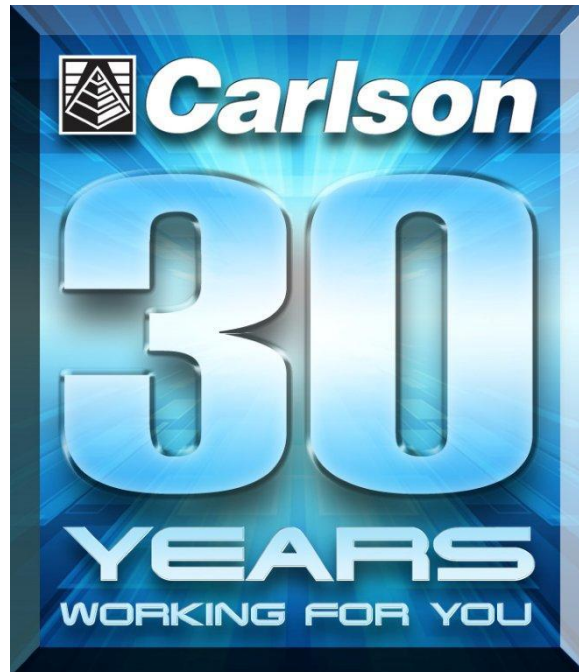


Carlson 30th Anniversary User Conference

April 7 – 10, 2013

IMPROVE YOUR SKILLS • LOOK TO THE FUTURE • CELEBRATE THE PAST



Using Carlson for Web-based Mapping

April 9, 2013 – Session 8

Presented By: Ladd Nelson
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Carlson Survey - Introduction to Web-Based Mapping

As the world becomes increasingly digital and more mobile, we'll explore how a variety of Carlson Software tools permit data extraction and creation of digital maps from, and to, on-line sources. We'll also learn how to leverage various technology tools to share site plans across the web and permit the collaboration of data-viewing outside of the CAD environment. Supporting data for the lessons to follow can be obtained at:

<http://www.carlsonsw.com/wordpress/wp-content/uploads/2013/03/M.zip>

Site Planning with Google Earth™

In the material to follow, our goal will be to utilize the coarsely-located and geographic search capabilities of Google Earth to serve as a launch platform for more accurate land survey information to follow.

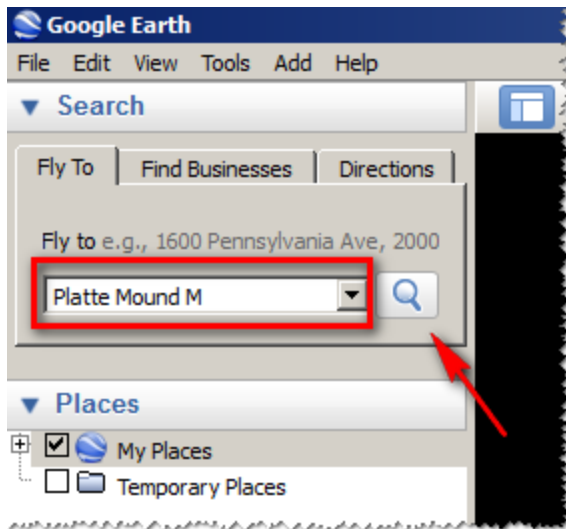
NOTE: To complete this section, a live Internet connection is required as is the [Google Earth](#) application.

Let's take a look at using Google Earth to sketch out our work-site... the [Platteville "M"](#) (*aka* the "Platte Mound M") located in Lafayette County in southwest Wisconsin. From your computer, launch the Google Earth application.




Navigating to Our Site

Once the Google Earth application has fully loaded into memory, supply the Search phrase **Platte Mound M** as shown below:



NOTE: In the event multiple search results are returned, we are interested in navigating to *West Mound Road, Platteville, WI 53818*.

Sketching a Polygon Placemark

Our next goal will be to sketch a polygon that outlines the "M" figure. Use the standard Google Earth controls to position the "M" to a location and orientation of your choosing. Once positioned, use the ADD → POLYGON command (alternatively, the  toolbar button).

With the Google Earth - New Polygon dialog box open, left-click at each vertex point surrounding the M (it is suggested you begin at the pointed "v" vertex).

NOTE: The "M" perimeter can be traced in either direction and errant points can be removed by right-clicking them. Additionally, placed vertex points can be re-positioned by left-clicking them and placing them in the desired location.

NOTE: It is **not** a requirement to exactly trace the "M" outline. Creating a four-point polygon surrounding the "M" is sufficient enough for this exercise.

When you've located your desired polygon, optionally provide a Name for your polygon and click the OK button to dismiss the Google Earth - New Polygon dialog box.

With the polygon created and highlighted in the Google Earth Places Explorer, issue the FILE → SAVE → SAVE PLACE AS command to save the polygon to a zipped KML file (KMZ). For the sake of consistency, let's save this place to the following folder and file name: *C:\Carlson Projects\Training\Survey\PlattevilleM.kmz* and exit from Google Earth.

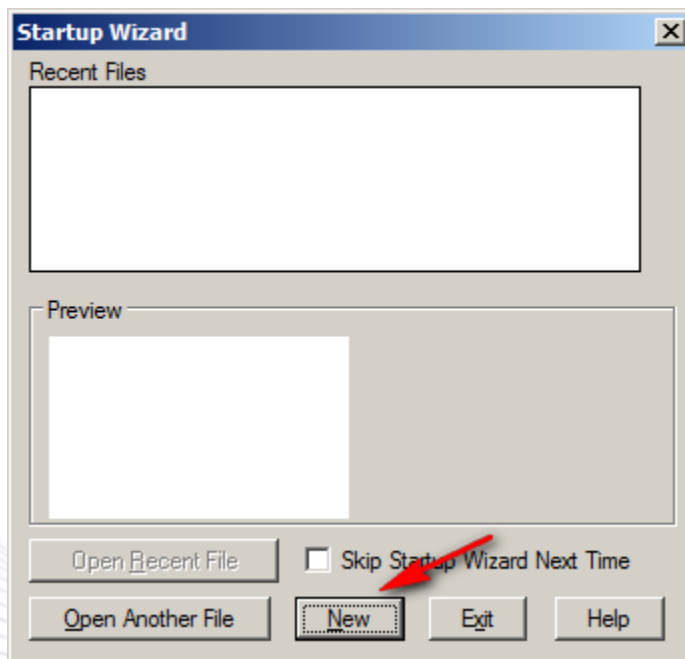
Start the "Survey Mapping" (M) Project



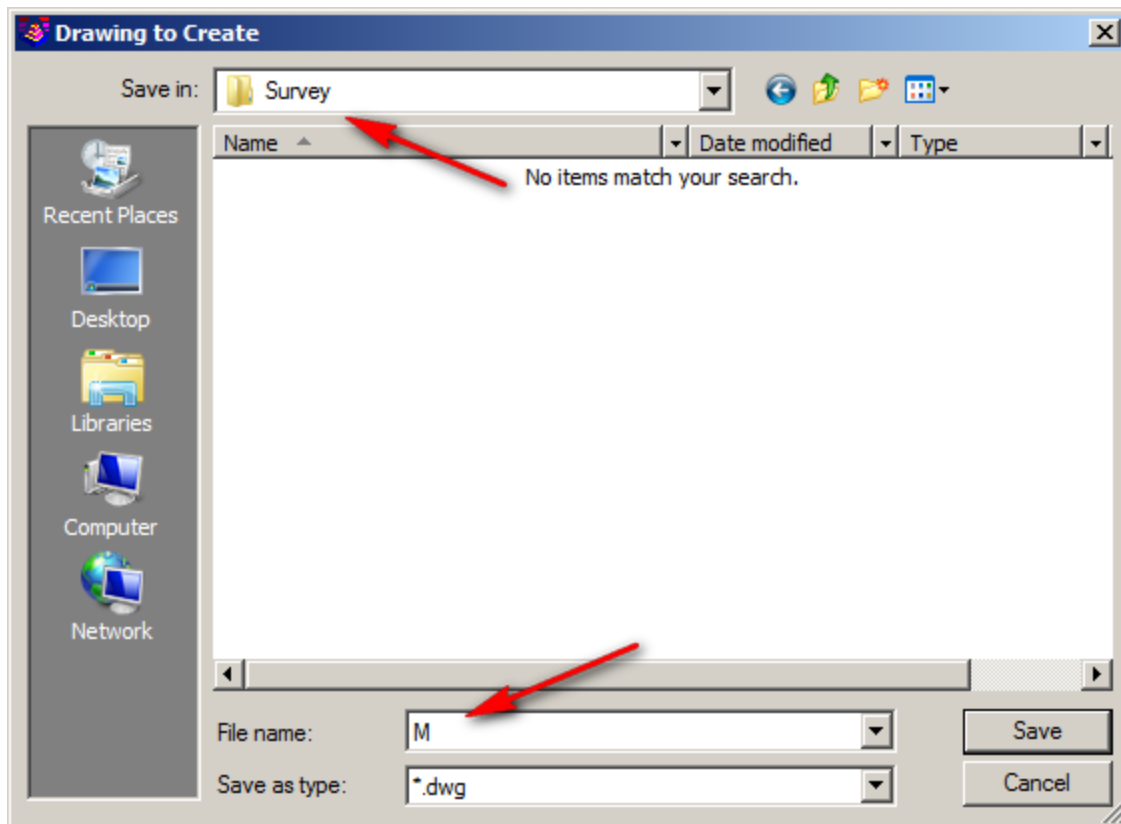
Carlson Survey comes pre-configured to place all external data file associated with a project in the same directory as the drawing file. The recommended way to begin a project is to start Carlson Survey by clicking on the Desktop icon.

