

**In Class 2:**

**Do a sample ARE problem on accessibility**

**Organization**

Break into groups

Do, and report on the in-class problem

Turn in materials produced, with names of participants, for credit

**Background Information**

This problem is based on the ARE 4.0 tutorials

The program has been adapted to this years BAC detail design problem

The following is taken from the ARE 4.0 tutorial instructions:

**"Directions**

Complete the floor plan [provided] by developing a ramp and stair system in accordance with the given program information. Using the tools provided, indicate all ramps, stairs, railings, walls, doors, and landings required to complete the plan and indicate all landing elevations.

The completed plan should reflect conformity to program and code requirements and to principles of design logic. Before beginning your solution, you should review the program and code information that can be accessed through the Vignette Index screen and familiarize yourself with the floor plan [provided]."

**Program**

- 1 The proposed coffee shop / branch library is designed with both the public and private spaces within the building being on two levels.
- 2 Provide a circulation system with a ramp and stair connecting the two levels of the public space.
- 3 Make this circulation system comply with the requirements and definitions of 'accessible' taken from the ARE 4.0 sample exam.
- 4 Make a design recommendation so that the accessible ramp may also be used for the private space to move goods from the loading dock to the coffee bar.
- 5 The stair shown in the sketch plan may be moved
- 6 Assume that the stair connecting the upper and lower levels of the public space is part of the "exit route."

**Discussion / Writing (use the overhead projector transparencies)**

- 1 Propose, and list, all the components of the stairs and ramps
- 2 Describe the kinds of details needed to show how they will be built

**Sketching (use overhead projector transparencies):**

- Do a sketch based on the ARE sample vignette requirements

**Presentation: Report out your results to the class**

**Note:** this text is taken from the copy of the ARE tutorial webpage shown on the following sheet. It's provided, because the type doesn't print clearly on the copy.

### "Code

Comply with the following code requirements. These are the **ONLY** code-related criteria you are required to use.

### Definition

1. **Accessible Means of Egress:** A continuous and unobstructed path of travel from an accessible space to a public way that is usable by a mobility impaired person. An accessible means of egress comprises the vertical and horizontal means of travel and shall include accessible exit routes, ramps, stairways, and doors.

### Maneuvering Clearances

1. The minimum width of an exit route shall not be less than 44 inches.
  - Projections into a required exit route width are prohibited, except for handrail projections.
2. The space required for a wheelchair to make a 180-degree turn is a clear space of 60 inches in diameter, as shown in Figure 1.
3. Minimum maneuvering clearances at doors shall be as shown in Figure 2.
  - The floor or ground area within the required clearances shall be level.

### Ramps

1. Floors or walks in an accessible means of egress path of travel having a slope steeper than 1:20 (one unit vertical in 20 units horizontal) shall be designed as ramps.
2. **Width:** The minimum width shall not be less than 44 inches.
  - Ramps shall not reduce in width in the direction of egress travel.
  - Projections into a required ramp width are prohibited, except for handrail projections.
3. **Slope:** The maximum slope of a ramp shall be 1:12 (one unit vertical in 12 units horizontal).
4. **Landings:** Ramps shall have level landings or floor surfaces at the top and bottom of each ramp run, all points of turning, entrance, exit, and at doors.
  - The least dimension shall not be less than the required width of the ramp.
  - The least dimension in the direction of travel shall be 60 inches.
  - If ramps change direction at landings, the least dimension shall be 60 inches.

**Stairways**

1. Width: The minimum width shall not be less than 44 inches.
  - Stairways shall not reduce in width in the direction of egress travel.
  - Projections into a required stairway width are prohibited, except for handrail projections.
2. Landings: Stairs shall have a level landing or floor at the top and bottom of each stair run.
  - The width of a landing shall not be less than the width of the stair.
  - The least dimension in the direction of travel shall be 44 inches.
  - If the path of travel changes direction between stair the least dimension shall be the width of the stairs
3. Treads and Risers:
  - Minimum tread depth shall be 11 inches.
  - Maximum riser height shall be 7 inches and minimum riser height shall be 4 inches.
  - There shall be no variation in any riser height or tread depth within the complete stairway system.

**Doors**

1. Width: Door openings shall have a minimum clear width of not less than 32 inches, measured between the face of the door and the opposite stop with the door open 90 degrees.
2. Exit Doors: Exit doors shall swing in the direction of egress travel.
3. Double-leaf Doorways: If doorways have two independ- ently operated door leaves, then at least one leaf shall meet the requirements for clear width and maneuvering space.

