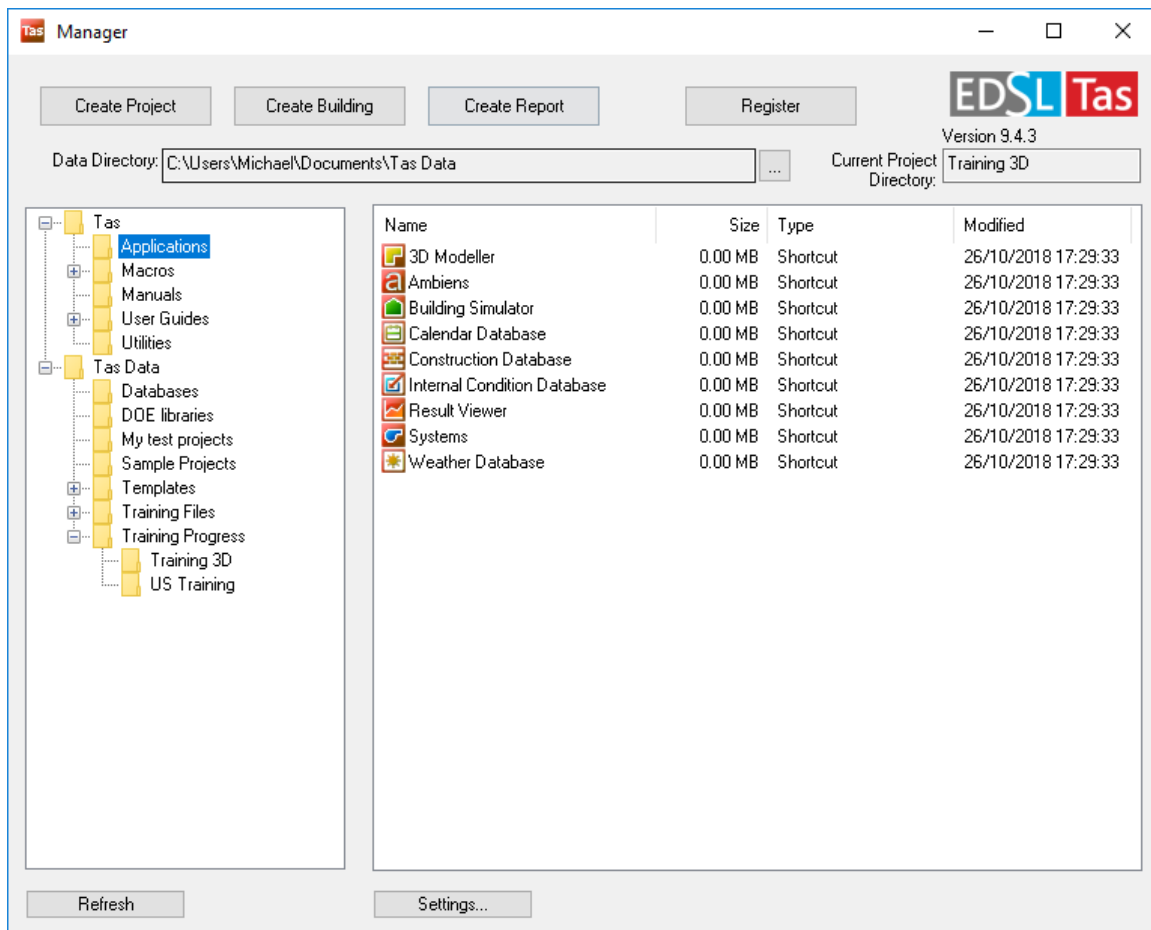


Workbook 1

Tas 3D Modeller



Tas Manager

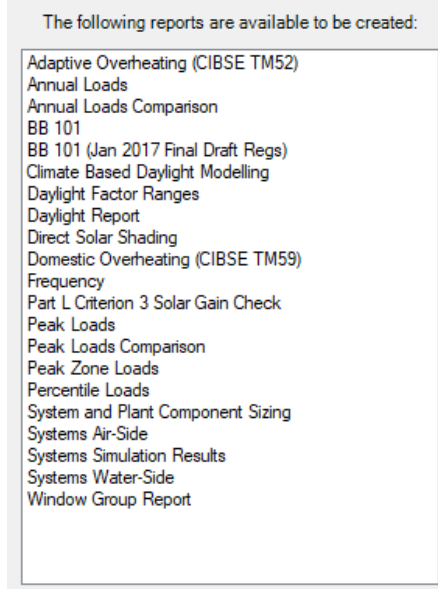


Key Points:

- Your Tas Manager contains two main folders: a Tas folder and a Tas Data folder. See the directory-tree on the left-hand side above. If you do not see a Tas Data folder, contact support@edsitas.com for assistance.
- The Tas folder contains the main programs in the 'Applications' subfolder (including the 3D Modeller, Building Simulator, Systems), Utilities, Macros, User Guides and Manuals. These files are always stored on your local machine.
- The Tas Data folder contains your project data files, example files, databases and templates that are included with the software. These files can be stored anywhere, e.g. on a server or a local machine.
- Registration of license keys takes place here, i.e. through your Tas Manager (click Register to open the Registration dialog box). License keys will expire periodically (typically after one month). These will be updated automatically from Tas 9.4.4, otherwise you will need to update them by sending an email to support@edsitas.com. For further details please see the website: <http://www.edsitas.com>.

Starting a New Project:

- Create Project – Allows you to simply add a new project directory to your 'Data Directory'
- Create Building - To begin a new project click 'Create Building', you will then be presented with the option to use templates. The below exercise continues without using a template. However, if you do have a template available you can use that in the future.
- Create Report – Will allow you to automatically generate reports from your Tas files, there are options to integrate your own logo files to personalize the reports:

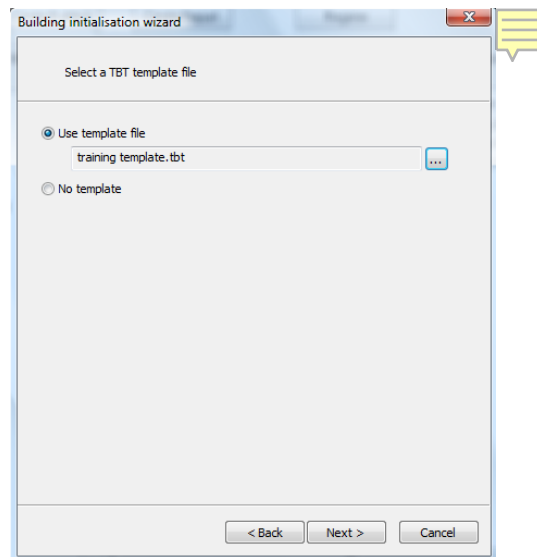


- Templates - The use of a templates allows some automatic assignment of building input data, such as:
 - Internal heat gains, thermostat set points, dynamic functions, and schedules (internal Conditions)
 - Building fabric data, e.g building envelope constructions, built up material layer by layer (Constructions)
 - Calendar, for day type specification
 - Also opens your 3D modeller file with 'Zone Sets' predefined based on the 'Internal Conditions' found in the template to allow for easier allocation of thermal zones in the model

Exercise:

- 1) Open the Tas Manager
- 2) Click on the **Create Building** button.
- 3) Call the building: **Training 3D_ 'user_name'**
- 4) Check the **create new project directory** box
- 5) Click the **Next** button.

Templates



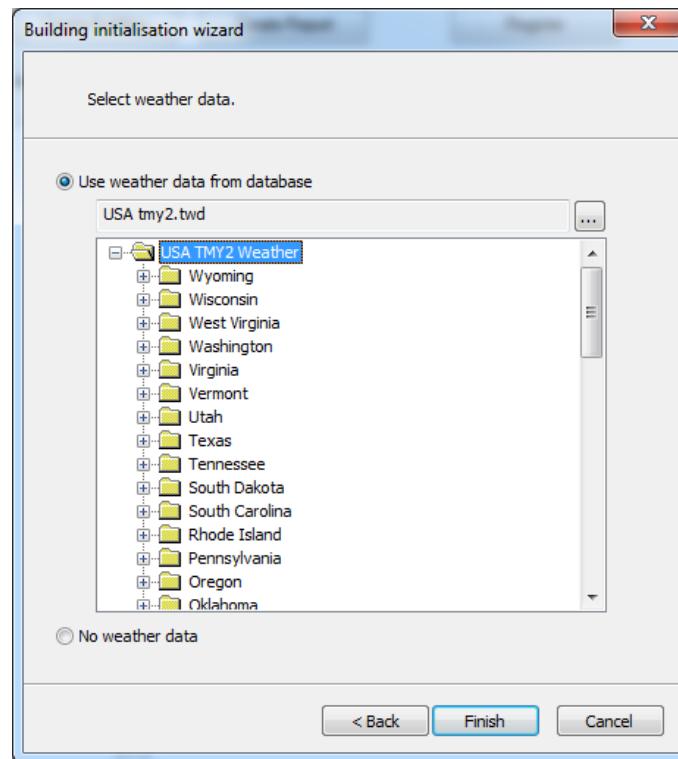
Key Points:

- Templates contain default constructions, internal conditions and a calendar. Zone sets will be generated based on the name of the internal conditions in the 3D Modeller file.

Exercise:

- 1) Use the **training template.tbt** template found in the data folder provided.
- 2) Click on the **Next** button.

Weather



Key Points:

- USA weather data is included with Tas, the data is obtained from the US government EnergyPlus website listed below.
- Weather data for locations across the world can be obtained from the Department of Energy's website for EnergyPlus, including many Canadian weather locations: <https://energyplus.net/weather>
- Another source of weather data is the program called Meteonorm: <http://meteonorm.com/>
- Data obtained from Meteonorm or from the EnergyPlus website will be in the EPW or TMY2 format which can be converted into Tas format by opening the Tas Weather database application and selecting "Import Weather Data".
- Once converted the data can be re-used on any project file. Tas allows users to create their own databases of data including for weather.
- The 3D model that is generated through the process will have its latitude, longitude and time zone set by the selected weather data.

Exercise:

- 1) Open the USA weather data database found in "...\\Tas Data\\Databases\\USA tmy2.twd".
- 2) Choose the New York – Central Park weather data
- 3) Click on the **Finish** button.

Building

The 'Building' dialog box is shown with the following fields and values:

- Name: Training 3D
- Description: (empty text box)
- North angle (degrees): 10
- Latitude: 40.78 °N
- Longitude: -73.97 °E
- Time Zone: UTC -5.0

Buttons: OK, Cancel

Key points:

- The orientation of the north angle (see North Angle in the 'Building' dialog box) can be altered at any time, even after the building has been drawn and the geometry has been exported to the Building Simulator.
- The Latitude, Longitude and Time Zone parameters are used for the shadow calculations performed in the Tas 3D Modeller application. These values displayed here have been read from the weather file and altering them is not recommended.
- There is no auto-save or file recovery option in Tas, so *you should save your work often*. You can also use CTRL+S to save.