Startup Wizard

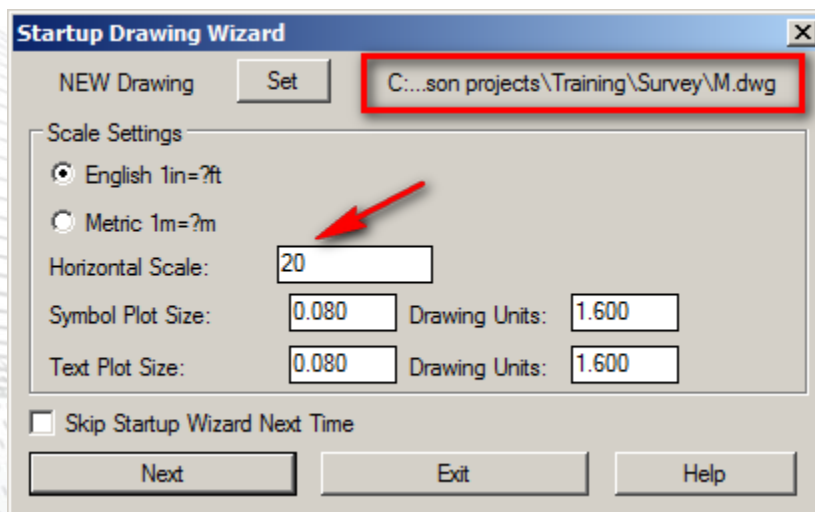
By default, the program will offer a **Startup Wizard** allowing you to choose an existing file (project) or start a new one. For this lesson, select **NEW**.



The New Drawing Wizard dialog requests that you set the name of your new drawing (project). For this lesson, select SET and navigate to the "C:\Carlson Projects\Training\Survey" folder (or other folder as indicated by your instructor) found on your computer. Name the file *M* and Save. Effective file management is always a good habit to practice. Keep in mind, several external file will be created and stored in the same folder as the drawing file and storing each project in its own unique folder on your computer is strongly suggested.

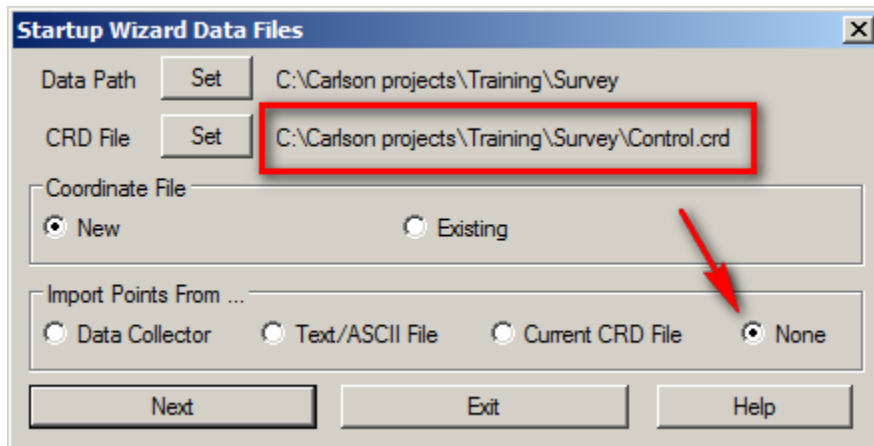


The New Drawing Wizard dialog will appear again requesting you to set the drawing units and scale. These settings will affect any additional text and symbols you may add to the drawing. If you know what scale your output will be plotted at, set the Horizontal scale to match it. If you do not know the scale of the output plotted output, leave the setting as is and select the Next button. We can always override these setting later.



Select Next on the Startup Wizard Data Files dialog. This dialog displays the path and file name of the coordinate points that you may generate for stakeout purposes. Notice that they default to

the same directory and name as the original drawing file saved earlier. Click on the SET button to establish the name of the CRD file shown below. Only certain Survey routines will use the coordinate file, and this step prevents having to set the file later. Click the Next button to continue. Your drawing will now be blank and ready for the importation of the survey control data.



Drawing Setup, Importing Google Earth KMZ and Survey Control

One of our first tasks will be to establish our desired coordinate system so that we can relate the WGS84 positions of Google Earth into the desired State Plane coordinate system for our project.

Drawing Setup

From the SETTINGS menu, click DRAWING SETUP and specify the values shown below:

Drawing Setup [X]

Scale and Size Settings

☒ English 1in=7ft English Units US Feet [v]
☐ Metric 1m=7m

Horizontal Scale 20.0
Symbol Plot Size 0.0800 Drawing Units 1.6000
Text Plot Size 0.0800 Drawing Units 1.6000
Line Type Scaler 0.5000 LTSCALE 10.0000

Angle Mode

☒ Bearing ☐ Azimuth ☐ Gon ☐ Other

Coordinate System

System
☐ Grid ☒ Local Define Localization
Define Projection

Projection State Plane 83 [v]
Zone WI South [v] Lat/Lon Datum WGS84 [v]

Project Scale Factor 1.0000000000000000 Base Z 0.00

Report Settings

Project Name Job Number
Report Distance Scale Factor 1.0000000000000000 Set

OK Cancel Set Paper... Help

Importing the Google Earth File

From the FILE menu, click LANDXML/ROADXML/GOOGLE EARTH → IMPORT GOOGLE EARTH FILE and specify the values shown below and click OK when done.

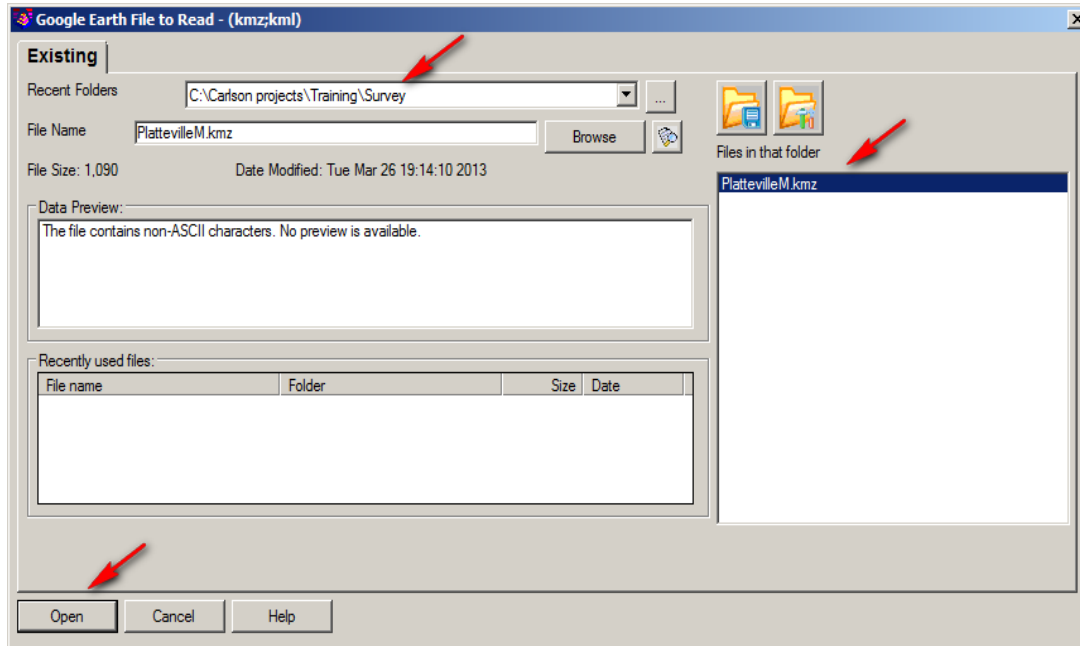
Import from KML/KMZ [X]

☒ Import Lines and Polygons
☒ Import Points ☒ Point Protect
☒ Use Folders as Layers


Default Layer: G-ANNO-SYMB Select Layer

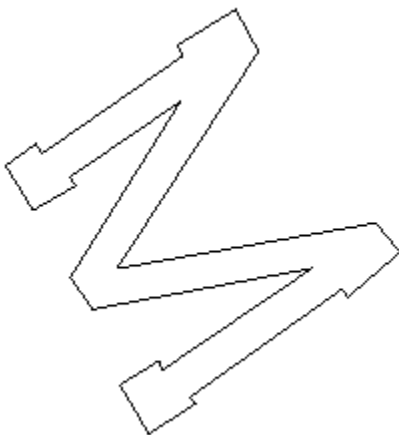
OK Cancel Help

Navigate and locate the KMZ file we wish to import:



View Extents

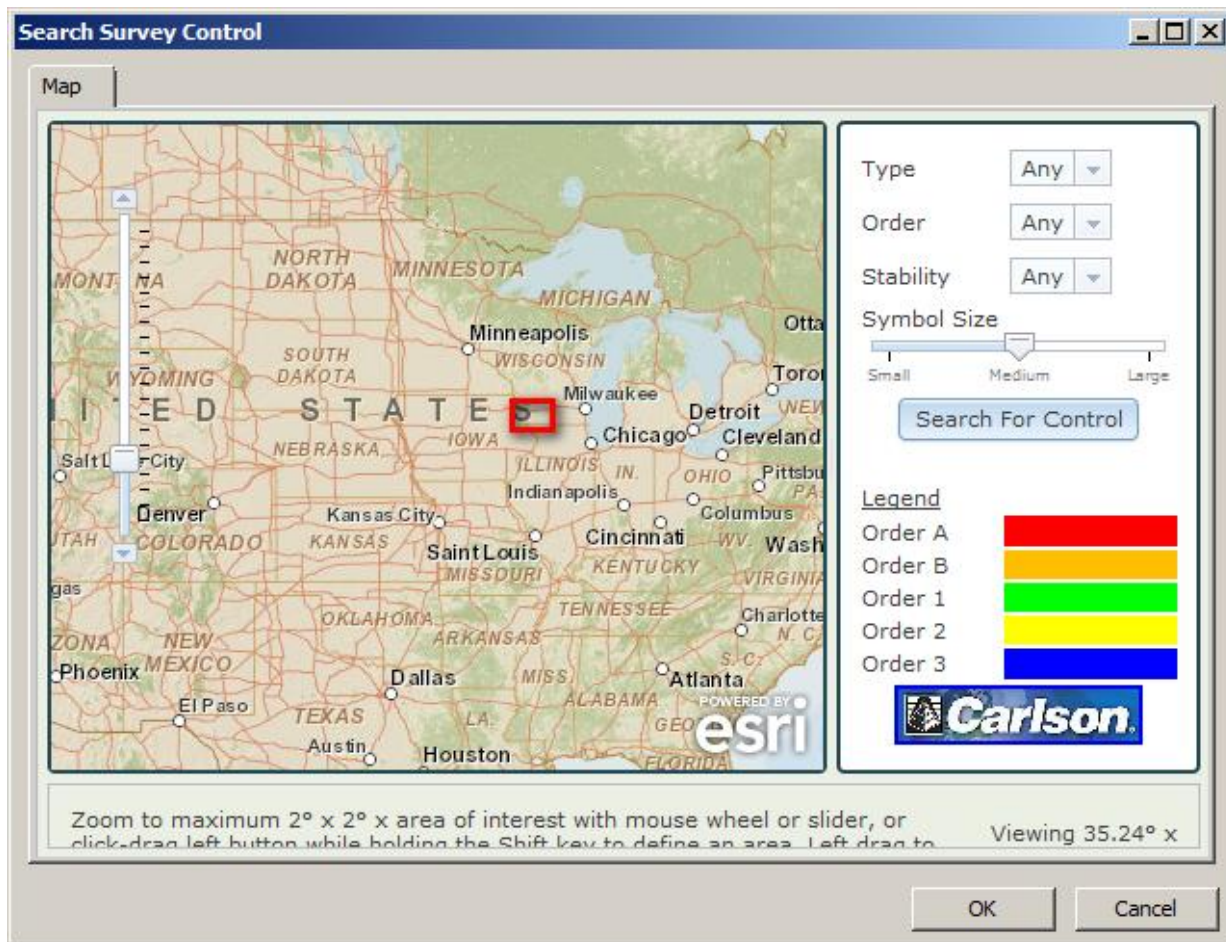
From the VIEW menu, click EXTENTS to see the shape of your Google Earth KMZ file and save () your work to this point. Your drawing should resemble that shown below:



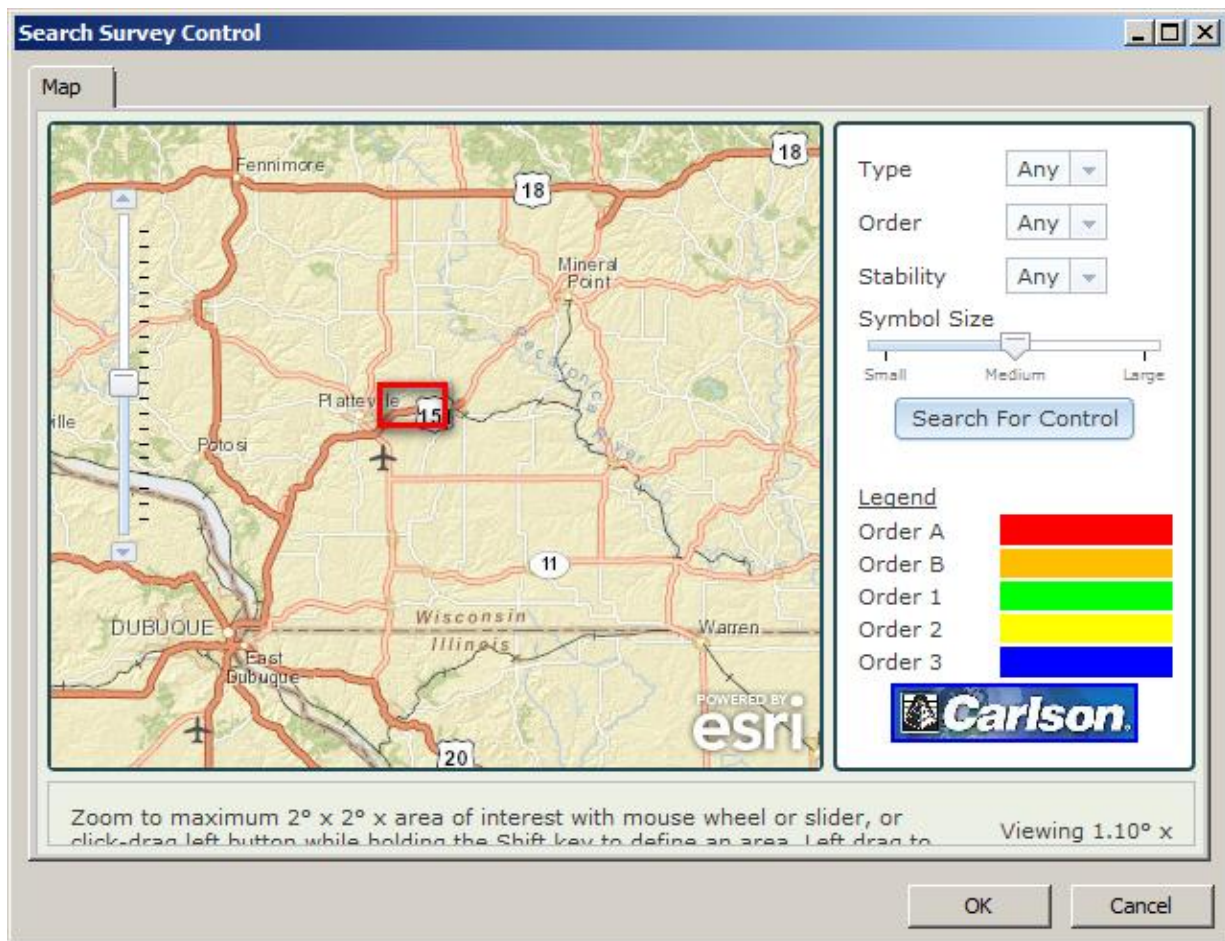
Search Published Control

Now that we have established our desired coordinate system for our project and graphically located the information from our KMZ file into CAD, our next task will be to establish National

