

Get moving with dozers

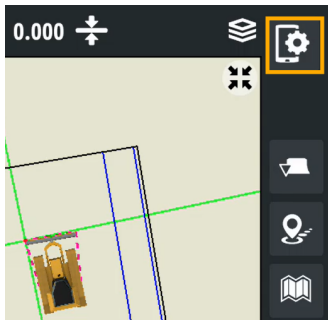
This section explains how to set up and use Trimble Earthworks on bulldozers. [Watch an expert operator](#) in action or check out the step-by-step instructions.

Tweak your sound settings

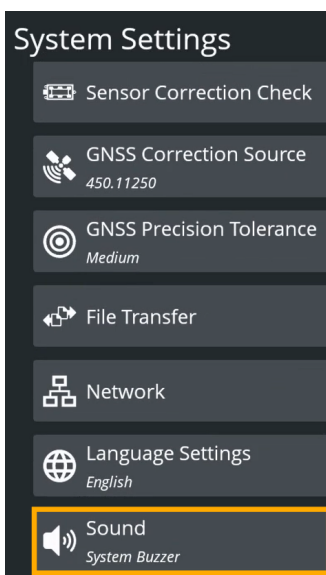
Trimble Earthworks can notify you when you're on grade, above grade, or below grade. You can choose whether you want to be notified. And you can change how loud the notifications are.

Step by step

1. Tap the System Settings  icon.

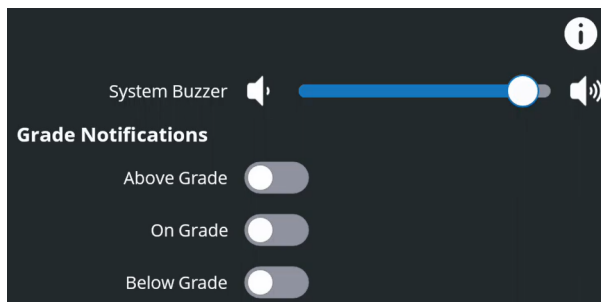


2. Scroll down and tap **Sound**.



3. To increase or decrease the volume of the sounds, drag the **System Buzzer** slider.
4. Specify whether you want a beep to sound when you're:

- above grade – fast intermittent beep
- on grade – solid beep
- below grade – slow intermittent beep



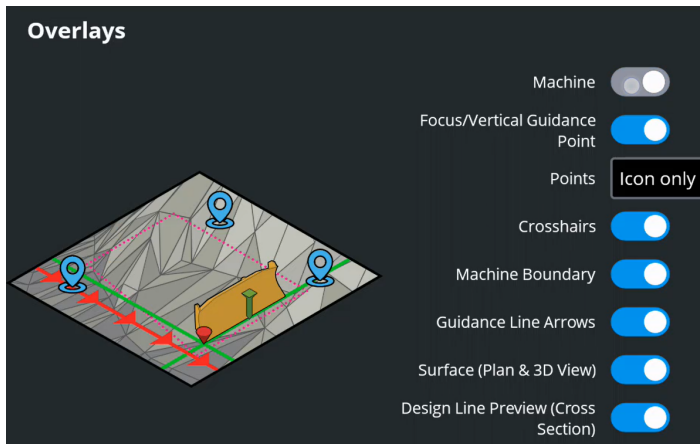
NOTE – If you use a hand-held laser receiver the beep patterns are the same.

5. Tap **Apply**.

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Choose your overlays

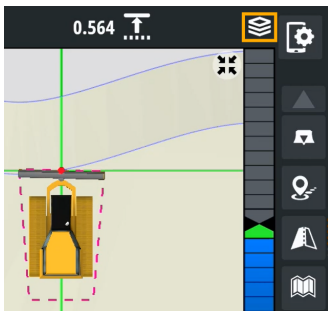
Overlays are graphical elements you can show or hide on the work screen in Trimble Earthworks.



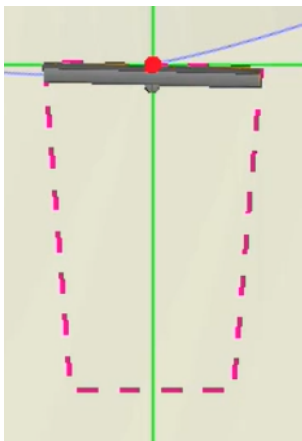
EXAMPLE – If you want to see more features on your design (like points) you might want to hide the Machine overlay.

