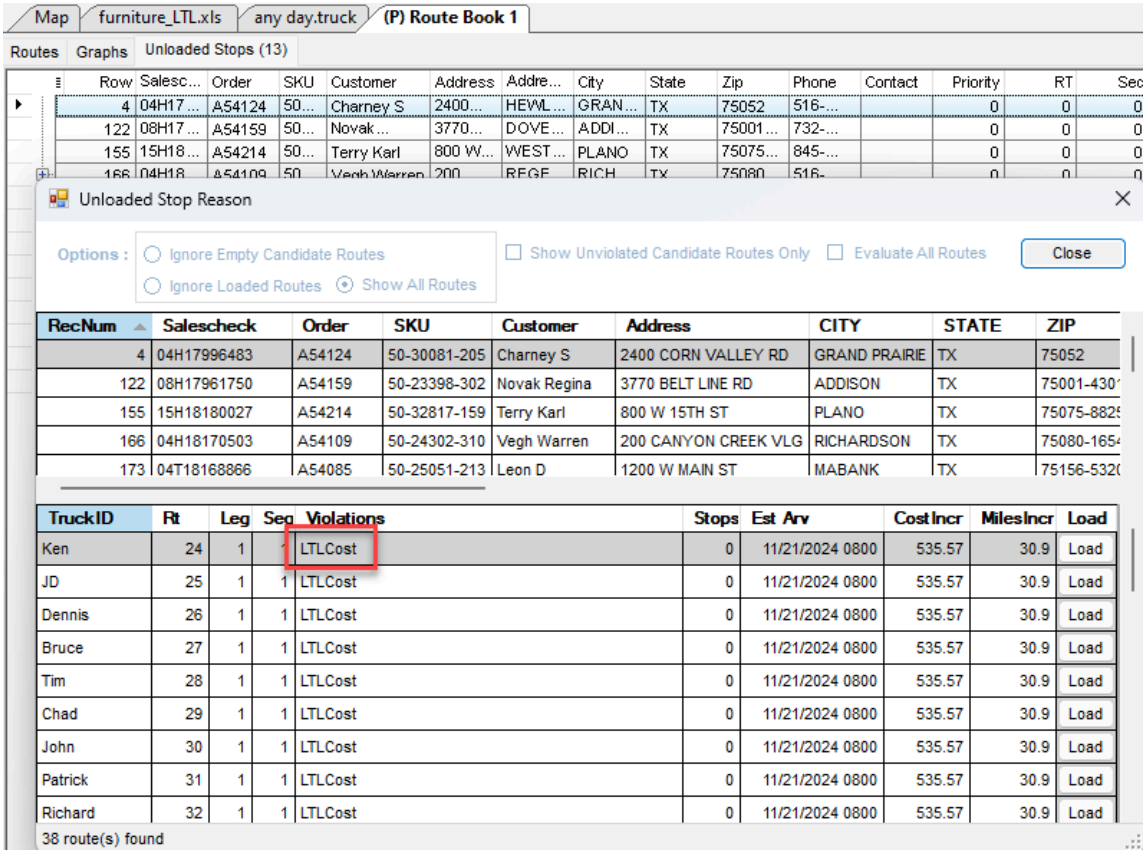


Figure 202 - Route Book 1 LTL Cost Violations

Notes on LTLCost

LTLCost is currently only viewable in the **Unloaded Stops** tab of the **Route Book**. You cannot drag to add it to the Routes tab in the Route Book as you can drag and add other **Stop User Fields**.

Appendix A: DOT Hours of Service

The following is a summary of the U.S. Department of Transportation **Hours of Service (HOS) Regulations**. Most drivers must follow the HOS Regulations if they drive a commercial motor vehicle, or CMV.

In general, a CMV is a vehicle used as part of a business, is involved in interstate commerce, and fits any of these descriptions:

- Weighs 10,001 lbs. or more.
- Has a gross vehicle weight rating or gross combination weight rating of 10,001 lbs. or more.
- Is designed or used to transport 16+ passengers (including driver) not for compensation.
- Is designed or used to transport 9+ passengers (including driver) for compensation.

A vehicle that is involved in Interstate or intrastate commerce and is transporting hazardous materials in a quantity requiring placards is also considered a CMV.

Hours of Service of Drivers Final Rule

The **Hours-of-Service Rules** were published in the Federal Register on December 27, 2011. The effective date of the Final Rule was February 27, 2012, and the compliance date of selected provisions was July 1, 2013.