Exercise:

- 1) Open the **Building** dialog box
- 2) Change the north angle to 10 degrees, clockwise from north.
- 3) Close the **Building** dialog box and save the model.

Storeys/Floors

Storeys

Col...	Name	Floor Level	Default Storey Height	Ground Floor	Used
	Ground Floor	0ft	11ft	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	First Floor	11ft	11ft	<input type="checkbox"/>	<input type="checkbox"/>
	Panel	22ft	11ft	<input type="checkbox"/>	<input type="checkbox"/>

Columns: ☐ Description

Buttons: New, New Above, Delete, Add Walls, OK, Cancel

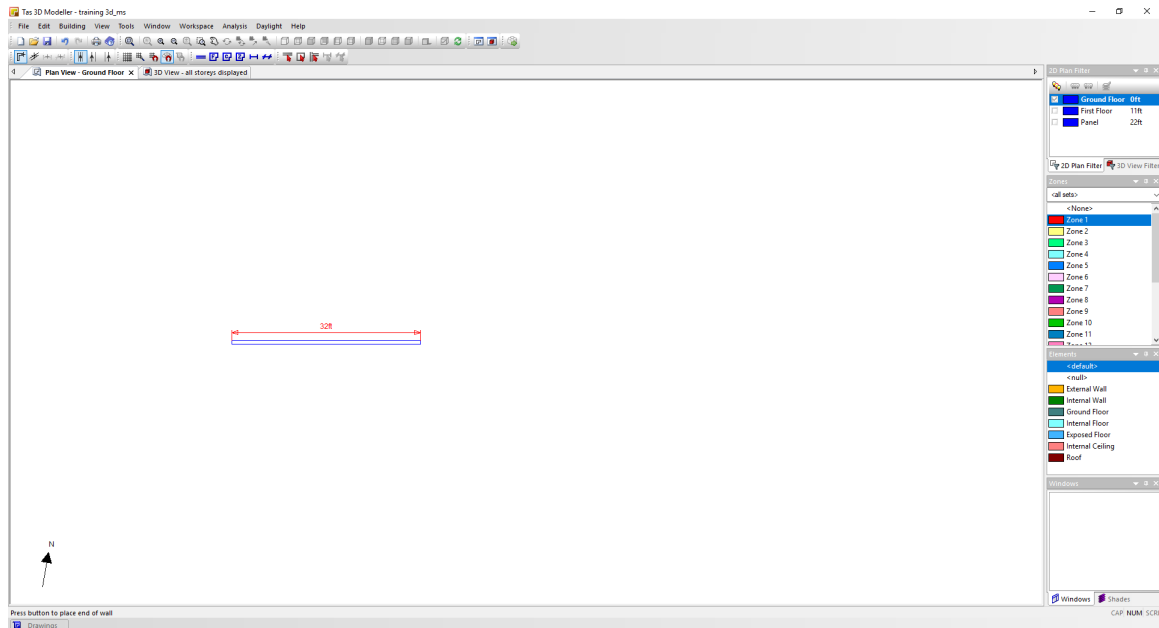
Key Points:

- Storeys/Floors can be added or removed at any stage in the development process.
- Removing a floor does not mean that other floor levels will change to accommodate the removal of the floor.
- The floor level is measured from the ground plane at datum 0.0m, not from sea level. Two or more floors can have the same level.
- A floor level can be negative, for example when modelling basements or underground car parks.
- The Default Wall Height dimension is measured from below the floor finish (e.g. below the carpet or tiles) to directly below the floor finish of the upper floor. If a constant value is assumed for the thickness of the finish it means that the default wall height can be thought as the floor-to-floor height.
- The “New Above” button generates a floor directly above the selected floor.
- The “Ground Floor” checkbox sets the default floor building element to “Ground Floor”. This should be done for floors that touch the ground.
- The “Create” button will open the “Copy New Floor” dialog box for copying walls between floors.

Exercise:

- 1) Open the **Storeys** dialog box.
- 2) Change the default wall height of the ground floor to 11ft.
- 3) Create a new floor called **First Floor**. Set Default Wall Height to 11ft. The level should be set so that **First Floor** sits directly above **Ground Floor**.
- 4) Create a new floor called **Panel**. Its default wall height is 11ft. The floor level should be such that **Panel** sits directly above **First Floor**.
- 5) Close the **Storeys** dialog box and save the model.

Drawing Walls



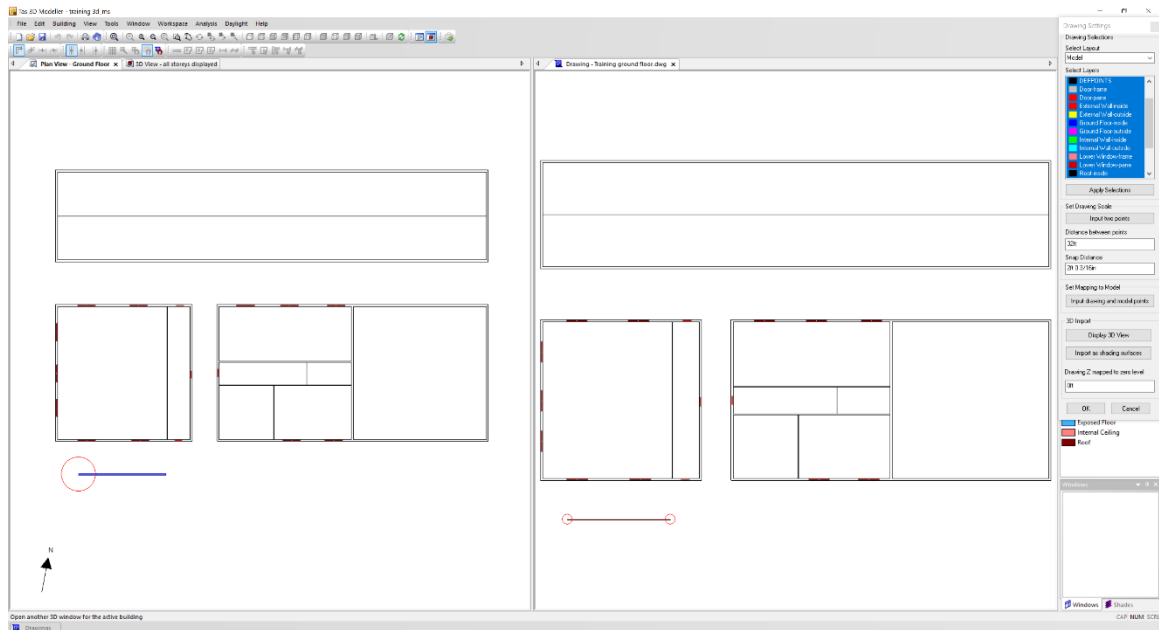
Key Points:

- Right clicking when drawing a wall, brings up a pop menu which includes options for setting the length, turning angle snap on/off etc.
- When drawing walls, keep Angle Snap *on* when possible.
- “Wall Centre” is the recommended wall alignment type.
- **<Null>** walls are non-physical dividing lines (or ‘construction lines’) used to partition and bound spaces that differ, for example: by zone, floor, ceiling construction, or slope...
- Tas cannot draw curved surfaces. You can approximate curves as a set of straight lines. A heuristic method of drawing a circle is to draw a 16 sided shape.

Exercise:

- 1) Draw a wall. Set the length of the wall to 32 feet.
- 2) Save the model.

Import Drawing



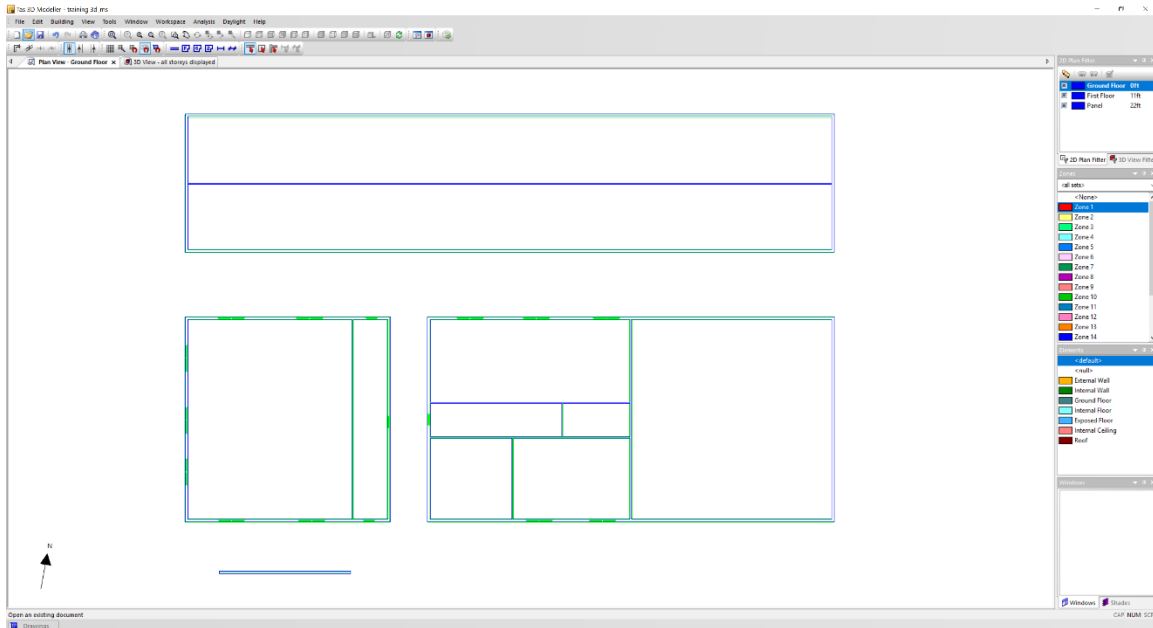
Key Points:

- Before importing a 2D DWG or DXF, the user should open the file in a CAD package and draw a 32ft line. This line will be used to set the scale in the 3D Modeller. You should also draw an unconnected 32 foot line in 3D Modeller.
- If the building has multiple DWGs, draw the line in the same place on each drawing. This is important to ensure the correct positioning of the DWG with respect to the model.
- While the DWG is open in the CAD package, select everything and copy to a new DWG to ensure the drawing is near the origin.
- Select everything in the DWG and then choose to explode or ungroup.
- If the DWG was not drawn on the XY plane, then use a rotate tool and save it on the XY plane.
- Remove any unnecessary layers, select the purge option and then save the file.
- To import a DWG after the model has been partially drawn requires the user to map the DWG to the existing model. This involves first selecting a point on the DWG and then selecting the identical point on what has already been drawn.

