


**International Union of  
Operating Engineers  
Local 49  
Trimble Siteworks  
Field Reference Guide  
2020**

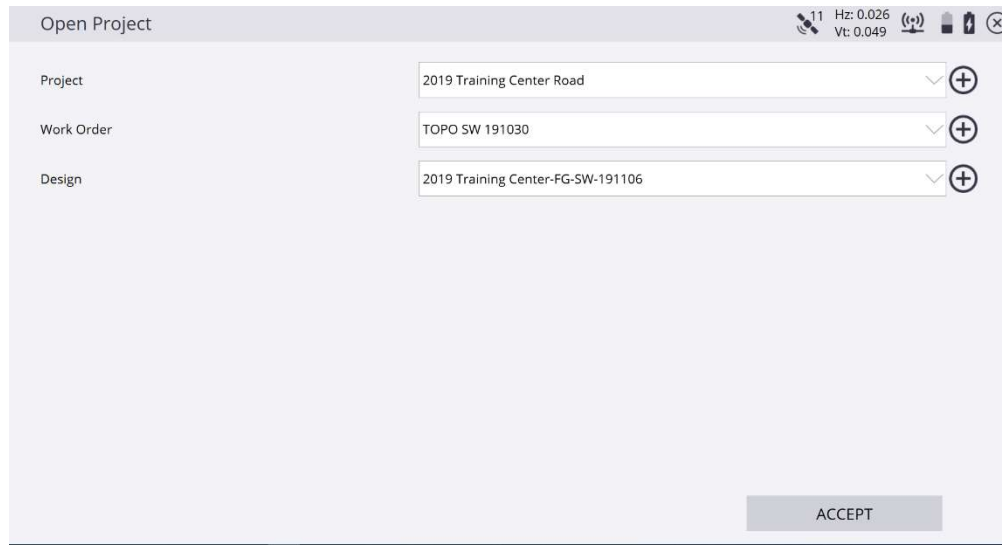
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- 2) Creating a New Project for the VRS Network
- 3) Connecting a Rover to Programmed Base Station
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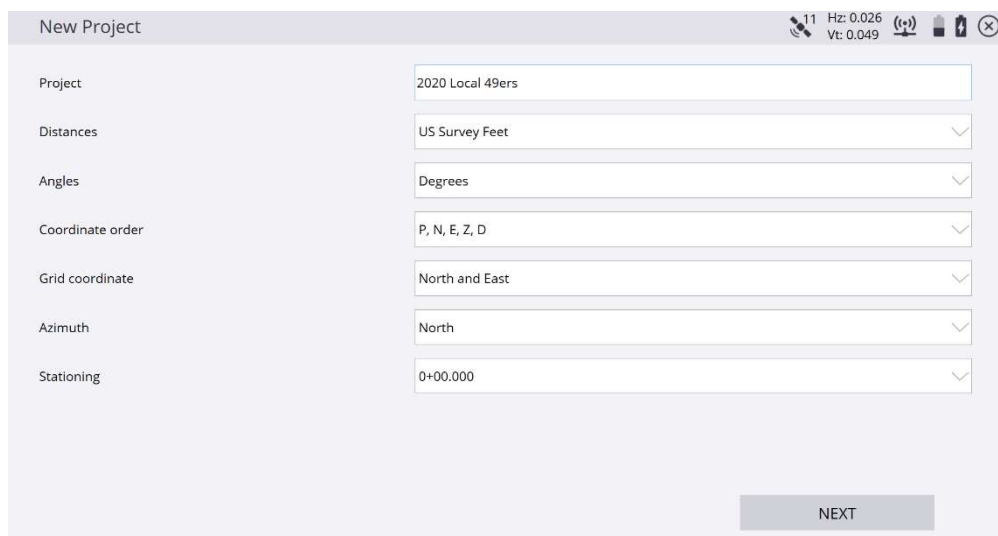
# Trimble Siteworks

## Creating a New Project for Base Station

1. Double-Tap Siteworks to Open the Program
2. From the “Open Project” screen, tap the  on the right side of the Project



3. This screen pops-up. Name the project according to your company standards and confirm all other settings match. Then tap NEXT.

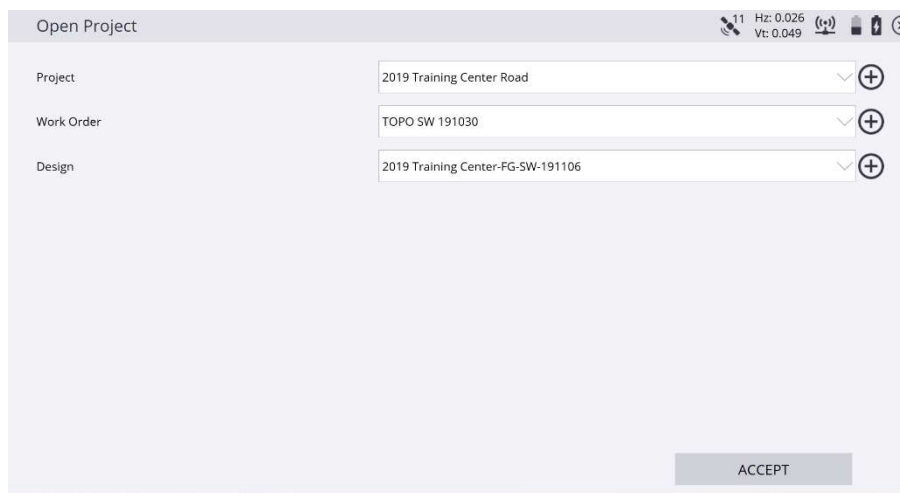


4. On the next screen that pops up, this is where you can load a Project Map, Calibration File, Control Point File and FXL File on your data collector; check those boxes and browse to those locations. Leave the other boxes unchecked and tap FINISH.
5. It will then bring you back to the “Open Project” screen. You need to create a new work order. Tap the ⊕ on the far right side of “Work Order” and name it accordingly. I usually name it Site Cal. Tap FINISH.
6. It will bring you back to the Open Project screen again. If you have a design, you would now select it. If you do not need a design, tap ACCEPT.
7. The software now brings you to the Receiver Setup screen, please refer to the “Connecting a Rover with Base Station” sheet.

