CHAPTER 13

Attaching References

PROJECT EXERCISE

This project exercise provides step-by-step instructions for creating the design shown in Figure P13–1. The intent is to guide you in using reference files to complete a design.

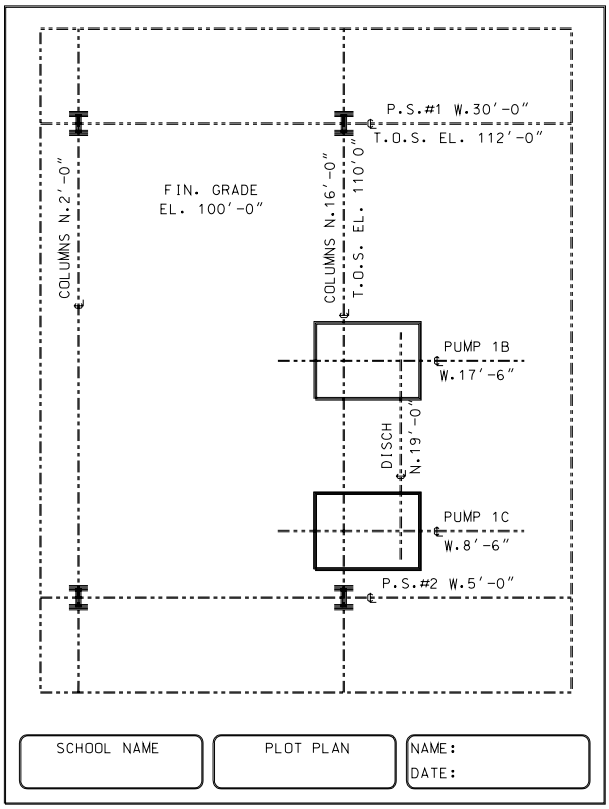


Figure P13–1 Completed project design

This project creates separate design files for the following:

- Pipe rack plot plan

- Pump foundation plot plan
- Border
- Complete design formed from references to the other three design files

Note: As you complete each step in the project procedures, place a check mark by the step to help you keep up with where you are in the project.

CREATE THE PIPE RACK PLOT PLAN

This procedure creates the design shown in Figure P13–2. The pipe rack is drawn using offsets from the design origin point.

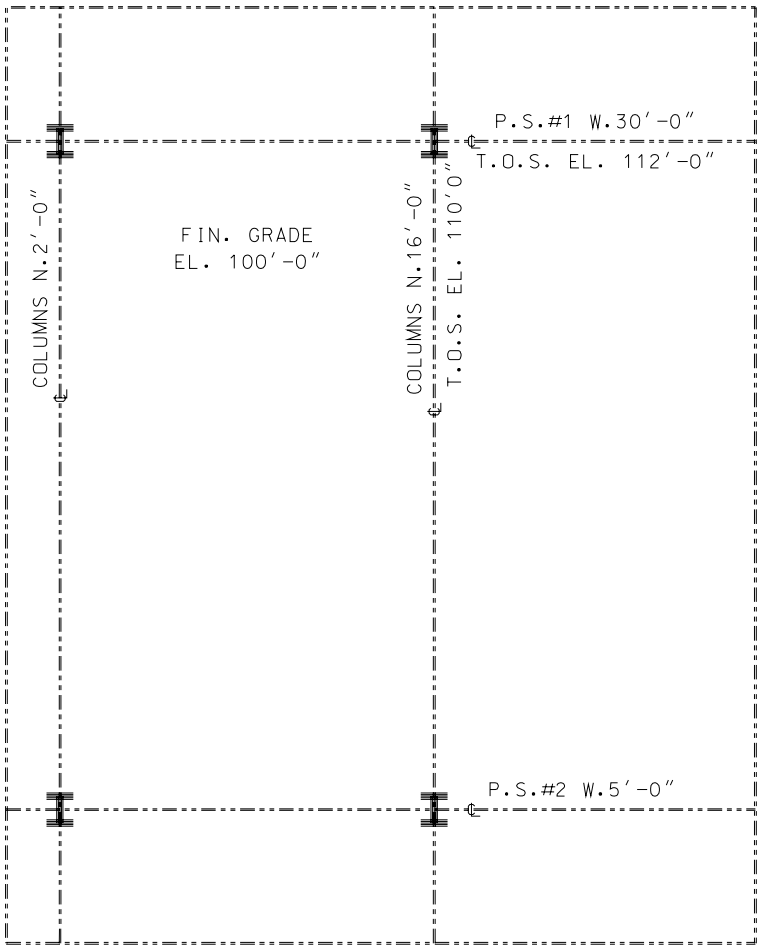


Figure P13–2 Completed pipe rack plot plan

STEP 1: Invoke MicroStation via the normal technique for the operating system on your workstation.