Step by step

1. Tap and hold the Overlays  icon.

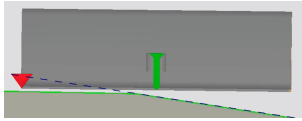


2. Toggle the options on or off to show or hide the overlays:
 - **Machine** – Show or hide the machine body.



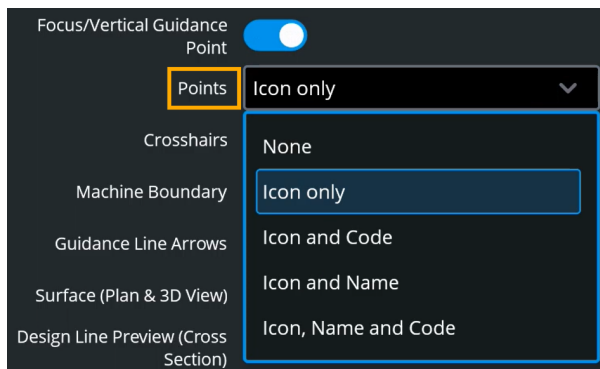
- **Focus/Vertical Guidance Point** – The Focus point is where points are recorded. It's also where the offline text item and horizontal guidance are determined from.

The Vertical Guidance point is where the design surface slope is determined for the Design Line Preview overlay.



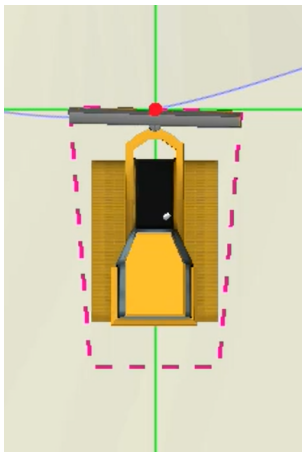
TIP – This help article explains [the difference between Focus and Vertical Guidance points](#).

- **Points** – Show icons, code, and name (or a combination of these).

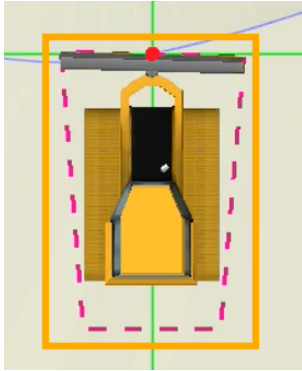


EXAMPLE – You might want to show the name if you have lots of points, or you can't remember which point you need but you know what it's called.

- **Crosshairs** – These green lines are centered on the focus point. They can help you align the attachment perpendicular or parallel to line work in a design.



- **Machine Boundary** – These are dashed magenta lines around the machine. They help you see where your avoidance zone warnings will be triggered from (if your project has an avoidance zone).

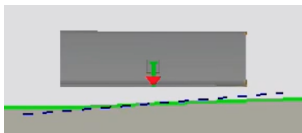


- **Guidance Line Arrows** – These show the direction of a line you've selected.
- **Surface** – Switching this on or off can make it easier to see line work in a design.

NOTE – The Surface overlay is available for Plan and 3D views.

- **Design Line Preview** – This shows the actual surface which cut / fill values are calculated from and where the blade will be driven to if you engage Autos.

The blade can straddle a change in grade (multiple slopes in the design) but it can't be 'bent' to match multiple slopes. So Trimble Earthworks calculates a single sloping surface from the design slope beneath the vertical guidance point.



NOTE – The Design Line Preview overlay is available for the Cross Section view.

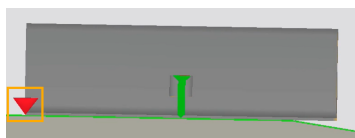
Focus vs. guidance points

In Trimble Earthworks you can show or hide the Focus  point and the vertical guidance  point in the cross-section view.

Understanding the difference between these points helps you work more effectively.

FOCUS POINT

The Focus  point is the red triangle.

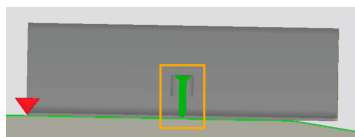


It shows in the center of the blade, or on the left or right blade tip.

This Focus  point is where your horizontal guidance and offline values are calculated from. This point sets the position where any points you record are dropped from.

VERTICAL GUIDANCE POINT

The vertical guidance  point is the point on the blade beneath which the [Design Line Preview overlay](#) is calculated (using the slope of the design surface).