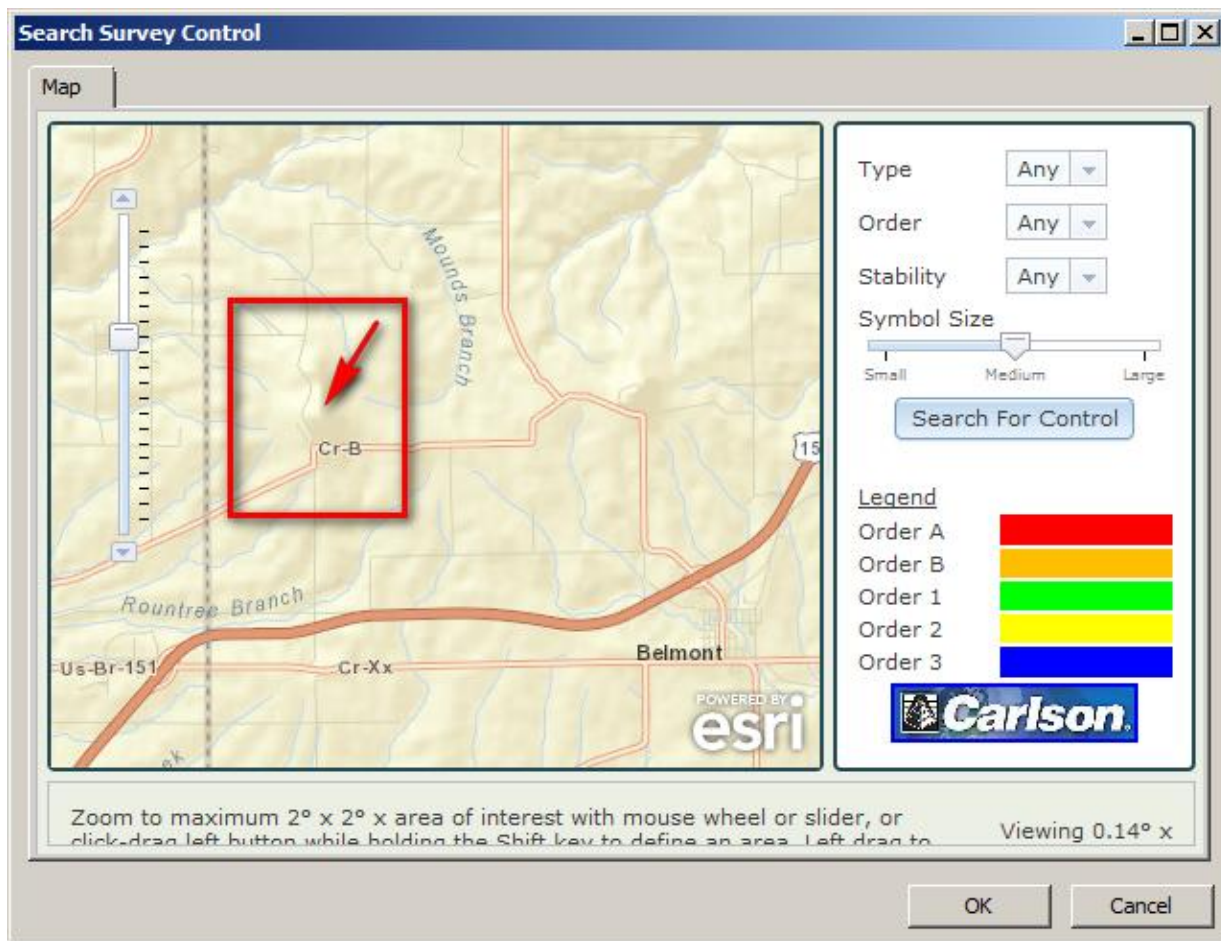
Geodetic Survey (NGS) control points for our survey crew for use in the field. From the POINTS menu, click POINT UTILITIES → SEARCH PUBLISHED CONTROL. The Search Published Control dialog box appears (below):



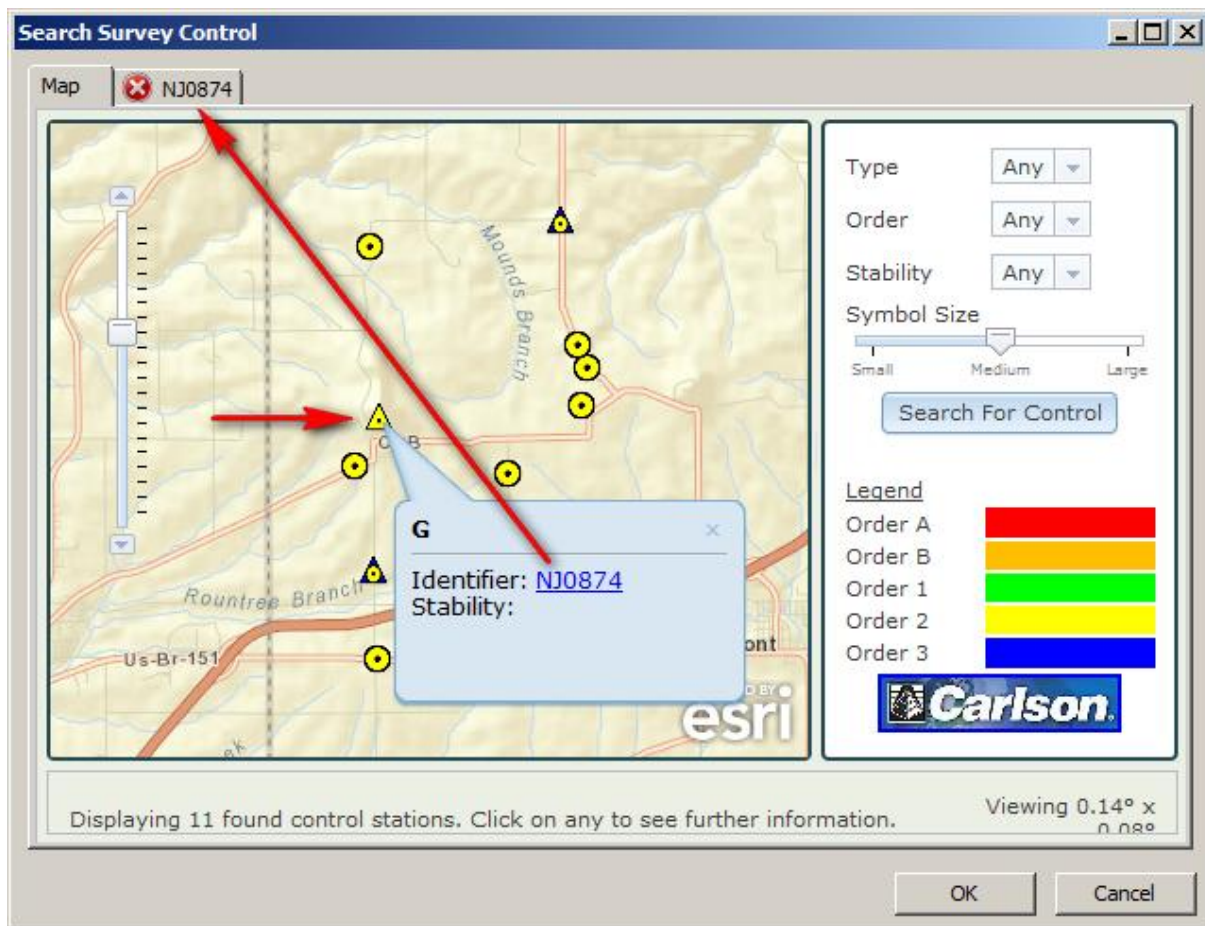
NOTE: There are several ways to "zoom" into our area of interest (using the control slider on the left side of the dialog box, double-clicking on the map, etc) but the quickest method is to *Shift*+click to form a rectangle around the area of interest indicated above. Repeat for each of the images below.



Our area of interest is denoted in the area shown below:

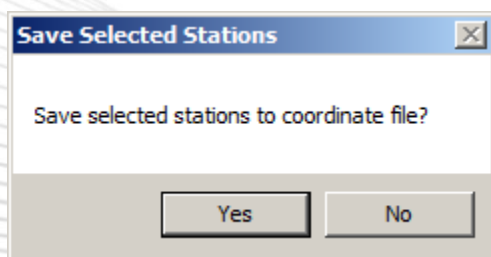


Click on the SEARCH FOR CONTROL button. Several NGS stations should appear. Click on the station indicated in the image below and then click on the station link to reveal its NGS data sheet.



NOTE: Other stations can be retrieved as desired by following the steps above.

Click OK to dismiss the SEARCH SURVEY CONTROL DIALOG box. If at least one NGS data sheet is active, the following alert will appear. Click YES to commit the NGS control point(s) to the active coordinate file (*e.g.* Control.crd as specified earlier).



NOTE: The CONTROL.CRD file can be loaded directly into [Carlson SurvCE™](#) or [Carlson SurvPC™](#) for use in the field or exported to an ASCII-based (CSV) coordinate file for use in other field collection software programs.

Draw-Locate Points

Now that we've located control for our project, let's place it into our drawing. From the POINTS menu, click DRAW-LOCATE POINTS and specify the values shown below. Click on the DRAW ALL button when ready.

Draw-Locate Points

Symbol Name:

Symbol Rotation Azimuth:

☐ Draw Nodes Only

☐ Elev Text Only ☐ Elev Label Decimal on Point

Locate within: ☐ Polyline ☐ Distance ☐ Window/Coord Range

Point Prompt-Label Settings

☒ Descriptions ☐ Notes

☒ Elevations ☐ Use '+' ☒ Use '-' ☒ Label Zeros

Elevation Prefix: Elevation Suffix:

☒ Locate on Real Z Axis Integers: Decimals:

Point Number Settings

☒ Point Numbers ☒ Automatic Point Numbering

Starting Point Number:

Wildcard Description Match:

☒ Erase Duplicates ☐ Fix Overlapping Point Attributes

Symbol Size Scaler: Text Size Scaler:

☐ Layer by Description Layer Prefix:

Layer Name:

From the VIEW menu, click EXTENTS to see the extents of our Google Earth KMZ and the selected Control point(s). Save your work to this point.