STEP 2: Create a new design file named RACK.DGN using the seed2d.dgn seed file.

STEP 3: Set the following design parameters:

- Working Units **Master Units** to ′ (for feet), the **Sub Units** to ″ (for inches)
- **Grid Master** to 0.5, **Grid Reference** to 2, and **Grid Lock** to OFF

STEP 4: Select **Settings > Level > Manager** to open the Level Manager settings box and create the following levels:

- Name=Rack, Color=White (0), Style=0, Weight=1, Display ON
- Name=Text, Color=Blue (1), Style=0, Weight=1, Display ON
- Name=Column, Color=Green (2), Style=0, Weight=1, Display ON

STEP 5: Invoke the Save Settings tool from the **File** drop-down menu to save the design settings.

STEP 6: Set Rack as the active level. Draw the following two unconnected lines:

- XY = 2,0 to DL = 0,35
- XY = 0,5 to DL = 28,0

STEP 7: Make parallel copies of the two lines:

- Horizontal line: 25 feet above the original line
- Vertical line: 14 feet to the right of the original line

STEP 8: Draw a block from XY = 0,0 to XY = 28,35, as shown in Figure P13–3.

STEP 9: Set Column as the active level.

STEP 10: Draw a 1-foot by 1-foot I-beam centered on the lower left centerline intersection, as shown in Figure P13–4.

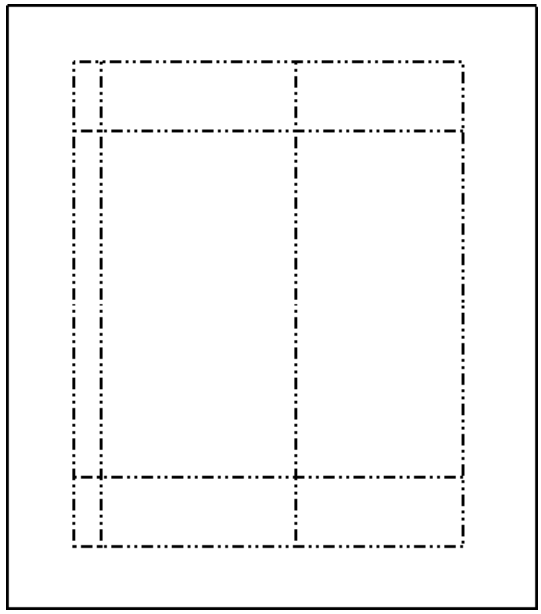


Figure P13–3 Pipe rack centerlines and perimeter

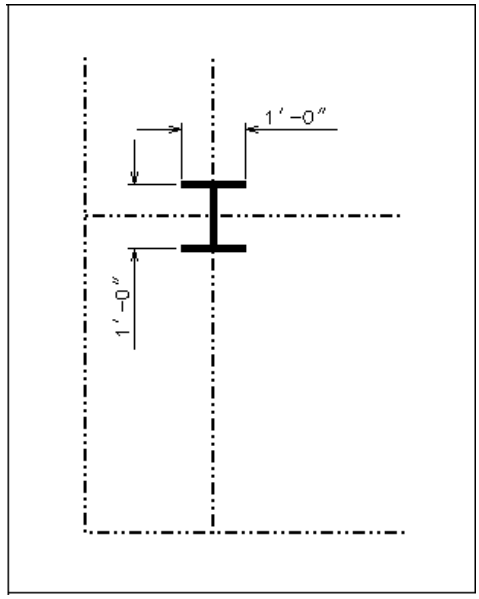


Figure P13–4 Lower left I-beam

STEP 11: Use the Array tool to place a rectangular array with the following settings (see Figure P13–5):

