

A Magic Button for Optimized Roadway Design



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Class outline

- Introduction Val, 5 min
- Profile Optimization: Val, 10 min
- Simple Corridor Optimization for Highways: Val, 5 min
- Suitability Maps: Dong video, 5-10 min
- Combining Corridor Optimization and Suitability Maps: Dong video or Val, 5 min
- Advanced Corridor Optimization: Edmundo, 20 min
- Q & A: Edmundo and Val, 5-10 min

Key learning objectives

At the end of this class, you will be able to:

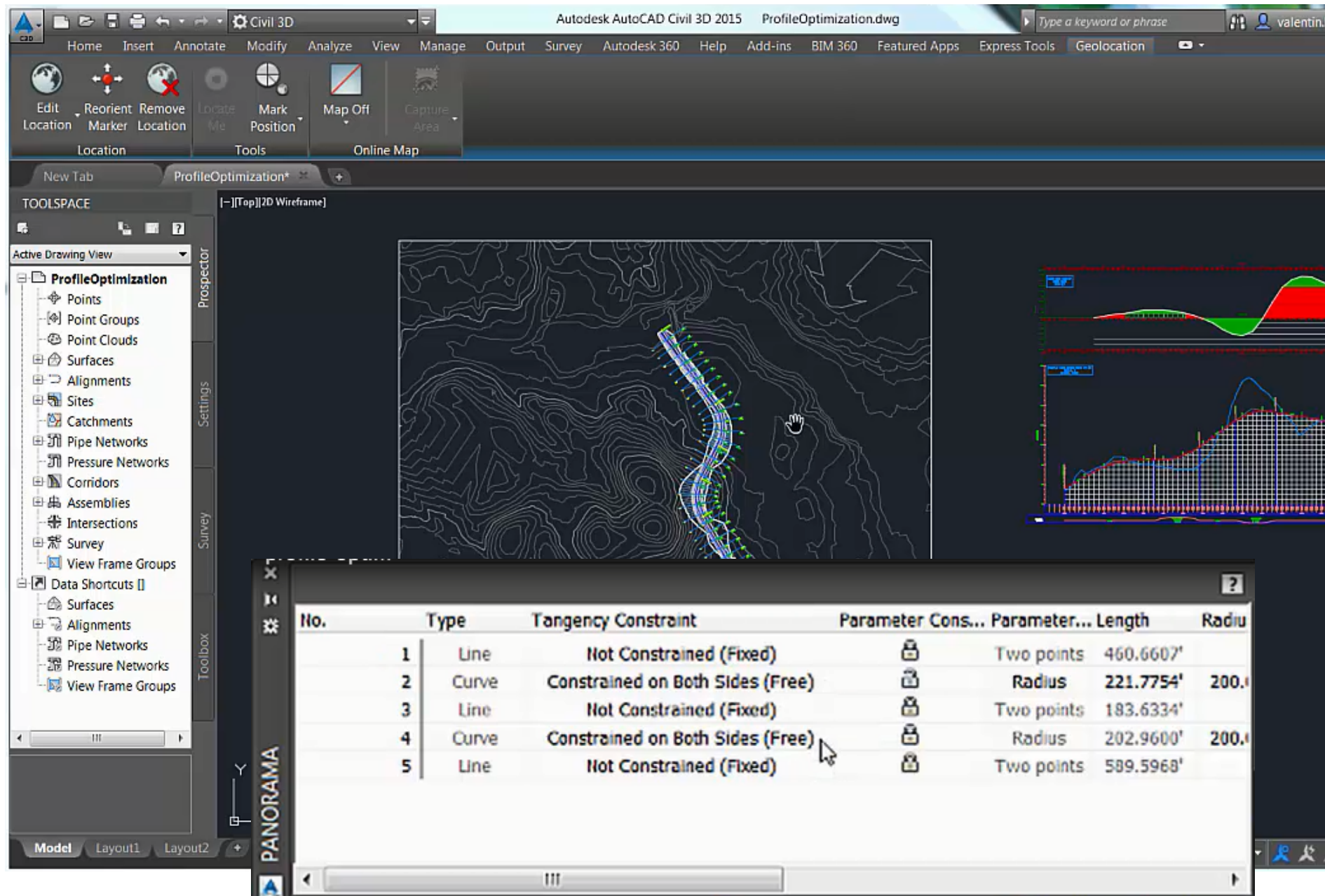
- Know when to use Corridor Optimization and Profile Optimization during your project phase
- Choose appropriate settings for each service based on your projects to get desired results
- Evaluate solutions returned by the optimization service
- Prepare your Civil 3D corridor design so as to use Profile Optimization, and compare the optimized result with your original design in Civil 3D
- Set up Suitability Maps and apply such maps in your Corridor Optimization