The cut / fill values for each blade tip are calculated from the design line.

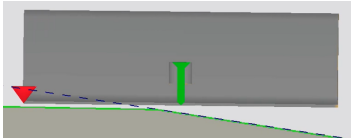
EXAMPLE – On the flat part of a design, cut / fill data is calculated relative to the flat plane under the vertical guidance  point. If you move over a change in grade and the vertical guidance point is now on a sloped plane, the cut / fill data will be calculated relative to the sloped plane.

SCENARIO

Let's say you're building a cut ditch or a swale. You've positioned the blade in the flat bottom of the ditch so the vertical guidance  point is above a level portion of the design (zero slope). The design line that's being calculated under the blade is level. If you engage Autos, the machine will drive to that design line so you can cut the flat bottom of the ditch.

Now you're ready to cut the sloped side of the ditch so you move the blade onto the slope. The vertical guidance  point is now over the sloped portion of the design. Trimble Earthworks recalculates the design line and the cut / fills for each blade tip and draws a sloped design line. When you engage Autos it will drive to that sloped design line.

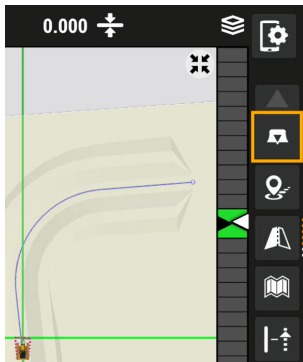
Having the [Design Line Preview overlay](#) on will show you the slope and elevation Autos will drive to. This avoids confusion when the design surface contains grade breaks and slope changes.



Step by step

1. To change where the focus point is on the blade:

- a. Tap the blade focus  icon.

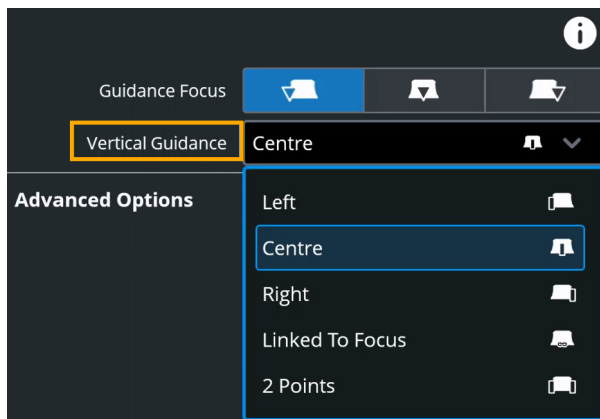


- b. Specify where the focus of the blade is – Left, Center, or Right.

TIP – The position you select depends on the line work you're using.

2. To change the vertical guidance:

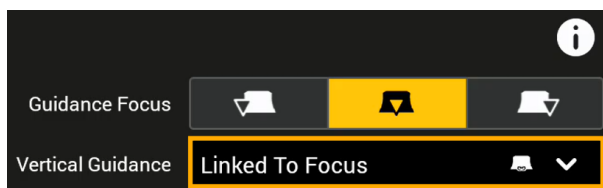
- a. Tap and hold the blade focus  icon.
- b. Expand the **Vertical Guidance** drop-down > Select Left, Center, or Right.



TIP – We recommend you leave the vertical guidance  point in the center of the blade. This will give you a more reliable and predictable response when you engage Autos.

3. To link the focus and vertical guidance points:

- a. Tap the blade focus  icon.
- b. Expand the Vertical Guidance drop-down > Select **Linked to Focus**.



NOTE – We recommend you only change the vertical guidance point to left / right or Linked To Focus for more complex grading applications – for example if you have a cut-ditch where the sides are less than half a blade width and you're only grading with one side of the blade on the slope at a time.

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Auto-level a site

When you move your machine around a site, Trimble Earthworks collects data about your machine's elevation. You can display this data as a cut / fill map on your TD5x0 screen in real time. This makes it easier to see what's above, below, and on grade when you're leveling a site.

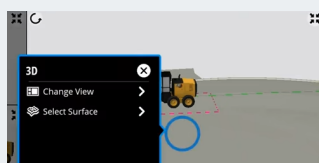
You can also tap and hold a point on the screen to see exactly how much material you need to move there. Being able to easily see this data on your screen helps you work efficiently because you can move material where it needs to go the first time, with fewer passes.