- Rows = 2
- Columns = 2
- Row spacing = 25
- Column spacing = 14

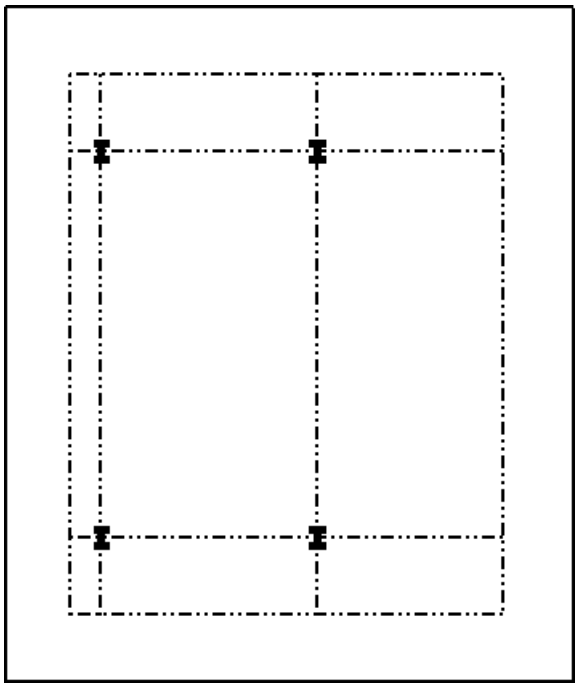


Figure P13–5 Results of the Rectangular Array tool

STEP 12: Set Text as the active level.

STEP 13: Set the text parameters to:

- Font = 3
- Height and Width = 0.125
- Line Spacing = 0.125

Note: The text size is 0.125′, so it will plot 0.125″ (1/8″) high at a plot scale of 1/4″ = 1′.

STEP 14: Place all text shown in Figure P13–2.

Note: To place the symbol on the centerlines, set the Font to 15 (IGES1001), and place the lowercase letter **q**.

STEP 15: Invoke the Save Settings tool from the **File** drop-down menu to save the design settings.

CREATE THE PUMP FOUNDATIONS PLOT PLAN

This procedure creates the design shown in Figure P13–6. The foundations are drawn using offsets from the design origin point.

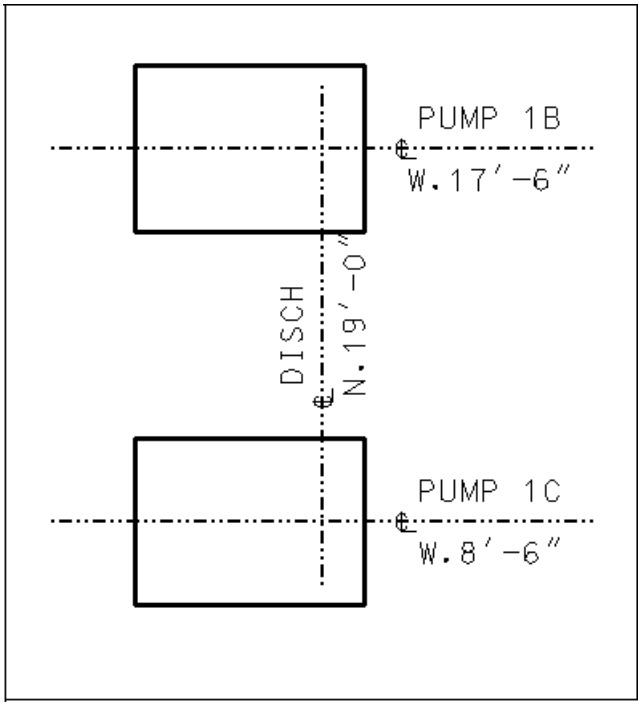


Figure P13–6 Pump foundations plot plan

STEP 1: Create a new design file named PUMPS.DGN, using the 2dEnglishGeneral.dgn seed file.

STEP 2: Set up the design settings as follows:

- Working Units **Master Units** to ′ (for feet), the **Sub Units** to ″ (for inches)
- **Grid Master** to 0.5, **Grid Reference** to 2, and **Grid Lock** to OFF

STEP 3: Select **Settings > Level > Manager** to open the Level Manager settings box and create the following levels:

- Name=Foundation, Color=White (0), Style=0, Weight=1, Display ON

- Name=Text, Color=Blue (1), Style=0, Weight=1, Display ON
- Name=Block, Color=Green (2), Style=0, Weight=1, Display ON

STEP 4: Invoke the Save Settings tool from the **File** drop-down menu to save the design settings.

