Smart Construction

Smart Construction Design3D
User Guide

October, 2023
Ver1.0-0005

Before you read this manual:

■Before you start

- The purpose of this manual is to provide explanation on the procedures for using Smart Construction Design3D.
- For displaying units, International System of Units (SI) is used.
  Explanation, numeral values, illustration, etc. are based on the information as of the time this manual was prepared.
- If you have any questions or opinions, please contact Smart Construction Support Center.
- Use the application after understanding the contract conditions, guarantees, and responsibilities stated in the application software terms of service.
- Screen and display of the application may change when updated. If there groundny differences between what is written in this manual and the display on the application screen, operate according to the application display.

■Trademark used in this manual

- Smart Construction and Smart Construction Dashboard are trademarks or registered trademarks of Komatsu Ltd.

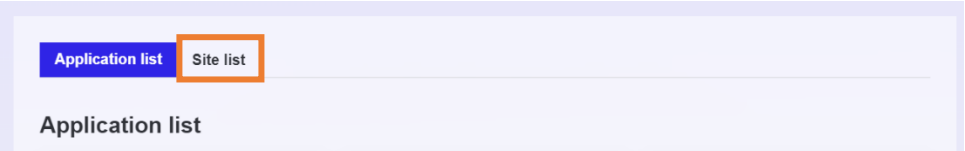
*In general, company names, product names, etc. written here are business names, trademarks or registered trademarks of each company.

Contents

1 Create new jobsite

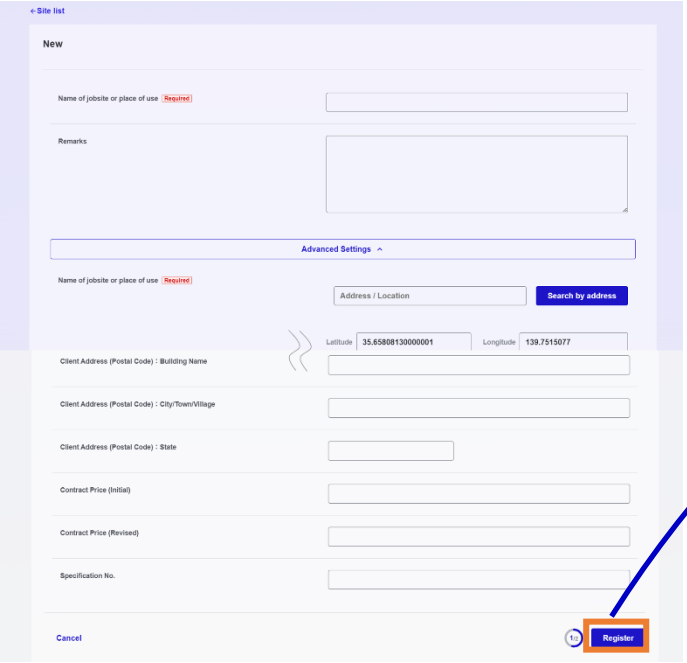
You cannot create the new jobsite directly from Smart Construction Design3D.
When creating the new jobsite, you need to create the new jobsite from the jobsite list on Customer Portal (registration of necessary information).

1. Log in Customer Portal before entering the “Site list”.

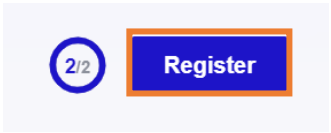


2. Press the “New” button.

3. Fill out the form completely, press the 1/2 “Register” button on the bottom, and press the 2/2 “Register” button on the confirmation screen.



Press the “Register” button to complete the registration.



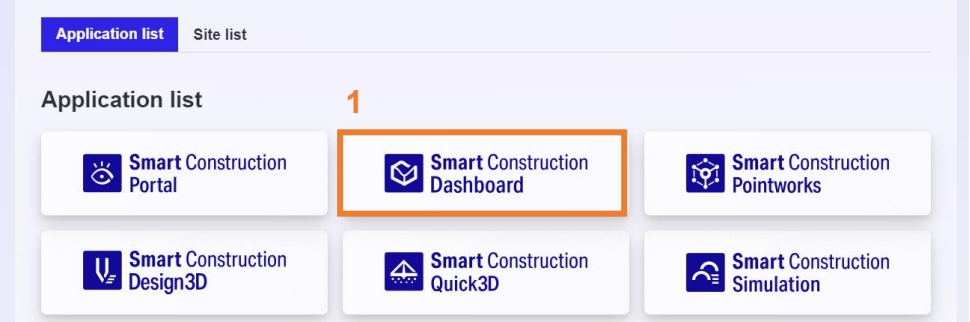
4. The new site is registered in the “Site list”.

2 Preparation for Smart Construction Dashboard

For creating a jobsite, there are two ways for setting: setting through localization linkage, and that through specifying the coordinate system.
For the localization linkage, it is required to convert the jobsite into a project on Smart Construction Dashboard. Follow the procedures below to start the operation.
(For the setting with the coordinate system, refer to “3.1.2 In case of setting coordinate system”.)

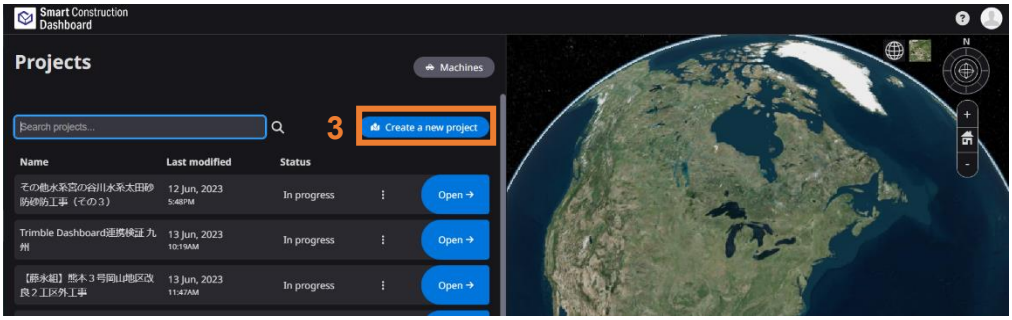
Start from Customer Portal to use Smart Construction Dashboard.

1. Click Smart Construction Dashboard on Customer Portal.

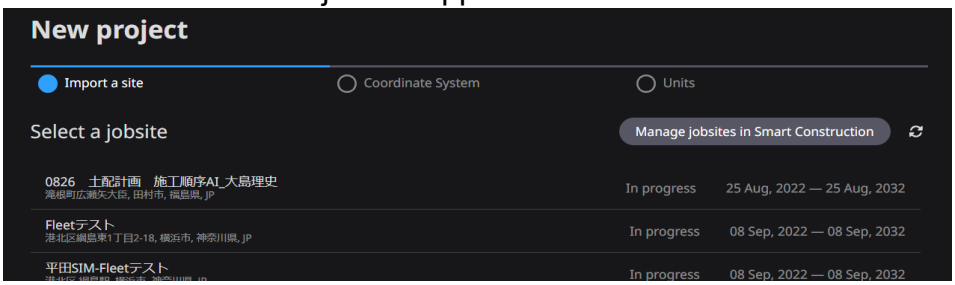


2. You will be asked for permission, so select permission (first time only).

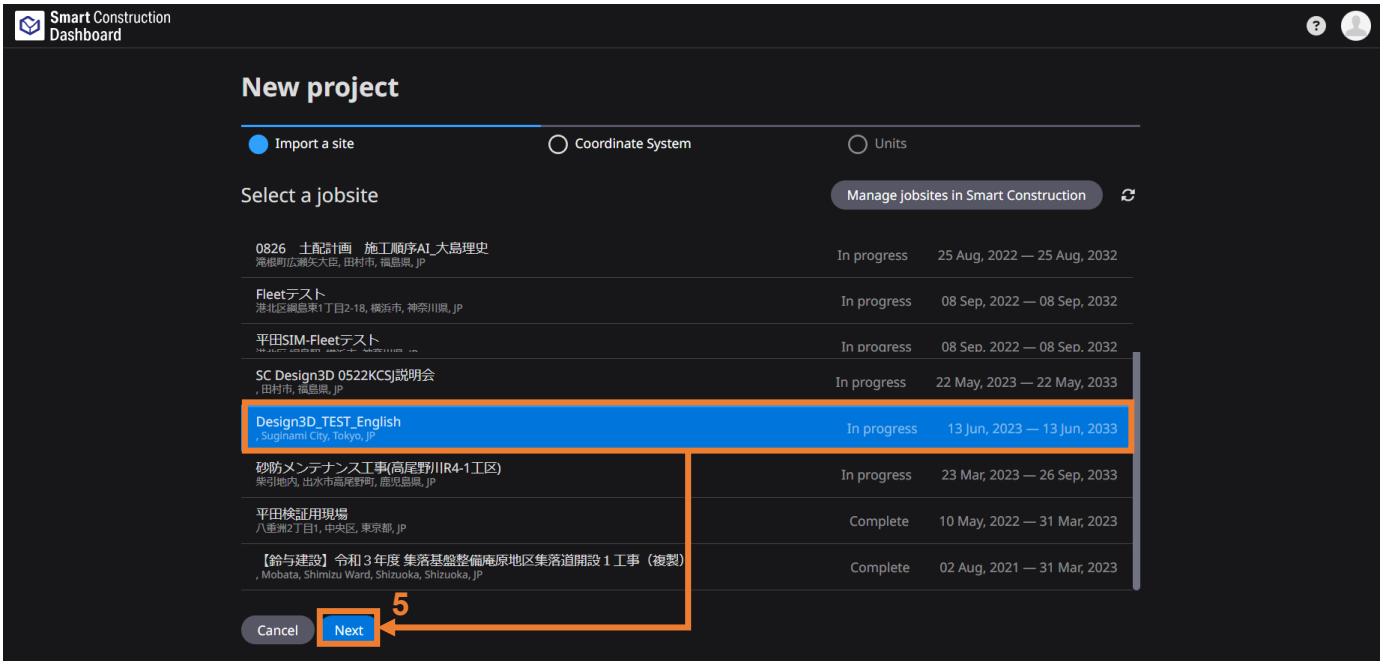
3. Smart Construction Dashboard becomes available
   Press the “Create a new project” button.



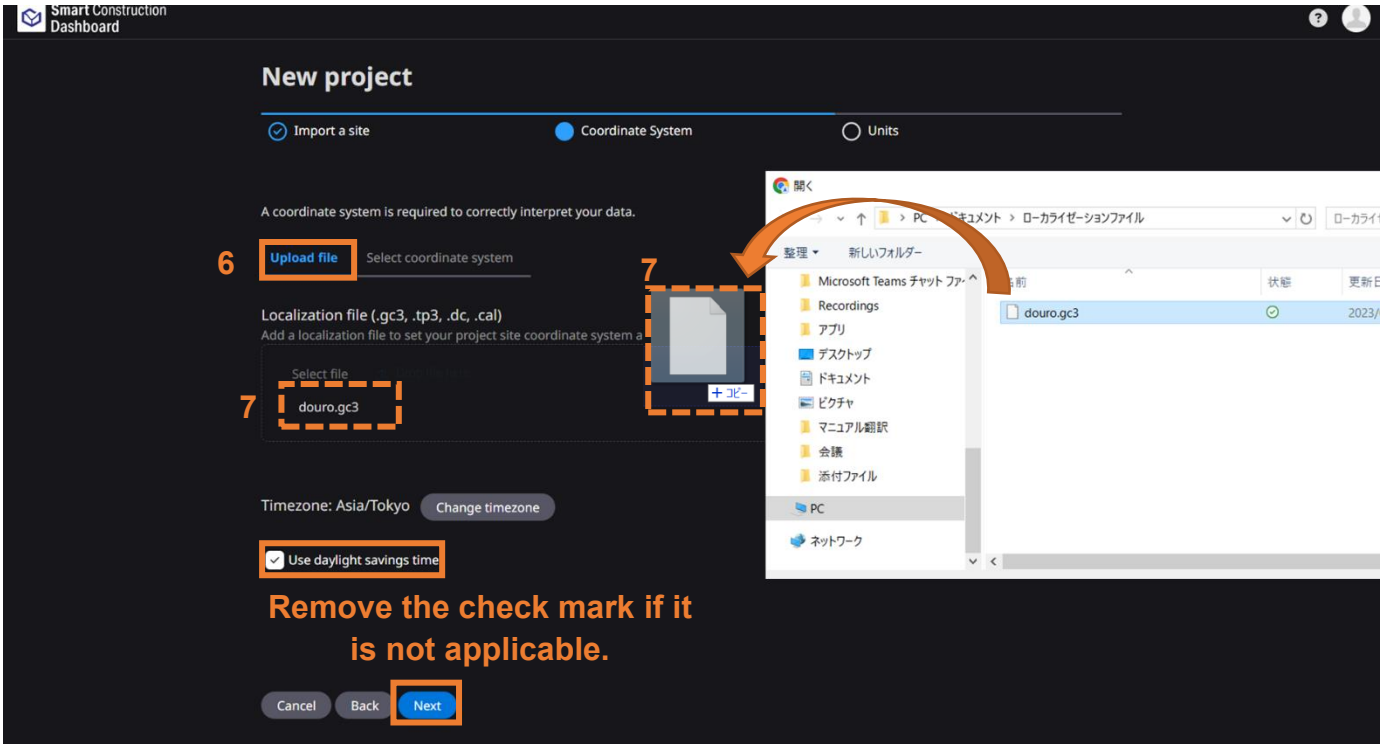
4. The list of created jobsite appears.



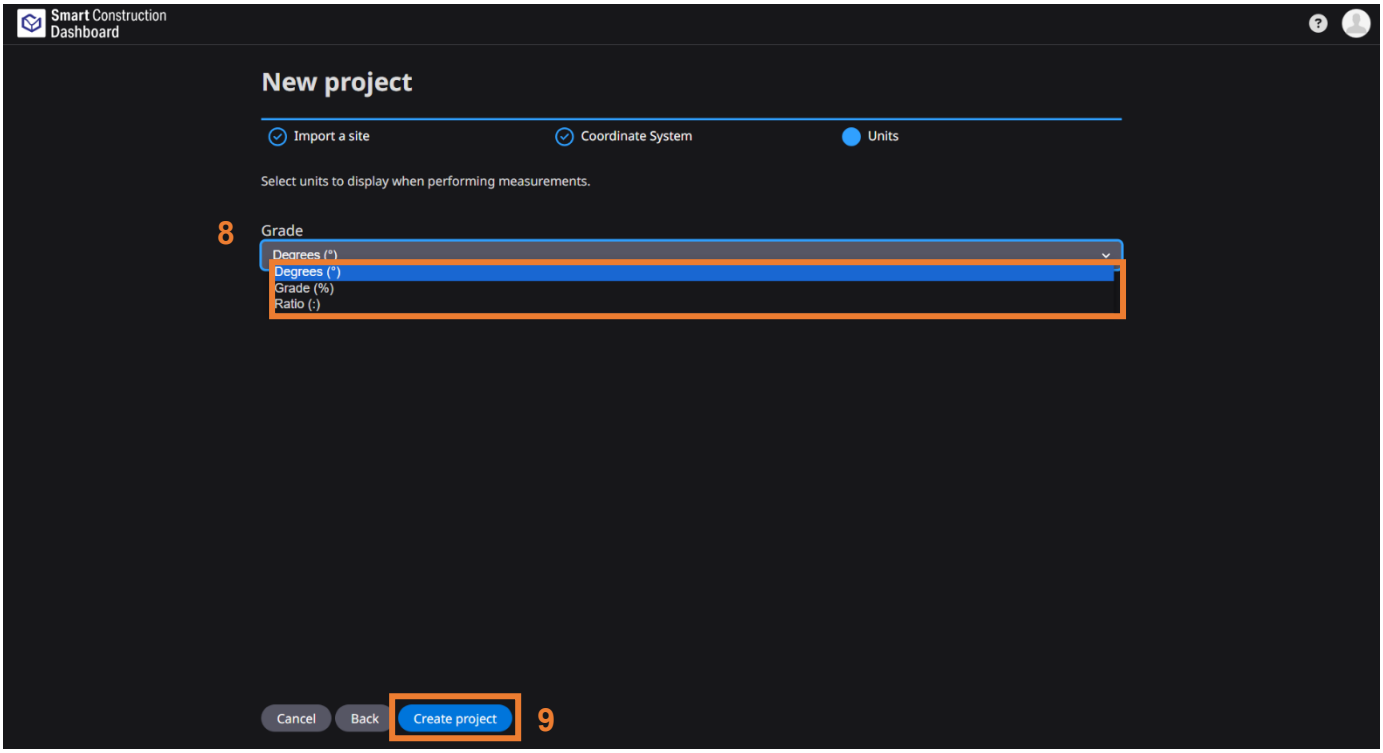
5. Select the site you use with Smart Construction Design 3D, and press “Next”.



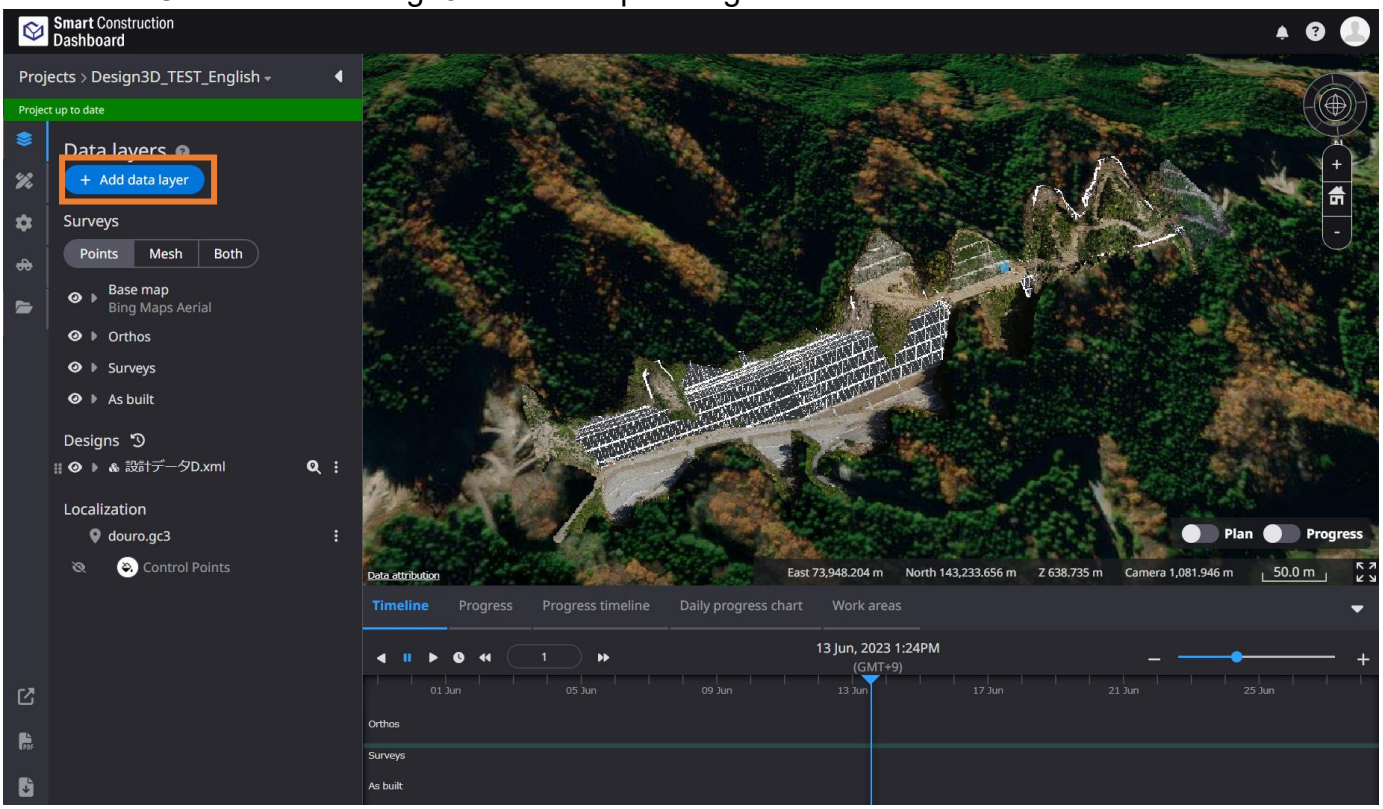
6. Set Coordinate system.
   Press “Upload file”.
7. “Select files” or upload a localization file by drag-and-drop action, and press “Next”.



8. Select the unit for grade.
9. Press “Create project”.



10. A project of the site has been done.
    You can upload the point cloud data and design data from “Add data layer”, but you can use Smart Construction Design3D without uploading them.