Step by step

1. Make sure your screen is showing Plan view in one of the viewing panes.



NOTE – To change a view, tap and hold in a viewing pane > Select **Change View**.

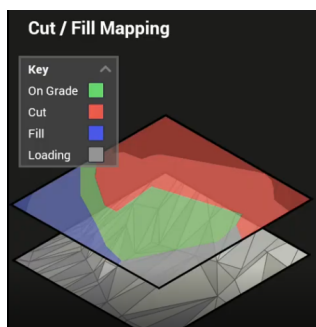


2. To show Cut / Fill Mapping data, tap the map  icon.



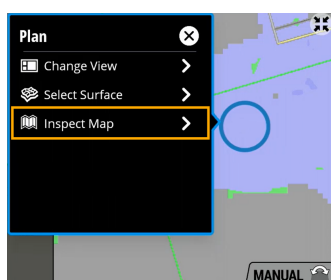
You'll see a map of the high and low spots on the site:

- **Green** shows which areas are on grade.
- **Red** shows the high spots you need to move material from.
- **Blue** shows the low spots where you need to fill in material.

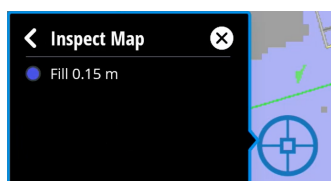


TIP – To change these colors, tap the System Settings  icon > tap **Grade Tolerance**.

3. To inspect an area, tap and hold it on the map.
4. To see the exact value of an area, tap **Inspect Map**.



This shows how much material you need to move at that part of the site.



NOTE – The Cut / Fill map is relative to the elevation offset you have active. This includes any [Working Surface](#) offset you've applied. The map will be regenerated each time you change offsets, and when you switch Lane Guidance on or off.

5. To start leveling the site, use the Cut / Fill map to plan the most efficient way to move material from high spots (red) to low spots (blue).

Save your offsets

If you often work to the same offset above or below the design surface, you can save your elevation offsets in Trimble Earthworks.

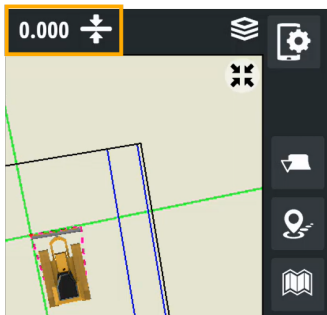
NOTE – The design surface is the surface you're working from.

Saving offsets means you don't have to keep adding these manually. It also means you don't have to repeatedly press the increment and decrement buttons on your joystick to increase or decrease an offset.

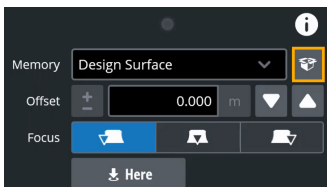
Once you've saved the offsets you use often, you can easily tap to cycle through these and choose the one you want to apply.

Step by step

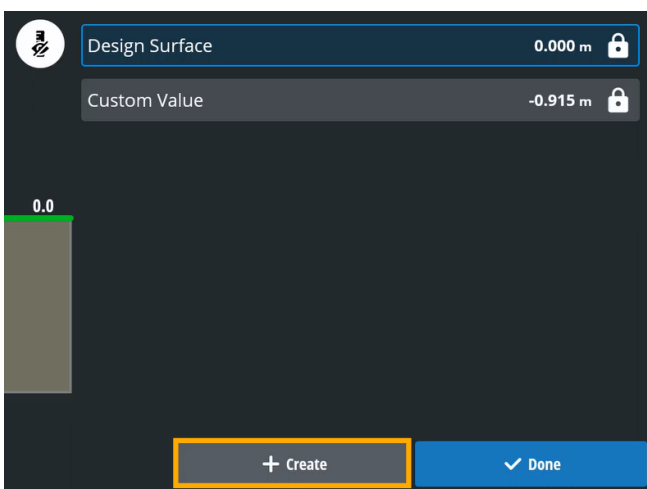
1. Tap and hold the elevation offset  icon.



2. Tap the box  icon.



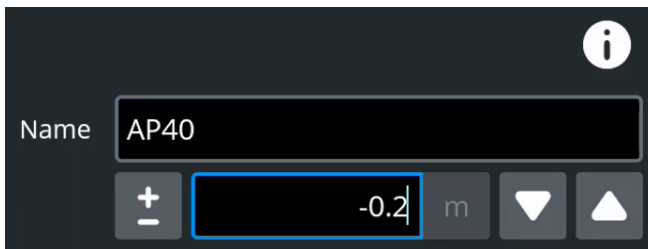
3. Tap **Create**.