STEP 5: Set Foundation as the active level. Draw the following two unconnected lines:

- XY = 12.5,8.5 to DL = 13,0
- XY = 19,7 to DL = 0,12

STEP 6: Make a parallel copy of the horizontal line 9′ above the original.

STEP 7: Set Block as the active level.

STEP 8: Draw a block from XY = 14.5,6.5 to DL = 5.5,4, as shown in Figure P13–7.

STEP 9: Make a copy of the block exactly 8′ above the original.

STEP 10: Set Text as the active level.

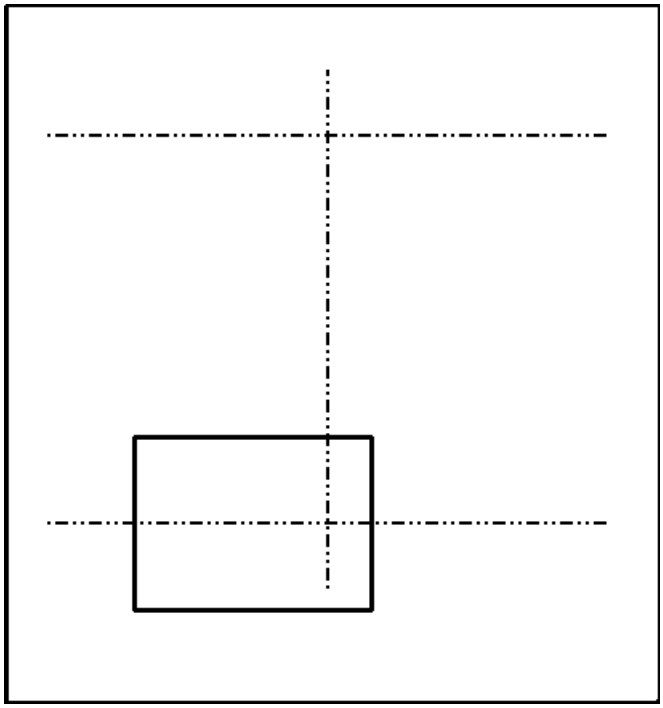


Figure P13–7 Pump centerlines and lower pump foundations

STEP 11: Set the text parameters to:

- Font = 3

- Height and Width = 0.125′
- Line Spacing = 0.125′

STEP 12: Place text as shown in Figure P13–6.

STEP 13: Invoke the Save Settings tool from the **File** drop-down menu to save the design settings.

CREATE THE BORDER

This procedure creates the design shown in Figure P13–8.