Exercise:

- 1) Click on the **Import Drawing** button as found in the **Drawings** tab.
- 2) Import the drawing file "Training Ground Floor.dwg". This file can be found data folder provided.
- 3) Drag the drawing tab towards the right-hand side to create a side-by-side as shown in the screenshot.
- 4) Set the drawing scale by clicking 'Input two points' and clicking both endpoints of 32ft line on the drawing and entering the 'Distance between points' as 32ft.
- 5) Map the drawing to the existing 32ft wall by clicking 'Input drawing and model points', selecting one end of the 32ft line on the drawing and then the corresponding end of the 32ft wall drawn in the Plan View.
- 6) Close the **Import Drawings** dialog box.
- 7) Display the drawing in the ground floor plan view. Change the display colour of the drawing to a bright green.
- 8) Save the model.

Drawing around the template



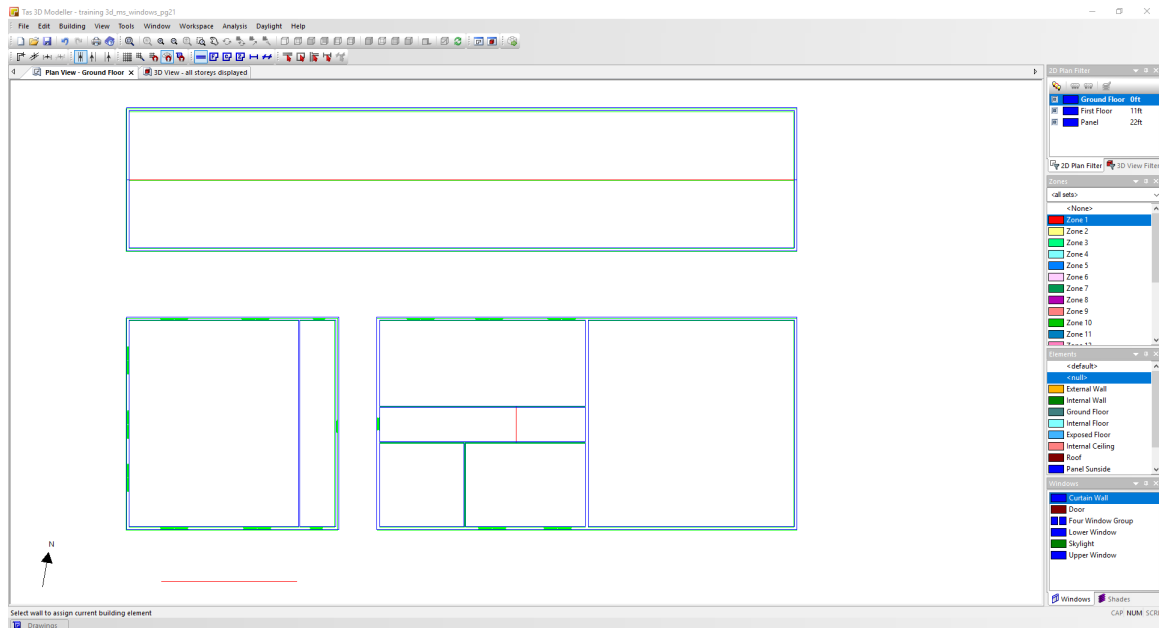
Key Points:

- There is an option to snap to drawing but is generally recommended that the option is *not* used.

Exercise:

- 1) Select **<default>** from the Elements
- 2) Draw the walls using the DWG file as a template.
- 3) Save the model.

Null Element



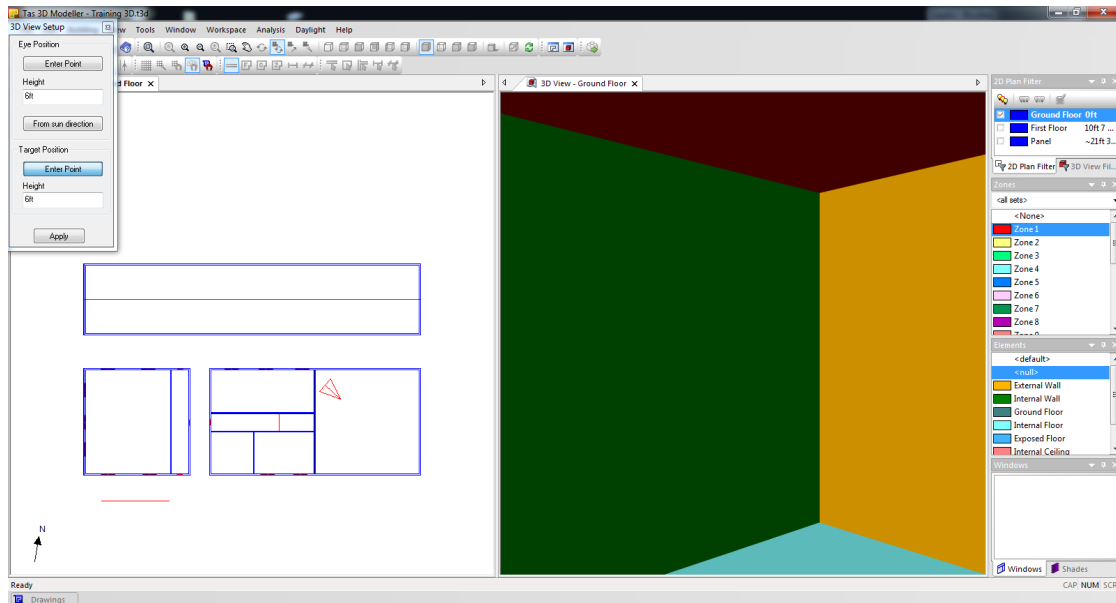
Key Points:

- The **<Null>** Building Element is a super-transparent construction that allows air/solar/light to go through it.
- When it is used as a wall, it is sometimes called a construction line.
- A space has one floor element, one ceiling element, up to one zone and one floor plane and one ceiling plane.
- If a room has multiple floor\ceiling element or planes or contains multiple zones, the room needs to be divided into multiple spaces.
- **<Null>** walls are used to divide rooms into multiple spaces.

Exercise:

- 1) Select **<Null>** from the **Elements** list.
- 2) Click on the **Set Wall Element** button.
- 3) Click on the 3 walls highlighted in the above drawing to change them into **<Null>** walls.
- 4) Save the model.

3D View



Key Points:

- The “New 2D Plan Window” and “New 3D Window” windows are used to generate additional views of the model. They are not used to return to an existing view. To do that, select an existing window from the Window menu or one of the open tabs.
- Fit All, Zoom In, Zoom Out and Pan are tools that can all be actioned with the mouse wheel.
- The Arrow keys on your keyboard can be used to walk around the inside of the model on a 3D window.
- Click Right-Shift on your keyboard to increase movement speed. Do not hold down the Right- Shift key as it will increase the speed excessively.
- Click the Backspace key to reduce movement speed. Again, do not hold down the Backspace key as it will decrease the speed excessively.

Creating Building Elements

Building Elements

Col...	Name	Thickness	Null	Ground	Transparent	Internal Shadows	Include sloping floor area	Type	Used
	Roof	1ft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Roof	<input type="checkbox"/>
	Internal Ceiling	1ft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Internal Ceiling	<input type="checkbox"/>
	External Wall	0ft 8in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	External Wall	<input checked="" type="checkbox"/>
	Internal Wall	0ft 3in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Internal Wall	<input type="checkbox"/>
	Panel Underside	0ft 0.040in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No Type	<input checked="" type="checkbox"/>
	Ground Floor	0ft 2in	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Slab on Grade	<input type="checkbox"/>
	Internal Floor	0ft 2in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Internal Floor	<input type="checkbox"/>
	Internal Floor/Internal Ceiling	0ft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Internal Floor	<input type="checkbox"/>
	Exposed Floor	0ft 2in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Exposed Floor	<input type="checkbox"/>
	Panel Sundside	0ft 0.040in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Solar/PV Panel	<input checked="" type="checkbox"/>

Columns: ☐ Description ☐ Secondary Elements ☒ Building Element Types

Buttons: New, Copy, Delete, Purge Unused, OK, Cancel

Key Points:










- The building element width is the thickness of the surface that affects the volume of the room. For example, the floor surface on the ground floor may be 1ft thick but the carpet is only 2in thick. The ground floor thickness in this table is 2in.
- The component width entered in this table does not affect the thermal mass or any thermo-physical property of the building element itself. It is the construction applied to the building element within the Tas Building Simulator module that affects these properties. This means the construction and building element widths do not have to match.
- By enabling the Ground checkbox and if this building element is exposed, then the external surface will be modelled as touching the ground. If the building element is used internally, then the Ground checkbox will have no effect on the results.
- The Transparent checkbox is for visualization only (Daylighting calculations are not covered in this training module). It is the construction applied to the building element within the Building Simulator module that determines if the surface is opaque or transparent.
- The Internal Shadows checkbox, if enabled, allows shadows to fall within the zone rather than on the transparent building element. It is recommended that this option is selected for transparent elements that are exposed to the outside (and required if performing daylighting calculations).
- The internal shadows option has no effect if applied to internal building elements.

Exercise:

- 1) Open the **Building Elements** dialog box.
- 2) Update the Building Element width to match the table above.
- 3) Create new building elements, as shown above. Change their widths to 0.04in and colors to match the table (the colors do not have to match exactly but the widths should do. Unit display settings can be altered in the Tas Manager > Settings dialogue). The new building elements are:
 - ***Panel Sunside***
 - ***Panel Underside***
- 4) ***Ground Floor, Internal Floor, Exposed Floor*** and ***Panel Underside*** should all include sloping surfaces in the floor area calculations.

Building Element Types

Building Elements

Col...	Name	Thickness	Null	Ground	Transparent	Internal Shadows	Include sloping floor area	Type	Used
	Roof	1ft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Roof	<input type="checkbox"/>
	Internal Ceiling	1ft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Internal Ceiling	<input type="checkbox"/>
	External Wall	0ft 8in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	External Wall	<input type="checkbox"/>
	Internal Wall	0ft 3in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Internal Wall	<input type="checkbox"/>
	Panel Underside	0ft 0.040in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No Type	<input type="checkbox"/>
	Ground Floor	0ft 2in	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Slab on Grade	<input type="checkbox"/>
	Internal Floor	0ft 2in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Internal Floor	<input type="checkbox"/>
	Exposed Floor	0ft 2in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Exposed Floor	<input type="checkbox"/>
	Panel Sunde	0ft 0.040in	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Solar/PV Panel	<input checked="" type="checkbox"/>

Columns: ☐ Description ☐ Secondary Elements ☒ Building Element Types

Buttons: New, Copy, Delete, Purge Unused, OK, Cancel

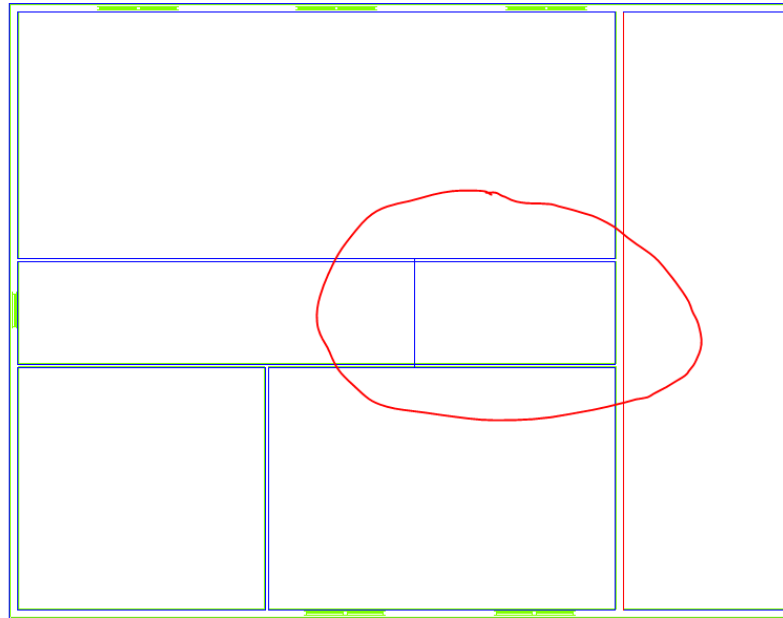
Key Points:

- Building Elements can have a Type assigned to them. This will then determine a template construction to be automatically assigned when the analysis model is generated.
- Constructions can be modified by the user at a later stage in the modelling process and you do not need to assign a type to all Building Elements.
- Window and shade types are assigned automatically. Window components are designated as 'Frame' and one of 'Glazing', 'Door' or 'Rooflight'. Opaque rooflights become 'Solar/PV Panel'.

