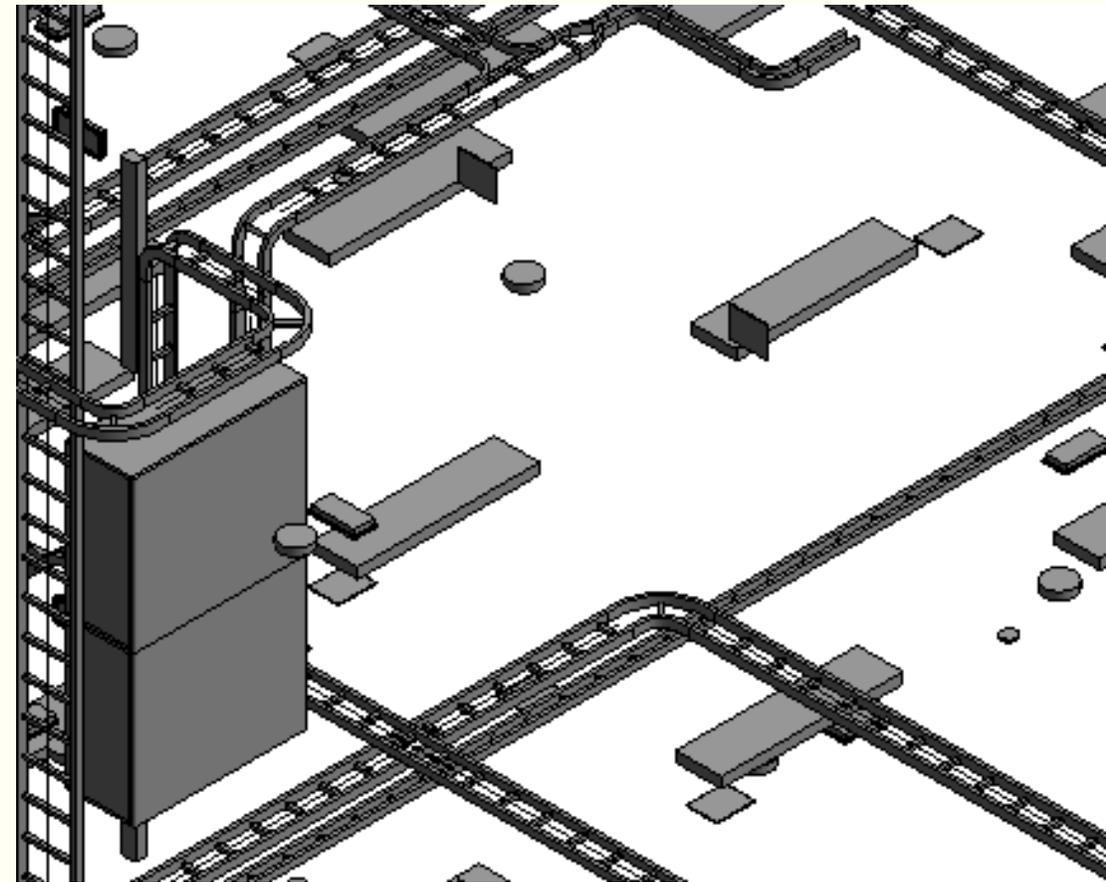




ASAS PENGGUNAAN BIM DALAM PELAKSANAAN PROJEK ELEKTRIK

1 - 3 NOVEMBER 2021



TENAGA PENGAJAR UBIM:

Ir. AHMAD SYUKRI BUKHARI

NAHZIATUL SHIMA ISMAIL

NUR ATIRA AMRAN



3. STARTING NEW ELECTRICAL PROJECT

- a. Loading Families
- b. Tools for placing families
- c. Placing Loadable Families (ceiling based)
- d. Placing Loadable Families (wall based)
- e. Placing System Families (Cable Tray & Conduit)

STARTING NEW ELECTRICAL PROJECT

- Electrical projects are typically created using linked architectural models. Revit provides tools that support typical Electrical workflows and tasks.

- Sub-topic under starting new Electrical project are as below:
 - a. Loading Families
 - b. Tools for placing families
 - c. Placing Loadable Families (ceiling based)
 - d. Placing Loadable Families (wall based)
 - e. Placing System Families (Cable Tray & Conduit)

STARTING NEW ELECTRICAL PROJECT

a) Loading Families

Loadable families are created in external RFA files and imported (loaded) in your projects. Because of their highly customizable nature, loadable families are the families that you most commonly create and modify in Revit.

Family Libraries

- Revit includes a library of content in which you can access loadable families that are supplied by the software and save the families that you create
- When you load families into a project, the Revit family library is accessed by default. If the required components for electrical component do not exist in your project, you can load the families from the library

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Identifying families

When you load families into a project, you should identify the family in the Revit family library.