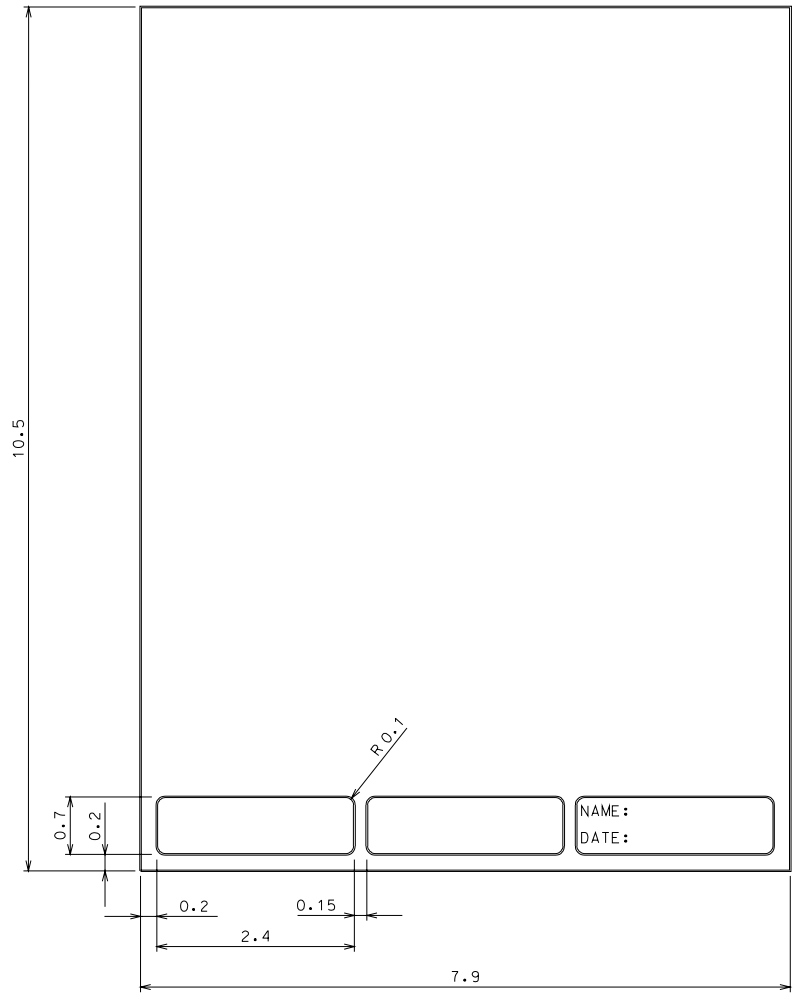


Figure P13–8 Letter-size border

STEP 1: Create a new design file named BORDER.DGN, using the 2dEnglishGeneral.dgn seed file.

STEP 2: Adjust the design settings as follows:

- Working Units **Master Units** to IN (for inches), the **Sub Units** to IN
- **Grid Master** to 0.1, **Grid Reference** to 10, and **Grid Lock** to ON

STEP 3: Select **Settings > Level > Manager** to open the Level Manager settings box and create the following level:

- Name=Border, Color=White (0), Style=0, Weight=1, Display ON

STEP 4: Invoke the Save Settings tool from the **File** drop-down menu to save the design settings.

STEP 5: Set Border as the active level. Draw the border and title block using the dimensions shown in Figure P13–8.

STEP 6: Set the following parameters:

- Text Height and Width = 0.125″
- Text Font = 3

STEP 7: Place the text as shown in Figure P13–8.

STEP 8: Invoke the Fit View tool to fit the view.

STEP 9: Open the Saved Views settings box by selecting **Saved Views** from the **Utilities** drop-down menu.

STEP 10: In the Saved Views settings box, create a new view:

- Key-in **border** in the Source Name field.
- Key-in **Letter-size border** in the Source Description field.
- Click the **Save** button to create a saved view.

STEP 11: Invoke the Save Settings tool from the **File** drop-down menu to save the design settings.

CREATE THE COMPLETE DESIGN

This procedure creates the composite design by referencing the previous design files (see Figure P13–1).

STEP 1: Create a new design file named CH13.DGN, using the 2dEnglishGeneral.dgn seed file.

STEP 2: Set up the design settings as follows:

- Working Units **Master Units** to ′ (for feet), the **Sub Units** to ″ (for inches)
- **Grid Master** to 0.5, **Grid Reference** to 2, and **Grid Lock** to OFF

STEP 3: Select **Settings > Level > Manager** to open the Level Manager settings box and create the following level:

- Name=Base, Color=White (0), Style=0, Weight=1, Display ON

STEP 4: Set Base as the active level. Open the References settings box by selecting **Reference** from the **File** menu.

STEP 5: Invoke **Attach** from the **Tools** menu in the References settings box. MicroStation opens the Attach Reference dialog box.

STEP 6: Select RACK.DGN from the appropriate folder, and click **Open** to attach the design file as a reference to the current design file. MicroStation displays the Reference Attachment Settings dialog box.

STEP 7: In the Reference Attachment Settings dialog box, make the following settings:

- Key-in **rack** in the **Logical Name** field.
- Key-in **Pipe rack plot plan** in the **Description** field.
- Select **Coincident** from the **Orientation** list box.
- Click **OK** to attach the pipe rack design file as a reference.

STEP 8: Invoke the Fit View All tool to fit the view window.

STEP 9: Similarly, attach the PUMPS.DGN design file as a reference, keying-in **pumps** for the **Logical Name, Pump foundations** for the **Description** and select **Coincident** from the **Orientation** list box.

STEP 10: Also attach BORDER.DGN as a reference. In the Reference Attachment Settings dialog box, set the following settings:

- Key-in **border** in the **Logical Name** field.
- Key-in **The drawing border** in the **Description** field.
- Select **Coincident** from the **Orientation** list box.
- Set the Scale (Master:Ref) ratio to 4 to 1.
- Click **OK**.