Introduction



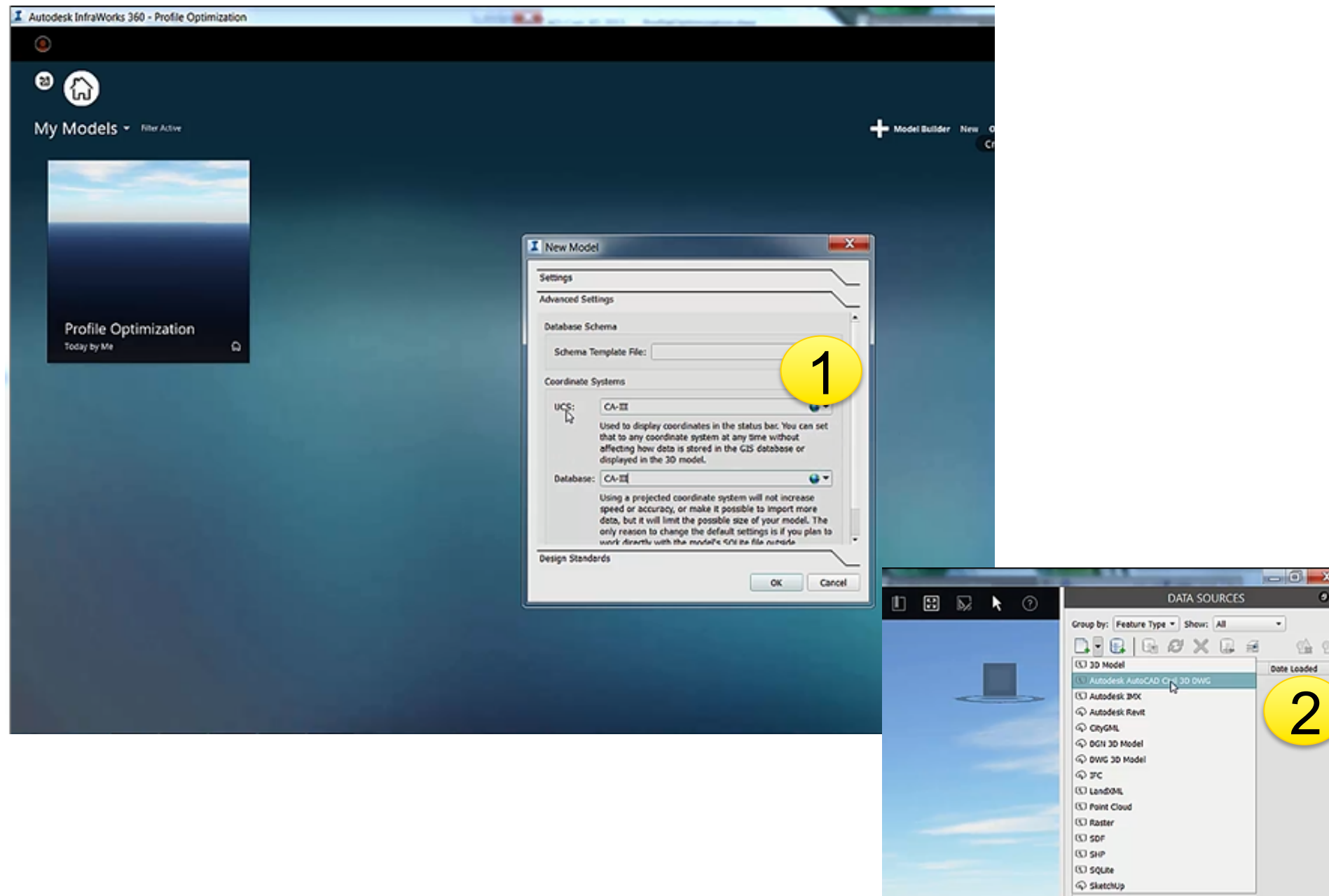
Profile Optimization with InfraWorks

Prepare Your Civil3D Road



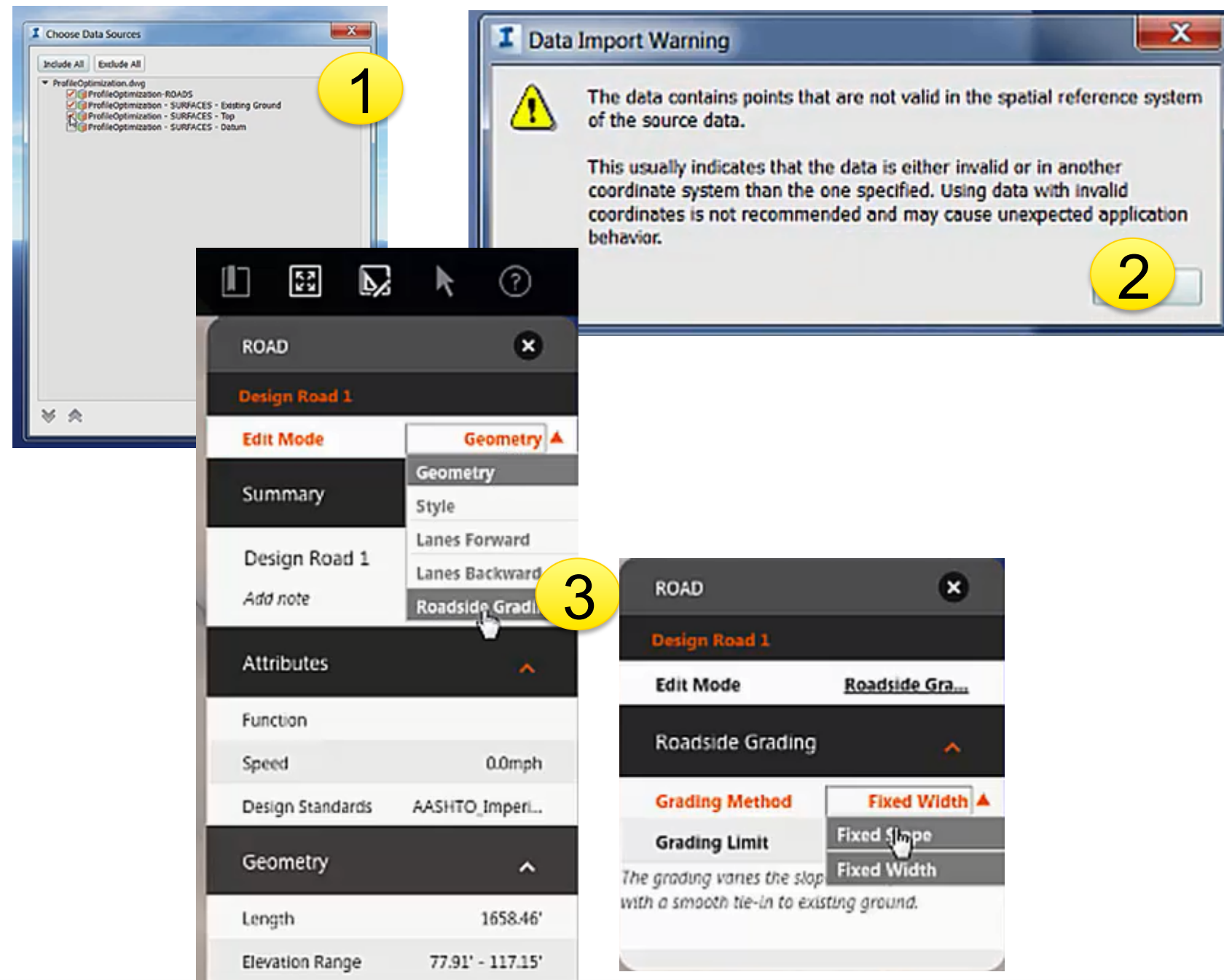
- Make sure that the surface is big enough
- Add sample lines with distance of 50 ft
- Set correct alignment geometry settings and make it editable – Curve constrained free on both sides

Select the Appropriate CS for New Model



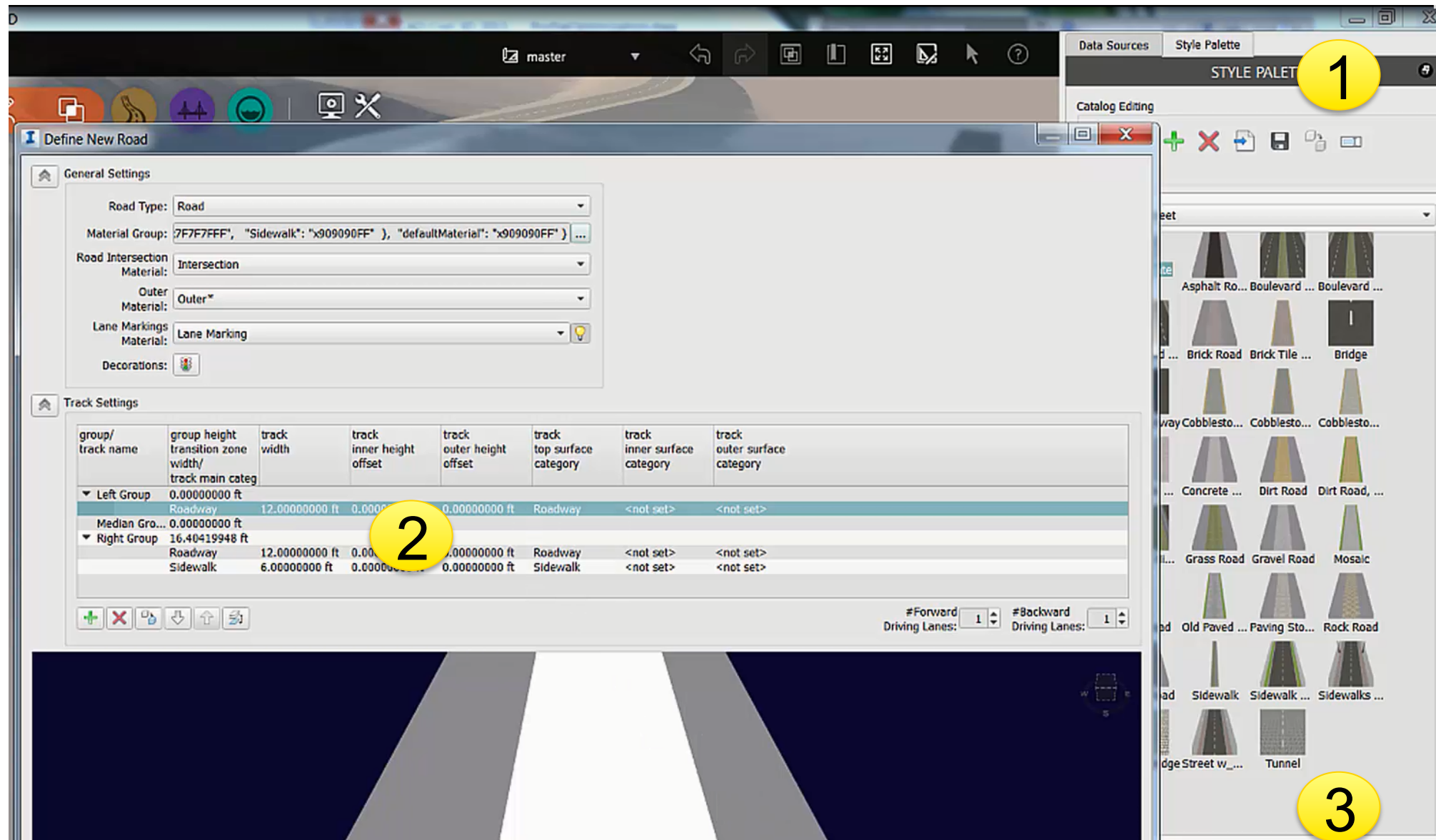
- On the New Model dialog box, select appropriate coordinate system for your project to match the corridor project set in Civil 3D
- Use the Civil 3D DWG import on Data Source to import the drawing data

Set Road Settings Consistent to Civil3D



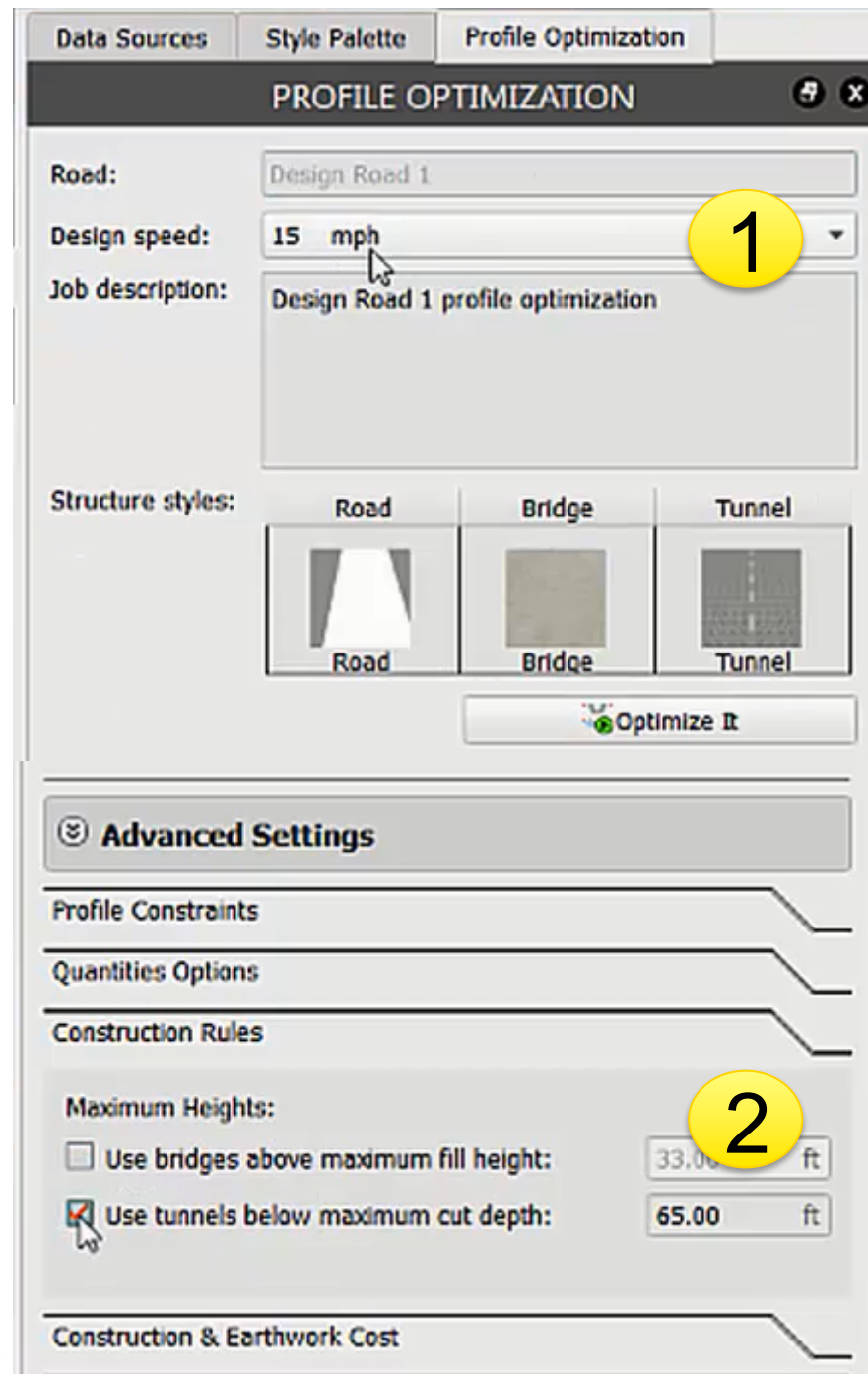
- Select ROADS and existing ground SURFACES only
- Ignore the data import warning
- In the road edit mode, select Roadside Grading and change the method to Fixed Slope
 - Grading Limit: 200 ft
 - Cut Slope: 2:1
 - Fill Slope : 4:1

