



User Guide

CIVIL CONSTRUCTION

April 2022

WorksOS

(This guide is a compilation of the individual help topics.)

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Introduction and Workflow

Introduction

Trimble WorksOS, a new cloud-based operating system and application, integrates data from many providers to deliver 3D productivity and real-time progress-to-plan data for site supervisors and project managers to maximize jobsite efficiency.

We're forging new ground so you can control your entire construction project while making every working hour more efficient. Simultaneously, stay three steps ahead with comprehensive real-time data to make construction management easier on and off the job site.

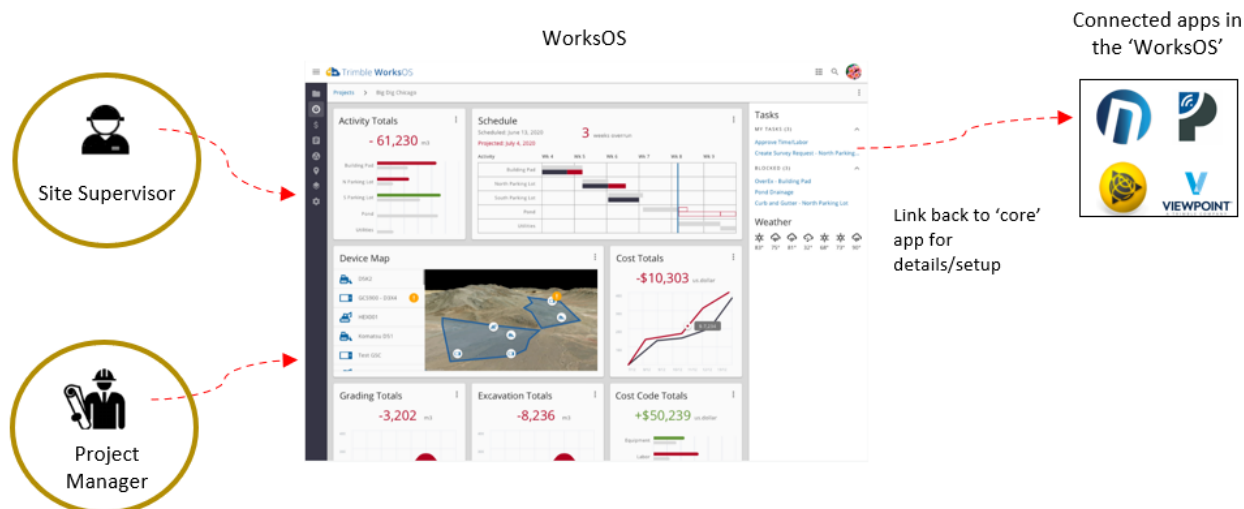
WorksOS is easy to use and will increase your team's productivity, even if you are not a surveyor! As a Trimble machine control customer, you have already seen the benefits of your machine control system.



WorksOS integrates with Trimble Business Center, Trimble WorksManager, Trimble Siteworks, Trimble Earthworks Grade Control, and Trimble PULSE Fleet and Equipment Management Software to bring next-generation, real-time visibility to the construction site.

WorksOS is the central 'operating system' that connects inputs from multiple sources to provide Progress, Productivity, and Quality, and Cost (PPQC) information to Site Supervisors and Project Managers:

- Use one 'central' application for monitoring a civil construction job site
- Connect back to existing Trimble apps that contain more details



Prerequisites

- Trimble Identity (TID) credentials (username and password); create a new TID [here](#)
- WorksOS license; [contact your SITECH dealer](#)
- WorksOS account
- Account, users, and devices setup in WorksManager

Note: Your ability to create, edit, and delete accounts, projects, users, and content in WorksOS and WorksManager depends on your role and permissions:

Account Roles

- **Administrator** - Account Admins can see and do everything needed to manage an account.
- **User** - Account Users can see some things in an account, but cannot change anything.
For details, see the [Account Roles](#) help topic.

Project Permissions

- **Manager** - Project Managers can see and do everything needed to manage a project.
- **Viewer** - Project Viewers can see some things in a project, but have limited abilities to change them.
For details, see the [Project Permissions](#) help topic.

To change your account role or project permissions, contact your Account Administrator.

Required Data

- Coordinate system/site calibration
- Georeferenced project site
- Machine data
- Alignments or linework
- Site surveys
- Design surfaces

Supporting Info

This guide includes numbered steps, as well as supporting information formatted like this:

Boxes like this contain supplemental text about the steps you are working through.

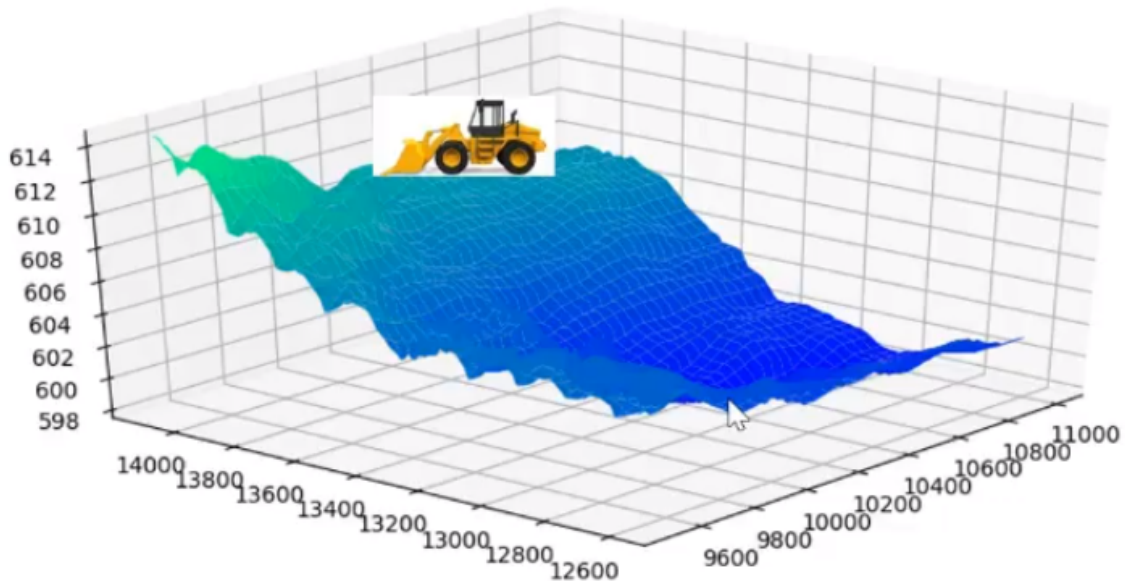
You can skip over the information in these boxes if you just want to work through the procedures. For in-depth, conceptual information, you should (of course) press **F1** to see the context-sensitive help.

Recommendation

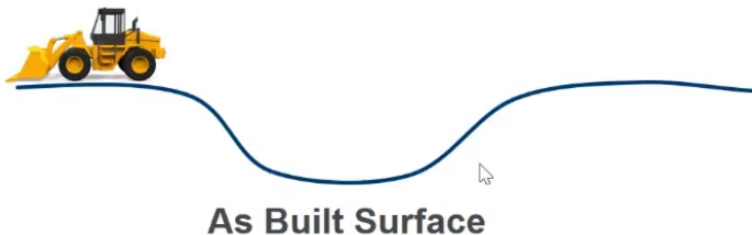
Use two side-by-side monitors to be more productive; switch back-and-forth between this guide on one screen and WorksOS on the second. Alternately, you may find it easier to print this document so that you can maximize the program on your monitor. Working from a printed copy may mitigate focus issues when switching between a PDF document and the application.

Workflow Overview

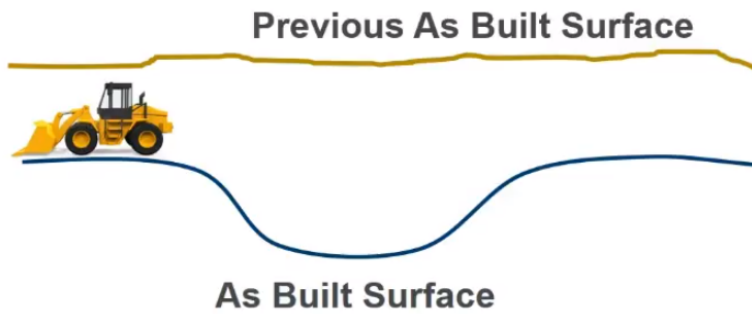
1. Using your machine control system's GPS/GNSS data, WorksOS accurately maps the locations and elevations of every place your machines work within your project's boundaries.



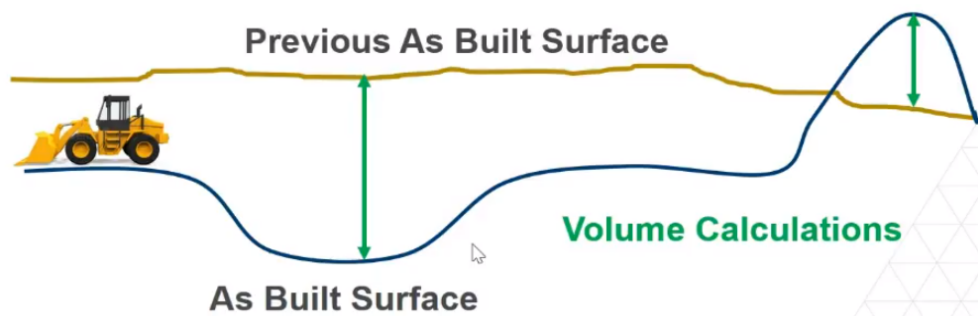
2. From that data, you can 'create' an as-built surface, which is the last pass of a machine creating the final surface of the day. This is done by refining the raw machine surface in WorksOS to create a more finished (i.e., filtered) version. The ability to refine an existing as-built surface is the power of WorksOS; they convert raw data into something you can use to plan. Filters provide you surfaces for specific dates (filter), machines (filter), and design/area/alignment (filter), etc.



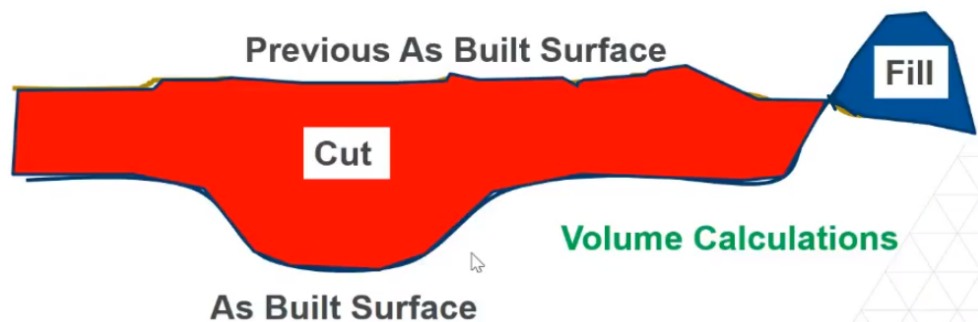
3. Now you can compare that last as-built surface to a previous as-built surface.



4. Based on the change/difference between the two surfaces, you can calculate volumes.

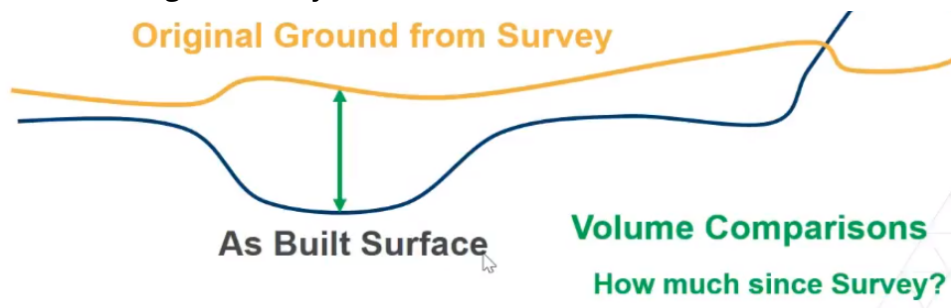


5. Anywhere the elevation of the design surface is below the current surface is 'in cut'; anywhere the design is above the existing is 'in fill', so you can also create cut/fill maps.

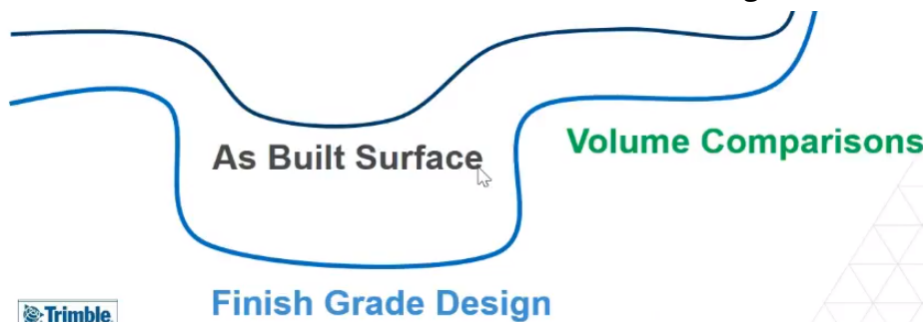


6. In addition, you can compare the as-built surface to the original ground surface from a survey. This volume comparison tells you how much work has been done

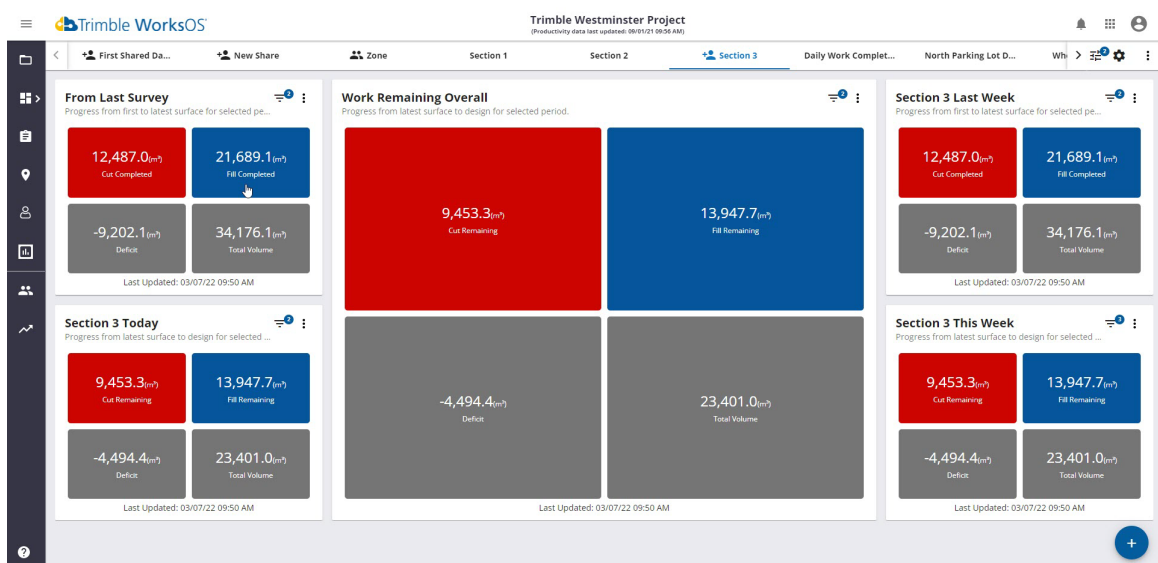
since the original survey.



- You can also import design surfaces from Trimble Business Center (TBC) to help determine how much work remains to achieve the design.



- If you also pull in linework and geofences from TBC, and compare them to the finish grade design, this will tell you how much work is remaining to complete.
- To see all of your cut/fill, compaction, and other data in one place, visit your configurable Dashboard where you can set up various widgets for a quick look at the movement of material, work completed since the initial survey, and work remaining to get to the finish grade.



When you have questions, your best source of help is the [WorksOS Resource Center](#).

Account Roles and Their Functions

Overview of Roles and Permissions

Account Level

At the **account level**, there are **two roles** that enable different functions within WorksOS:

- Account Administrator
- Account User

Here is a simple view of the functions for each role:

WorksOS Function	Administrator	User
Projects	Create, archive (All other project functions should be done by Project Managers at the project level. See Project Permissions .)	View
Account Users	Add to account, edit (reassign role), delete from account (All account user functions should be done by Project Managers at the project level. See Project Permissions.)	-

Note: Many [Account Roles](#) and [Project Permissions](#) are shared with **WorksManager** too.

Project Level




At the **project level**, there are two **permission levels** that enable different functions:

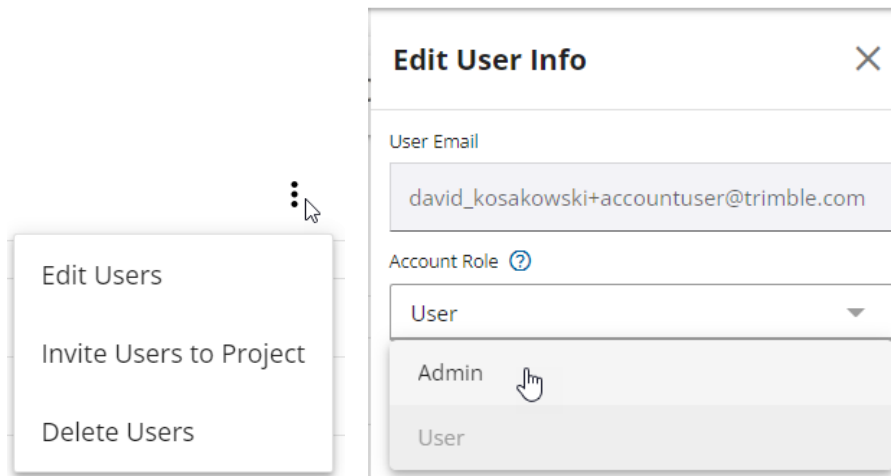
- Project Manager
- Project Viewer

For details, see the [Project Permissions](#) help topic. To change your account role or project permissions, contact your Account Administrator.

Demote current Account Admins to the Account User role

1. Log in to WorksOS with your admin credentials.
2. Choose an account in the Account Selection list, and click Apply.

3. In the left pane, click the  Account Users icon.
4. Search for and check the box next to one or more users who have Admin rights that you want to convert to the Account User role.
5. Click the  Actions menu icon and select Edit Users. For a single user, you can also just select the row and click the  Edit icon.
6. Select User in the Account Role list.




7. Click Save.

Once a user is demoted from Account Admin to Account User, they are project focused. User changes you make in WorksOS will appear in WorksManager too as the two apps share users.

Note: You can multi-select and change roles for many users at once.

Note: You cannot delete your own user account; only another Admin can.

Add Account Users

1. Log in to WorksOS with your admin credentials.
2. Choose an account in the Account Selection list, and click Apply.
3. In the left pane, click the  Account Users icon.
4. In the upper right, click the Add button.
5. In the Invite Users pane, select User in the Account Role list.

6. Enter the user's email address (the one used for their Trimble Identity (TID) account).
7. Click INVITE and then Save.

Manage Projects

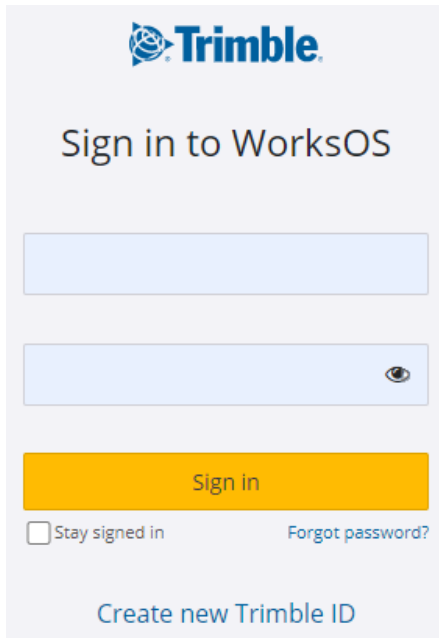
Review an Existing Project

Accounts and projects are shared between [WorksManager](#) and WorksOS so that when an Account Administrator creates a project in one application, it is visible and accessible in the other app.

This connection between WorksManager and WorksOS also applies when the Admin shares projects with other users in your account. If you create a project in WorksOS, other users you have shared with will automatically have access and administrative rights, without needing to go into WorksManager. A project is ready for use in WorksOS once it is created in WorksManager.

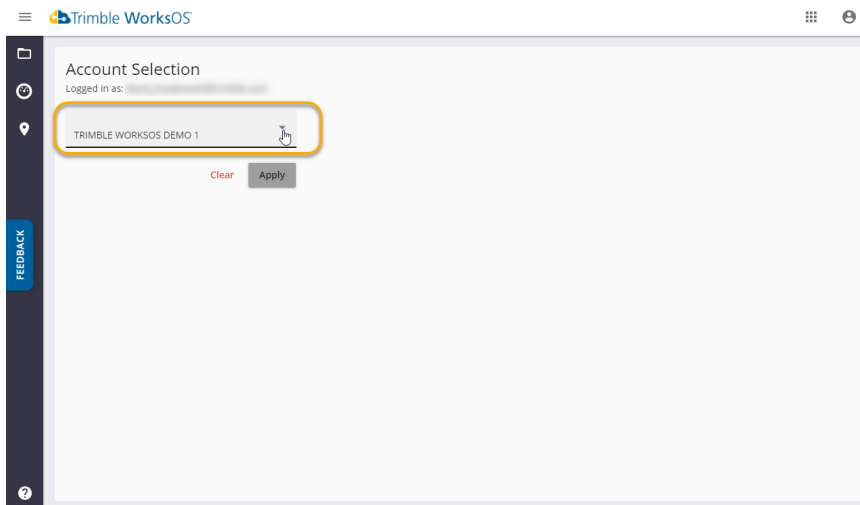
Note: Currently, all additional user management, such as adding/removing users to/from projects, is done in WorksManager. See the [WorksManager documents](#) here for more information. Only additional users (who did not create the project) need to be added to a project in WorksManager.

1. Go to <https://worksos.trimble.com/app/> and sign in to your Trimble Identity (TID) account.

The image shows the Trimble WorksOS sign-in interface. At the top is the Trimble logo. Below it is the text "Sign in to WorksOS". There are two input fields: the first is for the email/username, and the second is for the password, with an eye icon to toggle visibility. A yellow "Sign in" button is below the password field. Underneath the button are two links: "Stay signed in" (with an unchecked checkbox) and "Forgot password?". At the bottom is a link that says "Create new Trimble ID".

2. Select your account (as previously set up in WorksManager) and click Apply.

Note: If you have many accounts, type any part of the name in the Search field.

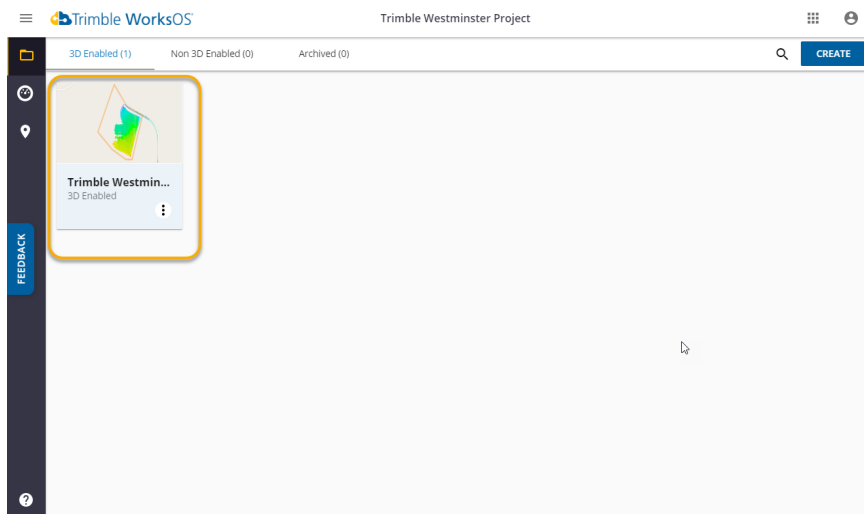
The image shows the Trimble WorksOS "Account Selection" screen. The header says "Trimble WorksOS". Below it, "Account Selection" is displayed, followed by "Logged in as:". There is a search input field containing "TRIMBLE WORKSOS DEMO 1", which is highlighted with a yellow border. Below the search field are two buttons: "Clear" (in red text) and "Apply" (in a grey button). On the left side, there is a vertical sidebar with a "FEEDBACK" button. The top right corner has a hamburger menu icon and a user profile icon.

You will see tabs for three types of projects:

- 3D-enabled - a project intended to have machine productivity (.tag file) data processed into it. 3D-enabled type projects are used primarily in WorksOS, but still have full project functionality in WorksManager.

- Non-3D-enabled - a project (also known as 2D-enabled) that is not intended to have machine productivity (.tag file) data processed into it. It will still have full project functionality in WorksManager and will primarily be used there.
- Archived - a completed project (of either type) in either WorksOS or WorksManager that has been 'shelved' as a record of the work that was done. The archived state is reflected in both applications.

These are all projects you have been given access to (or created), including all projects for this account in WorksManager. For more information, see [Creating, Editing, and Archiving Projects](#).



Project Permissions and Their Functions

Overview of Permissions and Functions

Project Level

At the **project level**, there are two **permission levels** that enable different functions:

- Project Manager
- Project Viewer


Here is a simple view of the functions for each permission level:

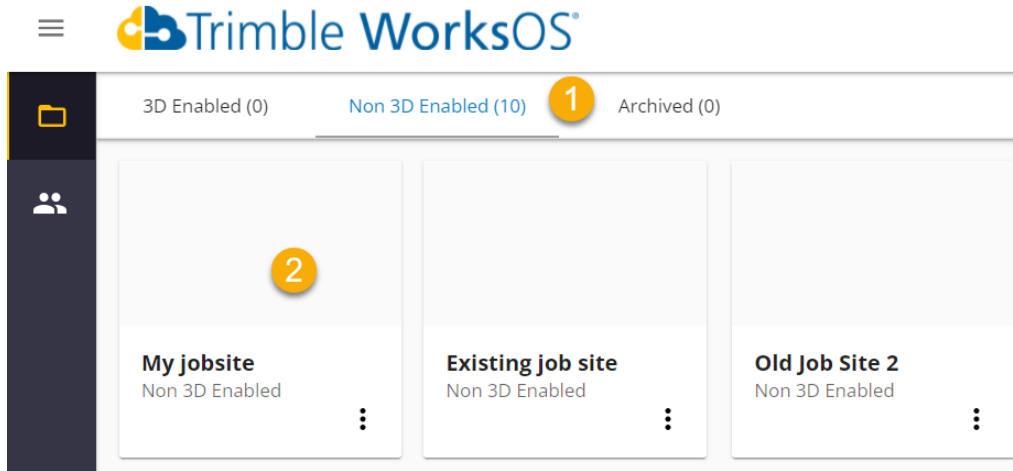
WorksOS Feature	Manager	Viewer
Projects	Create, view, edit, archive	View
Dashboards	View, view shared, add, edit, share, delete, add/reorder widgets	View, view shared
Map	View, change map type, Profile, Custom Area, DDV	View, change map type, Profile, Custom Area, DDV
Project Members	View, invite to project, edit (reassign role), remove from project	View
Filters	View, edit, apply, remove	(limited to filtering by Dashboard widgets)
Reports	Set parameters, generate, download (view in Microsoft Excel)	Set parameters, generate, download (view in Excel)
Imports	Import files, view, delete, connect to external apps for import	View
Exports	Set parameters, export	Set parameters, export
TBC Sync	Publish from Trimble Business Center (TBC)	-
Project Settings	View, edit	View, edit


For WorksOS account-level roles, see [Account Roles](#). To change your account role or project permissions, contact your Account Administrator.

Note: Many [Account Roles](#) and [Project Permissions](#) are shared with **WorksManager** too.

Invite a User to a Project

1. In the left pane, click the  Projects icon.
2. Click 3D Enabled, Non 3D Enabled, or Archived to show the right set of projects.



3. Click a project tile (...or click the  More icon and select View Project Members).
4. In the upper right, click the INVITE button.
5. In the Invite Members pane, select a role in the Project Role list.
6. Enter the user's email address (the one used for their Trimble Identity (TID) account).
7. Alternately, you can click the + icon next to existing users to invite them.

Bharathiselvan	+
Charlie	+
Dan	+
Jeeva	+
Jeff	+

8. Click NEXT.

Create, Edit, and Archive Projects

Creating Projects

Accounts and projects are shared between Trimble [WorksManager](#) and Trimble WorksOS so that when you create a project in one application, it is visible and accessible in the other app. A project will be ready for use in WorksOS once it is created in WorksManager.

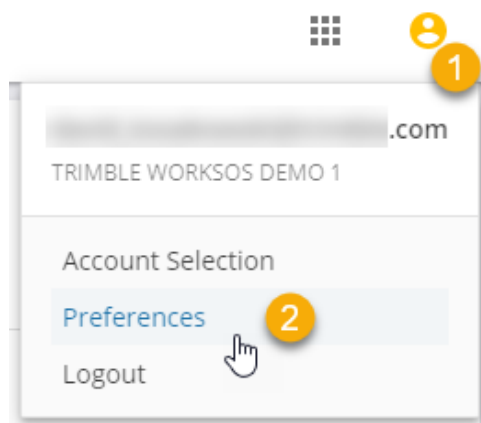
This connection between WorksManager and WorksOS also applies when you share projects with other users in your account. If you create a project in WorksOS, other users you have shared with will automatically have access and administrative rights, without needing to go to WorksManager.

Note: Currently, all user management, such as adding/removing users to/from projects, is done in WorksManager. See articles in the Learning Guides section of the [WorksManager Resource Center](#) for more information. Additional users (who did not create the project) need to be added to a project in WorksManager.

Note: A project created in WorksManager is ready to use in WorksOS once you have changed it to 3D-enabled.

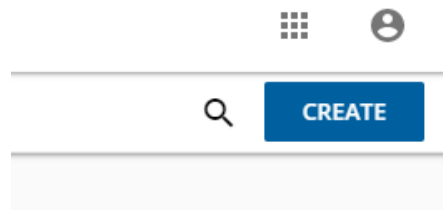
Create a project

1. Open worksos.trimble.com/app.
2. Select your account, and click Apply.
 - a. Click your Profile icon and select Preferences.



- b. Set preferences for:
 - i. Date and time formats and the time zone (of the project location)
 - ii. Location display and WorksOS interface language
 - iii. Units for measure (distance), pressure, temperature, and number format

- iv. Currency for cost data
- c. Click Save.
3. Click the Create button.
 - a. Click the Create button in the upper right corner.



4. In the Create New Project pane > PROJECT INFO tab:
 - a. Confirm your account or select a different one to create the project in (this is the same account used for WorksManager).
 - b. Enter a Project Name; this must be unique among all projects in the selected account.

 A screenshot of the 'Create New Project' dialog box. The title bar says 'Create New Project' with a close 'X' button. There are two tabs: 'PROJECT INFO' (active) and 'CONFIG FILES'. Under 'PROJECT INFORMATION', there is a dropdown menu for 'Account' showing 'TRIMBLE WORKSOS DEMO 1'. Below that is a text input field for 'Project Name' containing 'Rosemount Landfill'. At the bottom, there are three buttons: 'Cancel', 'Back', and 'Next' (highlighted in blue).

- i. Confirm your account or select a different one to create the project in (this is the same account used for WorksManager).
 - ii. Enter a Project Name; this must be unique among all projects in the selected account.
5. select the Project Type. There are 2 types of projects.
 - **3D Enabled** - this a project that is intended to have machine productivity (.tag file) data processed into it. 3D-enabled type projects are used primarily in WorksOS, but still have full project functionality in WorksManager.
 - **Non-3D-enabled** - this is a project that is not intended to have machine productivity (.tag file) data processed into it. It will still have full project functionality and will primarily be used there.

6. Click NEXT and select either 3D-enabled or Non-3D-enabled in the Project Type list.

Project Type

×

Please set your project type in the field below. "3D Enabled" projects allow TAG files and cannot have overlapping boundaries, while "Non-3D Enabled" projects do not have TAG files and can have overlapping boundaries.

Project Type



- a. Click NEXT and then FINISH on the bottom right toolbar to complete the new project setup. At this point, these project attributes are validated; if any fails, the project is not created:
 - Project name is unique for the account
 - Project calibration (coordinate system) file is valid
7. Click Next to proceed to the CONFIG FILES tab.
 - a. Click + next to Calibration .dc .cal., browse to a coordinate system file for the project.
 - i. Click + next to Calibration .dc .cal. Browse to and add a coordinate system/site calibration file for the project.

Note: Calibration files are mandatory for WorksOS 3D-enabled projects in order for machine productivity data (.tag files) to be processed into the project. To ensure data and location accuracy, the file should be the same calibration file as the machines in the field are using.

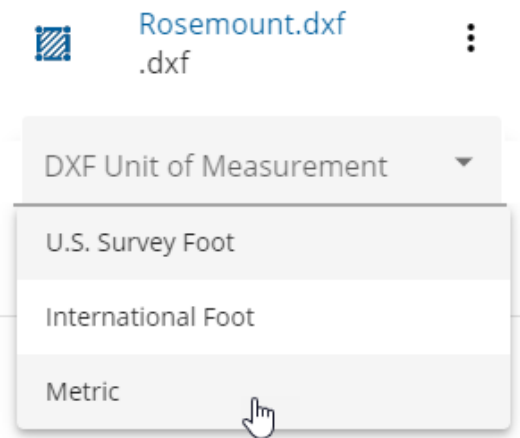
Calibration files are required for WorksOS 3D-enabled projects in order for machine productivity data (.tag files) to be processed into the project. To ensure data and location accuracy, the file should be the same calibration file as the machines in the field are using.

Note: WorksOS supports the Trimble Geodetic Library (TGL) for published coordinate system definitions that have been added to the library. This means that published shift grids and geoids contained within the TGL can have their respective coordinate system definitions assigned to projects in WorksOS. All project data should display and project correctly within the project boundary. This feature does not include custom coordinate system

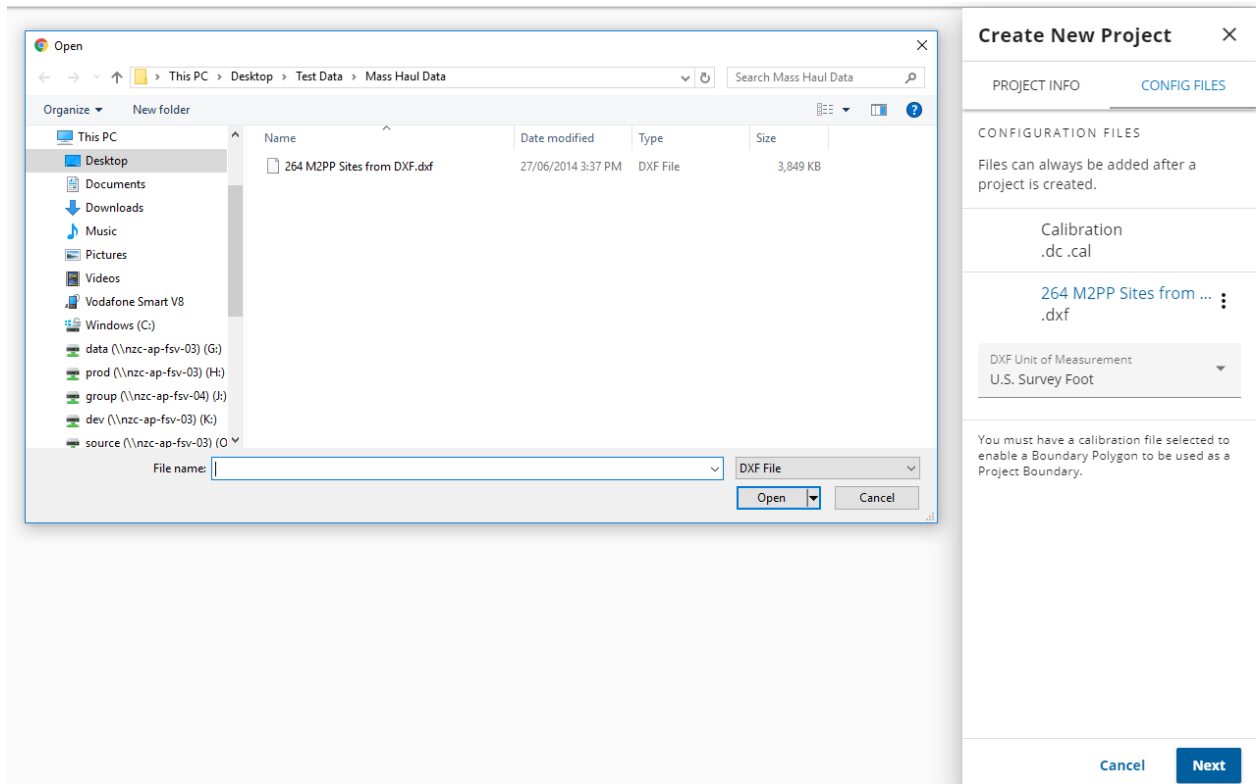
definitions that are not part of TGL; using these will impact project data accuracy and positioning.

Note: If you do not have a site calibration file during project creation, you can always add one later to make the project 3D-enabled.

- b. Typically, you will draw a project boundary in the next step, but you can optionally upload the boundary for a project as a .dxf file. Click + next to Boundary .dxf and browse to a .dxf with the boundary.
 - i. Optionally, add a boundary for the project as a DXF file. Click + next to Boundary .dxf and browse to a .dxf that includes the boundary.
- c. Then select the unit of measurement the DXF file was created in to ensure a correct project location and projection on the map in WorksOS.



Note: A .dxf file containing multiple boundaries can be uploaded. Currently, WorksOS automatically selects the first boundary it finds in the .dxf file. It is recommended that you select a .dxf file containing a single boundary.



8. Click Next to proceed to the DRAW BOUNDARY tab.
9. Pan and zoom into the location of the jobsite.

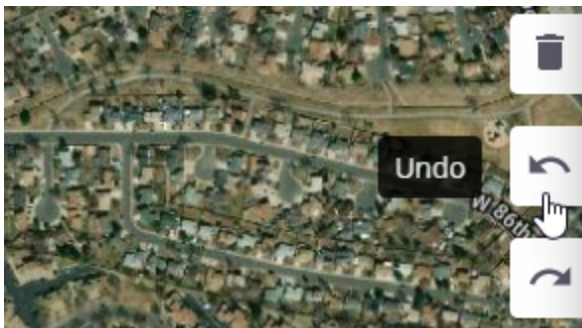
Note: All other project boundaries for the account will be visible on the map during the boundary creation step so that you can see where they are when you create a new boundary.

- 3D-enabled project boundaries are yellow
- Non-3D-enabled project boundaries are blue

10. Pick points in the Map view to draw a polygonal boundary representing the extents of the site, and double-click to close the final segment.



You can edit an existing project boundary by clicking-and-dragging a point. If you need to undo a point, click the Undo icon.



This boundary is used as a 'geo-fence' that determines whether your field devices and machines are 'on site'. The boundary must represent the true location of the project and encapsulate all areas where machines are running with the intention of having their data collected.

1. Pick points in the Map view to draw a polygonal boundary representing the extents of the site, and double-click on the first point to close the boundary. This boundary is used as a 'geo-fence' that determines whether your field devices and machines are 'on site'. The boundary must represent the true location of the project and encapsulate all areas where machines are/will be running with the intention of having their data collected.

If you uploaded a .dxf boundary in the previous CONFIG FILES step, the polygon it contains is displayed on the map as the pre-selected project boundary. No further steps are required. A .dxf boundary cannot be edited.

Note: Any data outside the project boundary will not be processed into the project. The seed position in each piece (.tag file) of machine data determines whether the data can or cannot be processed into the boundary.