What is the 34-hour restart rule?

Per the HOS rule, commercial motor vehicle drivers can reset their 60-hour or 70-hour clocks. In some circumstances, this enables drivers to get back on the road quickly. Drivers can take advantage of the rule by taking at least 34 consecutive hours in the sleeper berth, off-duty, or by using a combination of both.

Enforcement of the 34-hour rule was suspended by enactment of the *Consolidated and Further Continuing Appropriations Act of 2015* on 16 December 2014 but was later restored.

Only that portion of the rule that called for two off-duty periods of 1:00am to 5:00am in Section 395.3(C) of the agency's Hours-of-Service Rules will not be enforced, nor will the Once-Per-Week limit on use of the restart in 395.3(D). References: **FMCSA Summary of Hours of Service Regulations**, and **FMCSA Hours of Service Final Rule for Truck Drivers**

Summary of HOS Regulations

The following table summarizes the HOS regulations for property-carrying and passenger-carrying drivers. Reference: **https://www.fmcsa.dot.gov/regulations/hours-service/summary-hours-service-regulations**)

Summary of Hours of Service Regulations	
PROPERTY CARRYING DRIVERS	PASSENGER CARRYING DRIVERS
11 Hour Driving Limit–May drive a maximum of 11 hours after 10 consecutive hours off duty.	10 Hour Driving Limit–May drive a maximum of 10 hours after 8 consecutive hours off duty.
14 Hour Limit–May not drive beyond the 14th consecutive hour after coming on duty, following 10 consecutive hours off duty. Off-duty time does not extend the 14-hour period.	15 Hour Limit–May not drive after having been on duty for 15 hours, following 8 consecutive hours

	off duty. Off-duty time is not included in the 15-hour period.
Rest Breaks–May drive only if 8 hours or less have passed since the end of the driver's last off-duty or sleeper berth period of at least 30 minutes. Does not apply to drivers using either of the short-haul exceptions in 395.1(e). [49 CFR 397.5 mandatory “in attendance” time may be included in break if no other duties performed]	60/70 Hour Limit–May not drive after 60/70 hours on duty in 7/8 consecutive days.
60/70 Hour Limit–May not drive after 60/70 hours on duty in 7/8 consecutive days. A driver may restart a 7/8 consecutive day period after taking 34 or more consecutive hours off duty.	Sleeper Berth Provision–Drivers using a sleeper berth must take at least 8 hours in the sleeper berth, and may split the sleeper berth time into two periods provided neither is less than 2 hours.
Must include two periods from 1 a.m. to 5 a.m. home terminal time, and may only be used once per week, or 168 hours, measured from the beginning of the previous restart. Suspended NOTICE: The Consolidated and Further Continuing Appropriations Act of 2015 was enacted on Dec 16, 2014, suspending enforcement of new requirements for use of the 34-hour restart, pending a study. Based on the findings from the study, **the 34-hour restart rule in operational effect on Jun 30, 2013, is restored to full force and effect.** The requirement for two off-duty periods of 1:00am to 5:00am in Section 395.3(C) of the agency’s Hours-of-Service Rules will not be enforced, nor will the Once-Per-Week limit on use of the restart in 395.3(D).	
Sleeper Berth Provision–Drivers using the sleeper berth provision must take at least 8 consecutive hours in the sleeper berth, plus a separate 2 consecutive hours either in the sleeper berth, off duty, or any combination of the two.	

Figure 203 – DOT HOS Rules

Appendix B: Working With Spreadsheets

DirectRoute enables use of several common spreadsheet and keyboard shortcuts, as well as various mouse/keystroke shortcuts for accessing various menu and map options.

DirectRoute uses a spreadsheet format to create and use the various Route Files needed for routing projects. These files (spreadsheets) function much the same as any other spreadsheet would, using many of the same shortcuts, functions and behaviors, and most of the Route Files can also be opened, viewed and/or modified independent of DirectRoute using a spreadsheet, workbook or XML sheet (**.xls, *.xlsx, *.XML*, etc.).

The DirectRoute files that are accessible in spreadsheet format include:

- Route Files (.RTE, .ROUTE).
- Stop Files (.STOP, .xls, .STP).
- Truck Files (.TRUCK).

- Distance Files (.dist).
- Route Book.