Update Road Style



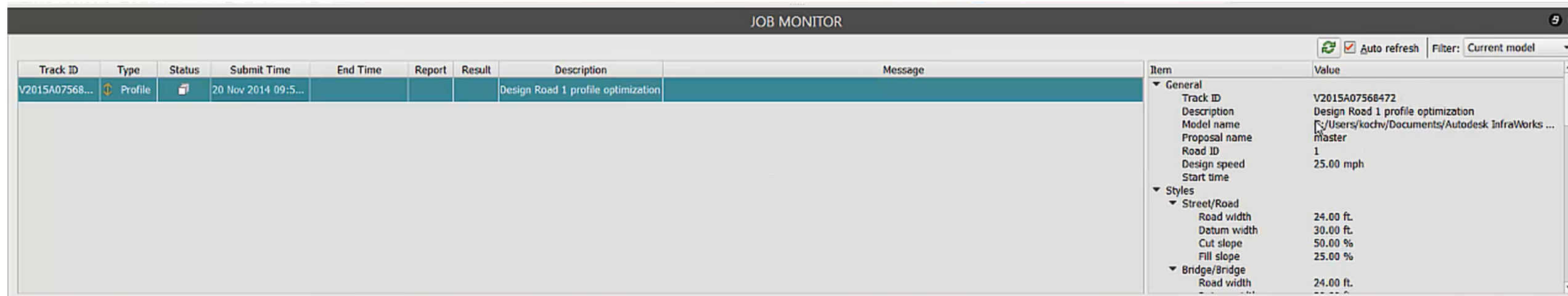
- Create a new roadway style
- Update the following
 - Roadway track width: 12 ft
 - Sidewalk track width: 6 ft
- Add Left Group and set its roadway to 12 ft
- Apply the new style to the imported road on canvas

Profile Optimization Setup



- Open **Profile Optimization** from the Roadway Design component toolbar
- Select the road from canvas and set **Design Speed** to 25 mph
- Optionally select bridge or tunnel styles
- Examine Advanced Settings and deselect the Use Bridges/Use tunnels option under **Construction Rules**

Job Monitor



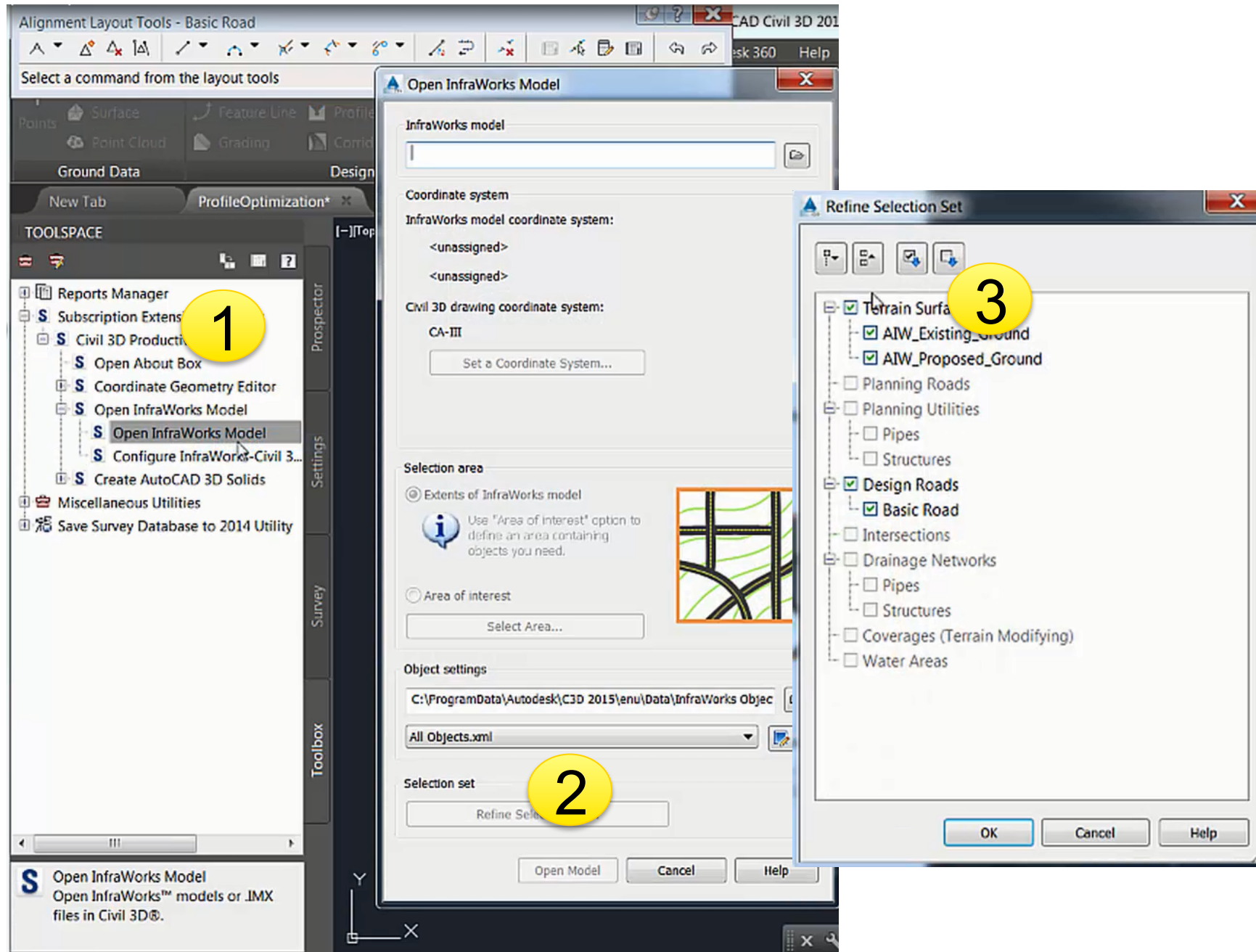
The screenshot shows the 'JOB MONITOR' application window. It features a table with columns: Track ID, Type, Status, Submit Time, End Time, Report, Result, Description, and Message. A single row is visible with Track ID 'V2015A07568...', Type 'Profile', Status 'In Progress', Submit Time '20 Nov 2014 09:5...', and Description 'Design Road 1 profile optimization'. To the right of the table is a detailed view of the selected job, showing a tree structure with 'General' and 'Styles' sections. The 'General' section includes fields like Track ID, Description, Model name, Proposal name, Road ID, Design speed, and Start time. The 'Styles' section includes 'Street/Road' and 'Bridge/Bridge' styles, each with fields for Road width, Datum width, Cut slope, and Fill slope.

Track ID	Type	Status	Submit Time	End Time	Report	Result	Description	Message
V2015A07568...	Profile	In Progress	20 Nov 2014 09:5...				Design Road 1 profile optimization	

Item	Value
General	
Track ID	V2015A07568472
Description	Design Road 1 profile optimization
Model name	C:/Users/kochv/Documents/Autodesk InfraWorks ...
Proposal name	master
Road ID	1
Design speed	25.00 mph
Start time	
Styles	
Street/Road	
Road width	24.00 ft.
Datum width	30.00 ft.
Cut slope	50.00 %
Fill slope	25.00 %
Bridge/Bridge	
Road width	24.00 ft.