**Guardrails**

1. Open sides of landings, floor surfaces, ramps, and stairways shall be protected by a continuous guardrail.

**Handrails**

1. Handrails shall be provided on both sides of ramps and stairs.
  - Exception: Handrails are not required on ramps where the vertical rise between landings is 6 inches or less.
2. Handrails shall be continuous within the full length of each ramp run or stair flight.
3. Inside handrails on switchback or dogleg ramps or stairs shall be continuous between runs or flights.
4. Non-continuous handrails for ramps and stairs shall have extensions as follows:
  - Ramp handrails shall extend horizontally at least 12 inches beyond the top and bottom of the ramp run.
  - Stair handrails shall extend horizontally at least 12 inches beyond the top and bottom risers.
5. Handrails may not project more than 4 inches into the required ramp, stair, or exit route width.
6. Stairways more than 88 inches wide shall have intermediate handrails."

# Building Design & Construction Systems

## ACCESSIBILITY/RAMP VIGNETTE

### Code

Comply with the following code requirements. These are the ONLY code-related criteria you are required to use.

### Definition

- 1. Accessible Means of Egress:** A continuous and unobstructed path of travel from an accessible space to a public way that is usable by a mobility impaired person. An accessible means of egress comprises the vertical and horizontal means of travel and shall include accessible exit routes, ramps, stairways, and doors.

### Maneuvering Clearances

- 1.** The minimum width of an exit route shall not be less than 44 inches.
  - ▶ Projections into a required exit route width are prohibited, except for handrail projections.
- 2.** The space required for a wheelchair to make a **180-degree turn** is a clear space of 60 inches in diameter, as shown in Figure 1.
- 3.** Minimum maneuvering clearances at doors shall be as shown in Figure 2.
  - ▶ The floor or ground area within the required clearances shall be level.

### Ramps

- 1.** Floors or walks in an accessible means of egress path of travel having a slope steeper than 1:20 (one unit vertical in 20 units horizontal) shall be designed as ramps.

FIGURE 1: TURNING SPACE

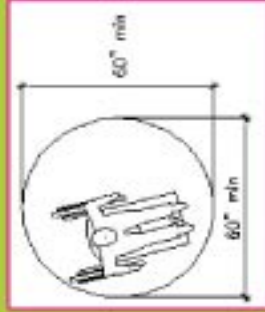
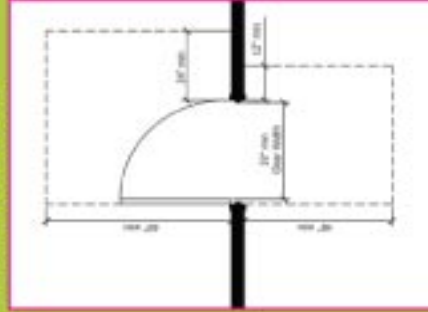


FIGURE 2: MANEUVERING CLEARANCES AT DOORS



- 2. Width:** The minimum width shall not be less than 44 inches.
  - ▶ Ramps shall not reduce in width in the direction of egress travel.
  - ▶ Projections into a required ramp width are prohibited, except for handrail projections.
- 3. Slope:** The maximum slope of a ramp shall be 1:12 (one unit vertical in 12 units horizontal).
- 4. Landings:** Ramps shall have level landings or floor surfaces at the top and bottom of each ramp run, all points of turning, entrance, exit, and at doors.
  - ▶ The least dimension shall not be less than the required width of the ramp.
  - ▶ The least dimension in the direction of travel shall be 60 inches.
  - ▶ If ramps change direction at landings, the least dimension shall be 60 inches.

### Stairways

- 1. Width:** The minimum width shall not be less than 44 inches.
  - ▶ Stairways shall not reduce in width in the direction of egress travel.
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- 2. Landings:** Stairs shall have a level landing or floor at the top and bottom of each stair run.
  - ▶ The width of a landing shall not be less than the width of the stair.
  - ▶ The least dimension in the direction of travel shall be 44 inches.
  - ▶ If the path of travel changes direction between stair runs, the least dimension shall be the width of the stairs.

# Building Design & Construction Systems

## ACCESSIBILITY/RAMP VIGNETTE

### Overview

### Sample Multiple-Choice Questions

### Accessibility/Ramp Vignette

### Stair Design Vignette

### Roof Plan Vignette

### References

#### 3. Treads and Risers:

- ▶ Minimum tread depth shall be 11 inches.
- ▶ Maximum riser height shall be 7 inches and minimum riser height shall be 4 inches.
- ▶ There shall be no variation in any riser height or tread depth within the complete stairway system.

#### Doors

1. **Width:** Door openings shall have a minimum clear width of not less than 32 inches, measured between the face of the door and the opposite stop with the door open 90 degrees.

2. **Exit Doors:** Exit doors shall swing in the direction of egress travel.

3. **Double-leaf Doorways:** If doorways have two independently operated door leaves, then at least one leaf shall meet the requirements for clear width and maneuvering space.