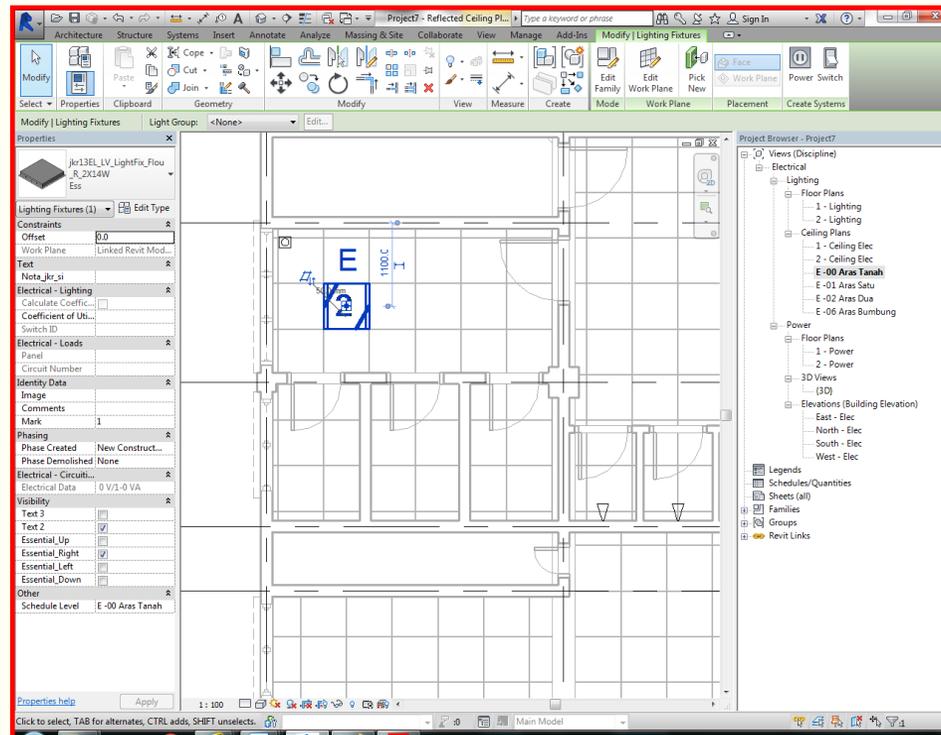
To load families

1. Click Insert tab > Load from Library panel >  (Load Family)
2. In the Load Family dialog, double-click the category of the family that you want to load that you identified the families before
3. Select the required family (**jkrEL16_LV_lit-fix_-3_flou_r_aplr_2X14W_E.rfa**)
4. Click Open button
5. The family type is now available to place in the project

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To load families (Cont')

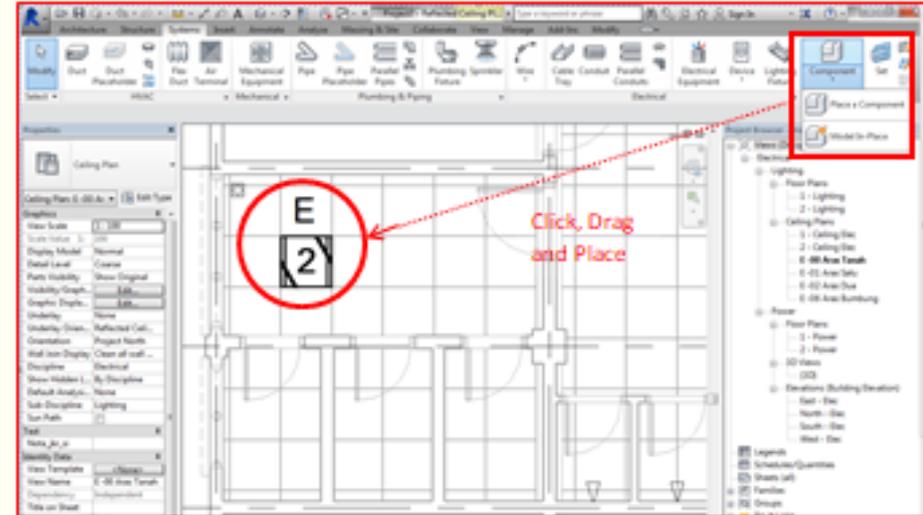
6. After you load a family into a project, it is saved with that project



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To viewing family in a project

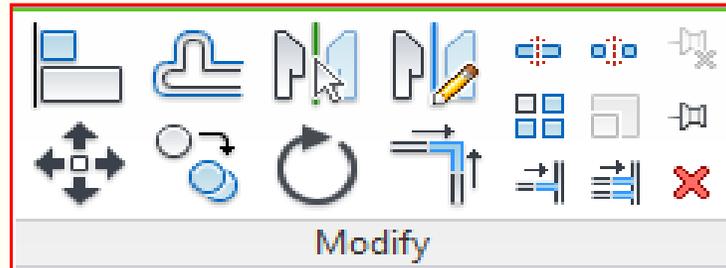
1. In the *System* tab > Model panel, expand **Component**, click  (Place a Component)
2. Drag the cursor to your drawing area
3. Place the selected family into the ceiling layout in the drawing area by click the family once



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b) Tools for placing families

- Revit Electrical software contains controls and temporary dimensions that enable you to edit elements. Additional modifying tools can be used with individual elements or any selection of elements. They are found in the Modify tab > Modify panel and in contextual tabs



- You can either select the elements start the command, or start the command select the elements and press <Enter> to finish the selection set.

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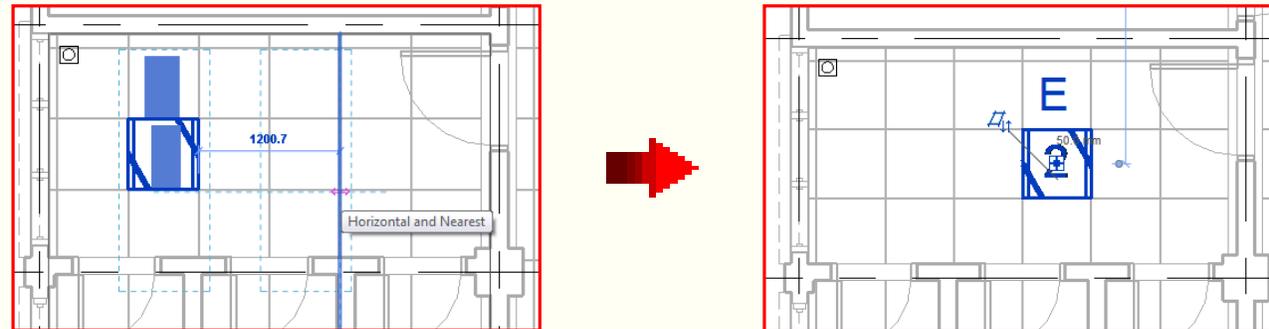
Moving and Copying Elements

- The Move or Copy commands enable you to select the element(s) and move or copy them from one place to another. You can use alignment lines, temporary dimensions and snaps to help place the elements
- The move tool works similarly to dragging. However, it offers additional functional on the Option Bar and allows more precision placement
- The copy tool copies one or more selected elements and allows you place copies in the drawing immediately. Use the copy tool when you want to copy a copy a selected element and place it immediately