Exercise(Optional):

- 1) At the bottom of the **Building Elements** dialog box, ensure that the **Building Element Types** checkbox is enabled.
- 2) Set up the **Types** to match those shown in the screenshot.
- 3) Close the **Building Elements** dialog box and save the model.

Assigning Building Elements to Surfaces



Key Points:

- When the **<Default>** building element is used, “External Wall” is applied to walls exposed to the outside and “Internal Wall” is applied to walls where neither surface is exposed. Similarly, floors will become Internal Floor/Exposed Floor and ceilings will become Internal Ceiling/Roof.
- This will be made explicit after exporting your geometry to the Building Simulator.
- When **<Null>** is applied to a ceiling or floor surface, the surface itself is removed from the space.
- Walls, floor and ceiling elements can be changed within the 3D view.
- When using the set building element option, one side of the wall is highlighted in red. The red line is the *outside* layer. If it is on the wrong side, right-click on the element and choose the Reverse Element option.
- Building elements can be applied to walls in three ways:
 - ‘Select’ a wall, right-click and edit the ‘Properties’
 - ‘Select’ a wall, right-click and ‘Set Building Element’ to whichever building element is selected in the Elements list
 - Choose a Building Element from the Elements list first and then use the ‘Set Wall Element’ tool to apply it to the wall with a single click
- Building elements can be applied to ceiling and floors in three ways:
 - ‘Select a space, right-click and edit the ‘Properties’.
 - Select a space right-click and edit and ‘Set Ceiling Element’ or ‘Set Floor Element’ to whichever element is selected in the Elements list.
 - Choose a Building Element from the Elements list first and the use the ‘Set Ceiling Element’ or ‘Set Floor Element’ tool to apply to the space with a single click

Exercise:

- 1) Assign ***External Wall*** to the walls that have a red line in the above picture.
- 2) Ensure that the red line for those walls is facing the eastern room (as pictured).
- 3) Set the ceiling of the circled space to **<null>**.
- 4) Save the model.

Windows and Doors

Windows

Col...	Name	Placement	Width	Height	Level	Transpare...	Internal Shadows	Frame Width	% Frame	Frame Percent...	Frame Depth	Used
	Curtain Wall	Full Wall Height	6ft 6in			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0ft 1 8/16in	<input type="checkbox"/>	8.65%	0ft 4in	<input type="checkbox"/>
	Upper Window	Wall	3ft 3in	1ft	6ft 3in	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0ft 1 8/16in	<input type="checkbox"/>	30.77%	0ft 4in	<input type="checkbox"/>
	Lower Window	Wall	3ft 3in	3ft 3in	3ft	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0ft 1 8/16in	<input type="checkbox"/>	14.79%	0ft 4in	<input type="checkbox"/>
	Skylight	Roof	5ft	5ft		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	~0ft 1 9/16...	<input checked="" type="checkbox"/>	10.0%	0ft 4in	<input type="checkbox"/>
	Door	Door	3ft	7ft 6in		<input type="checkbox"/>	<input type="checkbox"/>	0ft 1 8/16in	<input checked="" type="checkbox"/>	11.39%	0ft 4in	<input checked="" type="checkbox"/>



Key Points:

- Adding windows are a method of placing a building component within the area of an existing element. (Usually a glass pane and frame within a wall.) A window does *not* have to be transparent or even glass. (For example, a window can be used to model a louvre.)
- If two windows have different constructions, aperture, blind controls, or feature shading, then they must be different window types.
- Window and door dimensions must allow them to fit within the wall intended to house the components. The level must be greater than or equal to the floor surface width of the adjacent zone and the sum of the window level and height must be less than or equal to the difference between the wall height and ceiling surface width of the adjacent zone. The window cannot overlap any of these widths.
- The placement type “Door” means that the level is set to be slightly greater than the floor surface width. (An offset of 1mm will be used.)
- The placement type “Full Wall Height” will set the level to be equal to the floor surface width and the sum of the window level and height to equal the difference between the wall height and ceiling surface width.
- The window colour is used in both the 2D and 3D views.
- Roof window width represents its length in the x-direction.
- Roof window height is in the y-direction.

Exercise:

- 1) Open the **Windows** dialog box.
- 2) Enable the **Window Dimensions** and **Frame Dimensions** checkboxes to display the respective columns on the **Windows** dialog box.
- 3) Create the four windows and 1 door, as shown above.

Window Groups

Colour	Name	X Offset	Y Offset	Used
	 Four Window Group			<input type="checkbox"/>
	Upper Window	0ft	6ft 3in	
	Lower Window	0ft	3ft	
	Upper Window	3ft 3in	6ft 3in	
	Lower Window	3ft 3in	3ft	

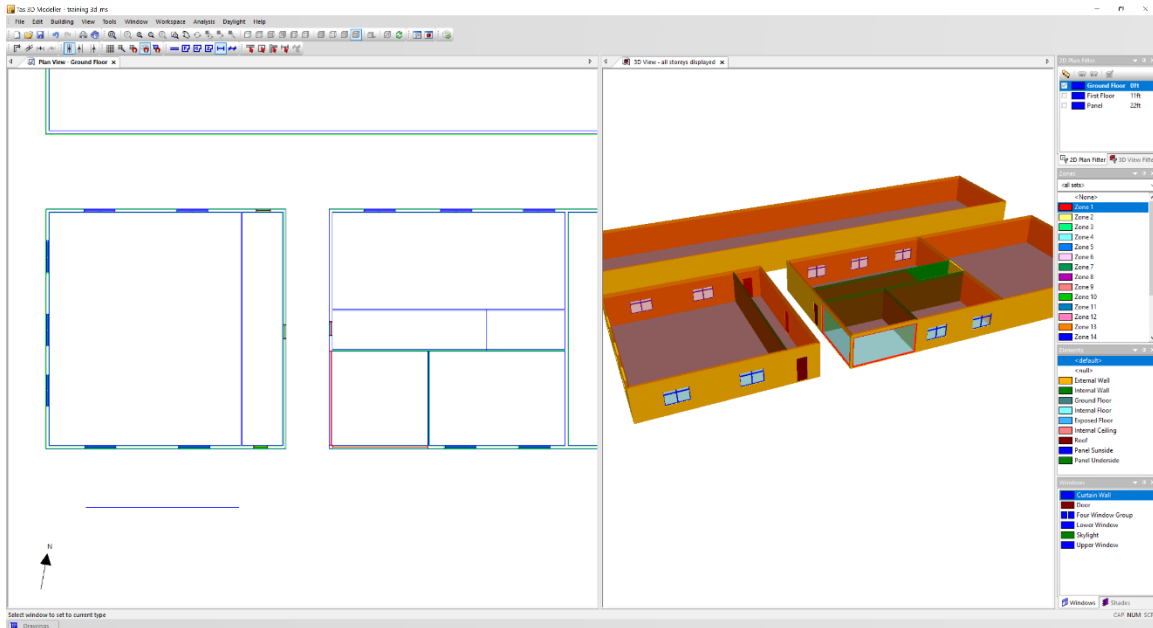
Key Points:

- Creating window groups defines a method of placing multiple windows or doors onto a model efficiently.
- To model a window positioned directly above another on the same floor level, a window group must be used.
- They can contain both windows and doors.
- They can contain other groups.
- They can contain both windows and doors that are not in contact with each other.
- Roof windows cannot be placed on the same group as wall or doors placement types.

Exercise:

- 1) Create a window group called **Four Window Group** it should contain two lower windows and two upper windows. The lower windows should be side-by-side as should the upper windows.
- 2) Close the **Windows** dialog box and save the model.

Adding Windows to Models



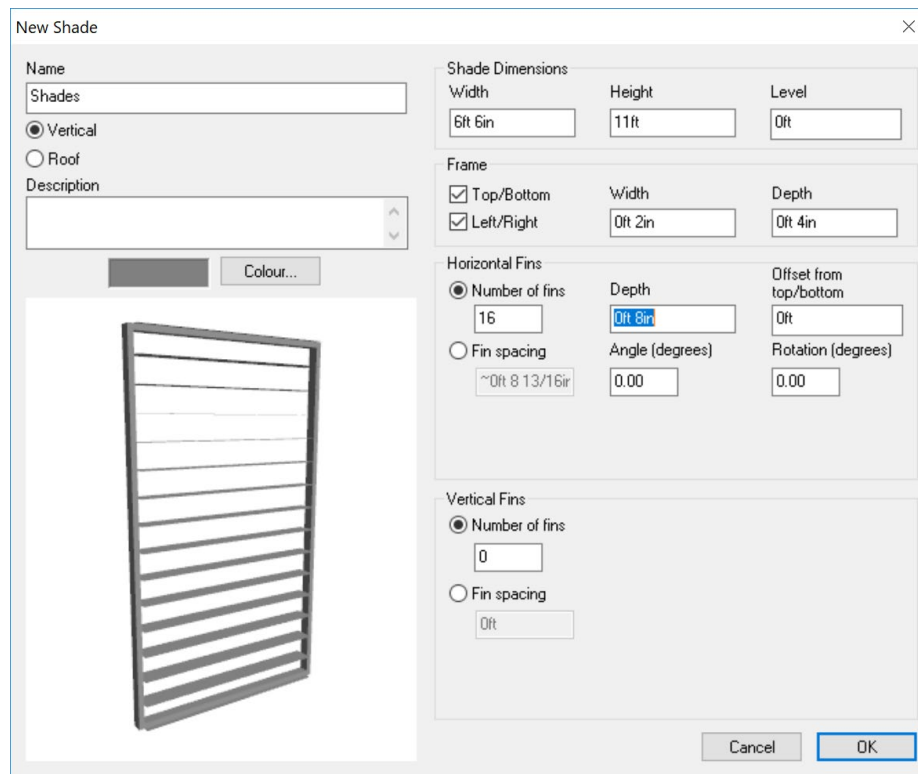
Key Points:

- Windows can be added, moved and deleted from a 2D Floors window.
- Windows can be stretched so that their width is as long as the wall they are applied to is. This is called “fit to wall”.
- Windows can be edited locally in a 2D plan view and existing windows can be replaced using the Set Window button on the toolbar, within a 3D Floors view.