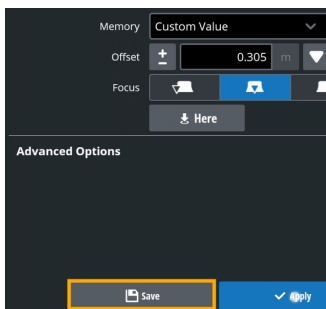
- Enter a name for your offset.

EXAMPLE – This could reflect the thickness of your material.

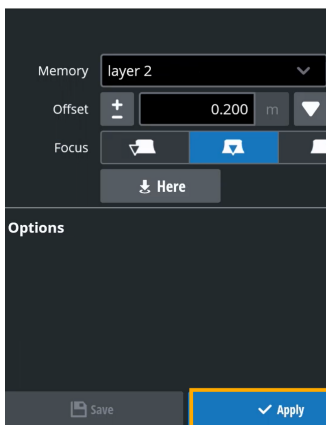
- Specify the amount for the offset.



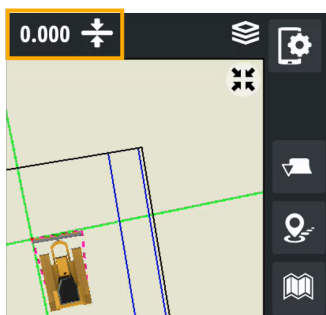
- To save your offset, tap **Save** > Tap **Done**.



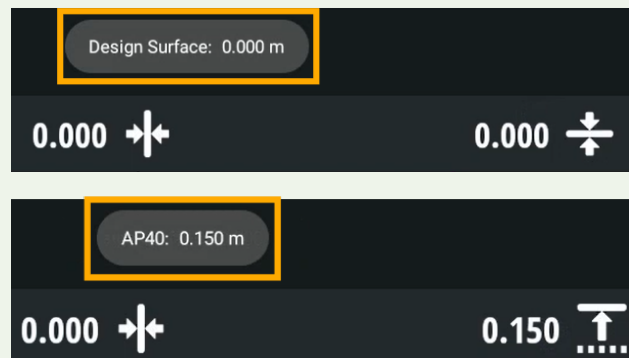
- To use the offset you've saved, tap **Apply**.



- To cycle through offsets you've saved (or to return to an offset of zero) tap the elevation offset  icon.



TIP – When you tap the offsets you've saved, you'll see the names you've given them.



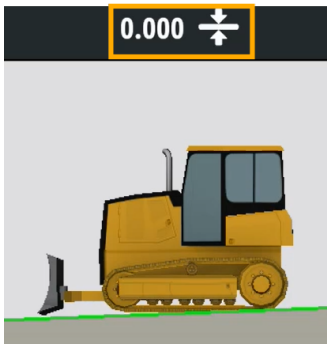
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Layer your way to grade

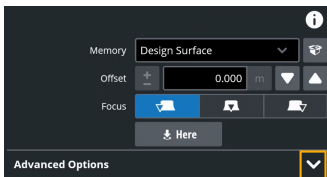
You can use the Working Surface feature in Trimble Earthworks to offset a whole design. This is helpful if you prefer to work your elevation offset to zero when you're on grade at a known depth above or below finished level – for example when you're working to sub-grade.

Step by step

1. Tap and hold the elevation offset  icon.



2. Expand the **Advanced Options** drop-down.



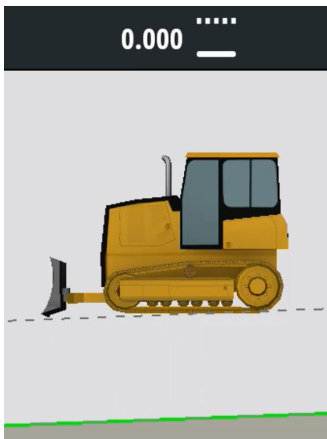
3. Enter a value for your Working Surface.

TIP – You can select Vertical or Perpendicular depending on your job specifications and how the surveyors are measuring their as-built checks on your graded surface:

- Use **Vertical** if you're working to a vertical depth or distance below finished level.
- Use **Perpendicular** when you need to achieve the true thickness of material (and this is specified) – for example if the thickness of topsoil is specified for a batter slope.