Field-to-Finish of Surveyed Data

The precept of this next session is that we have supplied a field survey crew with the CONTROL.CRD and asked that they perform a topographic survey of the project site. The crew has performed this work with Carlson SurvCE and a [Carlson Surveyor+ GNSS RTK rover](#). Our

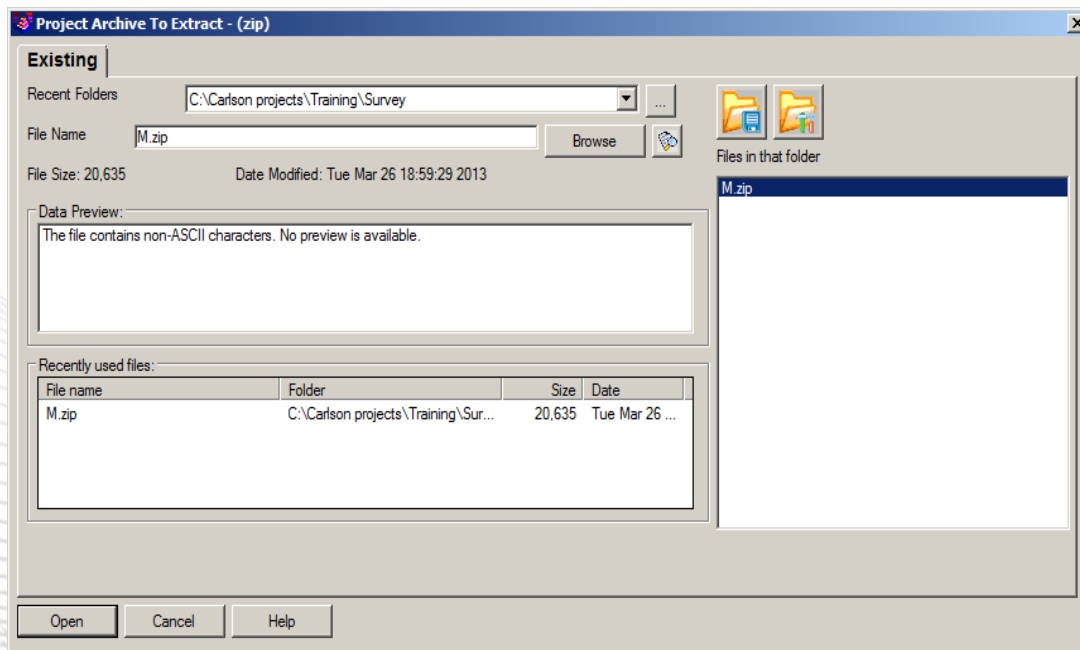
next task will be to integrate their field survey data into the project drawing. The data brought back in by the survey crew is comprised of:

- **M.sys** - Coordinate System information (e.g. USA/NAD83/WI South) associated with the data set.
- **M.inf** - Job and data meta-data file describing other aspects of the data set.
- **M.rw5** - Unadjusted and "raw" measurements observed and recorded in the field.
- **M.not** - Additional point notes (if applicable) that further describe a point beyond that of a standard point description.
- **M.crd** - An alpha-numeric Carlson coordinate file produced from the reduction of the RW5 file.
- **M.dxf** - A "drawing exchange format" file of the graphic results from the SurvCE "field-to-finish" process.

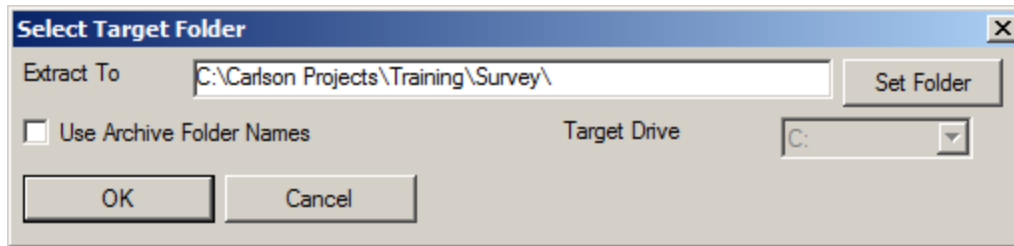
This data will need to be extracted from the <http://www.carlsonsw.com/wordpress/wp-content/uploads/2013/03/M.zip> file which should be saved to the folder specified in the [Startup Wizard](#) section.

Extract Project Archive

From the FILE menu, click PROJECT → EXTRACT PROJECT ARCHIVE. Browse for an open the archive file as shown below:

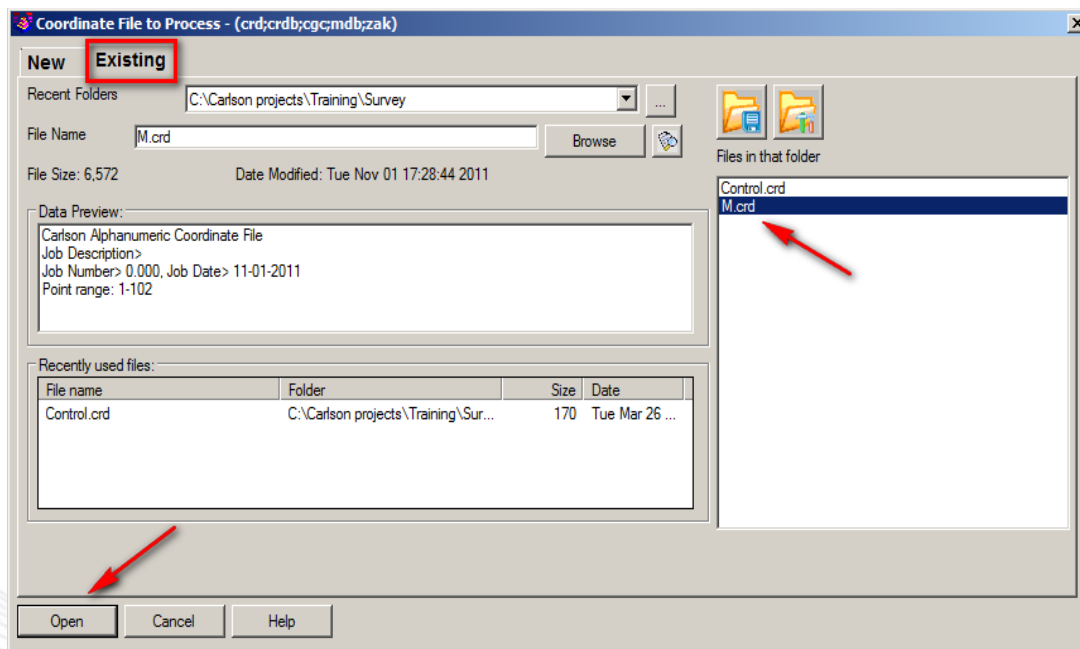


Extract the contents of the archive file to the folder location specified below (over-writing any previous files should they exist):



Set Coordinate File

Since Carlson SurvCE natively produces a CRD coordinate file that can be used in Carlson Survey, let's use it. From the POINTS menu, click SET COORDINATE FILE and specify the values shown below:



Out next task will be to use the "Field-to-Finish" capability of Carlson Survey to represent the data collected in the field in our DWG file.

Field-to-Finish

The "Field-to-Finish" capability of Carlson Survey provides an extremely powerful and highly configurable collection of settings that can save a dramatic amount of time during the production of a CAD drawing from field-surveyed data. At the heart of the Field-to-Finish "engine" is a "Feature-code Library Definition" (FLD) that serves as the instruction on how to process the description(s) of points located in the field. From the SURVEY menu, click the DRAW FIELD TO FINISH command to display the dialog box below:

Draw Field to Finish

Draw Options
Highest point number: 102
Range of Points:

Entities to Draw
☒ Points ☒ Lines ☒ Symbols ☒ 3D Faces

Draw within
☐ Polyline ☐ Distance ☐ Window/Coordinate Range

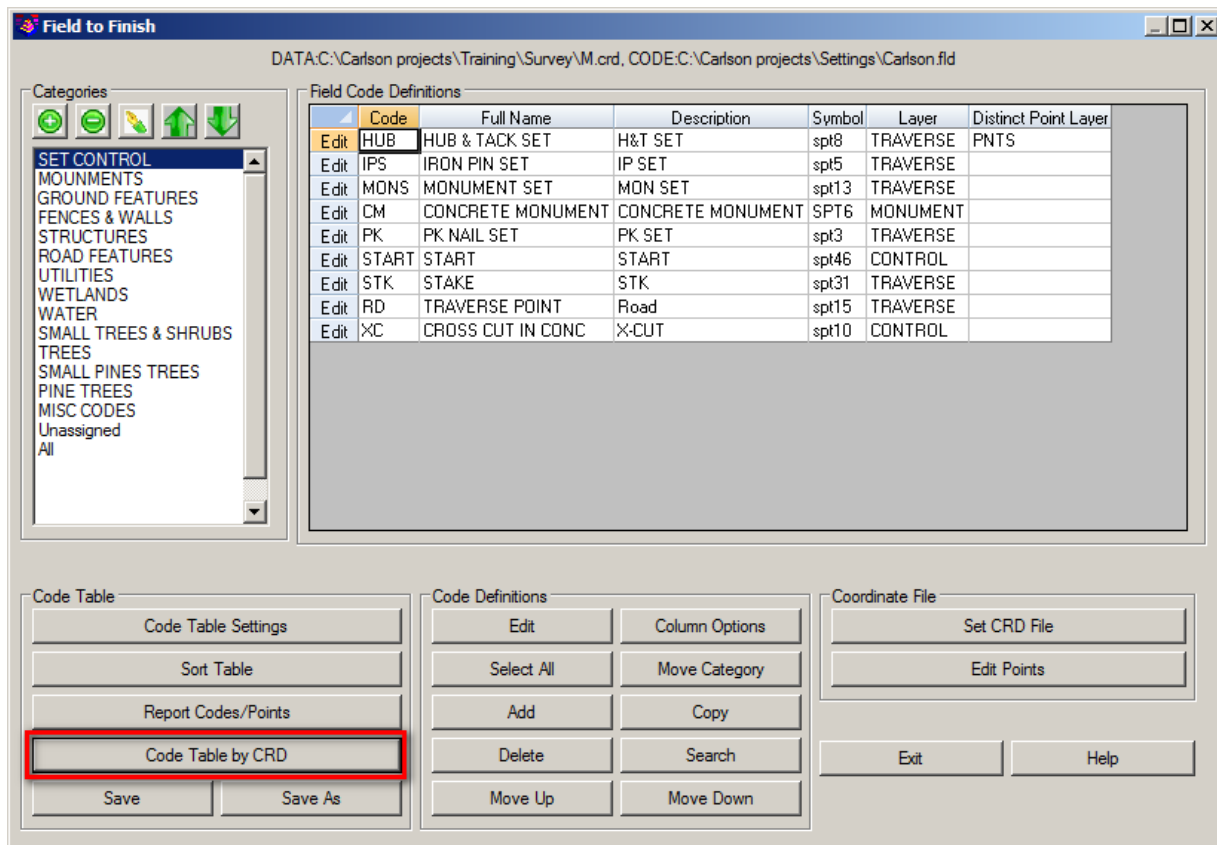
Layer Prefix:

☒ Erase Existing Field to Finish Entities ☐ Erase In Range
☐ Preview Only ☐ Fix Overlaps

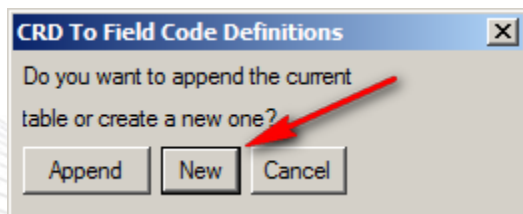
Code Table: C:\...son projects\Settings\Carlson.fld
GIS Table:

NOTE: The actual filename of the active FLD (highlighted in the image above) may vary from that shown. We will utilize some Field-to-Finish tools to create a new FLD file.

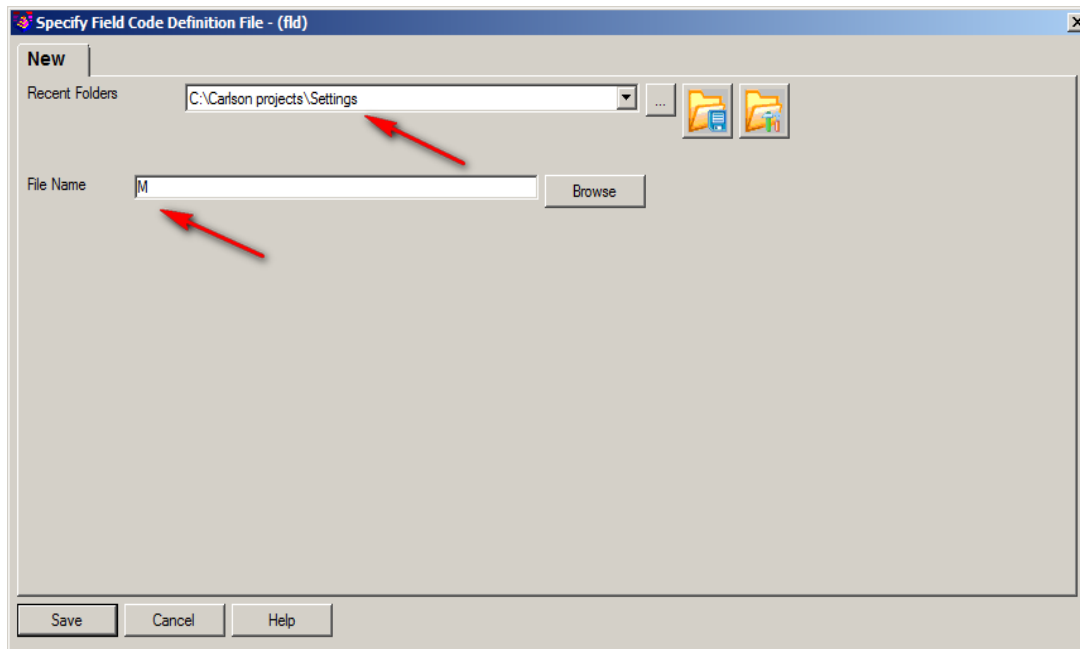
Click EDIT CODES/POINTS to gain access to the dialog box shown below:



Click on the CODE TABLE BY CRD button as shown above. At the dialog box that follows, indicate you'd like to create a NEW FLD file:

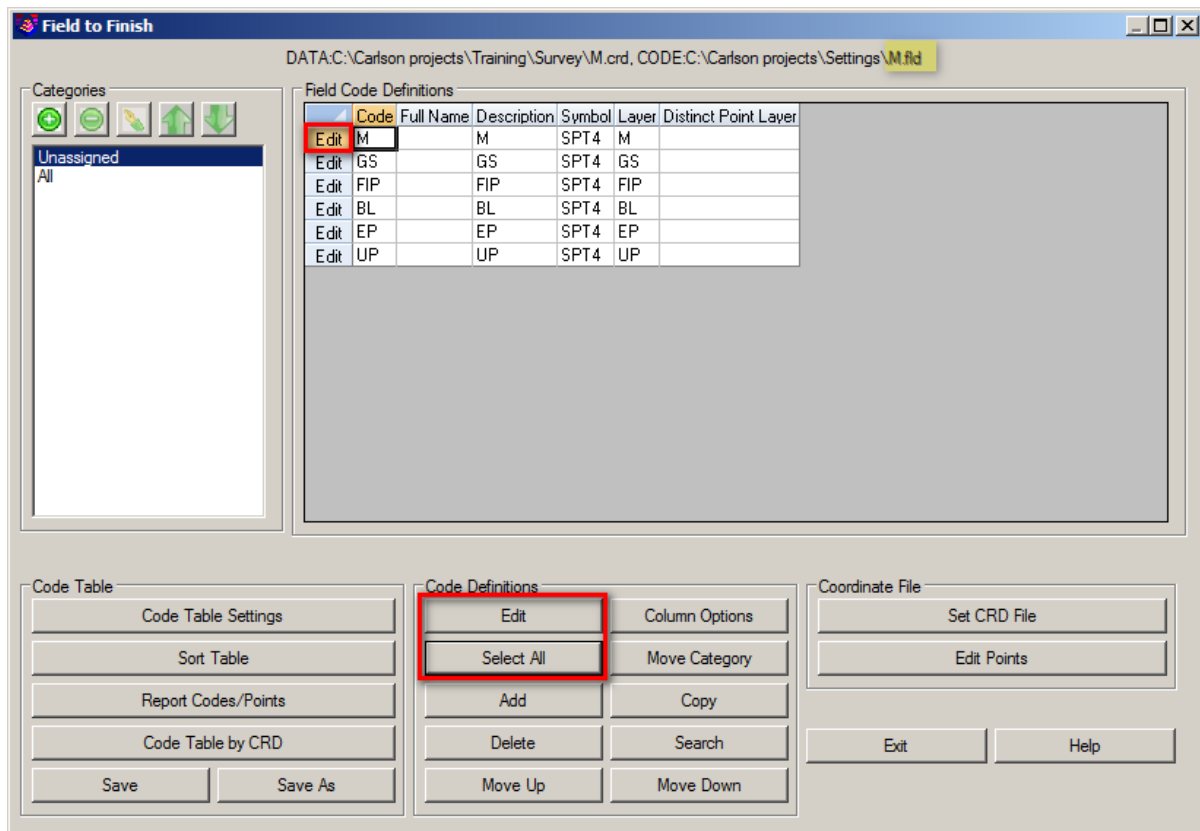


When prompted, supply a new FLD name as shown below:



NOTE: This routine gathers up each unique point description found in the current coordinate file and creates a listing the codes in the specified FLD file. This can be very handy for situations where survey crews encounter unique conditions in the field that require the use of a unique code. This also permits an organization to build their FLD file over time based on what the Surveyor shoot in the field.

The resulting FLD file should resemble that shown below. Our next task will be to configure this library to customize it for our desired DWG output.



Use the table below as a guide to configure various aspects for each code.

Field Code Properties [†]				
Code	Entity Type	Layout ID	Symbol	Layer
M	3D Polyline	5	SPT0	M
GS	Point	5	SPT0	Ground
FIP	Point	5	SPT4	Found Iron Pin
BL	3D Polyline	5	SPT0	Topo Breakline
EP	2D and 3D Polyline	5	SPT0	Edge of Pavement
UP	Point	5	SPT19	Utility Pole

[†]**NOTE:** Save yourself some time and use the SELECT ALL option followed by the EDIT button to globally set common values (e.g. Attribute Layout ID and Symbol) and then use individual Edit buttons to detail unique aspects of a desired code.