Exercise:

- 1) Add the **Four window group** to the walls. They are blue.
- 2) Add 4 doors to the model. They are purple.
- 3) Add 2 Curtain walls to the model. They are highlighted in red in the above picture.
- 4) Set the curtain walls to fit to wall.
- 5) Save the model.

Creating Shades



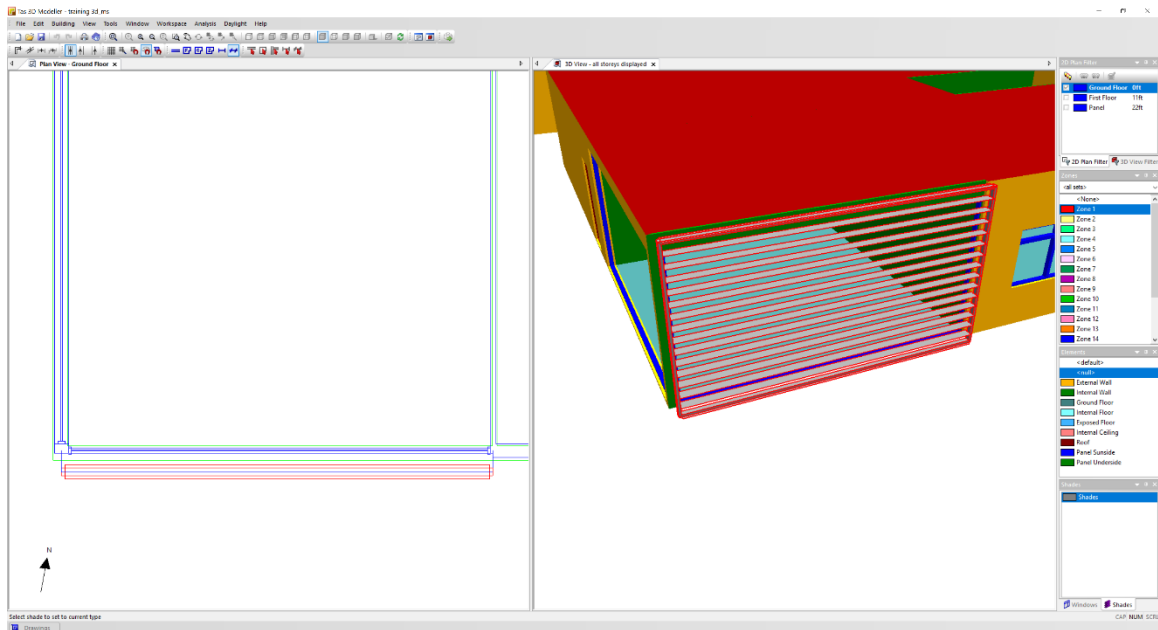
Key Points:

- Modelling external shades in a 3D model takes into account both direct and diffuse shading. (This is true also of Feature Shades which are set up numerically in the Building Simulator.)
- A shade configuration can be either “Vertical” or “Roof” and contain both horizontal and vertical shade elements, such as fins or slats.
- The shade elements can be rotated around their axis and from the frame.
- Horizontal fins, vertical fins, the left and right frame edges and the top and bottom frame edges can be made of different constructions.
- Shades follow the same rules regarding level and height as windows.
- Shade groups follow the same rules as window groups.

Exercise:

- 1) Open the **Shades** dialog box.
- 2) Create a grey vertical shade called **Shades**.
- 3) The shades should cover an area of 6ft 6in wide by 11ft high and should be at the floor height.
- 4) The shade has 16 horizontal fins. These fins are 8in deep. The fins are horizontal and have not been rotated.
- 5) The frame has a top and bottom edge and a left and right edge. The width is 2in and its depth is 4in.
- 6) Close the **Shades** dialog box and save the model.

Adding Shades to the Model



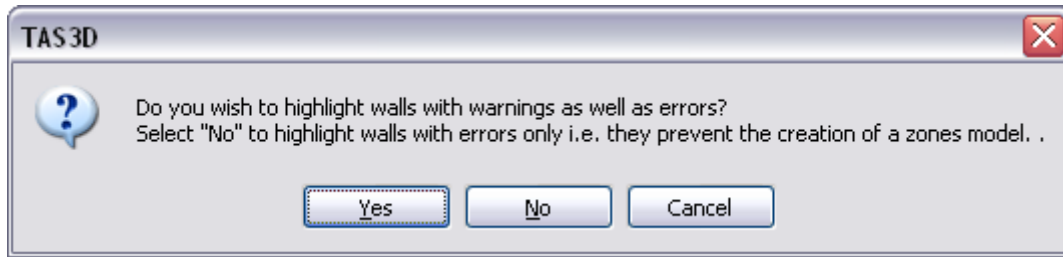
Key Points:

- Shades cannot be applied directly to the walls. They must be applied to a **<Null>** wall, which forms part of an external area connected to the building.
- This space is bounded by **<Null>** walls on its exposed surfaces. Its ceiling and floor surface are set to **<Null>** in order to remove them.
- The space should be assigned an external zone.

Exercise:

- 1) Using **<null>** walls, draw the space south of the curtain wall as shown in the drawing above. The short walls are 1ft long and the long wall is as long as the curtain wall.
- 2) Assign **<null>** to the ceiling and floor of that space.
- 3) Add a shade to the long **<null>** wall, fit it to the wall.
- 4) Save the model

Displaying Drawing Errors



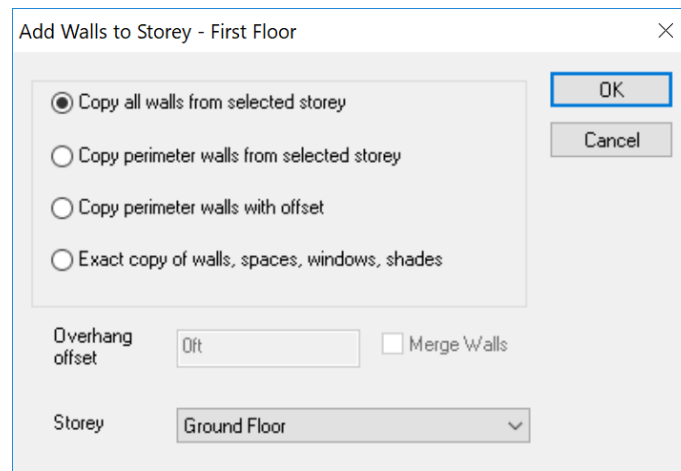
Key Points:

- The user can quickly validate a 2D floor plan by displaying any errors or warnings before further developing a model. On the View menu, click Display Errors. The dialog box shown above will open.
- Errors at this stage will prevent the model being displayed in a 3D Zones view and thus prevent the geometry being exported to the Building Simulator. For example, overlapping walls will cause an error.
- If a wall is less than 8in long, this can cause a warning. This is because 8in is the minimum snap distance. The user will still be able to export the model to the Building Simulator and the 3D Zones view will still properly display the model but the user may encounter issues when drawing walls near to the short walls and they might not correctly copy from one floor to another.
- If a wall causes an error or warning, its endpoints will be circled in black.
- The error check will not look at any other issue such as windows overlapping walls or intersecting spaces.

Exercise:

- 1) With a 2D Plan view active choose **Display Errors** from the **View** menu and then click Yes to display both errors and warnings.
- 2) Fix any problems that occur and re-check for errors.

Copying Floors



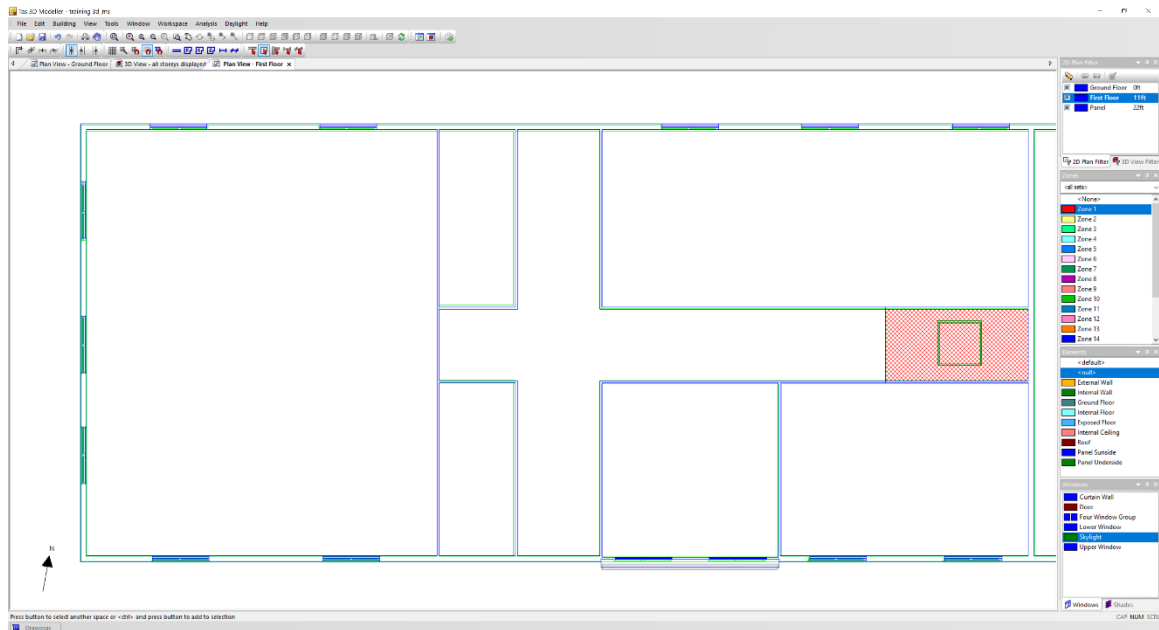
Key Points:

- The Create New Floor dialog box opens when an empty floor is selected from the Floors drop-down menu on the right-hand side of the main application window. It will not appear if something has already been drawn on that floor.
- When the “Copy all walls...” checkbox is enabled, the software will copy all walls, windows and shades from the floor selected in the dialog box.
- It will not copy the user-set floor or ceiling elements such as **<Null>** or Roof, the floor or ceiling height information or zones. It will use defaults instead.
- If “Copy perimeter walls with offset” is selected, the software will extend the perimeter walls by the distance set in the “Overhang offset” textbox and windows or shades will not be copied.
- A negative value can be entered in the “Overhang offset” field when copying perimeter walls. This will reduce the dimensions of the new floor with respect to the original floor.
- There are also options to copy a selection of walls, windows and shades *after* the initial floor has been drawn. (For example, “Copy to input floor”.)