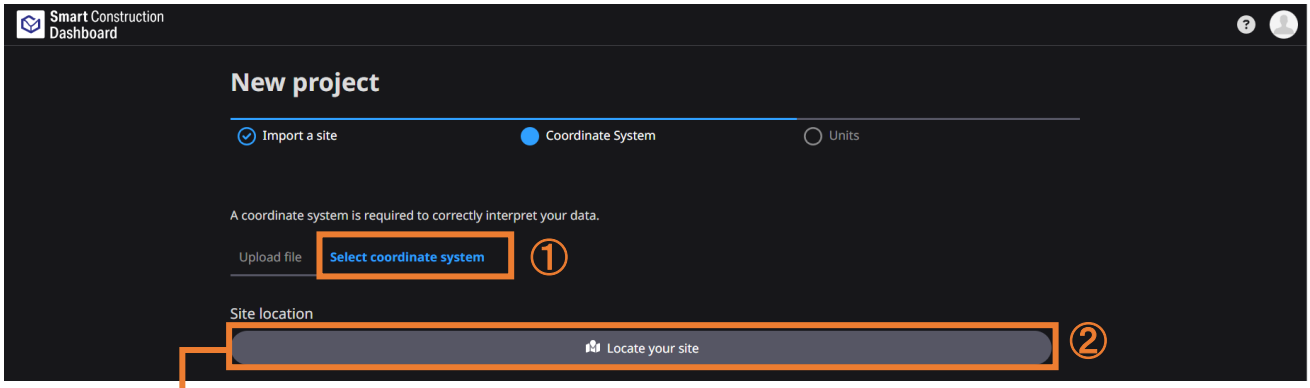


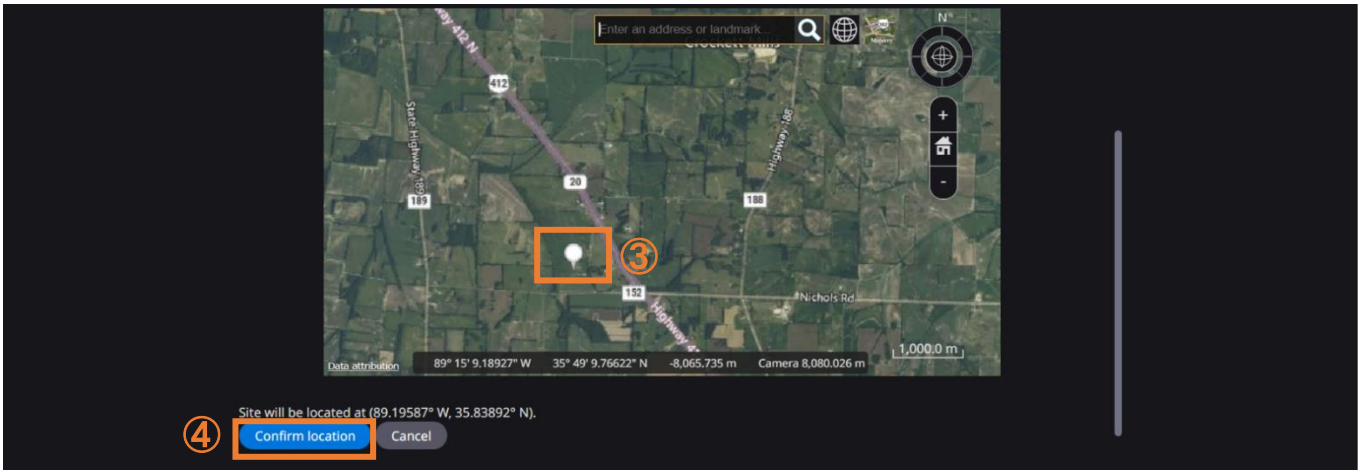
Supplement

You can set the coordinate system from Smart Construction Dashboard, even if there is no localization.

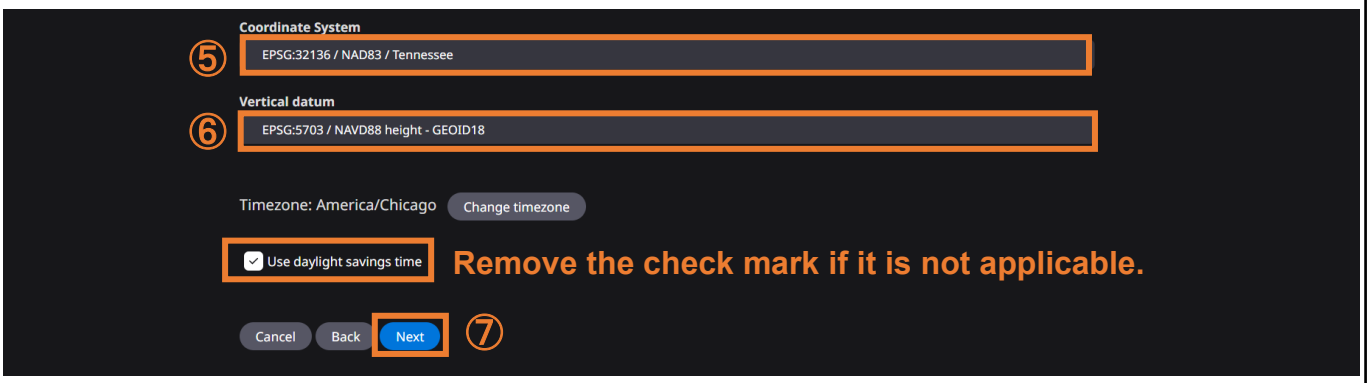
* Creation of jobsite on Smart Construction Dashboard enables exporting the drawing data to Smart Construction Dashboard. (Refer to “4. Export of drawing data”)

① Press “Select coordinate system”.
② Press “Locate your site”.
③ Click the map, and set the center position of the site.
Input the address, latitude and longitude in the Search form, then the search will be easier.
④ Press “Confirm location”.



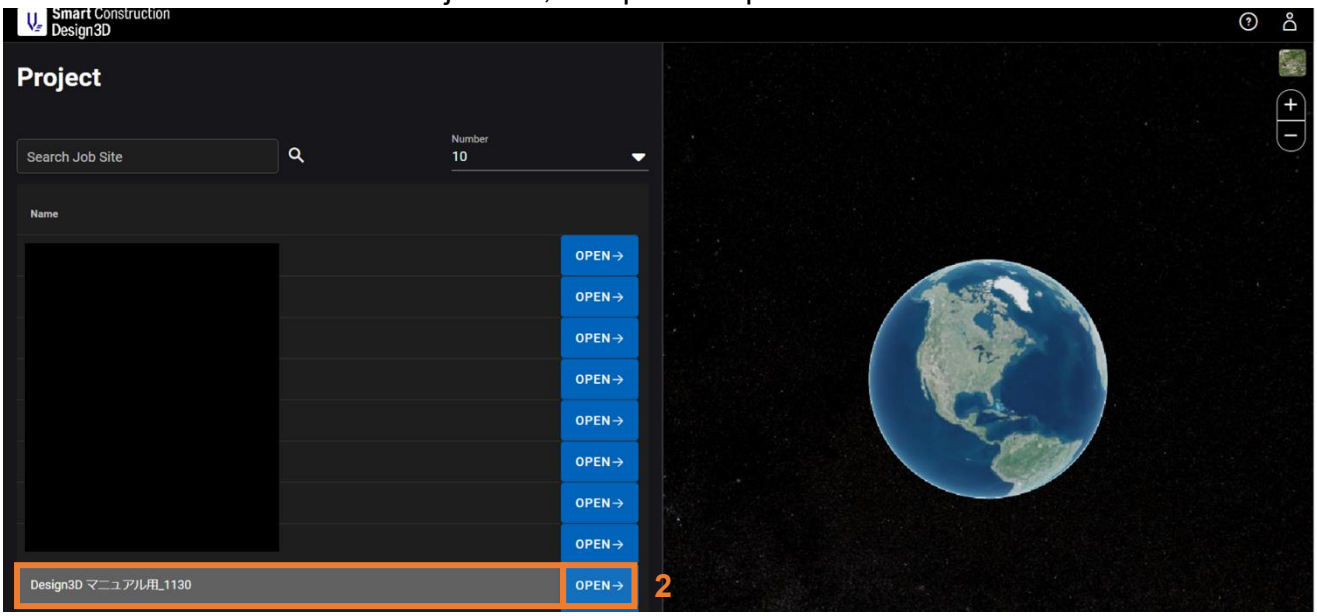


⑤ Select Coordinate System.
⑥ Select vertical datum.
⑦ Press “Next”.
Operate in the same manner as 8. “Select the unit for grade”.



3.1 Open the jobsite

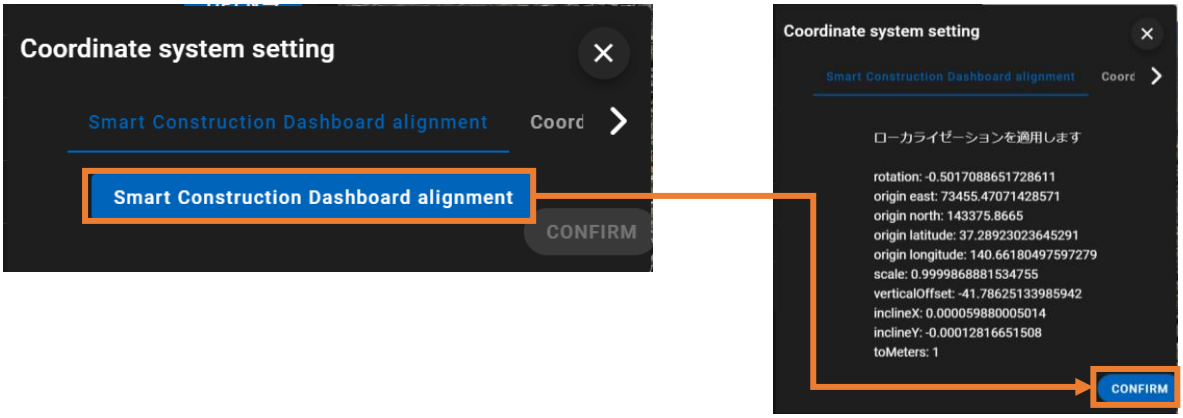
1. Access Smart Construction Design3D.
   URL https://design3d.smartconstruction.com/top
2. Select the site from the Project list, and press “Open”.



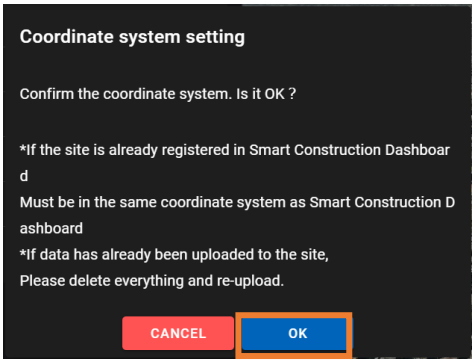
3.1.1 In case of localization linkage

If you set the localization on Smart Construction Dashboard (refer to “2. Preparation for Smart Construction Dashboard”), follow the procedures below to operate the Smart Construction Design3D.

1. Press “Smart Construction Dashboard alignment” > “Confirm”.



2. Jobsite opens when “OK” is pressed.

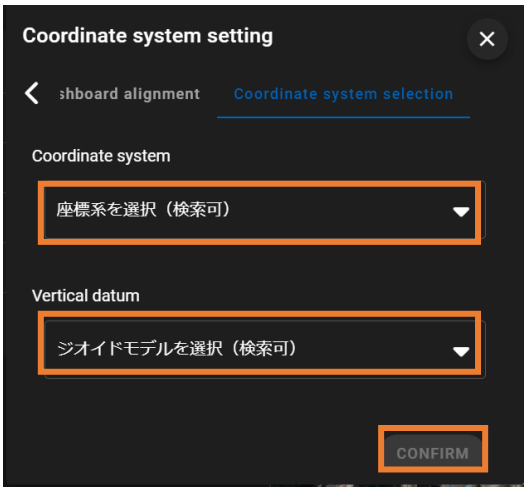


*** Note**

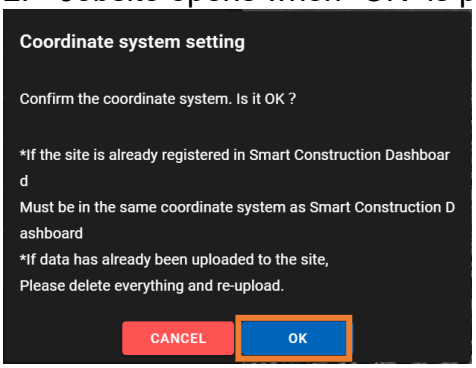
If you change the coordinate system in SC Dashboard while SC Dashboard and SC Design3D are linked in coordinate systems, delete the site data (point cloud data, design data and drawing data) of SC Design3D. Upload data again or create drawings again.

3.1.2 In case of setting coordinate system

1. Select “Coordinate system selection”, then select the appropriate coordinate system and vertical datum from the pull-down menu (or search by inputting the words directly), and press “CONFIRM”.



2. Jobsite opens when “OK” is pressed.



*** Note**

Regarding SC Dashboard and SC Design3D, coordinate settings are not linked.
Setting, changing, and updating are necessary for each.

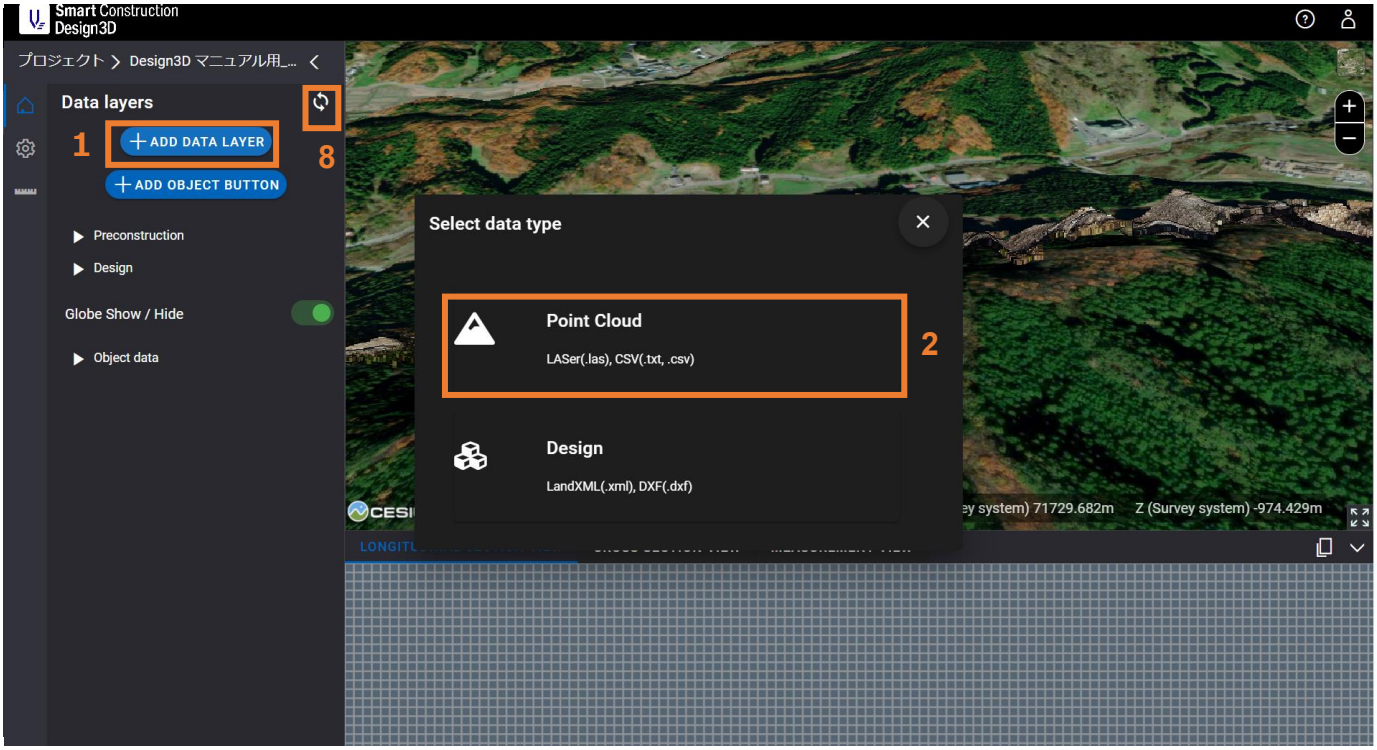
3.2 Upload point cloud data and design data

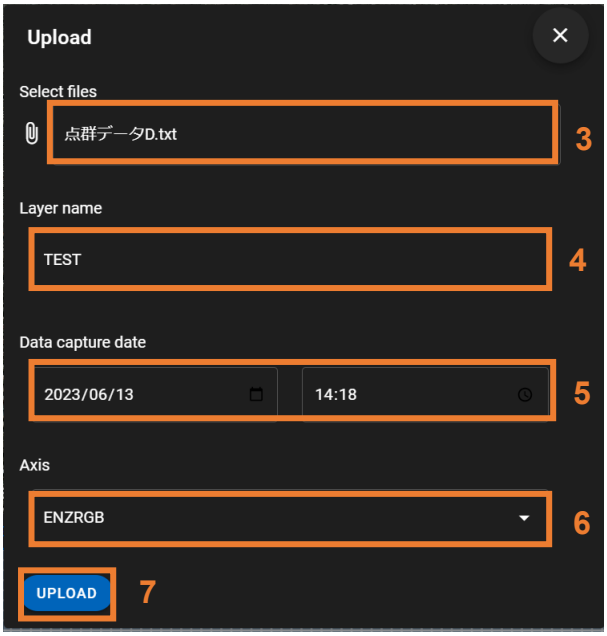
Upload point cloud data

1. Press “ADD DATA LAYER”.
2. Press “Point Cloud”.
3. Select the point cloud data saved in PC.
4. Input the data name.
5. Specify data capture date and time.
6. Select data type.
7. Press “UPLOAD”.
8. Press Refresh mark.

*** Note**

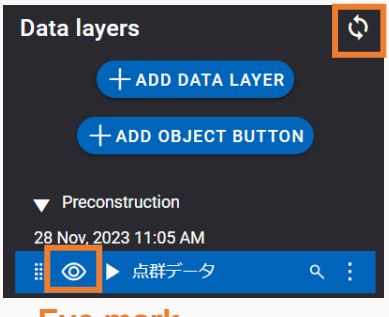
If the data size is large, it may take some time to reflect the data after executing [7. Press “Upload”]. Please wait for approximately 2 minutes if the data size is 43 MB, approximately 13 minutes if it is 1 GB. Then, press “Refresh” mark. (Since it depends on the network environment, these are provided for your reference.)





*** Note**

If the eye mark is not activated and data is not reflected even after execution of “8. Press Refresh mark”, press “F5” button of PC to refresh the browser. When refreshing the browser, the screen returns to the Project list. Open the site again to check.

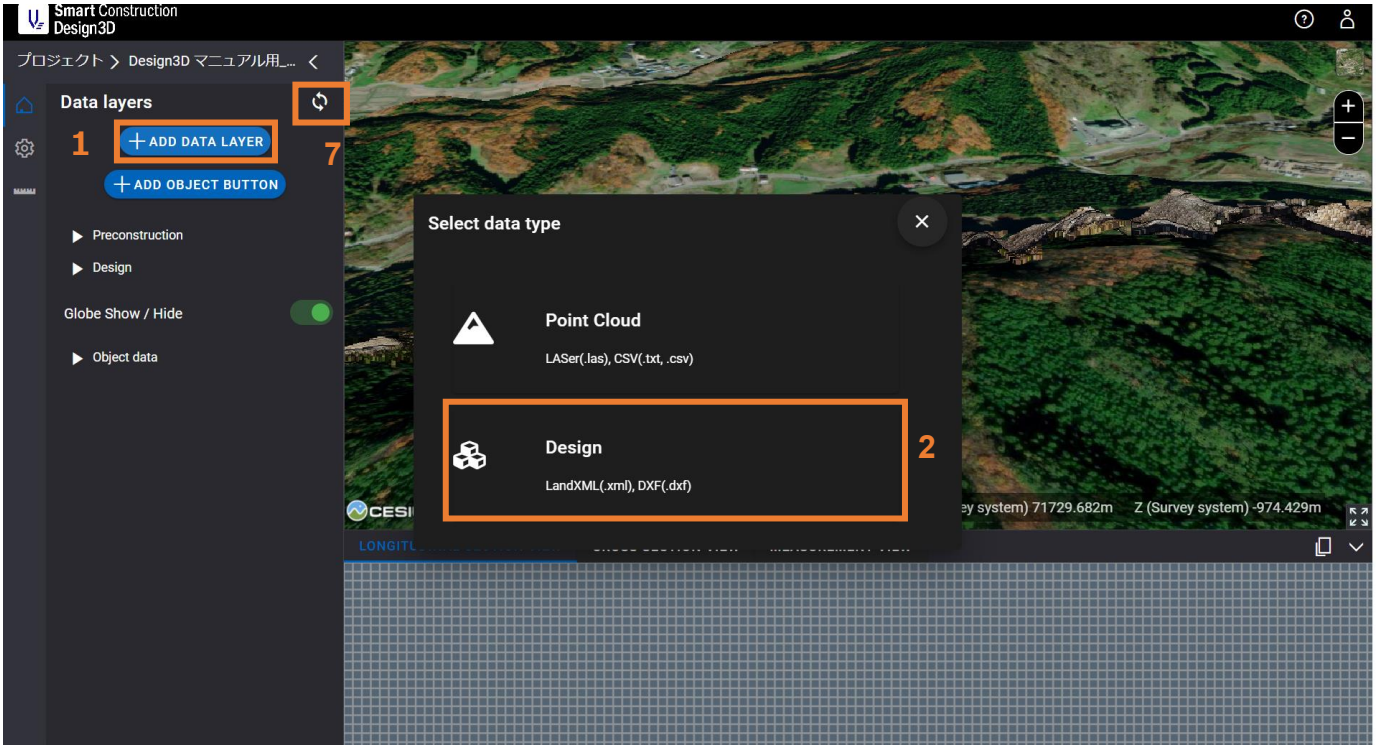


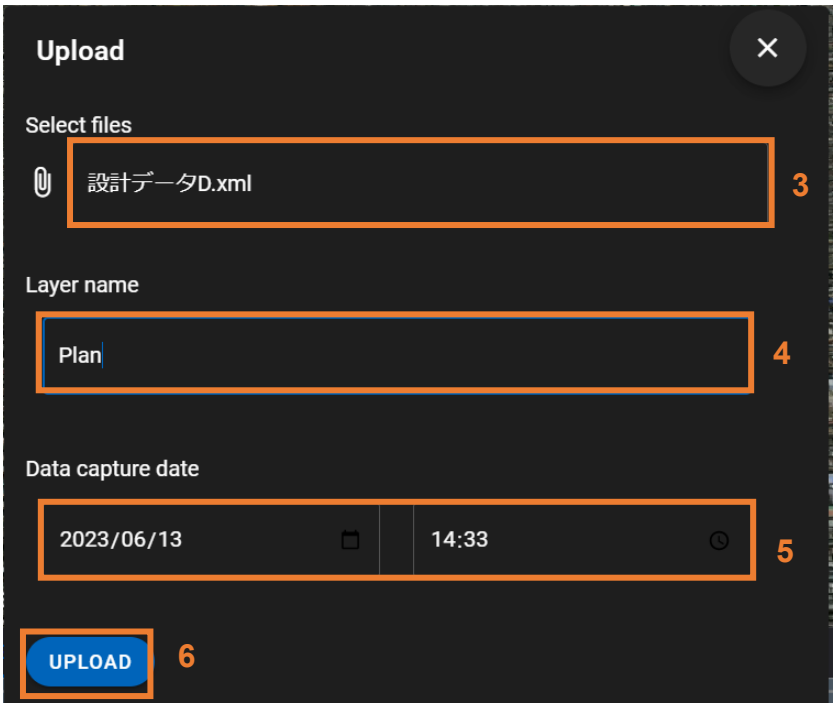
8. Refresh mark

Eye mark

■Upload a design

1. Press “ADD DATA LAYER”.
2. Press “Design”.
3. Select the design data saved in PC.
4. Input the data name.
5. Specify data capture date and time.
6. Press “UPLOAD”.
7. Press Refresh mark.

