

How To Find Property Lines and Corners With a Cell Phone GPS

By: Joseph Elfelt

PropertyLineMaps.com

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1. Introduction

Would you like to:

- Find an existing survey marker?
- Find an approximate corner for land that has not been surveyed?
- Follow your approximate property lines?

This article will show you how to do the above things with your cell phone or tablet. **You can do this whether or not there is cell service on your land.** This article also shows you how to get the best possible GPS accuracy from your mobile device by doing **two easy things**.

Note: If your land has not been surveyed and you need to know **exactly** where your property lines and corners are on the ground, then you need to contact a licensed land surveyor.

2. Approximate property corner coordinates

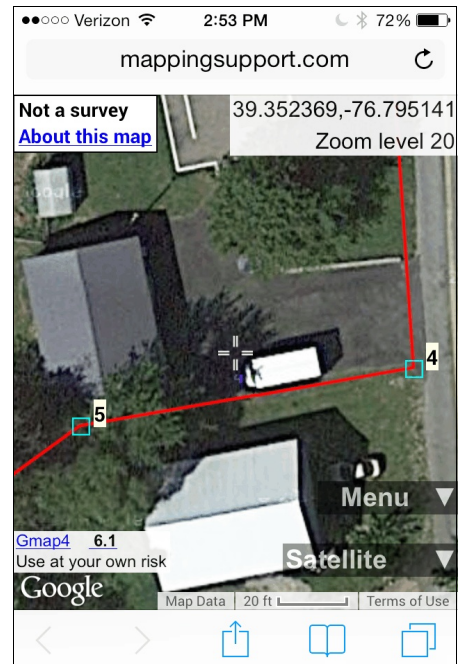
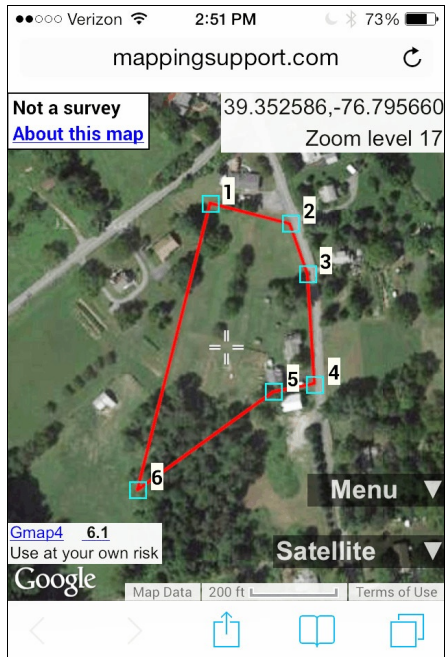
This article assumes that you have purchased approximate latitude longitude coordinates for the corners of your land from <https://PropertyLineMaps.com>. I am the owner and developer of that service.

Each client receives a GPX file (for use with a dedicated GPS) and an online map link. The map link starts the Gmap4 software I developed and displays your approximate property lines. The map link will work with most browsers and on most devices from cell phones to PCs.

Here is an example of an actual online map link that was delivered to a client. Note that the approximate corner coordinates are part of the link. **You will need to grant permission for the bitly link.**

<https://mappingsupport.com/p/gmap4.php?t=s&label=on&tilt=off&markers=//Not a survey Coordinates are approximate||description=plm2||label=on||line=on||39.353455,-76.795788^1||39.353334,-76.795159^2||39.353028,-76.795026^3||39.352357,-76.794969^4||39.352314,-76.79529^5||39.351716,-76.796352^6||39.353455,-76.795788^1>

The following page shows two screenshots taken from an iPhone 4s after opening the above map. One screen shot shows the entire parcel and the other screen shot is zoomed in as much as possible.



3. Cell phone/tablet requirements

Any cell phone or tablet will work as long as it meets three requirements.

- It must have a GPS feature
- It must be able to see both the USA **and the Russian GPS satellites**
- It must be able to open Gmap4 in the browser

The Russian GPS satellites are called GLONASS. If your device can see both the USA and Russian GPS satellites then your GPS accuracy should be around 15 feet. However, if your cell phone can only see the USA GPS satellites then **at best** your accuracy will be around 50 feet. If your cell phone cannot get data from the Russian GPS satellites then I recommend you upgrade to a phone that does include this feature.

The iPhone 4s and later can get data from both types of satellites.

For other mobile devices you should check the specifications for GLONASS support.