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To Move an elements

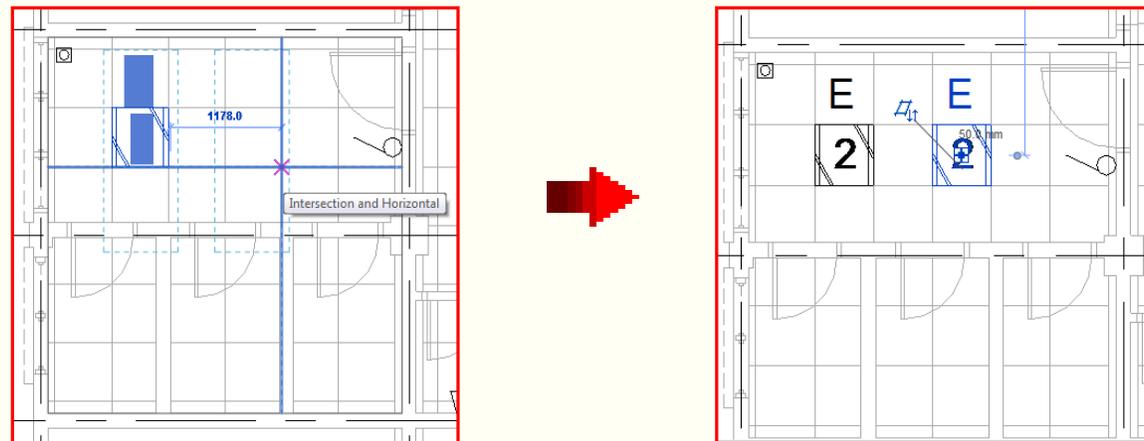
- Select the elements that you want to move, and then click Modify | <Element> tab, Modify panel, click  (Move). A boundary box displays around the selected elements. Select the elements to move
- Click once to enter start point for moving or near the element. Move the cursor in the direction that you want the element to move. The cursor snaps to snap points.
- Click again to complete the move or for more precision type a value for the distance to move the element and press <Enter>
- Use alignment lines and temporary dimensions to help place the elements. Press <Esc> to and the command



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To Copy an elements

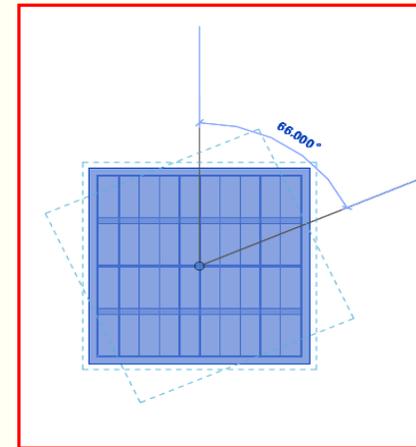
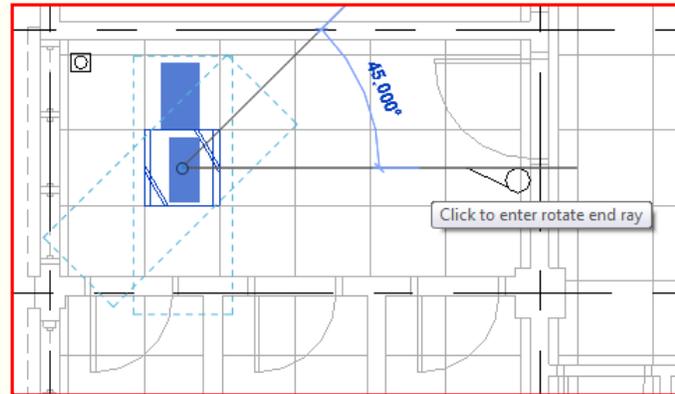
- Select the elements that you want to copy, and then click Modify | <Element> tab, Modify panel, click  (Copy). Select the elements to copy and then press <Enter>
- Click once in the drawing area to begin moving and copying the elements
- Move the cursor away from the original elements and toward the area where you want to place a copy
- Click to place the copy or enter a value for the dimension
- Continue placing more elements or press <Esc> to exit the Copy tool



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Rotating Elements

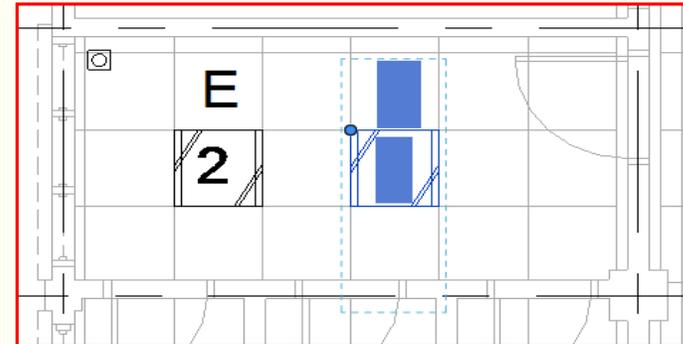
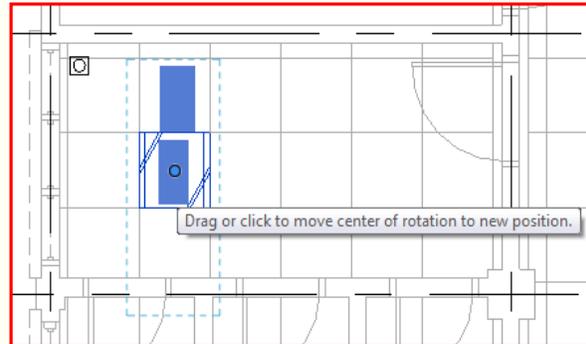
- The rotate command enables you to rotate selected elements around a center point or origin. You can also create copies of the element that is rotated.
- In floor plan, reflected ceiling plan, elevation and section views, elements rotate around an axis perpendicular to the view. In 3D views, the axis is perpendicular to the work plane of the view.



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To Rotate an elements

- Select the elements that you want to move, and then click Modify | <Element> tab, Modify panel, click  (Rotate. Select the elements to rotate and then press <Enter>
- A center of rotation control  displays at the center of the selected element
- The origin is automatically set to the center of the element or group of elements

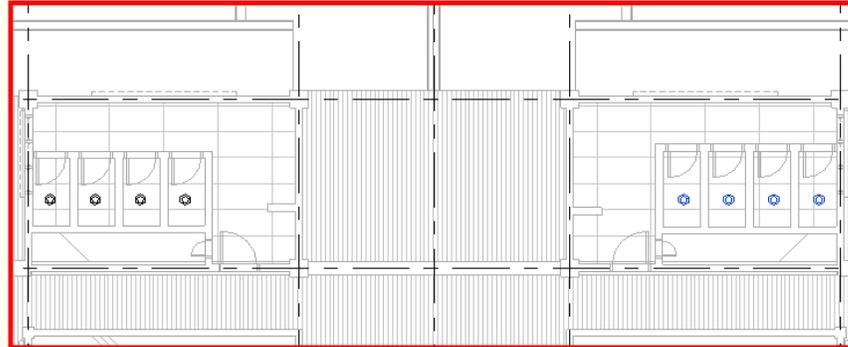


- Click to specify the start ray of rotation
- Move the cursor to place the end ray of rotation
- Click to place the end ray and finish rotating the selection