Note: All other enabled project type boundaries for the account will be visible on the map in the BOUNDARY step so that you know where they are when you create a new project's boundary. 3D-enabled project boundaries are yellow and non-3D-enabled project boundaries are blue.

Note: 3D-enabled project boundaries cannot overlap one another to ensure machine productivity data processes in the correct project. If you draw a boundary that overlaps another 3D-enabled project, you are notified that there is an overlap and you cannot finish creating the project. Non-3D-enabled project boundaries can overlap any other boundary without issue.

Note: To ensure that machine productivity data processes in the correct project, 3D-enabled project boundaries cannot overlap one another in space and time. If you draw a boundary that overlaps another 3D-enabled project, they will be given a prompt that there is an overlap and cannot proceed to finish creating the Project.

However, non-3D-enabled project boundaries can overlap any other boundary without issue, so you can have projects that overlap in time and space as long as only one of them is 3D-enabled.

Note: If you are also a Trimble Business Center (TBC) user, you can also add the appropriate data there instead. To do this, see Configure and Assign a WorksManager Project for a Job Site in the TBC help. The project you just created will appear in the Project list there.

a. Click the  Dashboard icon on the left navigation bar.

11. Once you have drawn or uploaded a polygonal boundary from a .dxf file, you click NEXT and then FINISH on the bottom right toolbar to complete the new project setup. At this point, these project attributes are validated; if any fails, the project is not created:

- Project name is unique for the account
- Project calibration (coordinate system) file is valid

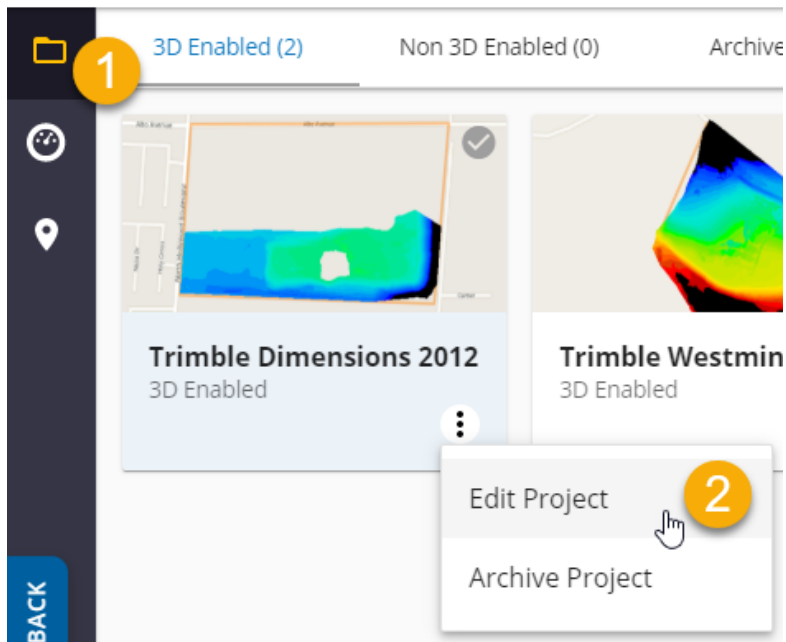
Editing Projects

You can edit an existing WorksOS project as requirements, designs, or field conditions change.

Edit a project

1. On the left navigation bar, click the Projects icon (1 below).

2. On the project tile you want to edit, click the More icon (ellipses), and select Edit Project (2).



3. Follow the Create Project workflow to edit your project (with exceptions). Not all fields can be edited; you can edit only these aspects of an existing project:
 - a. Project name
 - b. Project boundary - either manually redraw for a drawn polygon or by uploading a new .DXF File for a DXF Project Boundary.
 - c. Project coordinate system/site calibration file.

Note: Altering the calibration file can impact machine productivity data and project files; changing your coordinate/calibration after your project is in progress is **not recommended**.

- d. Project type - You can change the types of 3D-enabled and Non-3D-enabled projects as long as there are no overlaps between the 3D-enabled project boundaries. Machine Productivity Data (.tag Files) will be affected for processing at the time of project change and will not retrospectively fix already processed Machine Productivity Data files (.tag).

Archiving a Project

When you have completed a project (of any type) in either WorksOS or WorksManager, archive it as a record of the work that was done. The archived state is reflected in both applications. Once a project is archived:

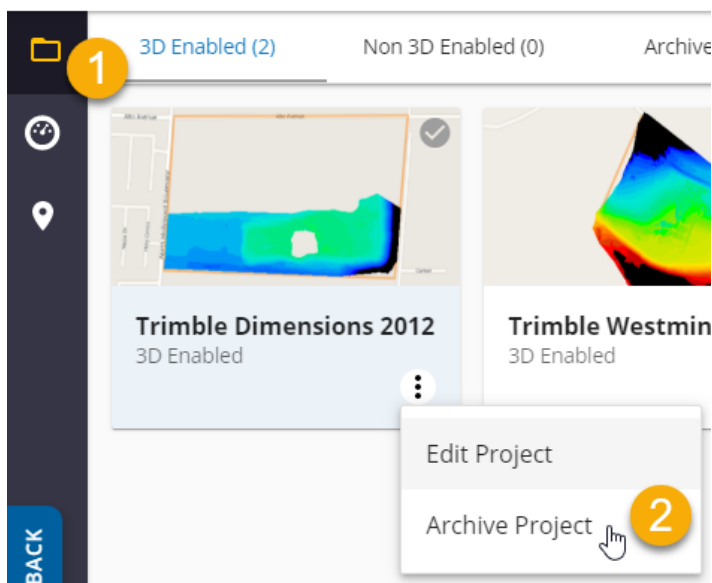
- You can still view, interact with, report on, and export a project's data.

- It retains all the data and functionality as when it was active.
- No new data of any kind, including Machine Productivity Data (.tag files), can be added, so a project only should be archived when it is truly complete.
- Its boundary is no longer displayed on the map when creating a new project, so you can use the same location for a new project's boundary.

Warning: Archiving a project in WorksManager has real world consequences. For example, devices are unassigned and designs are removed, etc. You should only archive a project once it is completely finished or if it is not needed at all. Once archived, a project cannot be restored.

Archive a project

1. On the left navigation bar, click the Projects icon (1 below).
2. On the project tile you want to edit, click the More icon (ellipses), and select Archive Project (2).



3. The project is moved to the Archived tab. Confirm that your project appears on the Archived tab.

Delete a project

You can only archive a project in WorksOS, but it can be deleted in WorksManager if it is no longer needed. Projects that have machine data can only be archived.

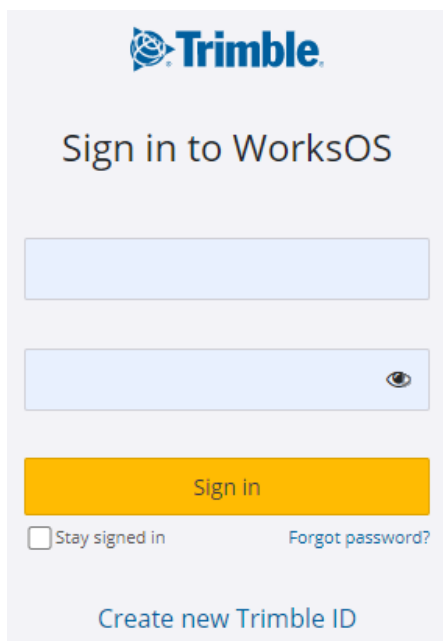
Review an Existing Project

Accounts and projects are shared between [WorksManager](#) and WorksOS so that when you create a project in one application, it is visible and accessible in the other app.

This connection between WorksManager and WorksOS also applies when you share projects with other users in your account. If you create a project in WorksOS, other users you have shared with will automatically have access and administrative rights, without needing to go into WorksManager. A project is ready for use in WorksOS once it is created in WorksManager.

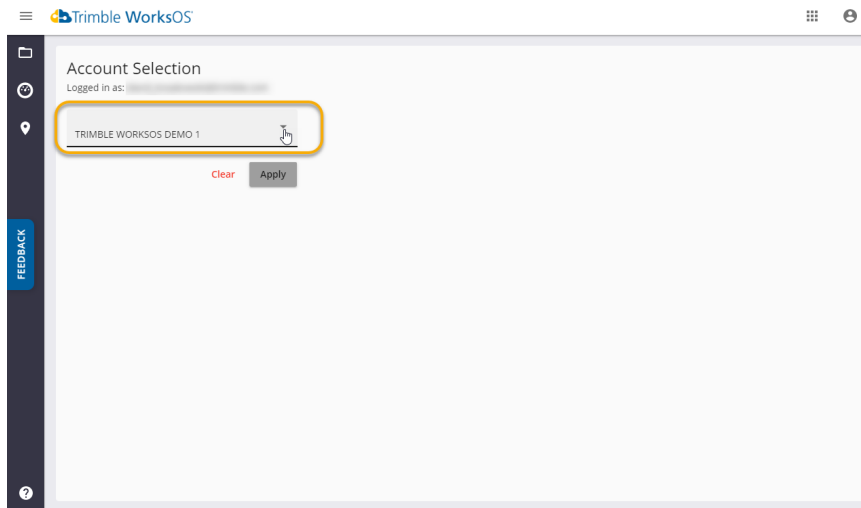
Note: Currently, all additional user management, such as adding/removing users to/from projects, is done in WorksManager. See the [WorksManager documents](#) here for more information. Only additional users (who did not create the project) need to be added to a project in WorksManager.

1. Go to <https://worksos.trimble.com/app/> and sign in to your Trimble Identity (TID) account.

The image shows the Trimble WorksOS sign-in interface. At the top is the Trimble logo. Below it is the text "Sign in to WorksOS". There are two input fields: the first is for the email address, and the second is for the password, with an eye icon to toggle visibility. Below the password field is a yellow "Sign in" button. Underneath the button are two links: "Stay signed in" with an unchecked checkbox, and "Forgot password?". At the bottom is a link that says "Create new Trimble ID".

2. Select your account (as previously set up in WorksManager) and click Apply.

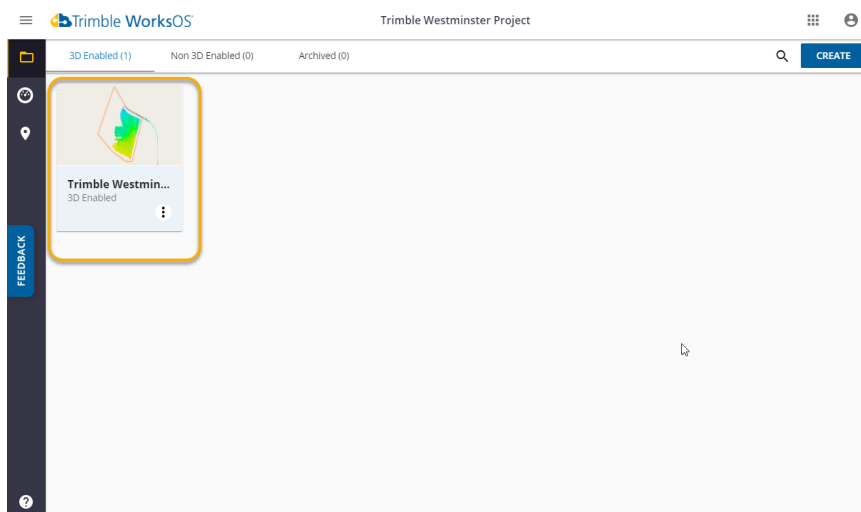
Note: If you have many accounts, type any part of the name in the Search field.



You will see tabs for three types of projects:


- 3D-enabled - a project intended to have machine productivity (.tag file) data processed into it. 3D-enabled type projects are used primarily in WorksOS, but still have full project functionality in WorksManager.
- Non-3D-enabled - a project (also known as 2D-enabled) that is not intended to have machine productivity (.tag file) data processed into it. It will still have full project functionality in WorksManager and will primarily be used there.
- Archived - a completed project (of either type) in either WorksOS or WorksManager that has been 'shelved' as a record of the work that was done. The archived state is reflected in both applications.

These are all projects you have been given access to (or created), including all projects for this account in WorksManager. For more information, see [Creating, Editing, and Archiving Projects](#).




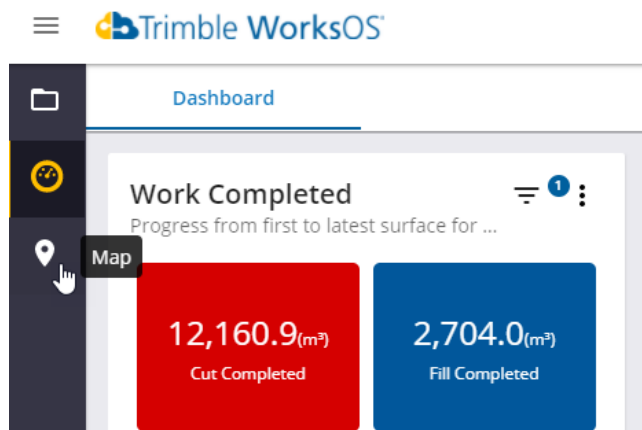
3D-Enable a Non-3D-Enabled Project from WorksManager

To make a 2D-enabled project fully functional in WorksOS, you need to 3D-enable it.

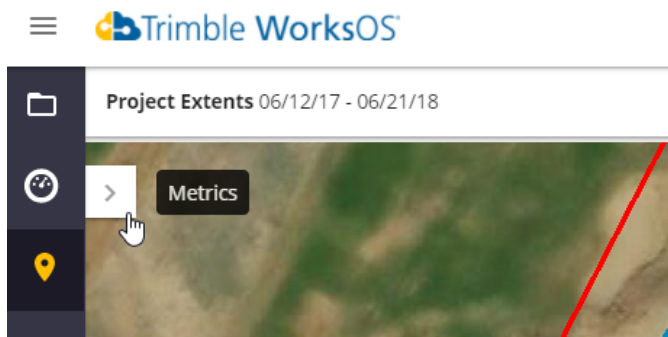
1. Click the Non-3D-Enabled tab and select the project.
2. Click the  More icon on the project tile and select Edit Project.
3. Click Next and confirm you have a .dc or .cal file attached in the Configuration Files tab. If not, click + and add an applicable site calibration.

Note: A .dc or .cal site calibration file must exist in the project (added in WorksManager) to 3D-enable it.

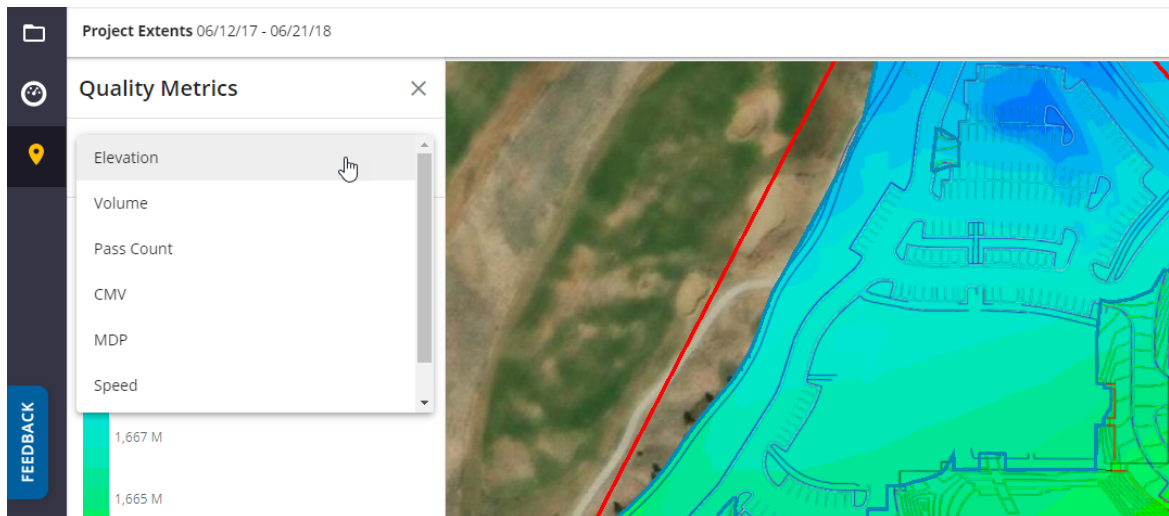
4. Click Next until you get to the Project Type pane.
5. Select 3D-Enabled in the list.
6. Click Next and Finish.
7. Wait a minute for the processing to complete and press F5 to refresh your screen. You will now see the project in the 3D-Enabled list.
8. To continue reviewing and editing an existing project, select it to open the Dashboard.
9. Review the Work Completed and Work Remaining volumes in the widgets.
10. To see the Map view, click either a widget tile or the  Map icon on the left side of the screen.



11. Click the Metrics arrow/fly-out to access Quality Metrics. For more information about map options, see this section.




12. Choose different metrics to review your project status. For more information, see View Quality Metrics and Coordinates for a Cell below.

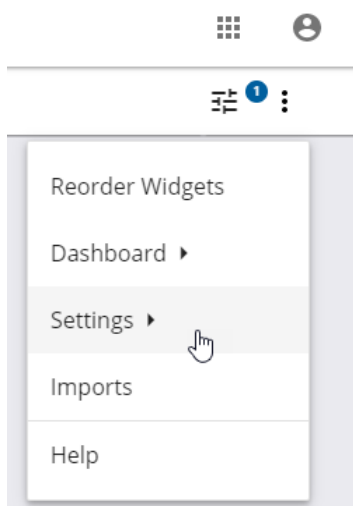


Create, Edit, and Archive Projects

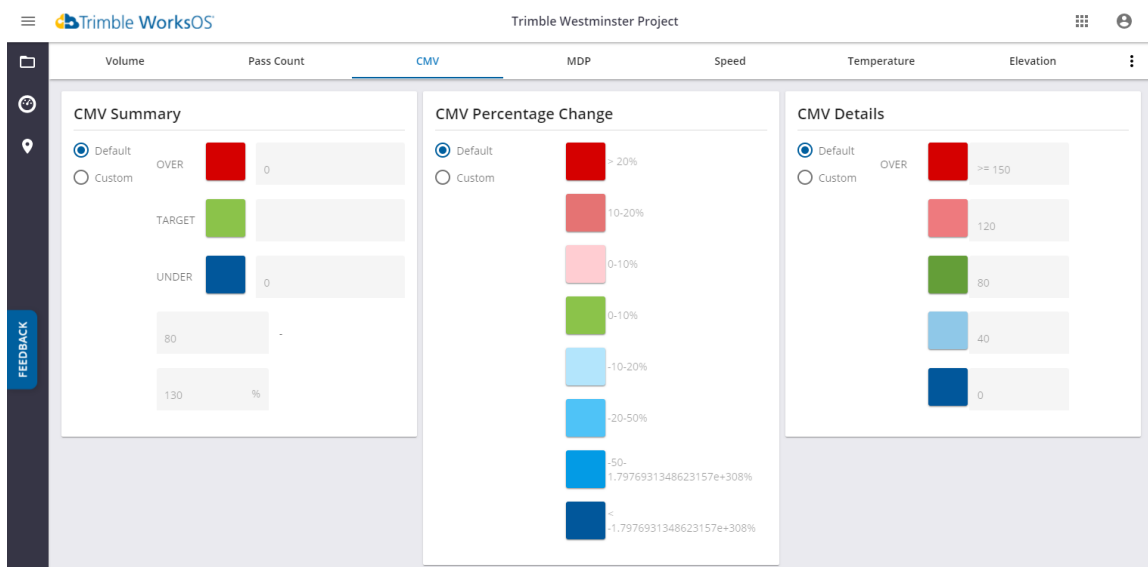
Manage Projects

Configure Project Settings

1. On the Actions bar, click the  More icon in the upper right, and select Settings > Project. This can be done either before or after you create a project.



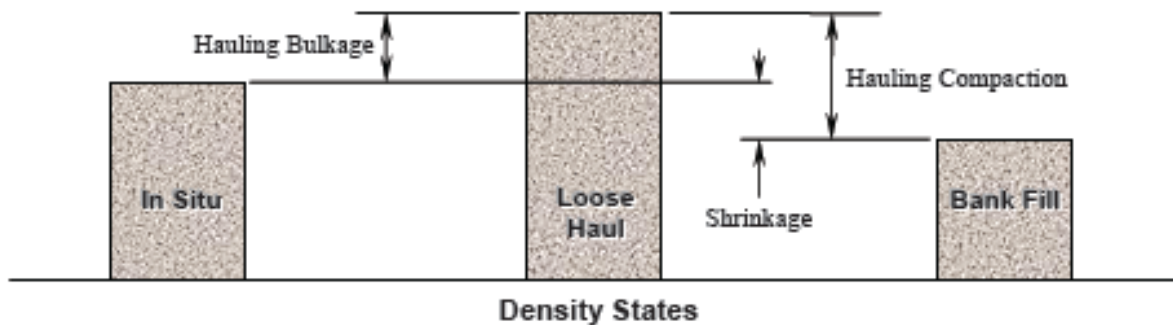
The settings for whichever metric you have selected in the Map view are shown.



2. Set preferences for:

- Volume - The amount of 3D space that a material occupies in cubic units. Volume differences are calculated by comparing two surfaces to determine how much material needs to be moved (cut and filled) during earthworks.
 - Cut/Fill - Settings for a map with shading and/or a grid of measurements at an interval showing the elevation differences between two surfaces, such as an original ground surface and a design surface. Cut/fill maps are color-coded to indicate where earth needs to be cut or filled.
 - Default - Use preset values for cut, on grade, and fill values to create a standard cut/fill map.
 - Custom - Enter values for a specific use, such as:
 - Excavation - Enter the highest and lowest elevations for a design surface. When set, this will define the target tolerances for your project for ALL devices.
 - Landfill - Enter, for example, 2' intervals for lifts.
 - Bulkage/Shrinkage - During mass earthwork operations, earthen materials, such as soils, occur in three fundamental density states, each of which contractors need to recognize, account for, and convert volumes between. Each of those density states represents specific circumstances in which the material will be encountered or handled, and for which its volume typically needs to be determined.
 - Default - Set to this when you do not need to account for material density states (or you do not have shrink/swell percentages).
 - Custom - Set material density percentages:
 - Shrinkage - Calculate the shrinkage from cut or the natural bed to fill. $= (\text{haul bulkage} \times \text{haul compaction})$. The decrease in volume of soil (or another material) due to contraction, settling, and compaction. Also, a measure of the decrease in volume of earth material as it is excavated and extracted from its in situ state and then placed into compacted earth fill. The expected amount of shrinkage for a given soil can be expressed as a percentage of the in situ soil volume (that of the material in its natural state prior to excavation). For example, a shrinkage factor of 9% indicates that the soil will shrink to occupy a volume 9% smaller than it occupied prior to its excavation.
 - Bulkage - Calculate the bulkage from the natural bed to the loose condition. $= (\text{shrinkage} / \text{haul compaction})$. The increase in volume and decrease in density of soil (or another material) due to expansion. Bulkage is a common result when soil at its original in situ density is

excavated from a job site and moved elsewhere during construction activities.



- Pass Count - A measurement of the number of times that a machine (e.g., roller compactor) has traveled over an area on a surface.
 - Pass Count Summary
 - Default - Use preset targets of 2 - 8 passes.
 - Custom - Set specific counts when there are higher requirements, such as a 4 pass minimum. When set, this will define the target tolerances for your project for ALL devices.
 - Pass Count Details
 - Default - Use preset targets.
 - Custom - Set specific values for the color-coded passes. When set, this will define the target tolerances for your project for ALL devices.
- Compacted meter value (CMV) - A measurement of the relative stiffness of compacted material as measured by a sensor on a compactor.
 - CMV Summary
 - CMV Percentage Change
 - CMV Details
- Machine drive power (MDP) - Machine drive power values recorded by compaction machine systems.
 - Default - Use preset values.
 - Custom - When set, this will define the target tolerances for your project for ALL devices.
- Speed - Vehicle speed
 - Default - Set to this when you do not need to account for speed.
 - Custom - When set, this will define the target tolerances for your project for ALL devices.
- Temperature - A measurement of the heat of asphalt material laid and compacted.
 - Temperature Summary

- Default - Set to this when you do not need to account for temperature.
 - Custom - When set, this will define the target tolerances for your project for ALL devices.
- Temperature Details
 - Default - Set to this when you do not need to account for temperature
 - Custom - When set, this will define the target tolerances for your project for ALL devices.
- Elevation - Vertical distance (height) above or below mean sea level. (2) Vertical distance above or below the geoid. (3) Distance above or below a local vertical datum.
 - Default - Use preset values.
 - Custom - The highest and lowest elevations are populated and cannot be edited. Select colors for elevation bands. When set, this will define the target tolerances for your project for ALL devices.

3. Click Save when you are done.

Settings

The Project Settings page contains all of the project targets and thresholds and all of the color settings that can be customized for the selected project. This feature simplifies customizing project targets and colors in Dashboard widgets, on the map, and in reports.



- Project Targets determines the ranges displayed in Dashboard widgets and the Map page.
- Project Colors lets you configure default or saved custom color settings for every Quality Metric data type for use in the Dashboard widgets and the Map page.

Configuring project targets

You can override target values from Machine Default values with custom target values. For example, you may need to increase the acceptable grade tolerance on this design. By overriding the lowest cut tolerance for Cut/Fill data, you can easily see the changes for grade data reflected on the map and in the Quality Metrics slider statistics.


Configure Project Settings, Map Colors, and Quality Targets

You can save your custom color selections in the color palette. This allows you to use your saved colors for other quality metric data types without having to recreate a palette each time. Saved colors are associated with user IDs and will be available for all projects accessed by this user.

1. On the Actions bar, click the  More icon and select Settings > Project. Settings for whichever category you have selected in Map > Metrics appear by default.
2. Select one of the filter types (Volume - Elevation).
3. Select Custom.
4. Click a color to access the palette. Use the color picker to choose a new color for the quality metric. You can pick a different hue for the current color in the swatch, use the slider bar to choose a new color, or enter a color's Hex value, RGB value, or HSL value (click the  arrows to access the entry formats).
5. Make changes to target values as needed.








Note: To reset targets to machine defaults, before saving, select Actions bar / Reset to Defaults.



6. Click Save. The Map and Dashboard legends update with the new colors and target values. Elevations have five colors to configure, which when saved are turned into a graduated color palette on the map.

Note: To reset colors to machine defaults, click the  More icon and select Reset to Defaults. This has to be done while you are in the Project Settings page.

Configure Map Settings

You can control the types of files to display in the Map view. You can then use the Profile tool to inspect a 2D cross-section of the work.

Map Settings	
Alignments	
Designs	
Linework	
Production Data	
Cell Information	
Devices	

1. Click the  Map icon.
2. In the Actions bar , select Settings > Map.

3. Toggle data types on/off to show/hide them in the Map view:
 - Alignments
 - Designs
 - Linework
 - Production Data
(controls surveyed surfaces; you cannot toggle Custom Areas (i.e., geofences))
 - Cell Information (see below)
 - Devices
4. Click X to close the pane.

Note: To see selected quality metrics and coordinates for an individual cell, select Cell Information. To see where the cells are located on the profile line, select Cell Markers.

Manage Users

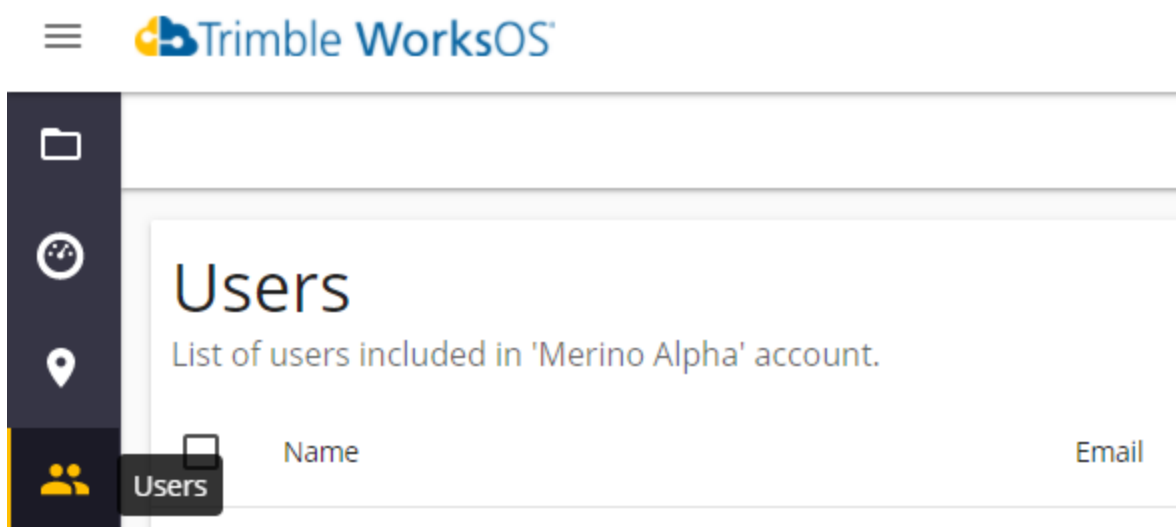
Manage Users

Add a User to a WorksOS Account

You can add one or more users to a WorksOS Account directly within the WorksOS application.

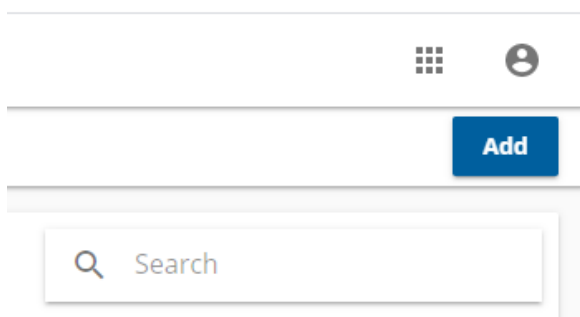
Note: This operation can also still be completed for the same account and user in Trimble WorksManager. Both applications have a common backend for accounts, users, and projects, so settings for all of these aspects are mirrored in each application.

1. Click the “Users” icon in the left-hand side navigation bar.



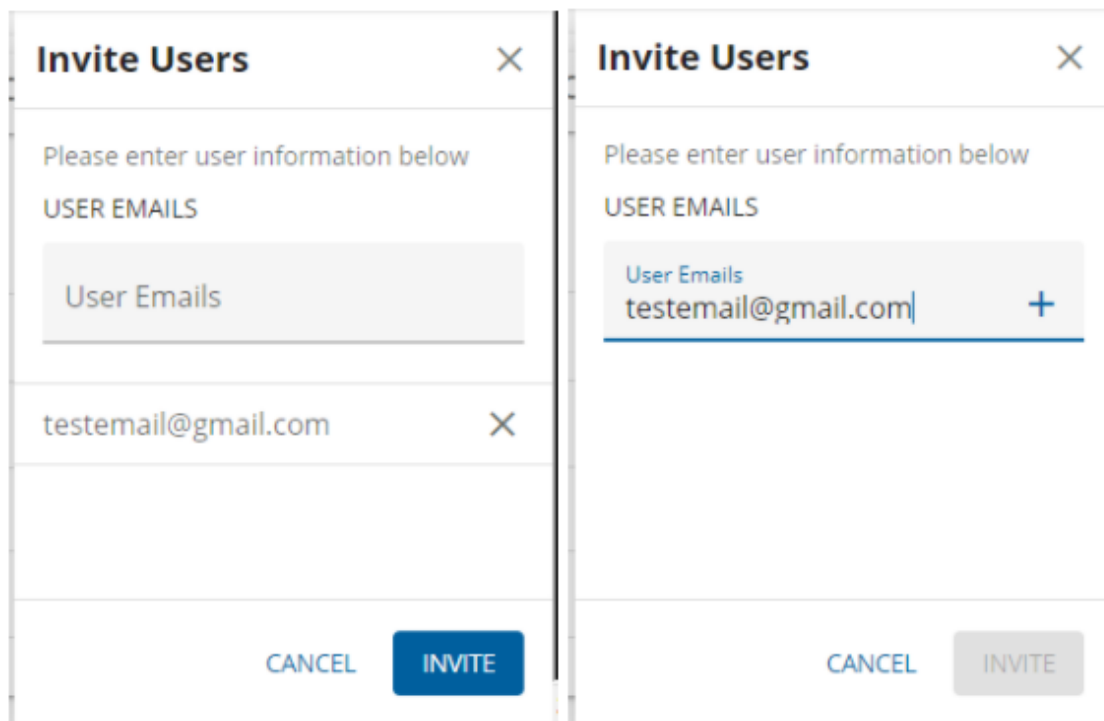
You are taken to the “Users” page which lists all existing users for the currently selected account.

2. Click the blue “Add” button in the top right-hand corner.



An “Invite Users” pane slides out from the right-hand side of the screen.

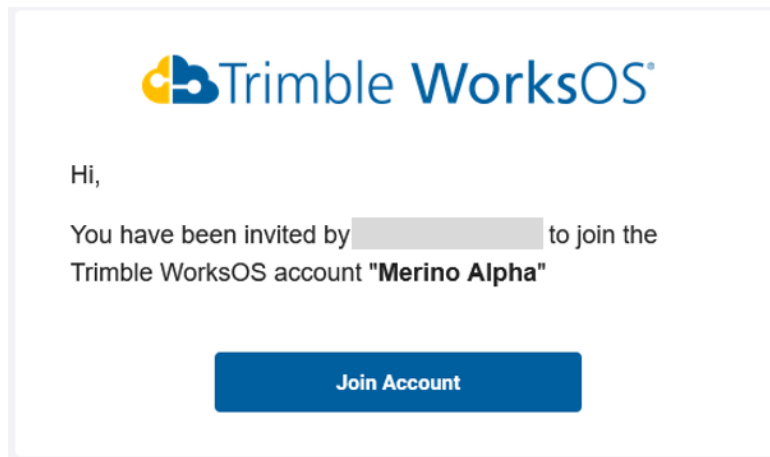
3. Begin typing the email address of the person you want to add to the account and click the + button to add the email address to the list.



Note: You can add multiple users at once in this UI by repeating the above step, once for each user.

4. After you have added all desired user(s), click the blue Invite button. A notification will appear in the bottom left corner of the screen, informing you an invitation has been sent to that email address.

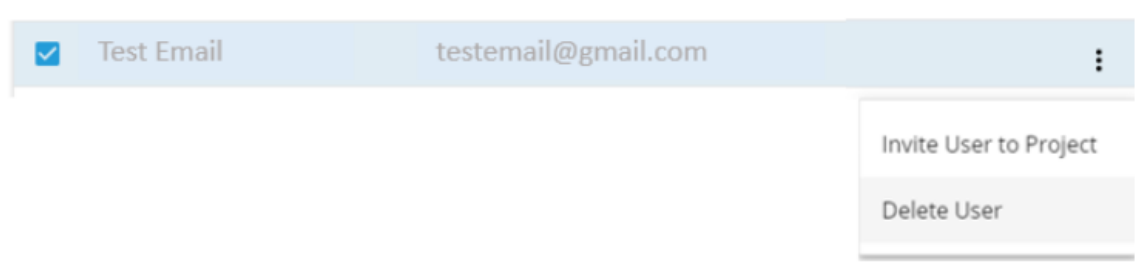
The recipient should receive an email notification in their inbox that they have been invited to an account (if not, suggest that they check their Junk Mail folders or email security settings).



The invitee must click the "Join Account" link and login to WorkOS to actually gain access to the account.

Note: The above steps only give a user access to an account; for access to a specific Project, they must be invited to a project specifically. Please refer to the section below.

Note: A user can also be deleted from an account by going to the same "Users" page and checking the box next to their name. Click the More icon (ellipsis) and choose Remove Member from Account.



Invite a User to a WorksOS Project

A user can also be added to a WorksOS Project inside the WorksOS application.

Note: This operation can also still be completed for the same account and user in Trimble WorksManager. Both applications have a common backend for accounts, users, and projects, so settings for all of these aspects are mirrored in each application.

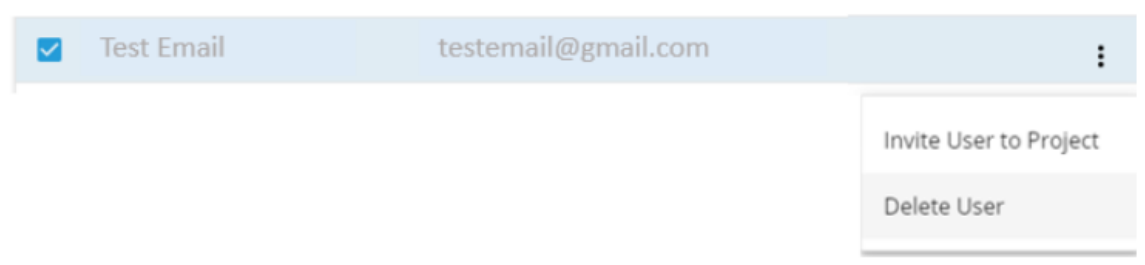
There are two ways that a user can be added to a Project.

Ways You can Add a User to a Project

From the Users Page

Once a user has been added to an account in the Users Page, they can be added straight to Projects by checking the box next to their name.

1. Click the More icon (ellipsis) and choose "Invite User to Project".

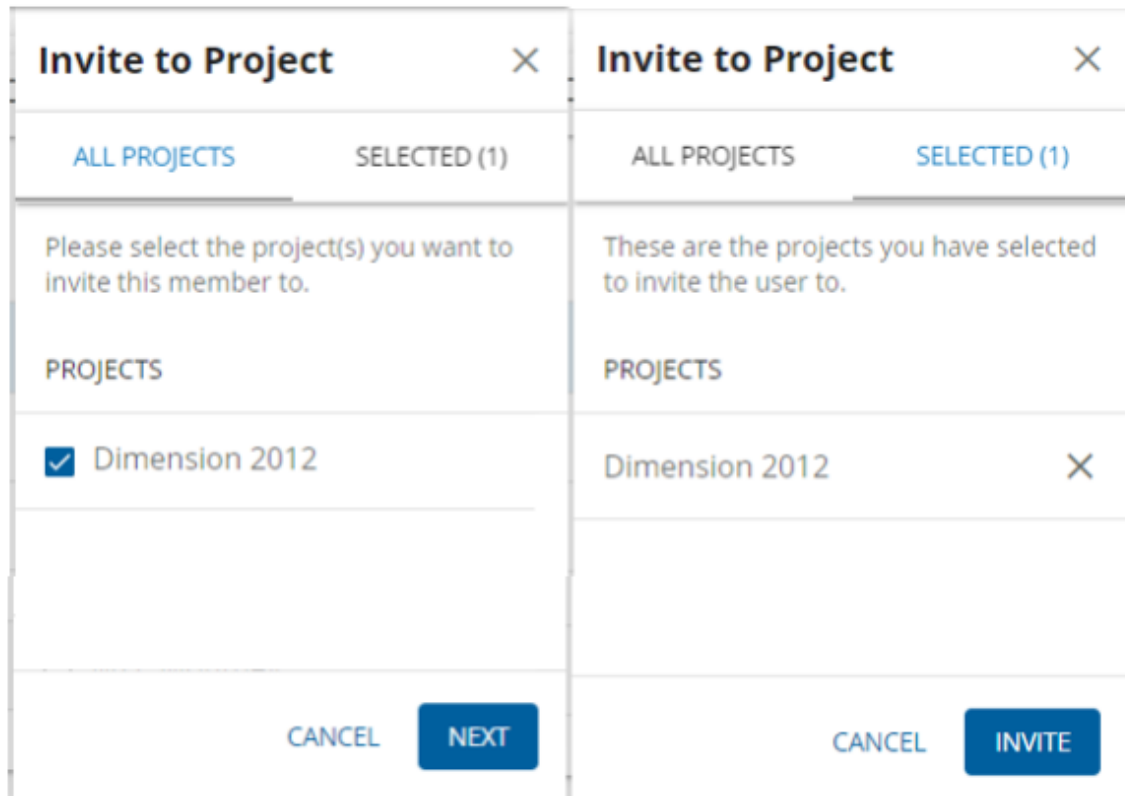


An "Invite to Project" pane slides out from the right-hand side of the screen. All existing 3D Enabled type projects for the entire account will be listed by name.