The **DirectRoute Keyboard Shortcuts Table** lists common shortcuts that can be used while working within the DirectRoute program (and files), and the **Mouse Enabled Shortcuts Table** lists common shortcuts created using the mouse and various keystrokes.

While most of these shortcuts may be familiar to those who work with spreadsheets on a regular basis, some users may not be as familiar with them.

Spreadsheet Queries
Selecting records in DirectRoute is a way of performing queries on your data based on criteria you specify. For example, you may want to select all customers on one route to calculate the quantity delivered or you may want to find all customers receiving more than 50 cases.

Inside the spreadsheet, DirectRoute attaches a column titled Selected. This column contains a TRUE or FALSE data element that populates upon selection of the records to indicate if the record is/is not selected.

Records can be selected for identification/view on the map from this column.

- In the spreadsheet column Selected, type TRUE in each record to select.
- Type FALSE in the same column of any record to deselect/not select.

Left click on the Map tab and all the selected records will have a blue box displayed around their symbol.

To select specific records by spreadsheet column while viewing the map, select *Map* > *Point Field Displayed* from the menu.

- Choose the field (column) to display.
- Choose the display options.
- Select OK when complete.

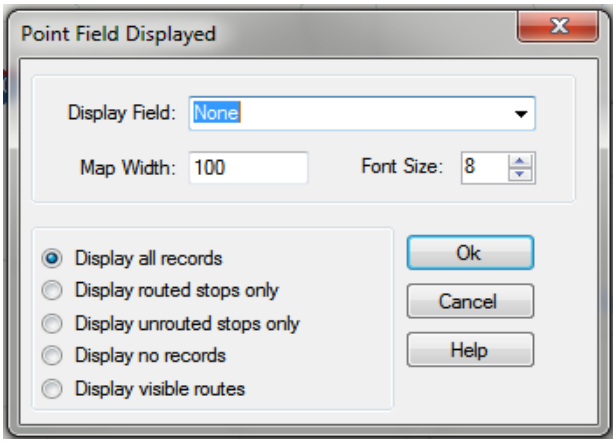


Figure 204 – Select Records with Point Field Displayed

To select specific records by value contained in a spreadsheet column, select *Map* > *Tools* > *Select* from the menu.

- Select the columns you want to use.
- Enter the selection criteria or combination of selection criteria.
  - Greater Than (> =).
  - Less Than (<=).
  - Contains.

Tip: The Greater Than and Less Than fields can contain either alpha (text) or numeric (number) data. The Contains field can only read text data.

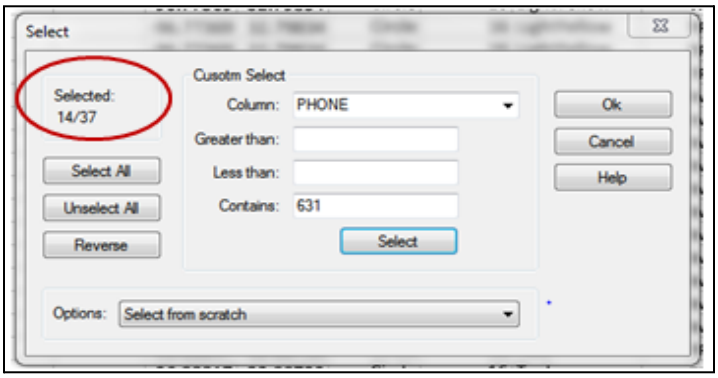


Figure 205 – Select Records in Spreadsheet

- From the Options drop down arrow, choose one of the selection methods.
- Choose the Select button and then choose Select All, Unselect All, or Reverse.

The number of selected records is displayed in the upper left corner of the dialog box.

- On the map, the selected records will be encircled by a box around their symbol.
- On the spreadsheet, TRUE will be listed in the selected column.

Spreadsheet Statistics

DirectRoute provides a statistics spreadsheet that will allow you to see relative statistics about numeric data columns within a spreadsheet. This can be particularly handy if you need to see volume totals such as quantities delivered and average quantity for a selected route or geographic area.

The statistics spreadsheet automatically shows quantity statistics for items such as:

- All records.
- Selected records.
- Unselected records.
- Records inside and outside of a selected boundary.

While the statistics worksheet in DirectRoute cannot be saved as an independent file, the data can be copied and pasted into a spreadsheet outside of DirectRoute, and then saved.

View Statistics for All Records

- Open any of the Route Files spreadsheets (Stop File, Truck File, etc.).
- Select *Edit* > *Statistics* from the menu, or press the F8 key.