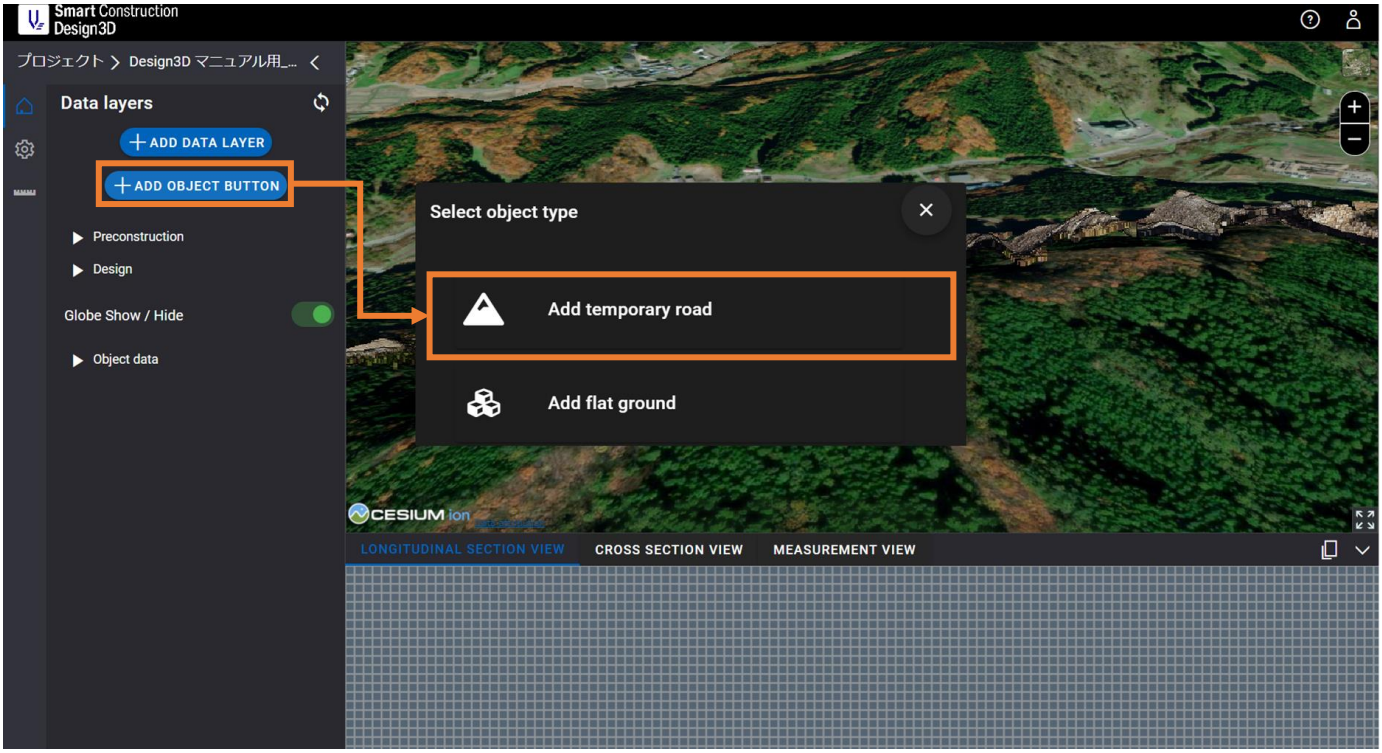




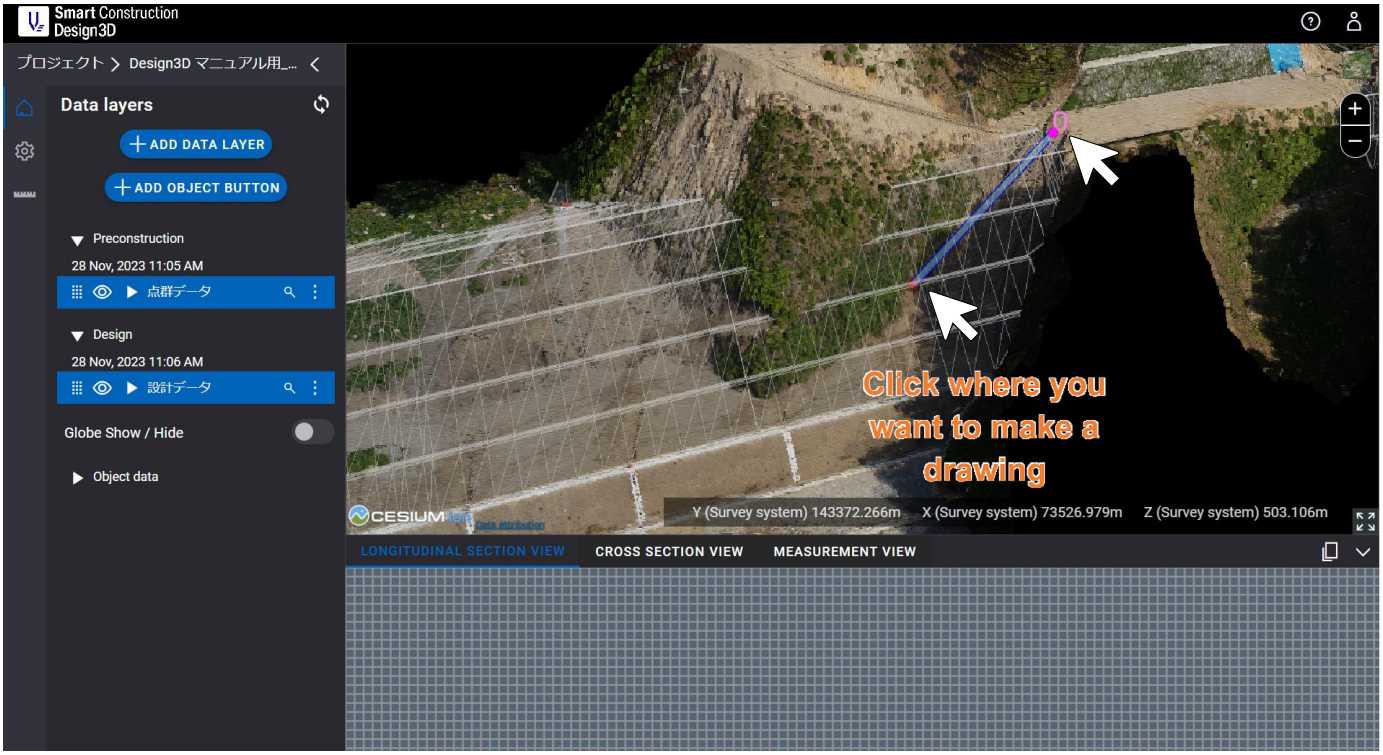
3.3 Create temporary road

3.3.1 Add temporary road

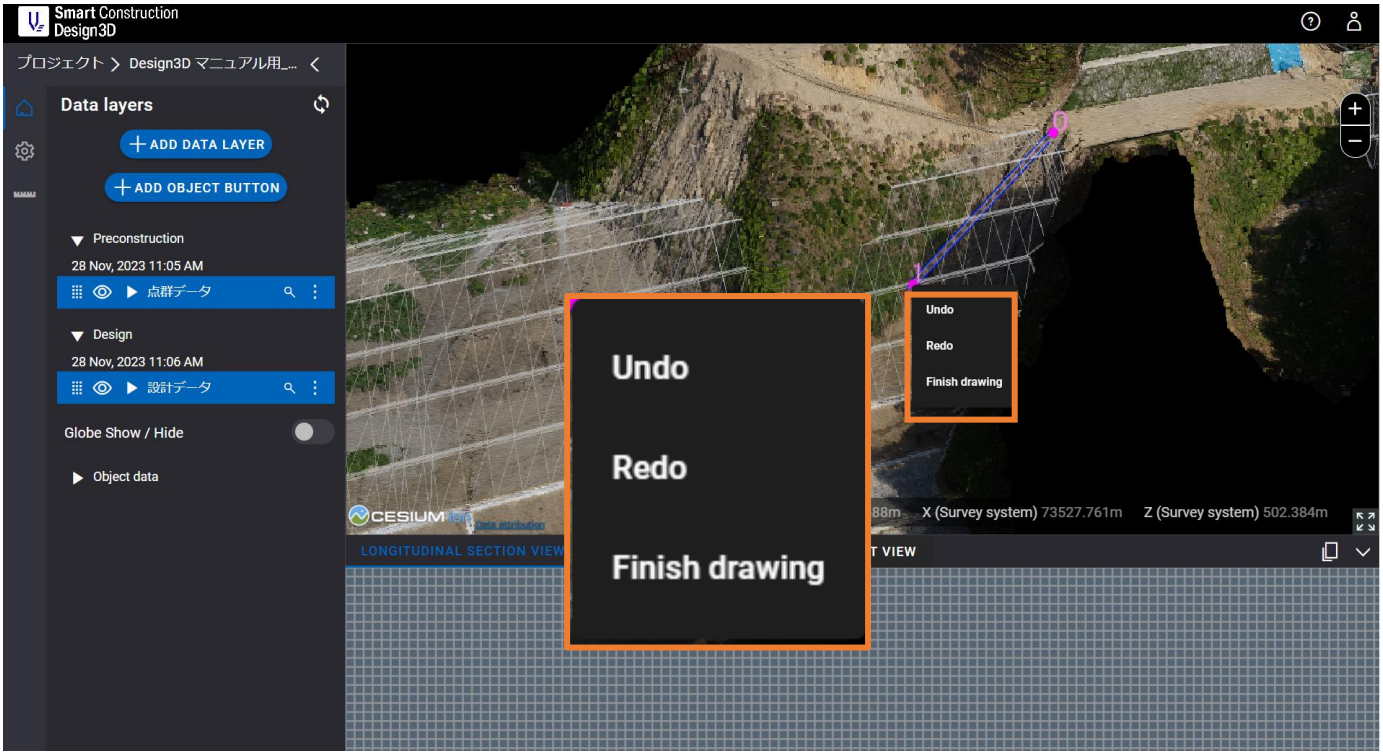
1. Select “Add temporary road” from the “ADD OBJECT BUTTON”.



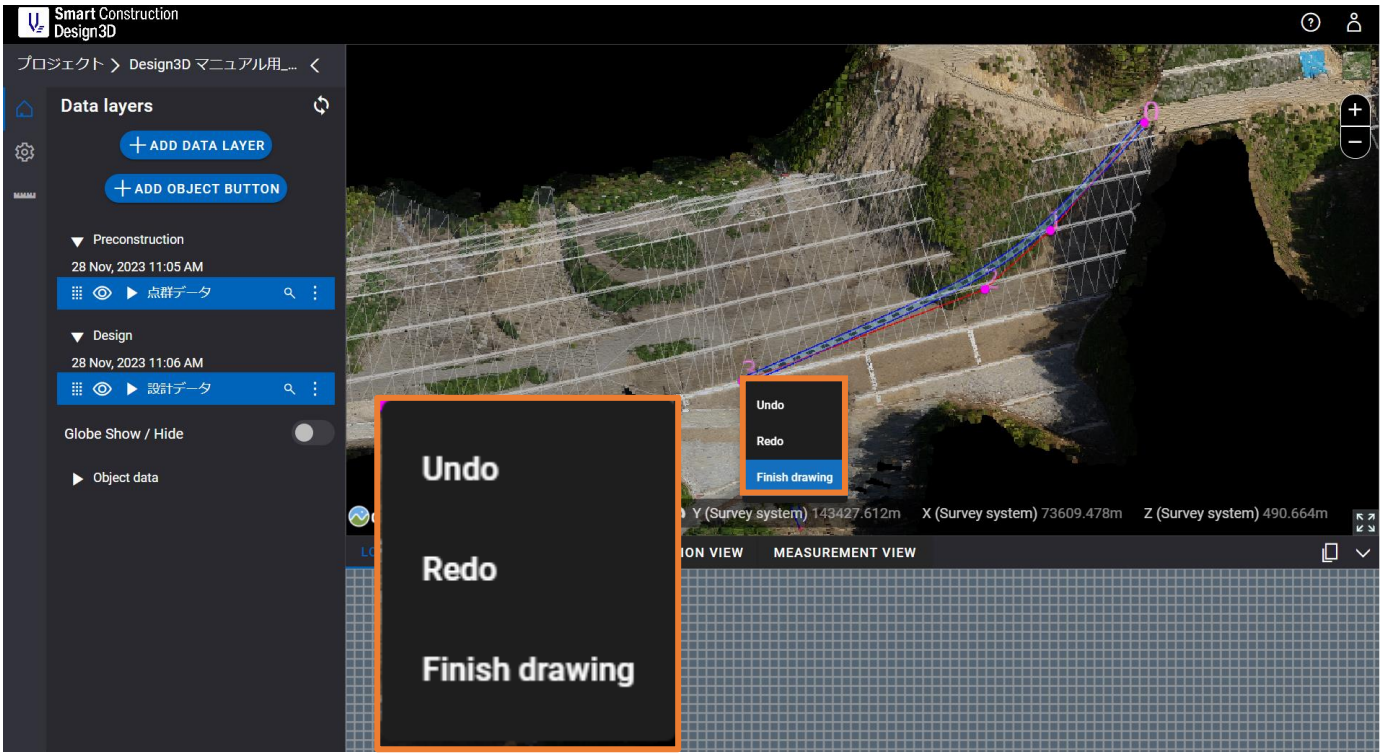
2. Click where you want to draw a temporary road on the point cloud data.
   ●: Clicked point
   ●: Where your mouse points at



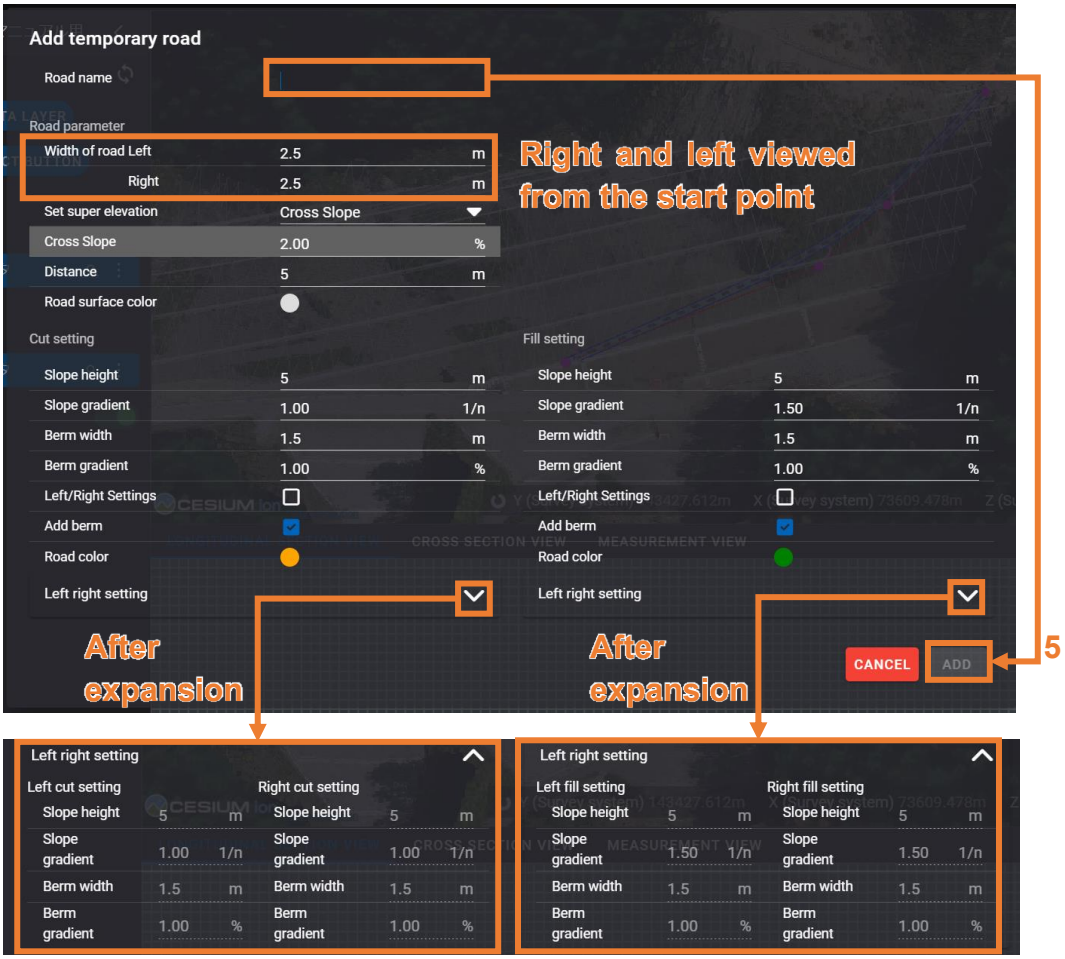
3. While drawing, you can open the menu by right click.
   Undo: The screen returns to the previous work status.
   Redo: The screen moves one step forward.
   Finish drawing: Completes creating a temporary road having ● that has been made by your latest click as an end point.



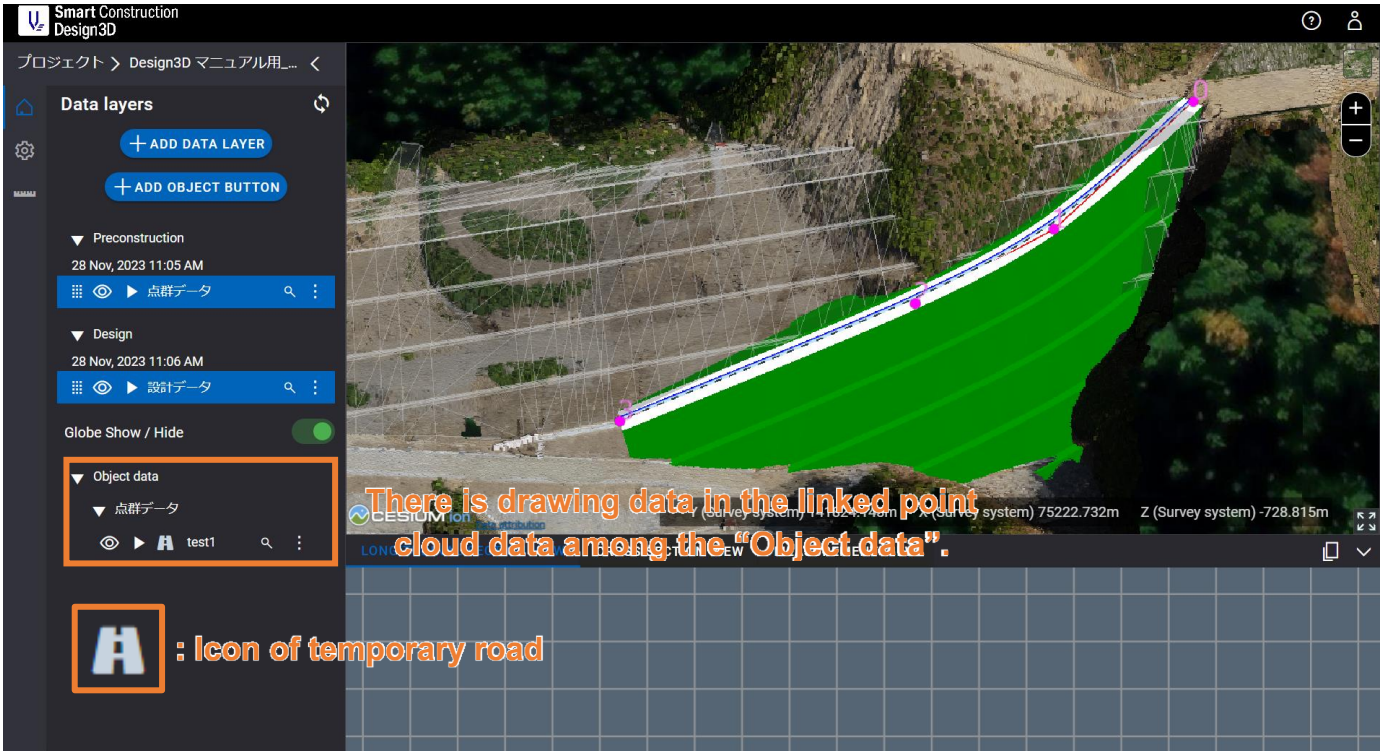
4. After clicking the end point, press “Finish drawing”.