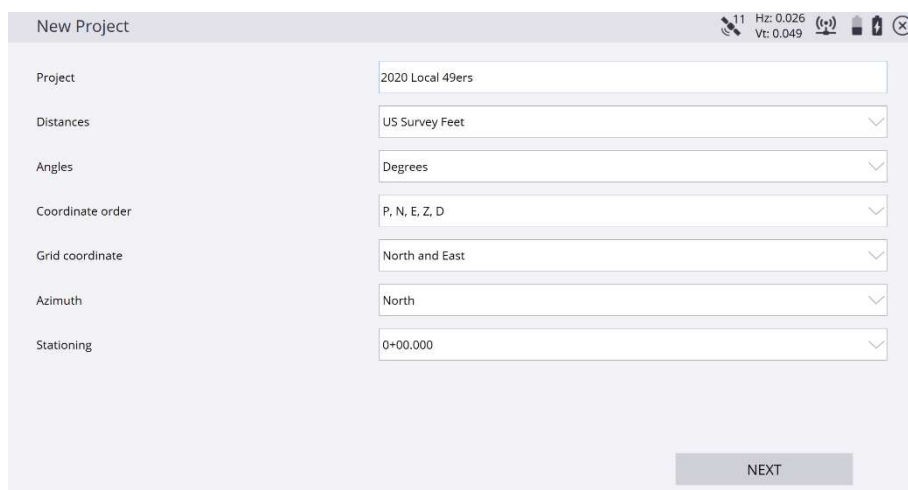
# Trimble Siteworks

## Creating a New Project for VRS

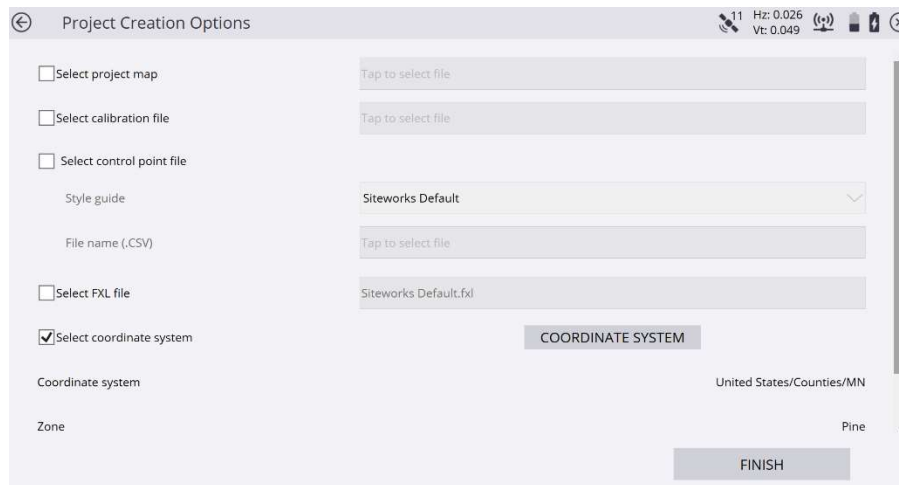
1. Before opening Siteworks, connect your device to the Internet. You will also need to know what county your project is in before getting started.
2. Double-Tap Siteworks to open the program
3. From the “Open Project” screen, tap the **+** on the right side of the project



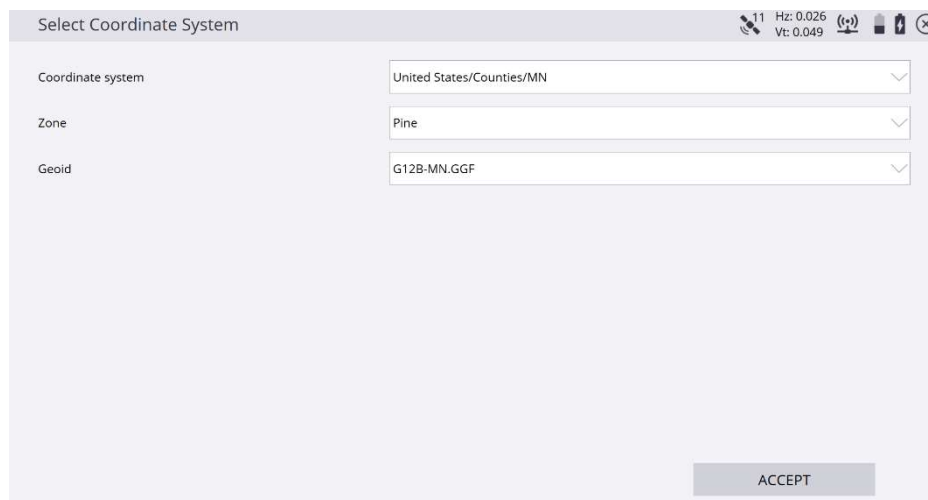
4. This screen pops-up. Name the Project according to your company standards and confirm all other settings match. Then tap NEXT.



5. This screen pops up. If you have a Project Map, Calibration File, Control Point File and FXL File on your Data Collector, check those boxes and browse to those locations. Make sure “Select Coordinate System” is checked and then Tap “Coordinate System.”



6. This screen pops up



Coordinate System – United States/Counties/MN

Zone – The county your project is located

Geoid – G12B-MN.GGF


Tap ACCEPT

Tap Finish

7. It will then bring you back to the “Open Project” screen. You need to create a new work order. Tap the ⊕ on the far right side of work order and name it accordingly. I usually name it Site Cal. Tap FINISH
8. It brings you back to the Open Project screen again. If you have a design, you would now select it. If you do not need a design, Tap ACCEPT.
9. The software now brings you to the Receiver Setup screen, please refer to the “Connecting a Rover with VRS” sheet.

# Trimble Siteworks


## Connecting a Rover with Base Station

1. Before you begin, you will need to have selected a Project, Work Order and Design (if needed). You will also need to know what channel the Base Station is sending out corrections.
2. From the main GPS screen, Tap  - Project Setup – Connect Device, you will choose the following options:
  - Mode – Rover
  - Connection Type – Bluetooth
  - Bluetooth Device – Your Rover last 4 digits of Serial Number
  - Corrections Method – Radio in Receiver
  - Network ID – This is specific to what the Base Station was set to
  - Connected to Base – This is the specific name of the base (populates automatically when connected to the correct channel)
  - Quick Release – Yes (look up to confirm you have one)
  - Enable Tilt Compensator – (SPS986 and newer only)
  - Antenna Height – 6.562 usft (2 meters converted)
  - Confirm settings and then tap ACCEPT
  - If your project is calibrated, it does not hurt to recheck system by shooting a control point.




## Trimble Siteworks

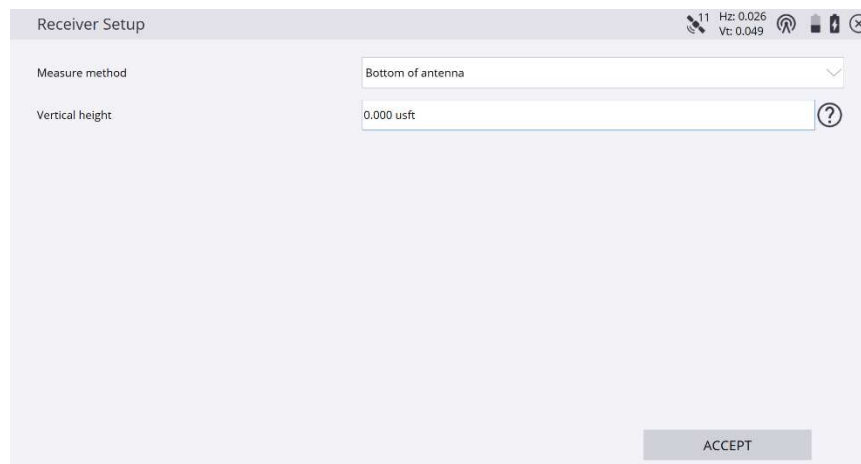
### Connecting a Rover with VRS

1. Before you begin, you will need to have selected a Project, Work Order and Design (if needed). You will also need to have a VRS username and password.
2. From the main GPS screen, Tap  - Project Setup – Connect Device, you will choose the following options:
  - Mode – Rover
  - Connection Type – Bluetooth
  - Bluetooth Device – (last 4 digit of Rover Serial Number)
  - Corrections Method – Internet
    - Server Address – mncors.dot.state.mn.us
    - Port Number – 9000
    - Username – (specific for each Tablet)
    - Server Password – (specific for each Tablet)
    - Tap ACCEPT
      1. Data Stream – CMRx Nad83 (2011)
      2. Tap ACCEPT
  - Quick Release – Yes (look up to confirm you have one)
  - Enable Tilt Compensator – (SPS986 and newer models)
  - Antenna Height – 6.562 (2 meters converted)
  - Confirm settings and then tap ACCEPT
  - If you need to perform a Site Calibration, please refer to the “VRS Site Calibration” workflow sheet.
    - If your Project is Calibrated, it does not hurt to recheck system by shooting a control point.