2. Check the selected Project(s) by name to add the user to.

Note: You can add a single user to a single project, a single user to multiple projects, or multiple users to multiple projects using the above steps.

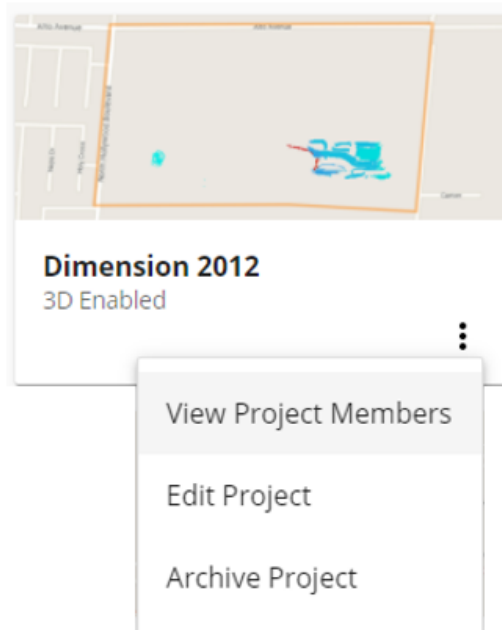
3. Once the project(s) are selected, click the blue "Next" button.



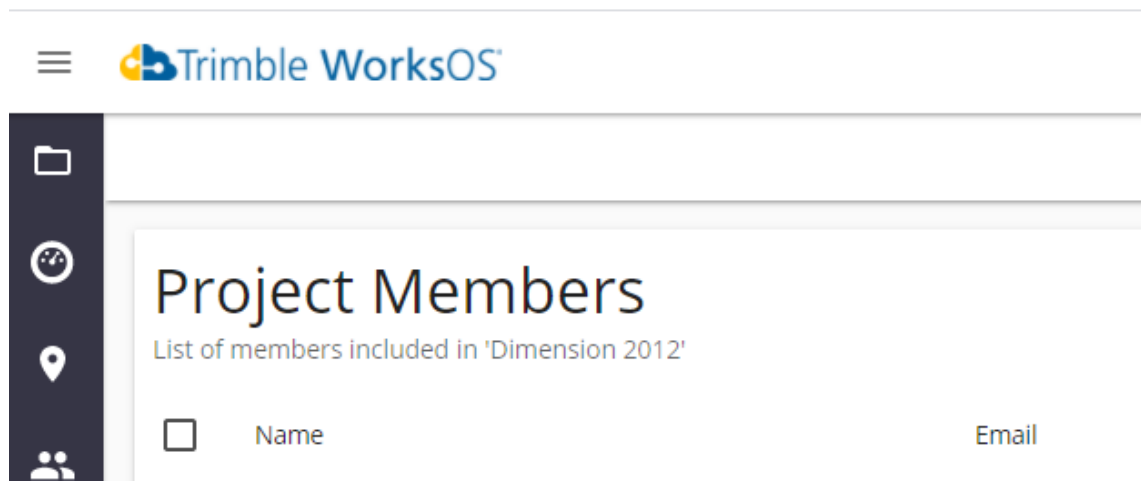
4. Once you have selected user(s) to become members for a project, click the blue "Next" button. The selected users will be listed by email address now.
5. Click the blue "Invite" button and a notification will appear in the bottom left corner of the screen informing you an invitation has been sent to that email address(es).

From the Projects Page

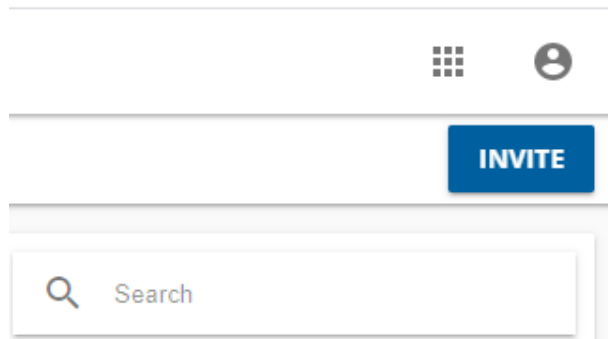
1. Find the intended project's thumbnail on the Projects Page, click the More icon (ellipsis), and select "View Project Members".



You are taken to the “Project Members” page which lists all existing users for the selected project (thumbnail).



2. To add a user, click the blue “Invite” button in the top right-hand corner.



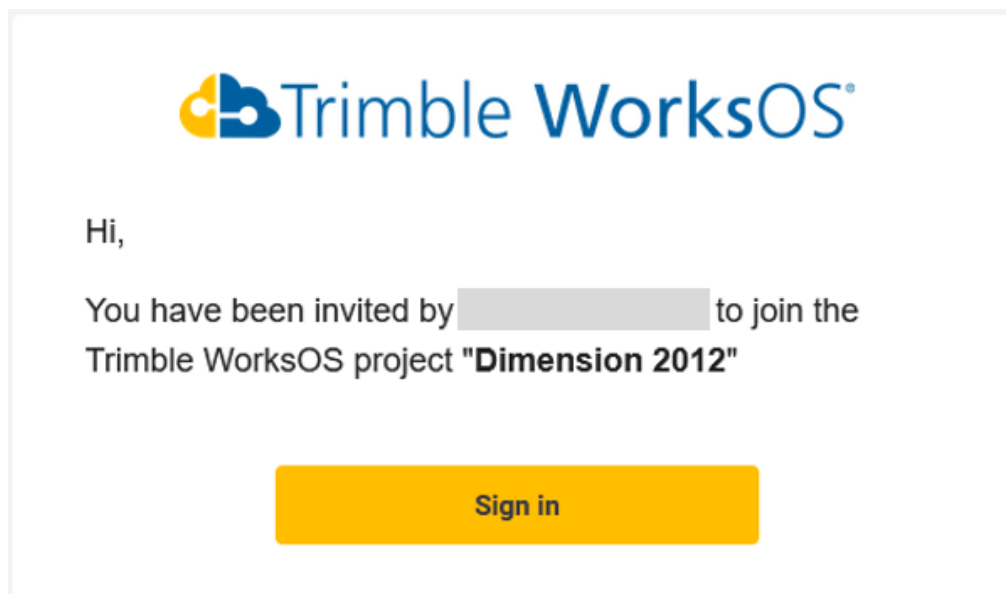
An “Invite Members to XX Project” UI slider will appear from the right hand side of the screen. All existing users for the entire account will be listed by name.

3. Either click the + button to select an existing user from the list or, alternatively, type their email address.

Note: You can add multiple users at once by repeating the above steps, once for each user.

4. Once you have selected user(s) to become members for a project, click the blue "Next" button. The selected users will be listed by email address.
5. Click the blue "Invite" button and a notification will appear in the bottom left corner of the screen informing you an invitation has been sent to the email address(es).

Once a user is invited to a project (using either method above), they should receive an email notification in their inbox that they have been invited to an account (if not, suggest that they check their Junk Mail folders or email security settings).



The invitee can click the "Sign In" link and login to WorkOS; the Project will then be available in the Projects page as a new thumbnail.

Note: A user must be invited to an account before they can be invited to a project.

Note: A user can also be deleted from a Project by going to the "Project Members" page, clicking the More icon (ellipsis), and selecting "Remove Member".


<input checked="" type="checkbox"/>	Existing User A	existingusera@gmail.com	⋮
			Remove Member

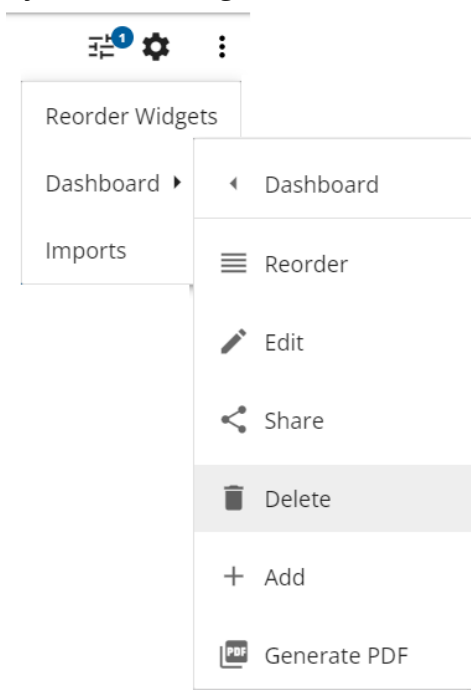
Manage and Share Dashboards

Manage Dashboards

Dashboards and their filters are specific to each project.

Adding, Editing, and Deleting Dashboards

To do any of these things, click the  More icon in the upper right, and select Dashboard.



- Edit - Allows you to change the dashboard name and description.
- Share - See the next section below.
- Delete - You are prompted to confirm, because you cannot undo or restore a deleted dashboard
- Add - Enables you to create another dashboard that can optionally include the Work Completed and/or Work Remaining widgets in small or large sizes, or to copy and then modify an existing dashboard.

In any project, these things are accessible to the users or shared with them by default:

- Imported data

These things can be shared:

- Dashboards

These things are never shared:

- Your own unshared dashboards.

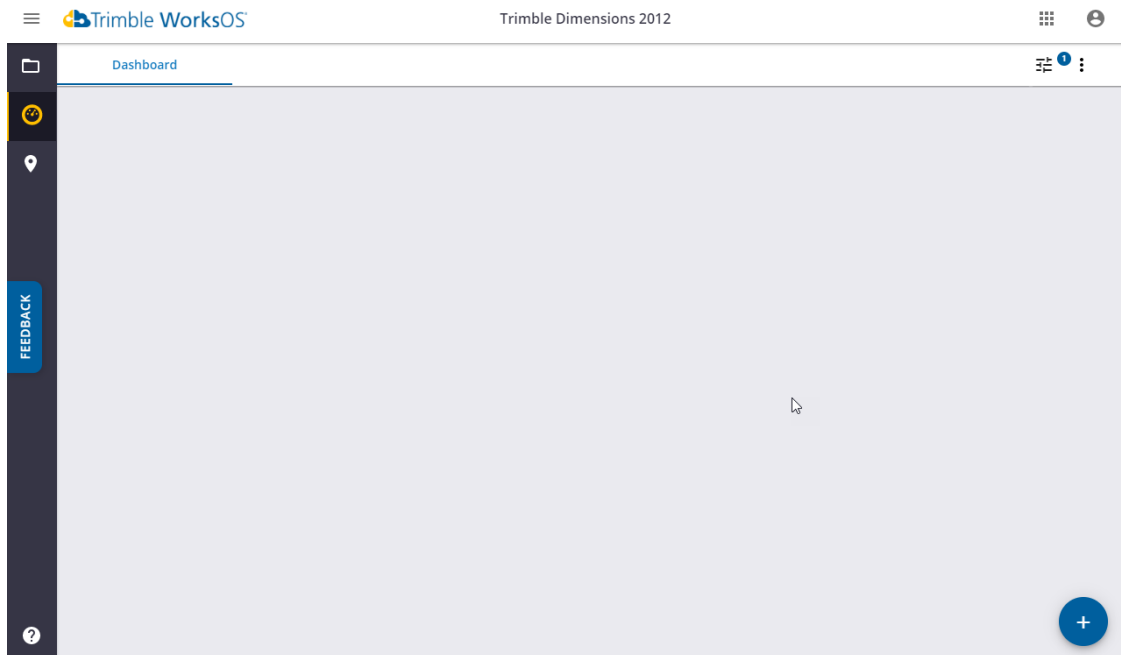
When you make a custom dashboard, you can now share it with colleagues in the same project. When you receive a shared dashboard, you can

1. Select More > Dashboard > Add.
2. Modify the dashboard widgets.

3. Select More > Dashboard > Edit.
4. In the Name field, enter a name that will be easily identifiable when you share the dashboard with colleagues. This name will not be editable by anyone but the creator once the dashboard is shared.

Add and Configure Dashboard Widgets

1. In the Dashboard, click the  Add icon in the lower-right.



2. In the Add Widgets pane, check boxes and select sizes for any of these widgets:
 - Work Completed - Shows progress (in cubic meters/yards) from the earliest ground surface to the latest surface for a selected period.

- Work Remaining - Shows progress (in cubic meters/yards) from the latest surface (or any in-progress) to a design surface for a selected period.

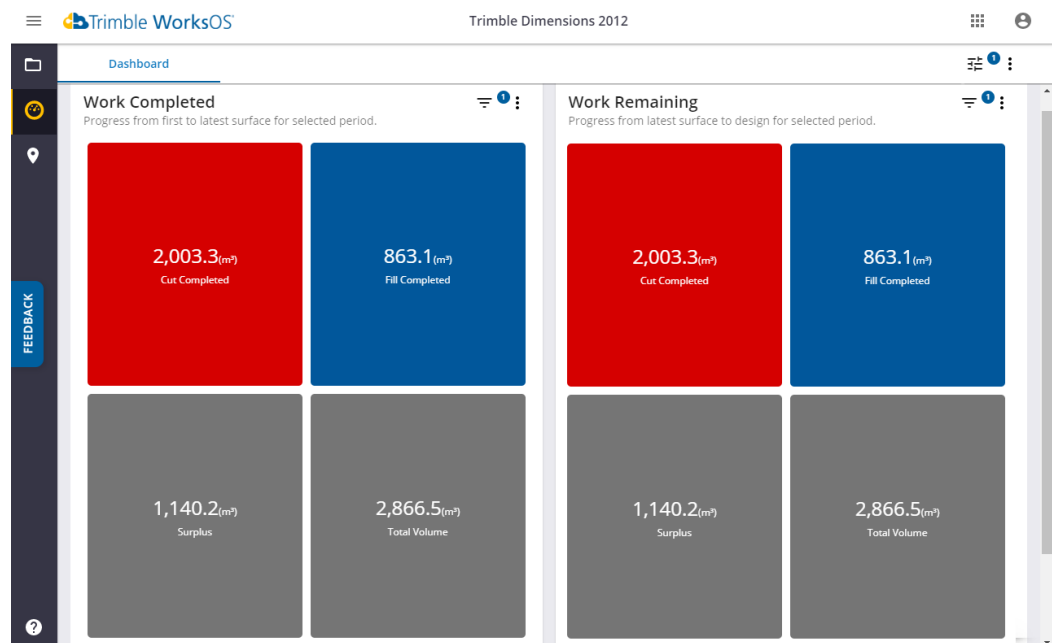
Add Widgets
X





☒ Work Completed
Progress from first to latest surface for selected period.
Widget Sizing
☐ Small
☒ Large
Only available to view on tablet or desktop.

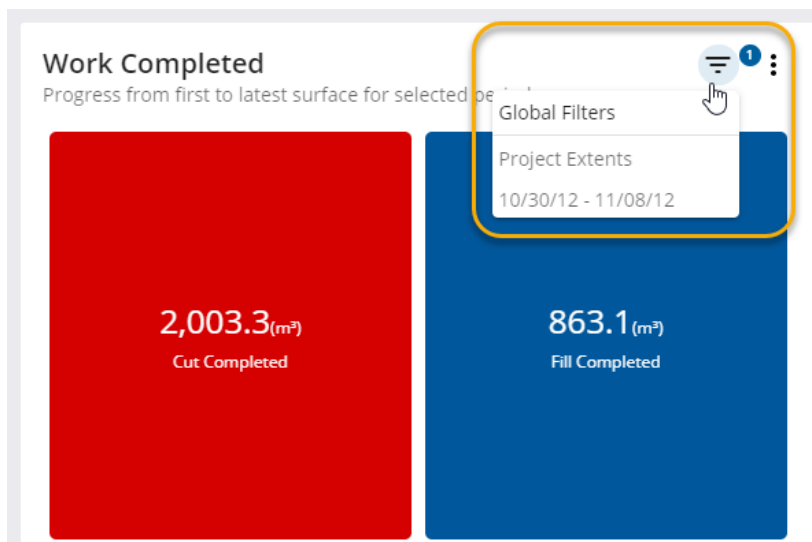
☒ Work Remaining
Progress from latest surface to design for selected period.
Widget Sizing
☐ Small
☒ Large
Only available to view on tablet or desktop.

Cancel
Add

- Click Add. Add as many widgets as you need. You can customize the filters that control what each shows using steps below.



3. Edit any widget by clicking the  More icon in its upper right corner and selecting the Custom option:
 - Change the type.
 - Enter a new name.
 - Enter a different description.
 - Change the size.
4. Continue to edit widgets by clicking the  More icon on the Actions bar:
 - Change the order of widgets by selecting Reorder Widgets. Then drag and drop the widgets in the list.
5. Add, remove, and edit Dashboards by clicking the  More icon and:
 - Select Dashboard > Add Dashboard/Delete Dashboard. Create more than one Dashboards to represent, for example:
 - different phases of work, such as excavation, grading, and compaction
 - different areas of the project site
 - different date and time ranges
 - Select Reorder Dashboards. Then drag-and-drop the Dashboards in the list.
6. Once your construction work has begun on site, review the work that has been completed and the work that remains each day. When you process new .tag file data, the applicable widgets are updated.
7. Open the Dashboard and click the  Widget Filters icon at the top of any widget.





8. Expand and edit the Dashboard Filters and Widget Filters as needed.
9. Click Apply when you are done.

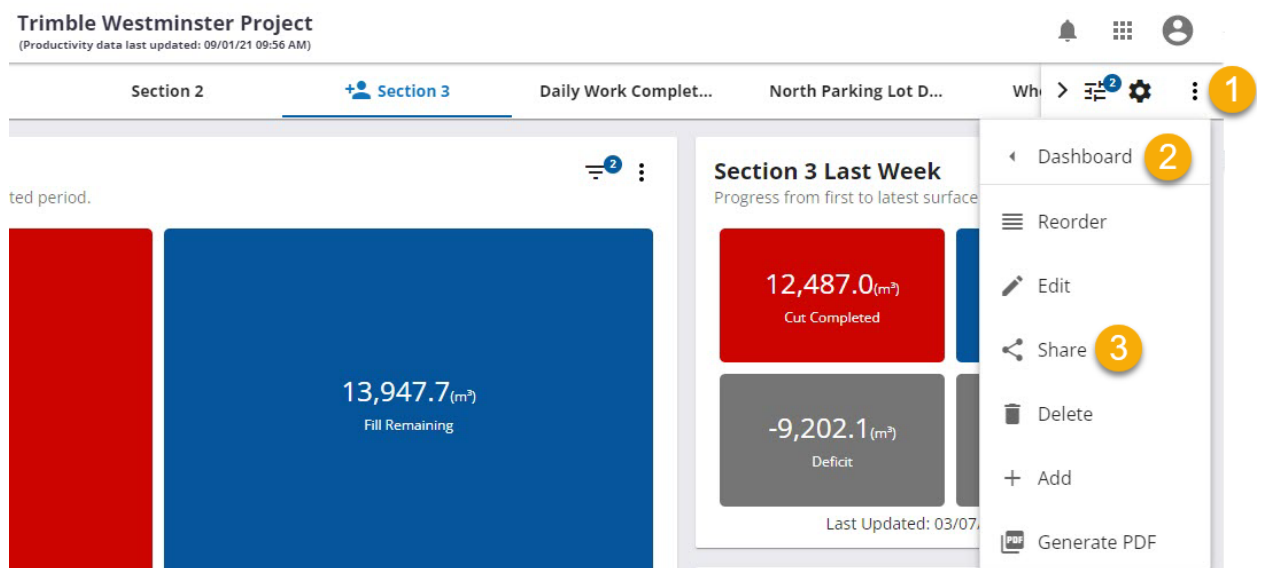
Note: You can click on any widget to open the Map view for that filtered data.

Share Dashboards

In addition to managing your own dashboards, you can also share a custom dashboard with other colleagues that have access to the same project. The ability to share dashboards (or receive ones shared with you) has these advantages:

- Only one person in your company needs to know how to set up a good dashboard.
- Your whole team can see the same Work Completed and Work Remaining data calculated using the same filters. Your staff has a consistent understanding of a project's status

1. On the left-side toolbar, click the  Dashboard icon and configure the dashboard as you want your colleagues to see it using the steps in Managing Dashboards.
2. On the Actions bar, click the  More icon in the upper right, and select Settings > Select Dashboard > Share.



3. Scroll through the AVAILABLE list (people with access to the current project) and click + next to each teammates name you want to share the dashboard with (1 below).

Share My Shared Dashboard [X]

DASHBOARD DESCRIPTION

Description Details

Please enter the information below for the user you would like to share the dashboard with

PROJECT MEMBERS

Search [2]

AVAILABLE SHARE WITH (0) [4]

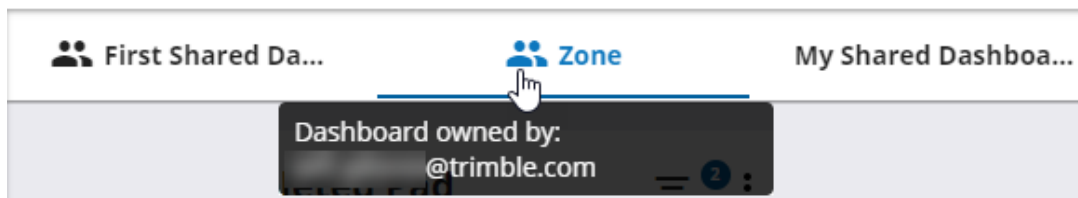
Anthony	+
Antti	+
Arthur	+
Becky	+
Bharathiselvan	+
Bill	+
Brent	+

[1]

CANCEL [3] SHARE

4. To find a colleague without scrolling through a long list, type their name in the Search box (2 above), and click + in the AVAILABLE list. You can share to specific individuals or everyone with project access.
5. Click Share (3 above). Each person you shared with is notified by email (which includes your/the creator name, dashboard name, and description). Everyone you share with gets immediate Read-only access (no edit, delete, filter functions are available) to the shared dashboard.
The name of all shared dashboards appear above the view. Hover over the icon to

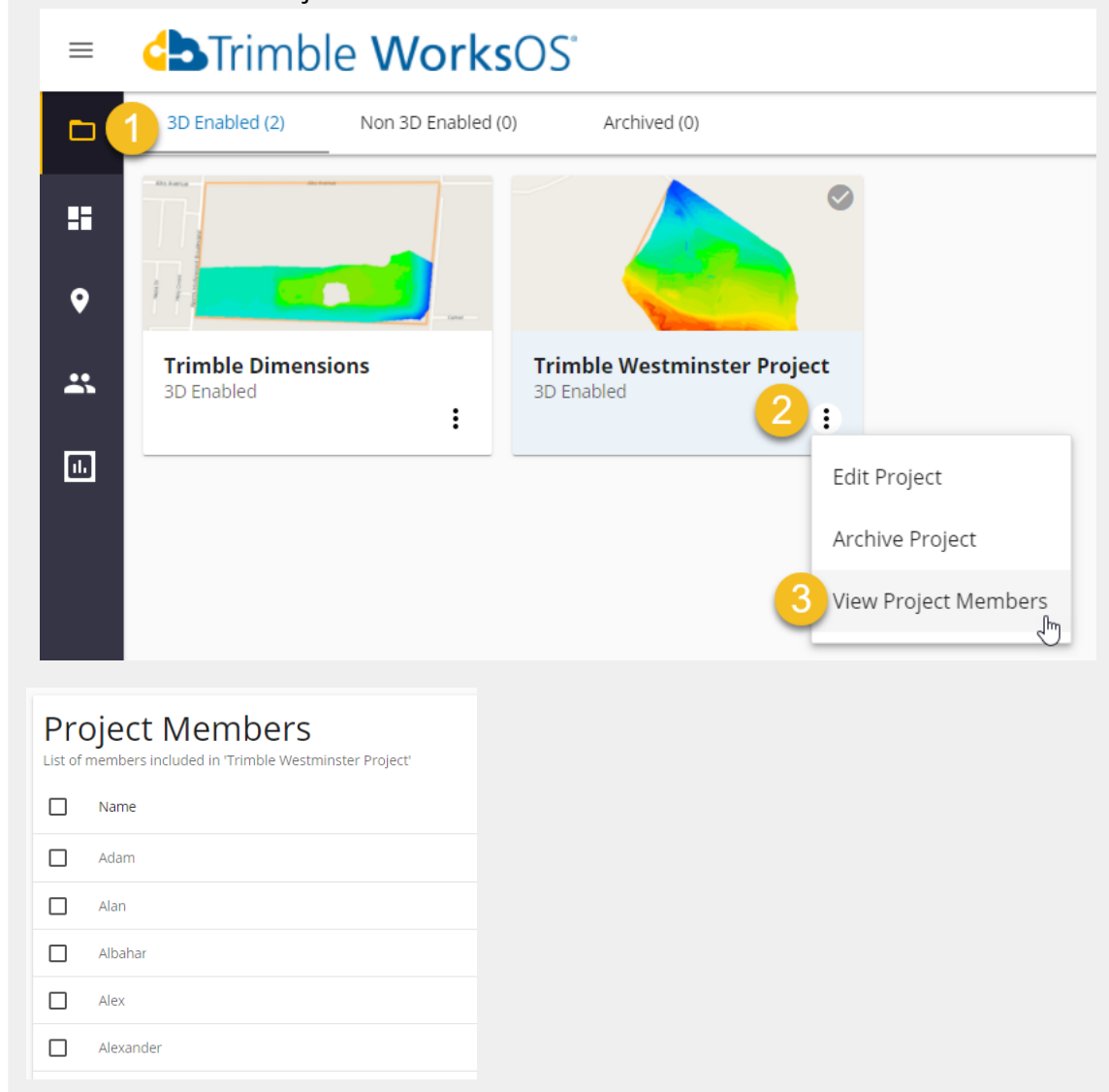
see the email address of the creator/owner of the shared dashboard.





6. To see a list of people you have shared with (and potentially remove a person), click the SHARE WITH tab (4 above).

Note: Because a company typically has only a few experts, only they will have edit and share rights. This is why the average user only has read-only permissions.

Note: You can also see who has project access by clicking the Project icon > More icon > View Project Members.



The Dashboard, Map view, and Progress Volumes screen each have their own settings and other options that are accessible via the  Settings icon and the  More icon on the Actions bar (at the upper right-hand side of the app).

Configure Map Settings and More

Configure the Dashboard

Project Settings (map colors and quality targets)




The Project Settings page contains all of the project targets and thresholds and all of the color settings that can be customized for the selected project. This feature simplifies customizing project targets and colors in Dashboard widgets, on the map, and in reports.



- Project Targets determines the ranges displayed in Dashboard widgets and the Map page.
- Project Colors lets you configure default or saved custom color settings for every Quality Metric data type for use in the Dashboard widgets and the Map page.

Configuring project targets

You can override target values from Machine Default values with custom target values. For example, you may need to increase the acceptable grade tolerance on this design. By overriding the lowest cut tolerance for Cut/Fill data, you can easily see the changes for grade data reflected on the map and in the Quality Metrics slider statistics.


You can save your custom color selections in the color palette. This allows you to use your saved colors for other quality metric data types without having to recreate a palette each time. Saved colors are associated with user IDs and will be available for all projects accessed by this user.

1. On the left-side toolbar, click the  Dashboard icon.
2. Click the  Settings icon (on the Actions bar next to the  More icon) > Project Settings.



3. On the Actions bar, click the  More icon and select Settings > Project. Settings for whichever category you have selected in Map > Metrics appear by default.
4. Select one of the filter types (Volume - Elevation).
5. Select Custom.
6. Click a color to access the palette. Use the color picker to choose a new color for the quality metric. You can pick a different hue for the current color in the swatch, use the slider bar to choose a new color, or enter a color's Hex value, RGB value, or HSL value (click the  arrows to access the entry formats).
7. Make changes to target values as needed.

Note: To reset targets to machine defaults, before saving, select Actions bar / Reset to Defaults.



8. Click Save. The Map and Dashboard legends update with the new colors and target values. The Map and Dashboard legends update with the new colors and target values. Elevations have five colors to configure, which when saved are turned into a graduated color palette on the map.

Note: To reset colors to machine defaults, click the  More icon and select Reset to Defaults. This has to be done while you are in the Project Settings page.

Excluded Elevations

1. On the left-side toolbar, click the  Dashboard icon.
2. Click the  Settings icon > Excluded Elevations.
3. See the help topic called [Apply Filters and Analyze Metrics](#).

More Menu

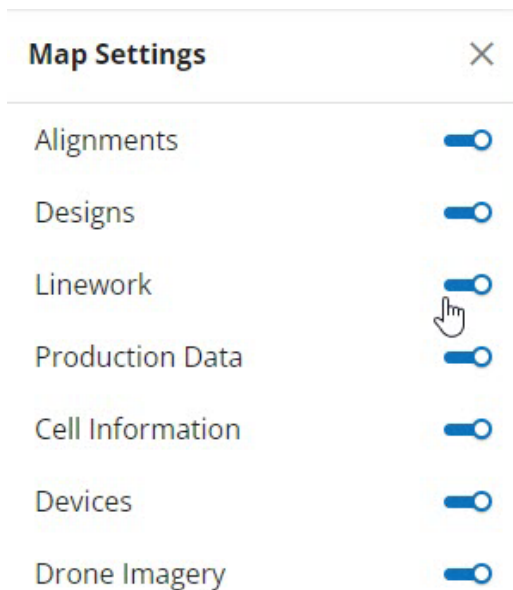
1. On the left-side toolbar, click the  Dashboard icon.
2. Click the  More icon.
3. See the help topic called [Manage Dashboards](#).




Configure the Map View

See above for Project Settings and Excluded Elevations.

Map Settings

You can control the types of files to display in the Map view. You can then use the Profile tool to inspect a 2D cross-section of the work.





1. On the left-side toolbar, click the  Map icon.
2. Click the  Settings icon (on the Actions bar next to the  More icon) > Map Settings.
3. Toggle data types on/off to show/hide them in the Map view:
 - Alignments
 - Designs
 - Linework
 - Production Data
(controls surveyed surfaces; you cannot toggle Custom Areas (i.e., geofences))
 - Cell Information (see below)

- Devices
 - Drone Imagery
4. Click X to close the pane.

Note: To see selected quality metrics and coordinates for an individual cell, select Cell Information. To see where the cells are located on the profile line, select Cell Markers.

More Menu

1. On the left-side toolbar, click the  Map icon.
2. Click the  More icon.
3. See the help topic called [Import/Export Data and Run Reports](#).

Other Map Functions

Zoom In/Out

You can zoom in and inspect the data using tools such as the Profile and Controls tools. For example, you can compare the design to the ground by drawing a profile line in the view. A longitudinal profile of the design and production layer appears above the map. You can select any point in the profile line to pinpoint the values.

Note: You can resize the map view vertically using mobile controls or your cursor while the Map and Profile views are visible. Resizing the map view vertically exposes more (or less) of the map to ensure the best use of limited screen space. The map view retains its new size during the current session.

Note: Select the Zoom to Extents map control tool (top left of the map) to return to the zoom level for the default Project Extents view.

Navigate the Map View

The Map page allows you to interact with data in a map overlay where you can inspect work done by a combination of assets for the entire project area.

The Map page is filtered by the selected date range, widgets, and design files on the Dashboard.

Note: The project boundary dictates the time zone in which the machines report. This is the time zone set when creating a new project in WorksOS Administrator. Keep this in mind when you look at a project's data reported in a time zone different from your preferred time zone; this could impact your date range selections.

Use the map to visualize the as-built surface and validate the quality of the machine data in the Quality Metrics slider.

The map is updated according to the selected Quality Metric in the Quality Metrics slider.

You can zoom in and inspect the data using tools such as the Profile and Controls tools. For example, you can compare the design to the ground by drawing a profile line in the view. A longitudinal profile of the design and production layer appears above the map. You can select any point in the profile line to pinpoint the values.

Note: You can resize the map view vertically using mobile controls or your cursor while the Map and Profile views are visible. Resizing the map view vertically exposes more (or less) of the map to ensure the best use of limited screen space. The map view retains its new size during the current session. Select the Zoom to Extents map control tool (top left of the map) to return to the zoom level for the default Project Extents view.

The Detailed Data Viewer (DDV) tool decodes and outputs machine data for a single selected cell on the map to a table that displays the complete history of all individual machine passes (including raw Quality Metrics and all machine data types). This information helps you analyze cell history and machine activity to pinpoint areas of interest or to perform quality checks.

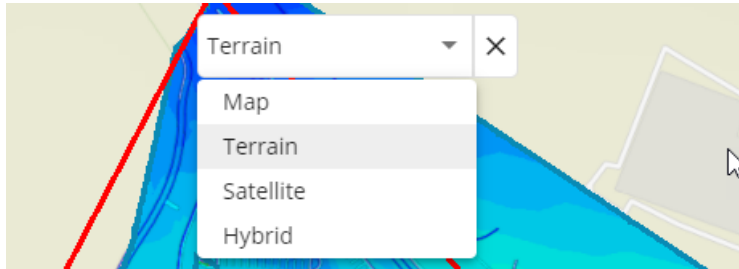
Refine, analyze, and export project data from the Map page.

Center

Moves your site to the center of the map view. (center of gravity?)

Map Type



Opens a list at the top of the screen that allows you to choose from these background map types:



Profile

You can zoom in and inspect the data using tools such as the Profile and Controls tools. For example, you can compare the design surface to the existing ground surface by drawing a profile line in the view. A longitudinal profile of the design and production layer appears above the map. You can select any point in the profile line to pinpoint the values.

Create a Profile View

1. Click the Maps icon and the Metrics fly-out.
2. Select Elevation (or Cut/Fill). Elevation contours and graduated colors are displayed for the highest (blue) to lowest (red) elevations based on filters and dates specified (or cut, fill, and on grade colors are displayed) This color scheme is based on surveyed data and machine productivity data.
3. Click the  Profile icon and pick two points on the map to create a line. The Profile View shows profiles for any enabled surfaces along the line.
4. At the top of the Profile View, click the  Controls icon to check boxes for which design, surveyed, and as-built surfaces (including specific passes) are shown in the Profile View.
5. Control the vertical exaggeration using the X- Axis Ratio and Y-Axis Ratio sliders.
6. Zoom in to compare the surface elevations.
7. Pick a point on any profile line in the view to see the distance along and elevation at that point.


8. Continue to pick different point pairs to see other elevation profiles.
9. Click the Profile icon again to hide the Profile View. Profile can be done with any quality metric. There is a Cell Marker Selection which turns on white dot cell markers in the Profile view. Turn it on and zoom right in to see them appear.

Note: You can resize the map view vertically using mobile controls or your cursor while the Map and Profile views are visible. Resizing the map view vertically exposes more (or less) of the map to ensure the best use of limited screen space. The map view retains its new size during the current session. Select the Zoom to Extents map control tool (top left of the map) to return to the zoom level for the default Project Extents view.

Custom Area

Click points around a custom area which is then added to your filters. This enables you to zoom into a specific part of your project site quickly and consistently.

Create a Custom Area

1. When drawing a custom area boundary, double-click the final vertex (white point) to close the polygon. When you hover over the  Custom Area icon (top right of the map), a tool tip explains this function.
2. Save your custom area filter with a unique name. Custom area filters are available for every user working with the project in this account. Only one custom area filter can be used at a time. After you save the custom area, the map automatically zooms to the custom area's boundary. Click the Zoom to Extents icon (top left of the map) to return to the zoom level for the default project extents view.
3. Click the Edit icon to draw a new custom area. You can click and drag vertices on the boundary to reshape it. Click Save when you are done. Each custom area is saved with the project for any users with access to quickly select.

Note: You will not see the custom area boundary take shape until you have drawn three vertices (white points). When you close the polygon, gray interim vertices are added for you.

Edit a Custom Area

You can edit a custom area boundary in two ways:

- Click and drag a white vertex to a different spot.
- Click and drag a vertex point to create a new vertex for a better fit over your data.

DDV (Detailed Data View)

View Machine Pass History in the DDV




The DDV tool decodes and displays both machine production data and surveyed surface data for a single selected cell on the map in a table that displays the complete history of all individual machine passes (including raw quality metrics and all machine data types). This information helps you analyze cell history and machine activity to pinpoint areas of interest or to perform quality checks.



When activated, the DDV map tool displays the entire cell pass history for a cell, including both machine passes and surveyed surfaces. By default, this cell pass history is in chronological order from most recent to least recent; this logic also extends to ordering surveyed surfaces by their survey date in accordance with machine pass dates/times. This ordering can be reversed to show from least to most recent by clicking the Date/Time DDV column header which will toggle the cell passes in the two ordering ways.

The DDV also recognizes any and all filters that are applied to project data and reflected in the map and the quality metrics. A cell's pass data in the DDV reflects all filters applied and returns the filtered subset of the data matching the filter criteria.

For example:



- If you filter to a single highest/lowest/first/last state and it is the surveyed surface that meets that criteria, then only that single surveyed surface data is shown in the DDV.
- If you filter to a single highest/lowest/first/last state and a machine pass that meets the criteria, then only the single machine pass is shown; no surveyed surface passes are shown in the DDV.
- If you filter to a state that excludes a surveyed surface, then that surveyed surface is not shown in the DDV.

1. Click the  Map icon.
2. Click the  Metrics fly-out and select either Volume or Pass Count.
3. On the right side, click the  DDV tool icon to open the Detailed Data View table above the map.

4. In the Map view, click any cell that contains machine data. The DDV shows all machine passes for the cell with the latest pass at the top. Information includes date/times, design surfaces, elevations, target metrics, actual metrics, and machine settings. Each individual machine pass is shown in a separate row.
5. You can use Date Range and other filters to refine the data displayed in the DDV. For example, you can select a date range and machine design to filter the data to passes by machines loaded with that design during the date range. See Filter Map Data.
6. DDV data for a single cell can also be downloaded from the table by clicking the  Download icon.
7. To close the DDV tool, click the  DDV icon again.

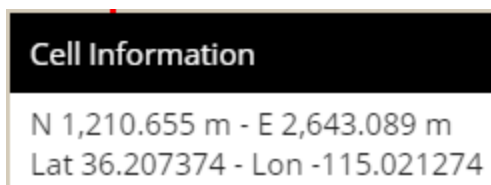
Configure DDV column settings

When the DDV tool is active, you can configure the columns to be displayed in the DDV. This lets you determine the order of the columns and column visibility, and pin columns so they remain in view as you scroll the DDV.




1. On the left-side toolbar, click the  Map icon.
2. On the right side, click the  DDV tool icon to open the Detailed Data View table above the map.
3. Make changes as needed, and click OK. The DDV updates to reflect your changes.
4. Select the Date/Time column in the DDV to change the view to the latest pass data last or first.

Cell Information

The Cell Information tool allows you to see selected quality metrics data and coordinates for an individual cell. Use Map Settings to turn Cell Information on/off Cell Information.