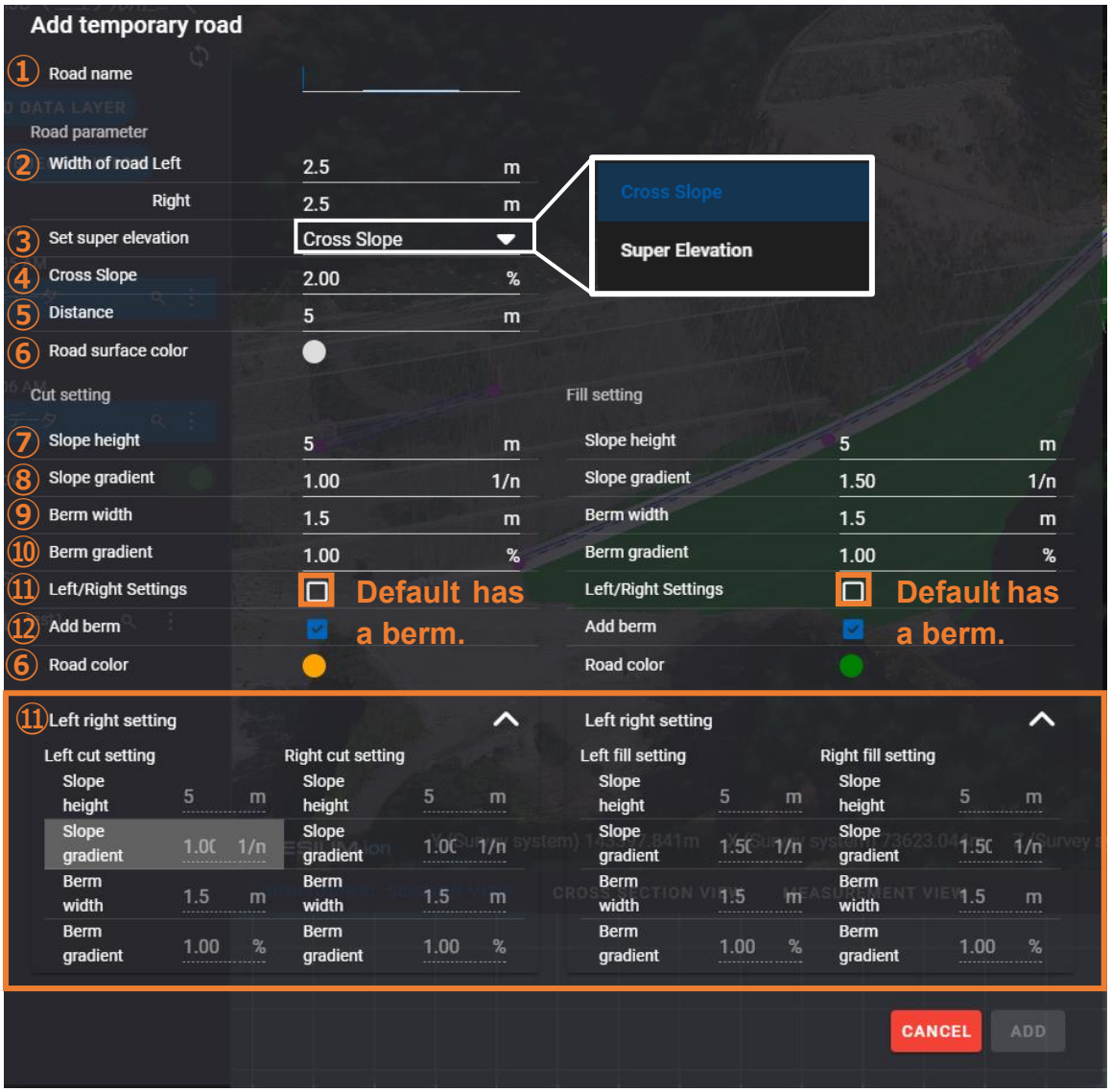
5. When the screen as shown below is opened, input the name of the road, and press “ADD”.
   Input the road name, then you can use “ADD” button.
   You can change other information as necessary.



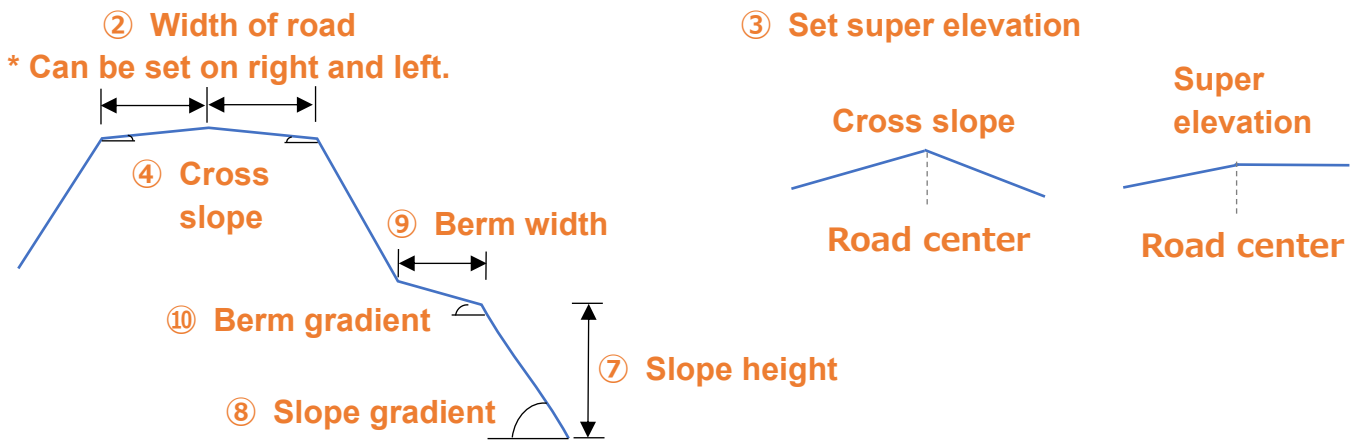
6. A temporary road drawn.



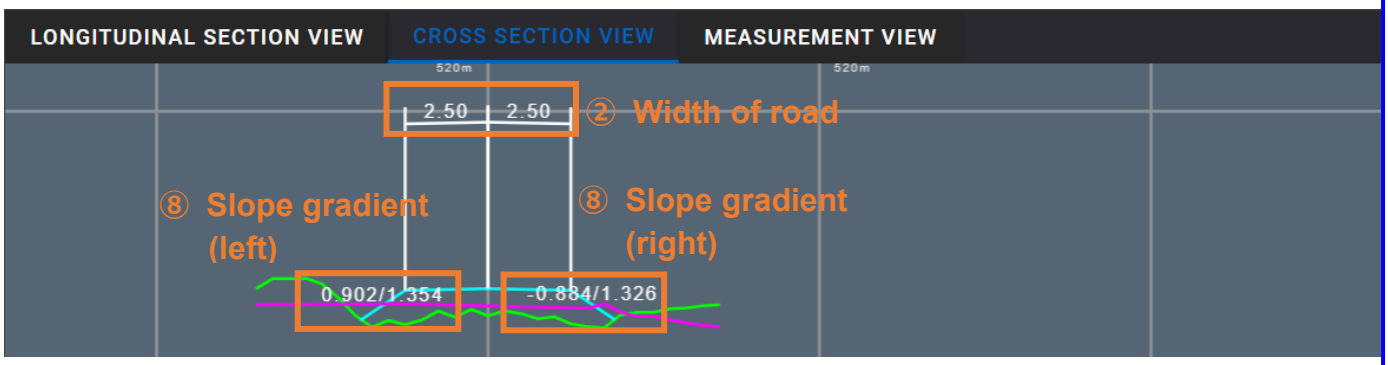
Description of additional setting and cross section view of temporary road



[Simplified drawing]



[Cross section view]

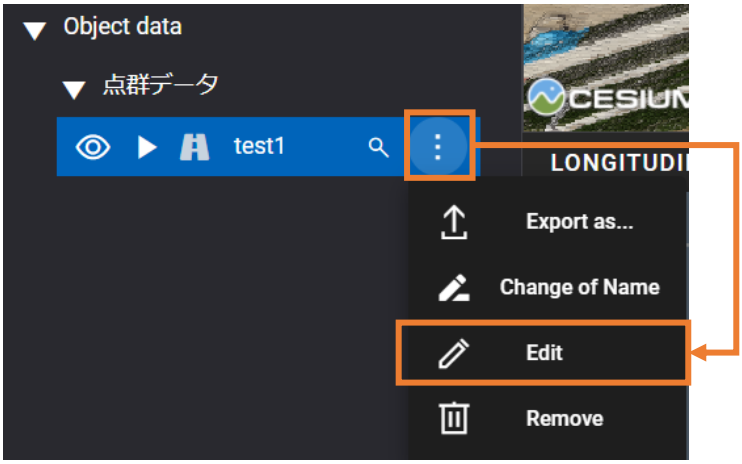


① Road name: You can input an arbitrary name.
② Width of road: You can set a road width for each lane on the left and right centering on the temporary road (see simplified drawing).
③ Set super elevation: You can select either from cross slope or one side grade (see simplified drawing).
④ Cross slope: You can set a cross grade of the temporary road (see simplified drawing).
⑤ Distance: You can set a pitch of TIN in longitudinal direction of road.
⑥ Road surface and road color: You can set an arbitrary color.
⑦ Slope height: You can set an arbitrary height of slope (see simplified drawing).
⑧ Slope gradient: You can set an arbitrary grade of slope (see simplified drawing).
⑨ Berm width: You can set an arbitrary width of berm (see simplified drawing).
⑩ Berm gradient: You can set an arbitrary grade of berm (see simplified drawing).
⑪ Left/Right Settings: You can set “height of slope, grade of slope, width of berm, and grade of berm”, respectively on right and left of the cutting soil and filling soil.
⑫ Add berm: You can set either of with or without a berm.

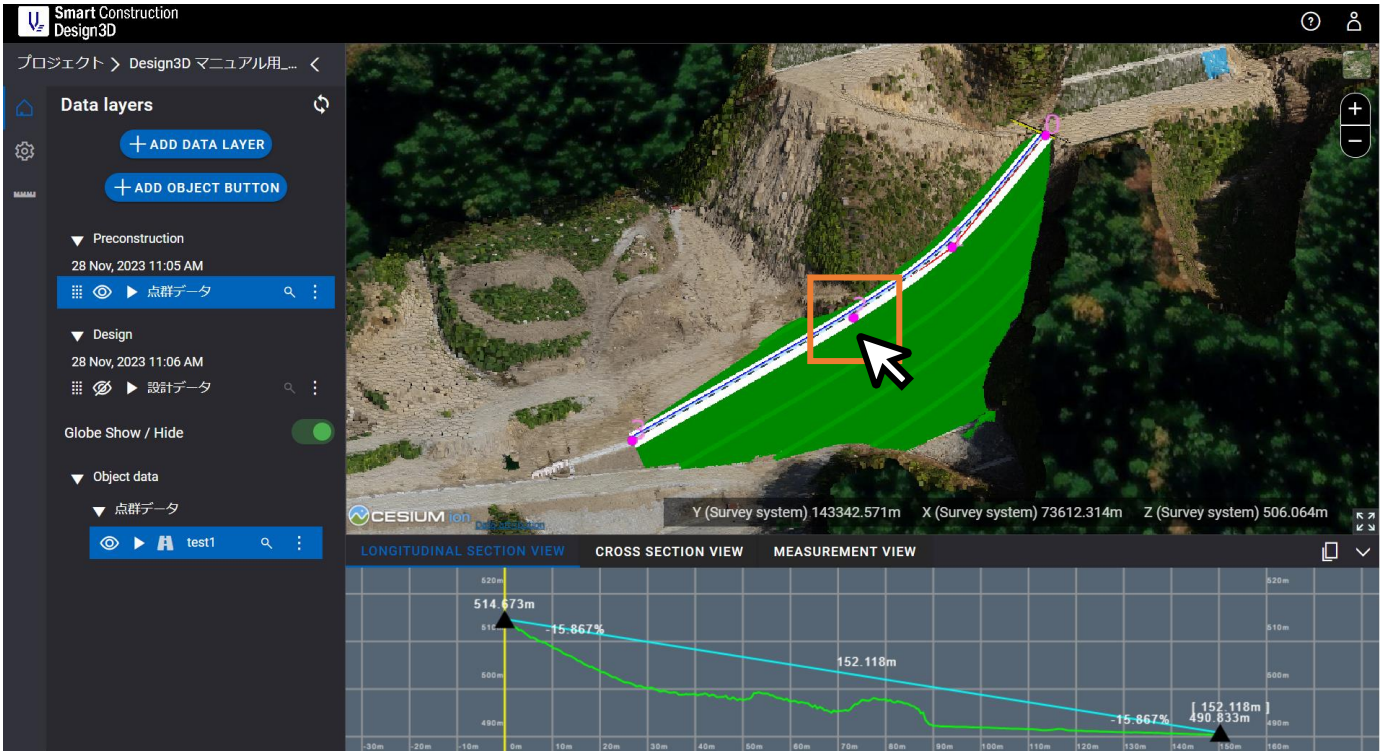
*** Note**
When you link ICT machine and Design3D output data, it is desirable that the distance is 4m or more.

3.3.2 Correct and edit a temporary road

For correcting and editing the added drawing data, you need to press “Edit” in the vertical ellipsis on the target drawing data to change the mode to “Edit mode”.



1. Change the position of temporary road.
   Grab the point ● on the 3D View and move it to change the position and the shape.

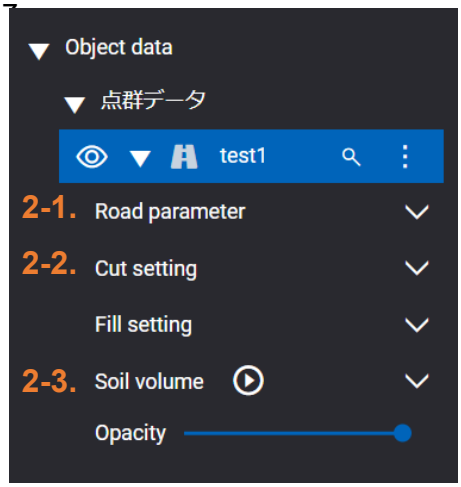


2. Confirmation and editing of the advanced settings of the created temporary road

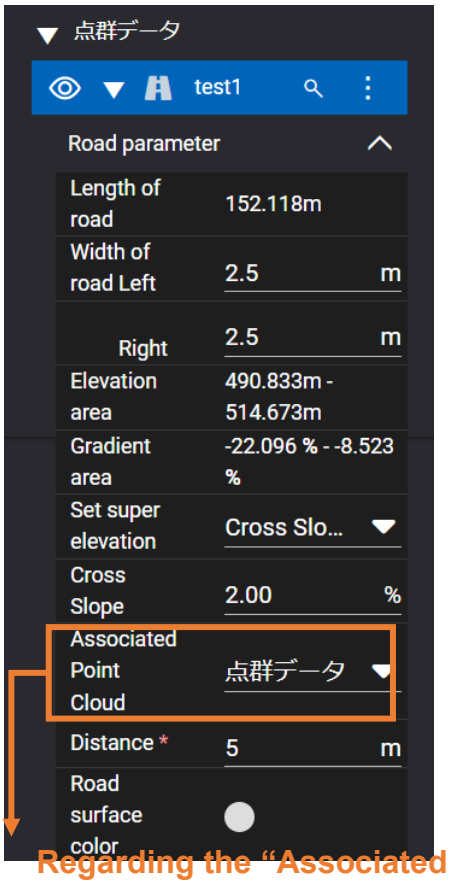
2-1. Length of road, etc. can be confirmed and edited on “Road parameter”

2-2. Slope settings, etc. suitable for each case can be confirmed and edited on “Cut (Full) setting”.

2-3. Calculation of cut and fill is executed by pressing the button of “Soil volume”
If the mouse is put on the , a message “Calculate volume” appears.

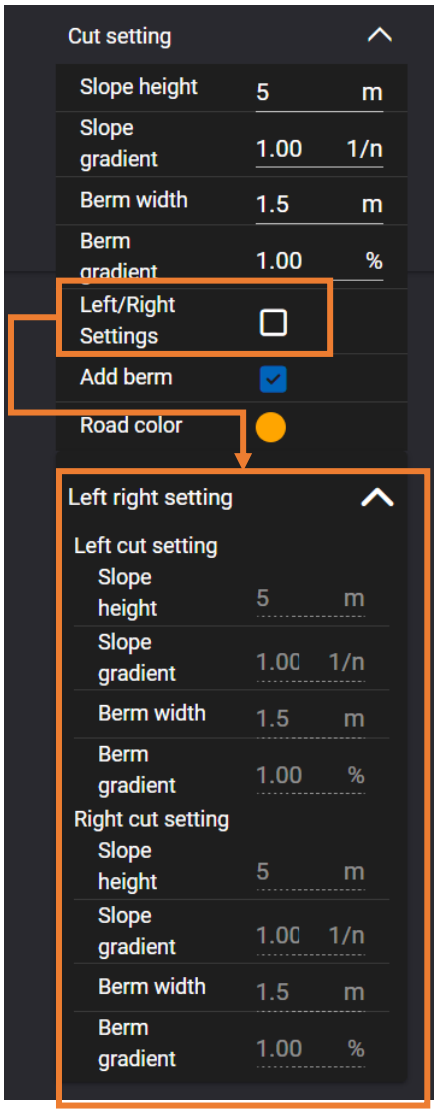


2-1. Road parameter



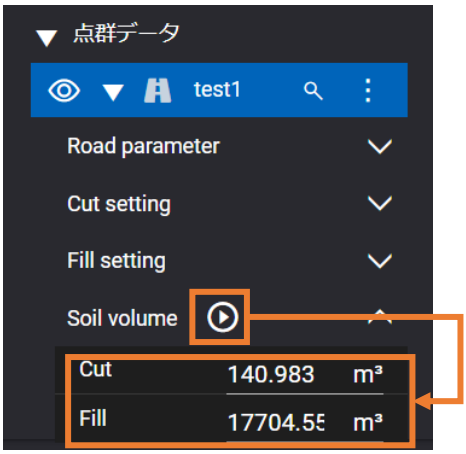
Regarding the “Associated Point Cloud”, if there are multiple sets of point cloud, endpoint of the connected part on the drawing data can be changed.

2-2. Cut (Full) setting



Conditions can be set for right and left respectively by checking “Left/Right Settings”.

2-3. Soil volume



Press to calculate the volume.

3. Editing of the changing point of temporary road

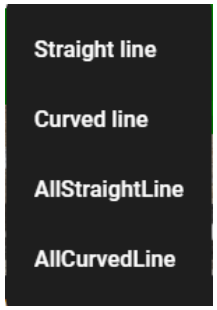
3-1. Right-click between arbitrary ● and ●, and then you can open editing menu.

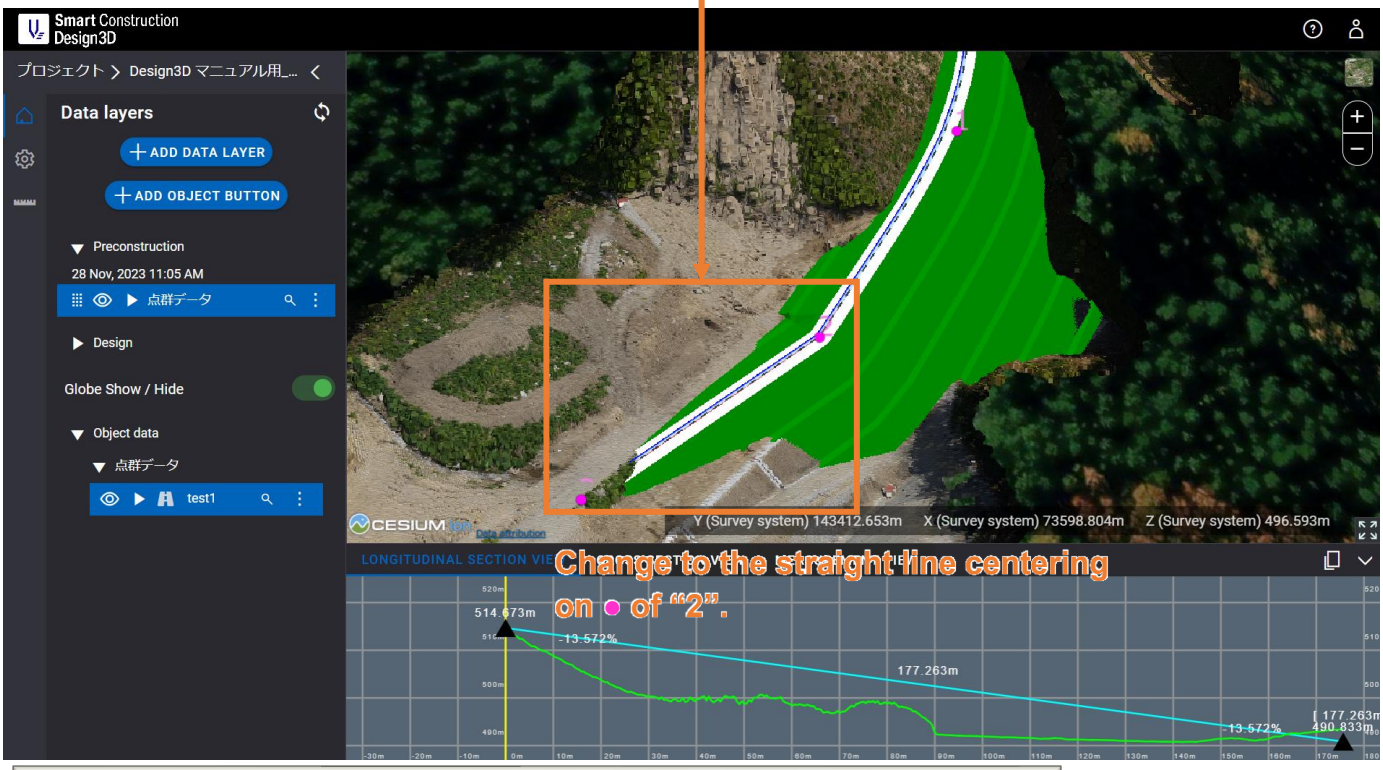
Straight line: A straight line is created based on the changing point.