And to find out if your cell phone can open Gmap4 links (very few phones cannot) you could try the sample online map link shown above.

4. How to get the best GPS accuracy from your cell phone/tablet

If you just grab your cell phone and start playing with its GPS, yes it will display your location. However, that might not be the most accurate location that your device can display. Since your

goal is to find ‘lost’ survey markers or approximate property corners, you want your cell phone to give you the most accurate location data possible. You can do this by following two easy steps.

Tip: Charge your phone since having the GPS ‘on’ drains the battery faster than if your GPS is ‘off’.

Step 1: Make sure the GPS in your phone is “on”.

iOS users: To (1) make sure the GPS is “on” and (2) give your browser permission, tap Settings ==> Privacy ==> Location services. This setting needs to be “on”.

Also, scroll down on this same page and make sure the setting for your browser is “While using”.

Android users: To (1) make sure the GPS is “on” and (2) to select the most accurate location method, do the following. These instructions are for a Samsung Galaxy S7.

From any Home screen, tap Apps.

Tap Settings.

Tap Privacy and safety.

Tap Location.

If necessary, slide the Location Switch right to the ON position, then tap Agree.

Tap Locating method.

Select **GPS only!** <== **Important**

Android users can choose from three location methods or modes.

- **GPS, Wi-Fi, and mobile networks.** This location method is called “High accuracy” on many Android devices. A better name would be “Medium accuracy” since this location method allows data from cell towers to degrade the more accurate data from the GPS satellites.
- **Wi-Fi and mobile networks.** This location method is called “Power saving” on many Android devices. This setting ignores the GPS in the phone and therefore will provide the worst location accuracy.
- **GPS only.** This location method only uses the GPS in the phone to determine your location and therefore will give the most accurate location.

Step 2: Tip: If the GPS in your phone is ‘on’ all the time then you can **skip this step** since your phone will always have a current almanac for the Russian GPS satellites.

Place your phone outside somewhere with a reasonably good view of the sky and leave it there for 20 minutes. The purpose of this step is to make sure that your phone has a current almanac for the Russian GPS satellites.

A GPS almanac is data that forecasts where the satellites will be in the sky for the next few days. Your cell phone likely downloads the almanac for the USA GPS satellites very quickly from the

cell towers even if you do not have a data plan. This is called A-GPS. The “A” stands for “assisted.

But the almanac for the Russian GPS satellites needs to be downloaded from the Russian satellites. Since the transmission rate is slow you should allow 20 minutes. If you typically leave the GPS ‘off’ in your phone (to conserve the battery) then you should take the time to download a new Russian GPS almanac if you have not done so in the last week.

Step 3: Use an online tool to pick a good time of day for GPS work. If you do your GPS work when the satellites are in a favorable position in the sky, then you will get better accuracy.

Several free online tools are available that can predict bad times and good times (i.e. a good satellite constellation) for you to use your GPS. For example, below is a link to a tool produced by Trimble. Since this tool requires Microsoft’s Silverlight plugin, I use Internet Explorer to open this tool.

Online tool that predicts good and bad times to use a GPS:
<http://www.trimble.com/GNSSPlanningOnline/#!/Settings>

Here are some tips for using this tool.

Open the online map link you obtained from us, put the cursor on your property and right click. Copy the latitude and longitude.

When Trimble’s tool opens, the settings screen is displayed. Paste in the latitude and longitude for your land. Pick a day. A interval starting at 8 AM and a time span of 12 hours are good choices. Finally, be sure to set the correct time zone. When you are done making these settings, click “Apply”.

Now go to the “Satellite Library” screen. Check the GPS box and the GLONASS box. Make sure the other boxes are not checked.

Now click the DOPs button and a graph will be displayed. The dark brown line is an estimate of the amount of horizontal position error a GPS will have as a result of the satellite constellation shape at different times of the day.

5. Try your cell phone GPS accuracy with Gmap4

Gmap4 is the browser app I developed that is used to display your property line map. Anyone can try out Gmap4’s ability to use the GPS in their cell phone or tablet.

For the best GPS accuracy, see the prior section.

Tip: Close all the open apps on your phone. Each time you open an app it stays open and consumes resources on your phone. On an iPhone press the home button twice and then swipe

each app thumbnail up to close the app. Then press the home button again. **If Gmap4 does not start on your phone or does not seem to run correctly, then close all your apps and try again.**

Open this link with your cell phone or other mobile device:

<https://mappingsupport.com/p/gmap4.php?mylocation=on&t=h&z=19&tilt=off>

The basemap is the Google aerial and **the circle and crosshair symbol shows your location.**

Touch the map scale in the lower right to change it from meters to feet.