# Trimble Siteworks

## Base Station Site Calibration

1. Before starting this procedure, you need to be:
  - a. In the Current Project (refer to “Creating a New Site for Base Station”)
  - b. Base Post should be set in ground with Base Station mounted, wires connected and powered on
  - c. Have your control point file loaded or entered in the tablet
  
2. From the main GPS screen, Tap  - Project Setup – Connect Device
  - a. Select GNSS
  - b. One the Receiver Setup, choose the following options:
    - Mode – Base
    - Connection Type – Bluetooth
    - Bluetooth Device – “Last 4 digits of Base Serial Number (look on back side of Base radio)
    - Correction Method – Radio in Receiver
    - Network ID – (Your company would have a standard channel to use. Make sure you write down what channel you used, it is needed for machines and Rovers)
    - Base Position – Unknown Position
    - Base Name – “Company Name” Base
    - Antenna – (Look on the bottom of the Disc, it tells you specifically what type it is). This screen then pops up:



- Corrections – CMRx = Newer Machines  
CMR+ = Older Machines
- Tap ACCEPT


3. From the Main GPS Screen, Tap  - Project Setup – Connect Device

a. Tap GNSS

b. Choose the Following options:

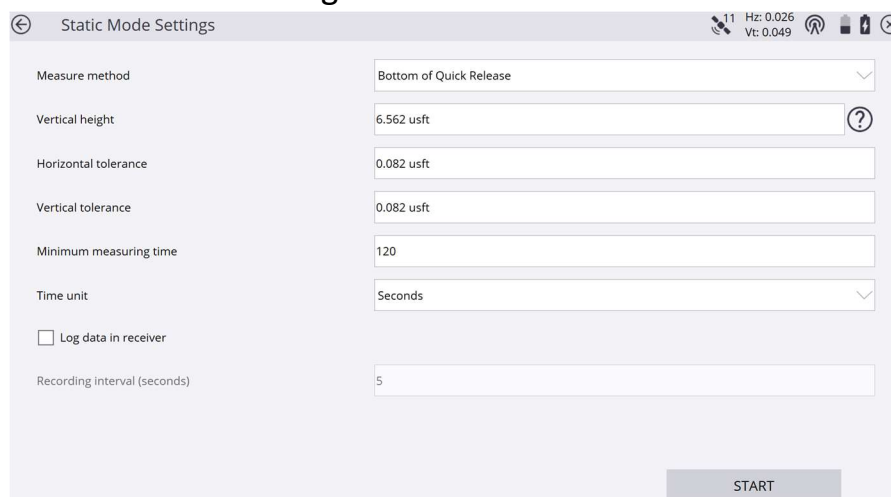
- Mode – Rover
- Connection Type – Bluetooth
- Bluetooth Device – (last 4 digits of Rover serial number)
- Correction Method – Radio in Receiver
- Network ID – (what you just programmed the Base to)
- Connected to Base – (confirm it matches what you named it)
- Using Quick Release – Yes (look up to confirm)
- Enable Tilt Receiver – (for SPS986 and newer models only)
- Antenna Height – 6.562 usft (2 meters)
- Tap ACCEPT

4. In the upper left-hand corner tap  - Project Setup – Project Calibration

a. Tap the 

b. You can either type the point name at the top or tap the control point on the map you want to start with. After entering or tapping a control point, tap SELECT

c. Confirm these Settings



Static Mode Settings



Measure method	Bottom of Quick Release
Vertical height	6.562 usft
Horizontal tolerance	0.082 usft
Vertical tolerance	0.082 usft
Minimum measuring time	120
Time unit	Seconds
<input type="checkbox"/> Log data in receiver	
Recording interval (seconds)	5

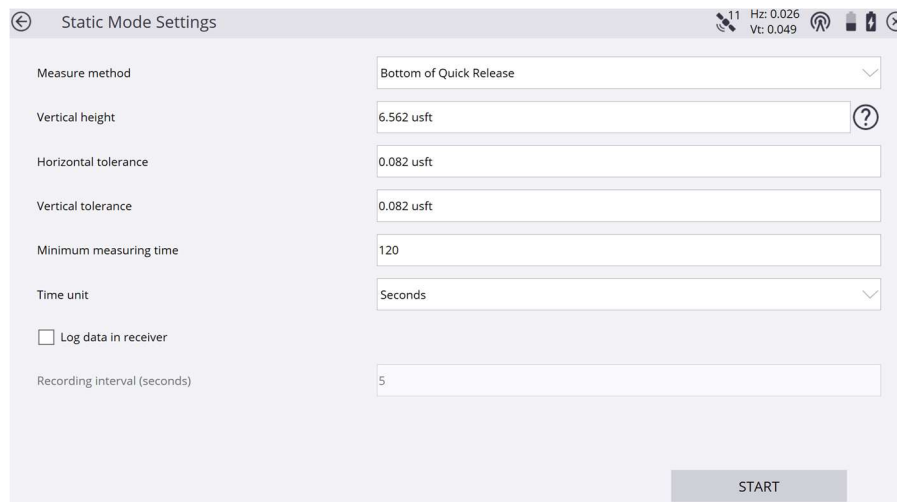
START

- d. After confirming these Settings, make sure the tip of the rod is centered on the control point, the rod is level and braced with the bipod legs. Tap START
  - If this Project is small and only has 1 control point, tap FINISH, tap YES and tap YES to complete.
- e. Continue Calibrating all control points. Note: for larger sites, 3 or more control points are necessary. The most common number of control points to occupy for a Site Calibration is 4.
- f. Once finished occupying all control points, confirm that the points you shot are all within tolerance on the screen. After confirming this, Tap FINISH.
- g. Your project is now calibrated. You can now upload the project to Connected Community, email, or copy onto a jump drive.

# Trimble Siteworks

## VRS Site Calibration

1. Before starting this procedure, you need to be:
  - a. In the current project (refer to “Creating a New Site for VRS”)
  - b. Rover setup and connected to the VRS Network (refer to “Connecting a Rover with VRS”).
  - c. Have your control point file loaded or entered in the tablet.
2. In the upper left-hand corner tap  - Project Setup – Project Calibration
  - a. Tap the 
  - b. You can either type the point name at the top or tap the control point on the Map you want to start with.
  - c. After entering or tapping a control point, tap SELECT
  - d. Confirm these Settings



Static Mode Settings

11 Hz: 0.026  
Vt: 0.049

Measure method	Bottom of Quick Release
Vertical height	6.562 usft
Horizontal tolerance	0.082 usft
Vertical tolerance	0.082 usft
Minimum measuring time	120
Time unit	Seconds
<input type="checkbox"/> Log data in receiver	
Recording interval (seconds)	5



START

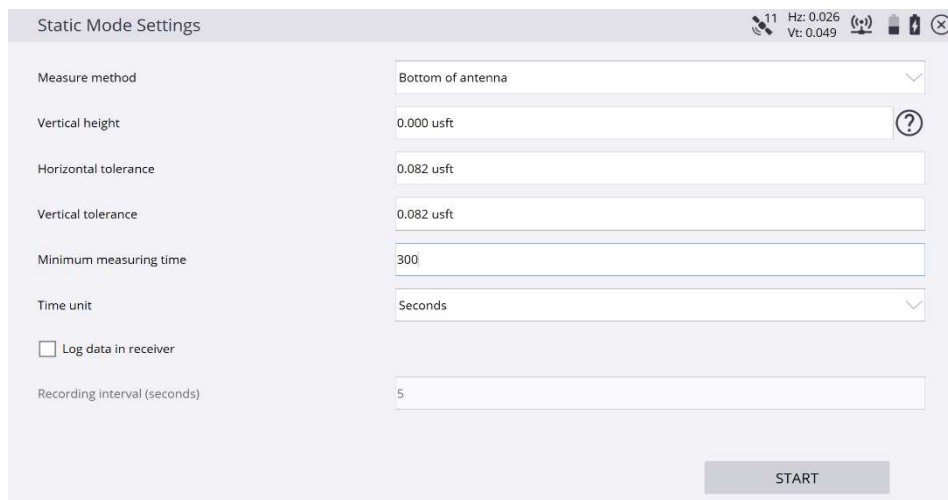
- e. After confirming these settings, make sure the tip of the rod is centered on the point, the rod is level and braced with the Bi-Pod legs. Tap START.
  - If this Project is small and only has 1 control point, tap FINISH, Tap YES and Tap YES to complete.

- f. Continue calibrating all control points (note: for larger sites, 3 or more control points are necessary. The most common number of control points to occupy for a site calibration is 4).
- g. Once finished occupying all control points, confirm that the points you shot are all within tolerance on the screen. After confirming this, tap FINISH.
- h. Your Project is now calibrated. You can now upload the Project to Connected Community, email or copy onto a jump drive.