Curved line: A curve is created based on the changing point (curve by default).

AllStaightLine: All the lines between the changing points become straight.

AllCurvedLine: All the lines between the changing points become curve.





*** Note**

A ● on the 3D view and a point of ▲ on the longitudinal section view are not linked.

3-2. Right-click on the ●, then you can open editing menu.

Create Arc: Draws a concentric circle based on the selected changing point (starting and ending points cannot be selected).

Add: Changing point is added.

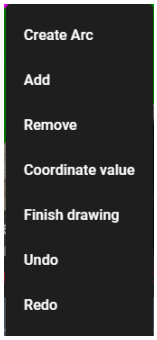
Remove: Changing point is removed.

Coordinate value: You can confirm the coordinate values of changing point and change X value and Y value (see figure below).

Finish drawing: Completes editing a temporary road.

Undo: The screen returns to the previous work status.

Redo: The screen moves one step forward.



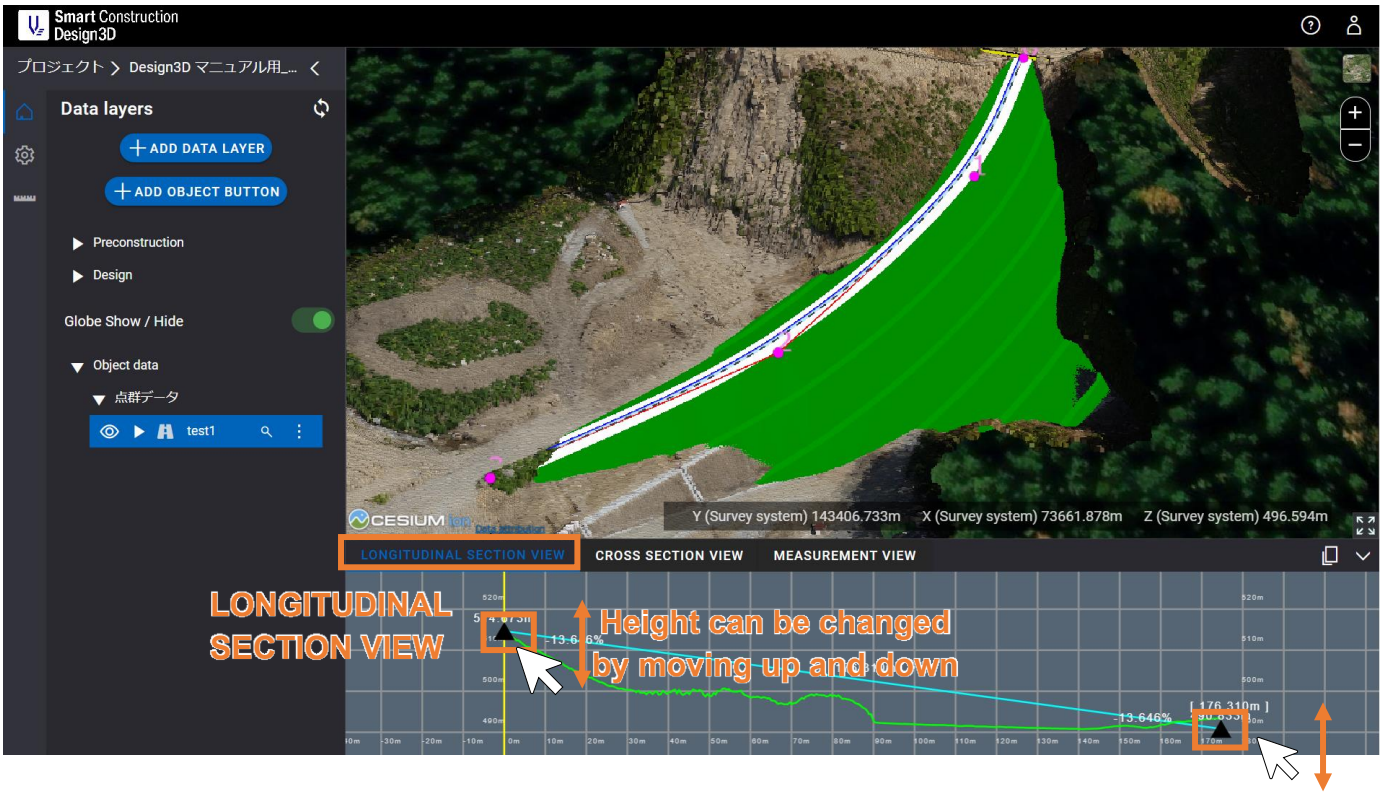
Coordinate value

*** Note**

Z value can only be set on the longitudinal section view.

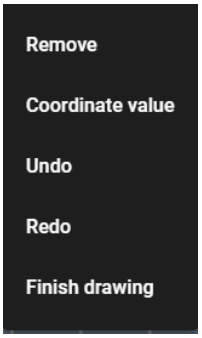
4. Editing on the longitudinal section view

4-1. Grab a point of ▲ on the longitudinal section view and move it up and down to change the height of starting and ending points.



4-2. Right-click on the light blue line and press “Add”, then you can newly add point of ▲ and change the vertical position.

4-3. Right-click on the ▲, then you can open editing menu.



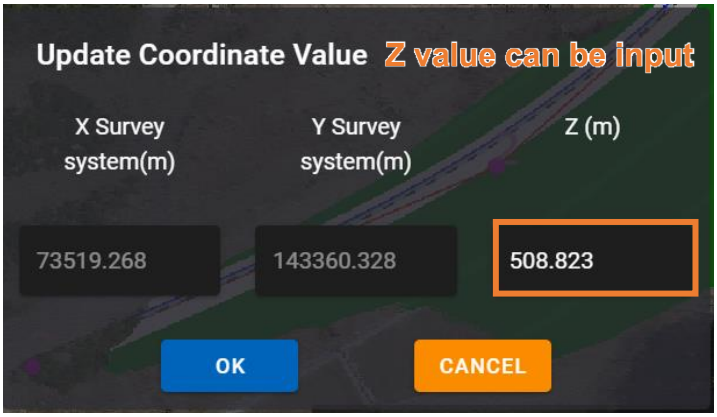
Remove: Removes changing point (starting and ending points cannot be removed).

Coordinate value: You can confirm the coordinate values of changing point and change Z value (see figure below).

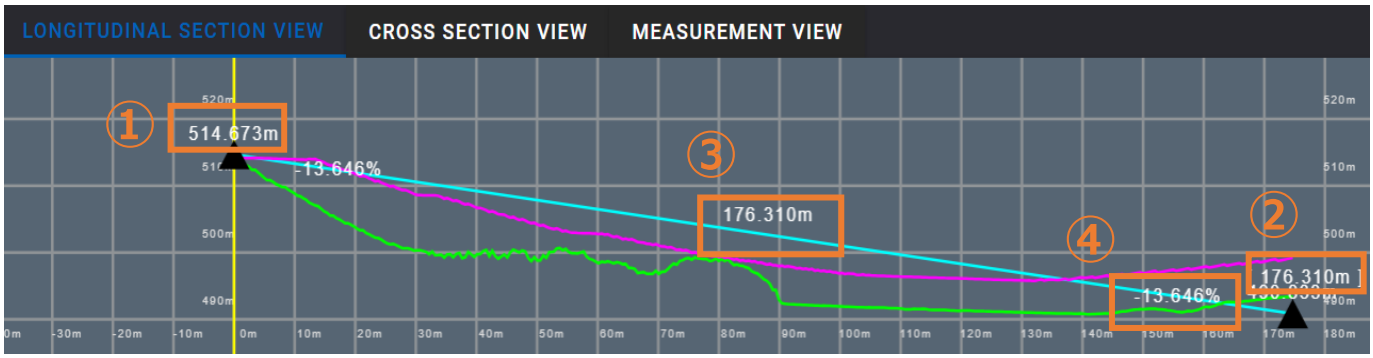
Undo: The screen returns to the previous work status.

Redo: The screen moves one step forward.

Finish drawing: Completes editing a longitudinal section view.



Description of longitudinal section view



Light blue line: Arbitrarily drawn temporary road line

Green line: Preconstruction line

Pink line: Design line

Yellow bar: Move this to where you want to check the cross section, then you can display the cross section drawing linked to the cross section view.

① Numeric value shown above ▲: Height of ▲

② Numeric value [****m] shown above ▲: Total of distances from the start point

③ Numeric value above the center of light blue line between ▲s : Distance between ▲s

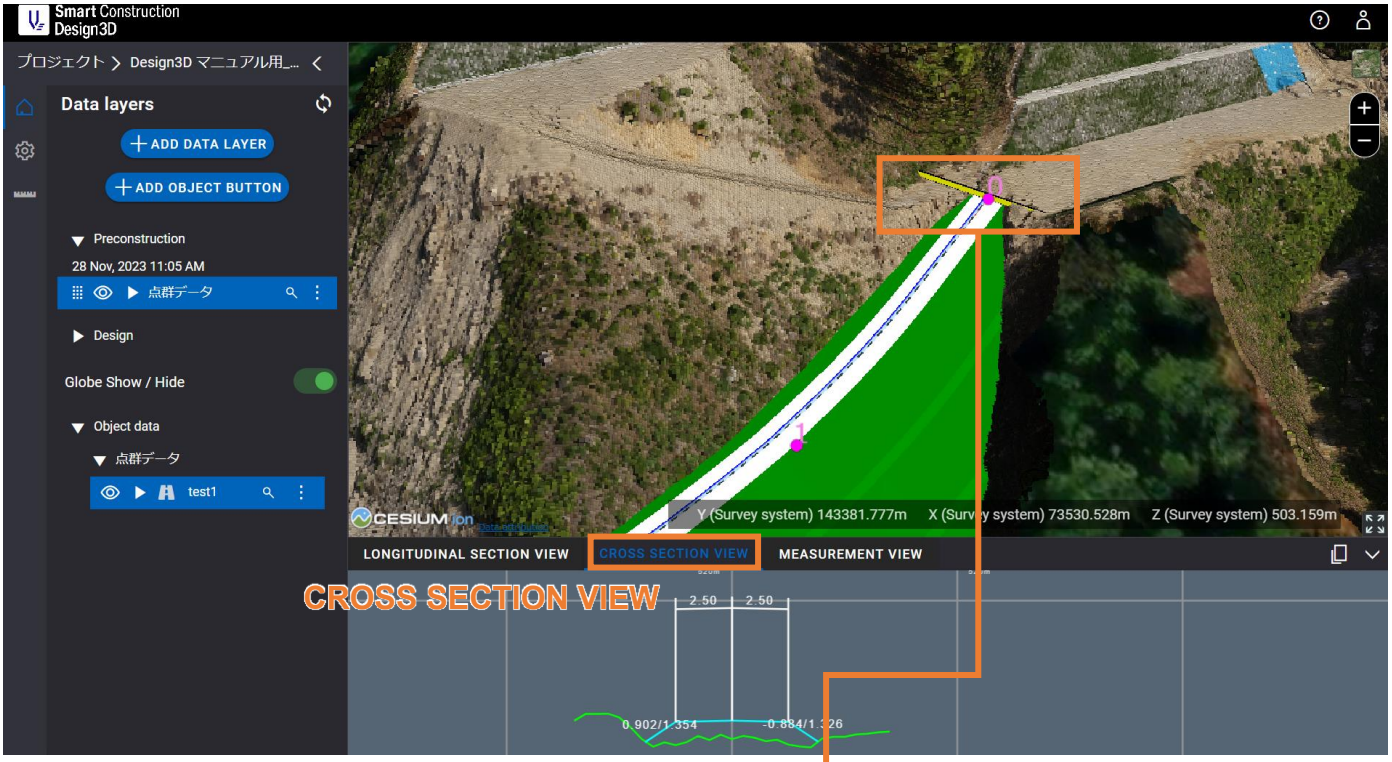
④ Numeric value of **** % around ▲: Grade between ▲s

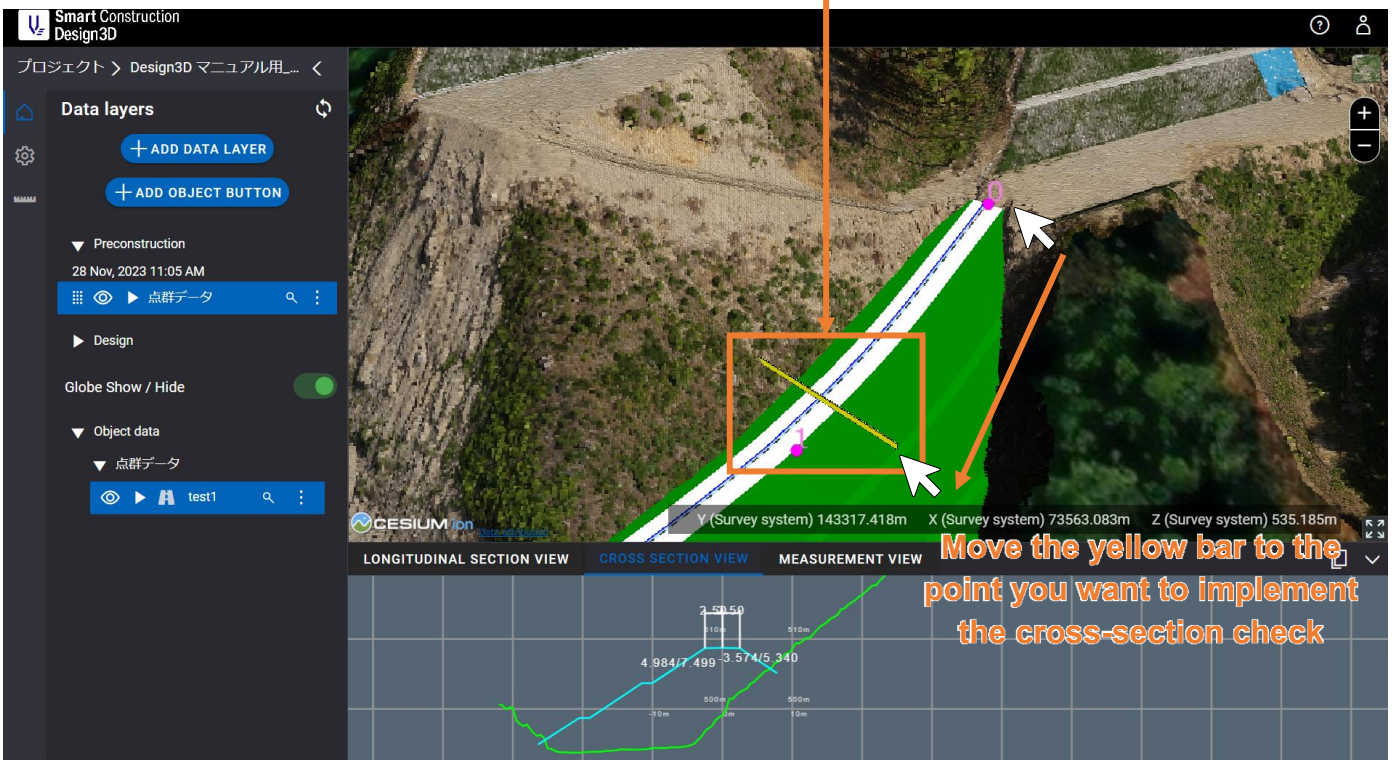
*** Note**

A point of ▲ is not linked with a point of ●on the 3D view.

5. Confirmation of the cross section view

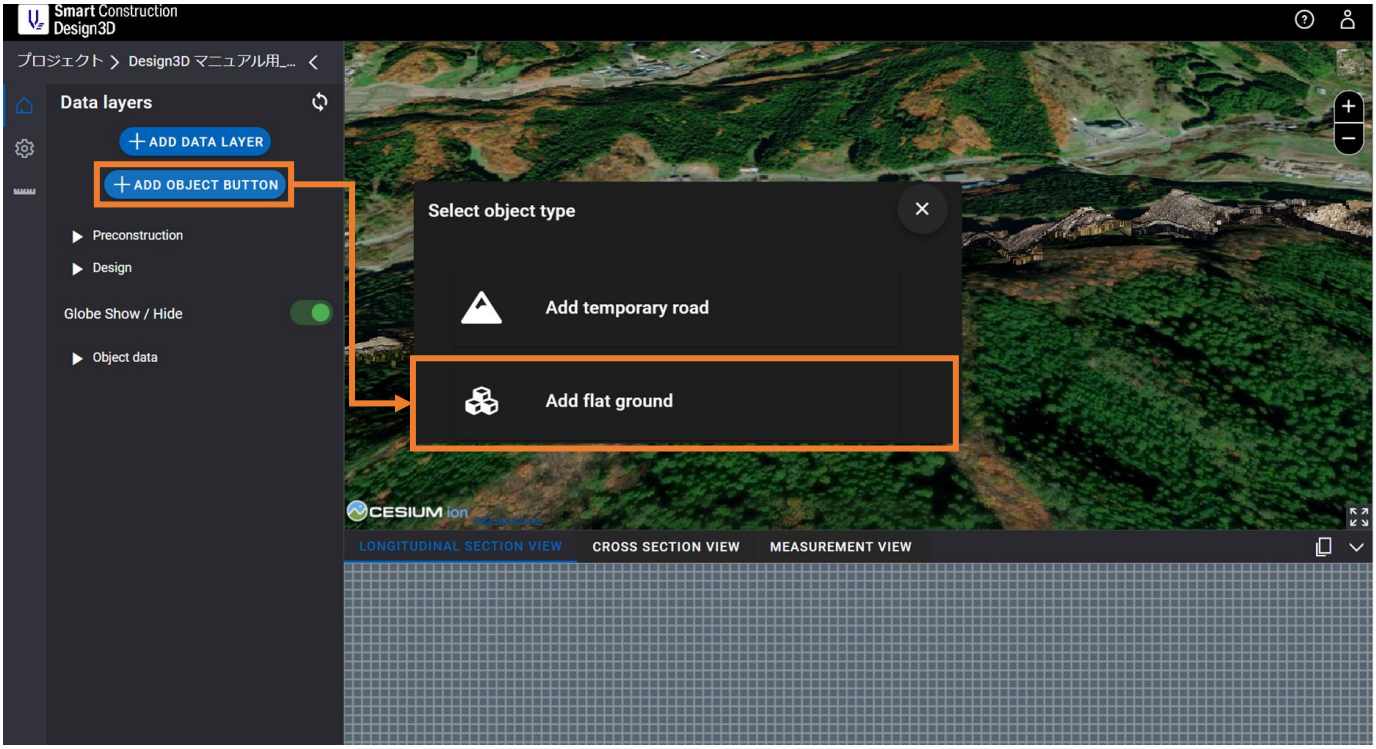
Select the cross section view, then you can check the cross section drawing of the position that is linked to the yellow bar on the screen.
Grab the yellow bar and move it, then you can change the position of the cross section to check.
You can move the yellow bar on the longitudinal section view.