Statistics for Selected Records

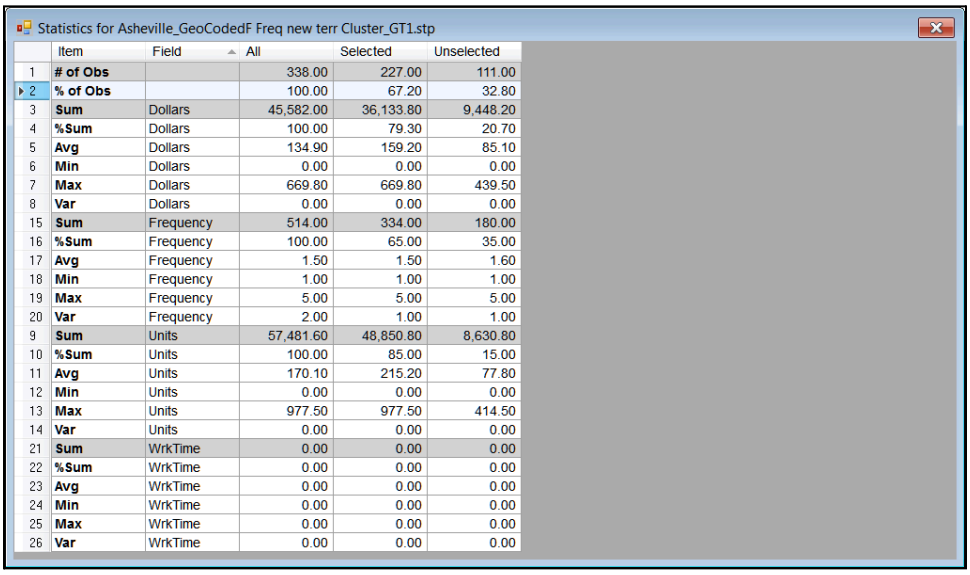
- Open the spreadsheet and select the records.
  - Type *TRUE* in the spreadsheet column *Selected, or*
  - Use the *Lasso Tool* to select records.
- Select *Edit* > *Statistics* from the menu, or press the F8 key.

The results will be displayed in separate columns (All, Selected, and Unselected).

Statistics Inside/Outside a Boundary

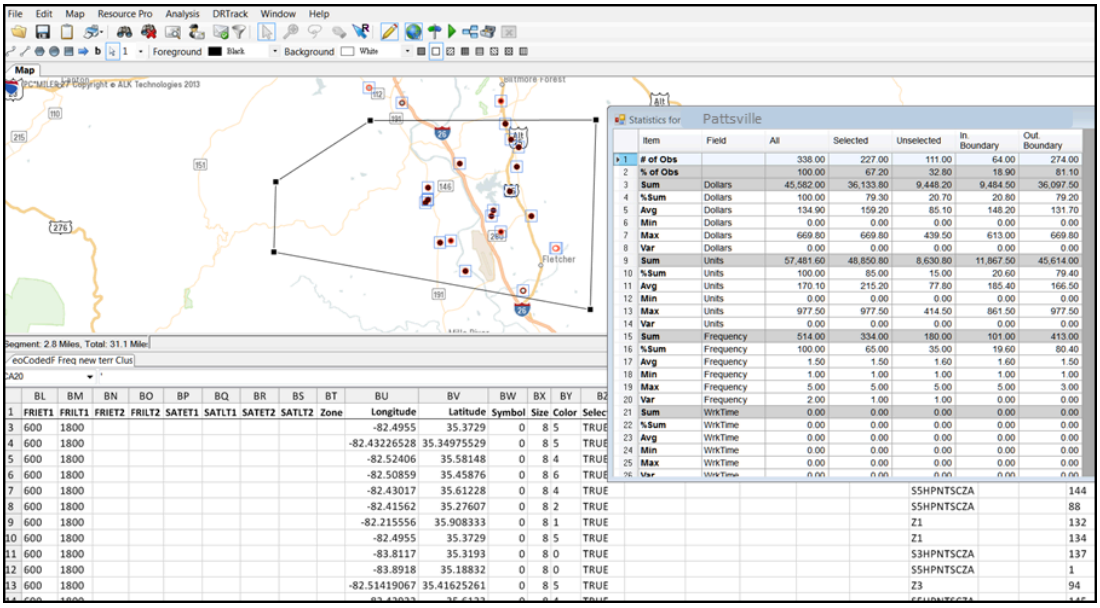
- Open the spreadsheet (Stop File or Truck File).
- Select the map tab to view the stops on the map.
- Select the  icon to activate the Drawing Tools and then select the  icon to activate the Polygon Tool.
- Draw the boundary around the stops on the map to select the records.
- Position the cursor over the drawn boundary and then click on it.
- Select *Edit* > *Statistics* from the menu, or press the F8 key.