Exercise:

- 1) Select the **First Floor** in the **2D Plan Filter** sidebar. This should open the **Create New Floor** dialog box.
- 2) Copy all walls from the **Ground Floor** to **First Floor**.
- 3) Save the model.

Drawing the First Floor

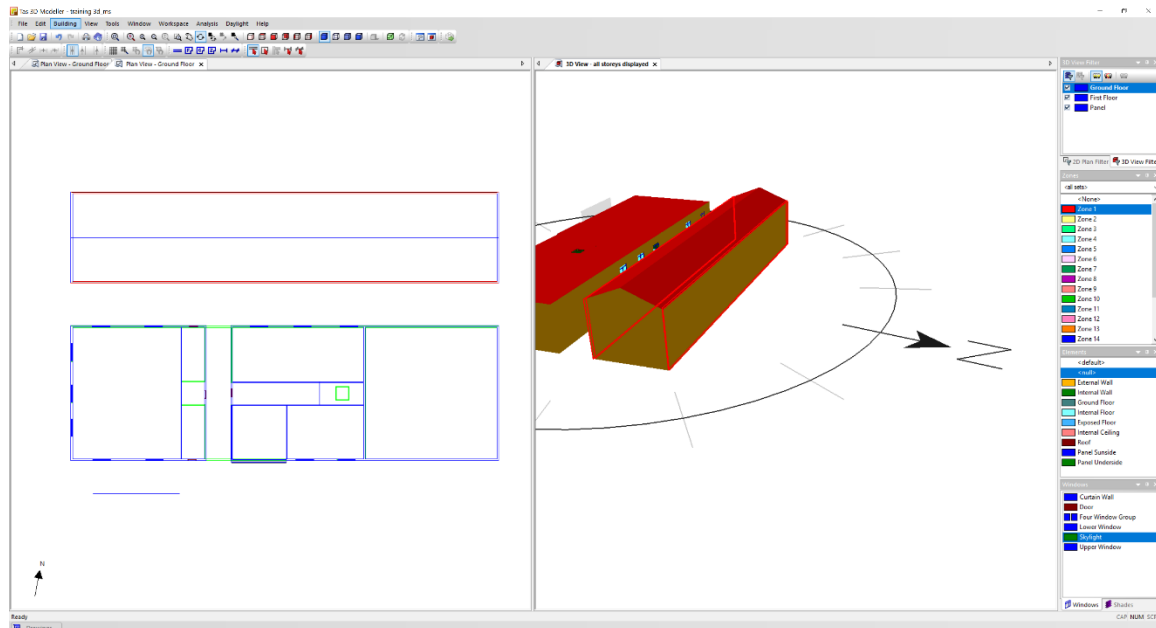


Exercise:

All the following changes should be made to the first floor only:

- 1) Delete all the walls of the northern building. Delete the **<Null>** walls of the external shade space.
- 2) Delete the southern curtain wall and add two of the **Four Window Group** in its place.
- 3) Delete the other curtain wall.
- 4) Delete all the doors.
- 5) Delete the shade and corresponding Null walls
- 6) Connect the top and bottom of the east and west buildings with **<Default>** walls.
- 7) Add two **<Default>** horizontal walls then delete two vertical walls in the area circled in the above picture.
- 8) In the space in red hatching in the above picture, set the floor to **<Null>**.
- 9) Add a skylight in the hatched space.
- 10) Save the model.

Setting Heights for Ceilings



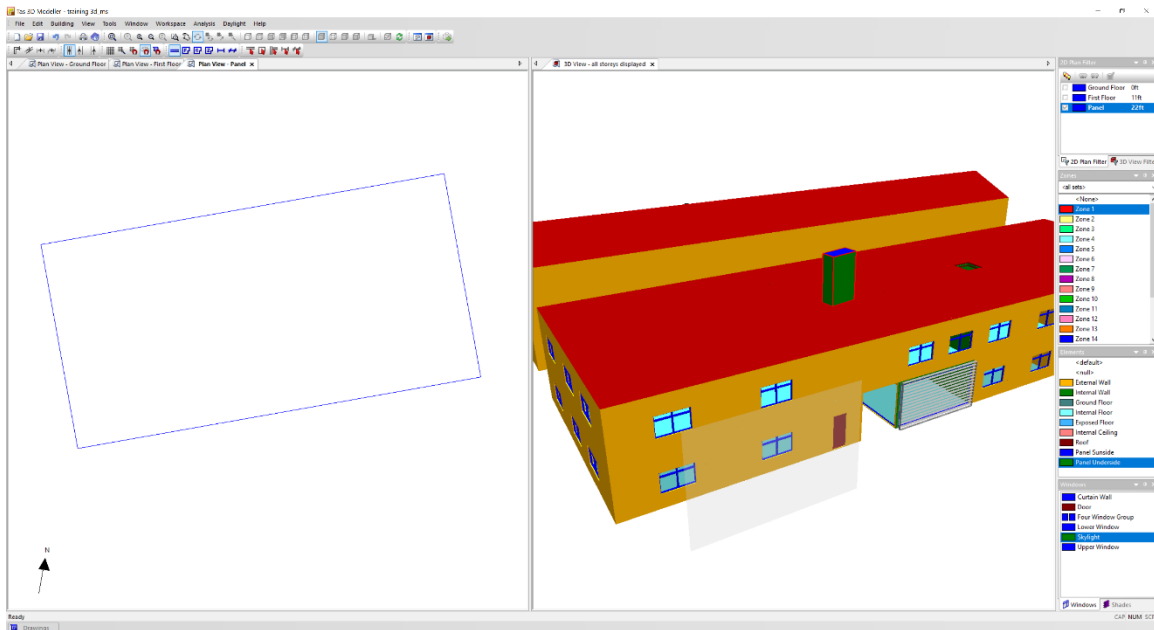
Key Points:

- Ceiling and Floor heights can be set for points, walls, and spaces.
- Heights can be set to the default value for the floor level; a user defined value or calculated using a plane.
- Ceiling heights default to the default value for the floor level, Floor heights default 0 metres above the height of the current floor.
- If the height of a wall or point is changed, Tas will slope the adjacent spaces accordingly.
- Tas can only create Euclidean planes, so if changing the height of a point or wall causes a non-Euclidean plane to be created, that surface will not appear in the 3D model and will generate a warning when exporting the model or viewing in analysis mode.

Exercise:

- 1) Select the **plan view- Ground Floor** tab
- 2) On the ground floor:
 - a. Set the ceiling height of the north and south wall of the northern building to 26ft 3in.
 - b. Set the ceiling height of the central **<Null>** wall of the southern building to 32ft 10in.
- 2) Save the model.

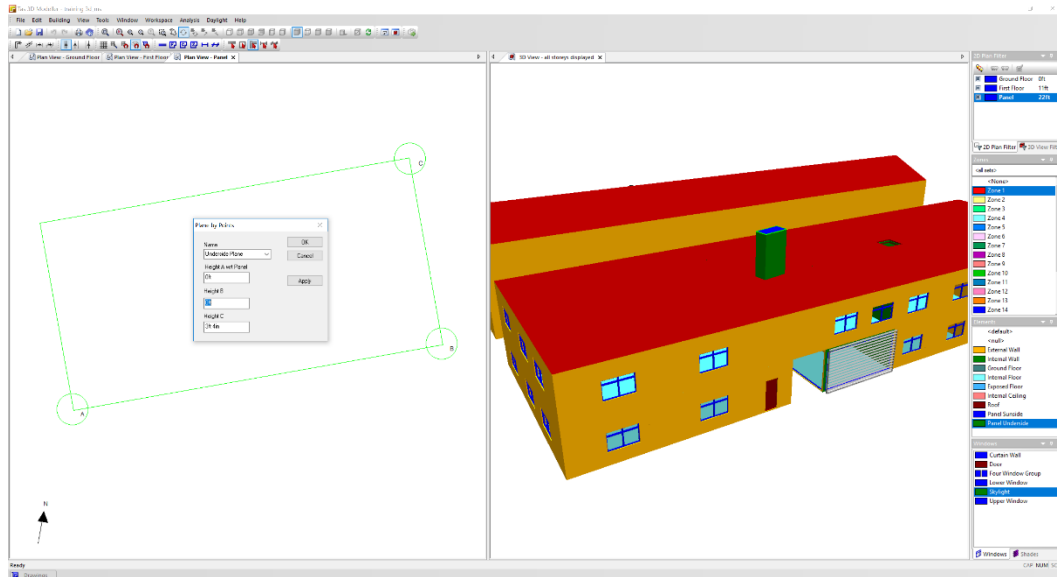
Snapping to the drawing



Exercise:

- 1) In the **2D Plan Filter**, select **Panel** and click **Cancel** on the subsequent dialog box. This should create a new 2D Plan View of the **Panel** floor without copying any existing walls from the **Ground Floor** or **First Floor**.
- 2) Import the "Training Panel Level.dwg". This file can be found in your "\Tas Data\Training Files" directory.
- 3) Set the drawing scale in the same way as with the previous drawings and map to the 32ft line on either the **Ground Floor** or **First Floor**.
- 4) Display the DWG on the **Panel** floor to use as a template for tracing.
- 5) Turn Angle Snap **OFF** and turn Snap to Drawing **ON**.
- 6) Use the **Panel Underside** building element to draw all four sides of the panel.
- 7) Set the floor to **Panel Underside** and set the ceiling to **Panel Sunside**.
- 8) Turn Angle Snap **ON** and turn Snap to Drawing **OFF**.
- 9) Save the model.