If your design has a steep slope, there will be a big difference between the vertical and perpendicular offsets.

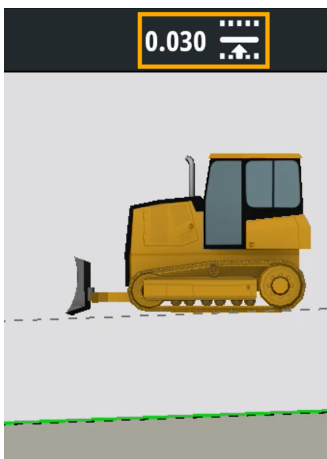
4. Tap **Apply**.



NOTE – The dashed line shows your original surface. The green line shows the guidance surface. This is the Working Surface. It's been created by the Working Surface offset you've specified.

5. To shift the Working Surface up or down, press the increment/decrement switch on the joystick.

NOTE – You'll see the numbers and the icon change in the guidance bar.



NOTE – Any offsets you apply now will be offset from your Working Surface (not from the original design). For reference, the original surface will still show as a dashed line.

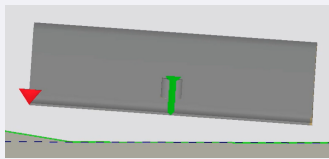
Protect a surface

You can use the Overcut Protection feature in Trimble Earthworks to protect the finished grade of a surface you're working on. This is especially useful when you're working up against (or across) a change in grade in the design.

EXAMPLE – You might be moving material across the toe of a batter slope.

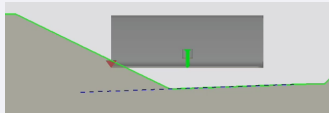
If you enable Overcut Protection and engage Autos, the blade tips won't be able to go below the finished level of the design you're working to. This makes it quick and easy to work across changes in grades in a design without compromising the final surface.

EXAMPLE – Overcut Protection is useful if you're building a swale and you need to finish it off with a layer of topsoil. If you're trying to move the material from the bottom of a swale to the top and over the grade break, the blade tip won't be able to pierce the design surface.



TIP – When you've finished moving topsoil you can switch Overcut Protection off for your final trim.

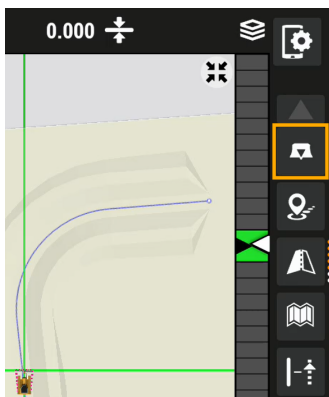
EXAMPLE – In the following image the blade is straddling a change in grade. Overcut protection is off. The Design Line Preview overlay (dashed blue line) is enabled. It shows the design slope the blade will drive to when you engage Autos. The left blade tip will undercut the batter slope and damage the finished grade.



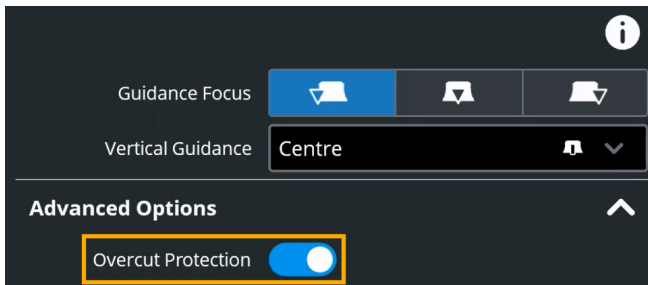
Step by step

To enable Overcut Protection:

1. Tap and hold the blade focus  icon.

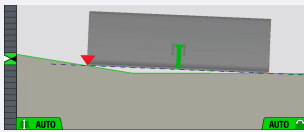


2. Expand the **Advanced Options** drop-down.
3. Toggle **Overcut Protection** on.



4. Tap **Apply**.
5. Engage Autos and start moving dirt!

EXAMPLE – The following image shows the blade is straddling a change in grade. Overcut protection is on.



The Design Line Preview overlay is enabled. It shows the design slope (dashed blue line) the blade will drive to when you engage Autos. The design line is being calculated to prevent either blade tip undercutting the batter slope and the floor of the drain. This protects the finished grade.

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