The statistics info box will include two additional columns, *In Boundary* and *Out Boundary*, with the applicable statistical results displayed in each.



	Item	Field	All	Selected	Unselected
1	# of Obs		338.00	227.00	111.00
2	% of Obs		100.00	67.20	32.80
3	Sum	Dollars	45,582.00	36,133.80	9,448.20
4	%Sum	Dollars	100.00	79.30	20.70
5	Avg	Dollars	134.90	159.20	85.10
6	Min	Dollars	0.00	0.00	0.00
7	Max	Dollars	669.80	669.80	439.50
8	Var	Dollars	0.00	0.00	0.00
15	Sum	Frequency	514.00	334.00	180.00
16	%Sum	Frequency	100.00	65.00	35.00
17	Avg	Frequency	1.50	1.50	1.60
18	Min	Frequency	1.00	1.00	1.00
19	Max	Frequency	5.00	5.00	5.00
20	Var	Frequency	2.00	1.00	1.00
9	Sum	Units	57,481.60	48,850.80	8,630.80
10	%Sum	Units	100.00	85.00	15.00
11	Avg	Units	170.10	215.20	77.80
12	Min	Units	0.00	0.00	0.00
13	Max	Units	977.50	977.50	414.50
14	Var	Units	0.00	0.00	0.00
21	Sum	WrkTime	0.00	0.00	0.00
22	%Sum	WrkTime	0.00	0.00	0.00
23	Avg	WrkTime	0.00	0.00	0.00
24	Min	WrkTime	0.00	0.00	0.00
25	Max	WrkTime	0.00	0.00	0.00
26	Var	WrkTime	0.00	0.00	0.00

Figure 206 – Spreadsheet Statistics



	Item	Field	All	Selected	Unselected	In Boundary	Out Boundary
1	# of Obs		338.00	227.00	111.00	64.00	274.00
2	% of Obs		100.00	67.20	32.80	18.90	81.10
3	Sum	Dollars	45,582.00	36,133.80	9,448.20	9,484.50	36,097.50
4	%Sum	Dollars	100.00	79.30	20.70	20.80	79.20
5	Avg	Dollars	134.90	159.20	85.10	148.20	131.70
6	Min	Dollars	0.00	0.00	0.00	0.00	0.00
7	Max	Dollars	669.80	669.80	439.50	613.00	669.80
8	Var	Dollars	0.00	0.00	0.00	0.00	0.00
9	Sum	Units	57,481.60	48,850.80	8,630.80	11,867.50	45,614.00
10	%Sum	Units	100.00	85.00	15.00	20.60	79.40
11	Avg	Units	170.10	215.20	77.80	185.40	166.50
12	Min	Units	0.00	0.00	0.00	0.00	0.00
13	Max	Units	977.50	977.50	414.50	861.50	977.50
14	Var	Units	0.00	0.00	0.00	0.00	0.00
15	Sum	Frequency	514.00	334.00	180.00	101.00	413.00
16	%Sum	Frequency	100.00	65.00	35.00	19.60	80.40
17	Avg	Frequency	1.50	1.50	1.60	1.60	1.50
18	Min	Frequency	1.00	1.00	1.00	1.00	1.00
19	Max	Frequency	5.00	5.00	5.00	5.00	3.00
20	Var	Frequency	2.00	1.00	1.00	0.00	0.00
21	Sum	WrkTime	0.00	0.00	0.00	0.00	0.00
22	%Sum	WrkTime	0.00	0.00	0.00	0.00	0.00
23	Avg	WrkTime	0.00	0.00	0.00	0.00	0.00
24	Min	WrkTime	0.00	0.00	0.00	0.00	0.00
25	Max	WrkTime	0.00	0.00	0.00	0.00	0.00