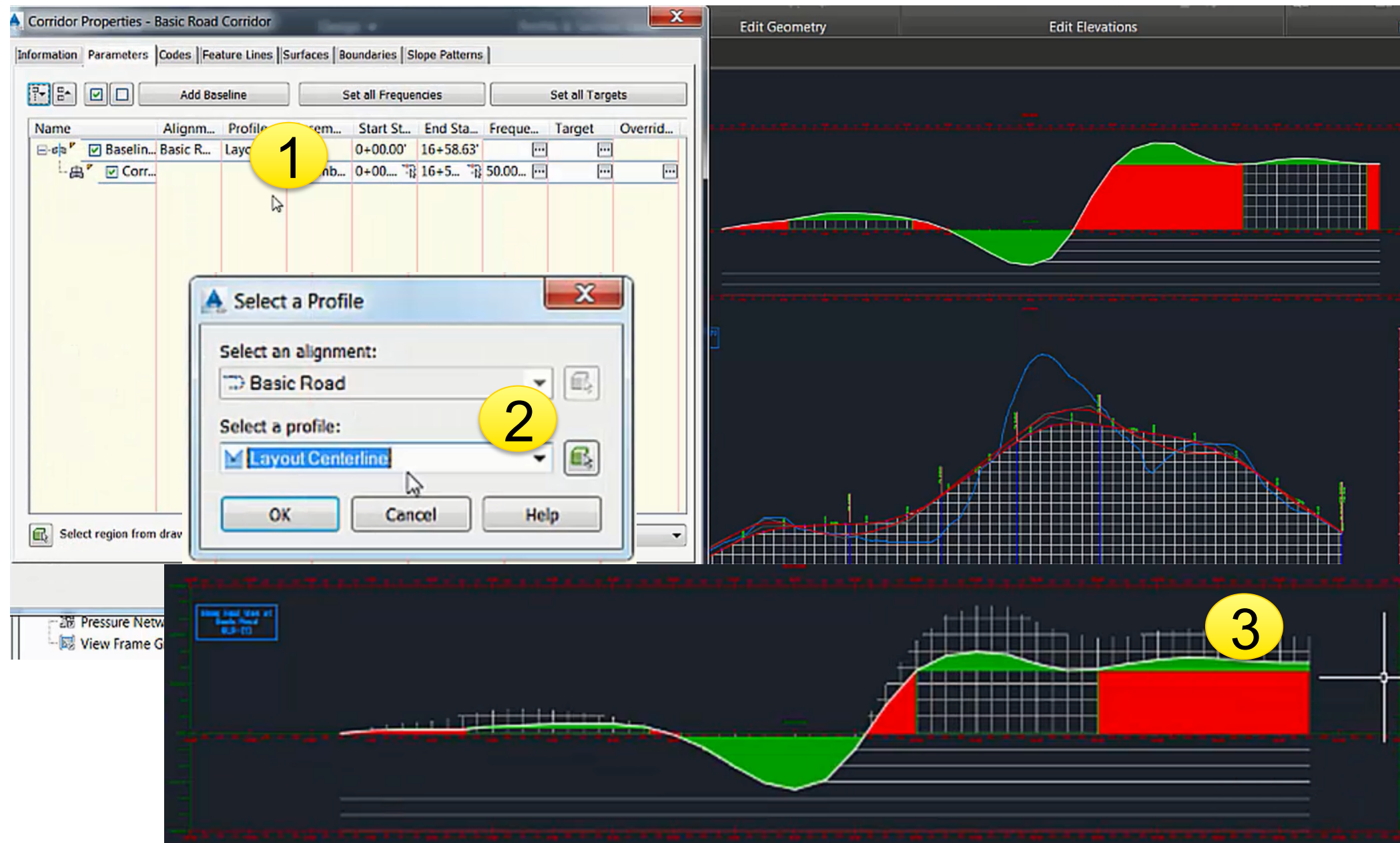
- On Job Monitor, watch out the job status and result
- Download the PDF report
- Download the result into a new proposal

Import in Civil 3D



- On Toolbox, under Subscription Extension Manager > Civil 3D Productivity Pack 1 > Open InfraWorks Model, click **Open InfraWorks Model**
- Click **Refine Selection Set** and uncheck **Terrain Surfaces**

Compare Profile and Mass Haul



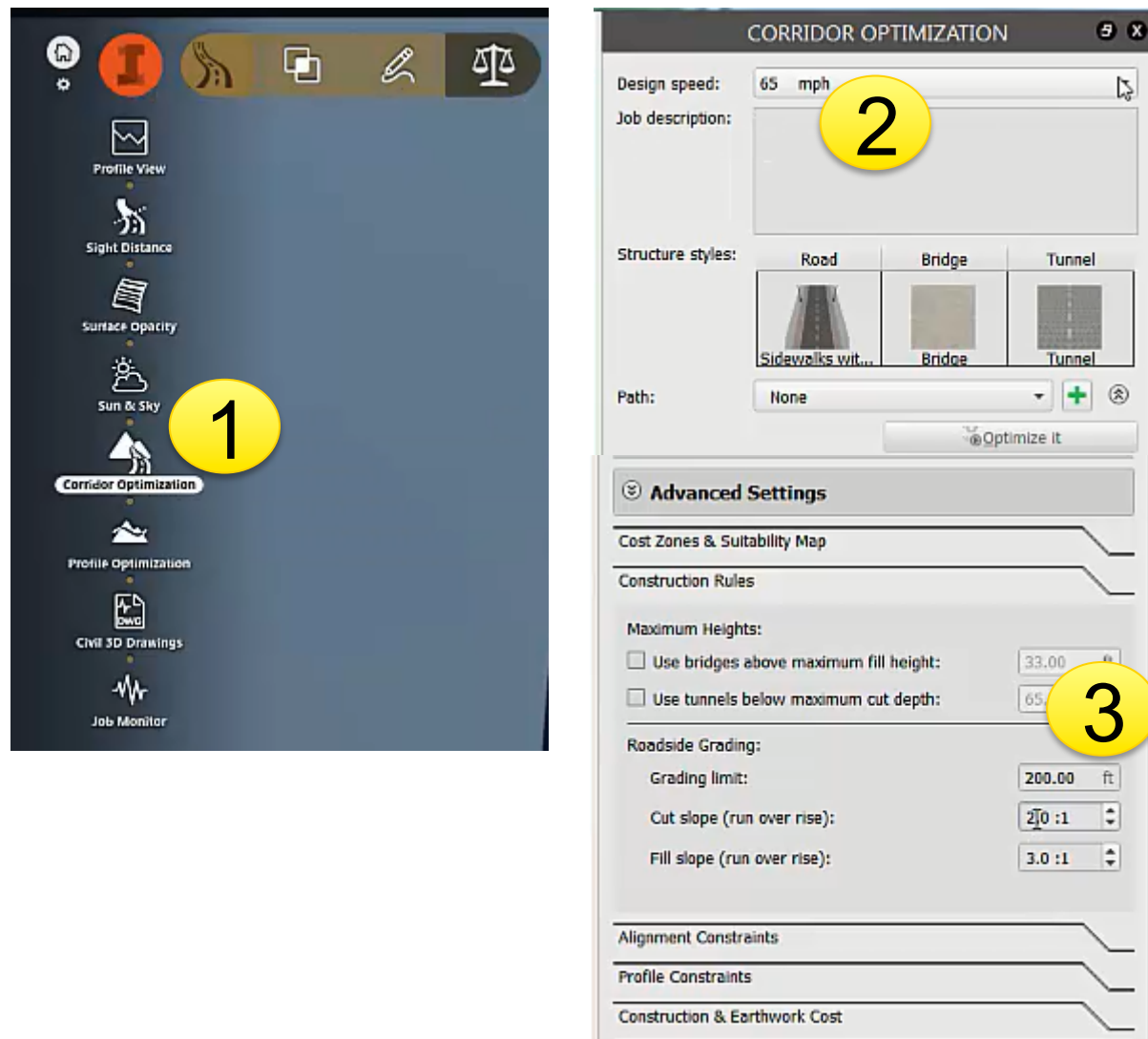
- On Prospector, open Properties for the corridor.
- Switch profile to **Basic Road**
- Check the difference in mass haul

An aerial perspective of a multi-lane highway bridge crossing a wide river. The bridge has a rainbow-colored line along its edge. In the background, a city skyline with various skyscrapers is visible under a clear blue sky. The foreground shows green grassy banks with some trees and a small landscaped area with purple flowers.