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Mirror an elements

- The Mirror tool reverses the position of a selected model element, using a line as the mirror axis. You can pick the mirror axis or draw a temporary axis.
- **Mirror - Pick Axis** prompts to select an element as the Axis of Reflection (mirror line)
- **Mirror - Draw Axis** prompts to select two points to define the axis about which the elements mirror



To mirror an element

- a. Select the elements that you want to mirror, and then click Modify | <Element> tab, Modify panel, click  (Mirror – Pick Axis) or  (Mirror – Draw Axis)
- b. Select or draw the line to use as a mirror axis. You can pick only a line or a reference plane that the cursor can snap to. You cannot mirror an element around empty space

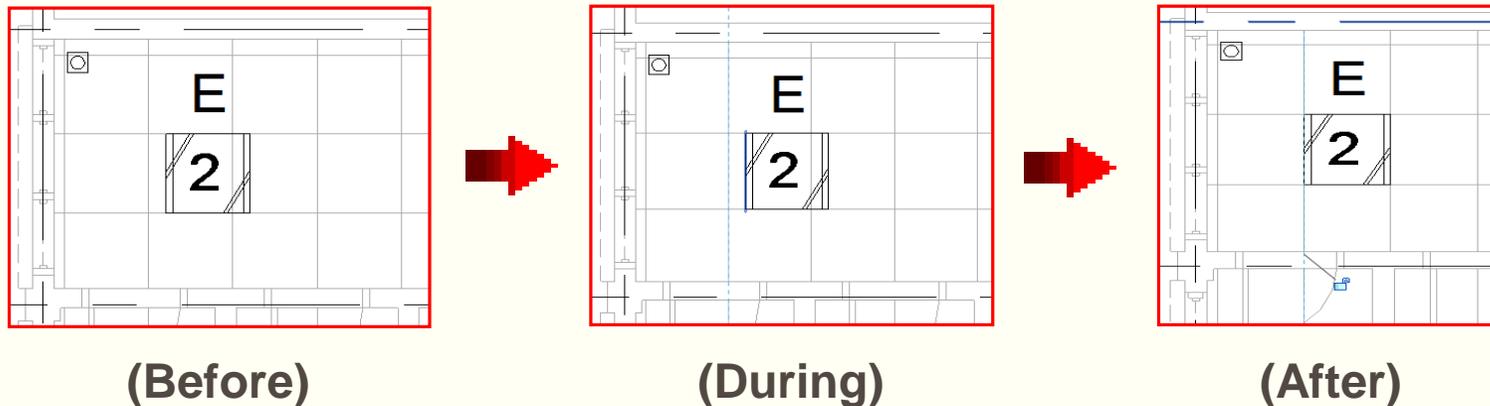
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Align Elements

- Use the Align tool to align one or more elements with a selected element. You can align elements in a plan view (2D), 3D view, or elevation view.

To align an element

- a. Click Modify tab | Modify panel, click  (Align) or type AL for key shortcuts
- b. Select a line or point on the element that is going to remain stationary
- c. Select a line or point on the element to be aligned. The second element moves into alignment with the first one



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c) Placing Loadable Families (ceiling based)

- Electrical systems in Autodesk Revit software are circuits consisting of devices, lighting fixtures and other electrical equipment. They are elements in a project and are added to the model using tools in Ribbon. There can be different types of electrical plan views based on the type of information required.
- Components or families consists of panel, equipment's, switches, receptacles, various communication and safety devices and lighting fixtures. Electrical components can be placed in any view including plan, elevation and 3D. Families differentiate by the hosted components which are **ceiling based** and **wall based**.

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c) Placing Loadable Families (ceiling based)

Lighting Fixtures

- Most lighting fixtures are hosted components and therefore placed on a ceiling or on a wall

Load Lighting Fixtures

1. In the Project Browser, double-click the ceiling plan view where you want to place the Lighting Fixtures
2. Click Insert tab > Load from Library panel > (Load Family)



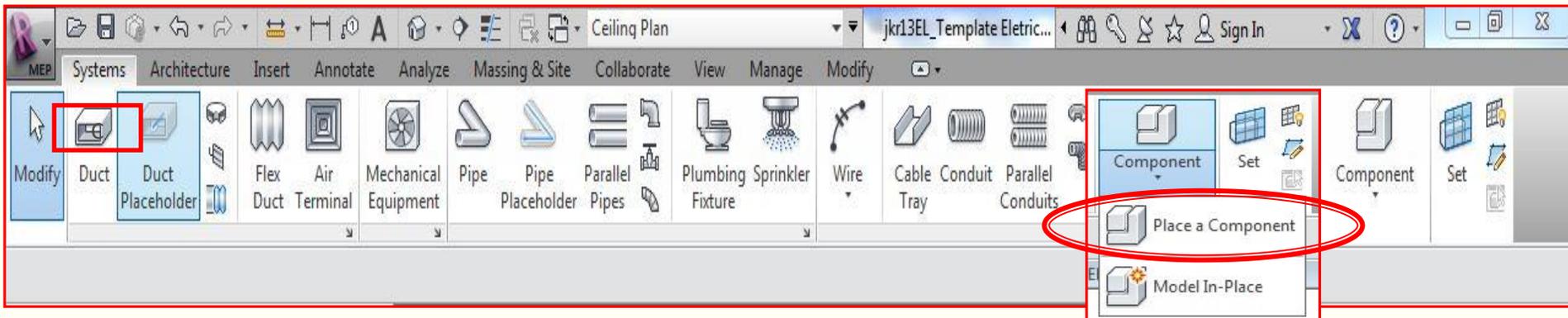
3. In the Load Family dialog, double-click the category of the family that you want to load
4. Select the family and click Open button
5. The family type is now available to place in the project. It displays in the appropriate component category under Families in the Project Browser

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c) Placing Loadable Families (ceiling based)

Place Lighting Fixtures

1. In the System tab, component panel, expand component, click Place a Component
2. Move cursor to drawing area
3. Place the family to the ceiling layout in the drawing area by click the family
4. Click on the required location in the model view. Use alignment lines, temporary dimensions and snaps to aid you in placing the component
5. Continue to place additional devices or click  (Modify) to exit the command