	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	
1	FRIET1	FRILT1	FRIET2	FRILT2	SATET1	SATLT1	SATET2	SATLT2	Zone	Longitude	Latitude	Symbol	Size	Color	Selec
3	600	1800								-82.4955	35.3729	0	8	5	TRUE
4	600	1800								-82.43226528	35.34975529	0	8	5	TRUE
5	600	1800								-82.52406	35.58148	0	8	4	TRUE
6	600	1800								-82.50859	35.45876	0	8	6	TRUE
7	600	1800								-82.43017	35.61228	0	8	4	TRUE
8	600	1800								-82.41562	35.27607	0	8	2	TRUE
9	600	1800								-82.215556	35.908333	0	8	1	TRUE
10	600	1800								-82.4955	35.3729	0	8	5	TRUE
11	600	1800								-83.8117	35.3193	0	8	0	TRUE
12	600	1800								-83.8918	35.18832	0	8	0	TRUE
13	600	1800								-82.51419067	35.41625261	0	8	5	TRUE

Figure 207 – Statistics Inside/Outside a Boundary

Appendix C: Printing From DirectRoute

DirectRoute enables the printing of several files used in the routing process, in addition to reports, directions, and map pages. The following files can be printed while working in DirectRoute.

- Route File.
- Route Book Summary Page.
- Route Book Route Pages.
- Driving Directions.
- Truck File.
- Stop File.
- Maps.

Printing Route Book Pages (Route Files)
To print a Route File, or portions of a Route File (Summary and/or Route pages):

- Open the Route File.
- From the DirectRoute menu, select *File* > *Print* > *Route Book*, or
- Select the Print icon from the menu.
- When the 'Print Route Book' info box opens, make the appropriate selections in both the Options and Layout tabs then select the OK button to print.

Print Options and Layout Tabs

- **Print To**–Select Paper, File (Text, Excel, or HTML), or Crystal Reports (if installed).
- **Print Range**–All routes and stops, or selected routes and/or stops.
- **Show Summary**–Summary Page of the Route Book (composite list of routes).
- **Show Stats**–The detailed report appears in gray above the detailed stops (Route Book).
- **Show Detail**–Detailed list of each route and its stops (if directions were generated, select this option to print them).
- **Show Unloaded**–Will print unloaded stops/routes.
- **Show Input Files**–Print files used to generate the route in the report.
- **Skip Empty Routes**–Will skip unloaded routes.
- **Print Route Maps**–Only available if printing to paper.
- **Print Displayed Routes Only**–Print only the routes displayed on the screen.
- **Display Route Number**–If not selected, the Route/Leg number on the Route Page will print.
- **Number of Copies**–Enter the number desired.
- **Print Landscape**–Check if desired.