When complete, click the EXIT button and save the changes to the underlying FLD file and return to the Draw Field to Finish dialog box shown below:

Draw Field to Finish

Draw Options
Highest point number: 102

Range of Points: ALL **All** Point Group

Entities to Draw
☒ Points ☒ Lines ☒ Symbols ☒ 3D Faces

Draw within
☐ Polyline ☐ Distance ☐ Window/Coordinate Range

Layer Prefix: Additional Draw Options

☒ Erase Existing Field to Finish Entities ☐ Erase In Range
☐ Preview Only ☐ Fix Overlaps

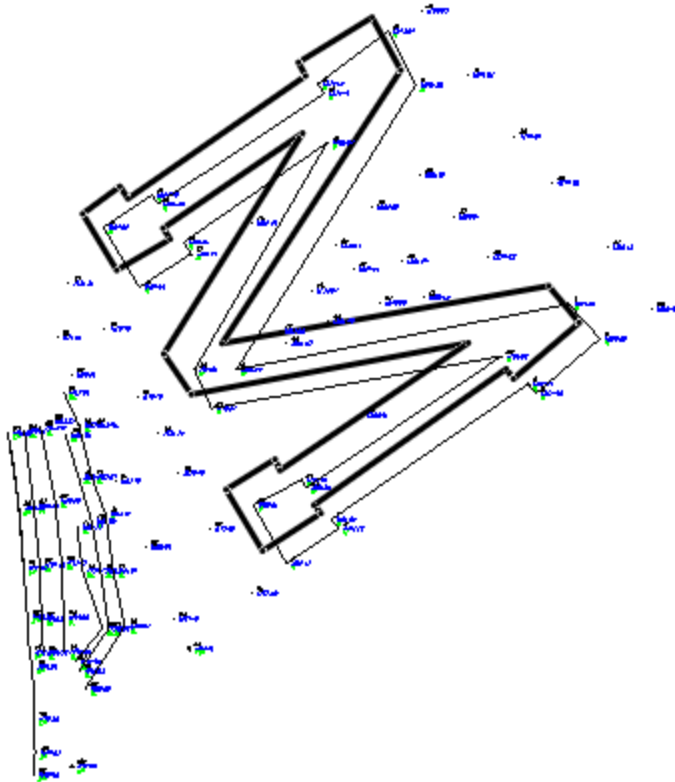
Code Table: C:\Carlson projects\Settings\N.fld Set

GIS Table: Set


Edit Codes/Points Report Codes/Points Tree Survey

OK Cancel Help

Set the values as shown and click OK when ready. Depending on the accuracy of the polygon placemark you drew in the [Sketching a Polygon Placemark](#) section, your drawing may closely resemble that shown below:



NOTE: The original Google Earth polygon has been bolded for positional emphasis. Why are the positions between the two outlines so different? In this particular case, it is likely that the geo-referenced position of the photograph in Google Earth that we based our original polygon on is/was not at the proper location... a supposition we'll corroborate in the next section!

Save () your work to this point.

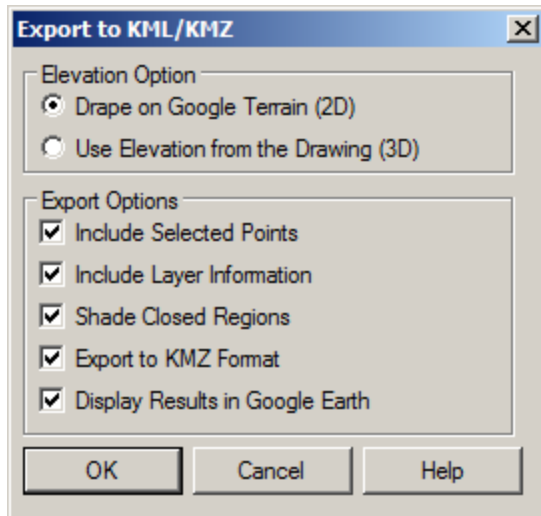
Web-based (On-line) Mapping

Now that we've reduced our field measurements into a CAD drawing, our next goal will be to produce data that can be posted on-line and shared (for example) with a client-base who may not have a CAD application and/or fully understand CAD drawings.

Exporting to Google Earth

NOTE: The following section presumes that an active Internet connection is available and that Google Earth has been installed.

From the FILE menu, click LANDXML/ROADXML/GOOGLE EARTH → EXPORT GOOGLE EARTH FILE and specify the values shown below and click OK when done.



When prompted, choose an arbitrary filename (*e.g.* M.kmz) and click SAVE when ready. The following command is displayed:


Select points, polylines, lines and arcs to write.

FILter/<Select entities>:

Type ALL and press the ENTER button twice. Google Earth should automatically launch and display the results similar to that shown below (color added for clarity):



NOTE: In this first example, the KML/KMZ file could be attached to an Email message and sent to a client. This option does, however, necessitate that the recipient has an application like Google Earth installed to their computer.

As we can see, the location of the CAD data points do not coincide with the current aerial position of the Google Earth image. However, let's look at other snap-shot of the same area through time. From the Google Earth VIEW menu, click HISTORICAL IMAGERY ().

Use the Historical Imagery slider typically located toward the upper left of the Google Earth display. Compare the placement of Google Earth images over time. You may find that the image locations change that would seem to indicate that Google Earth maps should be considered as "approximate" only. Exit from the Google Earth application and return to Carlson Survey.

NOTE: The "take-away" from this lesson is that appropriate qualifiers and disclaimers should be included when sharing Google Earth files.

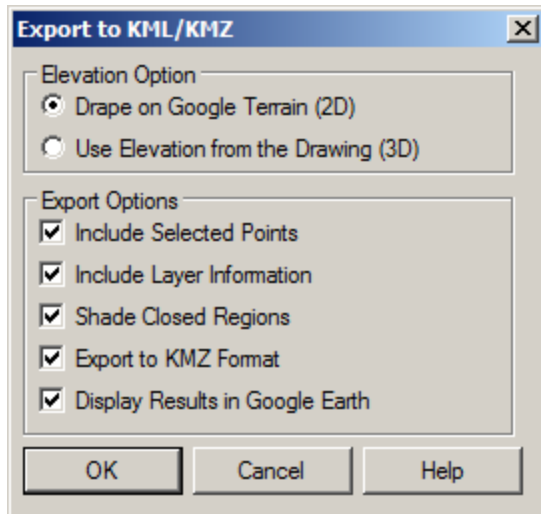
Exporting to Dropbox™/Google Maps

NOTE: The following section presumes that an active Internet connection is available and that the user has a Dropbox account.

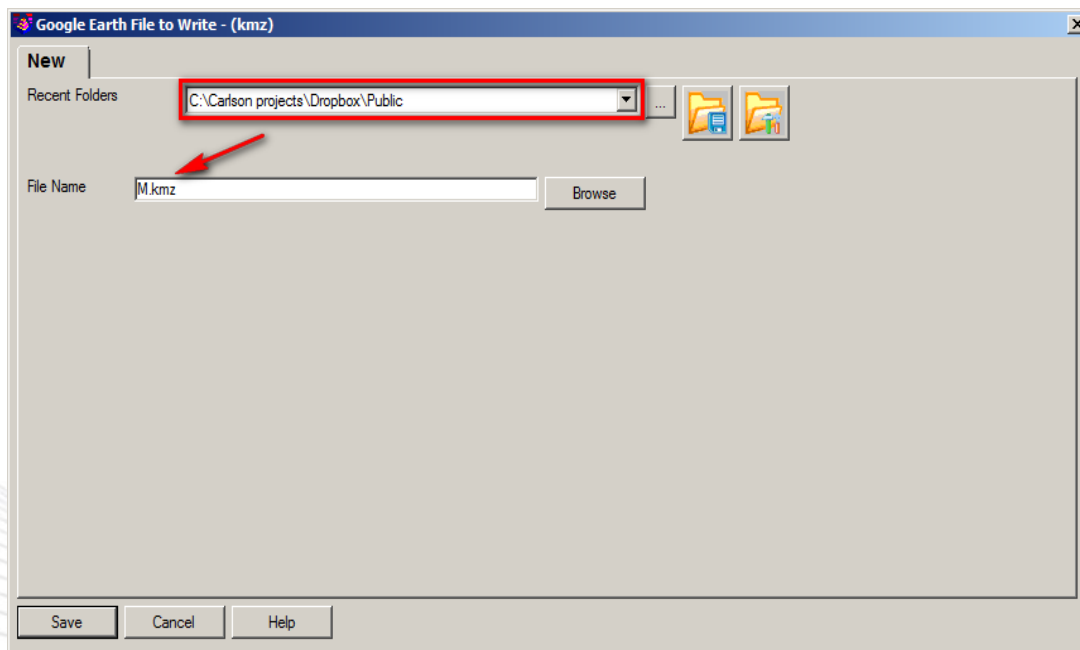
From <https://www.dropbox.com/about>: Dropbox is a free service that lets you bring your photos, docs, and videos anywhere and share them easily. Further, it is possible to establish a link between a local folder on your computer and your Dropbox account "in the cloud." This makes it relatively easy to automatically share files by simply locating them in a designated folder on your PC. The Dropbox application then handles the on-line synchronization. In the example below, a Dropbox account (and its "Public" folder) has been linked to a "C:\Carlson Projects\Dropbox" folder (which subsequently creates a "C:\Carlson Projects\Dropbox\Public" folder). It will be the Public folder in which we share our files on-line.

NOTE: If you'd like your own, free, Dropbox account, feel free to visit the Dropbox referral site at <http://db.tt/ejoc8jQR>.

From the FILE menu, click LANDXML/ROADXML/GOOGLE EARTH → EXPORT GOOGLE EARTH FILE and specify the values shown below and click OK when done.