View Quality Metrics and Coordinates for a Cell



1. To enable the Cell Information tool, click the  Settings icon on the Actions bar (next to the  More icon).
2. Click the  More icon on the Actions bar, and select Settings > and select Cell Information and OK.
3. Select the Quality Metric in the Quality Metrics slider.
4. Use mobile controls on or hover the cursor over (desktop) the cell. A tool tip containing the cell's Quality Metric data values appears at the bottom of the screen.
 - Elevation - Elevation value (for example, Elevation: 1265.8 ft)
 - Cut/Fill - Cut/Fill value (for example, Cut: 2.5 ft)
 - Cut/Fill Volumes - Cell coordinates only
 - Pass Count Details - Pass Count value (for example, Pass Count Details: 10)
 - Pass Count Summary - Pass Count value as a percentage of the target (e.g., Pass Count Summary: 10.5 %)
 - CMV Details - CMV value (for example, CMV Details: 20)
 - CMV % Change - CMV change value (for example, CMV % Change: 20.0 %)
 - CMV Summary - CMV value as a percentage of the target (e.g., CMV Summary: 20.0 %)
 - MDP - MDP value as a percentage of the target (e.g., MDP Summary: 15.5 %)
 - Speed - Cell coordinates only
 - Temperature Details - Temperature value (e.g., Temperature: 100° C)
 - Temperature Summary - Temperature value
 - None (no Quality Metrics available) - Cell coordinates only

See details in [Filters and Metrics](#).

Configure the Progress Volumes Screen

See above for Project Settings and Excluded Elevations.

More menu

1. On the left-side toolbar, click the  Map icon.
2. Click the  More icon.

3. See the help topic called [Track Progress Volumes](#).

Other Options

Help

There are a variety of ways to learn, get help, and submit a support ticket, including:


- Terms of Use
- Privacy
- Version info (About)
- Legal notices
- [Community/Resource Center](#)

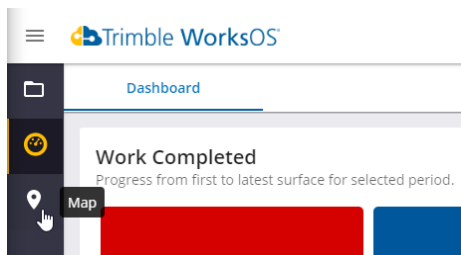
Apply Filters and Analyze Metrics

Review PPQ Metrics on the Dashboard and Map

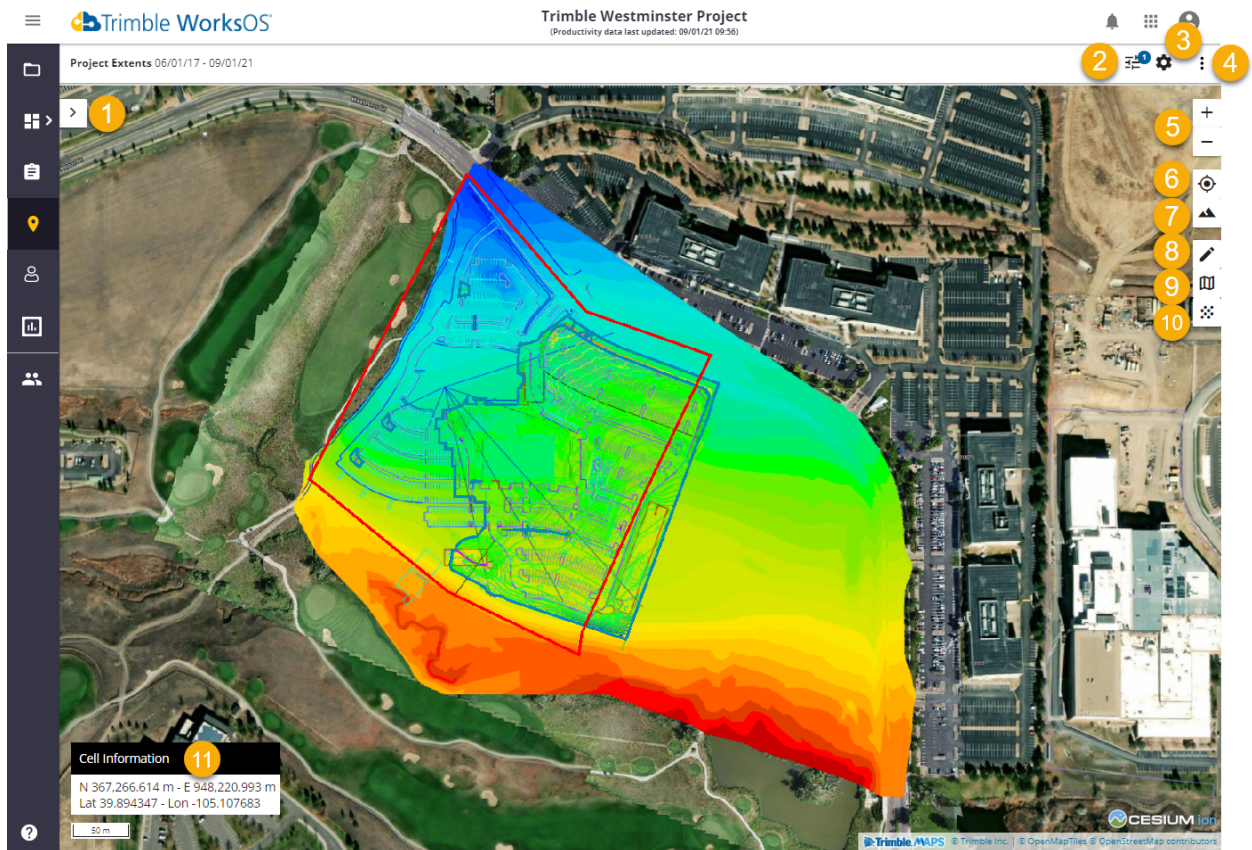
Review Project Status on the Dashboard

After you have configured your Dashboard with widgets that give a quick look at the movement of material, work completed, and work remaining, you can begin to monitor progress, productivity, and quality (PPQ) values on both the Dashboard and Map view. Once your field crews have begun, you will receive PPQ metrics from the project site as .tag file data.

1. On the left navigation bar, click the  Map icon.



2. Explore the map filters, controls, and metrics:



1. Metrics > Elevation, Volume, Pass Count, CMV, MDP, Speed, and Temperature
2. Selected Filters
3. Settings > Project Settings, Map Settings, and Excluded Elevations
4. More > Imports, Exports, and Reports
5. Zoom In/Out
6. Center (project in the view based on center of gravity within the boundary)
7. Map Type
8. Profile
9. Custom Area
10. DDV (Detailed Data View)
11. Cell information

See sections below for details on each of these.


Selected Filters

There are two types of Dashboard filters:

- Global filters are applied to the Dashboard and control filters in all widgets.
- Widget filters are applied to individual widgets. These filters can be added to or override global filters.

These filters are 'sticky', which means Dashboards retain their filter settings when you log out and back in, which saves you from having to reselect filters each time.

Configure Global Filters

1. Click the Global  Filters icon on the Actions bar at the upper right.
2. Expand each filter and select one or more options as needed. Some filters allow multiple selections.

Filters

✕

04/12/22 - 04/12/22

Finish Design - Mapping ✕

☆

Clear All

Date Range

▲

Today

✓ Yesterday

Current Week

Previous Week

Current Month

Previous Month

Last 31 Days

Project Extents

Custom

Favorite Filters

▼

Machine Name

▼

Design Boundary

▼

Machine Design

1

▲

Q Search

A-Z

Trimble

✓ Finish Design - Mapping

Trimble DM2 Design 2 15 19

Cancel

Apply

As you choose options, they appear at the top of the pane.

Filters

✕

2 Machine Selected

08/18/20 - 08/18/20

WRN00487 ✕

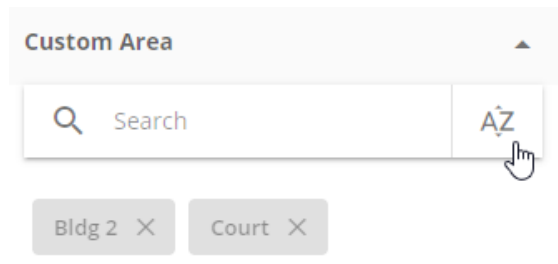
140M2 6 21 16 ✕

Lowest Pass ✕


☆

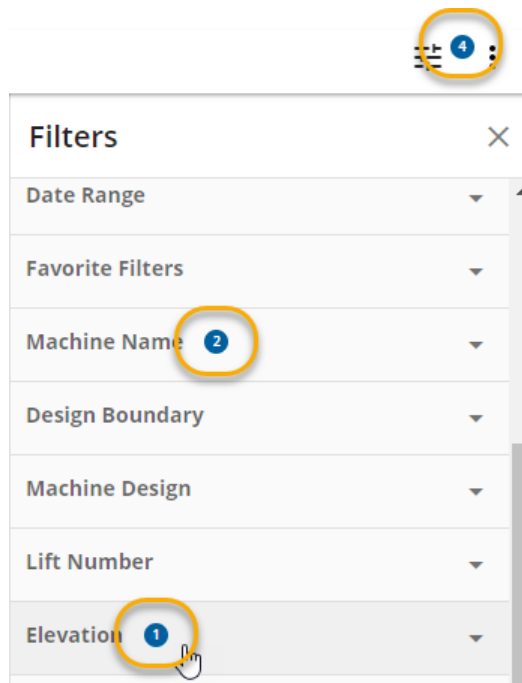
Clear All

3. When you have a lot of options, you can also use Search to find the ones you need, as well as click the Sort icon to list them alphabetically.

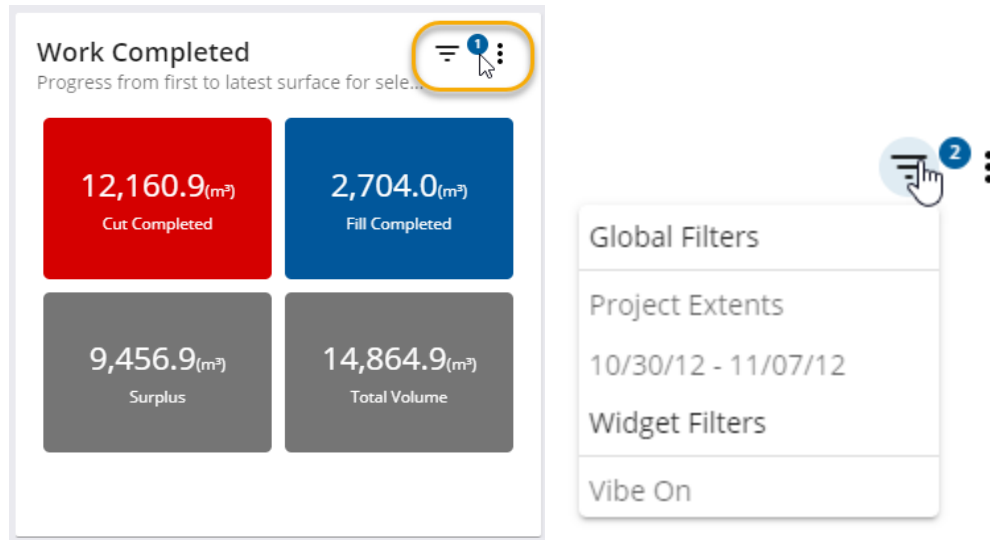


4. Click Apply when you are done. The Map view, Dashboard, and its widgets are updated based on the global filters.


Numbers next to the  Global Filters icon and filters indicate how many filters are applied. Any widget you add to the Dashboard inherits the global filters from now on.



5. To view which filters are applied to the Dashboard and widgets, hover over (desktop) or press and hold (mobile) any filter icon.



Configure Widget Filters

1. Switch to the Dashboard and click the  Widget Filters icon at the top of a widget you want to configure.

Note: For the Work Remaining widget, you must have a Design Boundary filter applied.


2. Select the filters from the Widget Filters category lists. Selected filters apply only to the widget and will not impact the rest of the Dashboard. Widget filters are added to the global filters or override existing filters.
3. Click OK. The widget updates based on the filters.
4. To view which filters are applied to the Dashboard and widgets, hover over (desktop) or press and hold (mobile) any filter icon. A pale orange global filter indicates it is overridden by a widget filter.

Note: When you navigate to the Map page from the Dashboard (not from a widget) you navigate to Elevations with the Project Extents date range filter set.

Filter Dashboard Data



The primary Dashboard filters are:

- date range
- and
- design surface or design boundary


When you click a widget, the filters applied to that widget are applied to the Map view, e.g., a good way to run a calculation from the Dashboard to the Map is by running volume calculations. From the Map view, you can also apply the global filters by clicking the  Filters icon on the Actions toolbar. Hover over the filter number icon to see the active filters.

Filter Map Data

You can filter mapped data by date range and many other factors to help you visualize the project state you want to see. The date range filter is always applied to the displayed data. Applying an additional filter further refines the displayed data.

1. Click the  Global Filters icon.
2. Select the filters from the filter category drop-down lists.
3. Click OK to apply the filters. The number next to the  Global Filters icon indicates how many filters are applied.

For example, to understand what a particular machine did on a specific day in a specific project area:

1. Filter to the day using a date filter such as Today, Yesterday, or Custom day. Date Range is a required filter.
2. Apply a Machine filter to select the specific machine whose work that day you want to view.
3. To display work done in only one area, use the Custom Area filter by clicking the  Draw icon on the map and drawing the area of interest. This will adjust the displayed data for just that custom area. All of the metrics will adjust based on the applied filters.

Filters You can Apply

You can apply as many of these filters to a data set as you need. Favorite filters can be reused in reports or elevation surveys. You can also find them within volume and Work Remaining calculations.

Date Range

Refine your project data (including surveyed surfaces) to a set period in time, including Today, Yesterday, Current Week, Previous Week, Custom, or the default value: Project

Extents. A Date Range filter must always be applied to your project. Using the Custom date range filter, you can also specify the hours and minutes.

Note: Project Extents does not use the project start and end dates. Instead, it sets the date range from the first day project data was received to the date of the most recently received project data, which lets you see all project data at once. The Custom date range lets you set a range of dates and times within the Project Extents.

Note: The project boundary dictates the time zone in which the machines report. This is the time zone set when creating a new project in WorksOS Administrator. Keep this in mind when you look at a project's data reported in a time zone different from your preferred time zone; this could impact your date range selections.



Favorite Filters

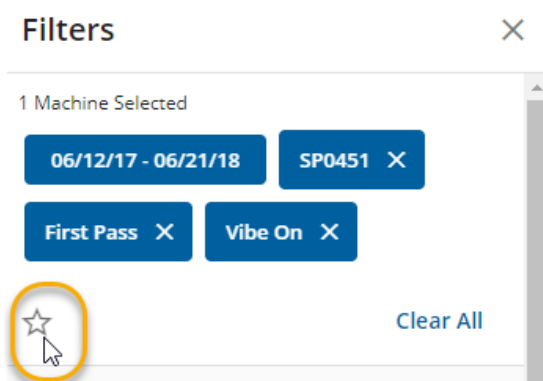
This option shows and lets you quickly reuse your saved filters.

Configure Favorite Filters

To save time, you can save a combination of filters as a **Favorite** filter. This allows you to use your filter combination without having to rebuild it each time.

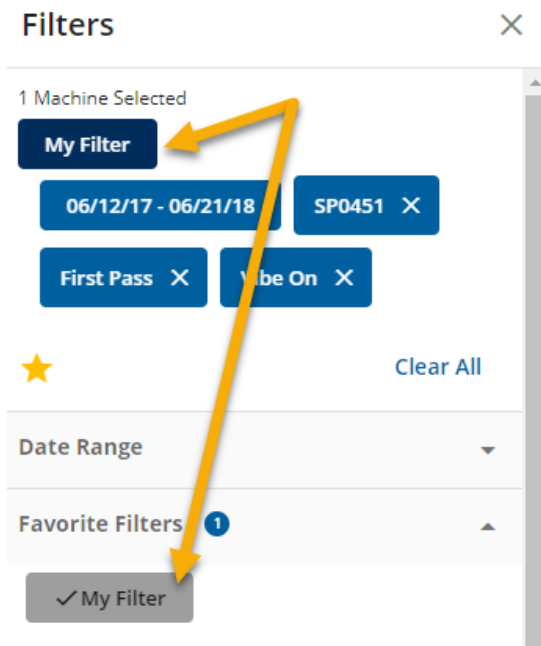
Note: Although the **Date Range** is set in a separate window, it will be included in the **Favorite** filter.

1. On the **Map** page, click the  **Global Filters icon**.
2. Select the filters you want.
3. When you have configured a commonly used filter, click the  Favorite icon to save it to your favorites.



4. Save it with a unique name, and click **OK**.

Note: The **Favorite** filter is available only to the **Favorite** filter creator. **Favorite** filters are not shared with other users working with the project in this account.



Edit a Favorite Filter

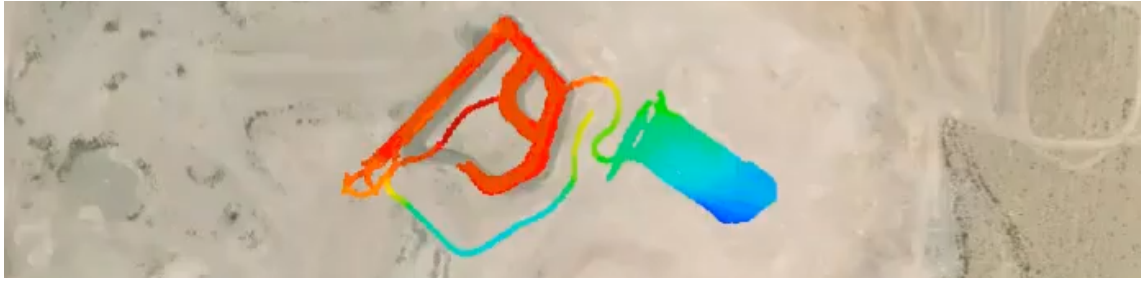
1. Select the filter in the Favorite Filters list.
2. Select the filter criteria you want to add and delete the criteria you do not want.
3. To overwrite the filter, click Apply.
4. To save the filter as a favorite with a different name, click the ☆ Favorite icon, enter the new name, and click Save.

Delete a Favorite filter

1. Select the filter in the Favorite Filters list.
2. click the ☆ Favorite icon.
3. Click Delete.

Machine Name

Refine data to machine production data and surveyed surface data from a single or multiple assets. This filter lists every asset that has submitted production data to the project (using the name of the control box installed on each machine operating within the project boundaries).



Design Boundary

Refine data to any that exists within a single design boundary.



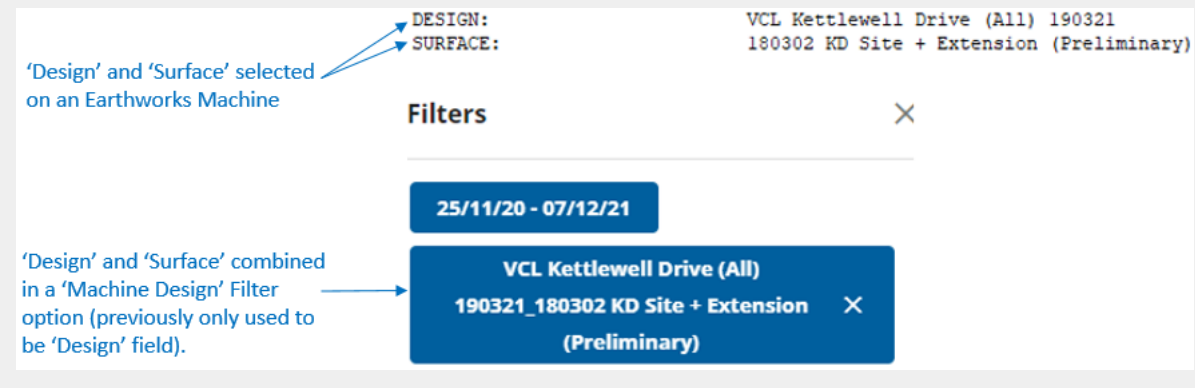
Note: These design boundaries must be imported or created as reference surface files and selected in the Project Files window.

Machine Design

Refine data to the on-machine design loaded onto a single asset that has submitted production data to the project. This filter shows data only while the design is loaded onto an asset. Any data regardless of location is shown for the selected machine design.



Note: The WorksOS 'Machine Design' filter reads surfaces from Trimble Earthworks to accommodate more granular Earthworks machine filtering. Trimble Earthworks machines that have a machine design and also a surface selected in the field reflect this in the Machine Design filters in WorksOS. The Machine Design filter options will be appended with the subselected surface name. Different surfaces loaded to the same existing machine design will appear as unique filter options, e.g., "DESIGNA_SURFACE1*", "DESIGNA_SURFACE2". This logic enables you to filter an individual Trimble Earthworks machine's productivity to a higher degree of accuracy.



Lift Number

Refine data to a single machine-defined lift by number, which can be a range of machine passes and elevations. This filter is available for any lifts that have been entered by an operator on a control box.



Elevation

Refine data to the series of cell elevations that make up the combined Highest, Lowest, First, or Last Pass for a specified area. This filter shows all cells at their highest, lowest, earliest, or latest set of elevations. Lowest pass is a good choice for excavator data to get

an idea of the starting surface. If you specify a different area, the color key is recalibrated for the area.



Alignment

Refine data to an imported alignment of linework file using a defined Start and End Station Range and Left and/or Right Offset to filter data for. When these selections are populated, the Alignment filter includes data only within the selected spatial extent and excludes all other data. These settings help eliminate excess data when doing a roadway project.



Vibe State

Refine data to submitted data from CMV-enabled compactors that performed vibratory compaction (Vibe State On) or non-vibratory compaction (Vibe State Off).



Note: When this filter is active, all other machine data is excluded.

Machine Direction

Refine data to machines that were moving forward or in reverse.



Geofences/Custom Area

Refine data to within geofences or to areas where you used the Draw tool to draw a polygon on the map to inspect data only within the area. Production data outside the boundary is excluded.



For more information, see [Create a Custom Area](#) below.

Pass Count

Refine data to a Min - Max pass count range. This filter is designed for compaction users who want to analyze Quality Metrics data filtered by a pass count range without having to export and analyze the data outside of WorksOS. Filter by Pass Count requires a lower and upper pass count range to be specified. You will see the data extents, which is the number of available passes to filter from within the range. You can set the filter to return quality metrics data such as temperature, CMV, speed, etc., from within that range. The Pass Count filter is applied after all other filters have been applied. This is done because the Pass Count filter interacts with and depends on other filters that have been applied to data.

Filter by Pass Count looks at individual passes within each cell. In this example, your machine data comes from 4 cells (Cells A - D). You are interested in a pass count range of 3 to 4. As shown below, data from passes 1, 2, and 5 would be excluded while data from passes 3 and 4 would be included. Data from Cell C would be excluded while relevant data from Cells A, B, and D would be included:

Excluded	Pass 5			
Included	Pass 4	Pass 4		
Included	Pass 3	Pass 3		Pass 3
Excluded	Pass 2	Pass 2	Pass 2	Pass 2
Excluded	Pass 1	Pass 1	Pass 1	Pass 1
	Cell A	Cell B	Cell C	Cell D

Temperature

Refine data to a Min - Max asphalt temperature range. This filter is designed for asphalt compaction users who want to analyze Quality Metrics data filtered by a temperature range in their choice of units. Filter by Temperature Range requires a lower and upper

temperature range to be specified. You can set the filter to return quality metrics data such as pass counts, CMV, speed, etc., from within that range. The Temperature Range filter is applied after all other filters have been applied. This is done because the Temperature Range filter interacts with and depends on other filters that have been applied to data.

Automatics

Filter by Automatics filters machines when they have Automatics engaged in their GCS or Earthworks Machine Control systems and when they do not. It can provide a starting point for efficiency measurements (for example, time using Automatics mode vs. time not using Automatics mode). Site managers and project foremen use this filter to check when operators engage machine control and/or to remove unnecessary production data.

When a machine is using Automatics mode, its blade, bucket, or drum automatically tracks work done to achieve the machine's loaded design grade. Best practices for Machine Control often include using Automatics mode as often as possible.


The Automatics filter has Automatics On and Automatics Off selections that refine and return Quality Metrics data. Automatics On includes states such as Auto, Inactive Auto, etc., from Machine Control systems. When the filter is active, it excludes data from machines that do not have Automatics configured (Undefined).

Excluded Elevations

Use the Excluded Elevations filter to specify the valid elevation band for your project. Machine data with elevations above or below this range will be excluded from calculations. This can help improve the accuracy of your material volumes. Filtered data is not deleted or otherwise purged. This setting is disabled by default.

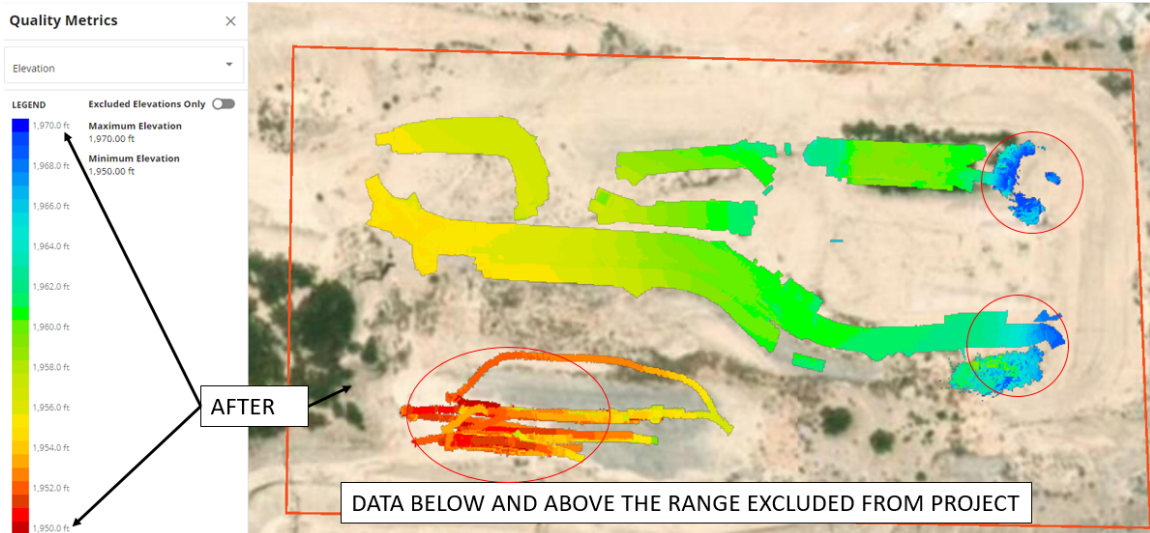
1. On the left navigation bar, click the  Map icon and in the Elevations Quality Metric you will see your current Project Elevations range.



2. Click the  Settings menu icon and select Exclude Elevations.
3. An Excluded Elevations slider dialog will appear on the right-hand side of the screen.

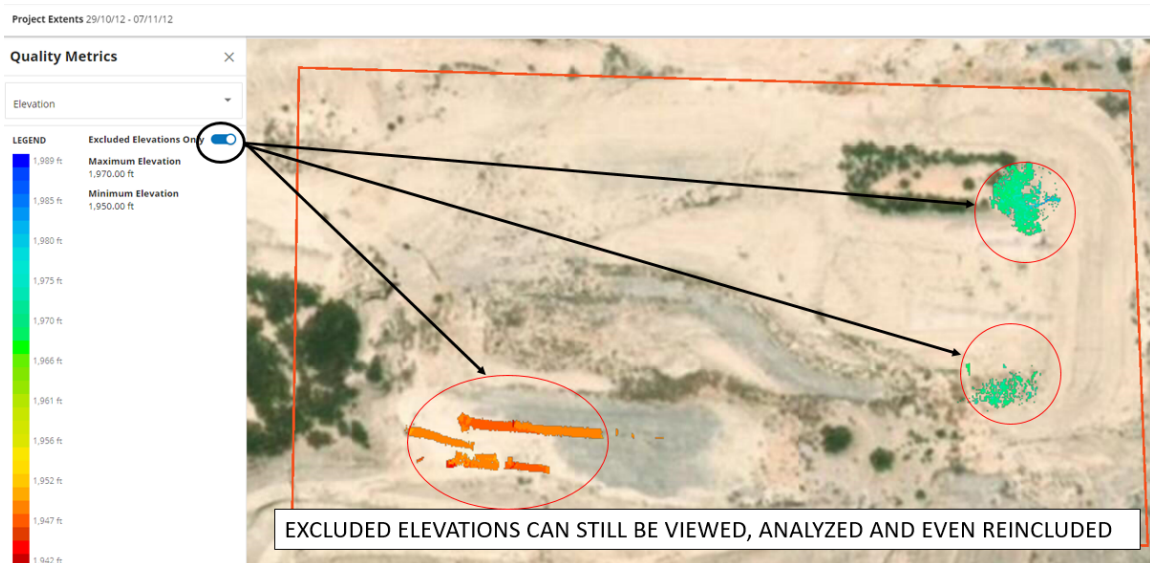
The screenshot shows the 'Excluded Elevations' dialog box. It has a title bar with a close button (X) and a settings gear icon. Inside the dialog, there is a toggle switch labeled 'Turn On Elevation' which is currently turned off. Below the toggle are two input fields: 'Maximum Elevation' with the value '635' and a unit 'm', and 'Minimum Elevation' with the value '601' and a unit 'm'. At the bottom of the dialog is a blue button labeled 'Apply Elevations'.


4. Enter the Minimum and Maximum Elevation range values (every elevation above and below this range will be excluded).
5. Click the 'Apply Elevations' button.
6. To apply the Elevations Range to the data click the 'Turn On Elevation' toggle. The slider will close and the data will automatically update on the Dashboard, Activity Dashboard, Map and Progress Volumes Pages.
7. Review your model data without the elevations you filtered out.



Note: You can turn off Excluded Elevations by accessing the menu again and toggling it off.

Note: To see and analyze just the data that has been filtered out, switch back to the Elevations Quality Metric and toggle Excluded Elevations Only on.



8. On the right side menu, click the  DDV tool icon to open the Detailed Data View.
9. Click a location on the map to pick a cell, and review raw data properties like what:
 - machine collected the data
 - design was loaded
 - coordinate system was used
 - the date and collection time was

- the GPS accuracy was to see if changes need to be made in the field.

10. Click the  DDV tool icon again to close the Detailed Data View.

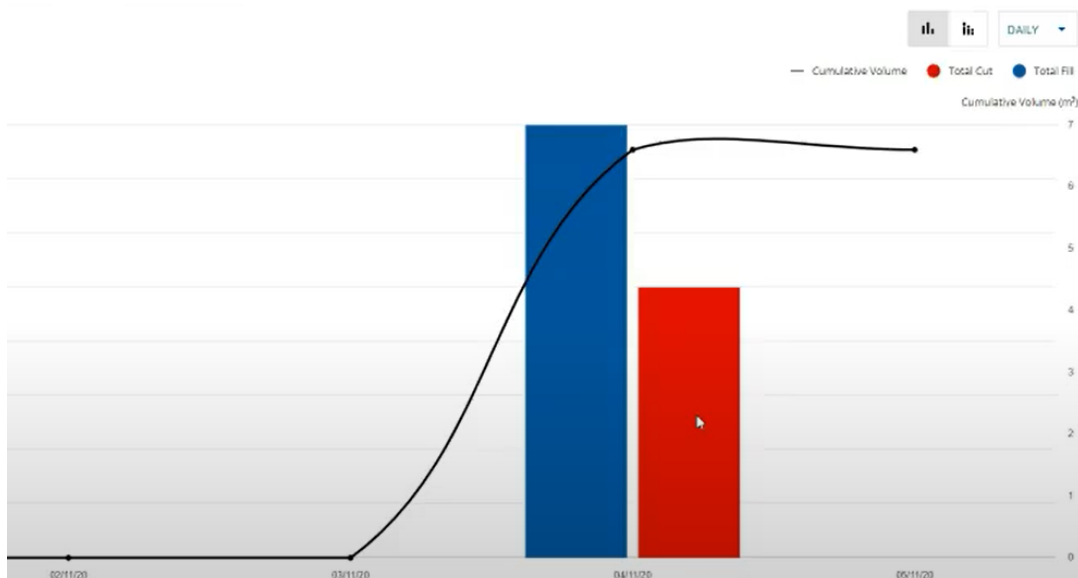
Tip: If you see data that should have been included in calculations, go back to the Elevation Range filter and adjust the top and/or bottom elevations to re-add it.


11. To export the raw data (while still viewing excluded elevations), select More > Exports > Machine Passes.
12. To generate a summary report with a screen capture (while still viewing excluded elevations), select More > Reports > Summary. The exported data and reports can help you analyze and prevent the collection of data with invalid elevations in the future.

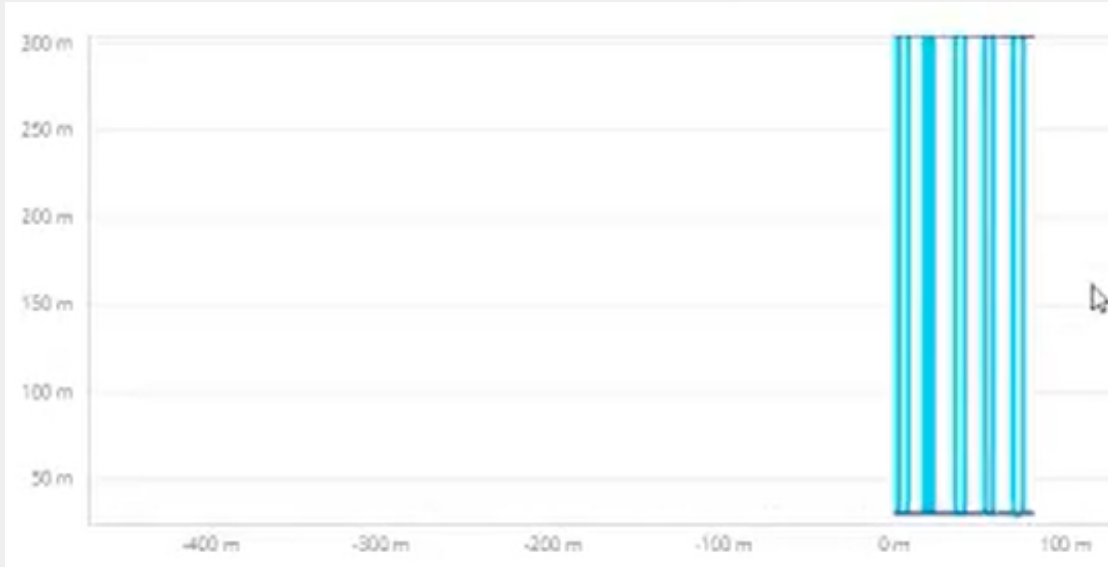
Note: When you are in excluded elevations, the export and report options will only pass the excluded elevation data. When you are not viewing excluded elevations, the export and report options will pass the elevation data not including the excluded elevations. Be careful to be in the right mode when you...

Filtering your data by elevation range affects everywhere you see volumes, such as:

- Dashboard volumes
- Progress volumes



Tip: Use your Profile Viewer to check for elevation spikes in your data. On the right side of the Map View, click the  Profile icon and pick two points on the map to create a line. If the profile along the line looks anything like this, you may have bad data that needs to be filtered.



Metrics

Elevation



Elevation filter

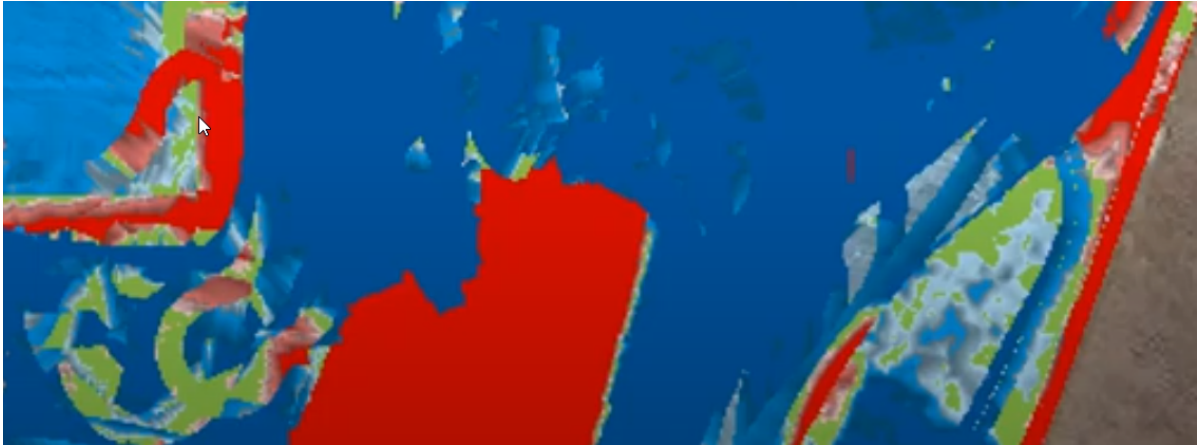
Uses: Excavations

Volume

Terms in heavy construction and earthmoving used to indicate whether soil is to be removed or added, respectively. Get a Work Remaining (cut/fill) map relative to the available elevation data and any imported designs.

Note: There is no separate Work Remaining metric in WorksOS. Instead, see Work Remaining for volumes).

Cut/fill map



A map with shading and/or a grid of measurements at an interval showing the elevation differences between two surfaces, such as an original ground surface and a design surface. Cut/fill maps are color-coded to indicate where earth needs to be cut (on page) or filled (on page). See Compare Surfaces and Calculate Volumes.

Uses: Excavation and Grading type projects

Pass count

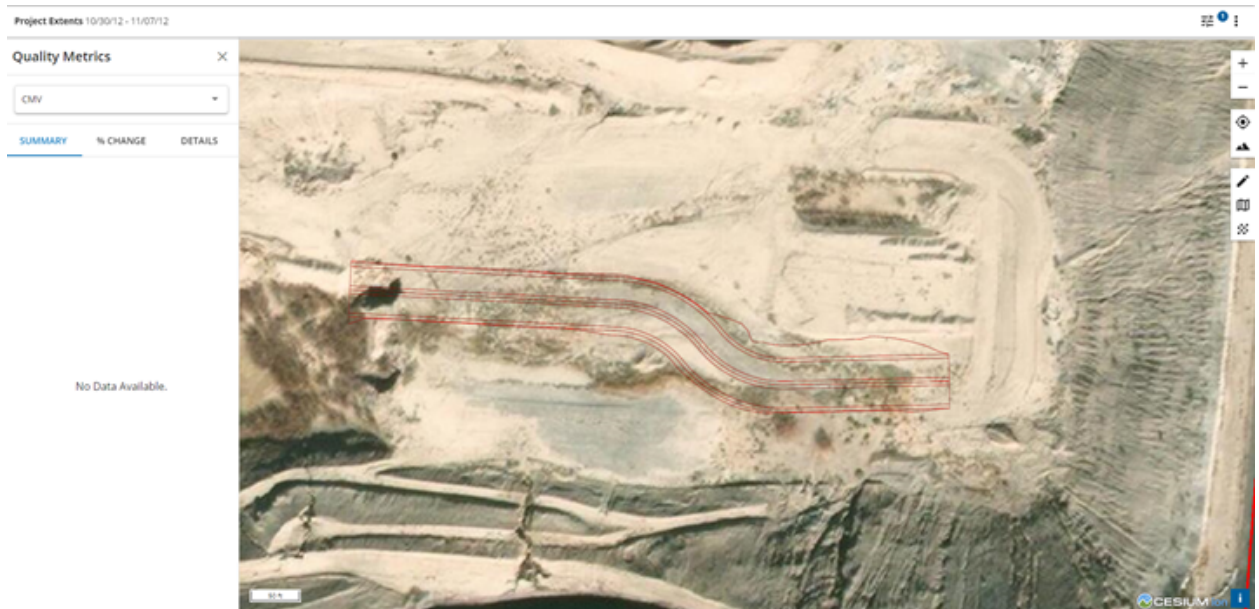
A measurement of the number of times that a machine (e.g., roller compactor) has traveled over an area on a surface.