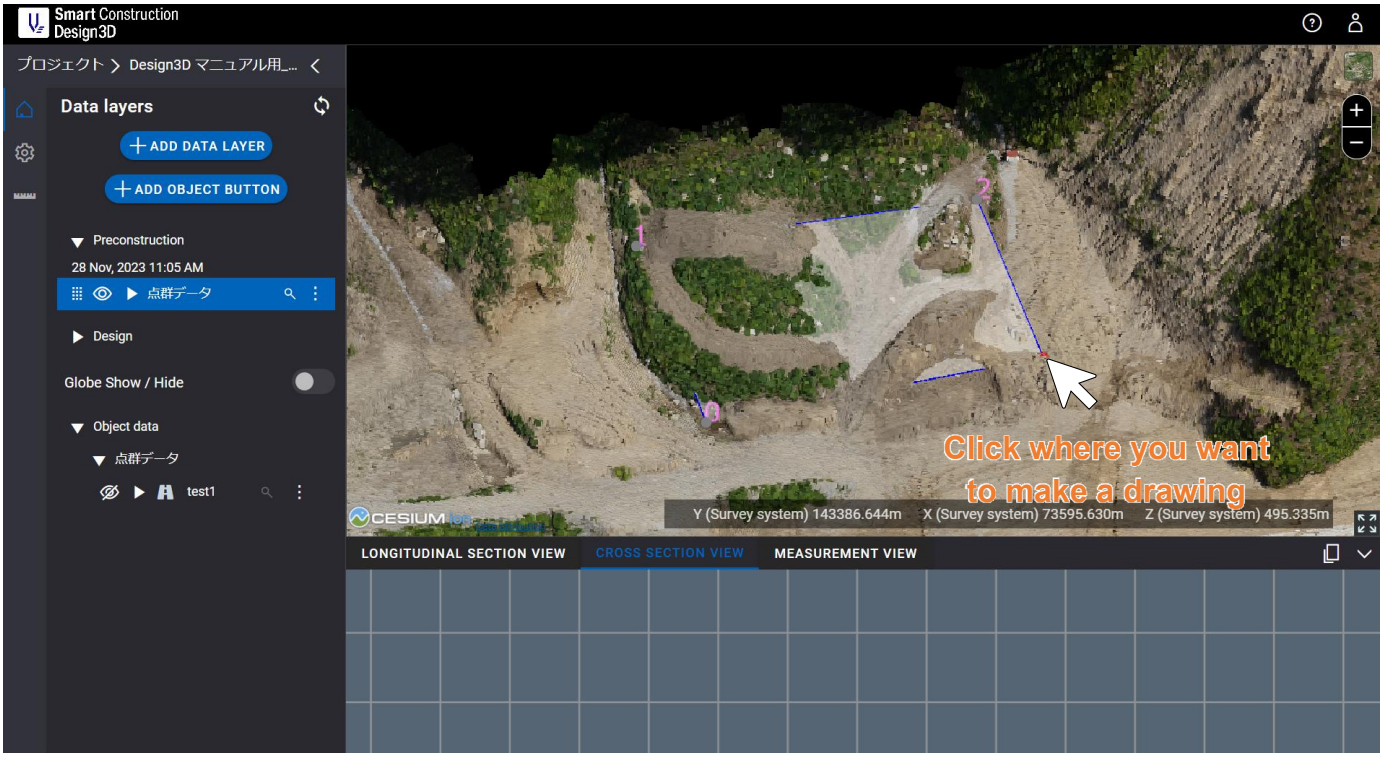


3.4 Create flat ground

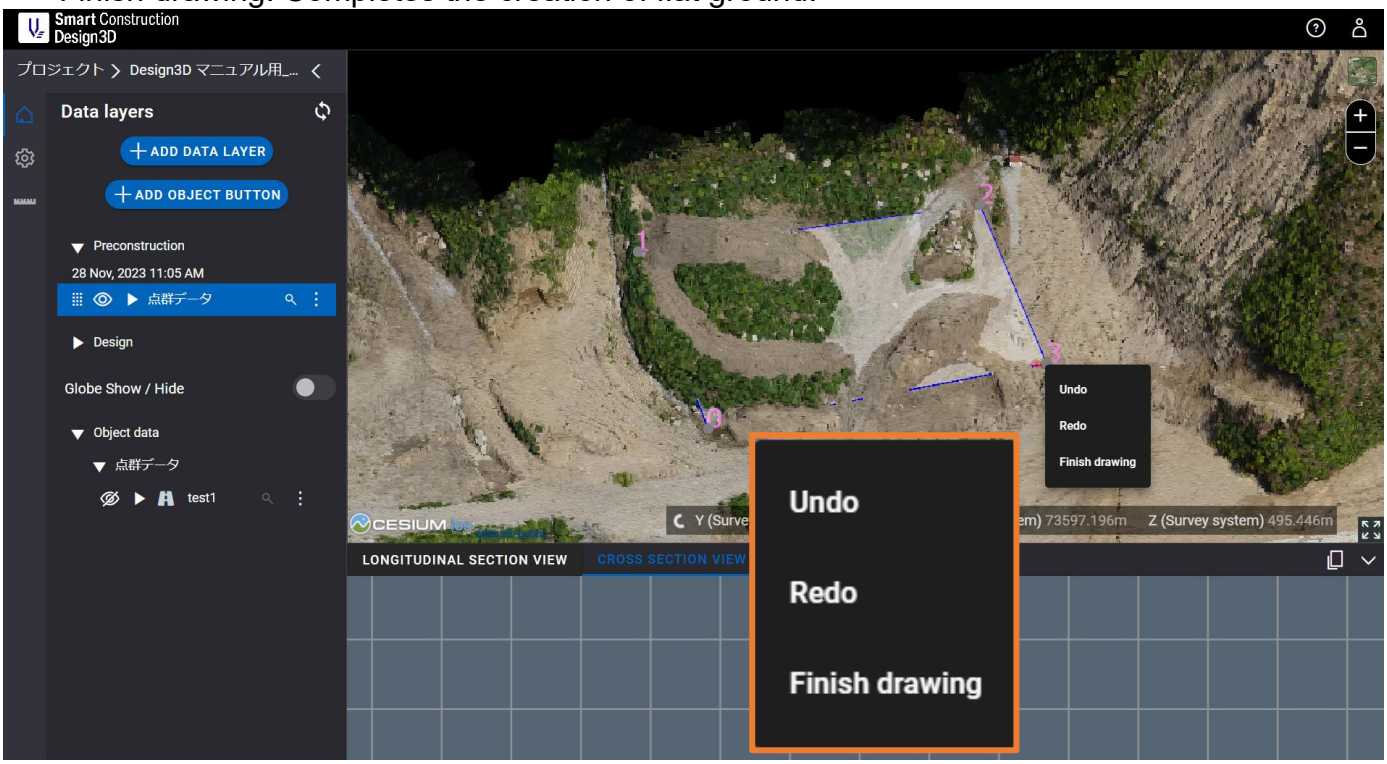
1. Select “Add flat ground” from the “ADD OBJECT BUTTON”.



2. Click where you want to draw flat ground on the point cloud data.
   - ●: Clicked point
   - ●: Where your mouse points at

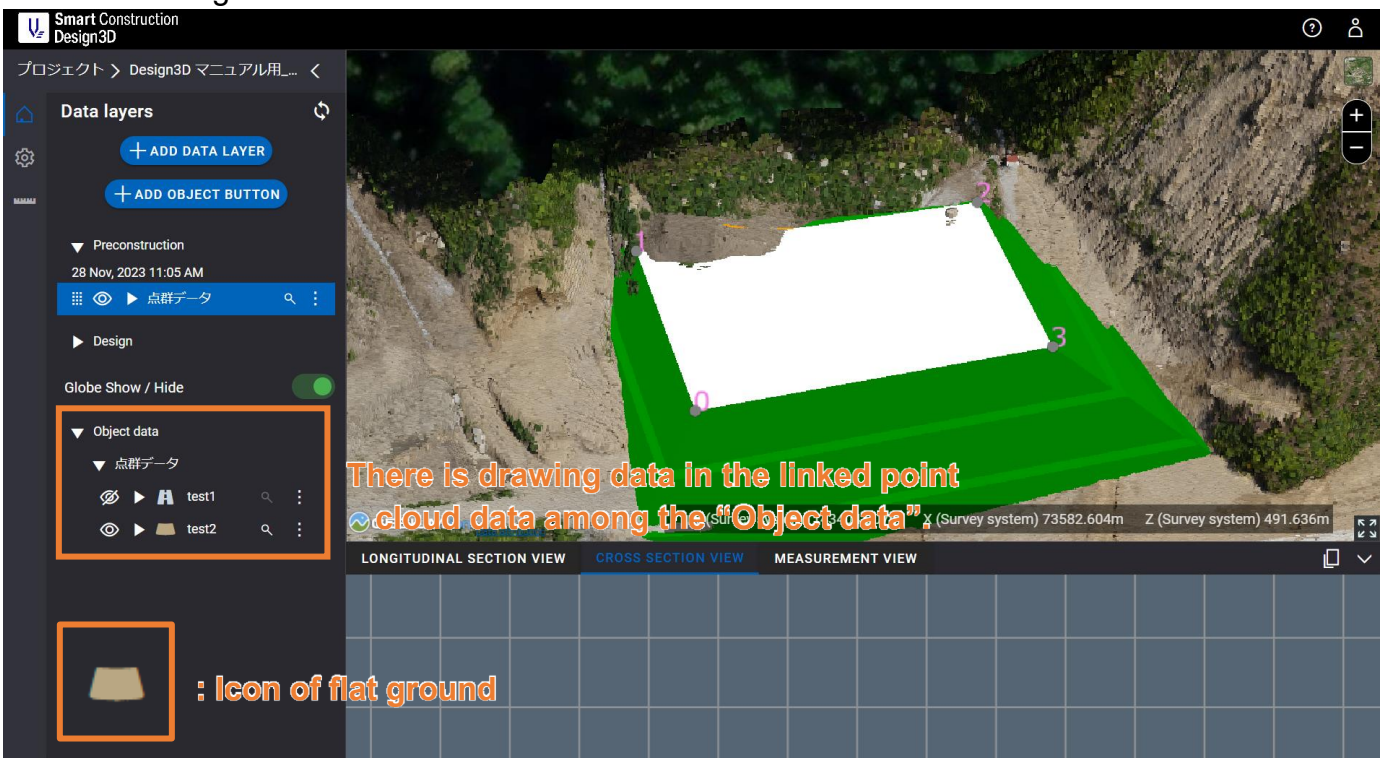


3. Complete the drawing
   While drawing, you can open the menu by right click.
   Undo: The screen returns to the previous work status.
   Redo: The screen moves one status forward.
   Finish drawing: Completes the creation of flat ground.



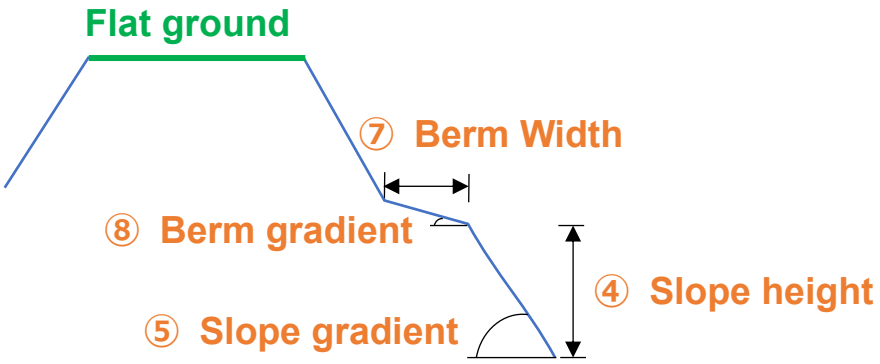
4. When the screen as shown below is opened, input the name of the road, and press “ADD”.
   Input the road name, then you can use “ADD” button.
   You can change other information as necessary.
5. Press “ADD”.

6. Drawn flat ground.



Explanation on settings of flat ground

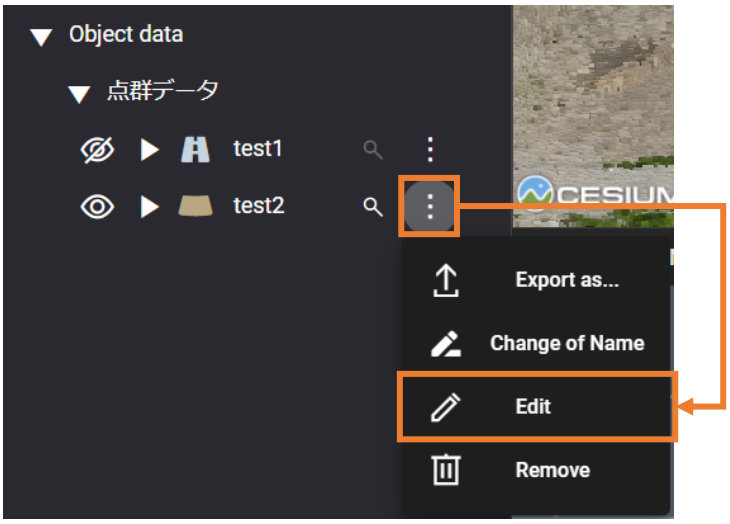
[Simplified drawing]



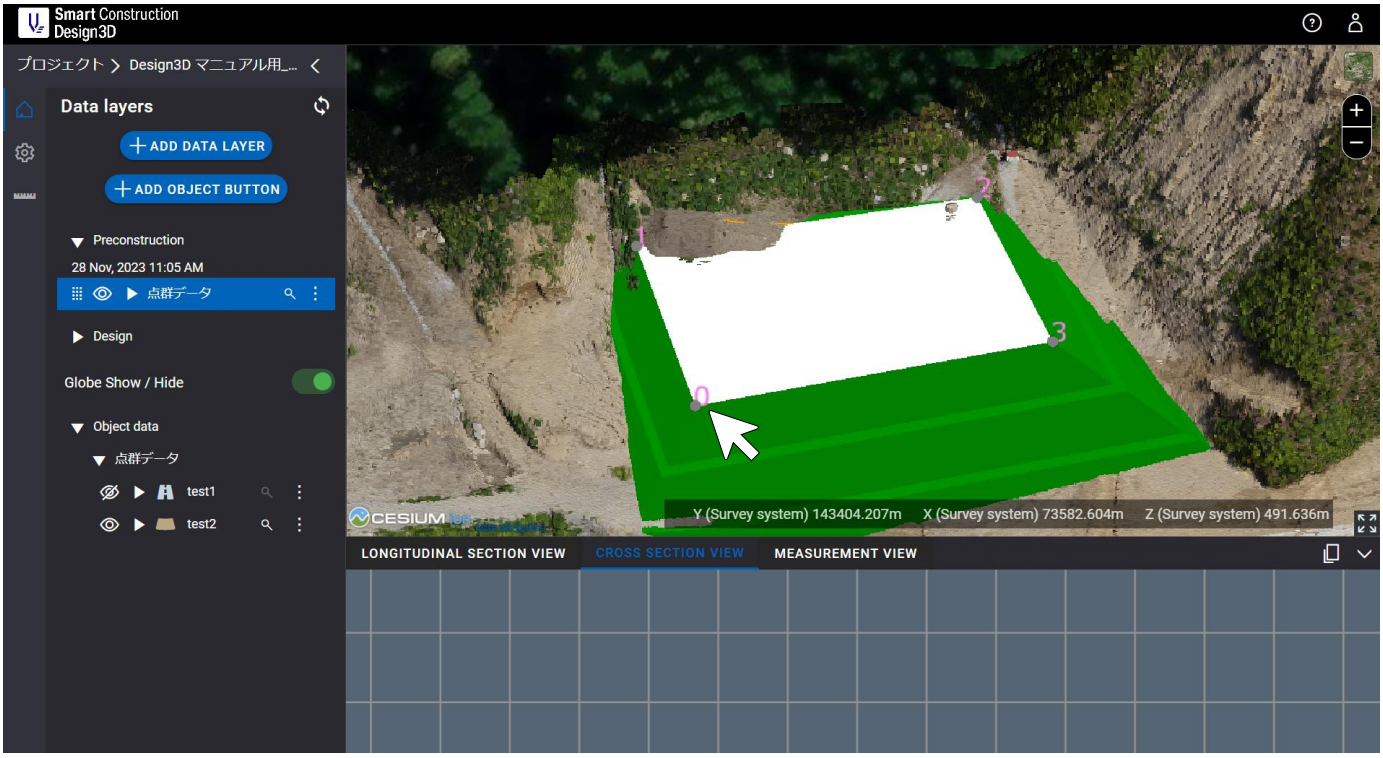
① Flat ground name: You can input an arbitrary name.
② With slope: You can set either of with or without a slope.
③ Distance: You can set a pitch of TIN in longitudinal direction of road.
④ Slope height: You can set an arbitrary height of slope (see simplified drawing).
⑤ Slope gradient: You can set an arbitrary grade of slope (see simplified drawing).
⑥ Add berm: You can set either of with or without a berm.
⑦ Berm width: You can set an arbitrary width of berm (see simplified drawing).
⑧ Berm gradient: You can set an arbitrary grade of berm (see simplified drawing).
⑨ Flat Ground Color: You can set an arbitrary color.

3.4.1 Correct and edit flat ground

For correcting and editing the added drawing data, you need to press “Edit” in the vertical ellipsis on the target drawing data to change the mode to “Edit mode”.



1. Change of flat ground position
   Grab the point ● on the 3D View and move it to change the position and the shape.

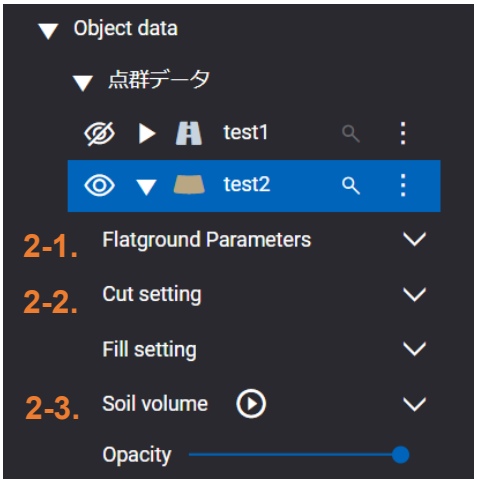


2. Confirmation and editing of advanced settings of the created flat ground

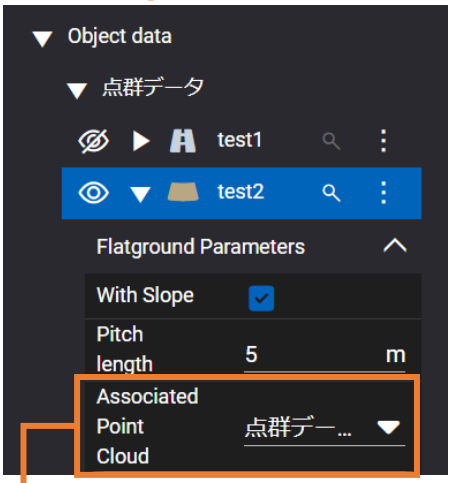
2-1. Existence of slope in the flat ground can be confirmed and edited on “Flat ground Parameters”

2-2. Slope settings, etc. suitable for each case can be confirmed and edited on “Cut (Full) setting”.

2-3. Calculation of cut and fill is executed by pressing the button of “Soil volume”
If the mouse is put on the , a message “Calculate volume” appears.

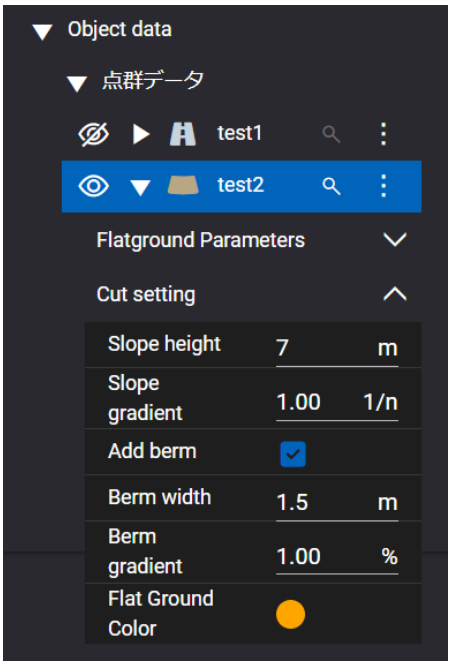


2-1. Flat ground Parameters

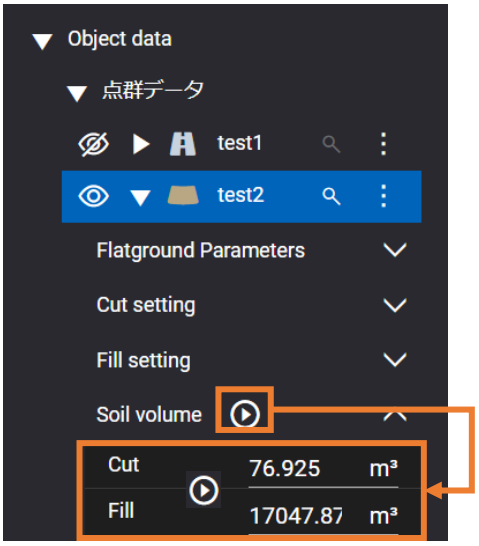


Regarding the “Associated Poin Cloud”, if there are multiple sets of point cloud, endpoint of the connected part on the drawing data can be changed.