- ❖ These steps can apply to other components that hosted on a ceiling which are communication devices and security devices

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d) Placing Loadable Families (wall based)

Electrical Fixtures

- Electrical fixtures such as receptacles are typically hosted components as they are usually placed on a wall

Load Electrical Fixtures

1. Open the floor plan view where you want to place the Electrical Fixtures
2. Click Insert tab ► Load from Library panel ► (Load Family)



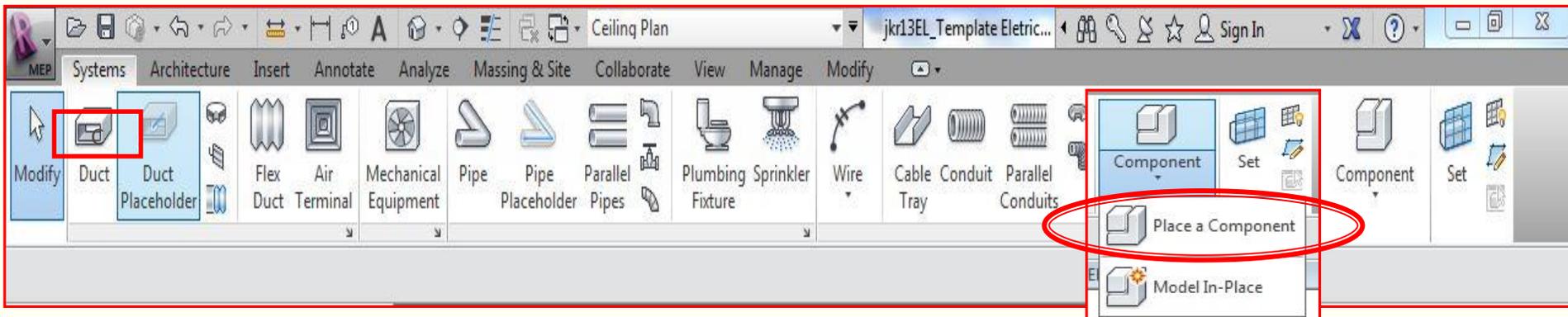
3. In the Load Family dialog, double-click the category of the family that you want to load
4. Select the family and click Open button
5. The family type is now available to place in the project. It displays in the appropriate component category under Families in the Project Browser

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d) Placing Loadable Families (wall based)

Place Electrical Fixtures

1. In the System tab, component panel, expand component, click Place a Component
2. Move cursor to drawing area
3. Place the family to the floor layout in the drawing area by click the family
4. Click on the required location in the model view. Use alignment lines, temporary dimensions and snaps to aid you in placing the component
5. Continue to place additional devices or click  (Modify) to exit the command



- ❖ These steps can apply to other components that hosted on a wall which are lighting devices, telephone devices, communications devices, data devices, nurse call devices, security devices and fire alarm devices

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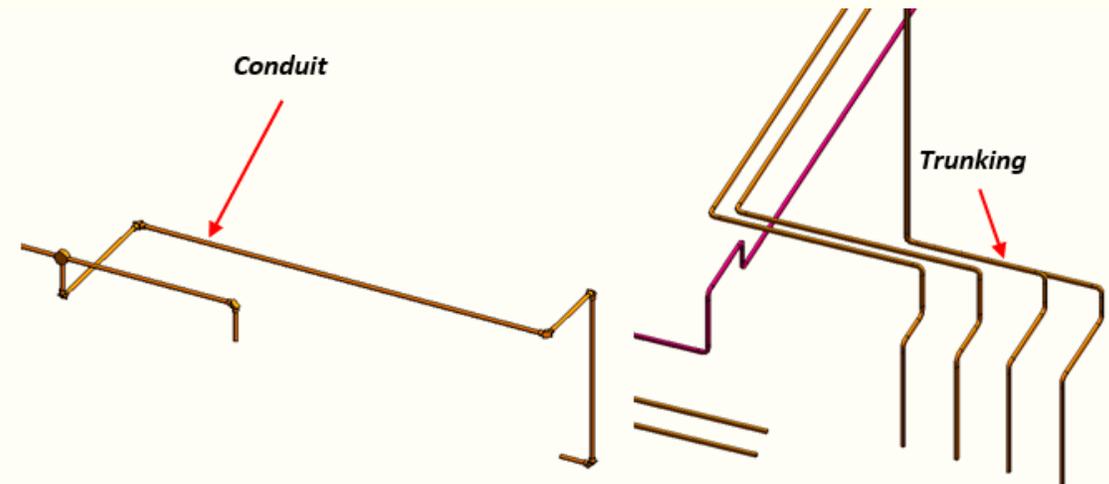
e) Placing System Families

- System families contain family types that you use to create basic building elements such as walls, floors, ceilings, stairs, conduit, cable trays, pipe and ducts in your building models.
- System families are predefined in Revit and saved in templates and projects, not loaded into templates and projects from external files. You cannot create, copy, modify, or delete system families, but you can duplicate (copy) and modify the types within system families to create your own custom system family types.

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e) Placing System Families

- Conduit and cable tray are system families for which you can define different types in electrical system
- Conduit will display as a single line in views set to Course or Medium detail level.
- Cable tray display as a single line in views set to Course detail level. In view set to Medium detail level, cable tray will display as two-line geometry