Uses: Compaction

Compacted meter value (CMV)

A measurement of the relative stiffness of compacted material as measured by a sensor on a compactor.

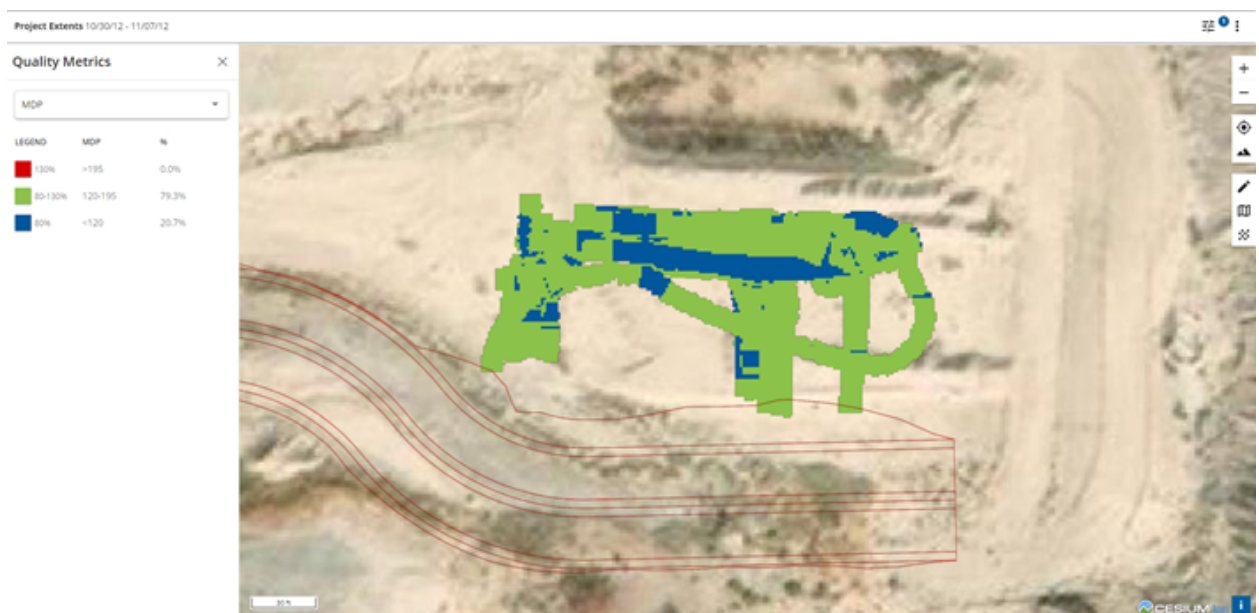


CMV

Uses: Compaction

Machine drive power (MDP)

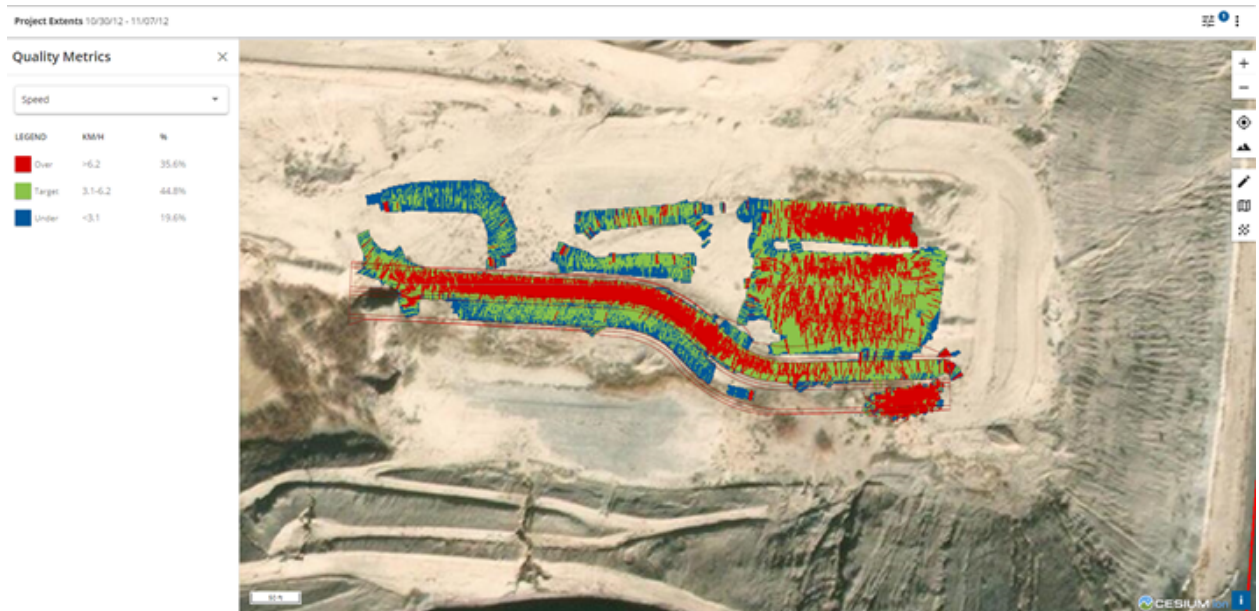
Machine drive power values recorded by compaction machine systems.



MDP

Uses: Compaction

Speed



Speed

Uses: Compaction

Temperature



Uses: Compaction

Work Completed



Volume – Work Completed

Volume – Work Remaining










Volume – Work Remaining

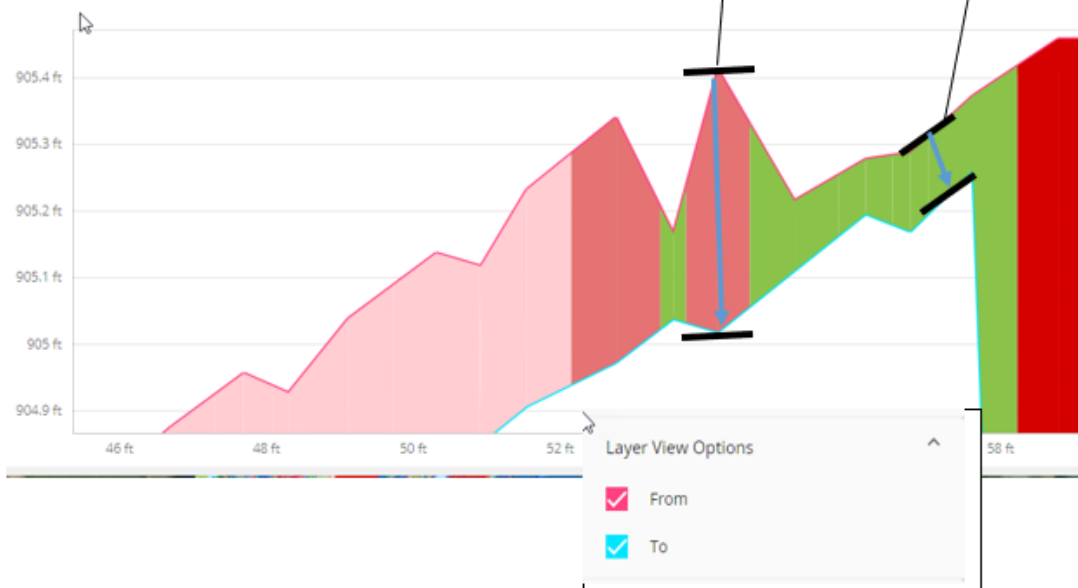
Addendum

Understand Cut/Fill Colors

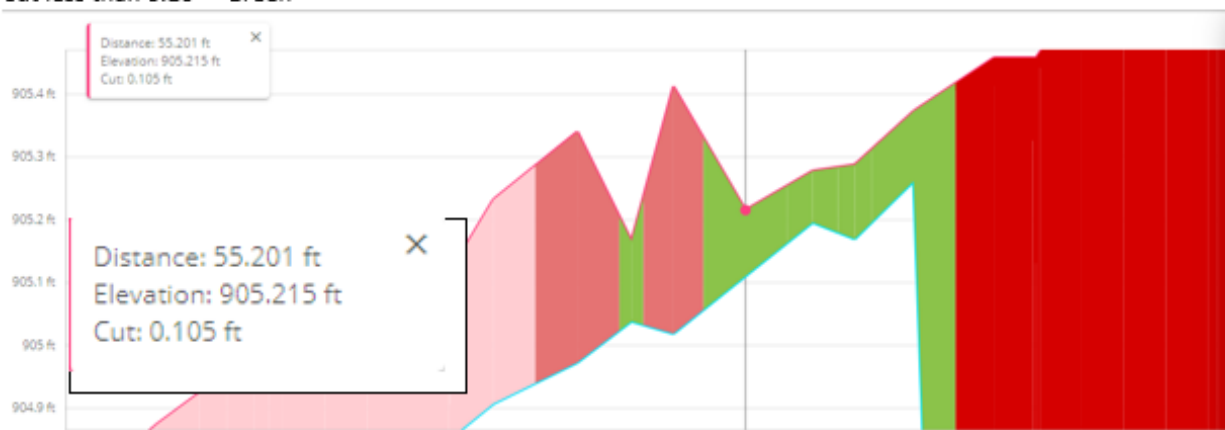
In WorksOS, the Work Completed calculation compares the volume and elevation change between two surfaces and assigns colors based on the Project Settings. 'Grade' = Original untouched surface.

The color changes as the elevation changes from 'Grade'.
Using the defaults, if you cut an area down <-0.16 feet it will remain green.

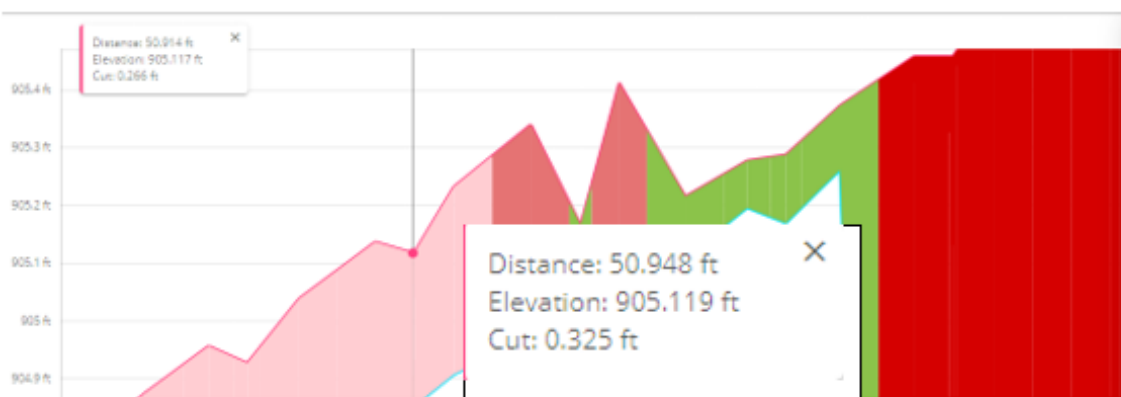
Volume	Pass Count	CMV
Cut/Fill		
<input checked="" type="radio"/> Default		
<input type="radio"/> Custom		
CUT		0.66 ft
		0.33 ft
		0.16 ft
GRADE		0.00 ft
		-0.16 ft
		-0.33 ft
FILL		-0.66 ft



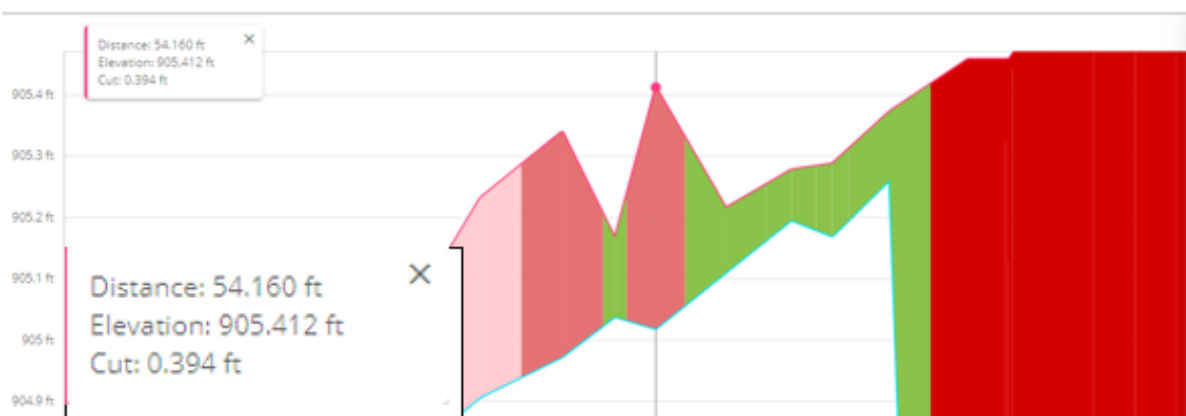
Cut less than 0.16' = Green



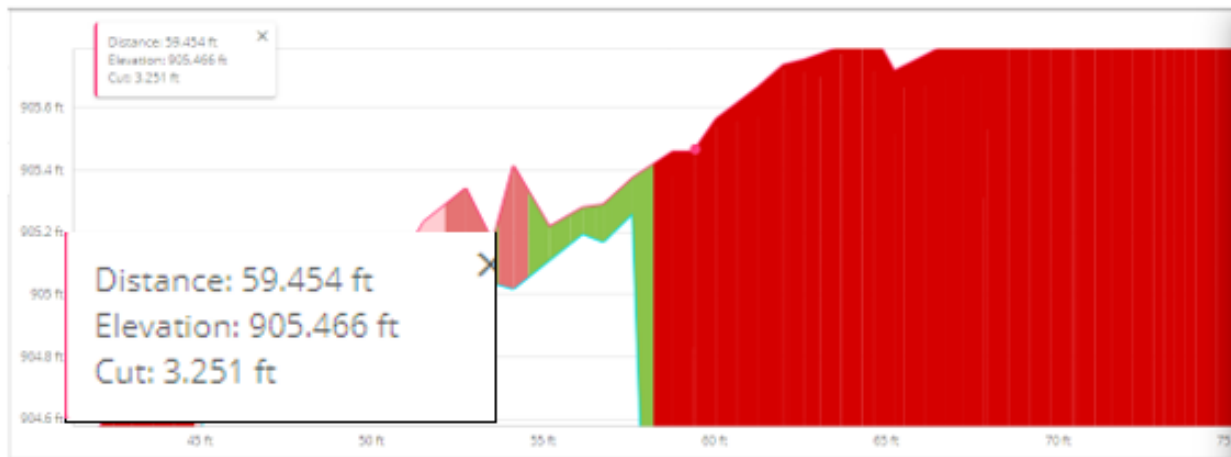
Cut between 0.16' – 0.33' = Pink



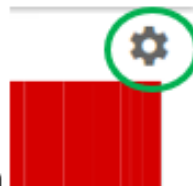
Cut between 0.33' – 0.66' = Light Red



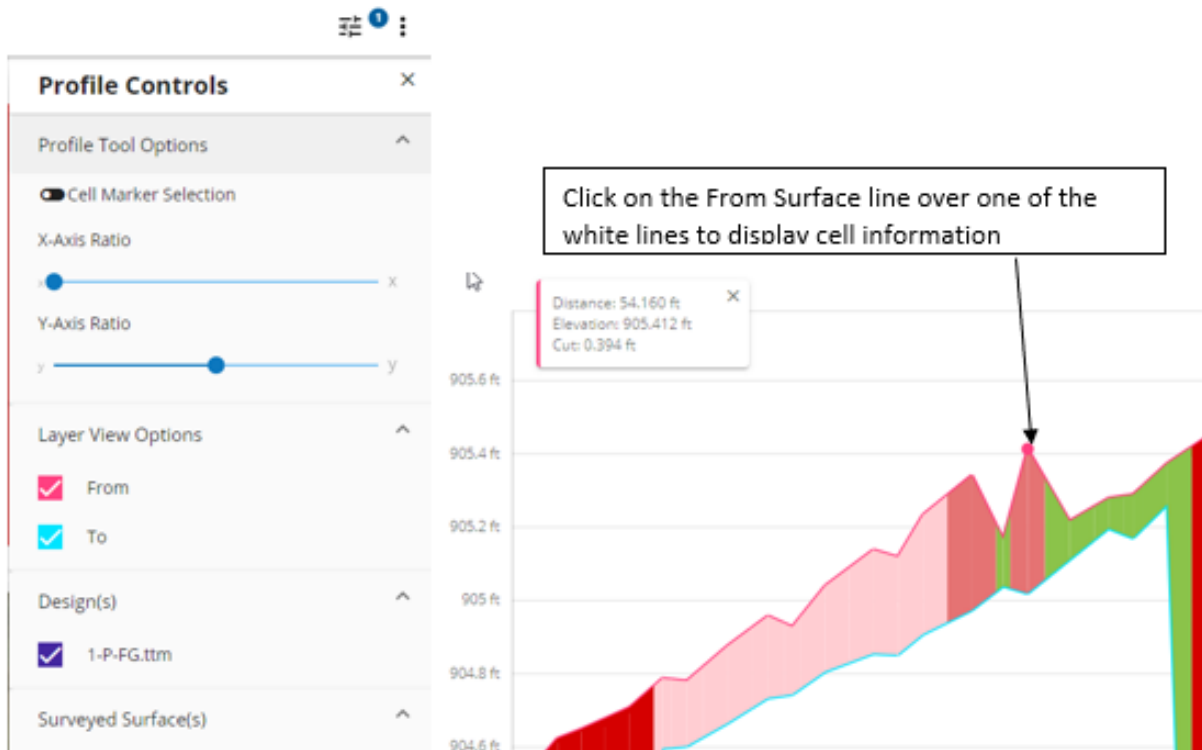
Cut > 0.66' = Dark Red



How to view in WorksOS



When on the Profile tool, click the settings button
This will display; To Surface, From Surface, Designs and Surfaces
Increase the Y-axis to better view small areas.



Track Progress Volumes

Tracking Progress Volumes

A preconfigured set of daily calculations and three views enable you to easily see the volumes of cut and fill materials moved on your job site on a day-over-day basis. These progress volume features allow you to analyze earthmoving progress during any time period you specify and in any project area you choose.

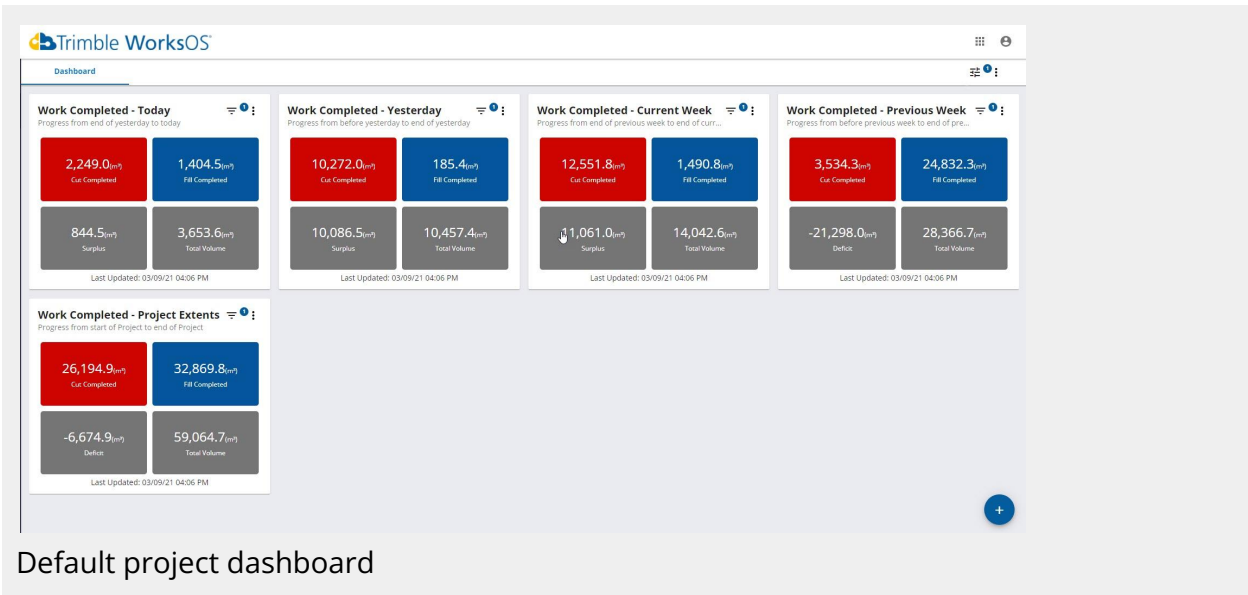
The data for progress volume views comes from both machine TAG (.tag) files and surface surveys (.ttm). When importing a .ttm file for progress volume calculations, always specify that it is surveyed surface and select the data and time to which it applies; doing this timestamps and dates the survey data to align it with any machine data that is automatically imported in the same time frame.

If you have applied material density (shrinkage and/or bulkage) factors for materials, the reported volumes reflect this.

Note: Progress volumes functionality is not specifically connected to the Dashboard and Map screens. I.e., the Dashboard does not account for progress volumes; this means the dashboard calculations (other than Today or Yesterday) will not match progress volumes as the filter setup and calculations are different on the dashboard.

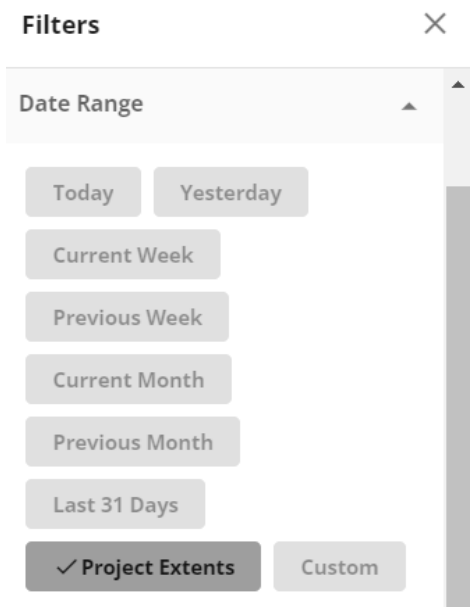
To access the Dashboard, click the Dashboard icon on your left-hand navigation bar. The dashboard automatically includes these five dynamic Work Completed date range widgets that support common workflows for volume calculations:

- Work Completed - Today
- Work Completed - Yesterday
- Work Completed - Current Week
- Work Completed - Previous Week
- Work Completed - Project Extents



These represent total cut and fill quantities for the specified time periods. With just a surveyed surface, e.g., Original Ground, as soon as your machines start working, the daily or weekly difference from time frame to time frame can be calculated. You can also add a Work Remaining widget, which is always relative to a specific design that you imported. This design gives you a surface to compare to.

The widgets are built from existing filters.



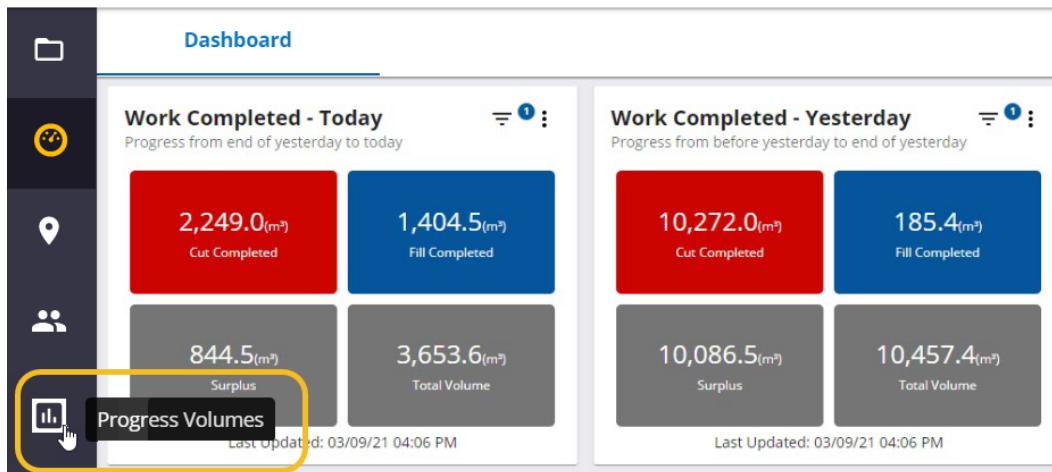
Views for Progress Volumes

There are three types of views of for progress volume data:

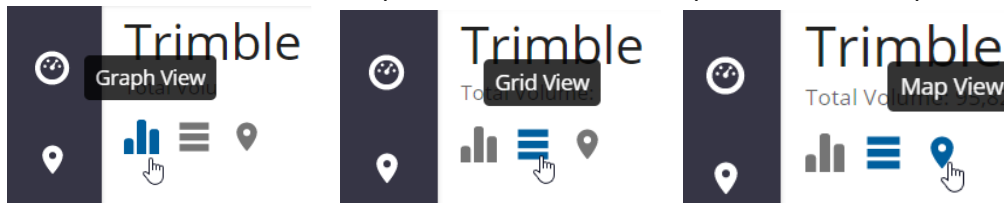
- **Graph view** - A bar chart of cut and fill volumes broken down by day or week helps you see the trend of material volume movement in your project area. Each bar is separated into cut and fill colors representing the volumes moved. Hover over or click any bar chart for details on the exact cut and fill volumes for that day or week, as well as the cumulative volume for the project up to that time. The chart also includes a line graph of the cumulative volume over time for the date range you have selected. Scroll in/out in the view to see fewer or more days in the view.
- **Grid view** - An even more detailed table of values sorted by date allows you to see the exact cut, fill, total, and cumulative values for every working day. You can also export this grid to a CSV file for greater data analysis and visualization in Microsoft® Excel.
- **Map view** - A birdseye/plan view of your project geographically that shows all the areas in which material has been cut or filled over the entire project time period. To see a smaller set of progress volume data, you can reduce the date range or spatial boundaries shown in the map view.

Accessing the Progress Volume Views

1. Click the Progress Volumes icon on your left-hand navigation bar in WorksOS to access.

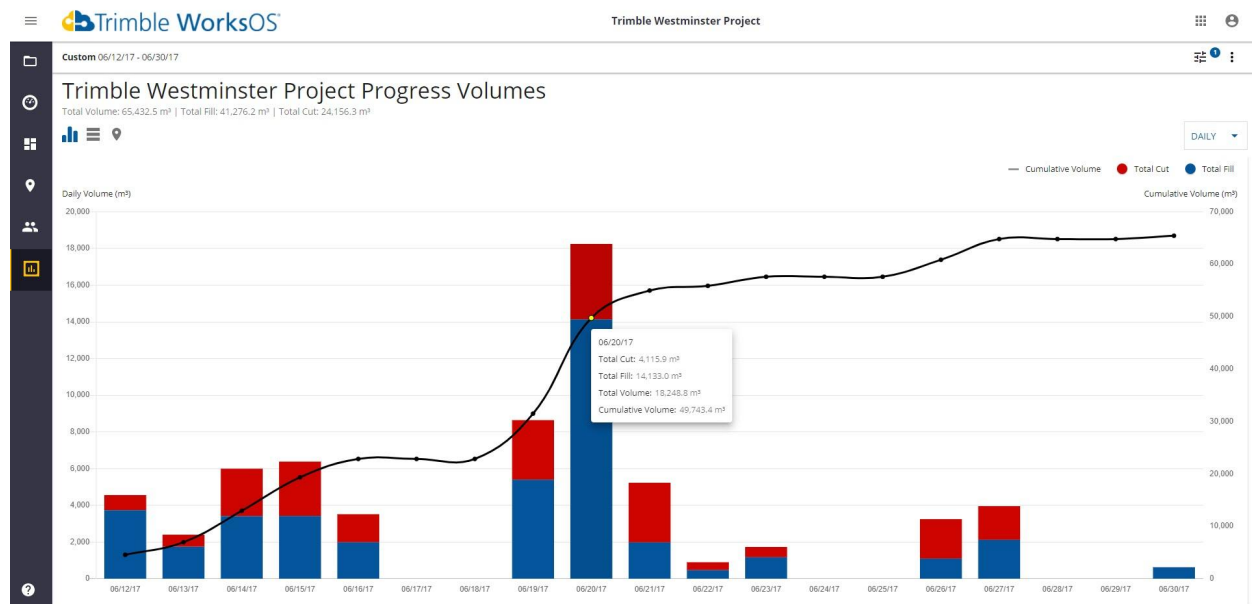


2. Click one of the 3 icons (Graph View, Grid View, Map View) at the top of the pane.



Graph view

The Graph View shows every day, start to finish. You can see here linear progression (bar charts) over the weeks. This can help you track the consistency of material volume movement as you normally would in the field (How much material was moved?) In addition, the black line with dots shows the cumulative material volume. Click any bar to see the daily cut, fill, and cumulative volumes.



Progress volumes daily graph

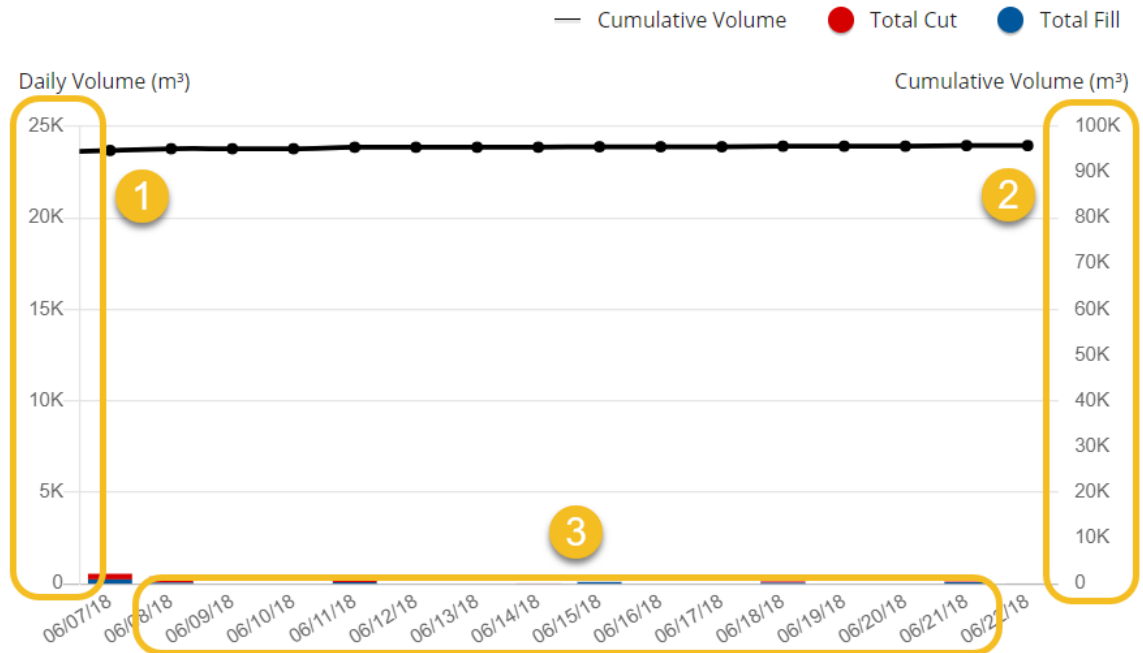
Graph View functions

The chart is configurable with a limited number of filters:

- Date range
- Spatial such as boundary, alignment, or custom area

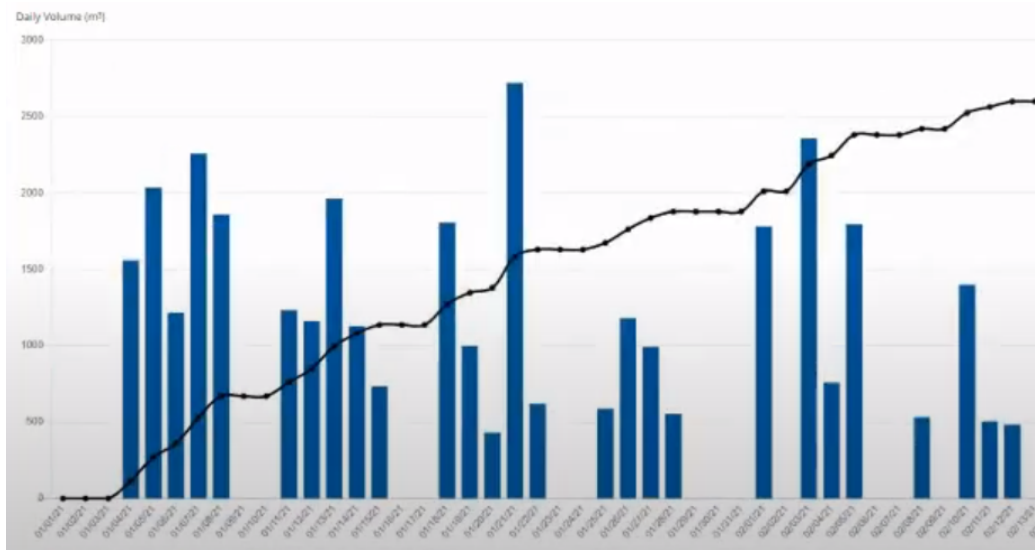
The chart is dual axis and includes three scales:

1. Daily values are shown on the left.
2. Cumulative values are shown on the right.
3. Dates are shown on the bottom.



You can click a legend label to toggle Cut, Fill, and Cumulative bars on/off in the view. If, for example, you are only being paid for cut volumes, simply remove fill from the chart and track the daily cut quantities. If you are doing a landfill job, you can toggle cut off so you see only fill volumes.

— Cumulative Volume ~~Total Cut~~ Total Fill



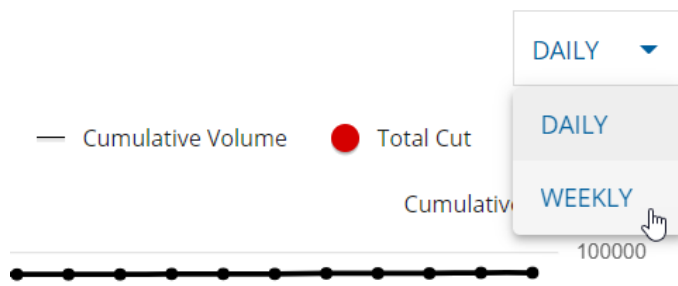
The total volume is always listed at the top of the chart under the name.

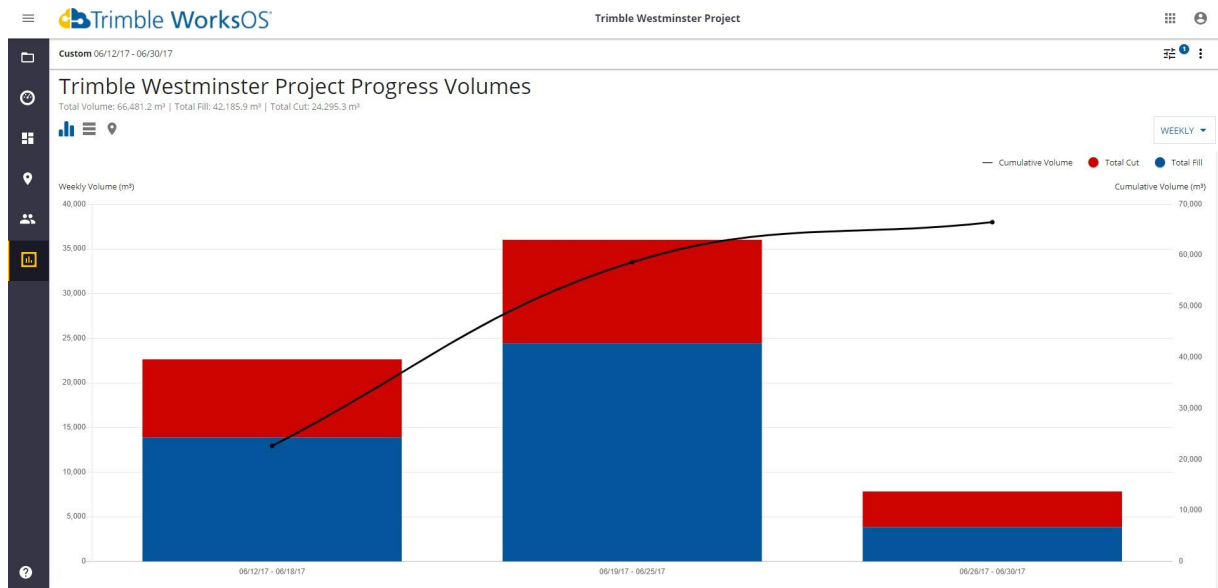
Project Extents 06/01/17 - 06/22/18

Project Progress Volumes

Total Volume: 95,820.9 m³ | Total Fill: 57,980.7 m³ | Total Cut: 37,840.1 m³

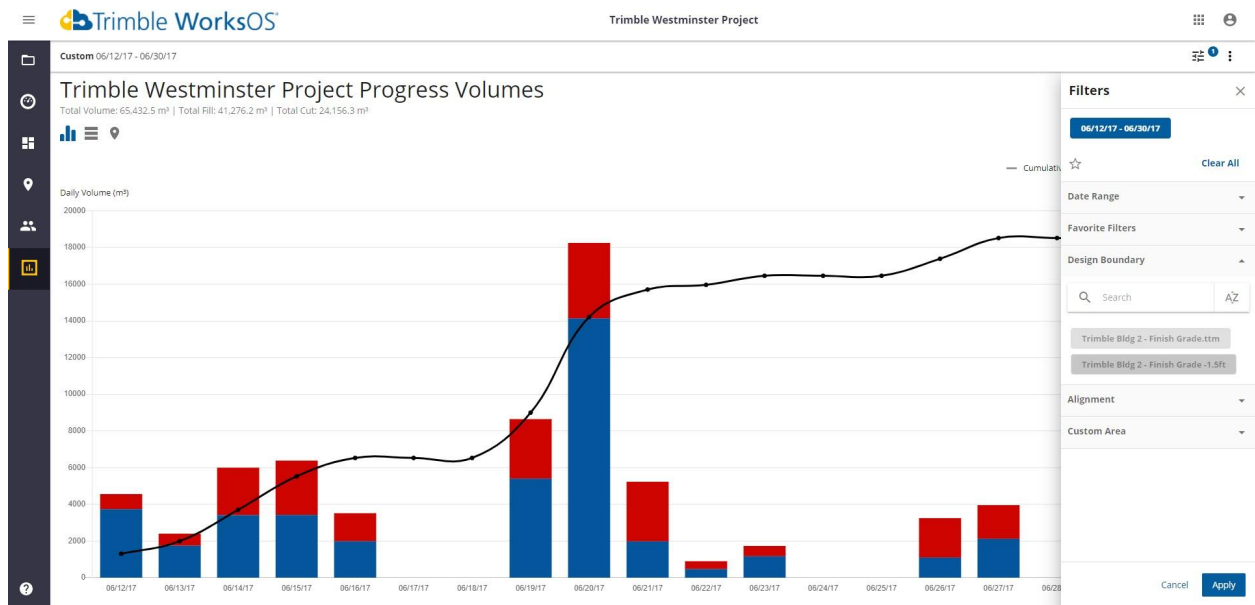
You can also filter by Daily or Weekly. Weekly combines the daily charts into weeks and sums them.