Now walk to a feature that you can see both on the ground and on the Google aerial. Notice how the location symbol on the screen **follows you as you move.**

Tip: If you stop moving then your location symbol might stop as well. Try moving your phone back and forth just with your arm. You may see the location symbol shift to more accurately show your position.

Tip: Touch the location symbol and your approximate coordinates will be displayed. To change the coordinate format do Menu ==> “UTM - USNG - LatLng” and pick the coordinate format you prefer.

Our clients do the same thing except when they look at their cell phone screen they also see the approximate property lines we produced together with the symbol showing their location.

6. Is there cell service on your land?

If (1) there is cell service on your land and (2) your cell phone has a current almanac for the Russian GPS satellites and (3) the satellites are in a favorable position (see the section above on GPS accuracy), then you are ready to open the online map link we produced for you with your cell phone.

Then do Menu ==> “My location” and grant permission to use the GPS. Now simply walk so that the location symbol comes to rest over one of your property corner symbols.

As you get close to a corner you might want to zoom in more. For the best quality aerials select Hybrid (with labels) or Satellite (no labels).

For the best quality topographic maps select “t4 Topo High”. Note that you cannot zoom in as much on the topo maps as you can on the aerials.

If your land was surveyed and the corners marked with 18” long metal rods pounded into the ground, then you may need a metal detector (they can be rented). The tops of these rods often get covered with a bit of dirt, leaves, branches, etc. A small shovel or sturdy garden trowel is often useful. You may also want to carry flagging tape or spray paint to mark what you find. Once upon a time I found a beer bottle slipped over the top of a survey stake.

Tip: Touch any corner on your property line map and the approximate coordinates for that corner will be displayed.

7. No cell service on your land? No worries!

Yes, the property line map links we produce will work on your cell phone on land where there is not any cell service. **To make this happen, you need to do a bit of advance work while you are online.**

You need to start Gmap4 while your cell phone or tablet is online. Gmap4 will continue to work after your device goes offline but your device must be online in order for Gmap4 to start. This is because Gmap4 needs to download some code from Google’s servers each time it starts.

Close all the open apps that are not essential. If you do not know how, do a Google search.

While you are still online, zoom in on your property and drag the map all around your land. Each basemap (aerial, topo, etc) is just a bunch of jpg or png files. **As you drag the map around your land (while you are online), a copy of those jpg/png files is saved in the browser’s cache.** Then when you are offline and walking around your land, Gmap4 will display the map that you have saved in the browser’s cache.

Here are the points to keep in mind:

- Your approximate property lines will display on your phone’s screen even if you have not saved the basemap in the browser’s cache. The screen will show a white background instead of a basemap. Your GPS will also work fine.
- **While offline you will only be able to see the basemaps that you saved in the browser’s cache.** If you want to see both Google’s aerials and the topographic maps, then you need to pan over your property for each of those basemaps **before** you go offline. If you want to see aerials at two different zoom levels when you are on your land, then **before** you go offline you need to pan over your property for each of those zoom levels.
- Do not turn your phone off or close the browser tab with Gmap4. If you do, then (1) you will have to wait until you are online before you can start Gmap4 again and (2) you will lose the maps you saved in the browser’s cache.

- Try to avoid doing any web browsing until you are done working on your property. Web browsing **might** start to overwrite the maps that you saved in the browser's cache. Or use two different browsers. For example, open your property line map with Safari and do your web browsing with mobile Chrome.

Tip: When using Gmap4 on a mobile device the zoom level is always displayed at the upper right corner.

Tip: Here is a tip that **might** double the amount of maps that can be stored in the browser's cache. This tip will work if each browser tab has its own dedicated amount of cache space. Simply open your property line map link in **two browser tabs**. Perhaps you use the first browser tab to cache the high resolution topographic map ("t4 Topo High") and you use the second browser tab to cache Google aerials. However, this tip will **not** work if all open browser tabs share a common amount of cache space.

Q: What happens if I am on my property and zoom to a level where I did not save any basemap?

A: The screen will still show your approximate property lines. Your location symbol will still use your phone's GPS and follow you around. The only difference is that the screen will show a white background instead of a basemap.

8. Compass

Most cell phones come with a compass app. It is a good idea to find that app on your phone and learn how to use it.