When prompted, specify the folder and filename as shown below and click SAVE when ready.



After clicking SAVE, the following command is displayed:

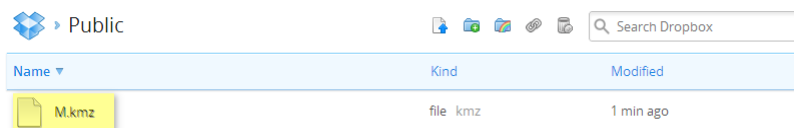
Select points, polylines, lines and arcs to write.

FILter/<Select entities>:

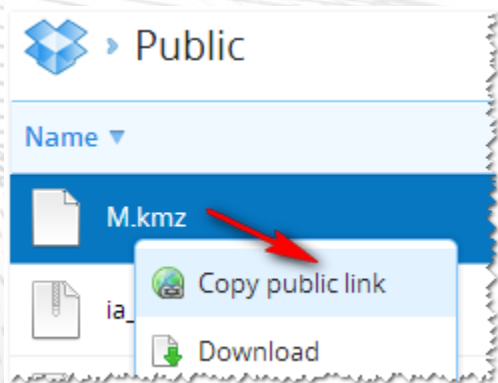
Type ALL and press the ENTER button twice. As before, Google Earth should automatically launch and display the results similar to that shown below (color added for clarity):



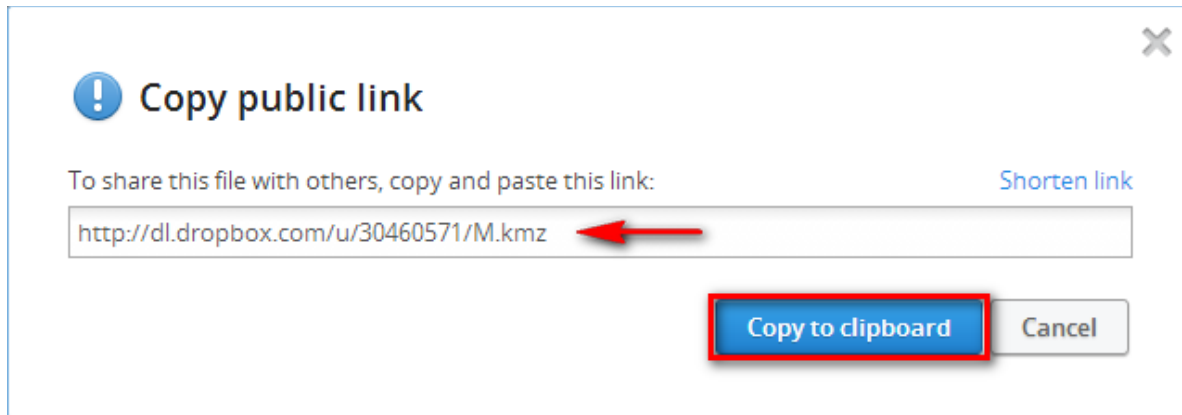
Exit from the Google Earth application and access the Public folder your Dropbox account through a web-browser at <https://www.dropbox.com/home/Public>. The Google Earth file created earlier should be synchronized and available as illustrated below:



As files are synchronized to Dropbox ("in the Cloud"), they are assigned a unique [URL](#) that can be used to share and locate the file. *Right*+click on our file to access the COPY PUBLIC LINK command as shown below:

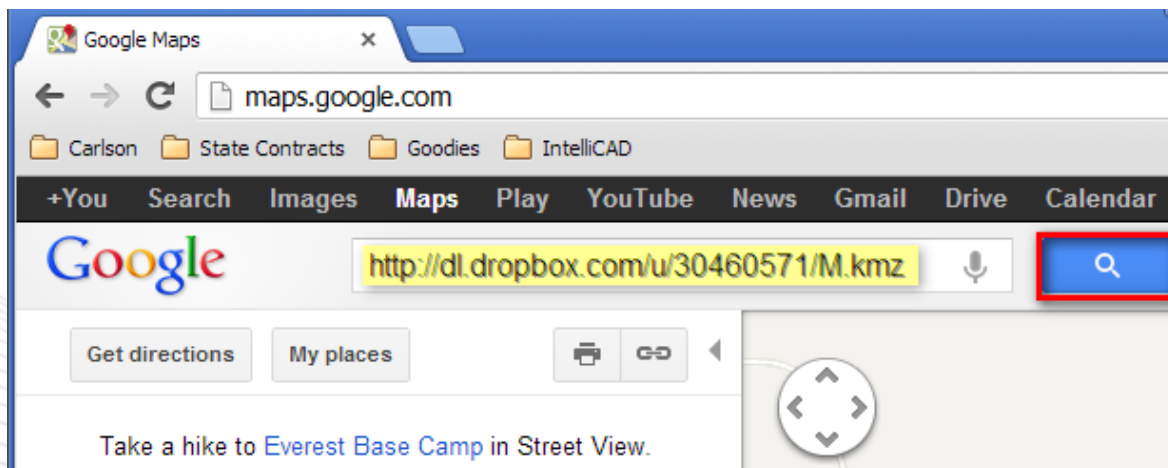


In the resulting web control, make note of the URL and/or use the "Copy to Clipboard" function as shown below:

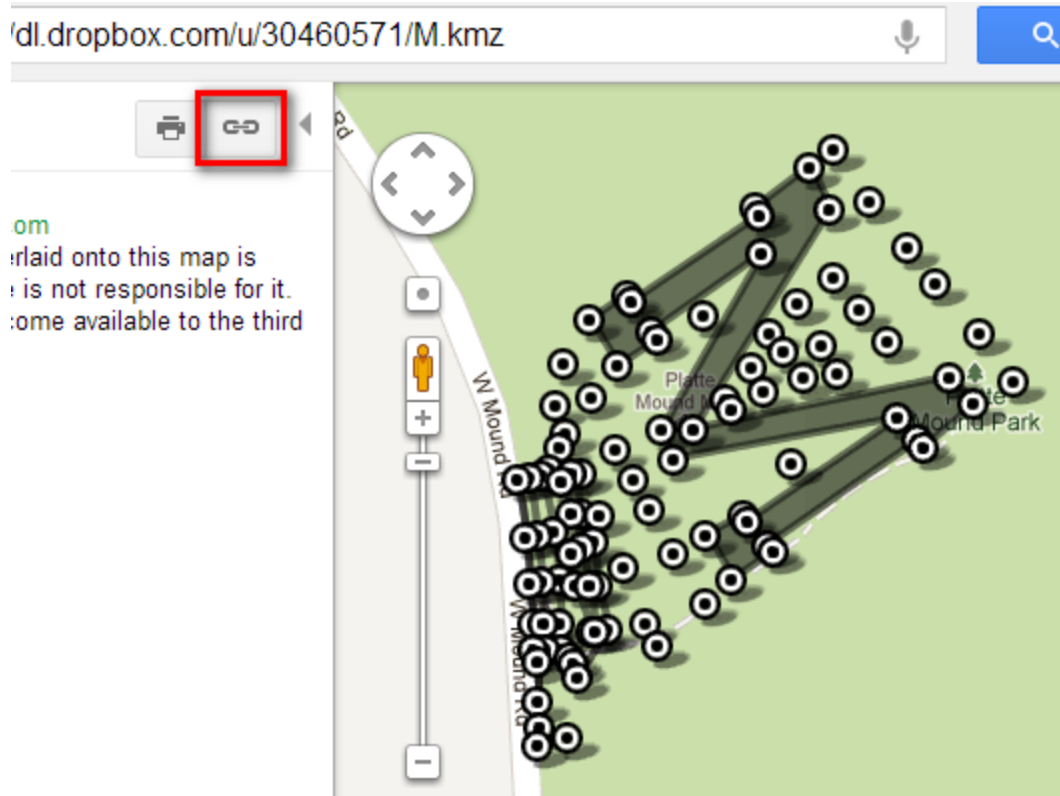


NOTE: The URL shown in the above image is subject to removal and is being shown for illustrative purposes.

Now that the URL to the Dropbox file is on the Windows Clipboard, we'll use it in another web-based application... [Google Maps](#). Navigate your web browser to <http://maps.google.com> and paste (via *Ctrl+V*) our file URL into the Google Maps "Search" as shown below:



The result of our KMZ file is now displayed in a web-browser-friendly format as shown below. We'll now use the Google Map hyperlink function to extract the URL of the combined map. Click on the link button highlighted in the image below:



In the resulting web control, enable the "Short URL" toggle for the benefit of client recipients as shown below. This (or the long URL) can be copy and pasted into an Email message to be shared with a client. Additionally, web-code is provided that can be embedded into a standard web page.

Paste link in **email or IM** ×

☒ Short URL Send

<http://goo.gl/maps/UgNrC>

Paste HTML to embed in website

```
<iframe width="425" height="350" frameborder="0" s
```

[Customize and preview embedded map](#)

NOTE: The URL shown in the above image is subject to removal and is being shown for illustrative purposes.

Conclusion

We've explored how data collected in the field with Carlson SurvCE and placed into a drawing with Carlson Survey can be exported to a Google Earth-friendly KMZ file. Further, we've learned how a cloud-based file sharing service such as Dropbox can be leveraged to produce a browser-friendly Google Map page that is easily shared with clients.