2-2. Cut (Full) setting



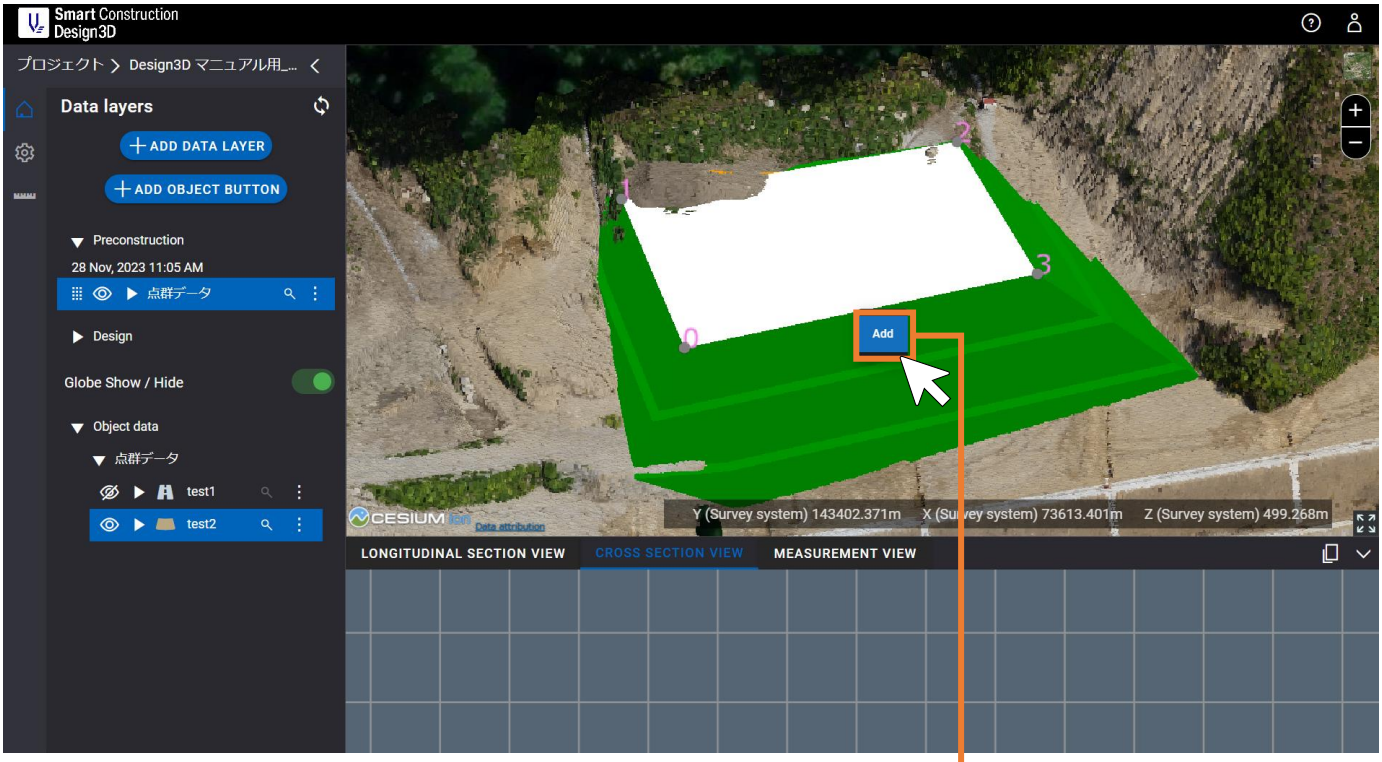
2-3. Soil volume



Press to calculate the volume

3. Addition of flat ground endpoint

3-1. Right-click between arbitrary endpoints on the crown side to open the editing menu.
Add: An endpoint ● is added on an arbitrary position on the 3D view.



3-2. Right-click on the endpoint ●, then you can open editing menu.

Remove: Removes the right-clicked endpoint.

Height change (points): Enables you to change the height of each endpoint (refer to the image below).

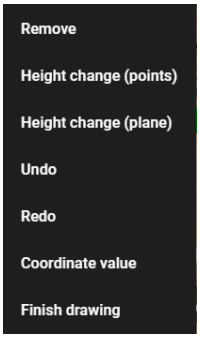
Height change (surface): Enables you to change the height of each crown surface (refer to the image below).

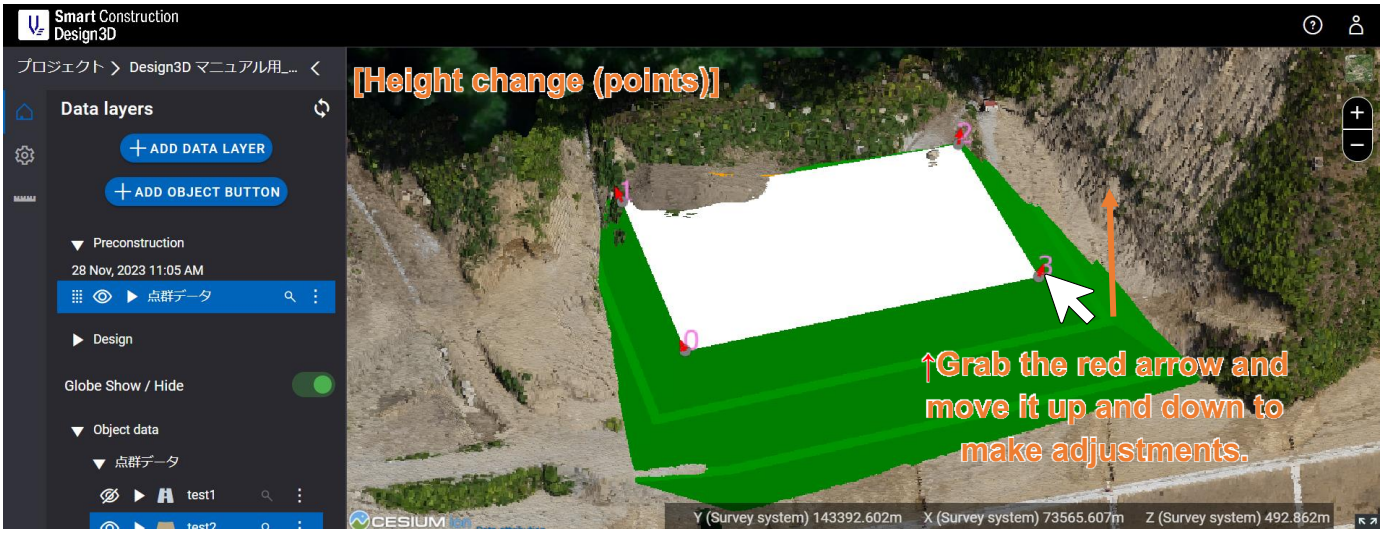
Undo: The screen returns to the previous work status.

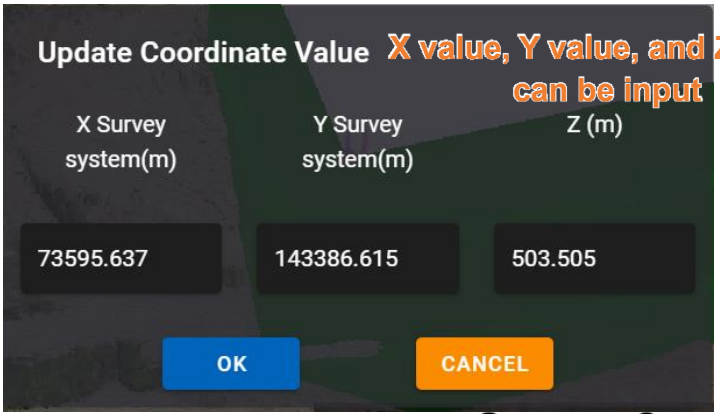
Redo: The screen moves one step forward.

Coordinate value: Enables you to confirm and change the coordinate values of the endpoint (refer to the image below).

Finish drawing: Completes the editing of flat ground.



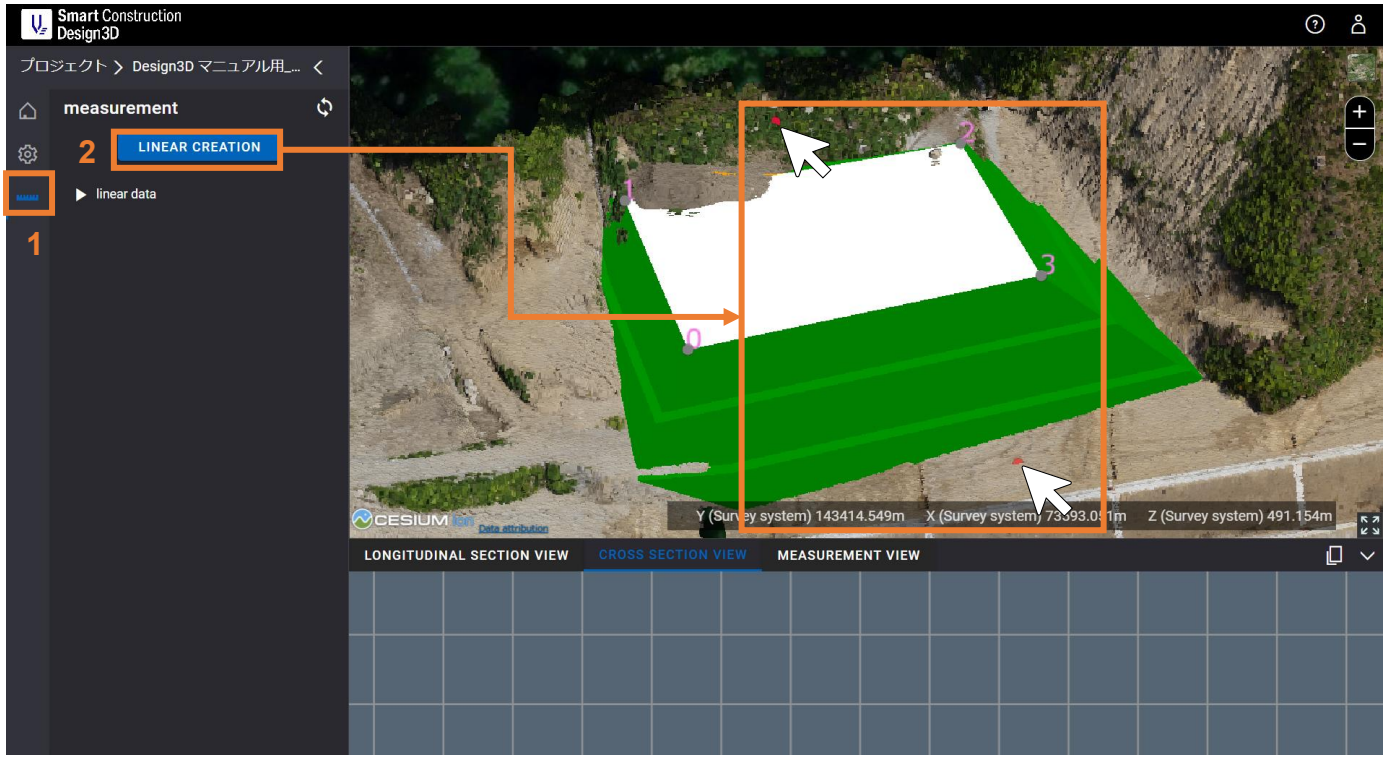


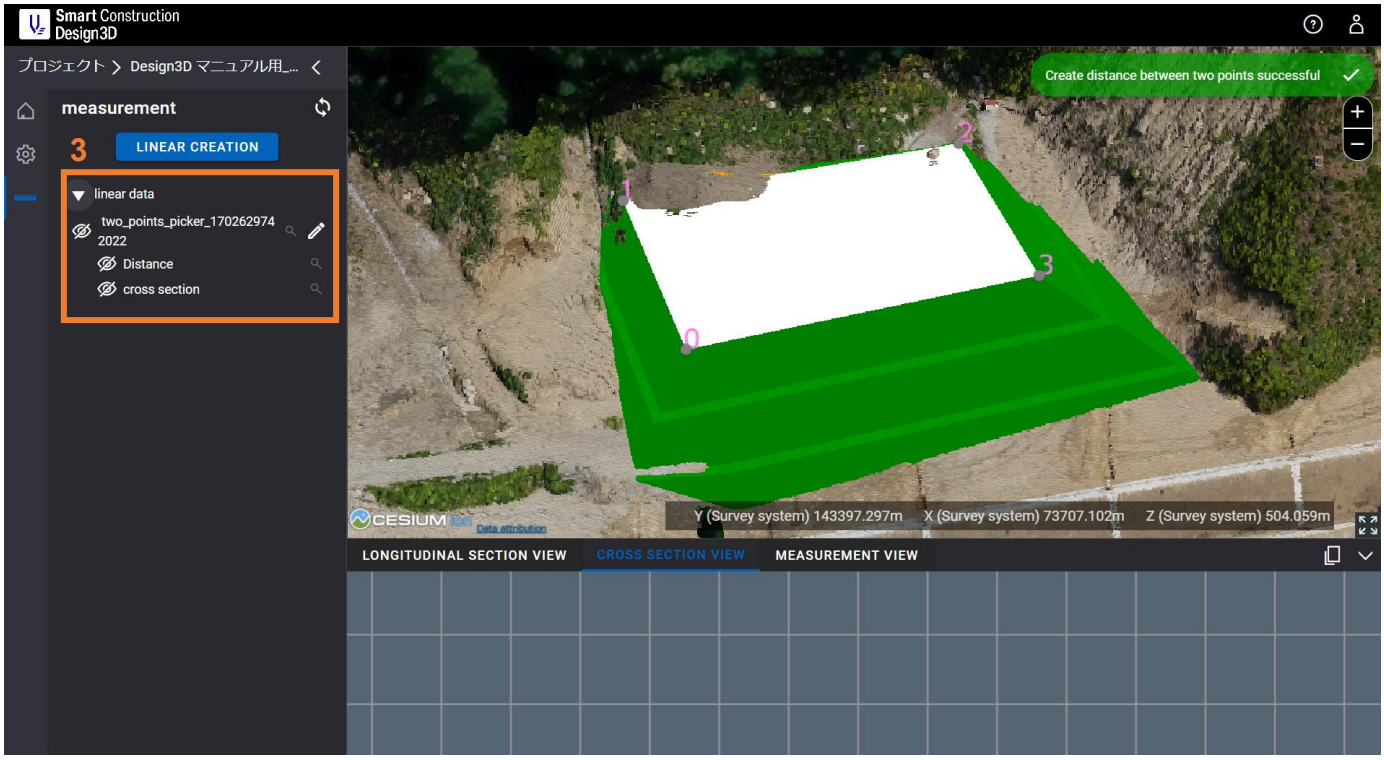


3.5 Measurement function

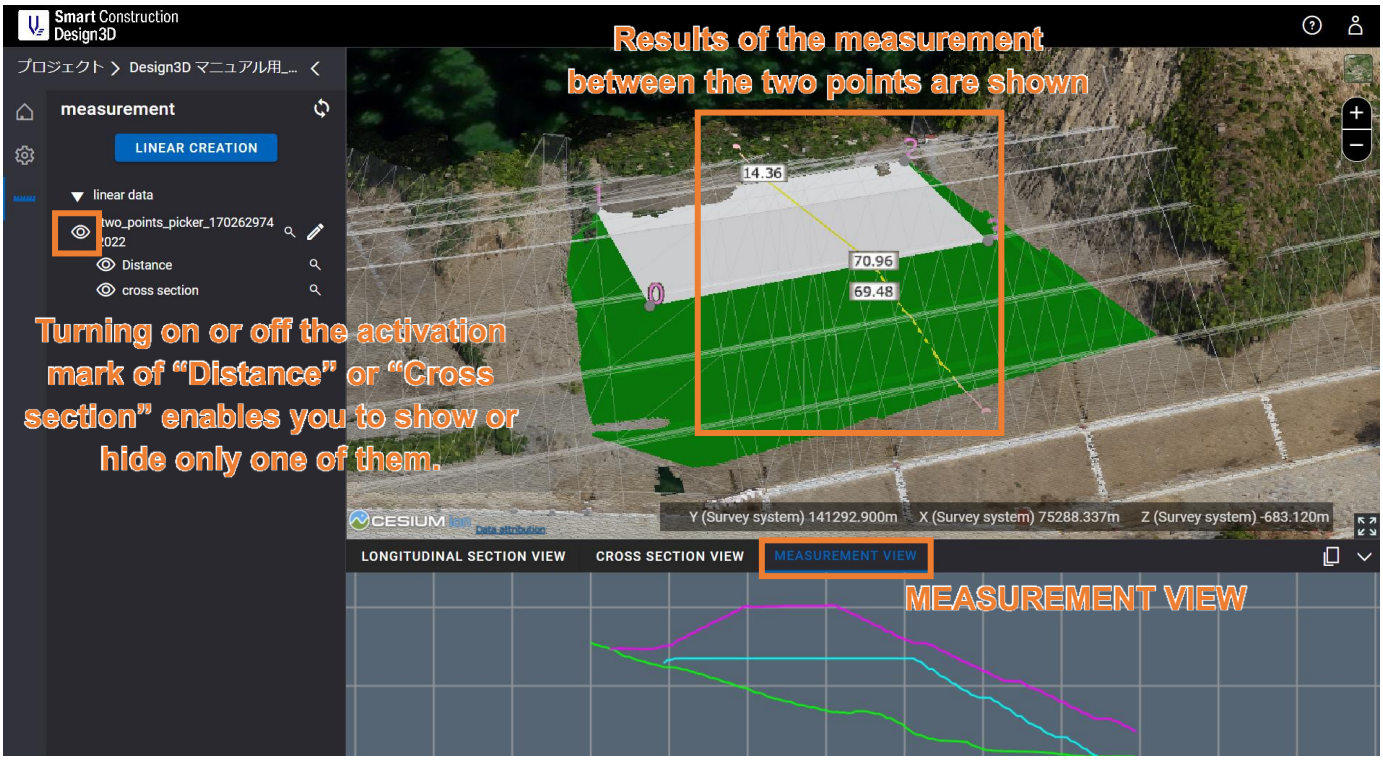
You can measure the arbitrary part of the point cloud data, design data, and drawing data and confirm the cross section view.

1. Press  mark on the left side of the screen.
2. Press “LINEAR CREATION” and click the space between the two points you want to measure (which is displayed as ●).
3. Alignment data is ready.



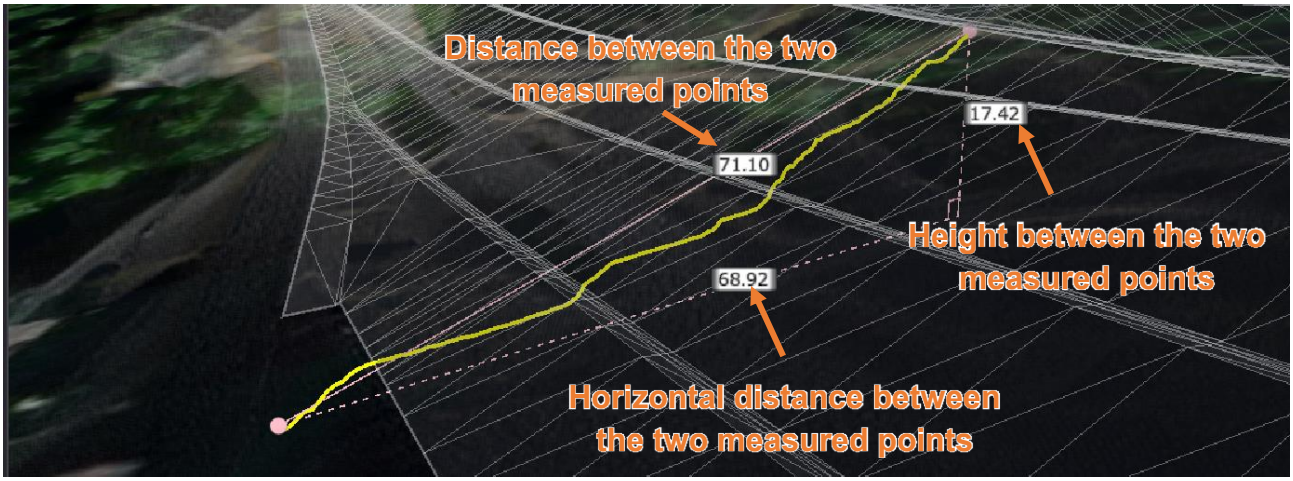


4. Turn on the activation mark on the left side of the alignment layer name to display the distance and the measurement view.



4-1. Distance

Three types of measurement results can be confirmed; measured two-point distance, measured two-point height, and measured two-point horizontal distance.