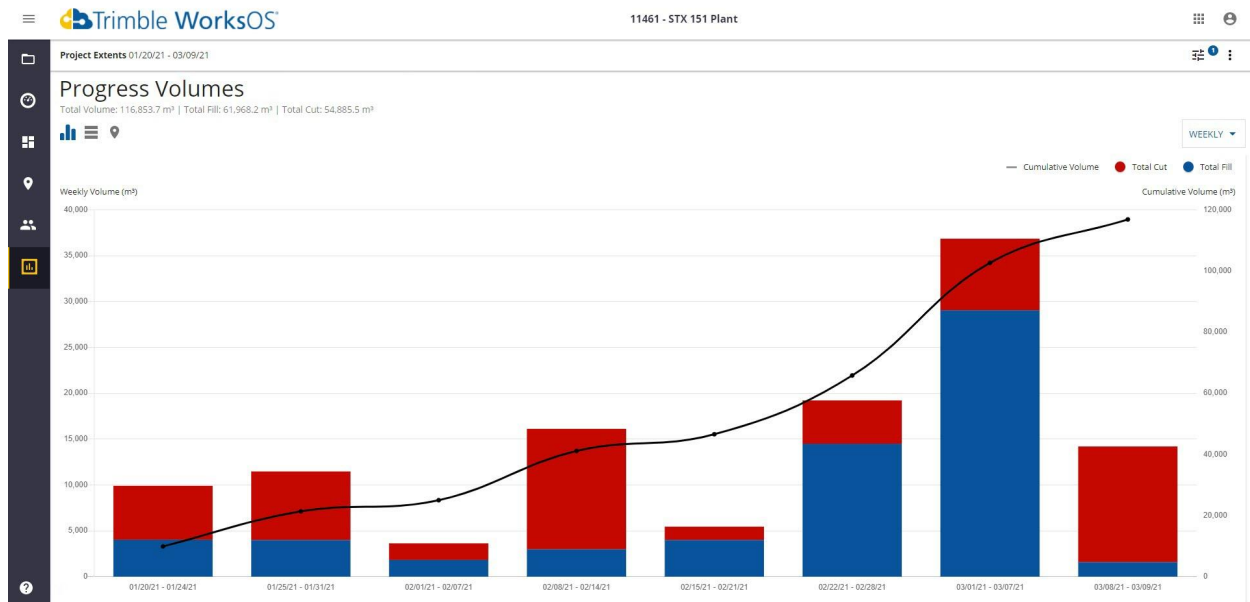


Progress volumes weekly graph

You can also filter the view in the standard way, but filters for progress volumes are independent from other Dashboard filters.




Progress volume daily graph with filter panel



Progress volumes weekly graph

Scroll in/out to see a shorter or longer time period in the chart.

To specify an alternate time span, click the Global  Filters icon on the Actions bar at the upper right. See Date Range Filters > Custom

The screenshot shows the "Filters" dialog box in Trimble WorksOS. The "Date Range" section is expanded, showing several preset options: "Today", "Yesterday", "Current Week", "Previous Week", "Project Extents", and "Custom". The "Custom" option is selected and highlighted with a yellow circle. Below the "Custom" option, the "Custom Date Range" section is visible, showing a "From" date of "06/01/17 00:00". A calendar icon is also highlighted with a yellow circle, indicating where to click to select a date.

Note: The maximum project extents (date range) is 1000 days, but the default extents for the Graph View is the last 31 days, not the full project extents.

Tip: Save your custom data range as a Favorite to quickly apply it at any time.

To configure the cut and fill colors, as well as material density factors (shrinkage and bulkage), click the More icon (ellipsis) and select Project Settings > Volume. The factors you set are reflected in the material volumes.

Cut/Fill

☒ Default
 ☐ Custom

CUT

0.20

m

0.10

m

0.05

m

GRADE

0.00

m

-0.05

m

-0.10

m

FILL

-0.20

m

Bulkage/Shrinkage

☐ Default
 ☒ Custom

BULKAGE:

.04

%

SHRINKAGE:

0

%

Grid View

Select the Grid View for a table of values with the exact cut, fill, total, and cumulative values for every working day. You can also export this grid to an CSV file for greater data analysis and visualization in Microsoft® Excel.

Trimble WorksOS

Trimble Westminster Project

Custom 06/12/17 - 06/30/17

Trimble Westminster Project Progress Volumes

Total Volume: 65,432.5 m³ | Total Fill: 41,276.2 m³ | Total Cut: 24,156.3 m³

Search

Date ↓	Fill Volume (m³)	Day of the Week	Cut Volume (m³)	Total Volume (m³)	Cumulative Volume (m³)	Cumulative Cut (m³)	Cumulative Fill (m³)
06/30/17	619.4	Friday	11.7	631.1	65,432.5	24,156.3	41,276.2
06/29/17	0	Thursday	0	0	64,801.5	24,144.6	40,656.9
06/28/17	0	Wednesday	0	0	64,801.5	24,144.6	40,656.9
06/27/17	2,121.0	Tuesday	1,834.7	3,955.7	64,801.5	24,144.6	40,656.9
06/26/17	1,095.2	Monday	2,151.1	3,246.4	60,845.7	22,309.9	38,535.8
06/25/17	0	Sunday	0	0	57,599.3	20,158.8	37,440.6
06/24/17	0	Saturday	0	0	57,599.3	20,158.8	37,440.6
06/23/17	1,167.6	Friday	562.7	1,730.3	57,599.3	20,158.8	37,440.6
06/22/17	467.3	Thursday	429.2	896.5	55,869.0	19,596.0	36,273.0

TRANSFORMING THE WAY THE WORLD WORKS

Trimble

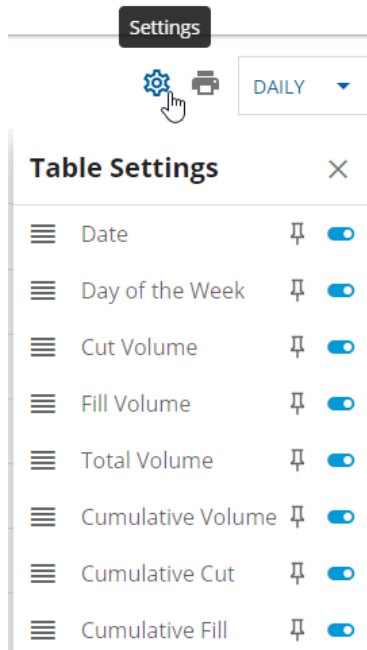
WorksOS - User Guide

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Grid View Functions

You can drag-and-drop columns and sort by column headers.

To toggle columns on/off in the Table Settings pane, click the Settings icon.



Trimble WorksOS

Trimble Westminster Project

Custom 06/12/17 - 06/30/17

Trimble Westminster Project Progress Volumes

Total Volume: 65,432.5 m³ | Total Fill: 41,276.2 m³ | Total Cut: 24,156.3 m³

Search

DAILY

Date	Fill Volume (m³)	Day of the Week	Cut Volume (m³)	Total Volume (m³)	Cumulative Volume (m³)	Cumulative Cut (m³)	Cumulative Fill (m³)
06/30/17	619.4	Friday	11.7	631.1	65,432.5	24,156.3	41,276.2
06/29/17	0	Thursday	0	0	64,801.5	24,144.6	40,656.9
06/28/17	0	Wednesday	0	0	64,801.5	24,144.6	40,656.9
06/27/17	2,121.0	Tuesday	1,834.7	3,955.7	64,801.5	24,144.6	40,656.9
06/26/17	1,095.2	Monday	2,151.1	3,246.4	60,845.7	22,309.9	38,535.8
06/25/17	0	Sunday	0	0	57,599.3	20,158.8	37,440.6
06/24/17	0	Saturday	0	0	57,599.3	20,158.8	37,440.6
06/23/17	1,167.6	Friday	562.7	1,730.3	57,599.3	20,158.8	37,440.6
06/22/17	467.3	Thursday	429.2	896.5	55,869.0	19,596.0	36,273.0
06/21/17	1,981.4	Wednesday	3,247.7	5,229.1	54,972.5	19,166.8	35,805.7
06/20/17	14,133.0	Tuesday	4,115.9	18,248.8	49,743.4	15,919.1	33,824.3
06/19/17	5,397.4	Monday	3,246.0	8,643.3	31,494.6	11,803.2	19,691.3
06/18/17	0	Sunday	0	0	22,851.2	8,557.3	14,294.0

Table Settings X

- Date [Sort Arrow] [Toggle On]
- Fill Volume [Sort Arrow] [Toggle On]
- Day of the Week [Sort Arrow] [Toggle On]
- Cut Volume [Sort Arrow] [Toggle On]
- Total Volume [Sort Arrow] [Toggle On]
- Cumulative Volume [Sort Arrow] [Toggle On]
- Cumulative Cut [Sort Arrow] [Toggle On]
- Cumulative Fill [Sort Arrow] [Toggle On]

Progress volumes grid view with Table settings

To export the grid values to CSV for more sophisticated data analysis, manipulation, and visualization in Microsoft Excel, click the download icon.



	A	B	C	D	E	F	G	H
1	Trimble Westminster Project Progress Volumes							
2	Total Volume: 95,820.9 m³ Total Fill: 57,980.7 m³ Total Cut: 37,840.1 m³							
3								
4	Date	Day of the Week	Cut Volume (m³)	Fill Volume (m³)	Total Volume (m³)	Cumulative Volume (m³)	Cumulative Cut (m³)	Cumulative Fill (m³)
5	6/22/2018	Friday	1.6	5.1	6.7	95,820.90	37,840.10	57,980.70
6	6/21/2018	Thursday	43.5	80.5	124	95,814.20	37,838.50	57,975.70
7	6/20/2018	Wednesday	0	0	0	95,690.20	37,795.00	57,895.20
8	6/19/2018	Tuesday	0	0	0	95,690.20	37,795.00	57,895.20
9	6/18/2018	Monday	69.8	52.9	122.7	95,690.20	37,795.00	57,895.20
10	6/17/2018	Sunday	0	0	0	95,567.50	37,725.20	57,842.30
11	6/16/2018	Saturday	0	0	0	95,567.50	37,725.20	57,842.30
12	6/15/2018	Friday	6.2	92.3	98.5	95,567.50	37,725.20	57,842.30
13	6/14/2018	Thursday	6.7	1.9	8.6	95,469.00	37,719.00	57,750.00
14	6/13/2018	Wednesday	0	0	0	95,460.40	37,712.30	57,748.00
15	6/12/2018	Tuesday	0	0	0	95,460.40	37,712.30	57,748.00
16	6/11/2018	Monday	243.5	82	325.6	95,460.40	37,712.30	57,748.00
17	6/10/2018	Sunday	0	0	0	95,134.80	37,468.80	57,666.00
18	6/9/2018	Saturday	0	0	0	95,134.80	37,468.80	57,666.00
19	6/8/2018	Friday	322.5	56	378.5	95,134.80	37,468.80	57,666.00
20	6/7/2018	Thursday	310.6	229.7	540.4	94,756.30	37,146.30	57,610.00

Map View

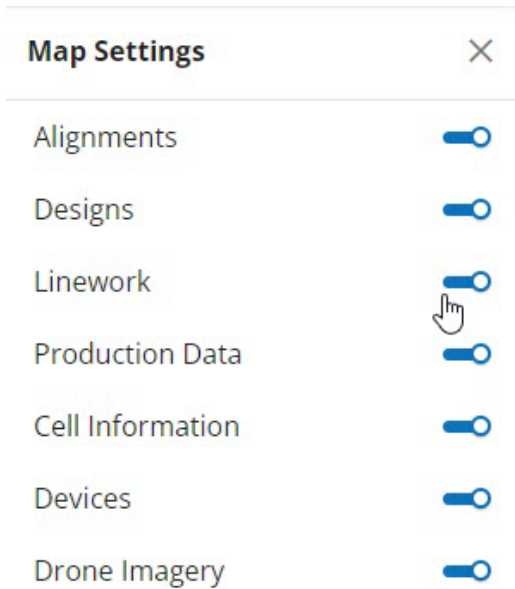
This view lets you see the areas your machines cut and filled geographically on the project site.



Progress volume map view

Map View Functions

To toggle certain types of data on/off in the Map Settings pane, click the Settings icon.



Click the Volume Information arrow on the left side to see totals, including daily and weekly averages.

Volume Information	×
Total Volume	
73,113.0 m ³	
Total Fill	
37,138.5 m ³	
Total Cut	
35,974.5 m ³	
Daily Average	
Cut: 1,713.1 m ³	
Fill: 1,768.5 m ³	
Total: 3,481.6 m ³	
Working Days	
21	
Weekly Average	
Cut: 5,995.7 m ³	
Fill: 6,189.8 m ³	
Total: 12,185.5 m ³	
Working Weeks	
6	

Note: Total Volume, Daily Average, and Weekly Average include both cut or fill, as applicable.

Note: Any non-working (0 volume) days/weeks are excluded from the Daily/Weekly Average.

Tip: Filter by new date ranges to see working areas and averages for specific time periods. This can help you, for instance, identify seasonal productivity patterns.

Note: If you cut and fill the same volume during the same day, the change is net 0.0. If you cut one day and fill the next day, there is a day-over-day change. Before WorksOS, this was done based on load counts. In this case, progress is measured by looking at the day-over-day change. There is usually an objective goal for how much to move (cut or fill) each day.

Work with Activities

Creating Activities




Activities in WorksOS provide you with a project-wide method for quantifying earthwork-related calculations. Using activities, members of a project have a way to understand progress made on earthwork volumes based on a surveyed surface, design, and start/end dates.

The % complete is calculated based on the progress made against the estimated volumes. The work done should generally occur within the target dates to count towards the activity, but work outside the dates still counts unless the activity is marked as Ended; this will either happen automatically if the target volumes have been achieved or if you set the actual end date manually. The target end is primarily of interest in calculating the target working rate. Target volumes (as specified in the UI) are used to determine when an Activity has started (change from 100% remaining) and finished (0% remaining).

This new feature better matches the way you estimate, bid, and track the execution of jobs. You could do this more manually in previous releases of WorksOS, but activities make it easier by matching your existing workflows.

To configure activities, you must have a design and one or more surveyed surfaces (.ttm, primarily from Trimble Business Center, SCS900, or Siteworks). In an activity, you can opt to track areas on the site (such as cut vs. fill) or phases (such as overburden stripping and unusable material removal). Use activities to divide areas and/or phases of work (even sequential) prior to starting work.

Recommendation: Do not create activities that encompass your entire project. There is a limit on the size of the cut and fill volumes (currently 10 million m³).

1. Select  **Map** on the left. Then click  **Custom Area** on the right and draw closed shapes to define any project areas that you want to use for activities, such as work type (e.g., cut, fill) or phase (e.g., overburden stripping, unusable material removal) boundaries.
2. Select  **Activities** in the left pane.
3. If the project has existing activities, review them in the **Activities** list before creating new activities to see how the work is being broken down and planned so the team can track progress and completions.

Tip: You can also configure the **Activities** list to make columns visible, reorder them, and pin them.

Each includes these parameters:

- **Cost code** - Optional data to tie together estimation and scheduling (see step 5 for details).
- **Target start date** - Dates are used for the job scheduling and estimation. The target dates are also used to specify the working period for the activity. The target start date is required and is used to calculate the target end date when a daily working rate is used. This date also serves as the starting point for calculating actual quantities.
- **Target end date** - Dates are used for the job scheduling and estimation. The target dates are also used to specify the expected working period for the activity.
- **Actual start date** - The actual start date is automatically detected based on the data. This date is determined by the day in which the actual volume remaining is different from the target quantity. This date can also be changed or input by the user in the case of Activities starting early. For example, if a machine does some work that is within the boundary of the activity and after the target start date, this will automatically set the actual start date.
- **Actual end date** - Based on the range of when data first comes in from the field, and when you specify that work is complete or the remaining volume is 0.0. If the work remaining does not reach zero you should set the actual end date manually to store the correct status of the surface and end state for that activity. This sets the working dates for the activity and changes the status to Finished.

Note: You should set the actual end date if the work remaining does not reach zero within the target start and end dates.

- **Boundary** - Shows names of the areas created in the **Map** view. Boundaries are used to divide activities by the different phases or working areas. Highly recommended that cut and fill areas are tracked separately when not a balanced site.
- **Estimate** - Shows the total volumes to be worked in each area.

4. To create a new activity, click **ADD**.

5. In the right pane, enter:

- **Activity name** - Make this descriptive so other team members can easily distinguish between activities.
- **Cost code** - Specify a cost code for the activity type. Entering codes is

optional, but beneficial if you want to tie the estimation (when using Trimble Viewpoint or Trimble Quest, for example) and scheduling (using Tilos, Primavera P6, or Microsoft Project, for example) to your WorksOS project. Cost codes are also used in the field when work is bid, executed, and completed.

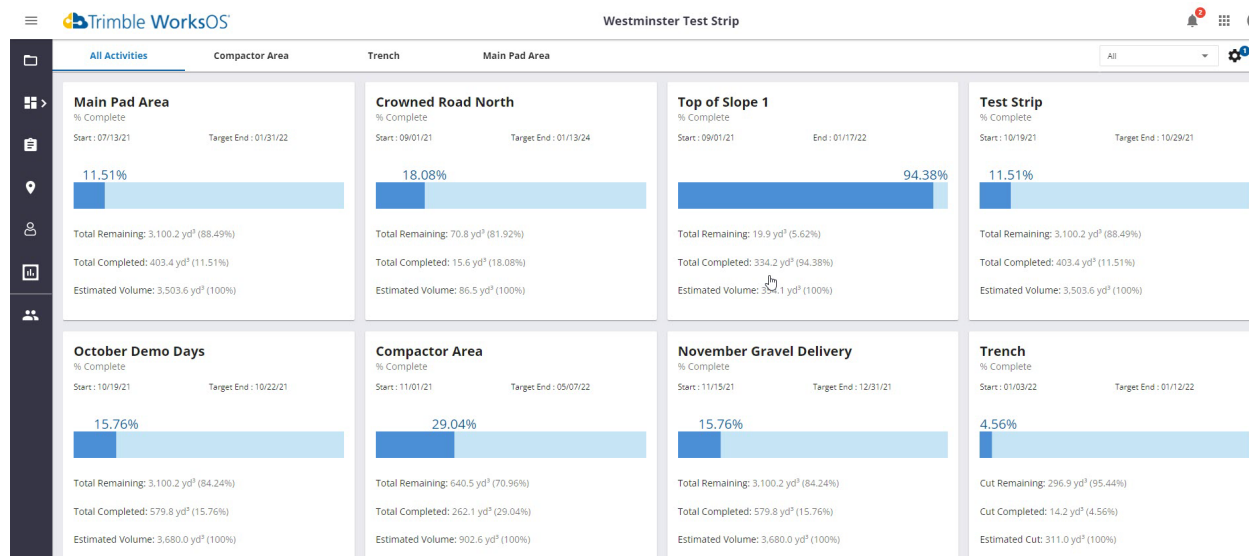
- **Activity type** - Choose a calculation type. Only Earthworks is available today.
- **Activity subtype** - Based on the selected activity type, choose a sub type: Cut/fill, cut, or fill. These choices are used to quantify and calculate the estimate, as well as track progress once work begins.

Note: For activities that are subtype cut only, the lowest pass elevation filter is used to calculate volumes. This is important in case you compare to other filters showing similar information.

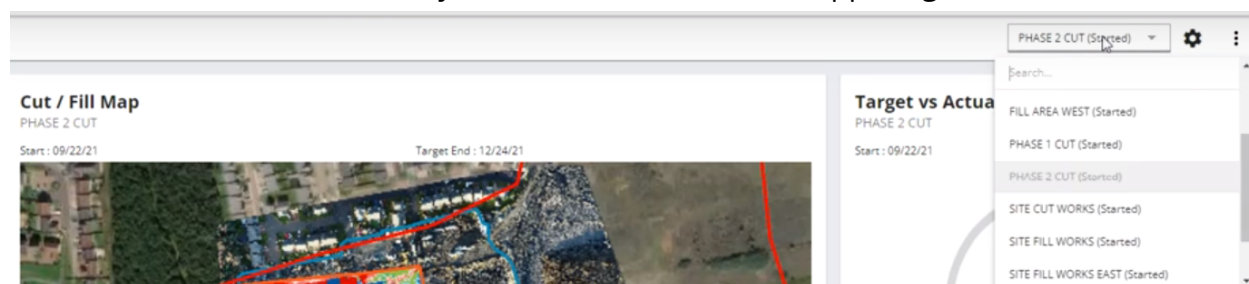
- **Surveyed surface** - Choose an initial surface (typically existing/original ground).
 - **Design** - Select a target for the finished surface. Any imported surface can be selected as the ending surface.
 - **Boundary** - Refine your calculations by selecting a smaller, custom area. You can create these areas in the Map view.
6. Click **Calculate** to see earthwork volumes broken down by estimated cut and fill areas, as well as a volume total. You can always change any of the previously specified parameters and recalculate without leaving the pane.
 7. Review the **Volume estimates** in the same pane.
 8. Click **NEXT**, and enter the **Target start date**.
 9. Enter a **Daily working rate** (meter³ or yard³/day) to indicate how much cubic material can be worked in a day.
 10. Enter a **Target end date** or calculate it based on the daily working rate specified above. If the latter, adjust either the work rate or end date as needed.
 11. Click **Add** to add it to the **Activities** list so all project users can see it. Once added, the activity's actual start and end dates are calculated based on machine production and surveyed data that WorksOS receives for the project.

Using the Activity Dashboard

As soon as you (or other project members) create activities for a project, an **Activity Dashboard** becomes available. This dashboard can show data for all activities in the project or for a single activity at a time.



You can select a different activity to review in the list at the upper right.



Use this dashboard to review these default widgets:

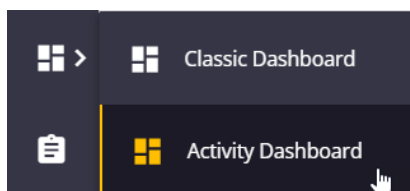
- **% Complete** - Review percentages for the remaining, completed, and estimated volumes for the specified activity type and subtype.
- **Work remaining** - Shows the work yet to be completed broken down over the last seven days (most recent 7 days or the last 7 days of a finished activity). If the activity is not yet started, this shows the same value for each of the last 7 days.
- **Cut/Fill Map** - Displays the visual cut/fill map for a single selected activity.
- **Target vs. Actual Working Rate** - Actual work rate is the work done divided by the actual working days. This shows you how much work is being done on average per every day worked. Target work rate is the total work estimate/total calendar days to complete the estimate. When Actual Working Rate is viewed for the first day of an Activity this will count as a full day.

You can input a number for the Target Working Rate. This would match up to the actual rate when you type in this number rather than deriving the target working rate from two dates. This, in turn, calculates a date in the future that is calendar days.

Because the actual working rate is calculated using only the days when earth was moved that matched the subtype of the activity, non-working/weekend days and days when earth was not moved due to working on another area of the site are not used.

Recommendation: Enter the Start Day and a target working rate, which will thus compare a proper target vs actual working rate.

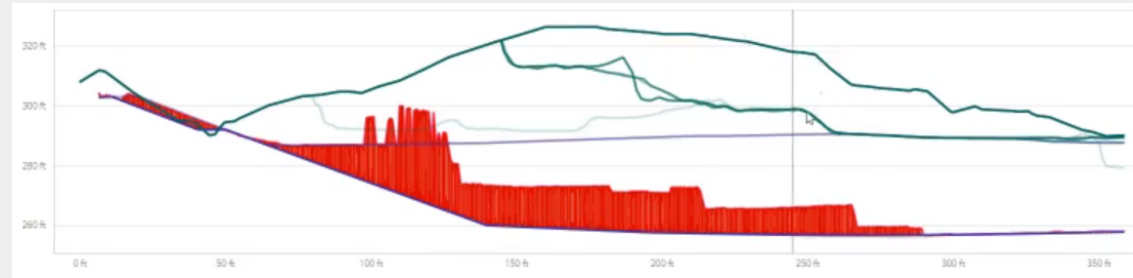
1. Select  **Dashboard > Activity Dashboard.**





2. Review the **Percentage complete** widget:
 - a. **% Complete** - You can click the progress bar to open the cut/fill Map view of the selected activity area.
 - b. **Cut remaining** - Calculated based on elevation data.
 - c. **Cut completed** - Calculated as (Estimated Cut - Cut Remaining).
 - d. **Estimated cut** - Estimated volume that was shown on the Create Activity (1/2) screen (calculated based on the selected Survey, Target Design & the Custom Area).
3. Click the **% Complete** progress bar to open the cut/fill **Map** view of the selected activity area. When you do this to from the progress bar to the Map, the **Total Remaining** value on **Activity Dashboard** is consistent with the **Total Volume** value in the **Remaining** tab, but the **Total Completed** value (on the **Activity Dashboard**) may not be in sync with the **Total Volume** on the **Completed** tab (Cut Completed = (Estimated Cut - Cut Remaining)).





Tip: Draw a profile through the activity area to see the progress of work based on different surveyed surfaces versus the design.



4. Select a new activity in the list in the upper right.
5. If needed, click the  **Filter** icon to narrow activities on the dashboard to those **Started**, **Not Started**, or **Finished**. Click **Apply**.
6. If needed, export the **Activity Dashboard** as a PDF by clicking the  Generate PDF icon.
7. The **Activity Dashboard** widgets act as filters using the activities specific parameters. When you click the progress bar to open the **Map** view for an activity you can set additional filters, run queries, create profile views, and run reports.

Editing Activities

1. Return to the **Activities view** to edit the areas and/or dates specified for an activity at any time. You can also end an activity if it is completed early, the quantity does not reach 100% or if it is intended to leave a quantity remaining for future use.
2. In the **Activities list**, click the  **More** icon next to an activity to edit the parameters or dates.

Target End Date	Actual End Date	Boundary	Estimate	
01/31/22			2,678.7 m ³ (Cut/Fill)	
01/13/24		North Crown Road	66.1 m	Edit Activity
03/31/22	01/17/22	Top of the Slope	270.7 m	Set Activity Dates
10/29/21			2,678.7	Duplicate Activity
10/22/21			2,813.6	Delete Activity

3. To end an activity manually simply specify the actual date ended.

An activity will only end automatically if the target volumes have been achieved, i.e., the volume remaining = 0. If the actual volumes never actually match the target because less earth was needed to be moved to complete the activity, it will never end. In this case, you should manually end the activity.

Generally, when activities are finished, their volumes are fixed; they cannot receive any more progress towards their working rate, etc. Although data arriving after the actual end date is ignored, any late-arriving data for a day before the end date will update the activity. The result is that the progress on the activity dashboard widgets can show non-100% progress for finished activities.

Data Exchange Workflows

Supported Data Types

Many types of information can be brought into Trimble WorksOS (both automatically and manually) as files from a variety of office and field sources. These data types integrate into WorksOS:

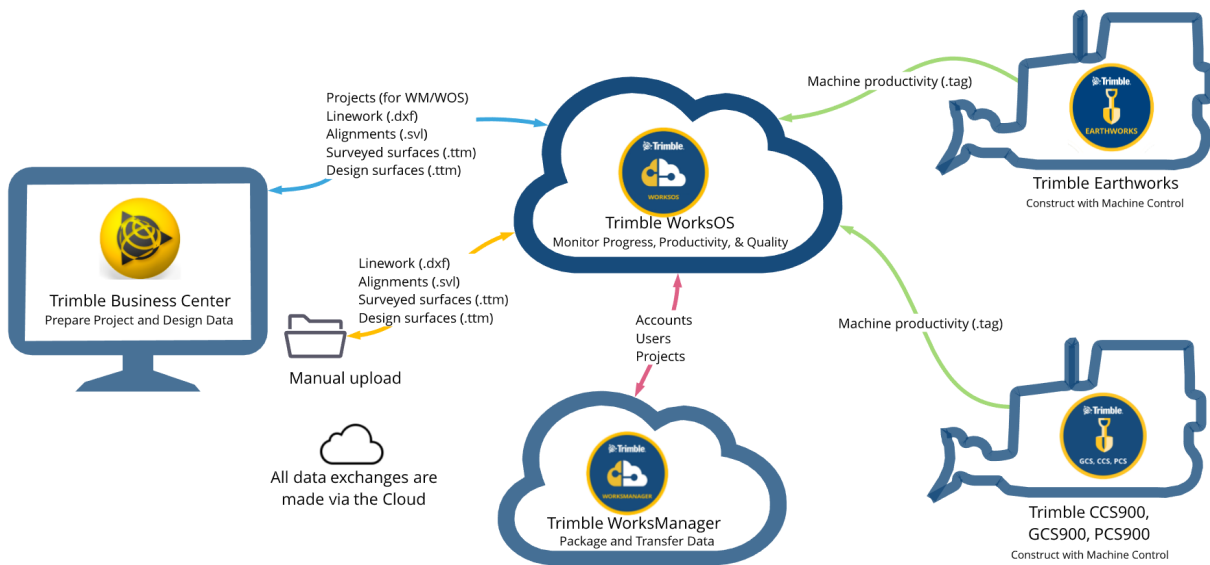
1. Trimble Earthworks machine productivity data (.tag)
2. Trimble GCS/PCS/CCS900 machine productivity data (.tag)
3. Trimble Business Center (TBC) projects (job sites) for WorksOS
4. Project data from TBC and manual imports:
 - a. Design surfaces (.ttm)
 - b. Linework (.dxf)
 - c. Alignments (.svl)
 - d. Surveyed surfaces (.ttm)
 - e. Drone Imagery (.tiff) - WGS-84 referenced
 - f. Calibration and coordinate system data (.dc, .cal)

TRANSFORMING THE WAY THE WORLD WORKS



5. Calibration and coordinate system data (.dc, .cal)
6. Project boundary (.dxf)

See details for each type below.



Terminology

- 3D-enabled** - A project type into which machine productivity data (.tag) files can be processed. 3D-enabled projects must have boundaries that do not overlap with other 3D-enabled projects. This type of project is fully functional in Trimble WorkOS and WorksManager. For details, see the WorksOS Guide - Creating, Editing, and Archiving Projects.
- Non-3D-enabled** - A project type into which machine productivity (.tag) files cannot be imported. Non-3D-enabled projects can have overlapping boundaries with other projects. These projects are only used in WorksManager.
- Machine productivity data** - Progress, productivity, and quality (PPQ) metrics transmitted from machines on site to cloud and office apps via machine data files (.tag)
- As-at state** - Ground truth at a specific moment in time, such as for the in-progress status of a surface

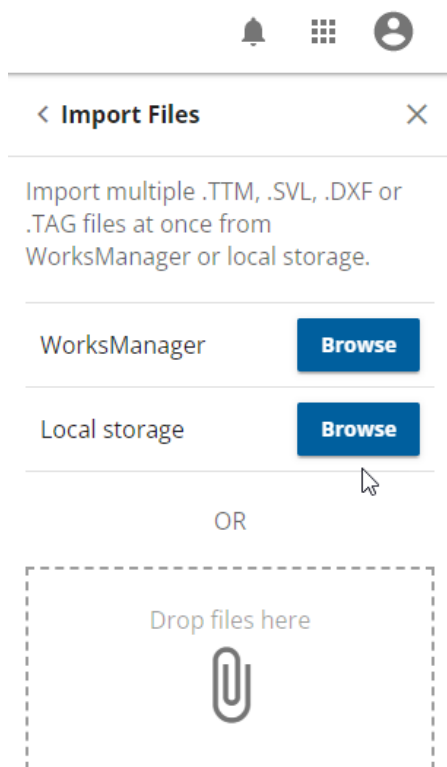
Bringing in data/files

Automatic method (processing)

Machine productivity data (.tag) from Earthworks and GCS/PCS/CCS900 automatically flows into WorksOS 3D-enabled projects and is immediately processed. This data can also be manually imported.

Manual method (importing)

Machine productivity files (above), as well as design surfaces, linework, alignments, and surveyed surfaces, can alternatively be imported manually into a project. Once you click Imports > Import Files, there are three options in the side panel:



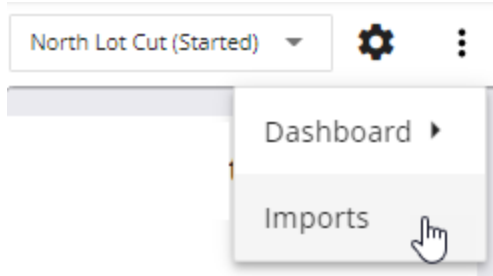
Import from WorksManger

You can import any compatible files from WorksManager into WorksOS as a one time import. DXF files and .ttm design files that have been loaded as data collector designs in WorksManger can be brought in. This is the only shared compatibility for file imports. The file name appears first, then type, design and version followed by the name of the user who imported in WorksManager and the date imported. Each time a new version is updated, this data will appear as another import in WorksOS and be overwritten only when

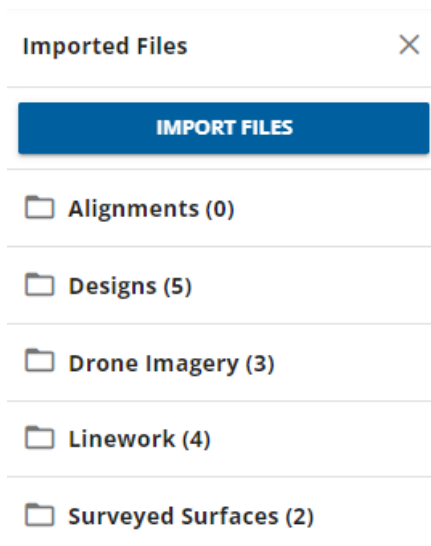
you choose.

Import data from Local Storage by browsing or drag-and-drop

1. From either the Dashboard or Map Screens for the currently selected project, click the More (ellipses) icon and select 'Imports' in the menu.



This will open the Imported Files screen which shows all currently uploaded files in the project.



2. Click the + button to open the Import Files window. From here, you can manually browse or drag-and-drop each file type you want to import into the Project.
3. Select machine productivity files (.tag) to import them into the project. The imported data is checked to see that it lies within the spatial extents of the project boundary. Any data outside the boundary is not added.
4. Select design surfaces (.ttm), linework (.dxf), alignments (.svl), and surveyed surfaces (.ttm) to import into the project. Once imported, these files are displayed in the Import Files list where you can view them by file type and disable or remove them if needed.

Note: Tag files cannot be automatically or manually imported into non-3D-enabled projects.

1. Earthworks Machine Productivity Data (.tag)

Earthworks machine productivity data can flow automatically into WorksOS and can also be manually imported into 3D-enabled types of projects.

Note: Tag files cannot be automatically or manually imported into non-3D-enabled projects.

For the data to flow into WorksOS, the Earthworks device (e.g., EC520) must have a device license in WorksManager (in the same account used by the WorksOS project). See the WorksManager support/documentation on [how to set up a device in the WorksManager account](#).

Once your device(s) have been set up in WorksManager, the data will flow to WorksOS and be accepted or rejected based on the project requirements. A Trimble Connected Community (TCC) license is not required to run Earthworks.

Data from Earthworks can also be manually imported into WorksOS if required. In the Imports sections, simply select or drag-and-drop a folder into the Import dialog. No further selections are required and the user can select import once all file(s) are selected.



2. GCS/CCS/PCS900 Machine Productivity Data (.tag)

Trimble GCS/CCS/PCS machine productivity data can flow automatically into WorksOS and can also be manually imported into 3D-enabled types of projects.

For the data to flow into WorksOS, the Earthworks devices (e.g., CB450, CB460) must have a device license in WorksManager (in the same account used by the WorksOS project). See the WorksManager support/documentation on how to set up a device in the WorksManager account.

Once your devices have been set up in WorksManager, the data will flow to WorksOS and be accepted or rejected based on the project requirements

Note: A TCC license is still currently required for Trimble GCS/CCS/PCS900.

Data from Trimble GCS/CCS/PCS 900 can also be manually imported into WorksOS if required. In the Imports sections, simply select or drag-and-drop a folder into the Import window. No further selections are required and the user can select import once all files are selected.



Note: Tag files cannot be automatically or manually imported into non-3D-enabled projects.

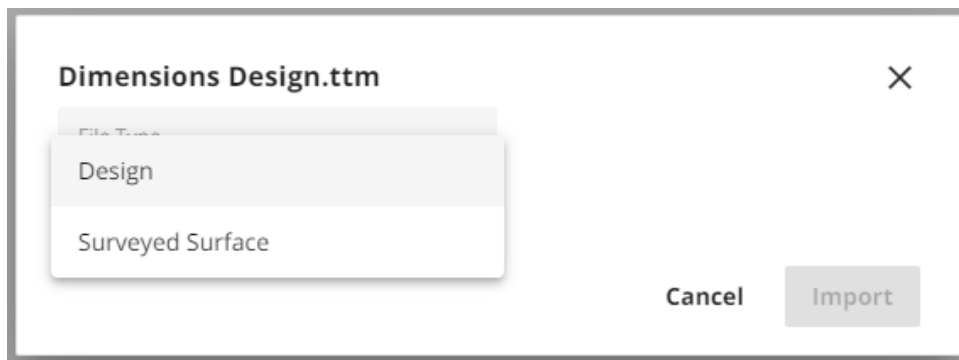
3. Project Data From Manual Import

3a. Design surfaces (.ttm)

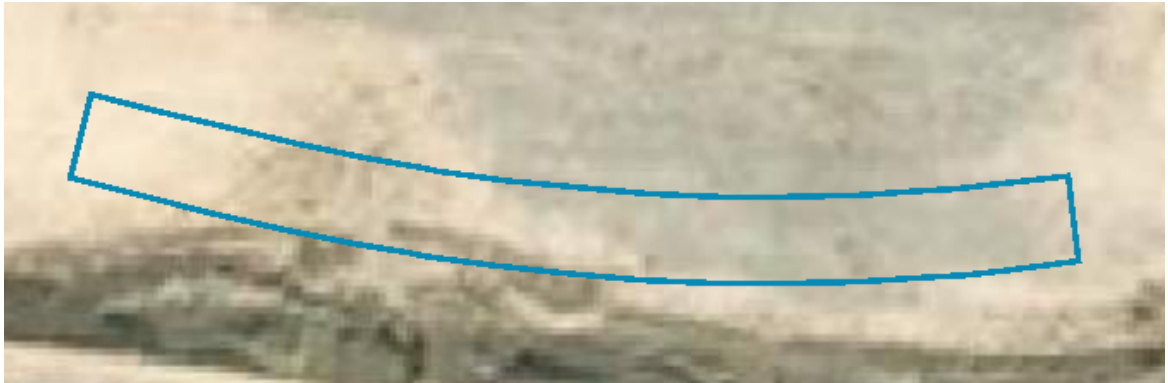
Design surfaces can be manually imported into a WorksOS project as a Trimble Triangulated/Terrain Model (TTM/.ttm).

Ideally, the exact design prepared in WorksOS should be sent to the machine in the field so they have the same definition and can map progress and productivity consistently. Design surfaces use X,Y,Z coordinates for length, width, and height (elevations) dimensions.

Importing a design in the Imports window requires you to choose whether the TTM is a design surface or surveyed surface.



Once imported, a design appears as a blue, closed polygonal boundary on the Map screen. Boundary filtering can be used on a design to show only data inside the boundary. Design surfaces can also be used for Work Remaining cut/fill and volume calculations required to achieve the Finished Design surface.



3b. Linework Files (.dxf)

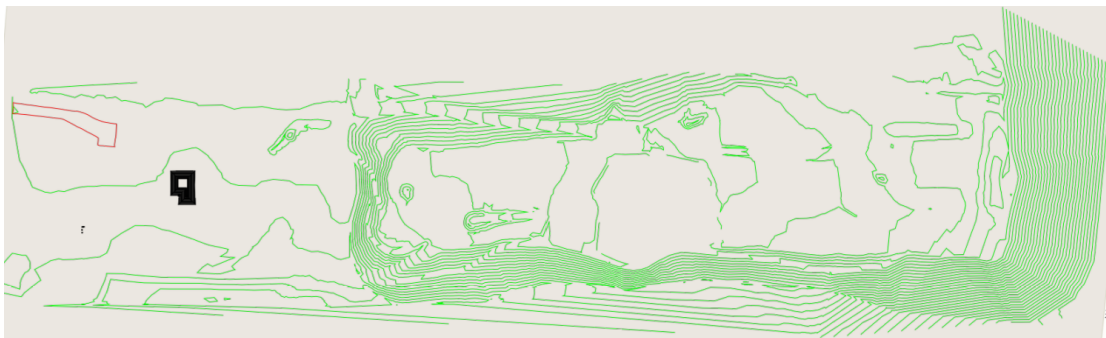
Linework can be manually imported into a WorksOS project as a .dxf (a universal CAD exchange format) .