Note: The Scale (Master:Ref) ratio scales the border for plotting at 1/4″ = 1′. This works because the border design has inches as its Master Units and the active design has feet as its Master Units. The ratio of 4 to 1 means every four feet of active design displays one inch of border reference, or 1″ = 4′, (divide both sides of the equation by 4 and you get $^1/_4$″ = 1′).

STEP 11: On the References dialog box select the Border design, select the **Move** References tool and drag the reference file dynamic outline until all of the pipe rack is inside and close to the top of the outline, and then click the Data button to place the border.

MicroStation prompts:

Move Reference > Enter point to move from

Place a data point somewhere in the design.

Move Reference > Enter point to move to

Move the drawing pointer the direction and distance the border needs to be moved, then place a second data point to move the reference file.

STEP 12: Set the text parameters to:

- Font = 3
- Text Height and Width = 0.125′

STEP 13: Fill in the title block text, as shown in Figure P13–1.

STEP 14: Invoke the Fit View tool to fit the view.

STEP 15: Invoke the **Save Settings** tool from the **File** menu to save the design settings.

DRAWING EXERCISES 13–1 THROUGH 13–5

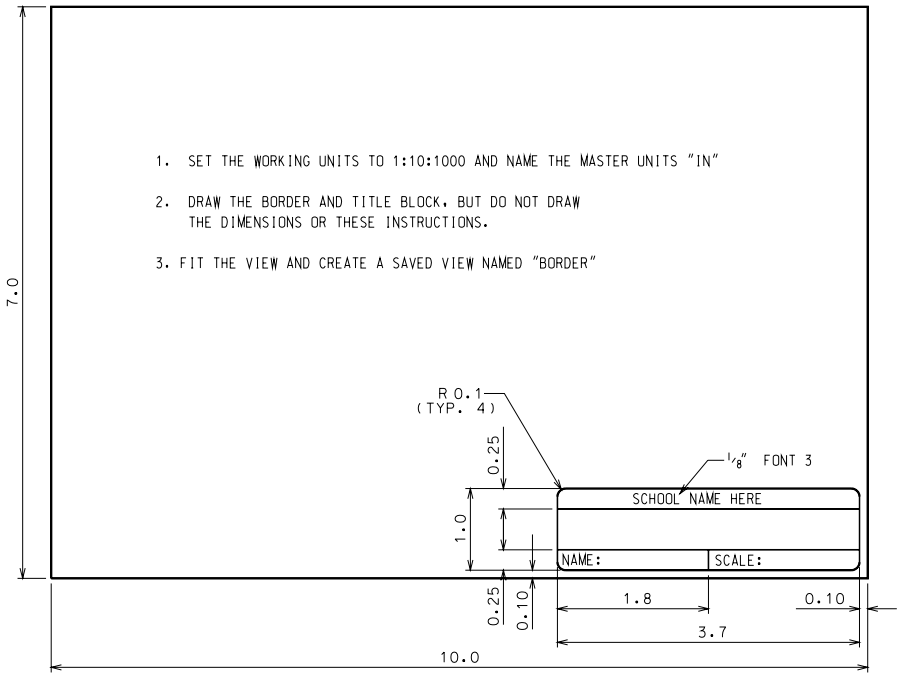
Use the following table to set up the design files for Exercises 13–1 through 13–5.

SETTING	VALUE
Seed File	seed2d.dgn
Working Units	Master and Sub Units to inches
Grid	Grid Master = 0.25, Grid Reference = 4