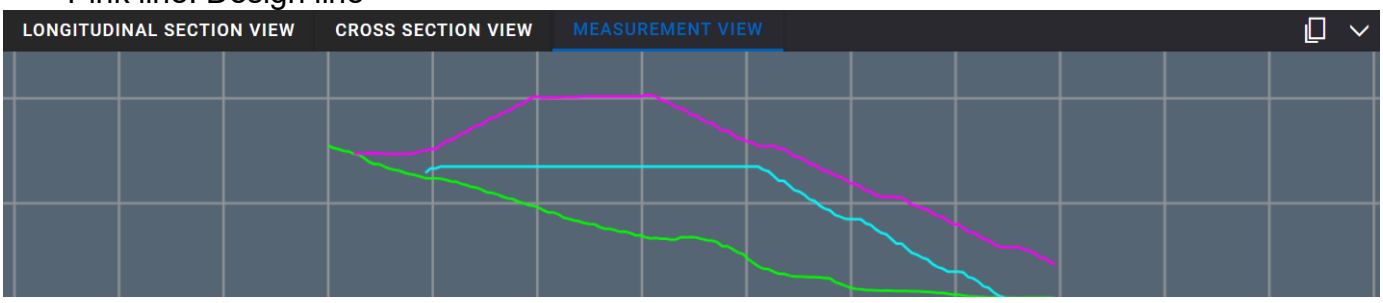


4-2. Measurement view

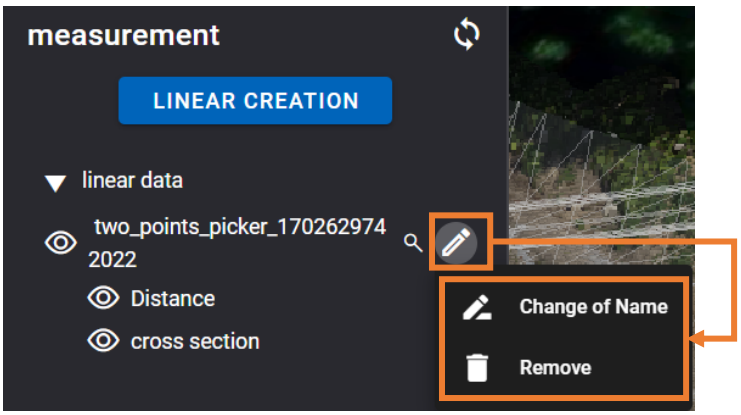
Light blue line: Arbitrarily drawn line (temporary road, flat ground)

Green line: Preconstruction line

Pink line: Design line



5. You can “Change of Name” and “Remove” the object from the mark on the right side of the alignment layer name.

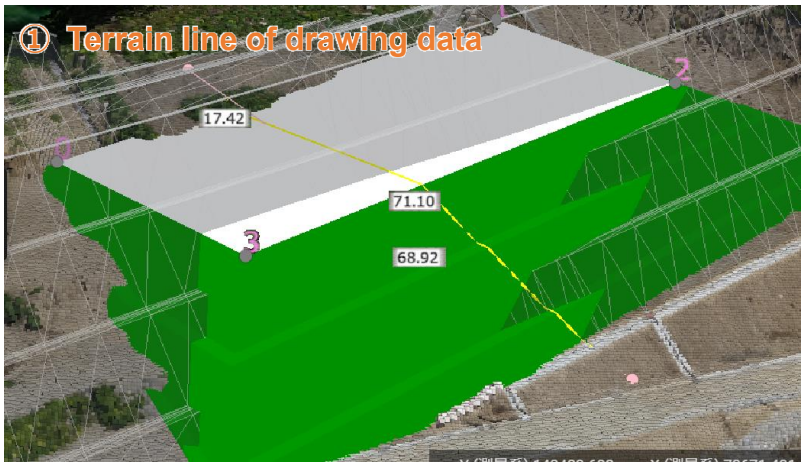


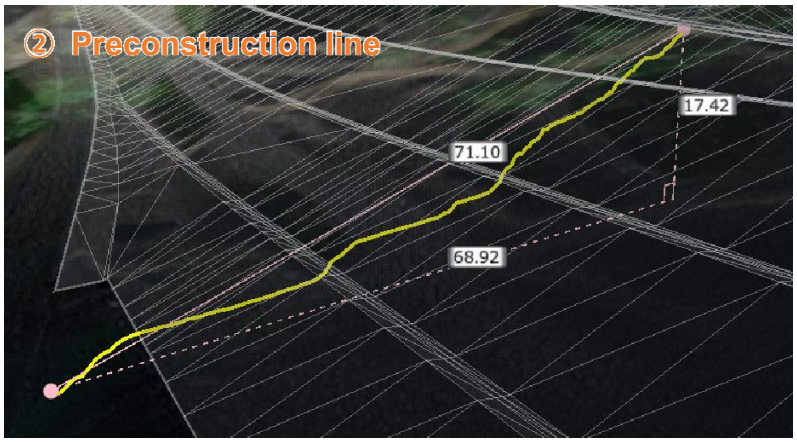
Supplement

About the yellow line

① It means the terrain line between the two points on the drawing data, if the drawing data (temporary road, flat ground) is displayed.

② It means the preconstruction line between the two points, if the drawing data (temporary road, flat ground) is not displayed.



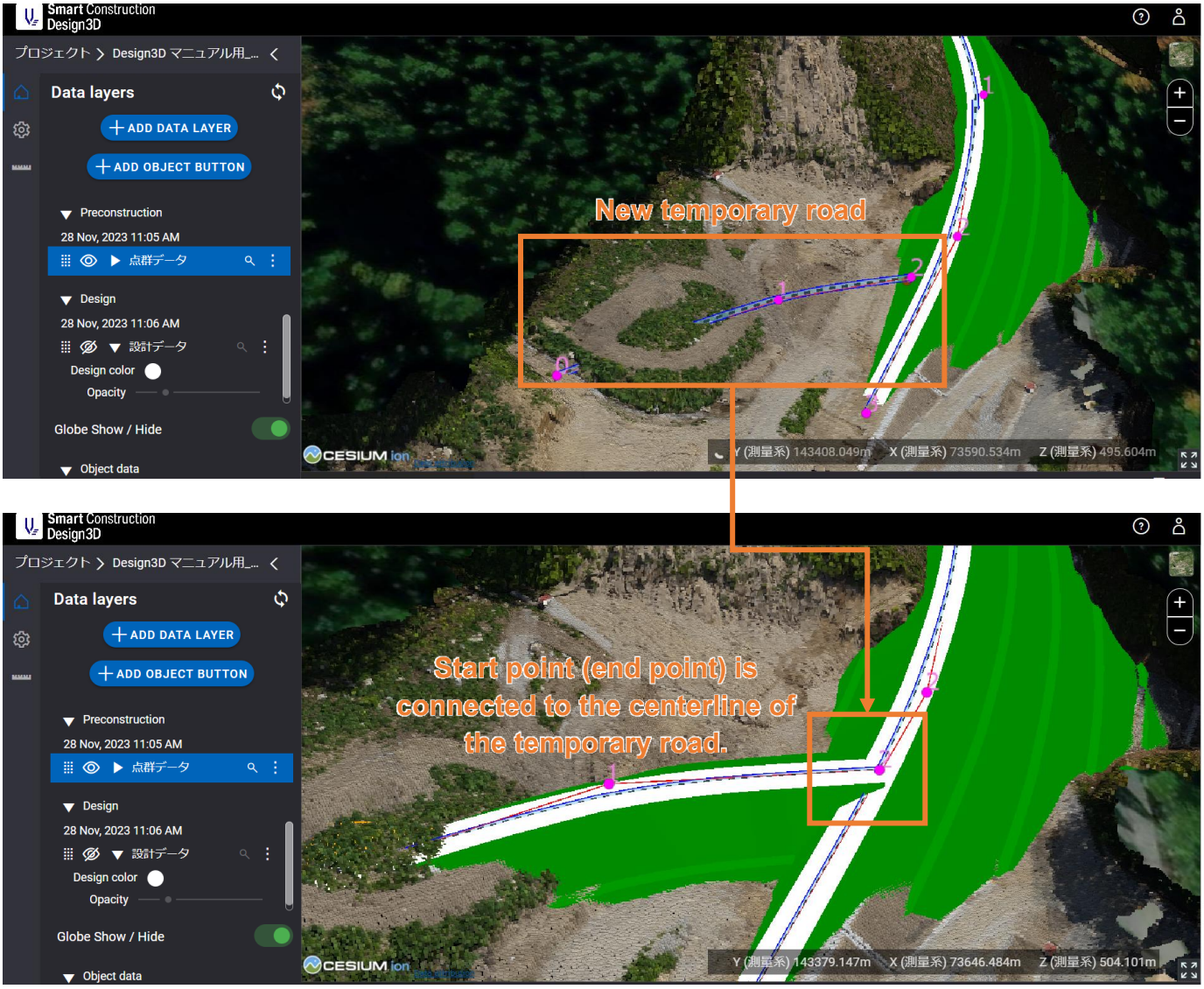


3.6 Separating/contacting function

This function smoothly connects two temporary roads as well as temporary road and flat ground in a simplified manner.

3.6.1 Connecting two temporary roads

1. Draw the line so that the start point or end point of the new temporary road to be drawn is placed on the temporary road that has already been drawn.
2. The start point (end point) of the new temporary road is automatically connected to the centerline of the temporary road that has already been drawn.



3.6.2 Connecting flat ground to temporary road

1. Draw the line so that the endpoint of the new flat ground to be drawn is placed on the centerline of the temporary road that has already been drawn.
2. Crown surface of the new flat ground is automatically connected to the road surface of the temporary road that has already been drawn.

*** Note**

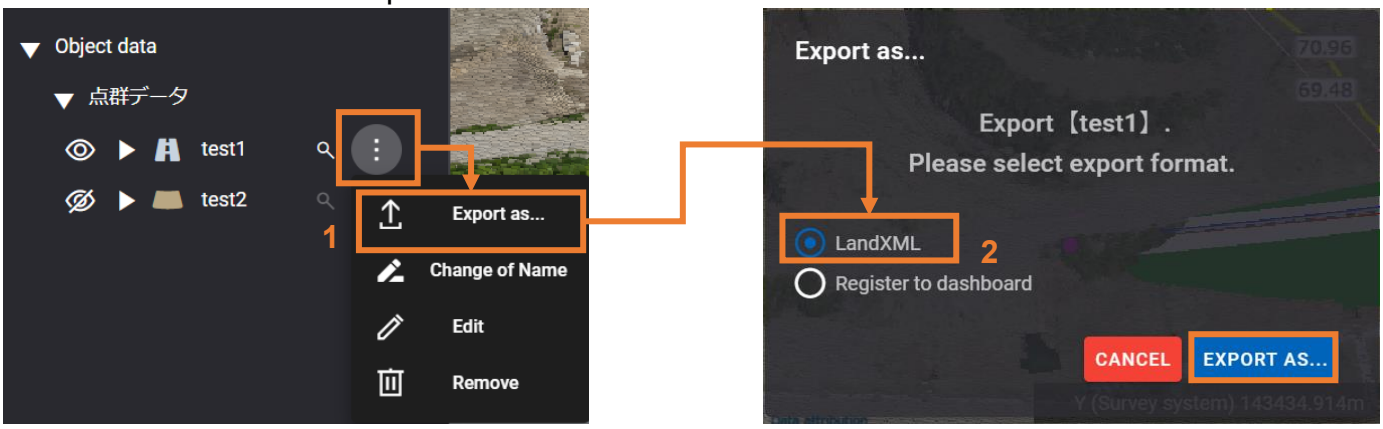
At the moment, this function only has a simplified version. Accurate slope creation will be reflected in the later release.

4 Export of drawing data

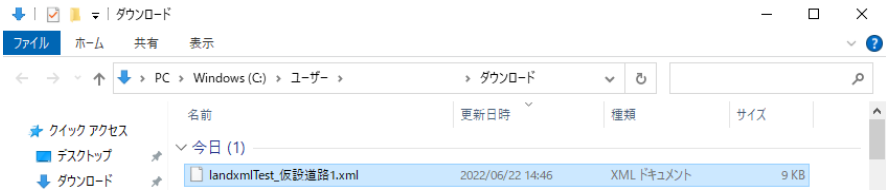
Temporary road and flat ground you have drawn can be exported as LandXML data or registered to Smart Construction Dashboard.

4.1 Export as LandXML data

1. Press “Export as...” in the vertical ellipsis on the drawing data you want to export.
2. Select “LandXML” and press “EXPORT AS...”.

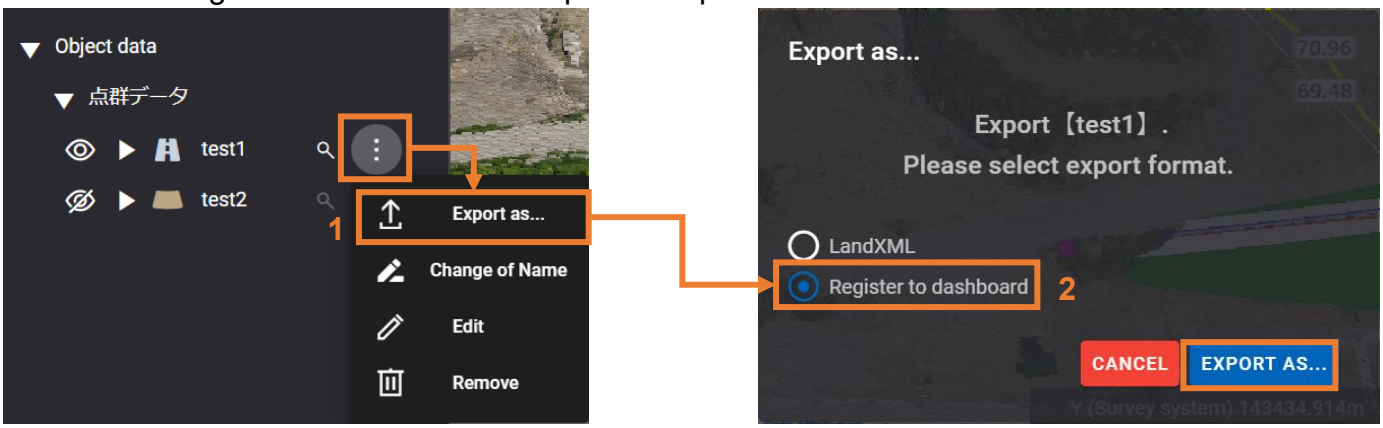


3. Export as LandXML data

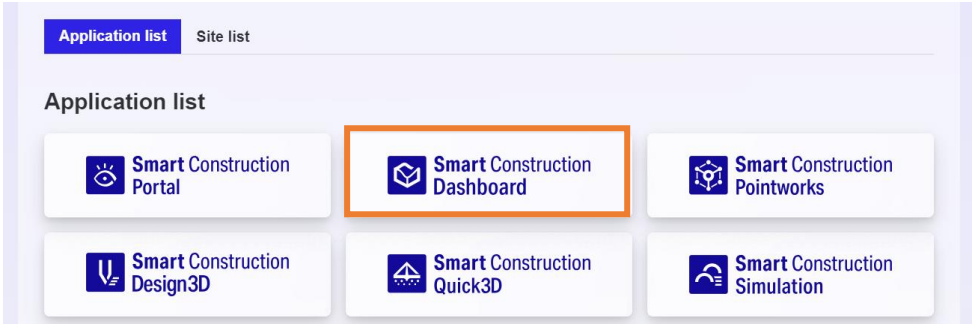


4.2 Smart Construction Dashboard linkage

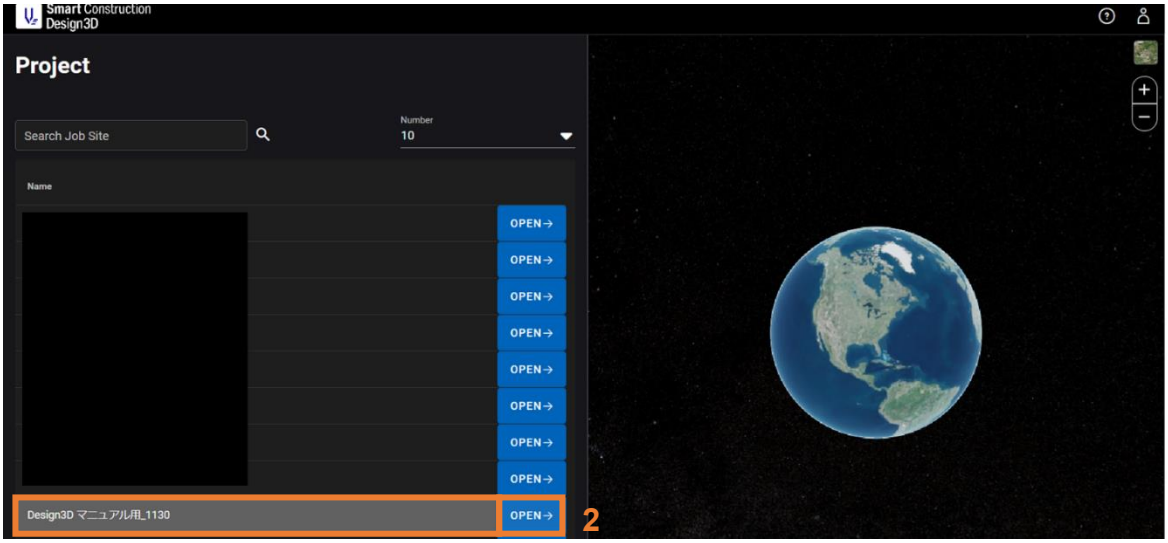
1. Press “Export as...” in the vertical ellipsis on the drawing data you want to export.
2. Select “Register to dashboard” and press “Export as...”.



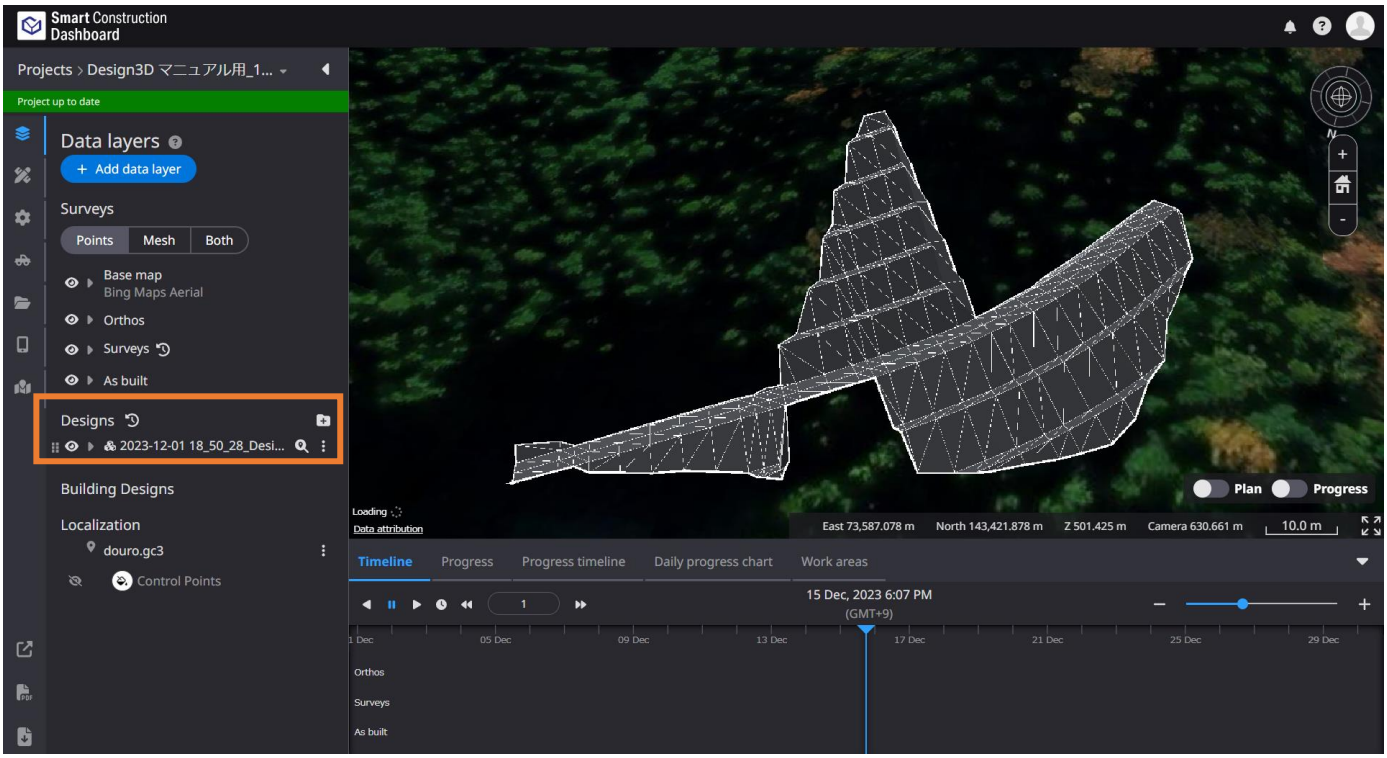
3. Click Smart Construction Dashboard on Customer Portal.



4. Press “Open” on the right side of the target jobsite name.



5. Temporary road and flat ground data is automatically registered to Smart Construction Dashboard.



5. Contact

- For inquiry on products
  EARTHBRAIN Ltd.
  The URL below brings you to the inquiry site.
  https://www.earthbrain.com/contact/form/

- Contact at the time of malfunction
  Please contact Smart Construction Support Center.

お客様の状況に適した3つのサポート体制 〈実際のお問い合わせ事例より〉

お電話でお問い合わせ

？ 新しい設計データが建機のモニタに表示されない。

サポートセンターへ電話

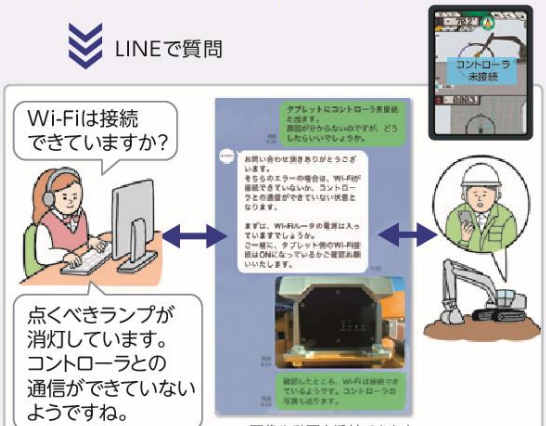
データの選択ができていなかった!
操作も教えてもらえた。

解決 ○

LINEでお問い合わせ

？ エラーが表示され、モニタとコントローラの通信ができない。

LINEで質問



配線がゆるんでいた。
しっかり差し直したら通信できるようになった。

解決 ○

サポートサイトでお問い合わせ

？ パソコンで進捗を管理したいが、土量の算出ができない。

サポートサイトで確認

「よくあるお問い合わせ」から、今お困りの内容で検索。

自己解決 ○

現況データがアップロードできていなかった!

解決しないとき

それでも解決しない場合は、ページ下にあるリクエストボタンからサポートセンターへお問い合わせできます。

製品・サービスに関するご相談や導入のご検討について詳しくはお問い合わせ下さい。

Smart Construction お問い合わせフリーダイヤル

0120-574-448

9:00～18:00（土日祝日/年末年始除く）

EARTHBRAIN

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泉ガーデンタワー29階

6 Revision history

Created/revised date	Description
June 28, 2022	Initial version
May 30, 2023	Revised for production release.
July 27, 2023	Revised due to additional functions (flat ground functions, etc.)
August 31, 2023	Revised due to additional functions (volume calculator, vertical/sectional display of design data, etc.)
November 30, 2023	Revision due to additional functions

Smart Construction Design3D User Guide

Issued by EARTHBRAIN Ltd.
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