Sloping Floors

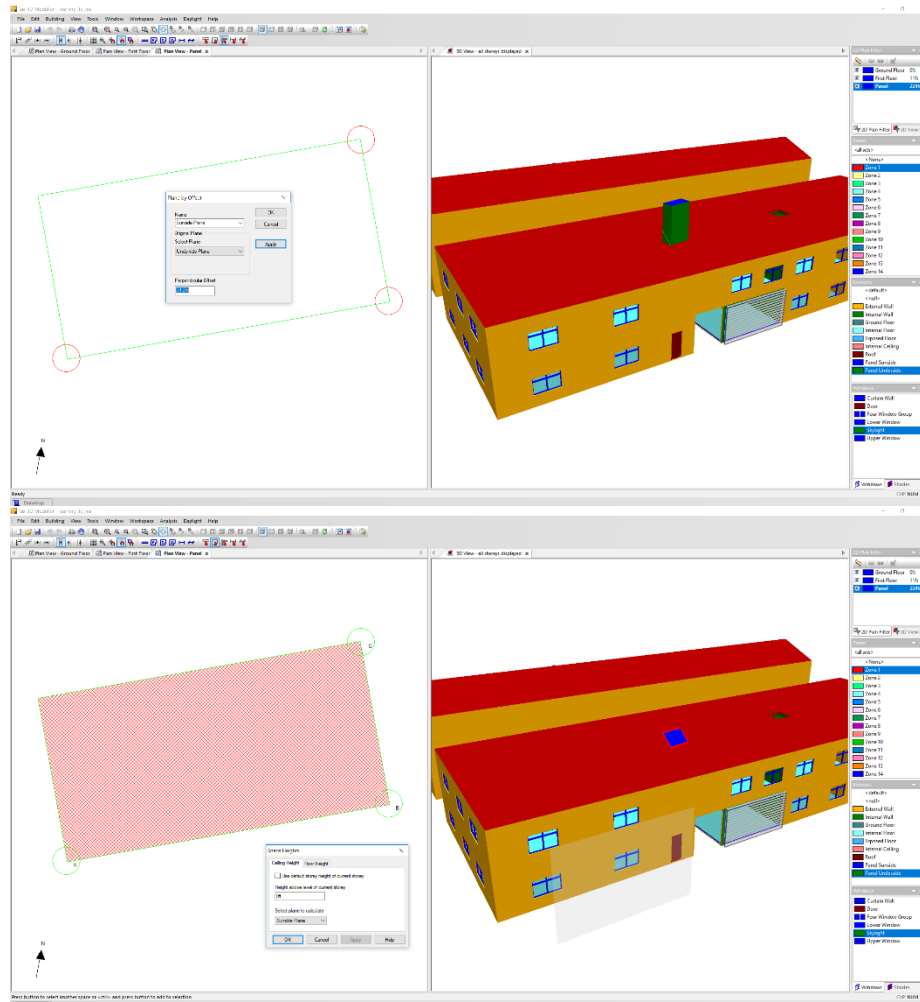


Key points:

- There are three ways of creating planes in the 3D Modeller: by selecting three points on an existing space; by selecting a wall and setting the inclination or by using offsetting from another plane.
- Once the plane is generated it can be applied in order to set the height of a ceiling or floor surface. If the plane is redefined or deleted, then the height of the ceiling or floor surface to which it was originally applied does *not* change.
- Planes cannot be used to directly slope walls. To model a sloped wall, apply a plane to a ceiling or floor surface then apply a suitable wall element.
- Planes are infinite in scope and can be applied to levels other than from the one it was generated.
- Tas models Euclidean planes and not curved surfaces. For curved roofs, facet the roof using **<Null>** walls.

Exercise:

- 1) Select 3 corners of the panel, the two southern points and the south-western point. The order you select them determines which point is called A, B and C.
- 2) Use **Tools -> New 3D Plane -> By points...** to create **Underside Plane**. This 3D plane should pass through the southern points (A and B in the diagram) at a height of 0ft and the south-western point (C) at a height of 3ft 4in.
- 3) Use **Tools -> New 3D Plane -> Offset...** to create **Sunside Plane**. This plane should be offset by 2in from the original Underside Plane.
- 4) Select the panel space and modify its height as follows:
 - a. The ceiling height should follow the **Sunside Plane**.
 - b. The floor height should follow the **Underside Plane**.
- 5) Save the model.



Zones and Zone Sets

Zones

	Colour	Name	External	Used
		Toilets	<input type="checkbox"/>	<input type="checkbox"/>
		Toilets 1	<input type="checkbox"/>	<input type="checkbox"/>
		Toilets 2	<input type="checkbox"/>	<input type="checkbox"/>
		<i>Plant</i>	<input type="checkbox"/>	<input type="checkbox"/>
		Circulation	<input type="checkbox"/>	<input type="checkbox"/>
		Circulation 1	<input type="checkbox"/>	<input type="checkbox"/>
		Circulation 2	<input type="checkbox"/>	<input type="checkbox"/>
		Circulation 3	<input type="checkbox"/>	<input type="checkbox"/>
		Circulation 4	<input type="checkbox"/>	<input type="checkbox"/>
		Store	<input type="checkbox"/>	<input type="checkbox"/>
		Store 1	<input type="checkbox"/>	<input type="checkbox"/>
		Office	<input type="checkbox"/>	<input type="checkbox"/>
		Office 1	<input type="checkbox"/>	<input type="checkbox"/>
		Office 2	<input type="checkbox"/>	<input type="checkbox"/>
		Office 3	<input type="checkbox"/>	<input type="checkbox"/>
		Office 4	<input type="checkbox"/>	<input type="checkbox"/>
		Office 5	<input type="checkbox"/>	<input type="checkbox"/>
		Office 6	<input type="checkbox"/>	<input type="checkbox"/>
		Office 7	<input type="checkbox"/>	<input type="checkbox"/>
		Office 8	<input type="checkbox"/>	<input type="checkbox"/>
		Office 9	<input type="checkbox"/>	<input type="checkbox"/>
		Office 10	<input type="checkbox"/>	<input type="checkbox"/>
		Office 11	<input type="checkbox"/>	<input type="checkbox"/>
		Office 12	<input type="checkbox"/>	<input type="checkbox"/>
		Office 13	<input type="checkbox"/>	<input type="checkbox"/>
		Office 14	<input type="checkbox"/>	<input type="checkbox"/>
		Office 15	<input type="checkbox"/>	<input type="checkbox"/>
		Office 16	<input type="checkbox"/>	<input type="checkbox"/>
		Office 17	<input type="checkbox"/>	<input type="checkbox"/>
		Unoccupied and Unconditioned	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		SHW Panel	<input type="checkbox"/>	<input type="checkbox"/>
		External	<input checked="" type="checkbox"/>	<input type="checkbox"/>

New Zone Set

Number

Add Multiple Zones

Colour
Variation ▼

Set Colour

Add Zone

Delete

Purge Unused

Reset to Spaces

OK

Cancel

Tags

Filter
Add
Remove
Clear

Columns: ☐ Description

Key Points:

- The zoning process should create a set of zones which are distinguished from all others in contact with it by differences in one or more of the following:
 - a. The Activity (Internal Condition) applied to it.
 - i. The lighting system which serves it.
 - b. The HVAC system which serves it.
 - c. The access to daylight (through windows and rooflights).
- To create these zones:
 - a. Divide the floor plates into separate areas bounded by structural walls or other permanent elements.
 - b. If any part of the area is serviced by a significantly different HVAC or lighting system, separate those areas using "Null" walls.
 - c. Use "Null" walls to create spaces that are bounded by fenestration with a similar glazing ratio, light transmittance and orientation. This means that where there is a benefit from daylight linked controls (manual or automatic) a given lighting zone should not extend beyond 20 feet from the perimeter.
- Do not set the same zone for two spaces that are not contiguous.
 - Never use the same zone in two spaces, creates cross-ventilation where it should not exist.
- A space can be sub-divided vertically into different zones. These zones will have to appear on different floor plans.
- If buildings have been drawn on a model for shading purposes, then those areas do not need to be zoned. They will still shade the zoned areas.
- If a wall of a zoned area is in contact with an unzoned area, it is modelled as being adiabatic (e.g. no heat loss to unzoned areas).
- When using templates, Internal conditions are applied to zones based on the zone set name so do not alter those names.

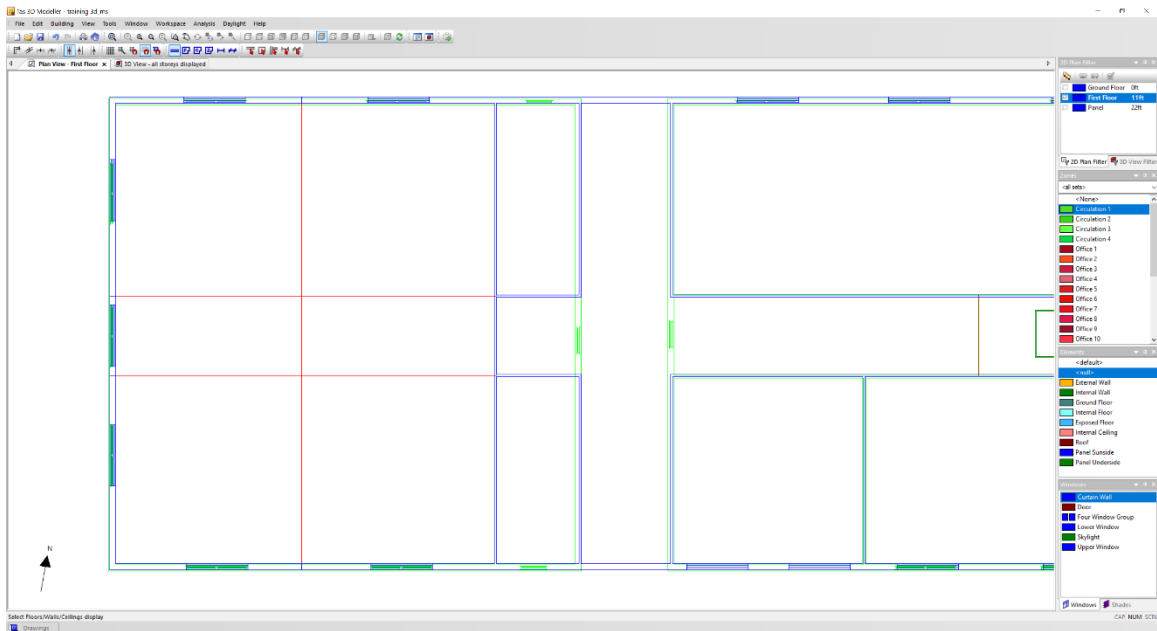
Exercise:

- 1) Open the **Zones** dialog box.
- 2) Delete the default zone set called "Zone" (contains 20 zones).
- 3) Add zones to the other zone sets according to the following table. Set the zone colours in each set to be a variation of the colour indicated in the table.

Zone Sets	No. of Zones	Colour
Office	17	Red
Circulation	4	Green
Store	1	Yellow
Toilet	2	Blue
Unoccupied and Unconditioned	2	Purple

- 4) Rename the 2 zones in **Unoccupied and Unconditioned** to **SHW Panel** and **External**.
- 5) Set **External** to be an external zone.
- 6) Close the **Zones** dialog box and save the model.