Exercise 13–1

BORDER

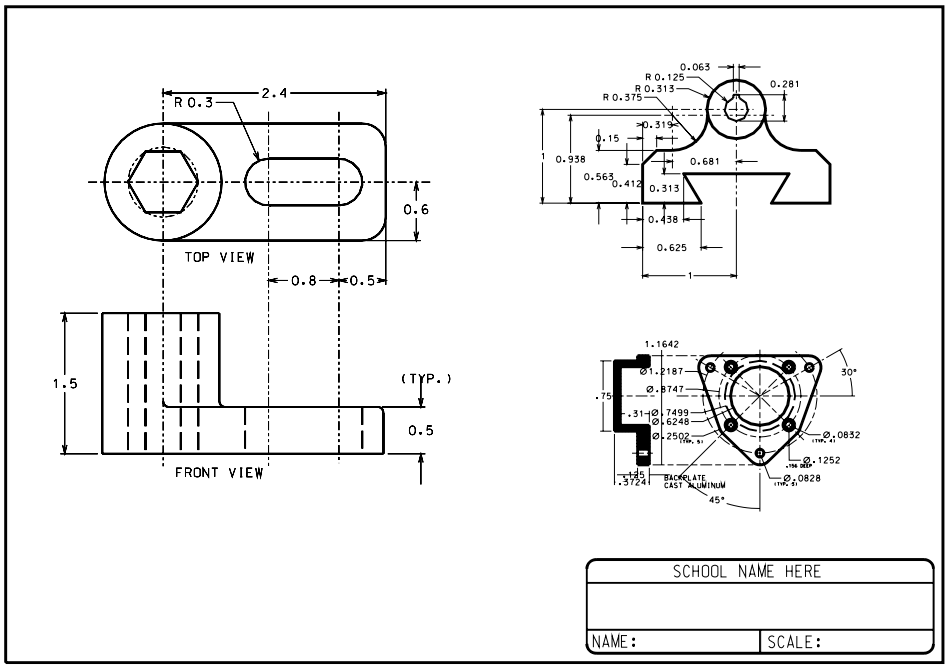
Draw the border shown in the figure. This border is used in the following exercises.



Exercise 13–2

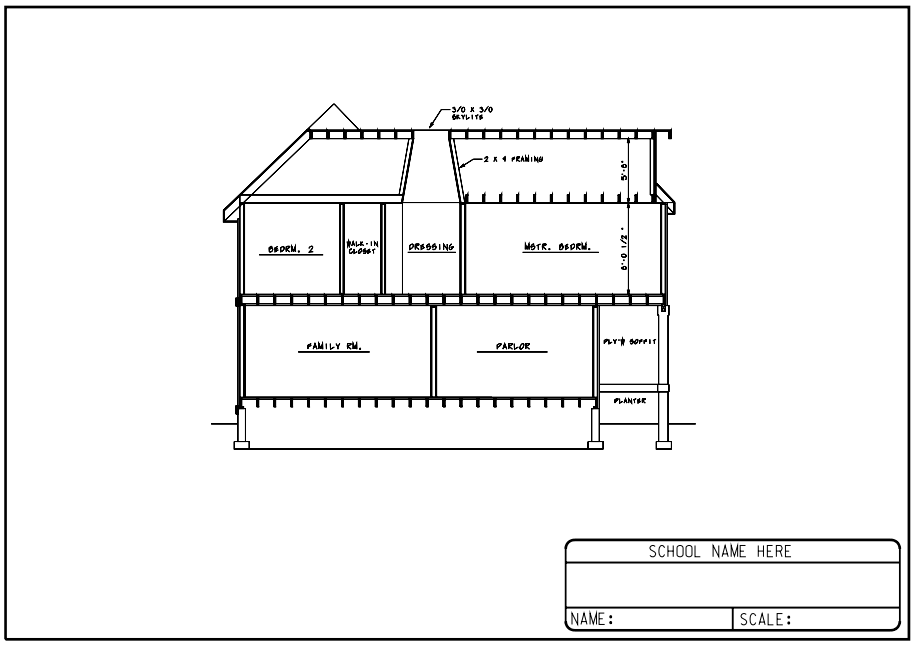
CREATE A DESIGN FILE

Reference the border in the new file, then reference the machine part drawings created in Exercises 4–1, 5–2, and 12–3. Clip the boundary of each of the machine parts, scale each one to one-half its true size (Master:ref 0.50000:1.00000), and then move each one inside the border.



Exercise 13–3

Open the front elevation design drawn in Exercise 7–3. If the design includes a border, delete it. Reference the border design file's "Border" saved view at an attach scale of 1/8″ = 1′ (Master:ref 4.00000:1.00000).



Exercise 13–4

Draw the two parts of a flow diagram shown in Figures Ex13–4a and Ex13–4b. Put each part in a separate model. Place the ends of the off-page lines at the XY coordinates shown in each figure. The dimension shown in the first figure is intended only to provide a feel for the size of the diagrams. Do not draw the dimension or XY coordinates.