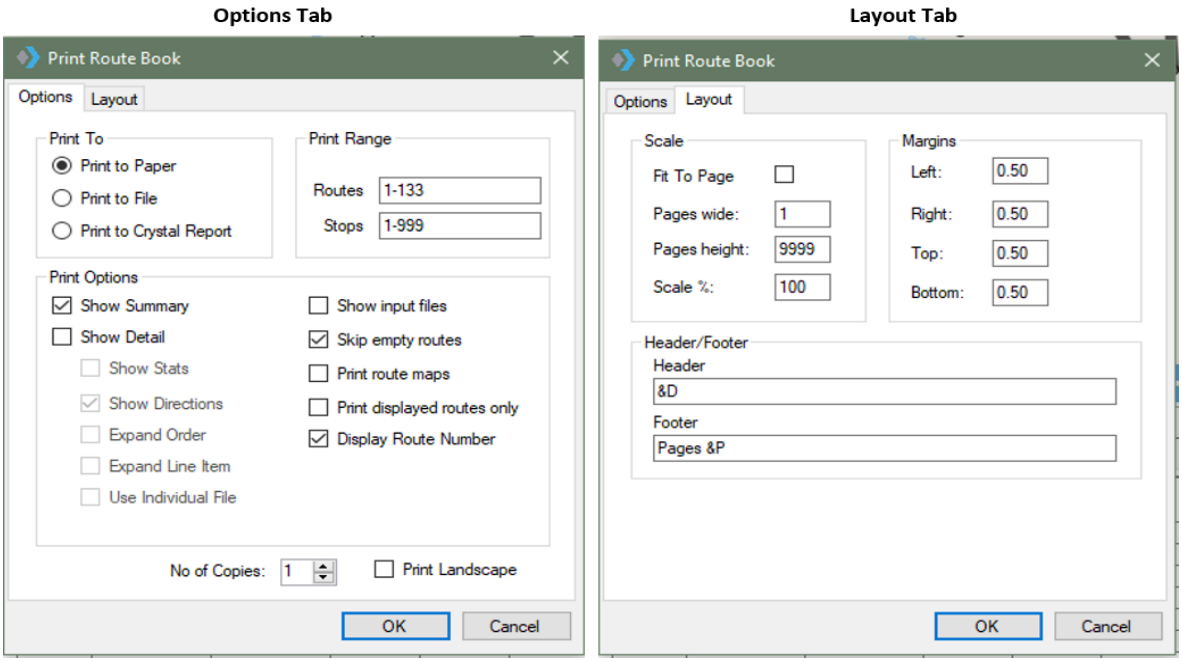


Figure 210 – Print Route Book

- **Scale**–Select Scale settings or leave at default settings (100%).
- **Margin**–Select Margin settings or leave at default settings.
- **Header/Footer**–Edit to customize the header/footer (Route pages and spreadsheets) or leave at default settings.
- &D (prints date).
- &T (prints time).
- &L (left align).
- &C (center alignment).
- &R (right align).
- &P (prints page number).
- &N (prints total number of pages in document).
- &B (prints text in bold font).
- &I (prints text in italics).
- &U (underlines the text).
- &S (strike out the text).
- &"font name" (allows you to select font).
- &NN (allows you to select font size, must be two digits).

Printing Maps

To print a map, with or without any Route Book Files opened, the map window must be the active window. The map that is displayed in the window will be the map that is printed.

If the Route Book is open and an active route is displayed on the map, this will be the view that prints.

- Select *File* > *Print* > *Map* from the menu or select the Print icon from the menu.

- Type desired text in Line 1/Line 2 to add a header to the map (actual text, not header commands).
- Check Landscape or uncheck to print Portrait format.
- To change current printer settings, select the Set Up button.
- Select OK to print.

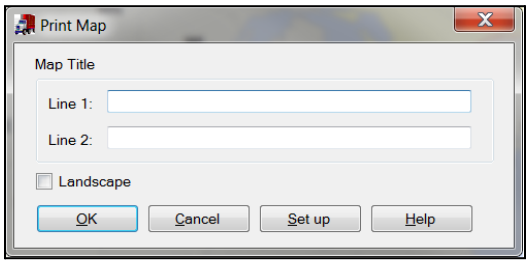


Figure 211 – Printing Captions on Maps

Printing Spreadsheet Records

To print records from one of the spreadsheets (Stop File, Truck File, etc.), the spreadsheet file must be open.

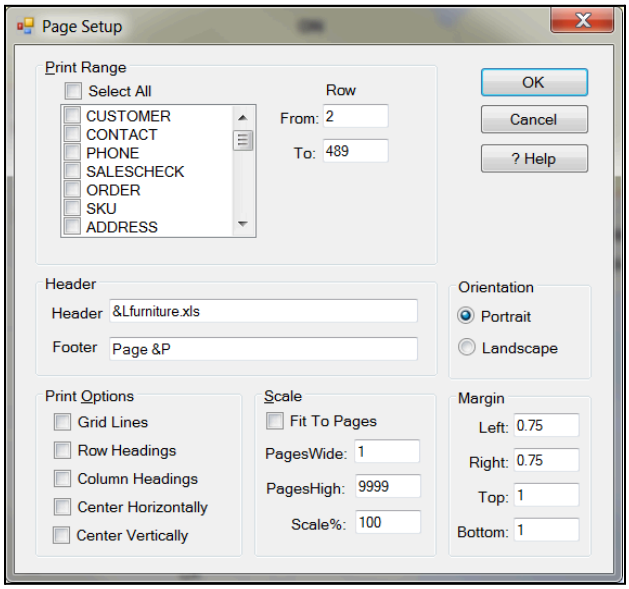


Figure 212 – Print Page Setup

- Select *File* > *Print* > *Stop File* (or Truck File) from the menu or select the Print icon from the menu.
- Select the print range; select specific columns or Select All to print all columns.
- Designate specific rows to print; default will list From/To all rows.
- Change the Header/Footer command if desired or leave at default settings.
- Choose Printing Format; default is Portrait or select Landscape.
- Select Print Options (Grid Lines, Headings, Horizontal/Vertical centering).
- Select Scale Options or leave at default settings.
- Select Margin Options or leave at default settings.
- Select OK to print.