Corridor Optimization for Highways



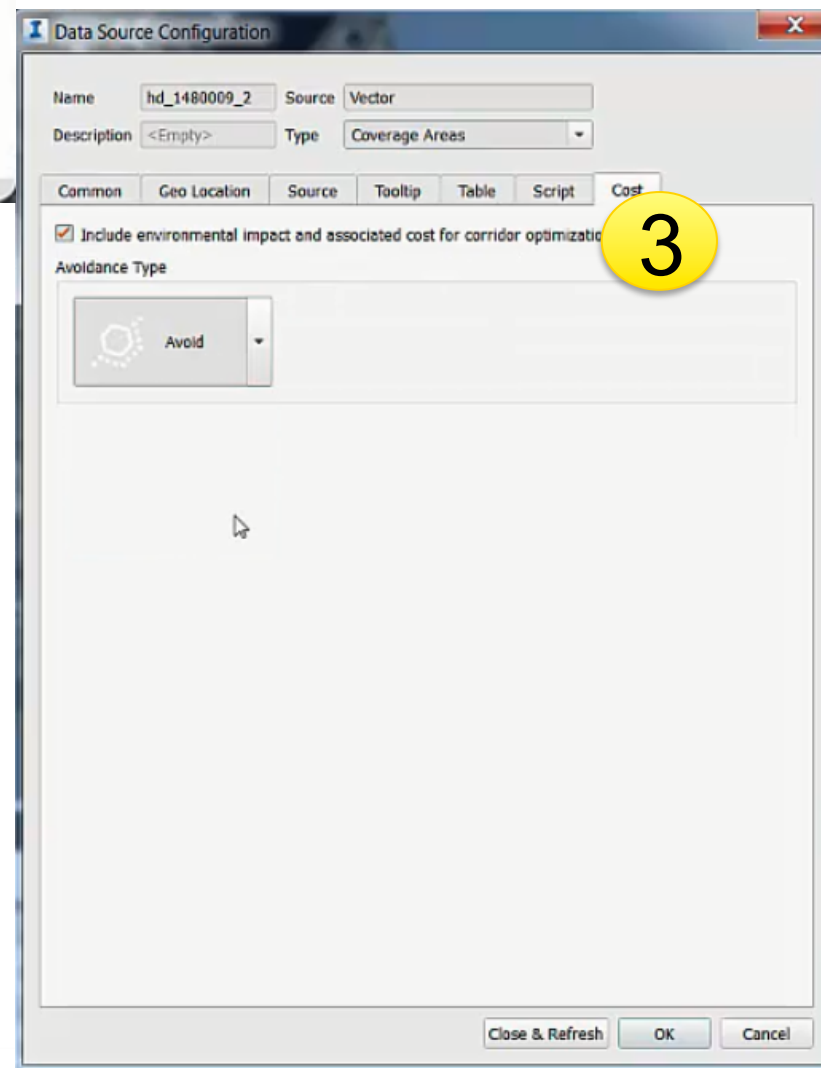
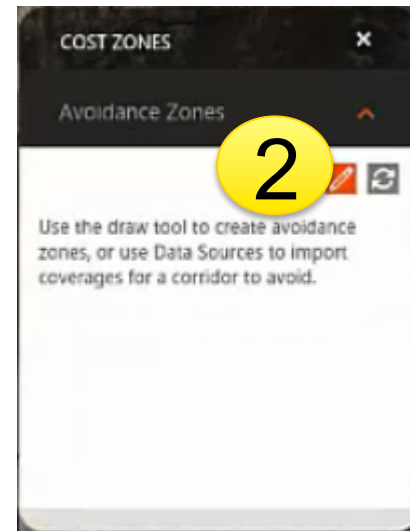
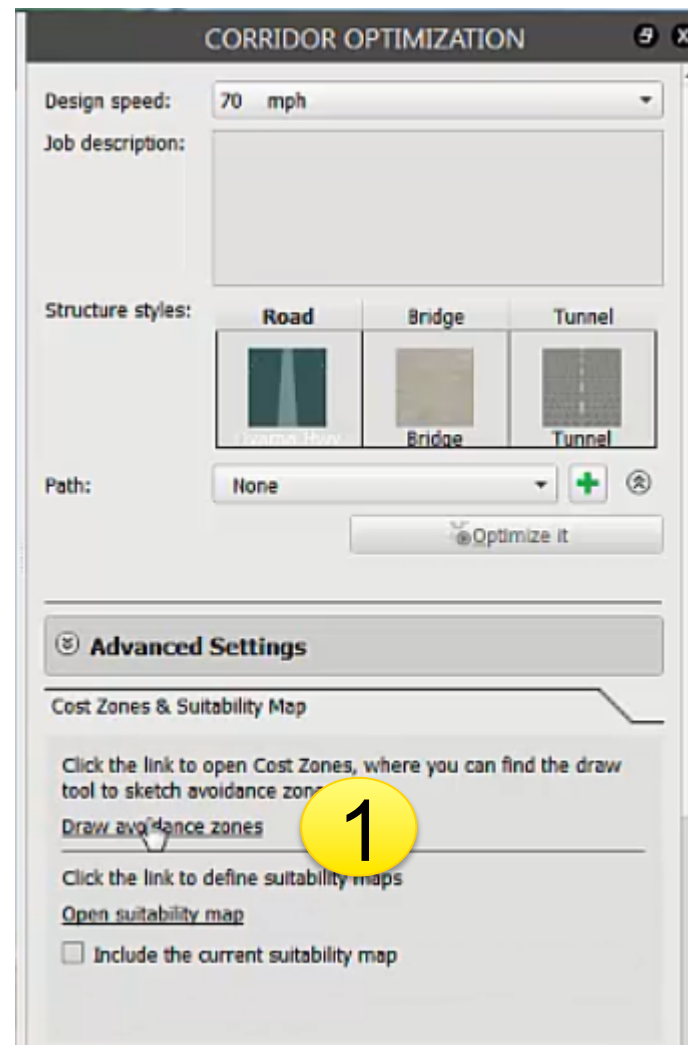
Corridor Optimization Entry Point and UI



- Open Corridor Optimization
- Set Design Speed to 70 mph
- Draw the intend path on canvas
- Fit the size of project area on canvas

Update Advanced Settings
No bridges/tunnels
Grading limit: 200 ft
Cut slope: 2:1

Create and Apply Avoidance Zones



- Select **Draw avoidance zones** under Advanced Settings on Corridor Optimization
- On Cost Zone, use the pencil tool to draw avoidance zones on the model
- Alternatively, you can import GIS data as Coverage and configure its Cost from Normal to Avoid

Download Results

CorridorOptimization1-1080

original

Profile View
Sight Distance
Surface Opacity
Sun & Sky
Corridor Optimization
Profile Optimization
Civil 3D Drawings
Job Monitor

End
Start

2

CORRIDOR OPTIMIZATION

Design speed: 70 mph
Job description: Path - (1) corridor optimization
Structure styles: Road Bridge Tunnel
Path: Path - (1)
Optimize it

Advanced Settings

Cost Zones & Suitability Map
Construction Rules
Alignment Constraints
Profile Constraints
Construction & Earthwork Cost

Click the link below to set and review unit price for construction and earthwork cost items. Price values will be used to evaluate optimization results.
[Construction & Earthwork Cost](#)

JOB MONITOR

Track ID	Type	Status	Submit Time	End Time	Result	Description	Message	Item	Value
V2015A00719095	Corridor	✓	26 Nov 2014 11:17:53			Path - (1) corridor optimization			
V2015A08071616	Corridor	✓	26 Nov 2014 11:17:41	26 Nov 2014 11:48:34		Path - (1) corridor optimization			
V2015A08786925	Corridor	✓	26 Nov 2014 11:16:47	26 Nov 2014 11:47:34		Path - (1) corridor optimization			
V2015A08280973	Corridor	✓	26 Nov 2014 10:32:35	26 Nov 2014 11:03:28		Path - (1) corridor optimization			

1

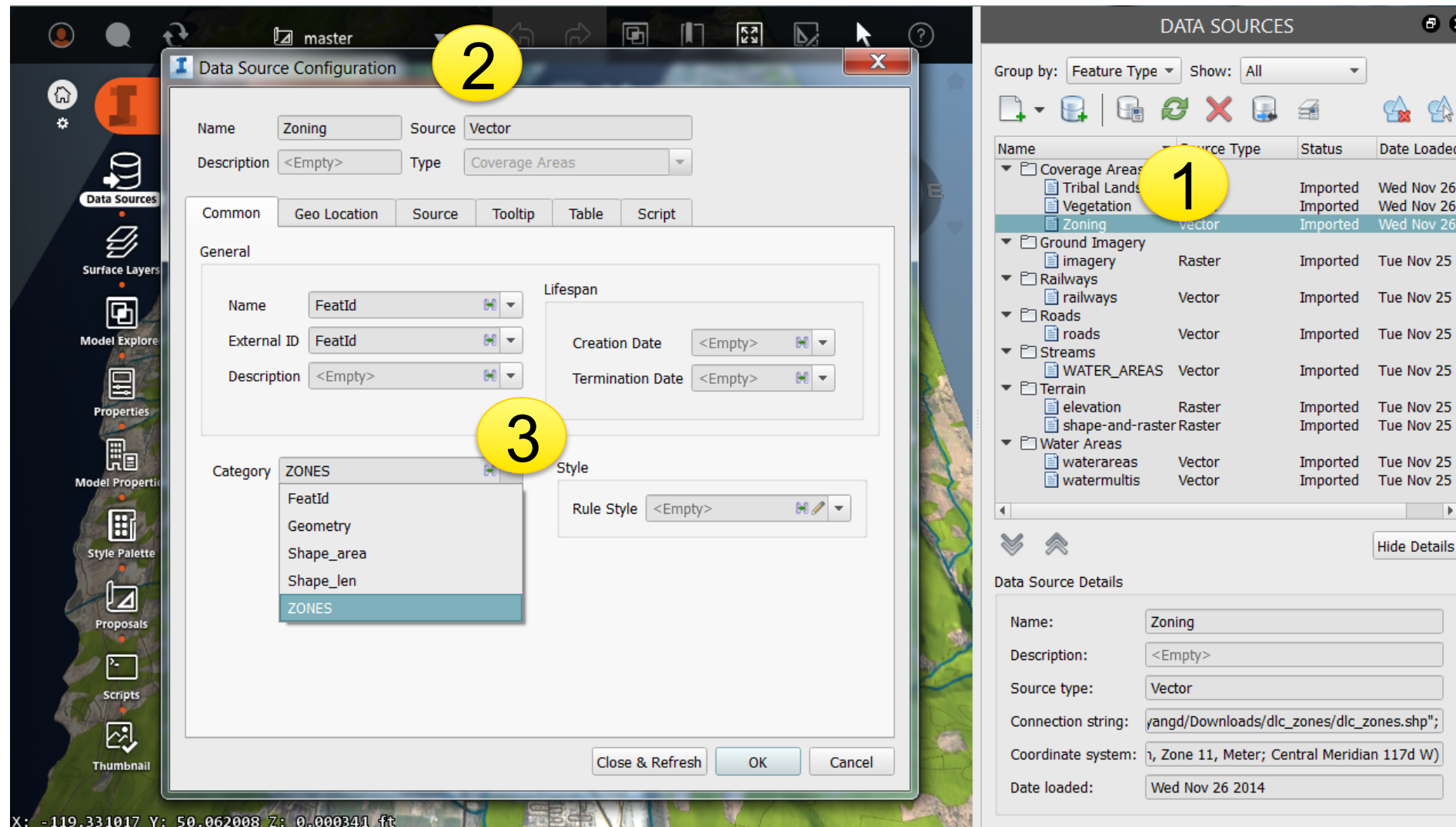
3

- Refresh Job Monitor to see results.
- Review the pdf report
- Download the result into a new proposal
- Create an avoidance zone
 - Manual draw
 - Import as coverage and set Cost to avoidance