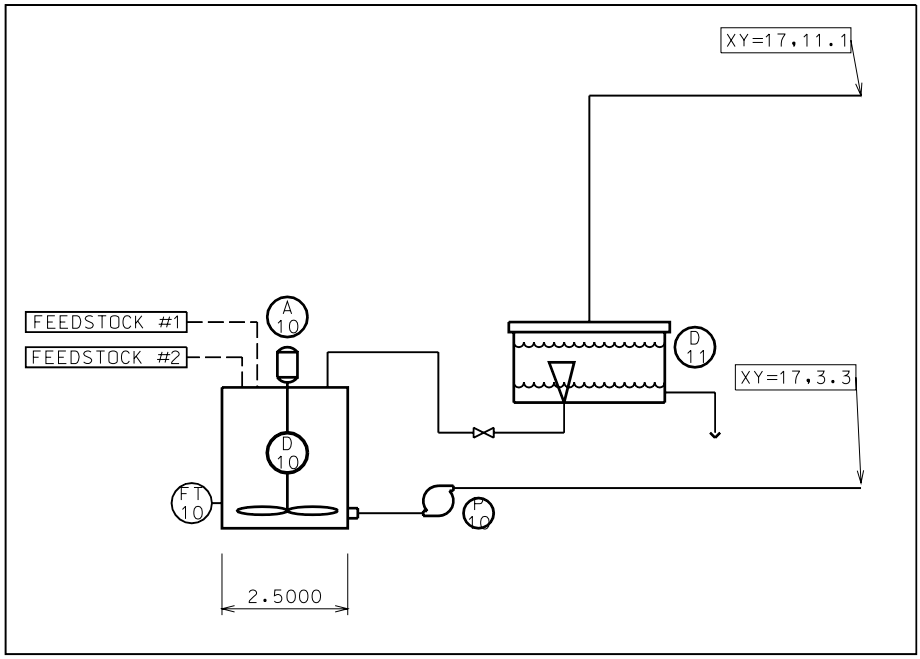


Figure Ex13–4a Flow diagram A

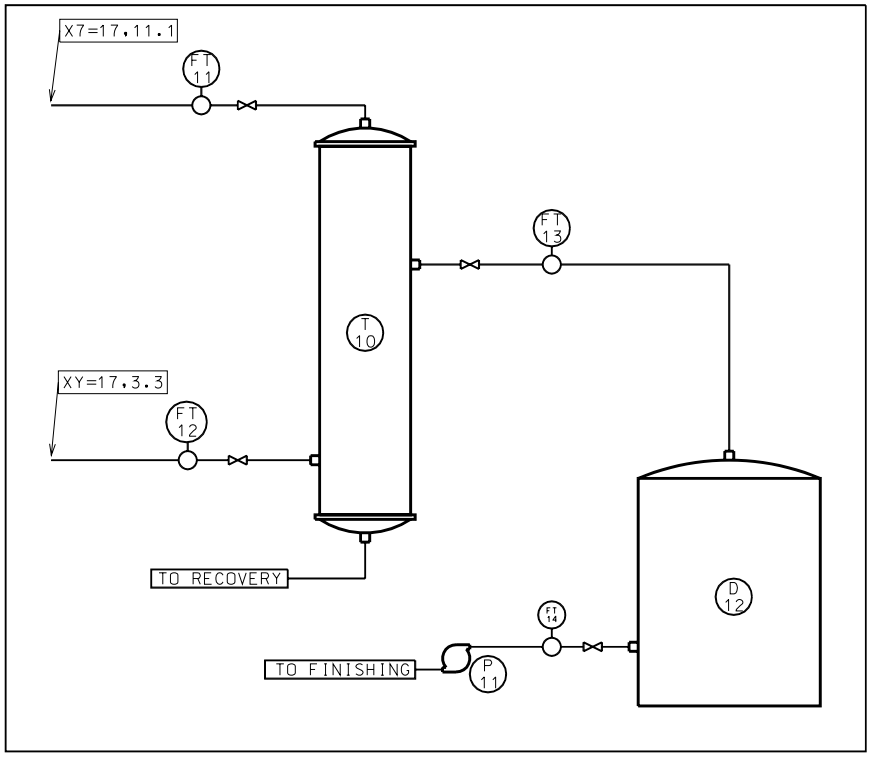


Figure Ex13–4b Flow diagram B

Exercise 13–5

COMPLETED FLOW DIAGRAM

Create a design file, and then reference the two flow diagram parts A and B to create the complete diagram. Reference the border and scale it to encompass the complete flow diagram, as shown in the figure.