# Trimble Siteworks

## Burning a Base Control Point with VRS

1. You must be in the current site, be connected to the Rover and have a base post in the ground.
2. Take the Rover off the rod with quick release. Then, unscrew the quick release from the Rover head. Once removed, screw the Rover onto the base post.
3. From Siteworks main screen, tap  -- Measure – Measure Control Point.
  - In the bottom right hand corner of the screen, tap 
  - Enter a numeric value for the point name (Ex 115)
  - Enter a description for the point code (Ex CP)
  - Then tap “Accept,” and the screen below will pop up next
  - Confirm the settings
  - Make sure the rod is centered on the point and leveled with Bi-Pods, Tap “START” to begin.




Static Mode Settings

11 Hz: 0.026 Vt: 0.049


Measure method	Bottom of antenna
Vertical height	0.000 usft
Horizontal tolerance	0.082 usft
Vertical tolerance	0.082 usft
Minimum measuring time	300
Time unit	Seconds
<input type="checkbox"/> Log data in receiver	
Recording interval (seconds)	5

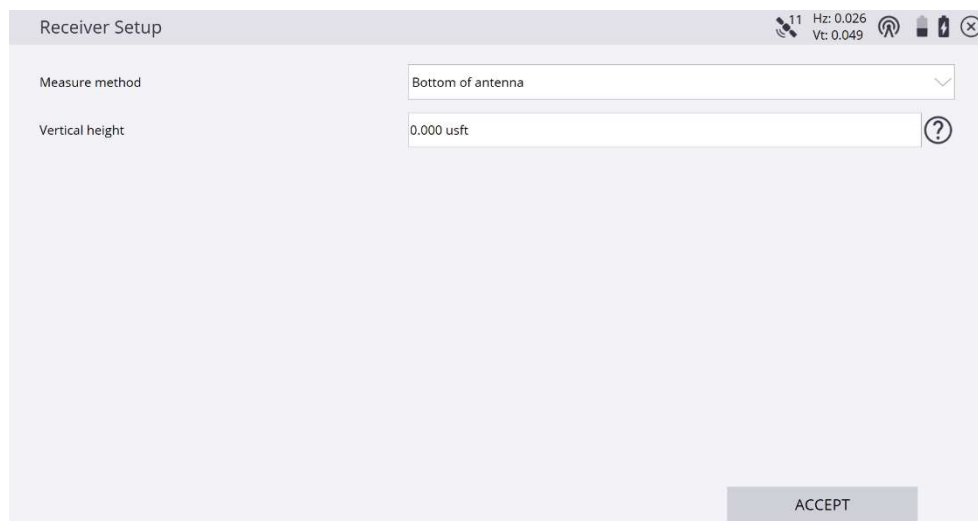
START

4. Tap  - Measure to end measuring control points
5. The point is now stored, and you can now set the Base Station equipment onto the post (See “Programming a Base Station to Control Point”)

# Trimble Siteworks

## Programming Base Station to Control Point on Base Post

1. Before starting this procedure, the base post must be in the ground and a control point stored for its location. You will also want to know the control point number that was assigned to that base post.
2. Set the Base Station up on the post and turn on, open up Siteworks, be in the correct project and within Bluetooth range of the Base Station
3. In the upper left-hand corner, tap  - Project Setup – Connect Device
  - If a pop up appears, select GNSS
  - Mode – Base
  - Connection Type – Bluetooth
  - Bluetooth Device – last 4 digits of Base Serial Number
  - Network ID – set this to your company specific ID. (If company name starts with A = 1, B = 2, C = 3....)
  - Base Position – Control Point
  - Base Name – the Control Point of the Base Post
  - Antenna – look under the Antenna, near where it threads, and it will tell you what Antenna it is.
    - Confirm these settings






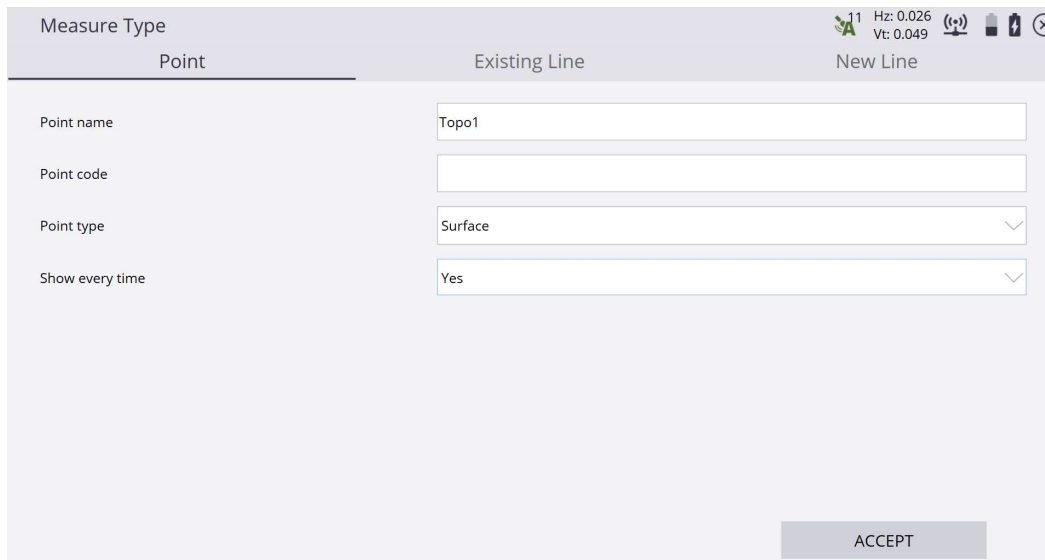


- Corrections – CMRx for newer machines
  - CMR+ for older generation GPS machines
- Tap ACCEPT
- You may want to check the radio channel on your machine so that they match what you set the Base Station to output.

# Trimble Siteworks

## Stockpile Topo & Field Volumes




1. You must be in the current project and be connected to a Rover through either VRS or a Base Station
2. From the main GPS screen, tap  - Project Setup – Change Project
  - a. On the far-right side of Work Order, tap 
  - b. Name the Work Order – “Project Name, Stockpile, Date”  
(example – 49ers Stockpile 200629)
  - c. Tap FINISH
  - d. You can select a design if you like or tap ACCEPT.
3. From the main GPS screen, tap  and this screen pops up.

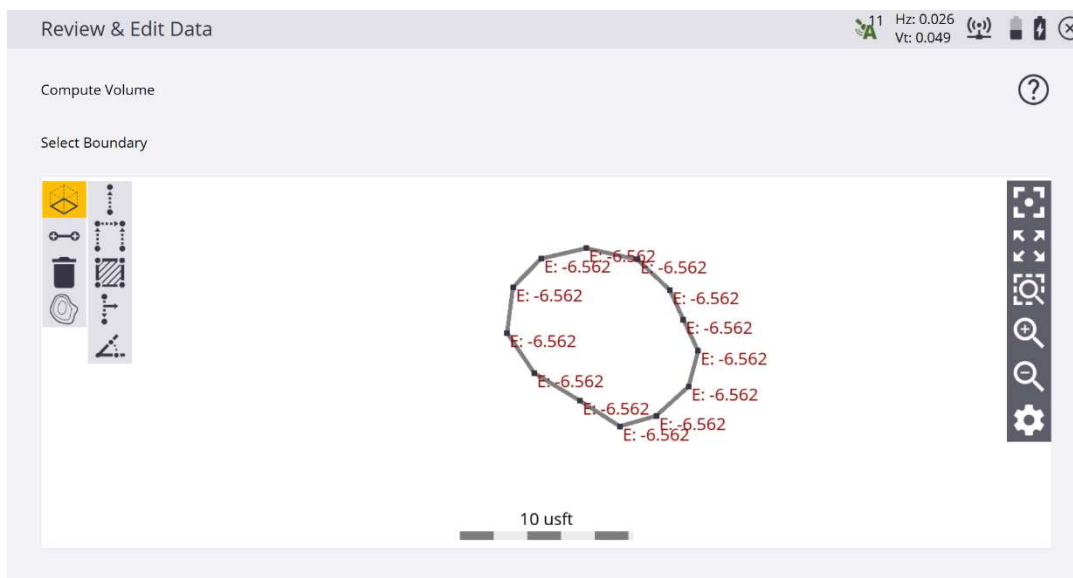


Measure Type	Point	Existing Line	New Line
Point name		Topo1	
Point code			
Point type		Surface	
Show every time		Yes	