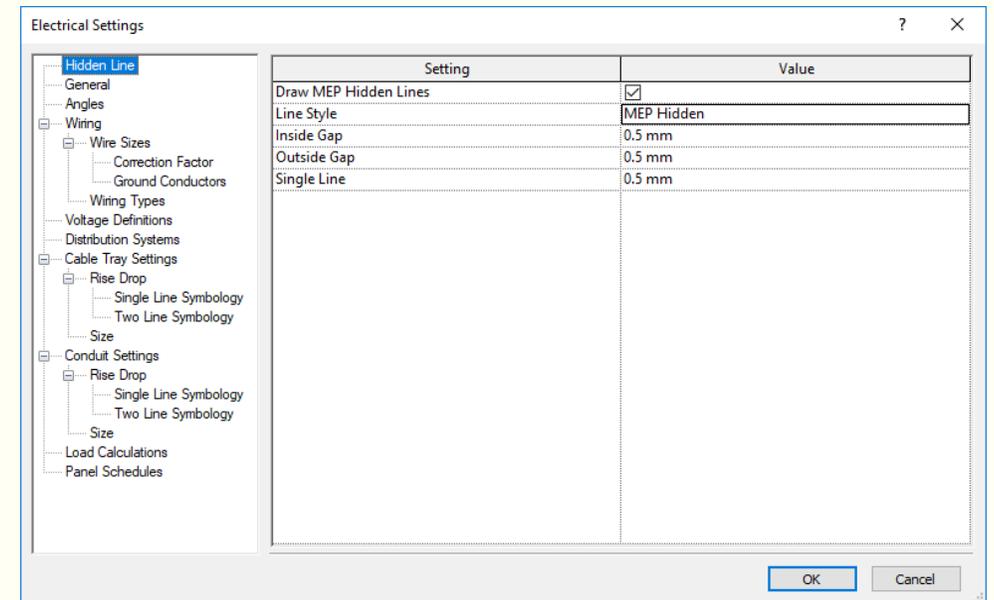


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e) Placing System Families

Defining Electrical Settings

- Conduit and cable tray settings and sizes can be defined in the Electrical Settings dialog box, which is accessed via the Electrical Settings button on the Manage tab. The general settings are used to define the visibility behavior of conduit or cable tray when shown as single-line graphics.

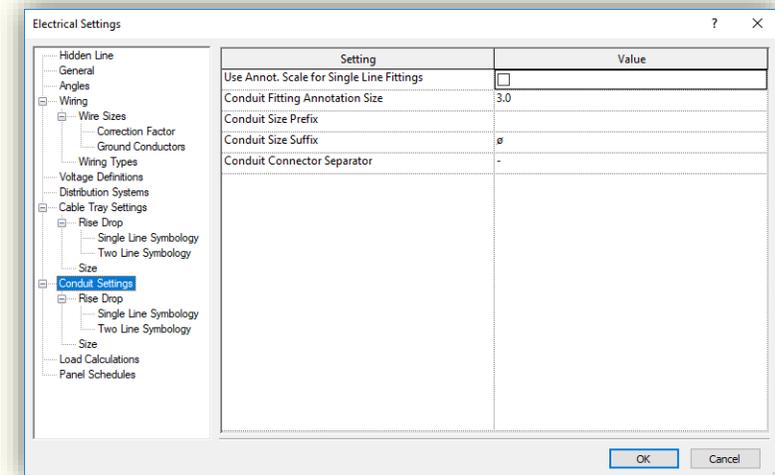
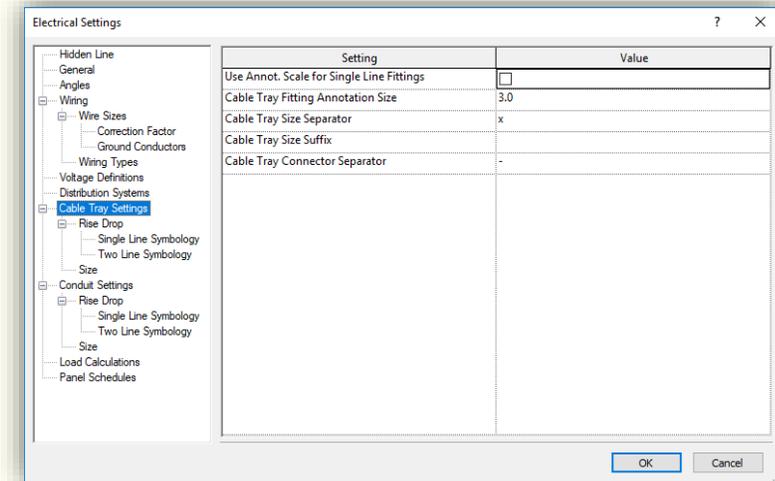


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e) Placing System Families

Defining Electrical Settings

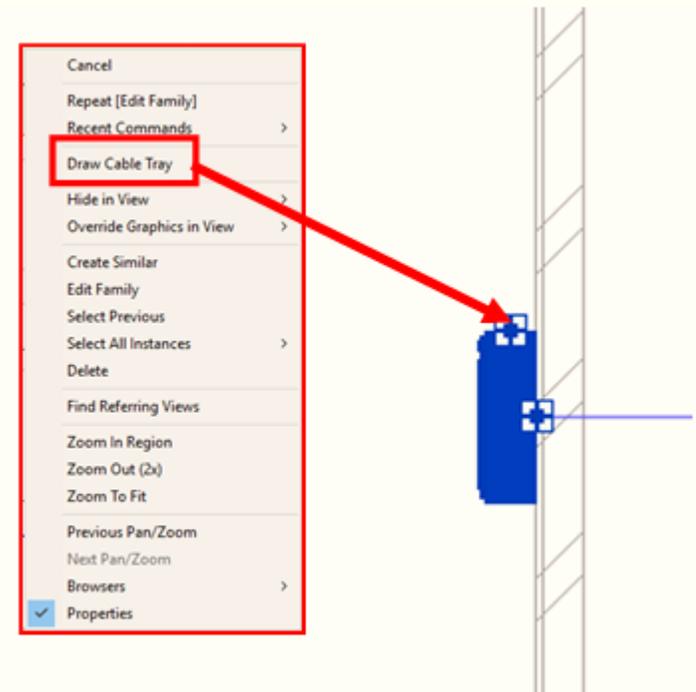
- In the Electrical Settings box, you can define size for both cable tray or conduit.
- The size settings for cable tray are very simple. You can choose whether certain sizes are available for use in your project by selecting the box in the Used In Size Lists column.