Linework provides you with visuals and guidelines for what a finished surface, structure, or area could look like when finished (or as a plan view while it is being built).

When importing a linework file through the Imports window, you must select the unit type in which the file was created in the source program (e.g., TBC). Selecting the wrong units for the data will cause linework to be displayed in the wrong place.



Once you have imported linework, it will appear on the Map screen in its original colors. Linework files can be large, varied, and detailed to render and upload. In WorksOS, they are for visualization purposes only, i.e., to show what a virtual finished surface/road/project could look like. You cannot filter or interact with the data in any way.



3c. Alignment Files (.svl)

Alignments can be manually imported into a WorksOS project as an .svl (a native Trimble Sitevision linework format). An alignment file contains an alignment centerline plus stationing/chainage (distance) start and end values within it.

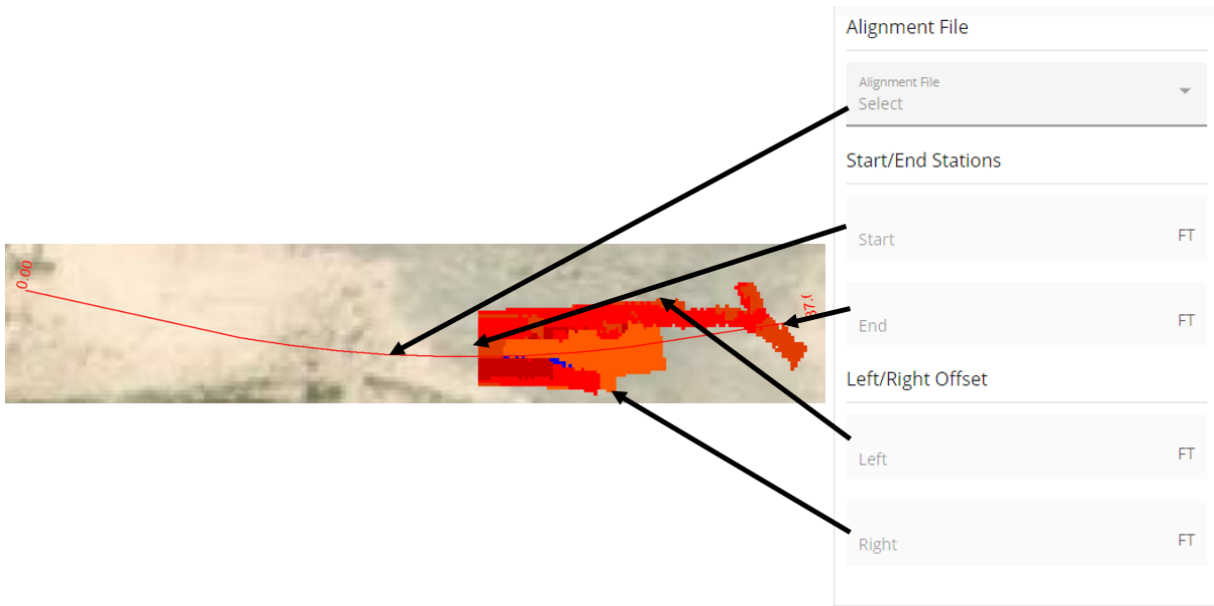
Once alignments are imported, they appear as red lines on the Map screen, complete with stationing/chainage labels. Alignments can be very long and typically represent one or more road centerlines, i.e., the center of a new road being built.

Alignments are used to spatially filter and report data for what is typically a road building project (as the alignment is the centerline of the new road).



The Alignment Filter allows you to select an alignment file and spatially filter the data for a set distance along it (which can be part or all). You can also specify how wide to sample left and right of the centerline, e.g., to encompass one or more traffic lanes.

Example:



The Station & Offset Report uses the same spatial filtering method to select data and also to specify the frequency at which you want to sample it in the report.

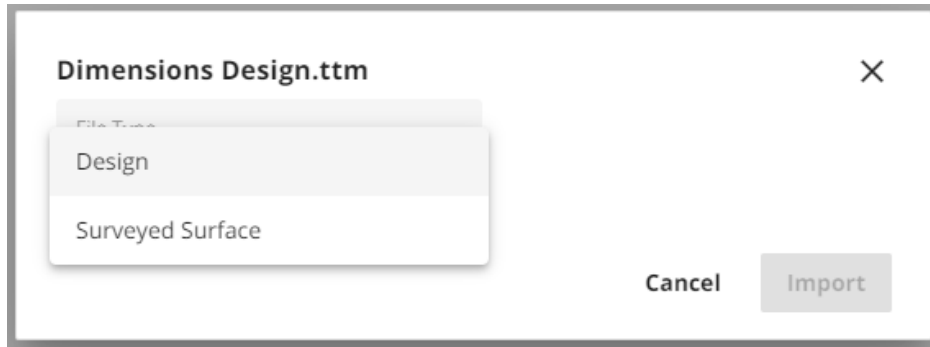
3d. Surveyed Surfaces (.ttm)

Surveyed surfaces can be manually imported into a WorksOS project as a .ttm file.

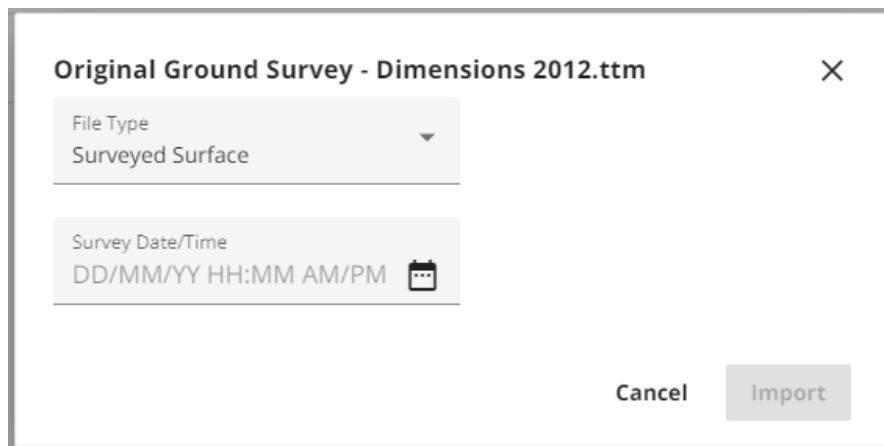
A surveyed surface may come from a survey device, data collector, or drone; it represents a surveyed area at a given point in time and is used as a source of truth for the 'as-at' state of the surveyed project area.

Surveyed surfaces combine with machine productivity data to form a composite surface where there are no spatial overlaps between the two. If machine productivity data and surveyed surfaces overlap spatially, then the most recent of the two supersedes the other in the composite surface. The date/time of the surveyed surface and the date/time for machine data are taken into account when producing the composite surface. There are data filter settings in WorksOS that can also control the two surface types.

Importing a surveyed surface in the Imports window requires you to select whether the .ttm file is a Design Surface or Surveyed Surface.



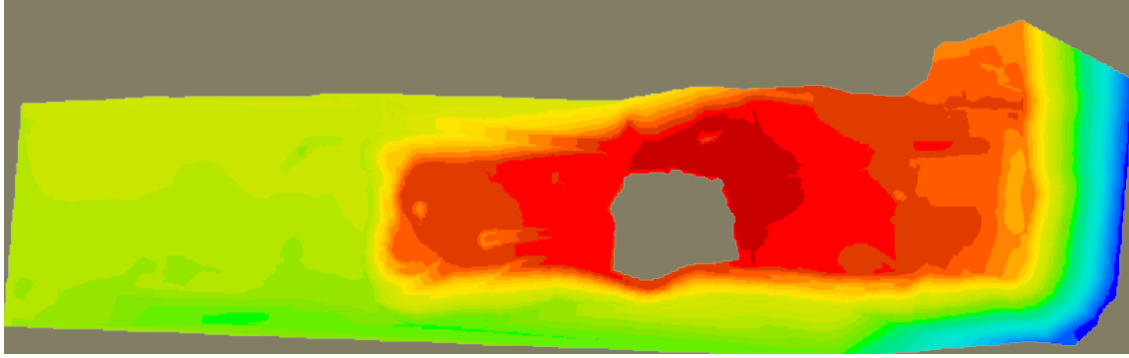
Once you choose a surveyed surface, you are prompted for a Survey Date/Time which determines the 'as-at' date/time for the surface. Any other data that overlaps spatially with this surveyed surface will either supersede or be superseded by it, depending on its own date/time.



Once imported, surveyed surfaces only appear visible on Elevations, Cut/Fill Quality Metrics, and in Volumes Calculations. They contain no pass counts, compacted meter value (CMV), temperature, machine drive power (MDP), or speed values, so they are not visible in those quality metrics and the detailed data view (DDV) tool does not pick them up either (shows machine data only).

Surveyed surfaces are imported:

- For the original ground topo survey (a starting point of the ground in the project)
- For periodic surveys during the project to state the ground "as-at" a certain time.
- To improve bad or missing machine productivity data



4. Calibration/Coordinate System Files (.dc, .cal)

Calibration/Coordinate system files can be published automatically through TBC's Publish to WorkOS command or manually imported into WorkOS at the time of project creation (or when you edit it in the CONFIG FILES tab as a .dc or .cal format).

The file should be the same file as used by the devices/machines submitting data from the field to ensure data accuracy. The coordinate system/calibration file can affect all other project files and machine productivity data.

Note: Once you have device/machine productivity data for a project, it is recommended that you **do not** change its coordinate system.



Create New Project

PROJECT INFO

CONFIG FILES

CONFIGURATION FILES

Files can always be added after a project is created.

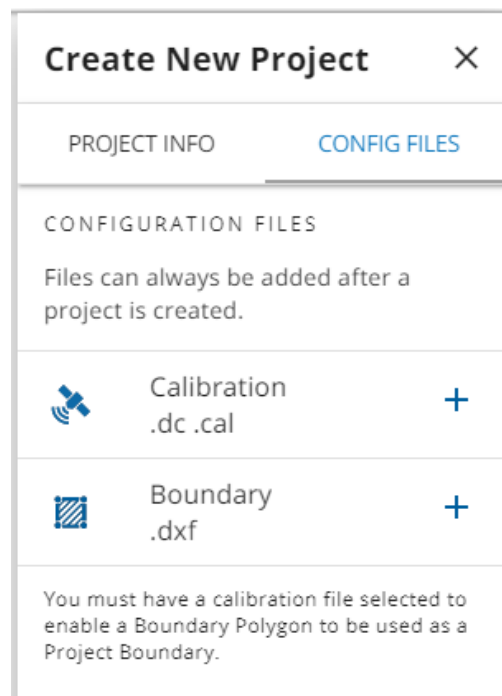
	Calibration .dc .cal	+
	Boundary .dxf	+

You must have a calibration file selected to enable a Boundary Polygon to be used as a Project Boundary.

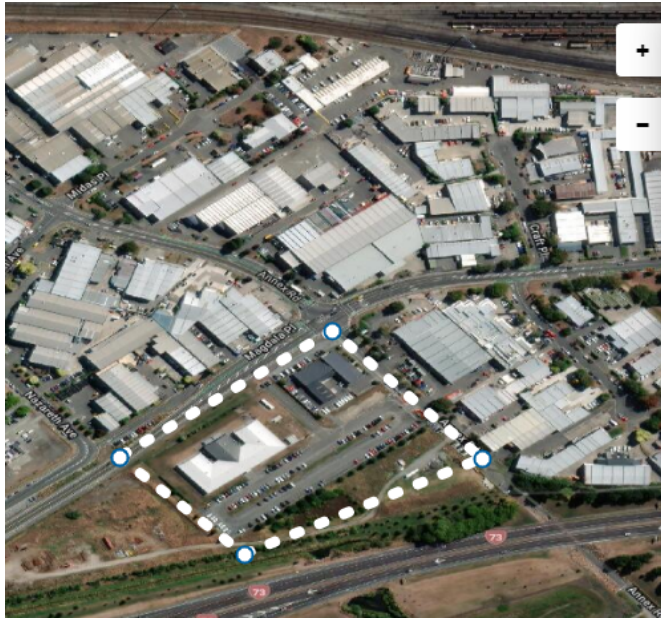
5. Project Boundary from a File (.dxf)

Project boundaries can be imported as a .dxf file when you create a project or edit its .dxf file in the CONFIG FILES tab.

The .dxf file must contain one closed polygon to create a valid project boundary. The calibration/coordinate system file must be uploaded before selecting the boundary .dxf file. In the Create/Edit Project > BOUNDARY step, the boundary contained within the .dxf is displayed on the Map before you finish creating the project.



Once selected in the Create or Edit Project > CONFIG Files step, the polygon in the .dxf file is displayed as the project boundary in the Project Type step. No further selections are needed once you have imported a project boundary.



Project Type



Please set your project type in the field below. "3D Enabled" projects allow TAG files and cannot have overlapping boundaries, while "Non-3D Enabled" projects do not have TAG files and can have overlapping boundaries.

Project Type



Note: A boundary from a .dxf file cannot be edited once it is imported into WorkOS as the project boundary. To change a project boundary from a .dxf, you must correct the .dxf file in the source program or create a new one and upload it in the CONFIG FILES step of create and edit project workflows.

Import, Export, & Report

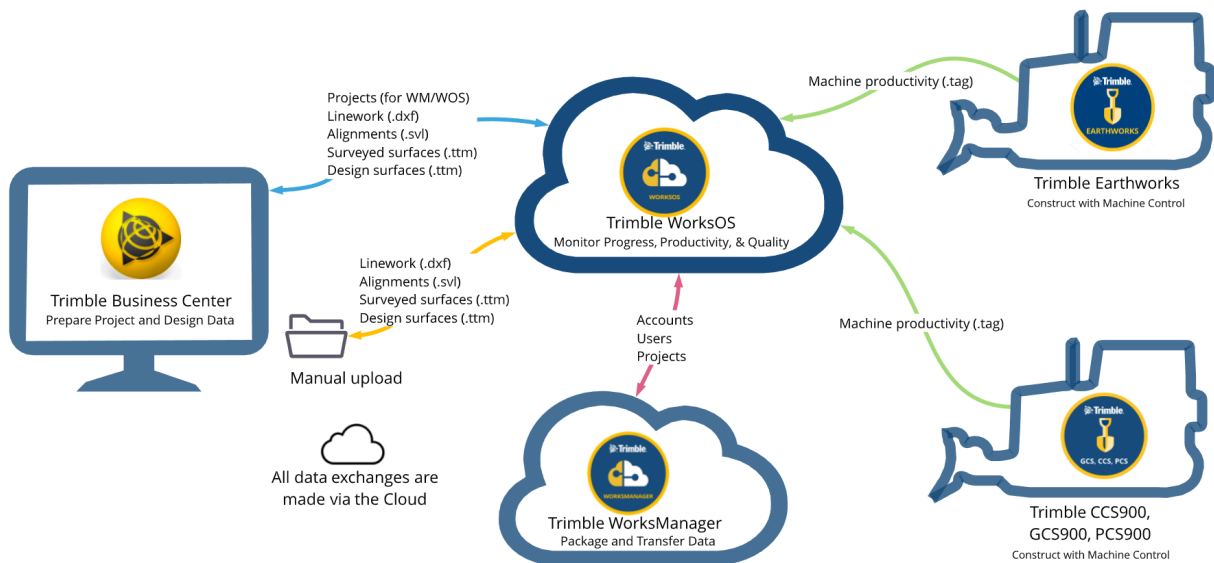
Imports

Many types of information can be brought into Trimble WorksOS (both automatically and manually) as files from a variety of office and field sources. You can import design surfaces, surveyed surfaces, and alignments/linework into a project. You can also manually import production files if needed.

Use these files to compare data to the machine productivity data to determine progress, productivity and quality on the site. These data types integrate into WorksOS:

1. Trimble Earthworks machine productivity data (.tag)
2. Trimble GCS/PCS/CCS900 machine productivity data (.tag)
3. Trimble Business Center (TBC) projects (job sites) for WorksOS
4. Project data from TBC and manual imports:
 - a. Design surfaces (.ttm)
 - b. Linework (.dxf)
 - c. Alignments (.svl)
 - d. Surveyed surfaces (.ttm)
 - e. Calibration and coordinate system data (.dc, .cal)
5. Calibration and coordinate system data (.dc, .cal)
6. Project boundary (.dxf)
7. Drone imagery (.tiff)

See details for each type below.



For more information, see [WorksOS Guide - Data Exchange Workflows](#).

Import Screen Options

- View Selected (number of files) - Click to open the Selected Files list.
- Selected Files - Shows all of the imported files available to the project. Click Clear All to remove selected files.
- + Add button - Click to open the Import dialog to bring in new files
- x Delete - Click to remove a file from the project and Selected Files list.
- Check/uncheck boxes to make the data active/inactive in your project.

Trimble Dimensions 2012

< Linework (3)

View Selected (7) 1

File Name	Imported Date	Imported By	Last Modified On	
<input type="checkbox"/> Milling - DesignMap.dxf	07/22/20 19:40	@trimble.com	07/22/20 19:40	x
<input checked="" type="checkbox"/> Dimensions Linework.dxf	07/22/20 19:40	@trimble.com	07/22/20 19:40	x 4
<input checked="" type="checkbox"/> Trimble Command Center - DesignMap.dxf	07/22/20 19:40	@trimble.com	07/22/20 19:40	x

FEEDBACK

3 +

Selected Files 2

7 file(s) selected [Clear All](#)

Dimensions Linework.dxf

Linework
Barret_Chapman@trimble.com
07/22/20 19:40
US Standard

Trimble Command Center - DesignMap.dxf



Linework
Barret_Chapman@trimble.com
07/22/20 19:40
US Standard

Milling.svl

Alignment
david_glassenbury@trimble.com
08/09/20 18:26

Import Project Files

Project files include designs, alignments, linework, and surveyed surfaces, i.e., files specific to your project.

1. On the Actions bar, click the  More icon and select Imports.
2. Click any of the folders (Alignments, Designs, Linework, Surveyed Surfaces) folders to see what data you already have that is being used in the project.
 - Design Surfaces - You can also pull in all of your design surfaces from Business Center so you can determine how much work remains to achieve the design.
 - Linework - If you also pull in linework and geofences from TBC, and compare them to the finish grade design, this will tell you how much work is remaining to complete.
 - Surveyed Surfaces - You can compare an as-built surface to the original ground surface from a survey. This volume comparison tells you how much work has been done since the original survey.
3. Then click the  button and either:
 - Browse to and select the files you need.
 - Drag-and-drop supported files (.tag, .dxf, .svl, and .ttm) from your Windows Explorer into the folders. This allows you to bring in entire folders of TAG files.

You can select multiple files of any type at once to import them simultaneously.

Import Surface Files (.ttm)

You are prompted to specify whether the file is a:

Surveyed Surface

1. Select a Surveyed Date and Time by clicking on the date icon.
2. Choose a Custom Date.
3. Select the Day and define the time when the survey was completed.
4. Once the processing is complete click Finish. Newly imported surveys are active by default as part of the Selected Files.

Optional Additional Working Items

5. Deselect the Survey from the project by clicking on the Survey name within the Selected Files Section.
6. Click Remove. This will keep the Survey as part of the Imported Files for the Project that are currently inactive.
7. Click on the Survey from underneath the Imported Files.
8. Click on Add to make this Survey active within the project.

The date and time selected must be the date/time of when the survey was taken. This will be used to define when the survey elevations are used vs recorded machine data. Then select the date it was surveyed. Machine productivity data that comes in after this date will replace it as the latest surface.

Design Surface

1. Import a design file (.ttm only) by dragging and dropping the file into the top of the window or click "New Import" to browse your computer for a design file.
2. Under File type select "Design" to treat the .ttm as a design within the software.
3. Add in additional files if desired. Click Import to begin the importing of the file(s).
4. Once the processing is complete click Finish. Newly imported Designs will be active by default as part of the Selected Files.
5. Deselect the Design from the project by clicking on the Design name within the Selected Files Section.
6. Click Remove. This will keep the Design as part of the Imported Files for the Project that are currently inactive.
7. Click on the Design from underneath the Imported Files.
8. Click on Add to make this design active within the project.

Import Alignment Files (.svl)

An Alignment File requires no additional setting once selected for Import.


Import Linework Files (.dxf)

You are prompted to specify the type of units used when the linework was created.

1. Newly imported Linework will be active by default as part of the Selected Files.


2. Deselect the Linework from the project by clicking on the Linework file name within the Selected Files Section.
3. Click Remove. This will keep the Linework as part of the Imported Files for the Project that are currently inactive.
4. Click on the Linework from underneath the Imported Files.
5. Click on Add to make this Linework active within the project.
6. To Delete the Linework from the Project, click on the "x" next to Linework.
7. Confirm by clicking Delete. (Cancel if you want to keep the imported file within the project.
4. Do not close the window until all files have been imported.
5. When files have been processed, click Finish, and confirm that the imported files appear in the appropriate folders. The data in these files is ready to use!
6. To make a file inactive in the project, uncheck its box.
7. To remove a file from the project, click the x to the right of the file name.

Import Production Data (.tag)

1. To import TAG (.tag) files, click the  More icon on the Actions bar and select Imports > Production Data.
2. Browse for files or drag and drop them from your directory into the Import files field.
3. Do not close the window until all files have been imported. When files have been processed, select Finish.

Note: For linework files, you must also select the type of units used when creating the linework. For .ttm files, you must also select the file type.

4. Select Import when done.
5. Do not close the window until all files have been imported. When files have been processed, select Finish.
6. In the Project Files window, ensure the imported files appear in Selected Files.


7. To remove a file from the project, select the file and select Remove. To remove a file permanently from WorksOS, select the file and select the Delete icon .
8. Click Save.

Import Drone Imagery (.tiff)

You can import [GeoTIFF files](#) (.tiff format with raster orthoimagery from Trimble Stratus or other 3rd party software) into WorksOS. After import, you can use a GeoTIFF as the background image for your project over the map. As your project progresses, you can import additional GeoTIFFs of the same area that show the different phases of work being completed. The most recent image is the default top image. When you change the date of your view, the corresponding drone image will appear.



GeoTIFFs are [raster images with georeference and geocoding information](#). WorksOS uses just the orthoimagery data in the file, not any survey data.

1. To import GeoTIFF files (.tiff) files, click the  More icon on the Actions bar, and select Imports.

2. Select Drone Imagery and click IMPORT FILES.
3. Click Browse next to Local Storage, navigate to the GeoTIFF file you need, and click Open.
4. Specify the date and time the drone imagery applies to (when the flight was made).

Tip: As a best practice, have the drone operator or Stratus tech name the file using this data and time.

Note: GeoTIFF files can take hours to import, so choose the appropriate file carefully. During the import process you can see the stages in the Notifications pane.

Note: GeoTIFF files must be in WGS84 coordinate system format (not Local grid or DTM) to be valid in WorksOS. Stratus also supports multiple other formats.


5. Click Import. Once imported, the image will persist as your project's new background image.

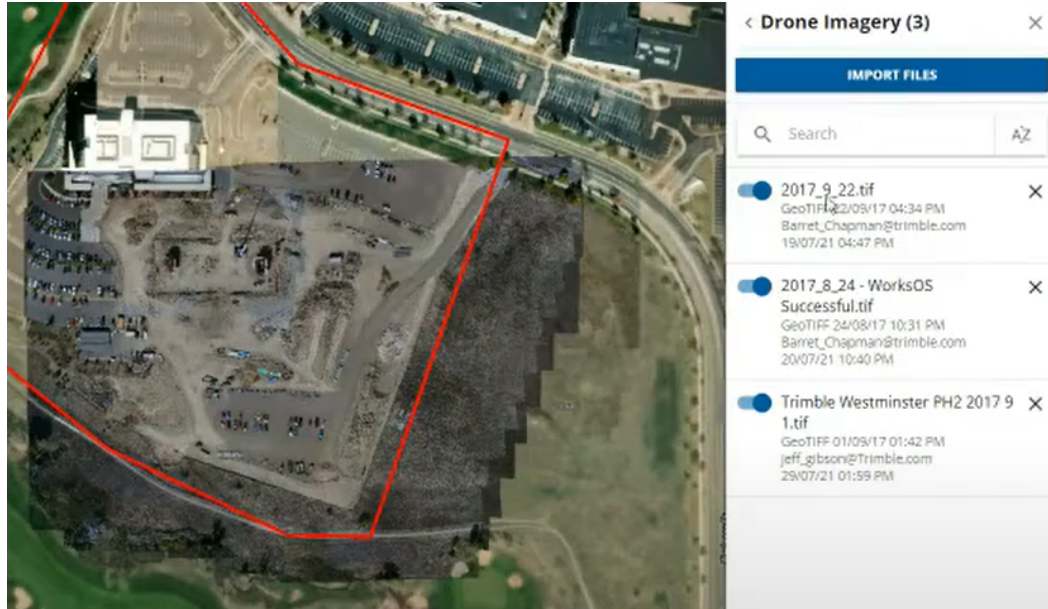




Note: As your project progresses, you can import additional GeoTIFFs that show the different phases of work being completed. The most recent image is the default top image. When you change the date of your view, the corresponding drone image will appear.



6. To hide all drone imagery, click the  More icon on the Actions bar, and select Settings > Map.



7. Toggle Drone imagery off. You can also hide individual drone images by toggling them off in the imported files pane shown above.

Import Designs from Trimble WorksManager

To complement new shared project functionality in WorksOS and [WorksManager](#), you can now easily import existing designs from WorksManager to use when performing progress calculations directly within WorksOS. When you connect to the same project within WorksManager, you can see the most recent version of all the designs that exist within the selected project. This workflow will help if you routinely send surfaces and linework to your data collectors in the field.


See the demo video here: [WorksOS Tutorial - Import from WorksManager](#)

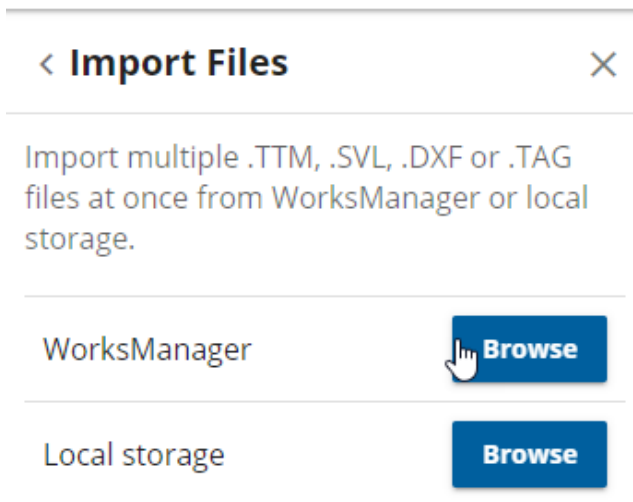
Note: Any/all edits to designs imported via WorksManager must be made within WorksManager.

Warning: Currently, you are not notified when a newer version of a design is available in WorksManager.

Note: All surfaces are designs at this time.

To import surface (.ttm) and/or linework (.dxf) files directly from WorksManager:

1. In WorksManager, open a project that is shared with WorksOS.
2. Select Designs and confirm the TTM and DXF files you want to import into WorksOS.
3. In WorksOS, open the same shared project.
4. On the Actions bar, click the  More icon and select Imports > Import Files.
5. Click Import Files from WorksManager. All of the files that you can import are displayed.



- Any files that have already been imported from WorksManager will not appear here, but they do appear on the Selected tab.
 - Newer versions of already imported designs will appear as files that can be imported.
 - Each file shows its design name, version, and extension.
 - The date of creation/update comes from WorksManager.
 - The creation date is the modified date for the first version.
 - The modified date is the last time the file in WorksManager was modified, thereby updating its version.
6. Check the box for each file to be imported to add it to the Selected tab.

Note: WorksManager is designed to send files to machines, so a TTM is typically not loaded unless going to a rover. The File Flipper utility can convert files for machine use but not vice versa.



7. Click the Selected tab to verify the files to import.
8. Click Import.
9. For each DXF file, select the measurement unit (Imperial, Metric, or US Survey).
10. Click Import again.
11. Once the import is complete, select Actions > Imports > Designs and Linework to see the files.

Exports

You can export design surfaces, surveyed surfaces, and alignments from a project to be used in other applications. Three types (surface, machine passes, and VETA) can be exported.

- To view machine data in Trimble Business Center (TBC), export Surveyed Surface files. This enables you to compare as-built surfaces to the design in Business Center.
- To export raw pass-count data, export Machine Passes.

Export Files

1. Click the  Map icon on the left side of the screen.
2. On the Actions bar, click the  More icon and select Settings > Exports.
3. Select one of the following:
 - Surface
 1. Enter the export file name (without spaces).
 2. Enter the vertical tolerance to convert the grid into a triangular irregular network.
 3. Select the required filter.
 4. Click Export. WorksOS exports the surveyed surface data as a .ttm file.
 5. Download the zipped file and import it into TBC.
 - Machine Passes
 1. Enter the export file name (without spaces).
 2. Select a Coordinates option:
 - Latitude/Longitude - Export for a global, Earth-Centered Earth-Fixed coordinate system.
 - Northing/Easting - Export for an X,Y,Z Cartesian coordinate system.

3. Select an output option:
 - Last pass only - Output only includes data for the final pass over each cell.
 - All passes - Output includes a line entry in the output file for every pass over every cell.
4. Select the required filter.
5. If required, select the exported file (.csv) options:
 - If you do not restrict the output to a maximum of 65535 rows per file, then the output will be a single zipped .csv file that includes an unrestricted number of rows.
 - If you select Output raw data in dbase format, the units that are selected are included as column headers in the output. If you do not select this option, then the units are included in each cell.

Note: The Machine Passes export has been formatted for easier importing into Trimble Business Center (TBC) as a CSV Point Cloud file. The following fields have had their units removed from each individual cell so the raw values are correctly formatted for manual import into TBC.

"CellN" for Cell Northing, "Cell E" for Cell Easting, and "Elevation" have all their units removed.

	A	B	C	D	E
1	Time	CellN	CellE	Elevation	PassN
2	2012/Oct/	1163.990m	2741.590m	594.837m	

They now only display in the column headers.

	Time	CellN(m)	CellE (m)	Elevation (m)
	2012/Oct/	1163.99	2741.59	594.837

Note: If you automatically or manually import these CSV files elsewhere, please be aware of the formatting change.

- VETA - See Export to VETA below.
7. Select Export.
 8. Download the zipped file.

Export to Veta

To export data specifically for Veta Data Management and Analysis software, select Veta. For more about Veta, visit [Veta Data Management and Analysis Software](#).



Note: Export to Veta exports only dates / times and filtered compactor machine data from the map. If you are not exporting data specifically for Veta Data Management and Analysis software, select Machine Passes instead.

1. Enter a file name or accept the provided file name.
1. Select a Coordinates option:
 - Latitude/Longitude - Export for a global, Earth-Centered Earth-Fixed coordinate system.
 - Northing/Easting - Export for an X,Y,Z Cartesian coordinate system.
2. Click Export.
3. Download the file for import into VETA Data Management and Analysis software.

Reports

WorksOS reports provide information to members of organizations who may or may not use WorksOS to receive critical data. You may need to allow pop-ups (disable the pop-up blocker) in your browser before the report can be generated. Three reports (summary, station/offset, grid) are available.

Generate reports

1. Click the  Map icon on the left side of the screen.
2. On the Actions bar, click the  More icon and select Settings > Exports > (one of these reports):
 - Summary - A snapshot of the map on screen and a pie chart for the selected Quality Metrics. This report is used to share any 3D productivity data.
 - a. Select the raw Quality Metric (you can choose multiple).
 - b. Select a Favorite filter or current filter (default).
 - Station & Offset - A statistical report used for roading projects. This report reports raw machine values instead of a Quality Metrics summary. Using an

imported Alignment file (such as a road centerline), you can select spatial areas to report raw machine values for.

- a. Select the raw Quality Metric (you can choose multiple). If you select Cut/Fill, select the Design. You can select more than one Cut/Fill metric.
 - b. Select the Alignment file.
 - c. Enter the Start Station and End Station values for the Alignment file (up to three decimal places).
 - d. Enter the Cross Section Interval value for reporting frequency (up to three decimal places).
 - e. Enter the Left Offset and Right Offset values to the left and right of the Alignment centerline. You can enter multiples of each (up to three decimal places).
 - f. Select a Favorite filter or current filter (default).
- Grid - A statistical report used for any construction project. This report reports raw machine values instead of a Quality Metrics summary. You can select and rotate spatial area grids of data to report raw machine values for.
 - a. Select the raw Quality Metric (you can choose multiple). If you select Cut/Fill, select the Design. You can select more than one Cut/Fill metric.
 - b. Enter the Grid Interval value (up to three decimal places).
 - c. Select the Grid Origin (Automatic or Manually Define). If you select Manually Define:
 - Enter the Grid Origin in Northing/Easting values (up to three decimal places).
 - Enter the Grid Rotation in Northing/Easting values or an Azimuth in degrees value (up to three decimal places from 0.001 to 360.000).

3. Click Download.

Workflows for Scenarios

Workflows for Specific Scenarios

Compare Surfaces and Calculate Volumes

Surfaces in WorksOS are either created in other programs, such as TBC, and imported as .ttm files or created when .tag files are processed when they automatically come into WorksOS.

Using your machine control system's GNSS (GPS) data, WorksOS accurately maps the locations and elevations of every place your machines work. From that data, you can generate an as-built surface, which is the last pass of a machine creating the final surface of the day. Then, you can compare that last as-built surface to a previous as-built surface.

Based on the change/difference between the two surfaces, you can calculate the volumes. Anywhere the elevation went down is cut and anywhere it went up is fill, so you can also generate a cut/fill map. check

1. Navigate to the **Map** view.
2. Click the **Selected Filters** icon.
3. Expand the **Date Range** section, select **Project Extents**, and click **Apply**.
4. Click the **Metrics** fly-out and choose **Volume** in the list.
5. Choose to calculate based on the **Filter** you selected or select **Design/Surveyed Surface** and choose the surface in the list.
6. Click **Calculate** to run the calculations.
7. In the **Quality Metrics** pane, review the **Completed and Remaining** volumes (deficit or surplus, total, area covered by machines, and material density percentages (if applied)).

Calculate Cut and Fill

1. Select the design you want to base cut/fill or volume calculations on.
2. Review the cells colored based on cut and fill depth targets. You can configure these colors in Project Settings.

3. Use the Profile tool to see depths and percentages of cut, fill, and on grade between surfaces along the profile line.
4. Change the selected design surface in the Metrics pane to see the cut/fill map for a new comparison.

Create a Reference Surface File

You can create a reference surface file by applying a positive or negative elevation offset to an existing design file. You can use this newly created reference surface file as a Design Boundary filter, and to complete Cut/Fill maps and Volumes calculations at an offset from a finished design.

1. To create a reference surface file, in the Import Panel, click on the Actions Menu next to the design name and Select New Reference Surface.
2. In the pop up, enter either a negative value (preceded by a minus sign) or a positive value. When you save it, a new reference surface file is created and given the selected design file name appended with the elevation offset value. This reference surface file now can be used anywhere a design file can be selected.
3. (Optional) Change the Name of your offset within the File Name.

Note: You can create multiple reference surface files from a design file as long as their offsets are unique negative or positive values. You can delete a reference surface file, but you cannot delete a design file if any reference surface file created from it still exists. You must first delete the reference surface file(s) before deleting the design file.

Calculate Compaction Metrics

Use the Dashboard to see summary values for various compaction metrics like speed, pass count, temperature, CMV, and CMV % change. The Dashboard widgets show summary values that are based on targets that come from a machine or are set here in WorksOS. These values can be filtered to a specific design boundary area.

1. Click a Dashboard widget to open the Map view using the same filters.
2. Select different compaction metrics in the list.
3. See descriptions in Filters You can Apply and View Quality Metrics and Coordinates for a Cell.
 - Pass count - For Summary values, the pass counts are mapped anywhere you have a target set up, whereas Details are mapped regardless of whether you have a target set or not. Details show percentages of each of the pass count

ranges you have set up, which can be configured in Settings > Project > Custom (targets). You can use the profile tool to see a profile of the quality metric. The color of the line shows not only the elevation, but the pass count in that location.

WorksOS shows a Pass Count Summary where the machine has a target Pass Count setting (if applicable). Using that or setting a target in Pass Count Settings will populate data in Pass Count Summary. The Profile line is colored the same color as the cells that have been profiled. The color of the cell determines how many passes it has, also clicking on the cell node (or turning on Cell Markers and clicking will also reveal this info).

- CMV - These values are mapped three different ways:
 - Details shows the raw CMV reading from the machine; i.e., the last pass for the filtered data.
 - CMV % change maps the difference in CMV percentage between the most recent pass and the previous pass. This helps you identify where CMV is decreasing from pass to pass.
 - Summary values map the CMV values according to the targets you set.
- Machine Drive Power (MDP) - This value, which is not used on vibratory compactors, shows colors for on target (within a threshold) or over/under the target.
- Speed - Machine or GPS speed (whichever is available) is mapped according to a target threshold's summary values. Speed considers all passes, so anywhere outside of tolerance will be colored as outside of the target threshold. Only areas where every pass was on target are mapped green. Blue trumps green and red trumps blue. This is a key metric for vibratory roller in achieving quality compaction.
- Temperature - Mapped according to an asphalt temperature threshold. The last pass (within the specified filter) is always shown.

Track Progress Volumes

A preconfigured set of daily calculations and three views enable you to easily see the volumes of cut and fill materials moved on your job site on a day-over-day basis. These progress volume features allow you to analyze earthmoving progress during any time period you specify and in any project area you choose.

The data for progress volume views comes from both machine TAG (.tag) files and surface surveys (.ttm). When importing a .ttm file for progress volume calculations, always specify that it is surveyed surface and select the data and time to which it applies; doing this

timestamps and dates the survey data to align it with any machine data that is automatically imported in the same time frame.