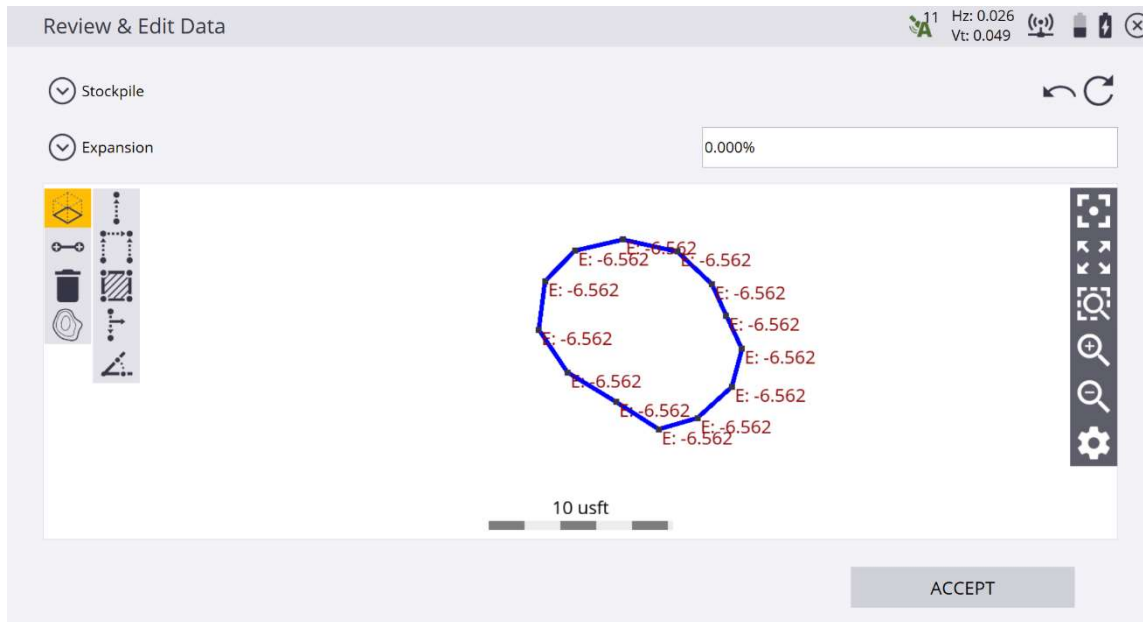
ACCEPT

4. Tap New Line
  - a. Line Name – Name it what you like or can accept the default Line 1
  - b. Line Type – Choose Volume Boundary
  - c. Tap ACCEPT

5. You want to start the topo at the toe of the stockpile. Every time you store a shot, the software draws a line from point to point. When the toe of the pile curves, take shots every 10' maximum. Tap  in the bottom right hand corner of the screen to store points.
6. Continue shooting around the base of the pile until you are near where you started toping. Tap , then tap "Point."
  - a. Point Name – 1000 (or the next available point number)
  - b. Point code – Stockpile
  - c. Point type – Surface
  - d. Show every time – No (only choose this option when you do are shooting points that will have the same point code)
  - e. Tap ACCEPT
7. Notice on your screen, that the line at the toe of the pile is now closed. You can now start the topo of the stockpile. You need to take shots that will represent what the pile looks like for the computer to give you accurate volumes.
8. When finished toping the pile, tap  - COGO – Review & Edit Data. This screen pops up:



Tap on the line you created for the toe of the pile. This screen pops up:



At the top where it says stockpile, you could now change options:

- Stockpile
  - Gives you the volume of dirt for the pile you shot.
- Measured to Entered Elevation
  - This option would be if you had a pile of dirt stored on a flat plane, the software would tell you how much dirt that is above or below entered elevation.
- Measured to Design
  - This option would be if you had a pile of dirt stored on your parking lot design. It would tell you how much dirt that is above or below that design.

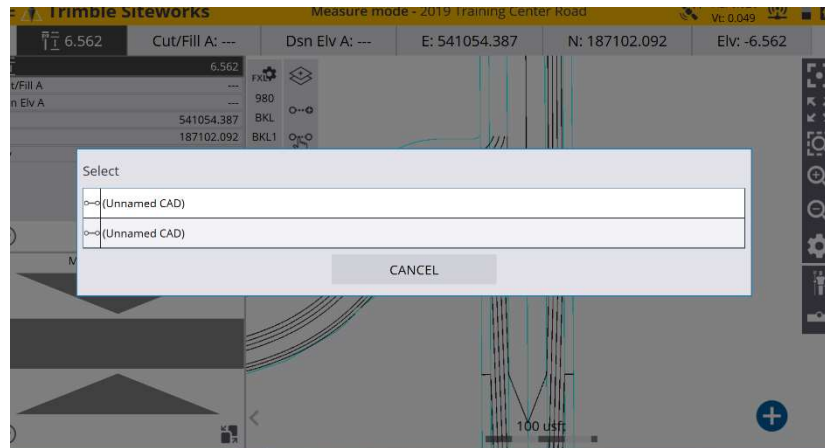
The next option below that is “expansion” or “expansion factor.” This normally is not applied for Stockpile volumes. But it could be useful for other scenarios. You can enter the number that you or your Foreperson tells you.

Tap ACCEPT. The software will then output Cut & Fill volumes. Take a picture of it so you can either text or email the quantities out.

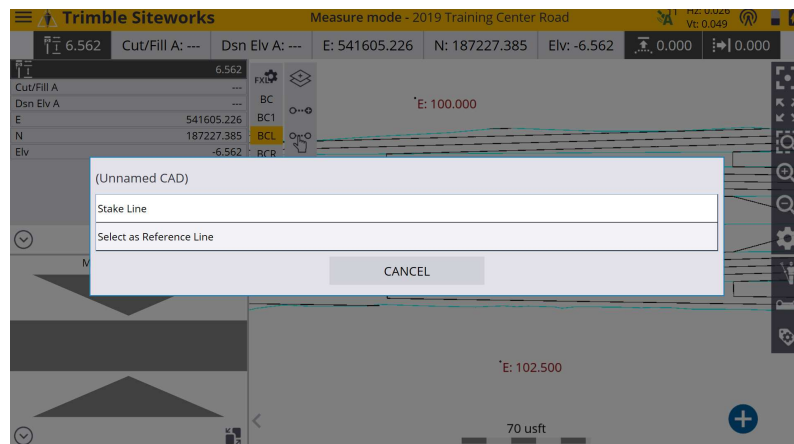
# Trimble Siteworks

## Staking a Line

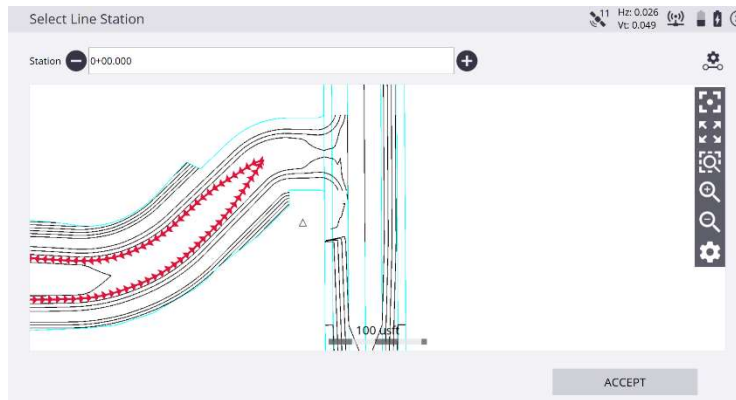
1. Before starting this procedure, you need to be:
  - a. In the Current Project
  - b. Rover set up and connected to a base or VRS Network
2. Zoom in and find the line you want to stake. Press and hold that line. Release when a pop up appears. If this pops up first, it means there are multiple lines on top or near each other. The program is prompting you to choose which one. Tap one to continue.