Adding a perimeter line

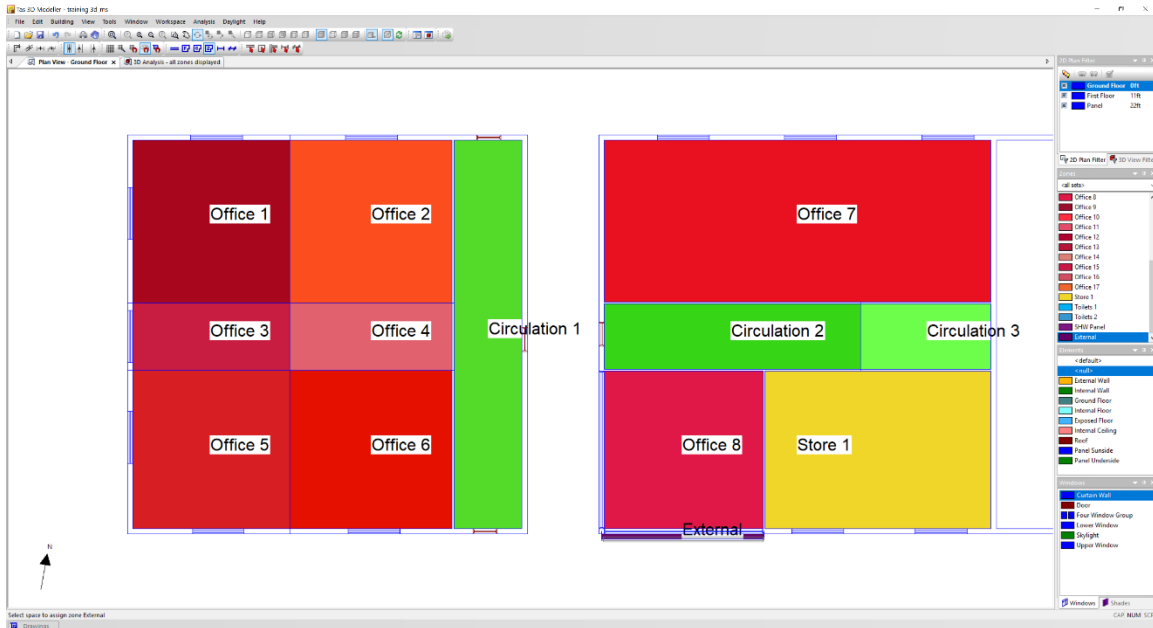


Exercise:

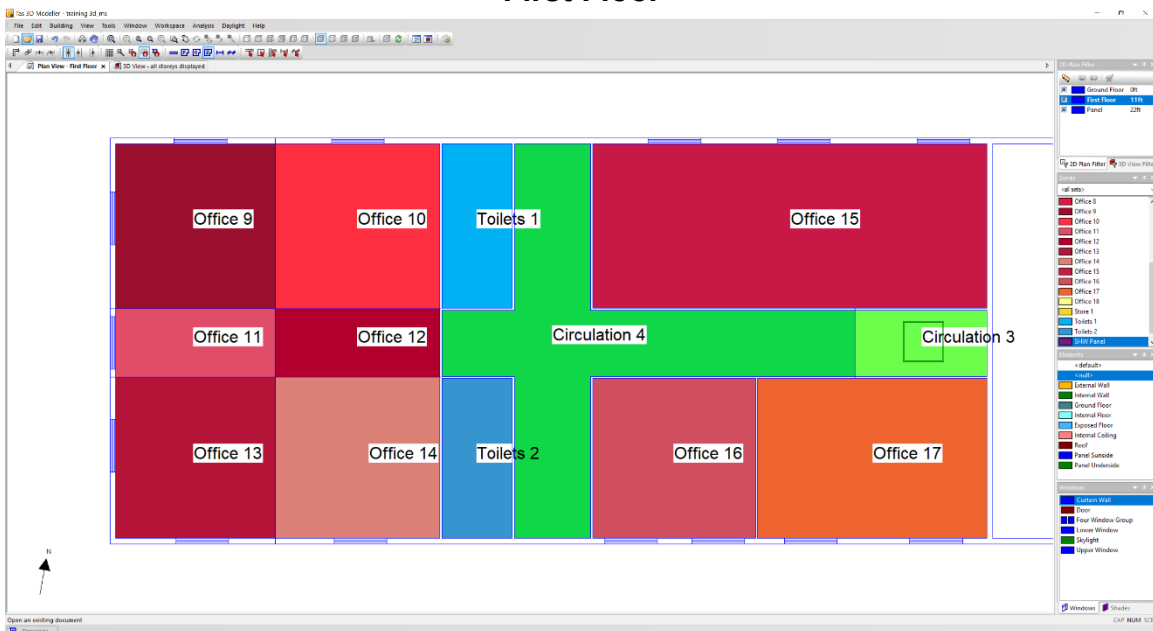
- 1) On the first floor, draw the **<Null>** walls shown in red in the above picture. The vertical **<Null>** should be 20ft from the western wall. The horizontal **<Null>** walls should be drawn as continuations of the respective, nearby short **<Default>** walls.
- 2) Select all of the newly drawn **<Null>** walls and copy them to the ground floor
- 3) Save the model.

Assigning Zones to Spaces

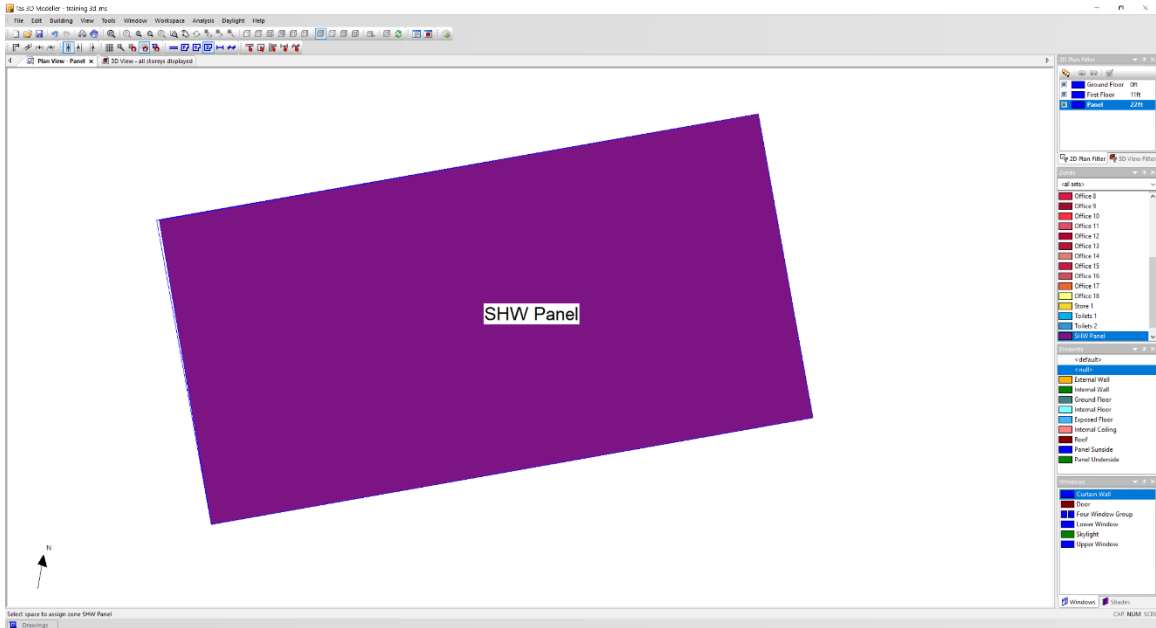
Ground Floor



First Floor



Panel



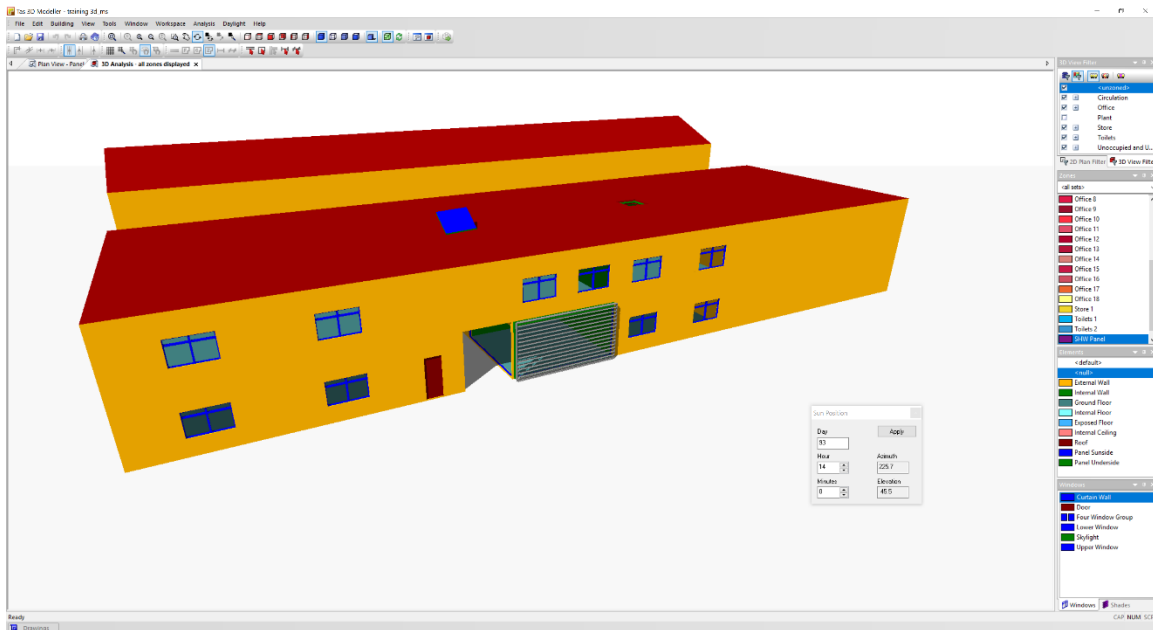
Key Points:

- Zones can be set in both a 2D and 3D floor view.
- Zone colours only appear in the 2D view when the “Set Zone” button on the toolbar is depressed.
- Holding the 'Alt' key while applying a new zone will automatically select (or create) the next zone in the zone set.
- To unzone a space, select the <None> option from the Zones drop-down list on the right-hand side of the main application window and apply it to the space.
- The font size for the zone names can be altered

Exercise:

- 1) Display zones by their colours and names.
- 2) Zone the model as per the screen shots. Note that **Circulation 3** is used on both the ground floor and the first floor.
- 3) Save the model.

3D Analysis



Key Points:

- Switching to the Analysis view carries out the same error checking as exporting the model.
- If any errors or warnings are found, a dialog box will open.
- Errors are problems that prevent the model from being generated.
- Warnings are problems that do not prevent the 3D Modeller from generating the building, but which may have an impact on your results.
- When checking errors and warnings, you must check all warnings and determine their effect on your results. If the effect is likely to be significant, then amend the geometry to remove the warning. Do **NOT** ignore warnings!
- Errors and warnings can be checked at any time. It is recommended that you check for errors and warnings through out the entire creation process and not just at the end.
- If you update your geometry, then the 3D Analysis view will not automatically be updated. You must refresh the view with Ctrl+R or the Refresh button.

Exercise:

- 1) Display the 3D model and enable **Analysis Mode**. if any errors or warnings are found, amend the model and refresh the analysis view.
- 2) Display shadows for day 93, hour 14.
- 3) Open the zone dialog box and purge unused zones
- 4) Save the model.
- 5) Close the model.