Suitability Maps

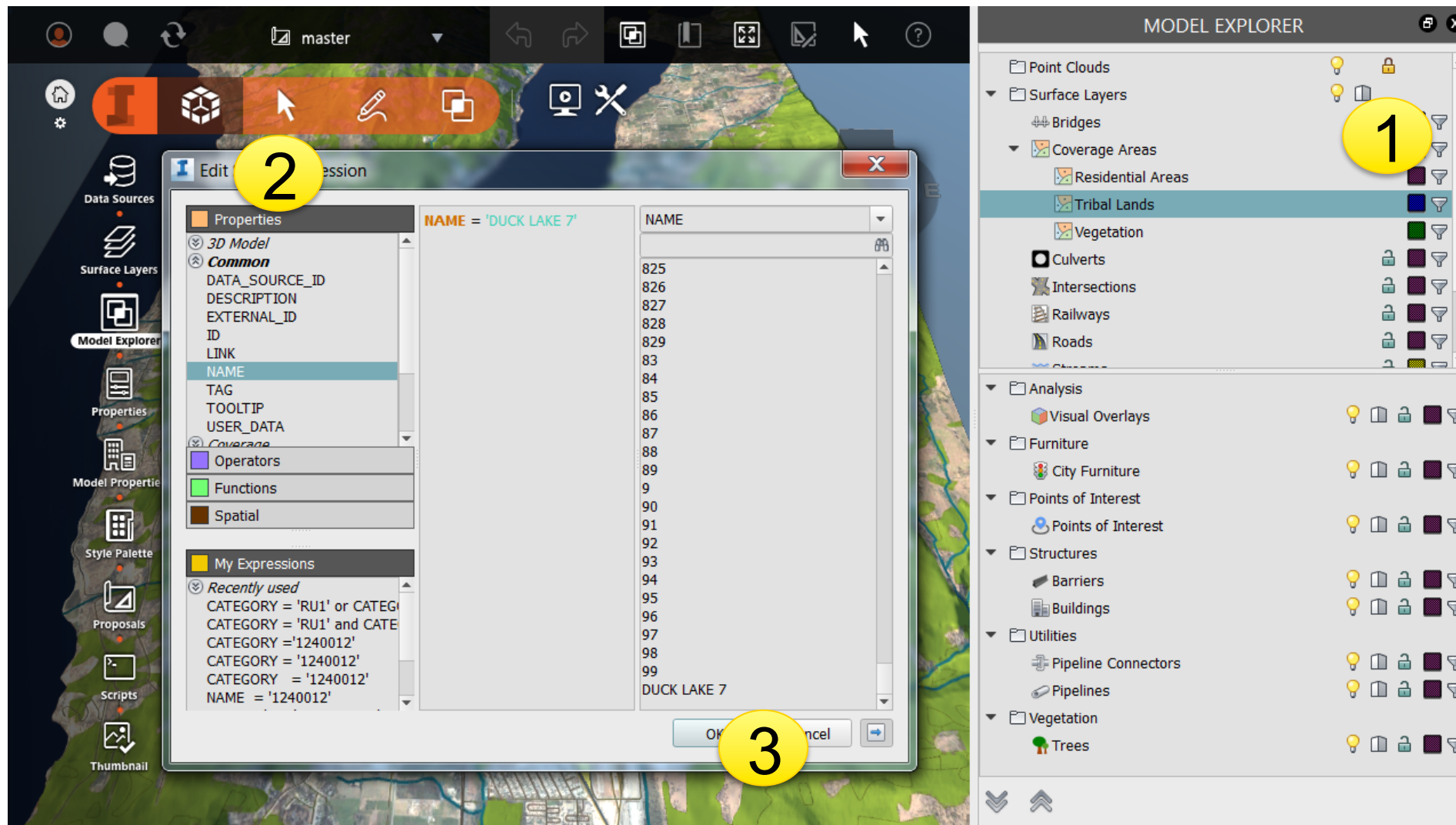


Prepare Datasets to be Used



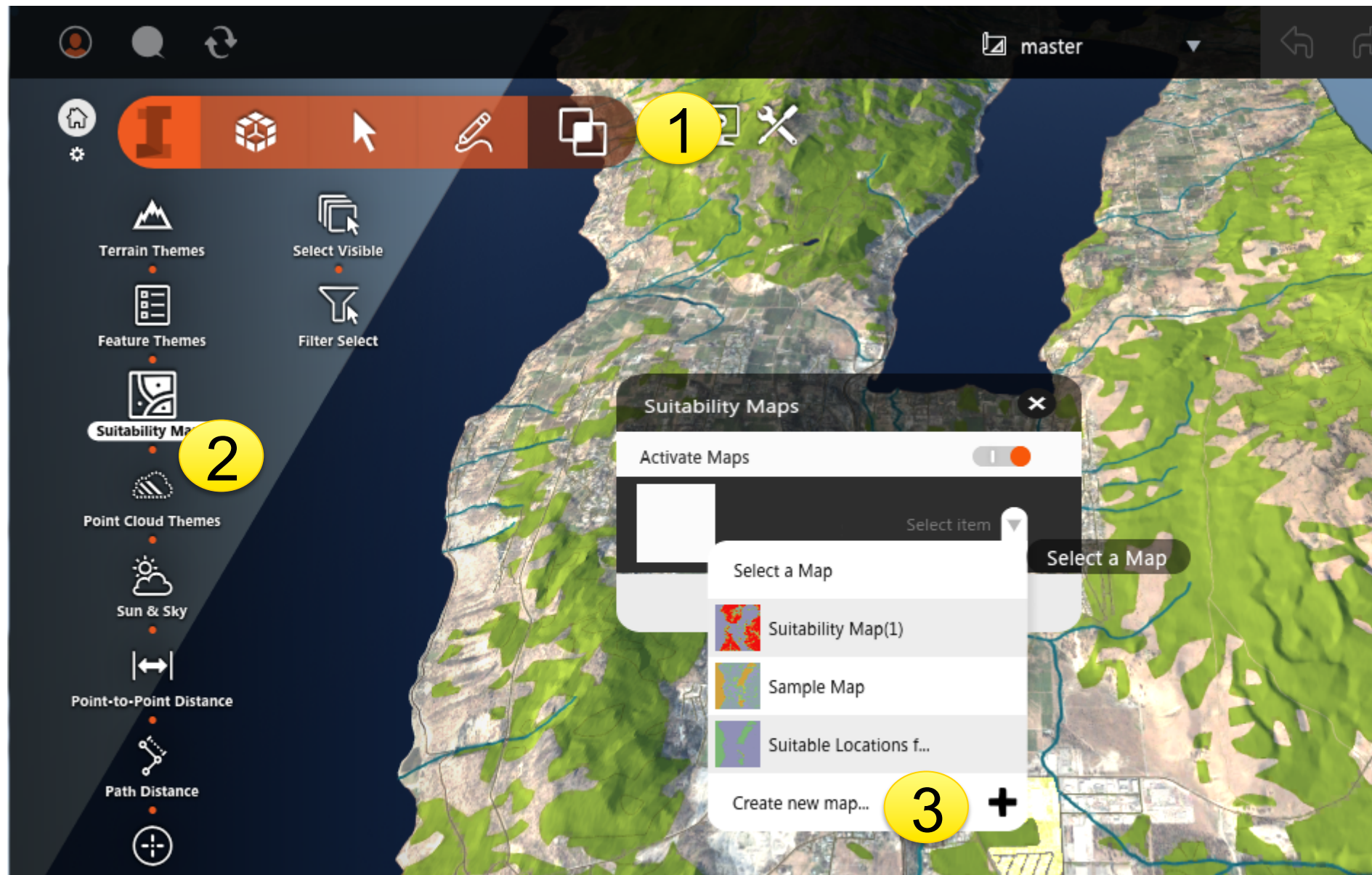
- On InfraWorks **Data Source**, import GIS datasets that contain project sensitive features into appropriate model feature classes
- Open **Data Source Configuration** and map attribute fields to model feature properties

Create Feature Subsets If Needed



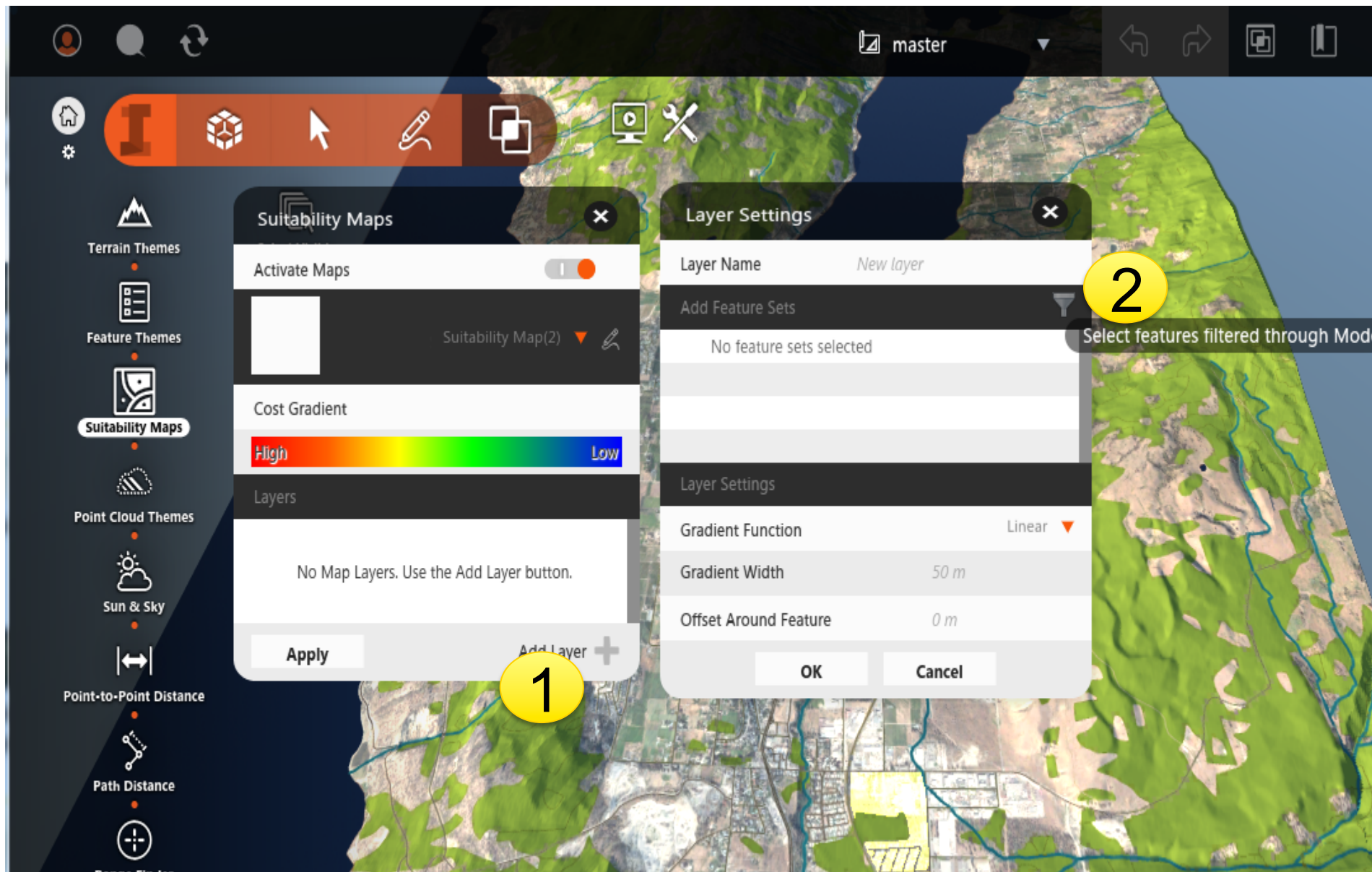
- On InfraWorks **Model Explorer**, use the Filter tool to create feature subsets that you would like to add to Suitability Map layers and apply layer settings