3. This will pop up next, tap "Stake Line."



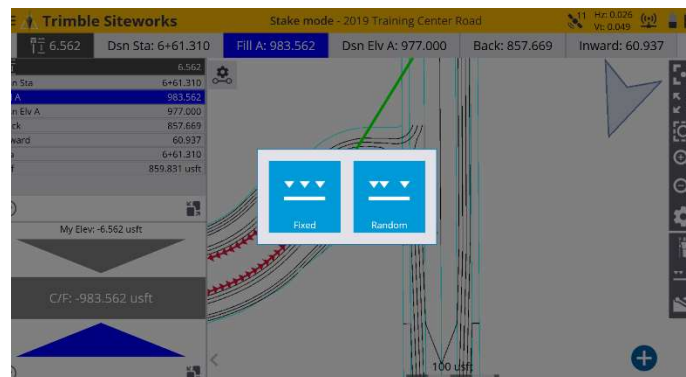
4. This screen will then pop up. If you wanted to enter a specific station range for a centerline alignment, you can do so at the top or tap ACCEPT.



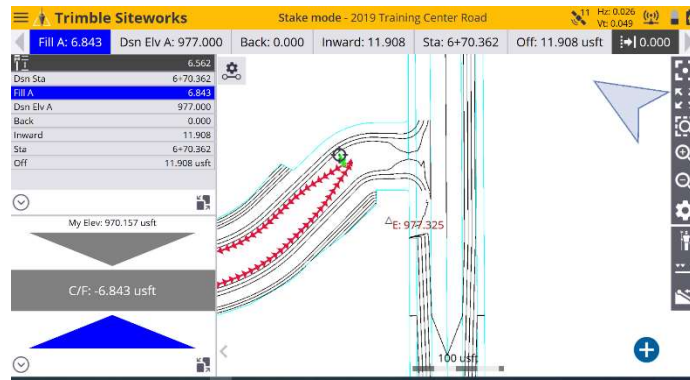
5. The first thing you may want to do, is tap this button




6. This screen then pops up, Tap Random




7. This changes from staking the beginning of the line to staking the lone perpendicular and showing you stake station and offset of the line as shown below. If the line you are staking has elevation (contours, back of curb, etc.) it will also give you Cut/Fill information as shown below.



8. If your Data Collector doesn't show these options near the top of the screen, first try tapping the arrow near the upper right-hand corner of the screen. If Station (Sta) and Offset (Off) still do not show up, tap  -- Settings – Info Bar/Panel. Make sure Station, Offset, Stakeout Line offset H and Surface Offset are checked, tap ACCEPT to continue.

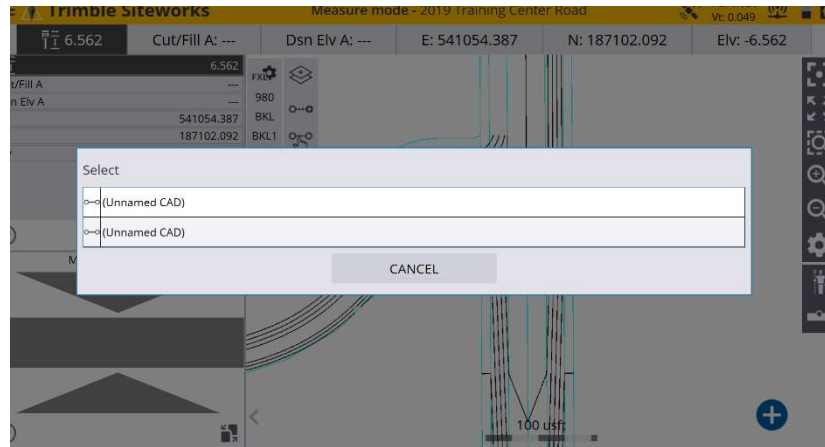


9. To exit out of staking the line, tap  and then tap "Measure."

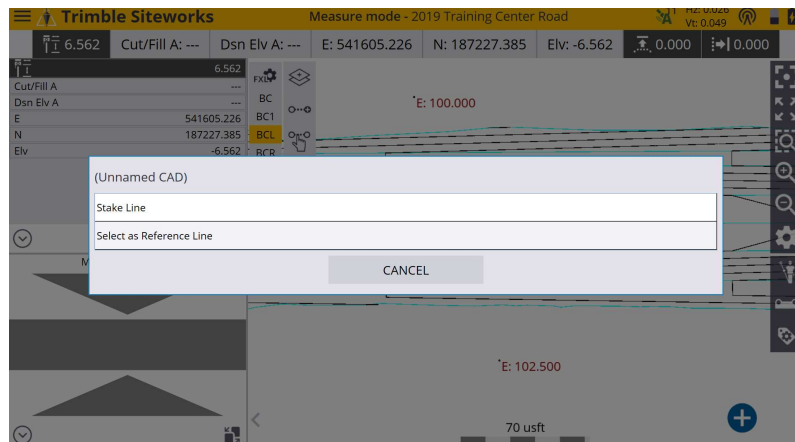
# Trimble Siteworks

## Staking a Line with Horizontal Offset

1. Before starting this procedure, you need to be:
  - a. In the Current Project
  - b. Rover set up and connected to a base or VRS Network
2. Zoom in and find the line you want to Stake. Press and hold that line. Release when a pop-up appears. If this pops up first, it means there are multiple lines on top or near each other. The program is prompting you to choose which one. Tap one to continue.

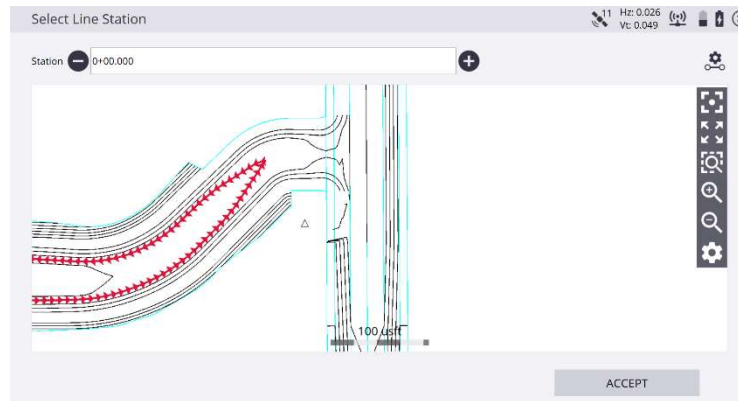


3. This will pop up next, tap Stake Line.





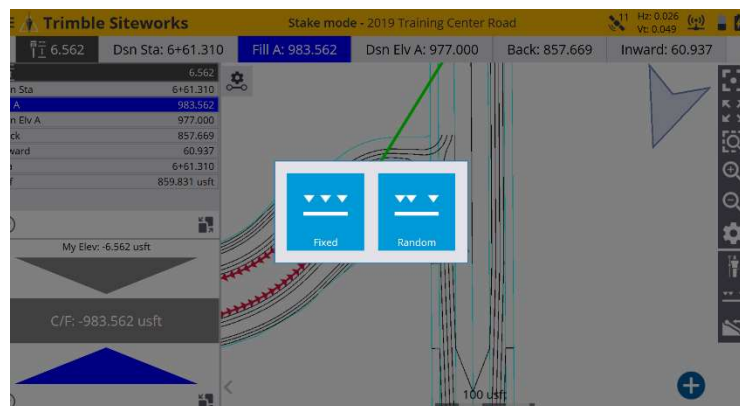
4. This screen will then pop up. If you wanted to enter a specific station range for a centerline alignment, you can do so at the top or Tap ACCEPT.