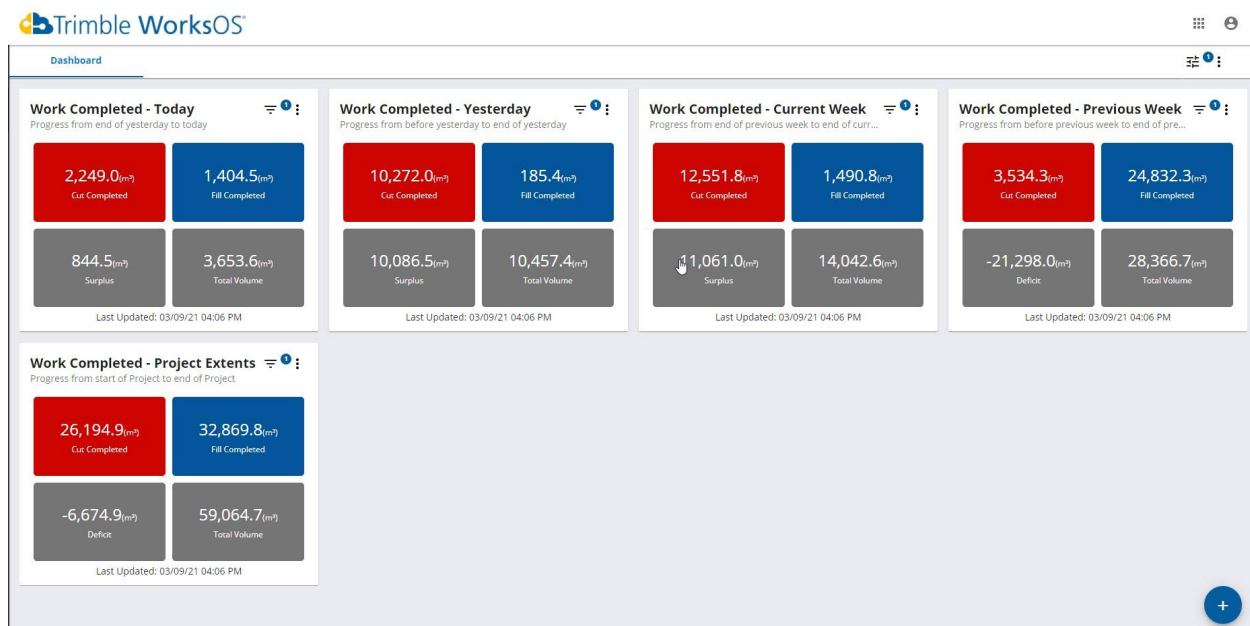
If you have applied material density (shrinkage and/or bulkage) factors for materials, the reported volumes reflect this.

Note: Progress volumes functionality is not connected to the other Dashboard and Map screens, i.e., the Dashboard does not account for progress volumes; this means the dashboard calculations (other than Today or Yesterday) will not match progress volumes as the filter setup and calculations are different on the dashboard.

Dashboard Configured for Progress Volumes

Click the Dashboard icon on your left-hand navigation bar in WorksOS to access the Dashboard, which is configured for progress volumes. The dashboard automatically includes these five dynamic Work Completed date range widgets that support progress volume calculations:

- Work Completed - Today
- Work Completed - Yesterday
- Work Completed - Current Week
- Work Completed - Previous Week
- Work Completed - Project Extents

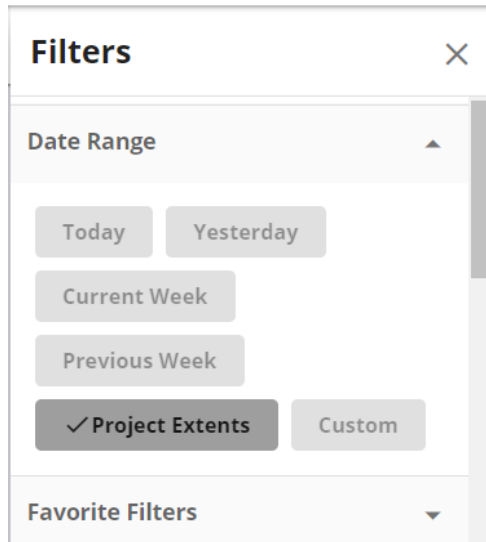


Default project dashboard

These represent total cut and fill quantities for the specified time periods. With just a surveyed surface, e.g., Original Ground, as soon as your machines start working, the daily or weekly difference from time frame to time frame can be calculated.

You can also add a Work Remaining widget, which is always relative to a specific design that you imported. This design gives you a surface to compare to.

The widgets are built from existing filters.



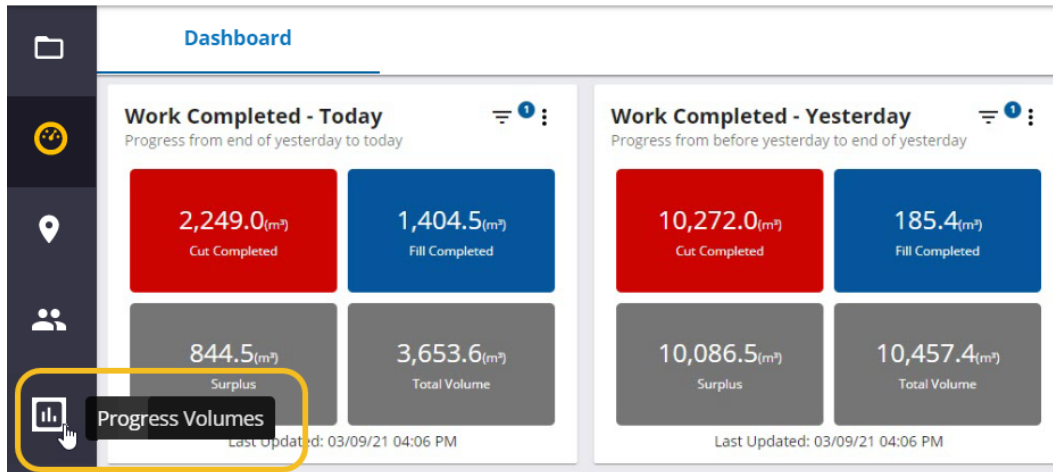
Views for Progress Volumes

There are three types of views of for progress volume data:

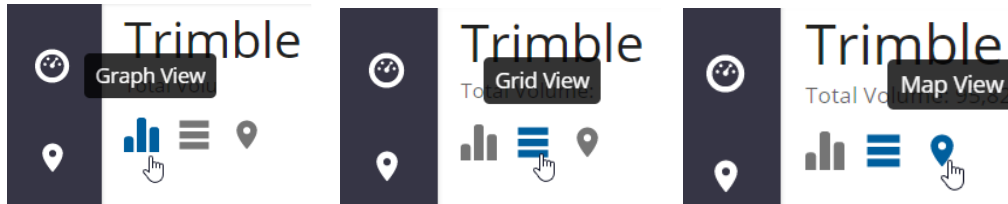
- **Graph view** - A bar chart of cut and fill volumes broken down by day or week helps you see the trend of material volume movement in your project area. Each bar is separated into cut and fill colors representing the volumes moved. Hover over or click any bar chart for details on the exact cut and fill volumes for that day or week, as well as the cumulative volume for the project up to that time. The chart also includes a line graph of the cumulative volume over time for the date range you have selected. Scroll in/out in the view to see fewer or more days in the view.
- **Grid view** - An even more detailed table of values sorted by date allows you to see the exact cut, fill, total, and cumulative values for every working day. You can also export this grid to an CSV file for greater data analysis and visualization in Microsoft® Excel.
- **Map view** - A birdseye/plan view of your project geographically that shows all the areas in which material has been cut or filled over the entire project time period. To see a smaller set of progress volume data, you can reduce the date range or spatial boundaries shown in the map view.

Accessing the Progress Volume Views

1. Click the Progress Volumes icon on your left-hand navigation bar in WorksOS to access.

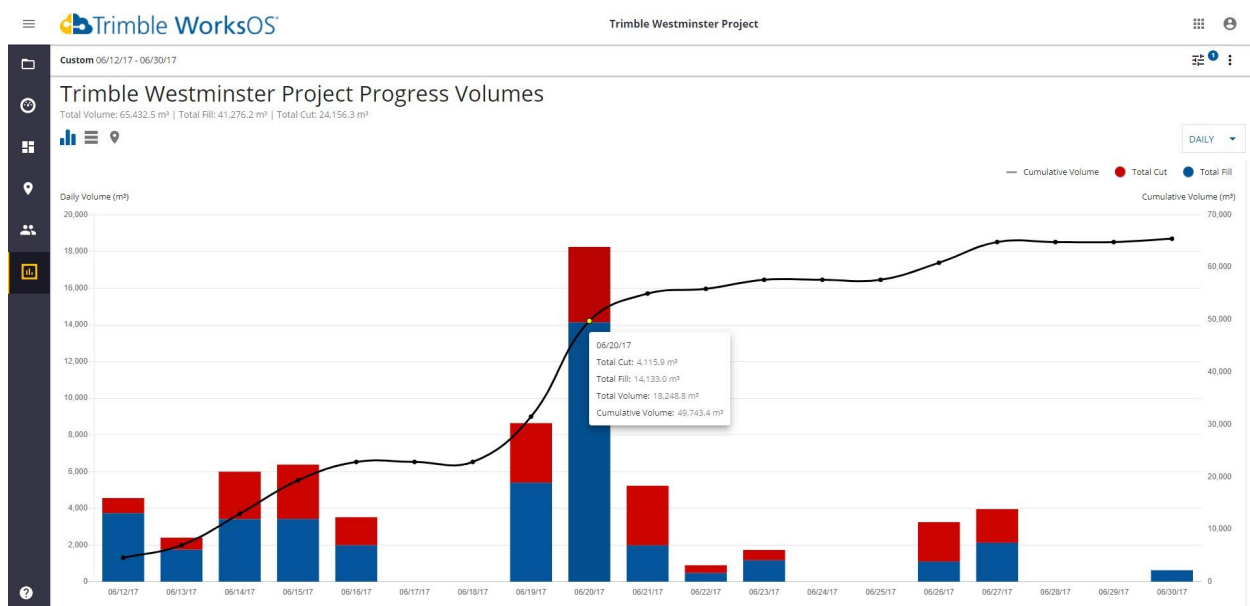


2. Click one of the 3 icons (Graph View, Grid View, Map View) at the top of the pane.



Graph view

The Graph View shows every day, start to finish. You can see here linear progression (bar charts) over the weeks. This can help you track the consistency of material volume movement as you normally would in the field (How much material was moved?) In addition, the black line with dots shows the cumulative material volume. Click any bar to see the daily cut, fill, and cumulative volumes.



Progress volumes daily graph

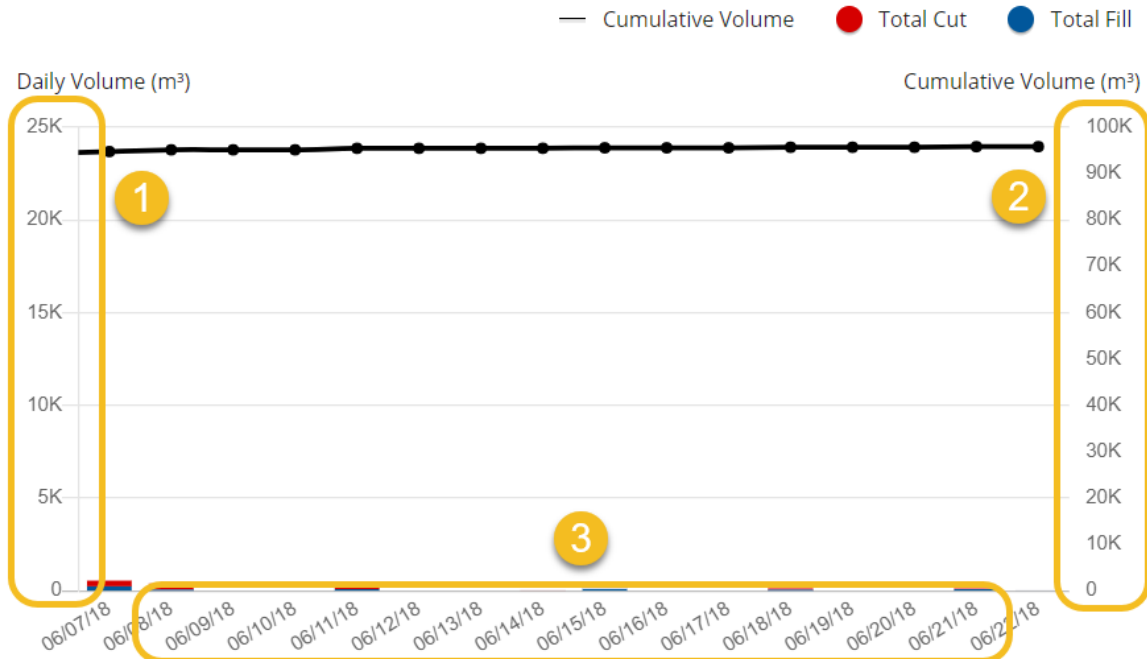
Graph View functions

The chart is configurable with a limited number of filters:

- Date range
- Spatial such as boundary, alignment, or custom area

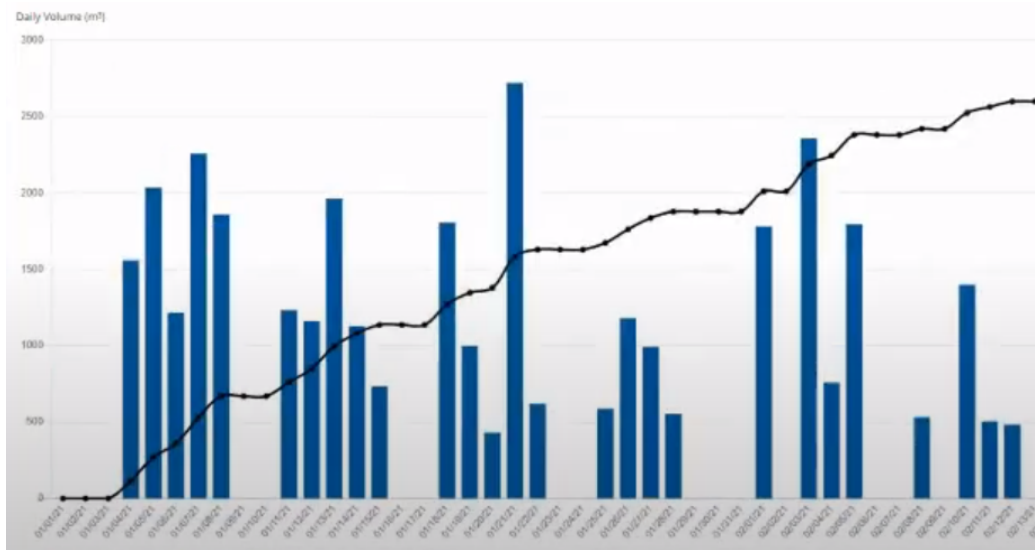
The chart is dual axis and includes three scales:

1. Daily values are shown on the left.
2. Cumulative values are shown on the right.
3. Dates are shown on the bottom.



You can click a legend label to toggle Cut, Fill, and Cumulative bars on/off in the view. If, for example, you are only being paid for cut volumes, simply remove fill from the chart and track the daily cut quantities. If you are doing a landfill job, you can toggle cut off so you see only fill volumes.

— Cumulative Volume ☒ Total Cut ☒ Total Fill



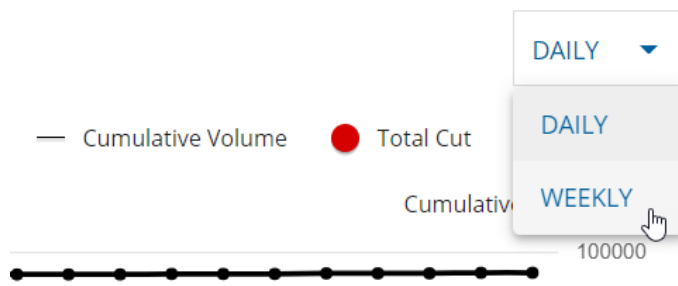
The total volume is always listed at the top of the chart under the name.

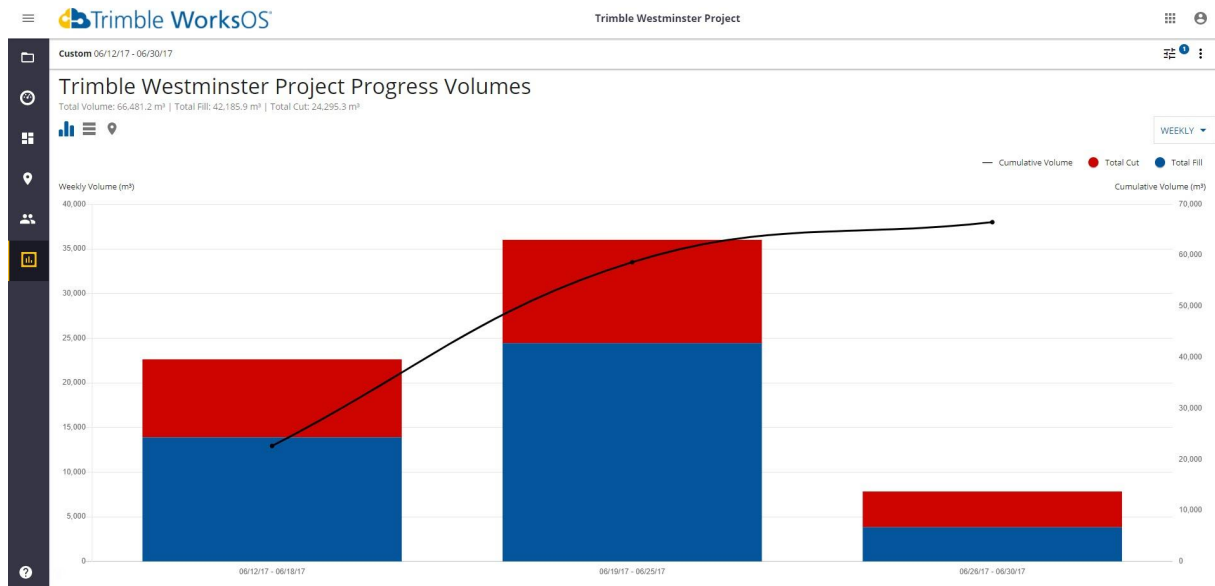
Project Extents 06/01/17 - 06/22/18

Project Progress Volumes

Total Volume: 95,820.9 m³ | Total Fill: 57,980.7 m³ | Total Cut: 37,840.1 m³

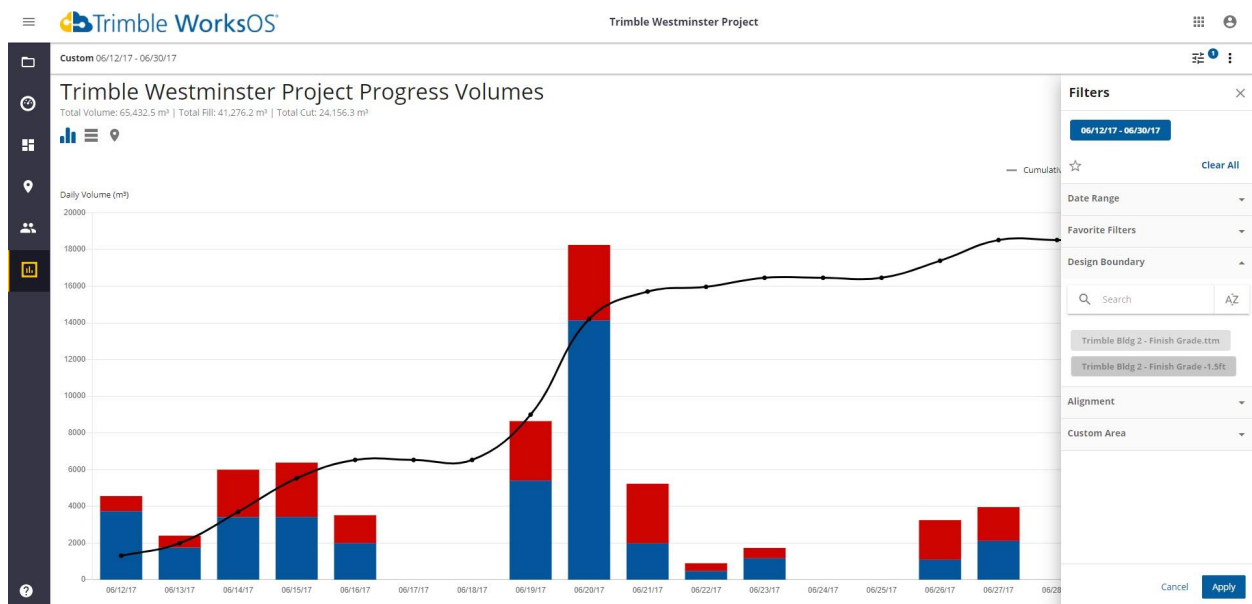
You can also filter by Daily or Weekly. Weekly combines the daily charts into weeks and sums them.



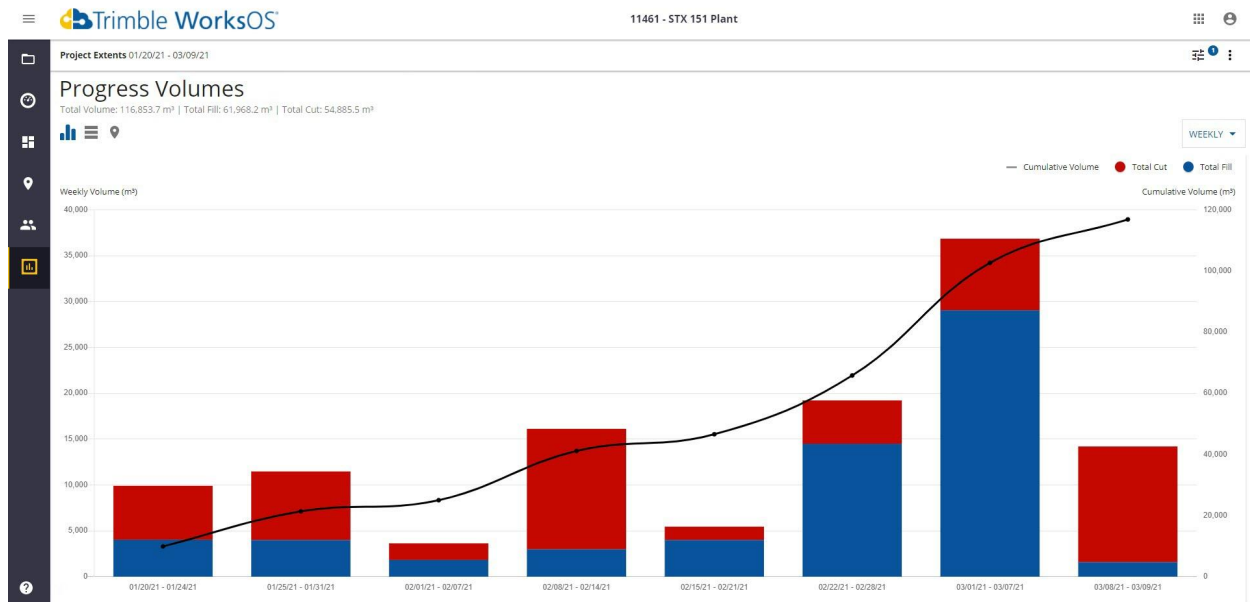


Progress volumes weekly graph

You can also filter the view in the standard way, but filters for progress volumes are independent from other Dashboard filters.




Progress volume daily graph with filter panel



Progress volumes weekly graph

Scroll in/out to see a shorter or longer time period in the chart.

To specify an alternate time span, click the Global  Filters icon on the Actions bar at the upper right. See Date Range Filters > Custom

The "Filters" dialog box is open, showing the "Date Range" section. The "Custom" option is selected and highlighted with a yellow circle. Below it, the "Custom Date Range" section shows the "From" date as "06/01/17 00:00", with a calendar icon also highlighted by a yellow circle.

Note: The maximum project extents (date range) is 1000 days.

Tip: Save your custom data range as a Favorite to quickly apply it at any time.

To configure the cut and fill colors, as well as material density factors (shrinkage and bulkage), click the More icon (ellipsis) and select Project Settings > Volume. The factors you

set are reflected in the material volumes.

Cut/Fill

☒ Default
 ☐ Custom

CUT

0.20

m

0.10

m

0.05

m

GRADE

0.00

m

-0.05

m

-0.10

m

FILL

-0.20

m

Bulkage/Shrinkage

☐ Default
 ☒ Custom

BULKAGE:

.04

%

SHRINKAGE:

0

%

Grid View

Select the Grid View for a table of values with the exact cut, fill, total, and cumulative values for every working day. You can also export this grid to an CSV file for greater data analysis and visualization in Microsoft® Excel.

Trimble WorksOS

Trimble Westminster Project

Custom 06/12/17 - 06/30/17

Trimble Westminster Project Progress Volumes

Total Volume: 65,432.5 m³ | Total Fill: 41,276.2 m³ | Total Cut: 24,156.3 m³

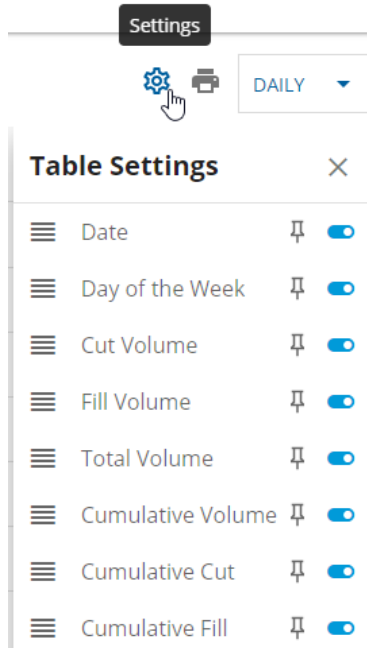
Search

Date ↓	Fill Volume (m³)	Day of the Week	Cut Volume (m³)	Total Volume (m³)	Cumulative Volume (m³)	Cumulative Cut (m³)	Cumulative Fill (m³)
06/30/17	619.4	Friday	11.7	631.1	65,432.5	24,156.3	41,276.2
06/29/17	0	Thursday	0	0	64,801.5	24,144.6	40,656.9
06/28/17	0	Wednesday	0	0	64,801.5	24,144.6	40,656.9
06/27/17	2,121.0	Tuesday	1,834.7	3,955.7	64,801.5	24,144.6	40,656.9
06/26/17	1,095.2	Monday	2,151.1	3,246.4	60,845.7	22,309.9	38,535.8
06/25/17	0	Sunday	0	0	57,599.3	20,158.8	37,440.6
06/24/17	0	Saturday	0	0	57,599.3	20,158.8	37,440.6
06/23/17	1,167.6	Friday	562.7	1,730.3	57,599.3	20,158.8	37,440.6
06/22/17	467.3	Thursday	429.2	896.5	55,869.0	19,596.0	36,273.0

Grid View Functions

You can drag-and-drop columns and sort by column headers.

To toggle columns on/off in the Table Settings pane, click the Settings icon.



Trimble WorksOS Trimble Westminster Project

Custom 06/12/17 - 06/30/17

Trimble Westminster Project Progress Volumes

Total Volume: 65,432.5 m³ | Total Fill: 41,276.2 m³ | Total Cut: 24,156.3 m³

Search

Settings DAILY

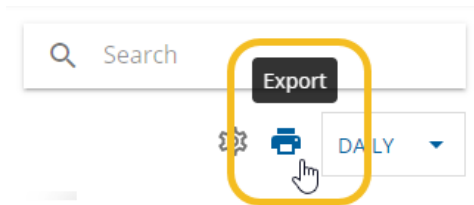
Date	Fill Volume (m³)	Day of the Week	Cut Volume (m³)	Total Volume (m³)	Cumulative Volume (m³)	Cumulative Cut (m³)	Cumulative Fill (m³)
06/30/17	619.4	Friday	11.7	631.1	65,432.5	24,156.3	41,276.2
06/29/17	0	Thursday	0	0	64,801.5	24,144.6	40,656.9
06/28/17	0	Wednesday	0	0	64,801.5	24,144.6	40,656.9
06/27/17	2,121.0	Tuesday	1,834.7	3,955.7	64,801.5	24,144.6	40,656.9
06/26/17	1,095.2	Monday	2,151.1	3,246.4	60,845.7	22,309.9	38,535.8
06/25/17	0	Sunday	0	0	57,599.3	20,158.8	37,440.6
06/24/17	0	Saturday	0	0	57,599.3	20,158.8	37,440.6
06/23/17	1,167.6	Friday	562.7	1,730.3	57,599.3	20,158.8	37,440.6
06/22/17	467.3	Thursday	429.2	896.5	55,869.0	19,596.0	36,273.0
06/21/17	1,981.4	Wednesday	3,247.7	5,229.1	54,972.5	19,166.8	35,805.7
06/20/17	14,133.0	Tuesday	4,115.9	18,248.8	49,743.4	15,919.1	33,824.3
06/19/17	5,397.4	Monday	3,246.0	8,643.3	31,494.6	11,803.2	19,691.3
06/18/17	0	Sunday	0	0	22,851.2	8,557.3	14,294.0

Table Settings

- Date
- Fill Volume
- Day of the Week
- Cut Volume
- Total Volume
- Cumulative Volume
- Cumulative Cut
- Cumulative Fill

Progress volumes grid view with Table settings

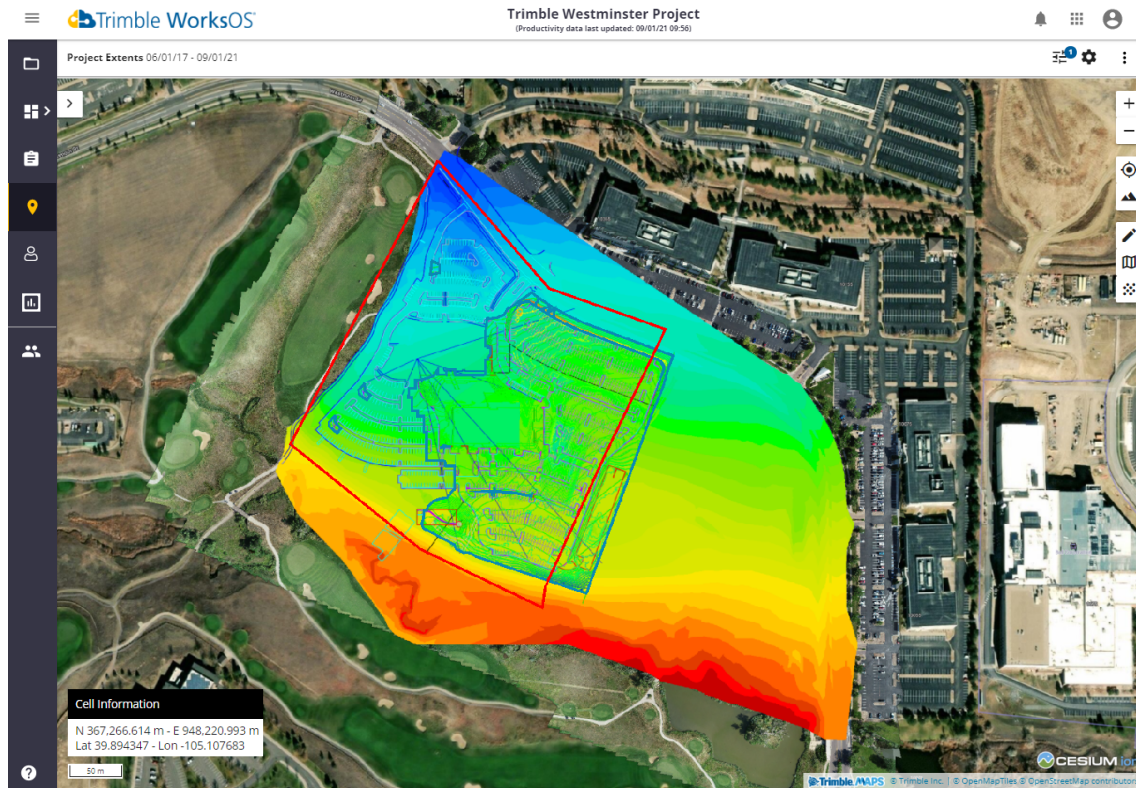
To export the grid values to CSV for more sophisticated data analysis, manipulation, and visualization in Microsoft Excel, click the Export icon.



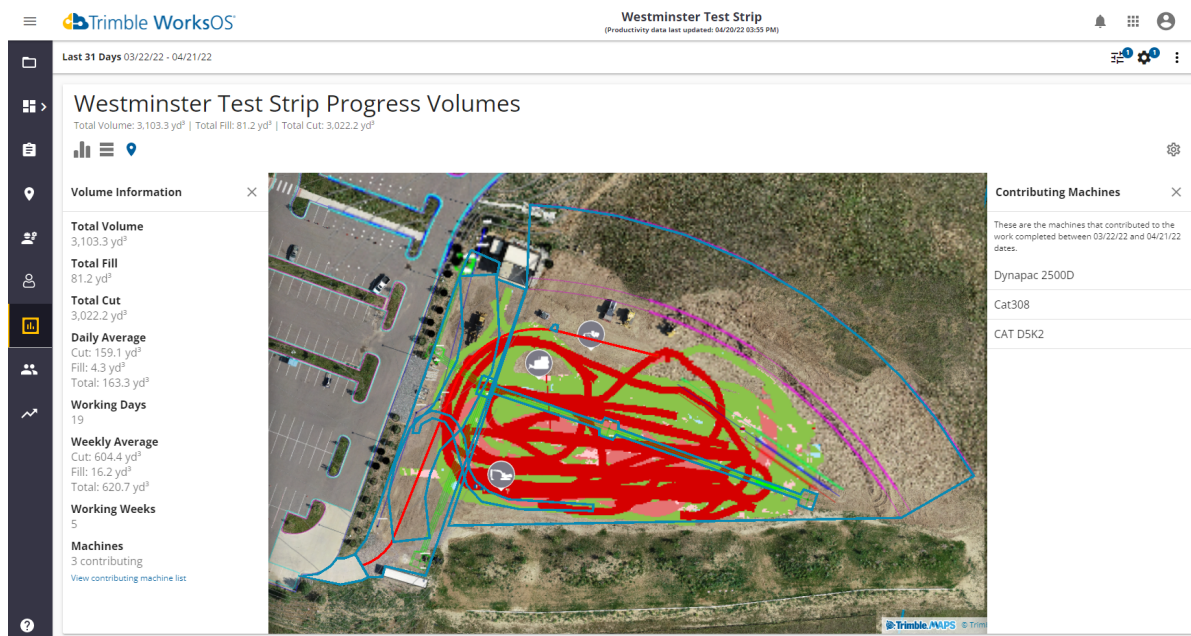
	A	B	C	D	E	F	G	H
1	Trimble Westminster Project Progress Volumes							
2	Total Volume: 95,820.9 m³ Total Fill: 57,980.7 m³ Total Cut: 37,840.1 m³							
3								
4	Date	Day of the Week	Cut Volume (m³)	Fill Volume (m³)	Total Volume (m³)	Cumulative Volume (m³)	Cumulative Cut (m³)	Cumulative Fill (m³)
5	6/22/2018	Friday	1.6	5.1	6.7	95,820.90	37,840.10	57,980.70
6	6/21/2018	Thursday	43.5	80.5	124	95,814.20	37,838.50	57,975.70
7	6/20/2018	Wednesday	0	0	0	95,690.20	37,795.00	57,895.20
8	6/19/2018	Tuesday	0	0	0	95,690.20	37,795.00	57,895.20
9	6/18/2018	Monday	69.8	52.9	122.7	95,690.20	37,795.00	57,895.20
10	6/17/2018	Sunday	0	0	0	95,567.50	37,725.20	57,842.30
11	6/16/2018	Saturday	0	0	0	95,567.50	37,725.20	57,842.30
12	6/15/2018	Friday	6.2	92.3	98.5	95,567.50	37,725.20	57,842.30
13	6/14/2018	Thursday	6.7	1.9	8.6	95,469.00	37,719.00	57,750.00
14	6/13/2018	Wednesday	0	0	0	95,460.40	37,712.30	57,748.00
15	6/12/2018	Tuesday	0	0	0	95,460.40	37,712.30	57,748.00
16	6/11/2018	Monday	243.5	82	325.6	95,460.40	37,712.30	57,748.00
17	6/10/2018	Sunday	0	0	0	95,134.80	37,468.80	57,666.00
18	6/9/2018	Saturday	0	0	0	95,134.80	37,468.80	57,666.00
19	6/8/2018	Friday	322.5	56	378.5	95,134.80	37,468.80	57,666.00
20	6/7/2018	Thursday	310.6	229.7	540.4	94,756.30	37,146.30	57,610.00

Map View

This view lets you see the areas your machines cut and filled geographically on the project site.



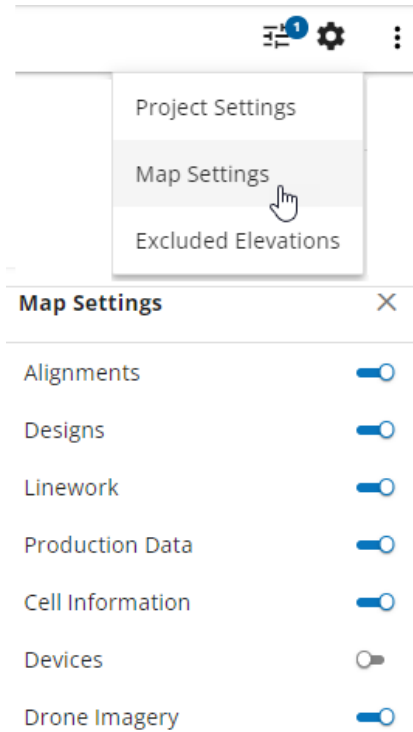
Map view



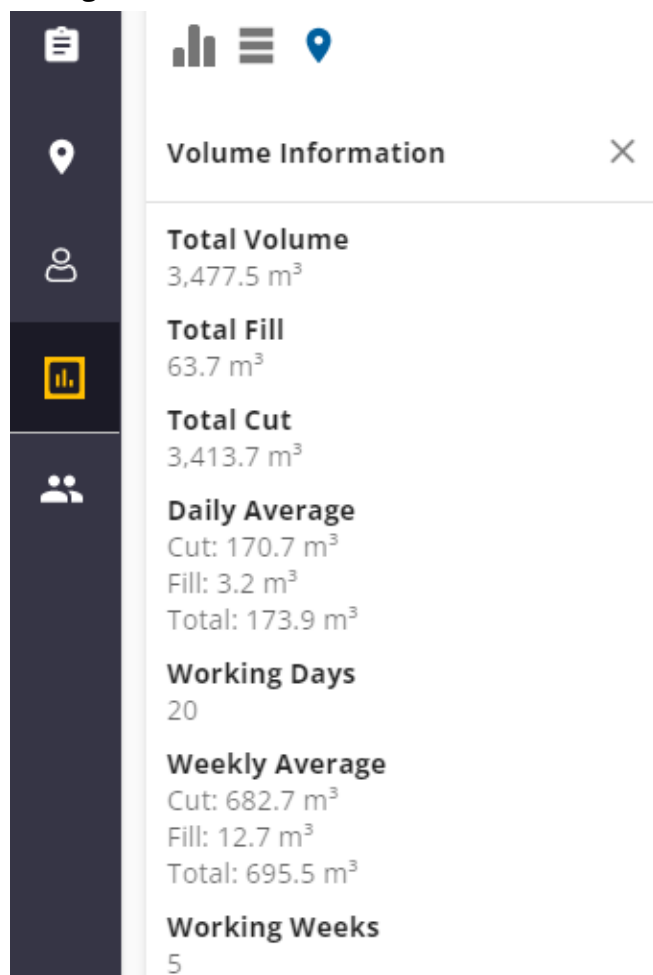
Progress volumes Map view

Map View Functions

To toggle certain types of data on/off in the Map Settings pane, click the Settings icon.



Click the Volume Information arrow on the left side to see totals, including daily and weekly averages.



Note: Total Volume, Daily Average, and Weekly Average include both cut or fill, as applicable.

Note: Any non-working (0 volume) days/weeks are excluded from the Daily/Weekly Average.

Tip: Filter by new date ranges to see working areas and averages for specific time periods. This can help you, for instance, identify seasonal productivity patterns.

Note: If you cut and fill the same volume during the same day, the change is net 0.0. If you cut one day and fill the next day, there is a day-over-day change. Before WorksOS, this was done based on load counts. In this case, progress is measured by looking at the day-over-day change. There is usually an objective goal for how much to move (cut or fill) each day.

When you have questions, your best source of help is the [WorksOS Resource Center](#).

Getting Help and Support

For more helpful information, see [Reaching Sales, Support, and Community](#).

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