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Place Cable Tray

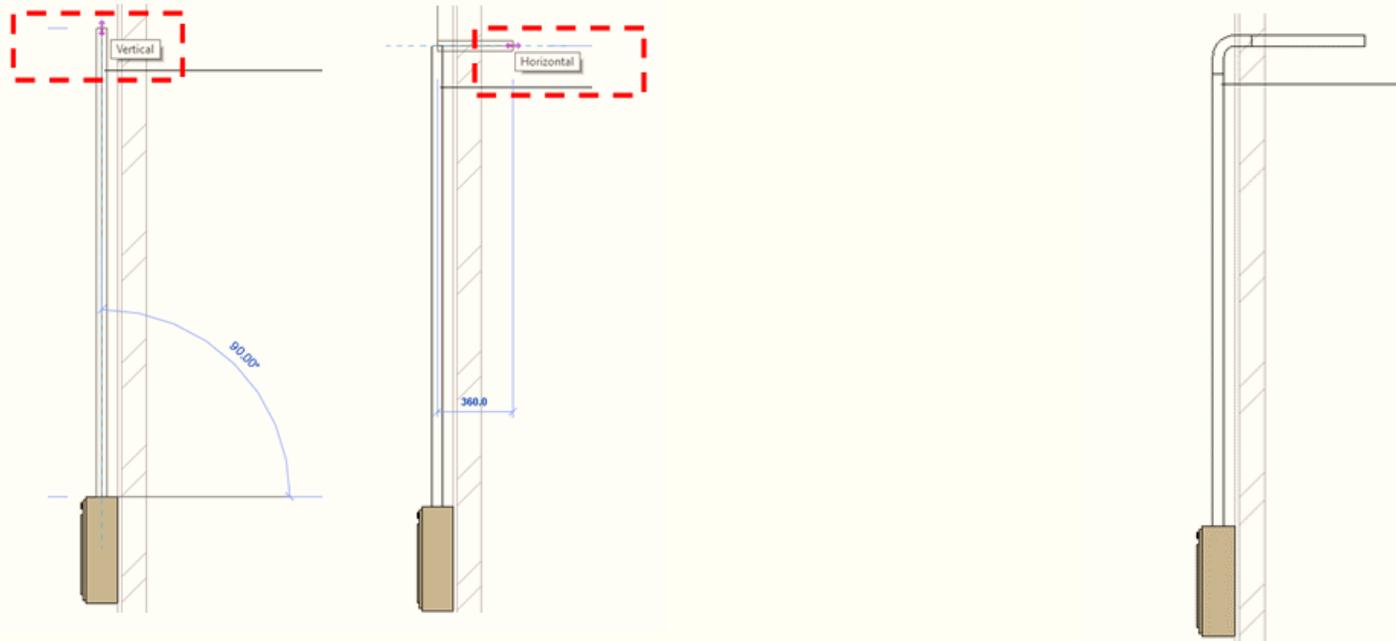
1. Open floor plan view
2. Click View tab > Create panel  (Section)
3. Place the cursor at the starting point of the section, and drag through the switchboard family
4. Click when you reach the end point of the section.
5. Open the section view by double-click the section header
6. Click the **family** (Switchboard). Right click the **connector** of the component Choose **Draw Cable Tray**
7. In the Type Selector, select a cable tray type: **Cable Tray with fitting** to insert in the drawing area
8. In the Option Bar, set **Width=50mm**, **Height=50mm** and **Offset=4700mm** values



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Place Cable Tray (Con't)

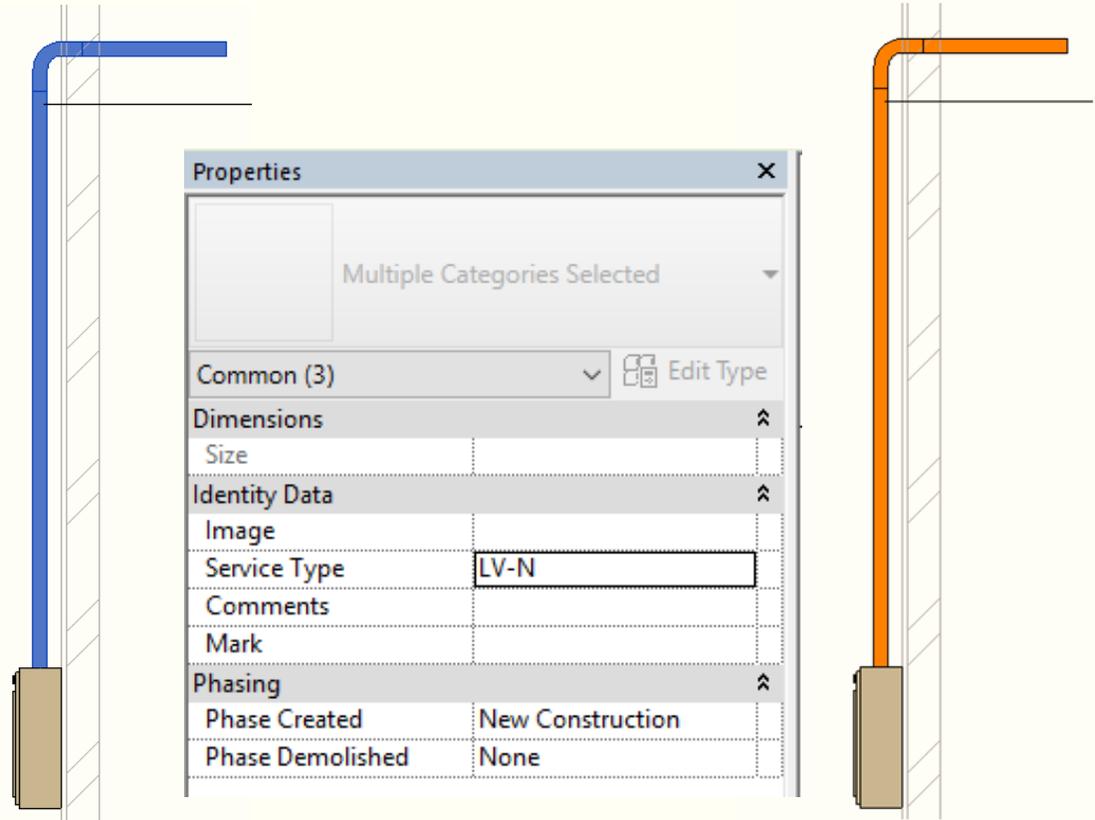
9. In the drawing area, click to specify the start of the cable tray run, then move the cursor and click to specify points along the run
10. Fittings are automatically added when needed. To finish the conduit run, click Modify to end and exit the command