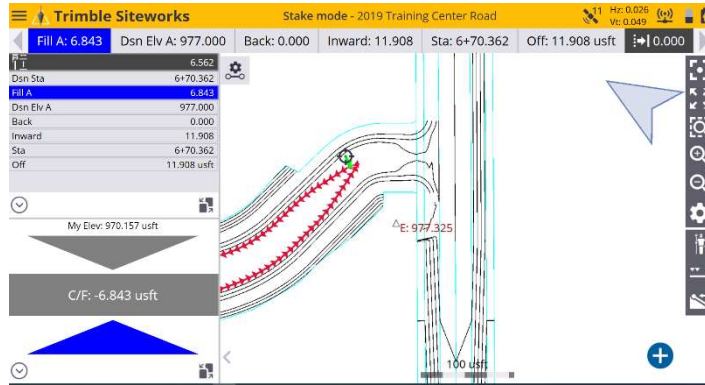
5. The first thing you may want to do is tap this button:




6. This screen then pops up, tap "Random."



7. This changes from staking the beginning of the line to staking the lone perpendicular and shows your station and offset of the line as shown below. If the line you are staking has elevation (contours, back of curb, etc.) it will also give you Cut/Fill information as shown below.



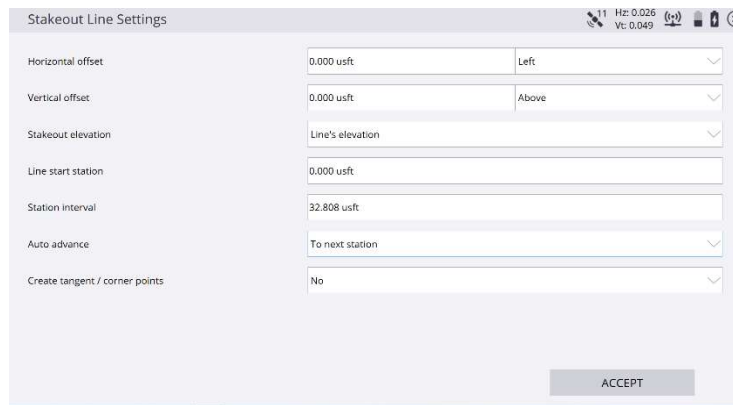
8. If your Data Collector doesn't show these options near the top of the screen, first try tapping the arrow near the upper right-hand corner of the screen. If Station (Sta) and Offset (Off) still do not show up, tap  - Settings – Info Bar/Panel. Make sure Station, Offset, Stakeout Line offset H and Surface Offset are checked, Tap ACCEPT to continue



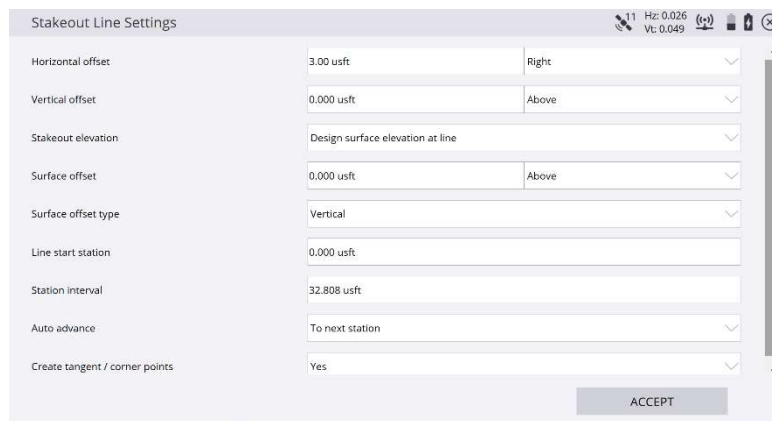
9. Now that your InfoBar is set up, tap this button.




10. This screen then pops up



11. Let's say you wanted to stake that line 3 feet right, 0.00 vertical offset but you want the design elevation of the original line. This would be typical of staking curbs. Choose the following options and tap ACCEPT




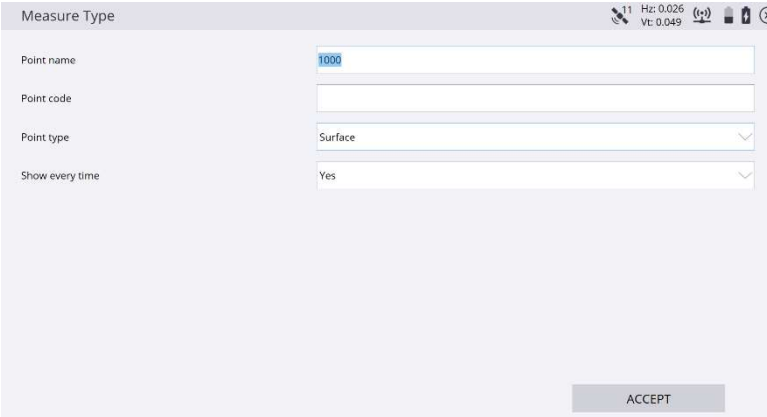
12. You will see the program draws a line three feet right of the original line, your offset is now referencing the new line. You are also staking the elevation of the original line. If your line offset the wrong direction, simply tap the button up top again, and change right to left. Left and right are based upon which way the arrows are facing of the original line you held down to stake. The arrows point to the direction they are flowing. Flowing with the arrows, left is left and right is right. Remember, left offsets are negative (-) and right offsets are positive (+) numbers.

13. Continue staking until you are finished, tap  - Measure to exit out of the staking a line.




# Trimble Siteworks

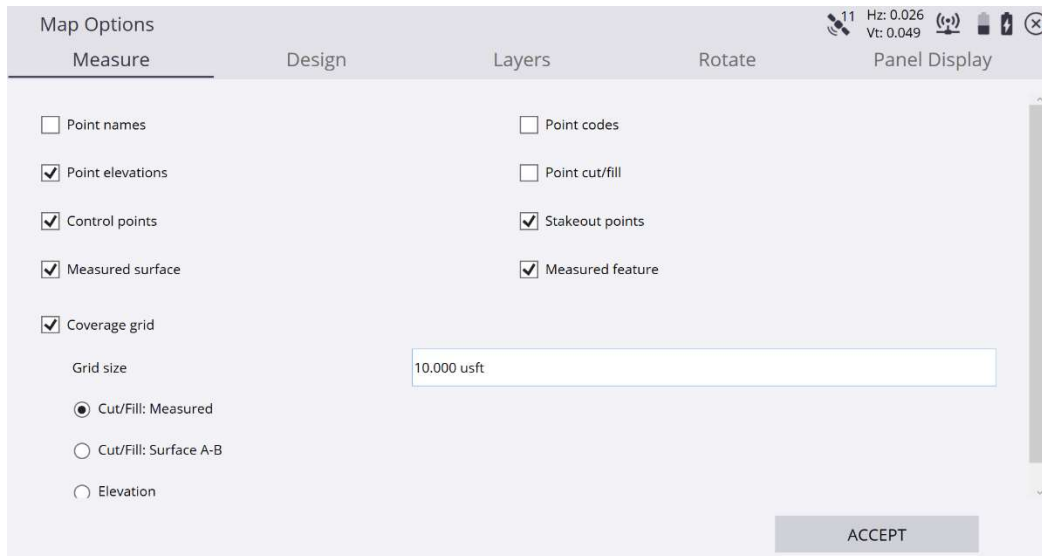
## Staking a Line Between Two Points

1. Before starting this procedure, you need to be:
  - a. In the Current Project
  - b. Rover setup and connected to a Base or VRS Network
2. First thing you will need to do is store two points from field shots. Walk to the object you wish to store a point on, level up the rod. To store a point, Tap  near the bottom right hand corner of the screen. This screen pops up

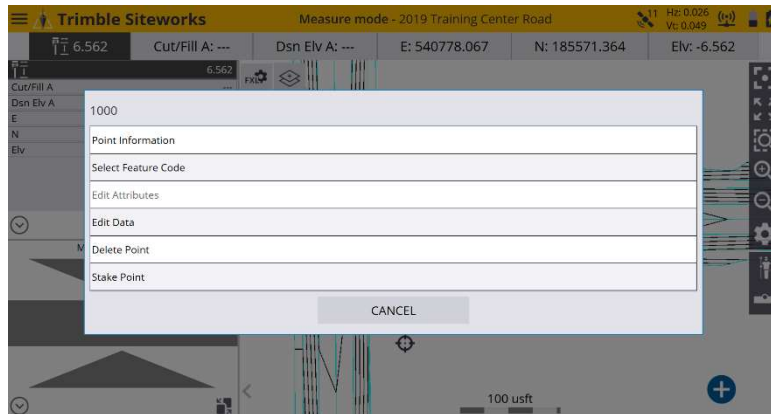


The screenshot shows the 'Measure Type' dialog box. The 'Point name' field is filled with '1000'. The 'Point code' field is empty. The 'Point type' dropdown menu is set to 'Surface'. The 'Show every time' dropdown menu is set to 'Yes'. An 'ACCEPT' button is located at the bottom right of the dialog.