Open the Suitability Maps Panel



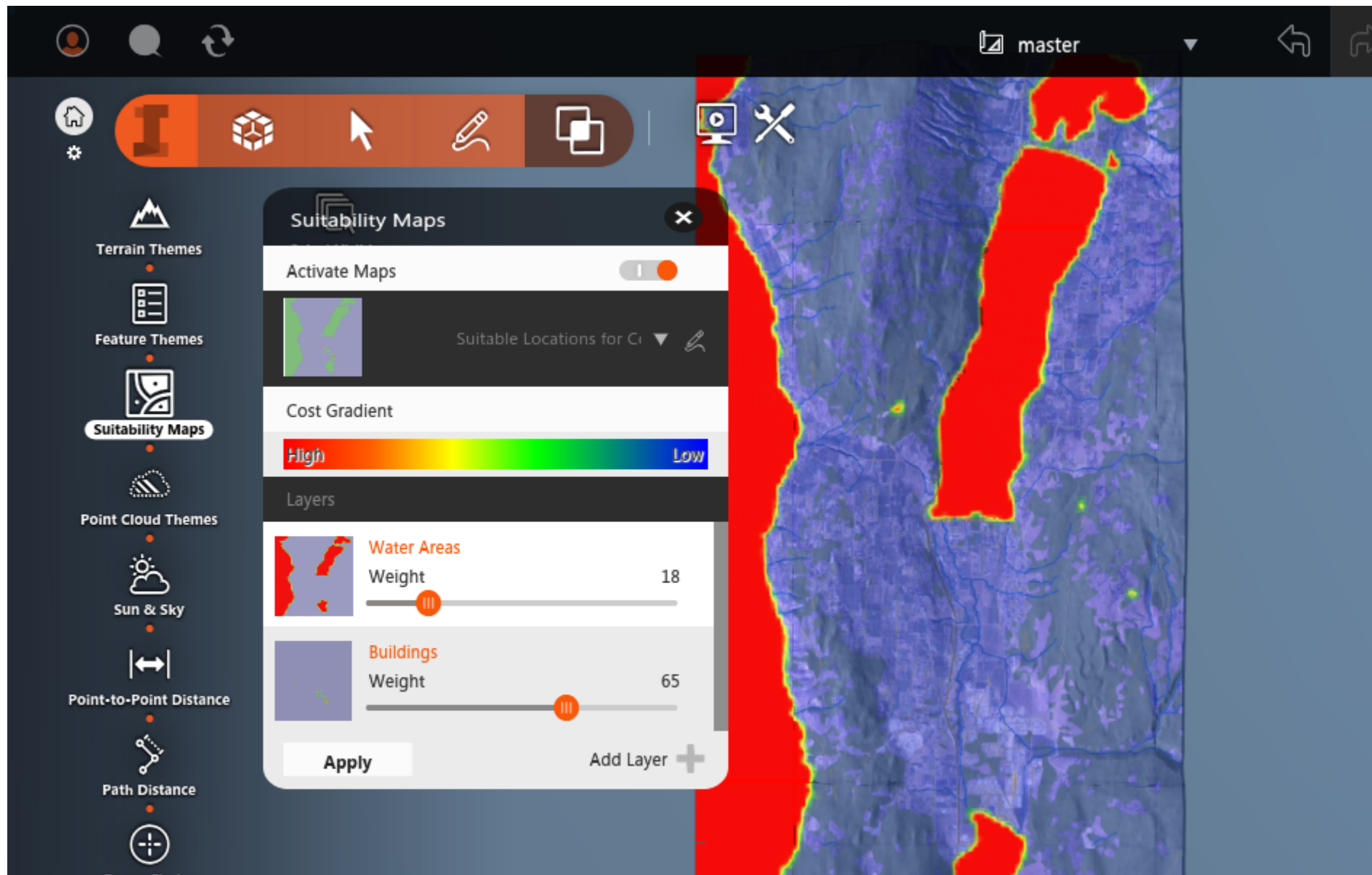
- Select the Analysis toolbar
- Click the Suitability Maps button
- On the Suitability Maps panel, select an existing or click the Create new map option

Add Map Layers



- On the Suitability Maps panel, click the Add Layer button
- On the Layer Settings panel, click the filter icon to open Feature Selection
- Pick feature sets or subsets that you'll apply the same layer settings
- Rename the layer (optional)
- Adjust settings (optional)

Add Map Layers

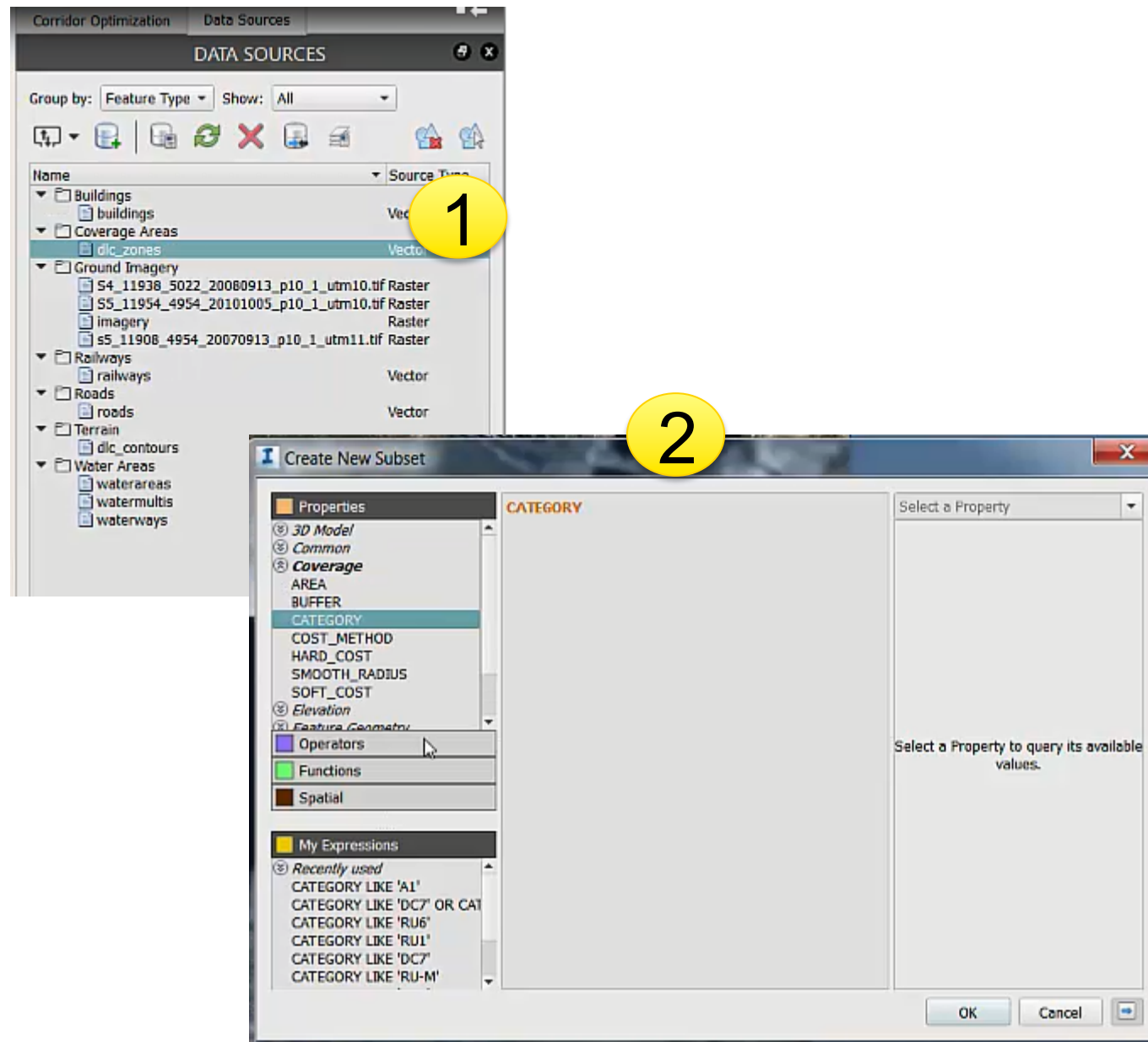


- Adjust weights for layers
- Click the Apply button
- You can use the slider button on the top of the panel to turn the visibility of a suitability map on or off