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Modify Cable Tray Fittings

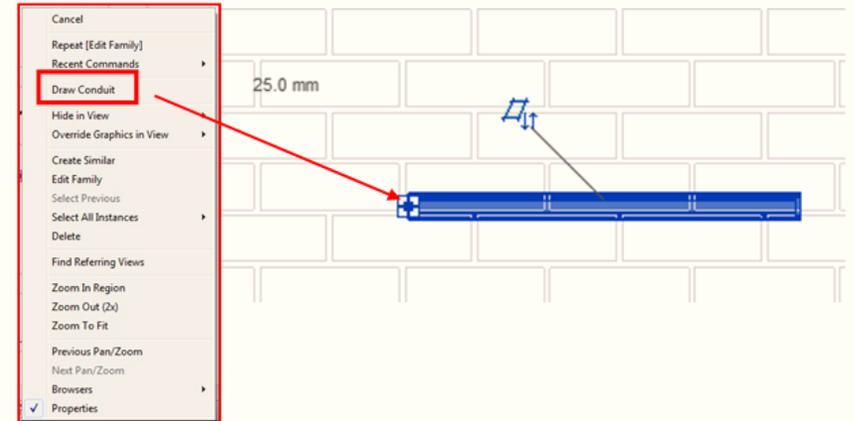
1. Select the cable tray run that you want to modify
2. In the Properties Palette, under Identity Data, set the **Service Type** to **LV-N**
3. Click **Apply** button
4. It will change automatically to the corresponding colour code trunking



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Place Conduit

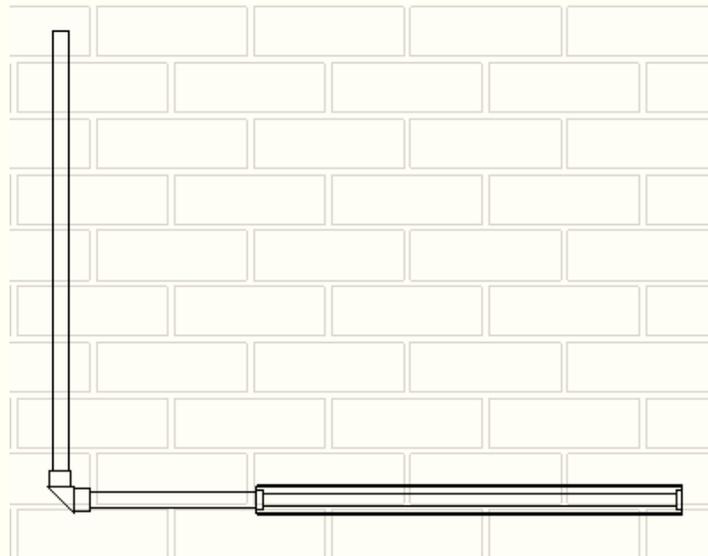
1. In the Project Browser, double-click the floor plan view where you want to place the Conduit
2. Click View tab > Create panel  (Section)
3. Place the cursor at the starting point of the section, and drag through the switchboard family
4. Click when you reach the end point of the section
5. To open the section view, double-click the section header
6. Click the **family** (Lighting). Right click the **connector** of the component Choose **Draw Conduit**
7. In the Type Selector, select a conduit type: **Conduit with fittings: Galvanized Iron (GI)** to insert in the drawing area



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Place Conduit (Con't)

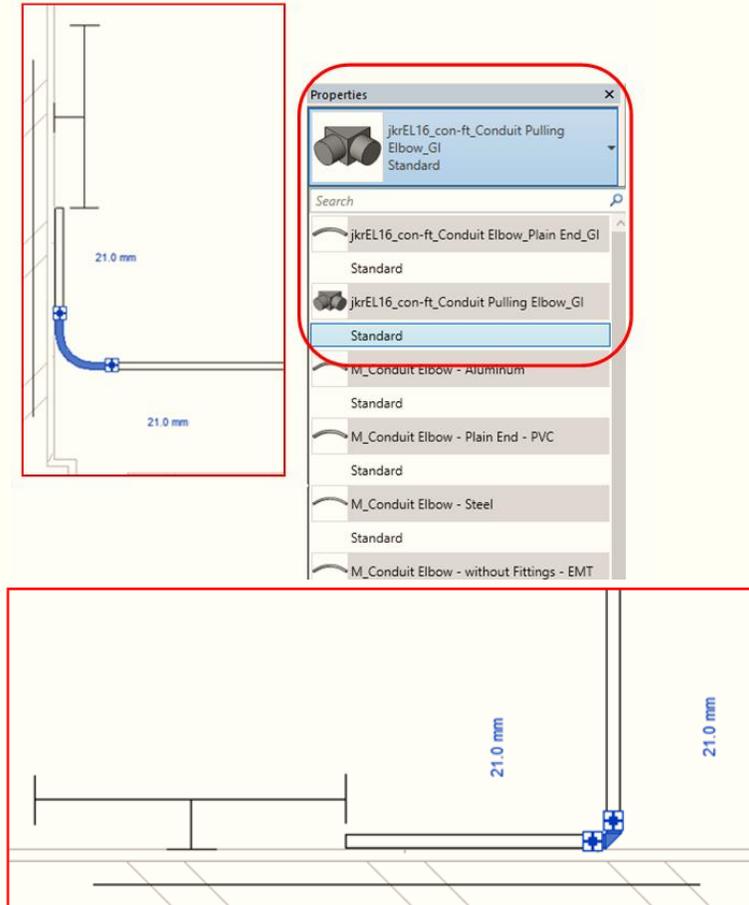
8. In the drawing area, click to specify the start of the conduit run, then move the cursor and click to specify points along the run
9. Fittings are automatically added when needed
10. To finish the conduit run, click Modify to end and exit the command



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Modify Conduit

1. Select the conduit run that you want to modify
2. Drag the control to move or extend the conduit segment to a new endpoint or to connect with another conduit
3. Drag the conduit segment to a new location
4. For Elbow Fittings, select the fitting that you want to modify
5. Go to **Properties** palette, from the **Type Selector**, select the conduit type with fittings that you want to place : **conduit pulling elbow_GI : Standard**
6. It will change automatically
7. To finish the conduit run, click Modify



UNIT
BIM

UNIT BUILDING INFORMATION MODELLING (BIM)
BAHAGIAN PENGURUSAN PROJEK KOMPLEKS
CAWANGAN PERANCANGAN ASET BERSEPADU
TINGKAT 20 MENARA PJD KUALA LUMPUR

SEKIAN TERIMA KASIH

DISEDIAKAN OLEH:

1. Ir. AHMAD SYUKRI BUKHARI (asyukri@jkr.gov.my)
2. NAHZIATUL SHIMA ISMAIL (nahziatul@jkr.gov.my)
3. NUR ATIRA AMRAN (atira@jkr.gov.my)