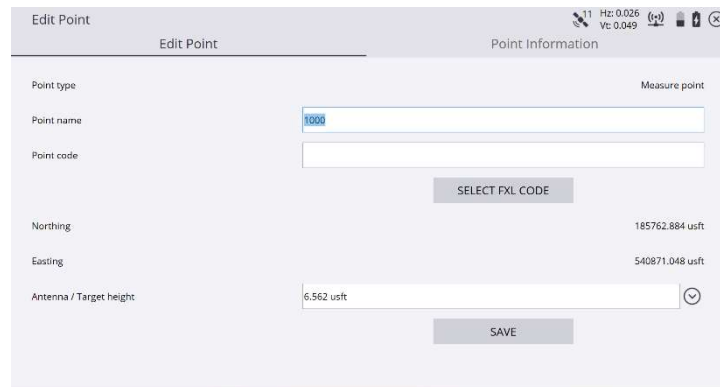
- a. Change Point Name to 1000
  - b. Type in a Point Code (this describes what you are shooting).
  - c. Point type is generally always Surface
  - d. Show every time means that every time you shoot a point, this screen will pop up. If you are topo-ing something with the same description, set this option to “No.” If you chose “No” and want to change the point description, go to  - Measure. Then tap the  in the bottom right hand corner again and you can change this setting back to “Yes.”
3. The point was stored for your current location. If you do not see the point, or you just want to see the elevation of the point, tap the  on the middle right hand side of the screen. This screen pops up




- a. On the measure tab, you can check items you wish to see for point information or uncheck them to not see them on your screen.
  - b. The Design Tab has more options you can check or uncheck if you do or do not want to see them on your screen.
  - c. The Layers Tab allows you to toggle on and off certain layers. This helps to declutter the screen and only display what you want.
  - d. The Rotate tab has different options for screen orientation. I prefer the default “Static.”
  - e. Panel Display allows you to configure the screen setting how you want.
  - f. Tap ACCEPT when finished.
4. You can also change the elevation of the point you just stored. Press and hold on the point, release when this screen pops up

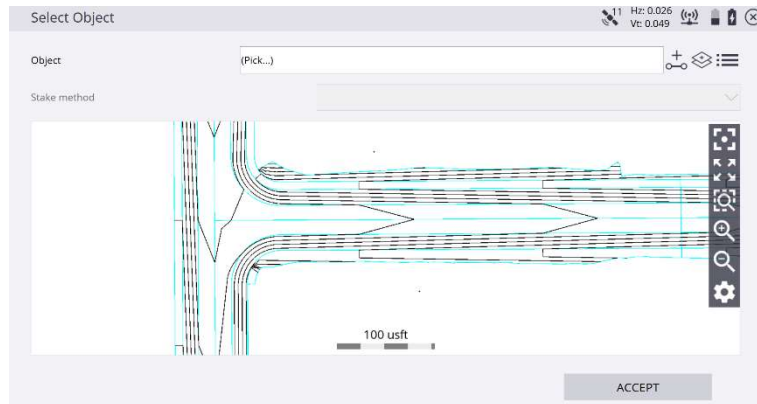



- a. To change the points elevation, tap Edit Data and this screen pops up

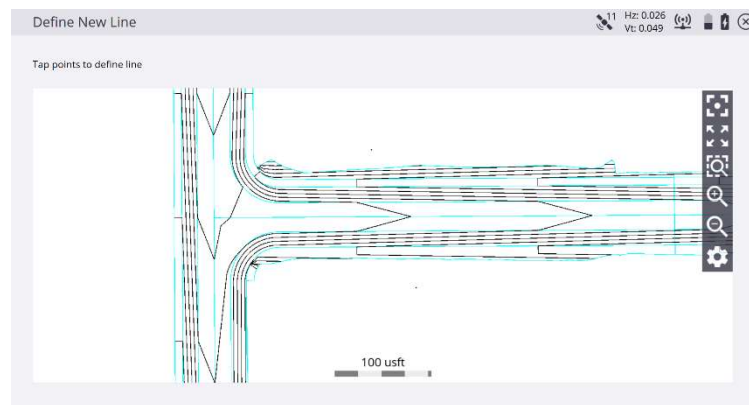


- b. Tap the down arrow on the far right-hand side of Antenna/Target height. Change it to Elevation. Now type in the box the elevation of what you want it to be set to.
  - c. Make sure to Tap SAVE before exiting or your changes will not be saved.
  - d. After saving, tap the close X in the upper right-hand corner of the screen. You will see the elevation of the point changed.
5. Now walk to where you want to store you second point and store another point.

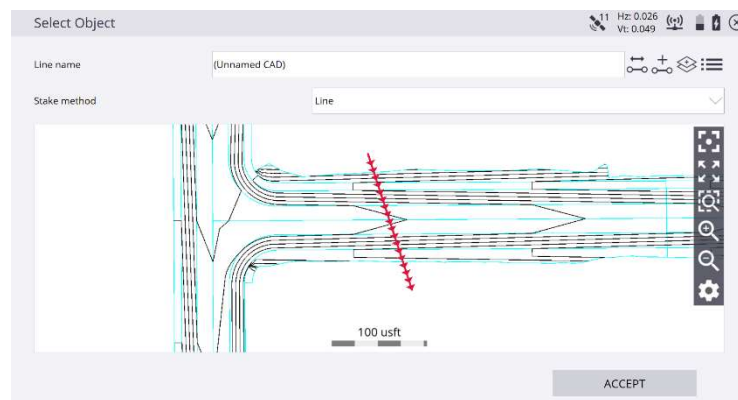
6. Tap  - Stake and this screen pops up






a. Tap this icon near the upper right corner  and this screen pops up



b. It tells you to tap points to define the line. Tap on one point and then the other. Tap ACCEPT and this screen pops up.



- c. If you wanted the arrows to flow the opposite direction than the default, tap this button . That reverses the arrow direction. Tap Accept to continue.
  - d. The next screen that pops up allows you to change the starting station if you like. Tap ACCEPT to continue
7. By default, the program wants you to stake the begin station first. To change this, tap  and then Tap Random. This will change the stake method to Station and offset. Remember, negative (-) offsets means you are left of the line and positive (+) offsets means you are right of the line.
8. To exit the command, tap  - Measure



## Trimble Siteworks

### Connected Community

1. Before starting this procedure, your company will have needed to purchase Connected Community and have the settings set up in your tablet already.
2. You will need to have Internet access.
3. Depending on Connected Community licenses within your company, you may need to call your GPS person and have them set your device as registered and tell you what your specific Device ID is.
4. Your Rover does not need to be connected to a Base Station or VRS, but it can be.
5. In the Top left corner press ☰ - Data Management – Connected Community
  - Synchronize
    - Projects – Uploads or downloads all information (work orders, designs, calibration etc.)
    - Work Order – Uploads or downloads information related to that specific work order
    - Design – Uploads or downloads information specific to that Design]
  - Project – Confirm its set to the current Project you want that the information uploaded or downloaded to.
  - Press ACCEPT
6. When finished, call the GPS person to let them know you have completed the process so they know you are finished.