Suitability Maps and Corridor Optimization

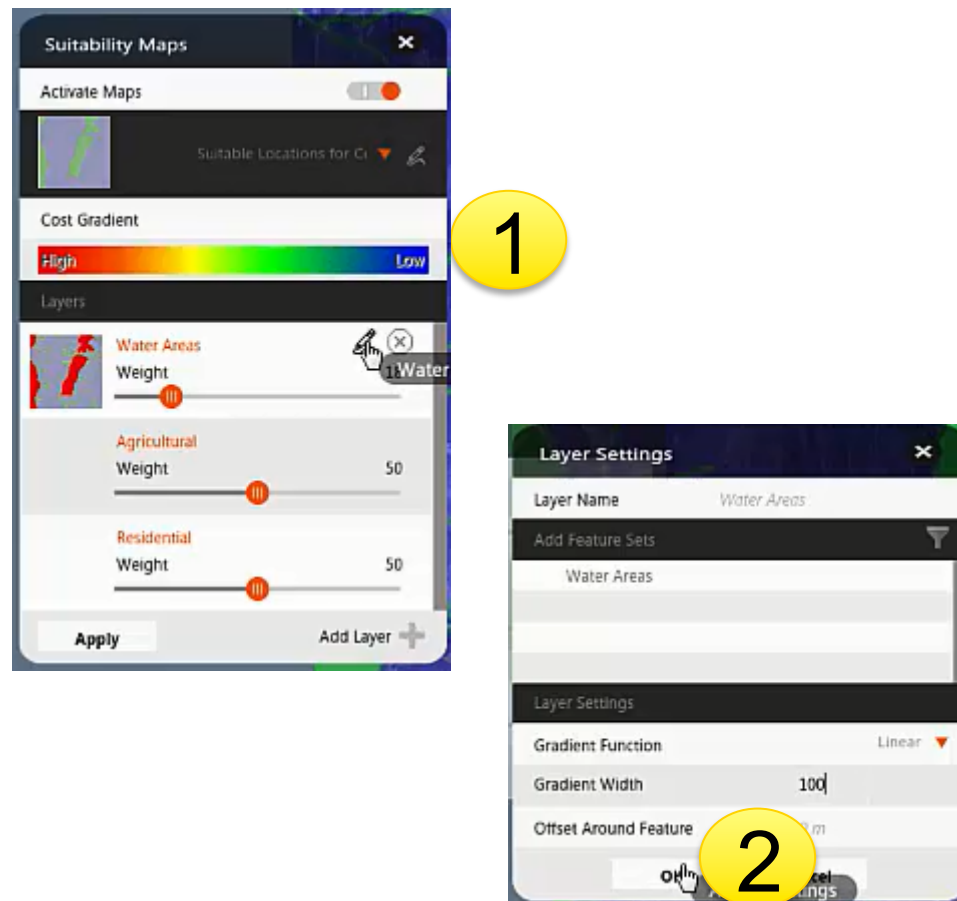


Import GIS Data and Create Subsets



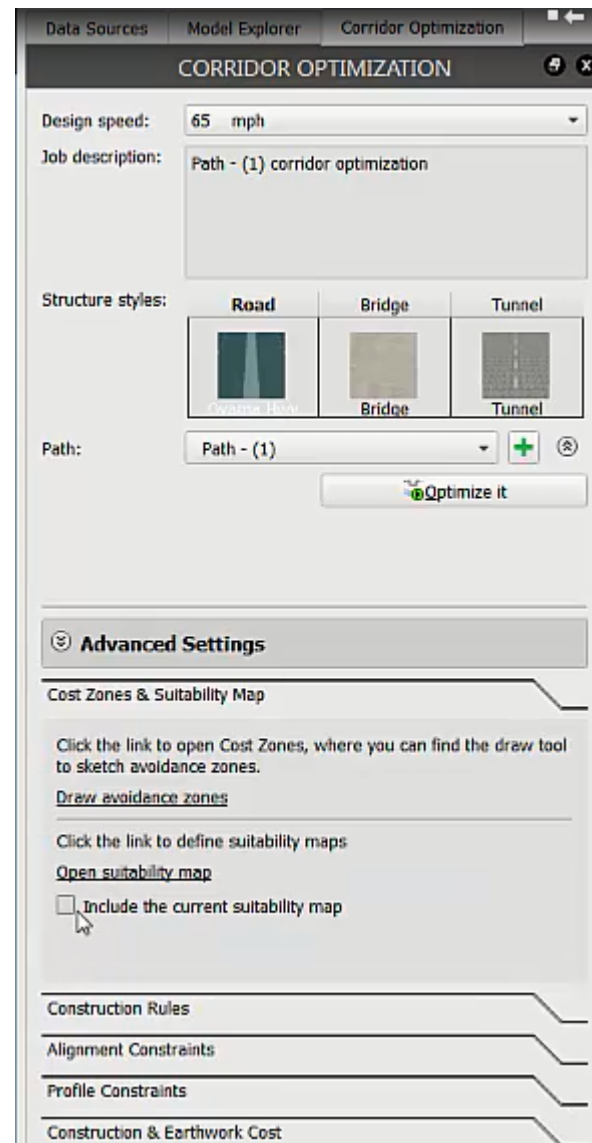
- Import GIS data as coverage
- Create subsets under Coverage

Create a Suitability Map based on Subsets



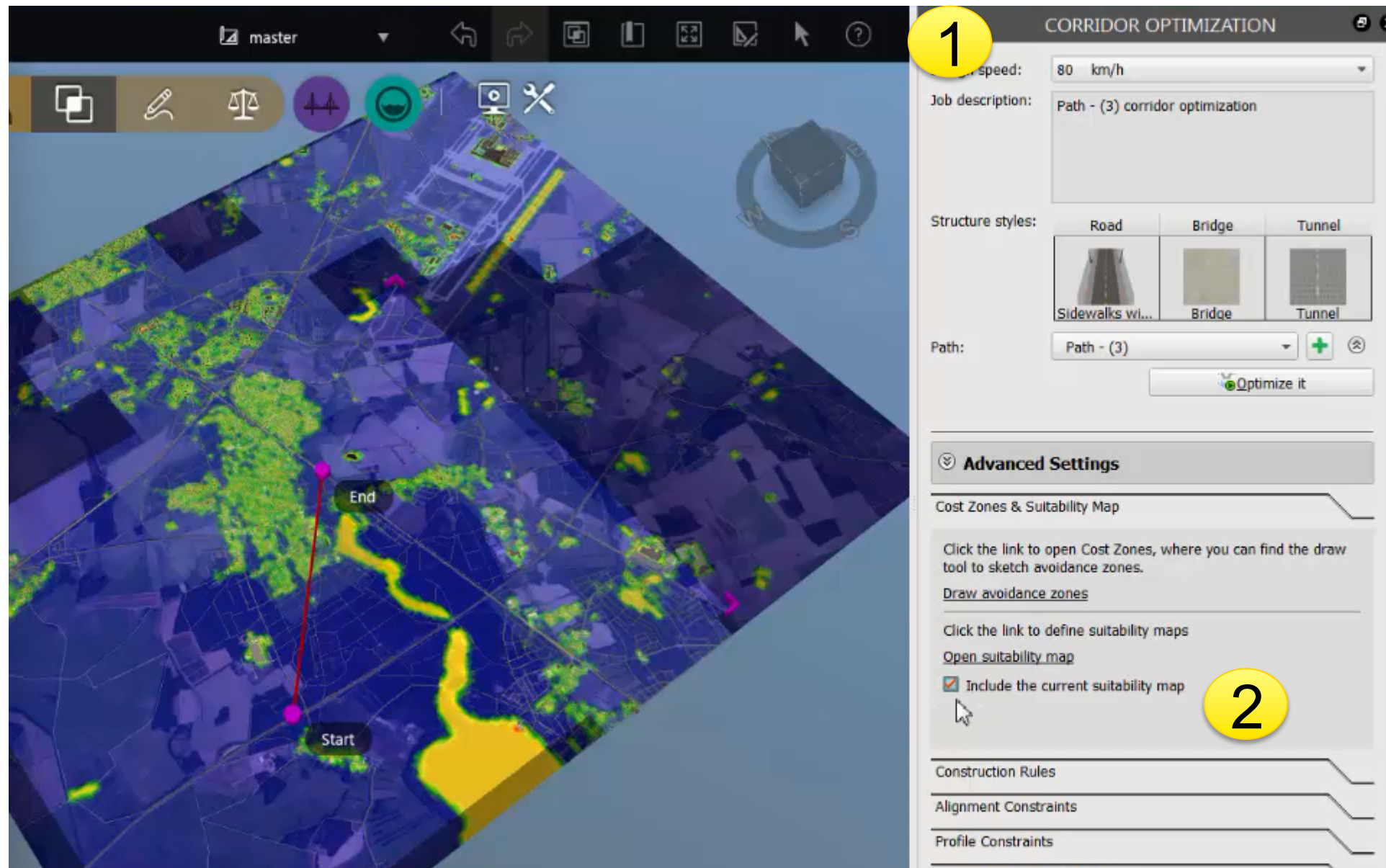
- Create a suitability map
- Add layers and adjust their weights
 - Water - 60
 - Agricultural - 40
 - Residential - 50
- Apply the settings

Apply Suitability Map



- Open Corridor Optimization
- On Advanced Settings, under Cost Zones & Suitability Map, check **Include the current suitability map**
- Click **Optimize It**

Include Suitability Maps in Corridor Opt



- Open Corridor Optimization
- On **Advanced Settings**, check Include the **current suitability map** option in **Cost Zones & Suitability Map**
- Set up your corridor optimization parameters and setting and submit the job



Advanced Use of Corridor Optimization



An aerial perspective of a cityscape featuring a large stadium, a multi-lane bridge crossing a river, and surrounding urban development. The scene is overlaid with a semi-transparent white banner containing the title text. The bridge has a rainbow-colored line along its edge, and the riverbank is landscaped with greenery and trees.

Questions & Answers