#### Guardrails

1. Open sides of landings, floor surfaces, ramps, and stairways shall be protected by a continuous guardrail.

#### Handrails

1. Handrails shall be provided on both sides of ramps and stairs.
  - ▶ Exception: Handrails are not required on ramps where the vertical rise between landings is 6 inches or less.
2. Handrails shall be continuous within the full length of each ramp run or stair flight.
3. Inside handrails on switchback or dogleg ramps or stairs shall be continuous between runs or flights.
4. Non-continuous handrails for ramps and stairs shall have extensions as follows:
  - ▶ Ramp handrails shall extend horizontally at least 12 inches beyond the top and bottom of the ramp run.
  - ▶ Stair handrails shall extend horizontally at least 12 inches beyond the top and bottom risers.
5. Handrails may not project more than 4 inches into the required ramp, stair, or exit route width.
6. Stairways more than 88 inches wide shall have intermediate handrails.

**Building Design & Construction Systems**

85 MC Questions +  
3 Vignettes

# Building Design & Construction Systems

Overview

Sample Multiple-Choice Questions

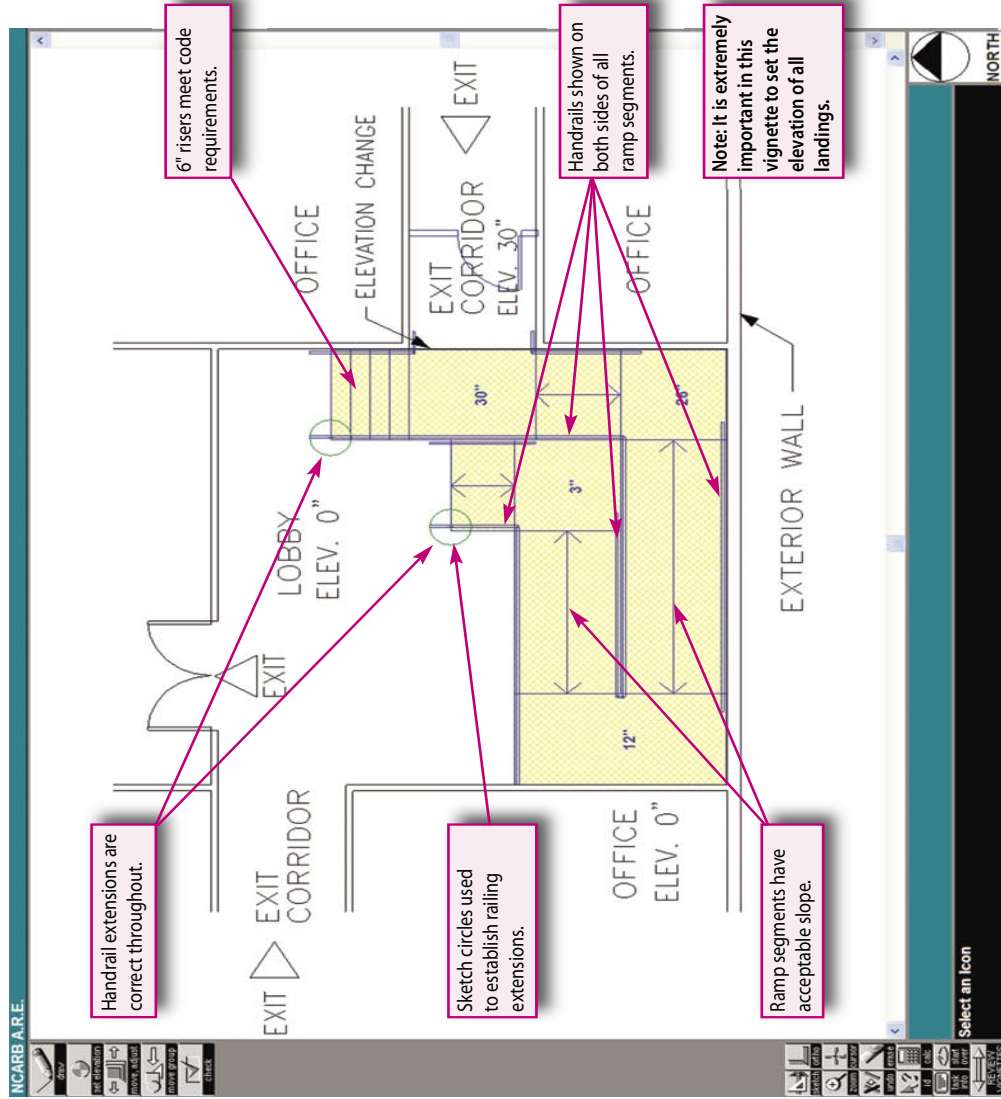
Accessibility/Ramp Vignette

Stair Design Vignette

Roof Plan Vignette

References

## ACCESSIBILITY/RAMP VIGNETTE - Sample Passing Solution



This vignette requires the candidate to connect two levels by means of an accessible egress stair and ramp system. The uppermost landing is set at the same elevation as the existing upper level. A simple ramp and stair system is shown with correct slopes for the ramps and the correct number of risers

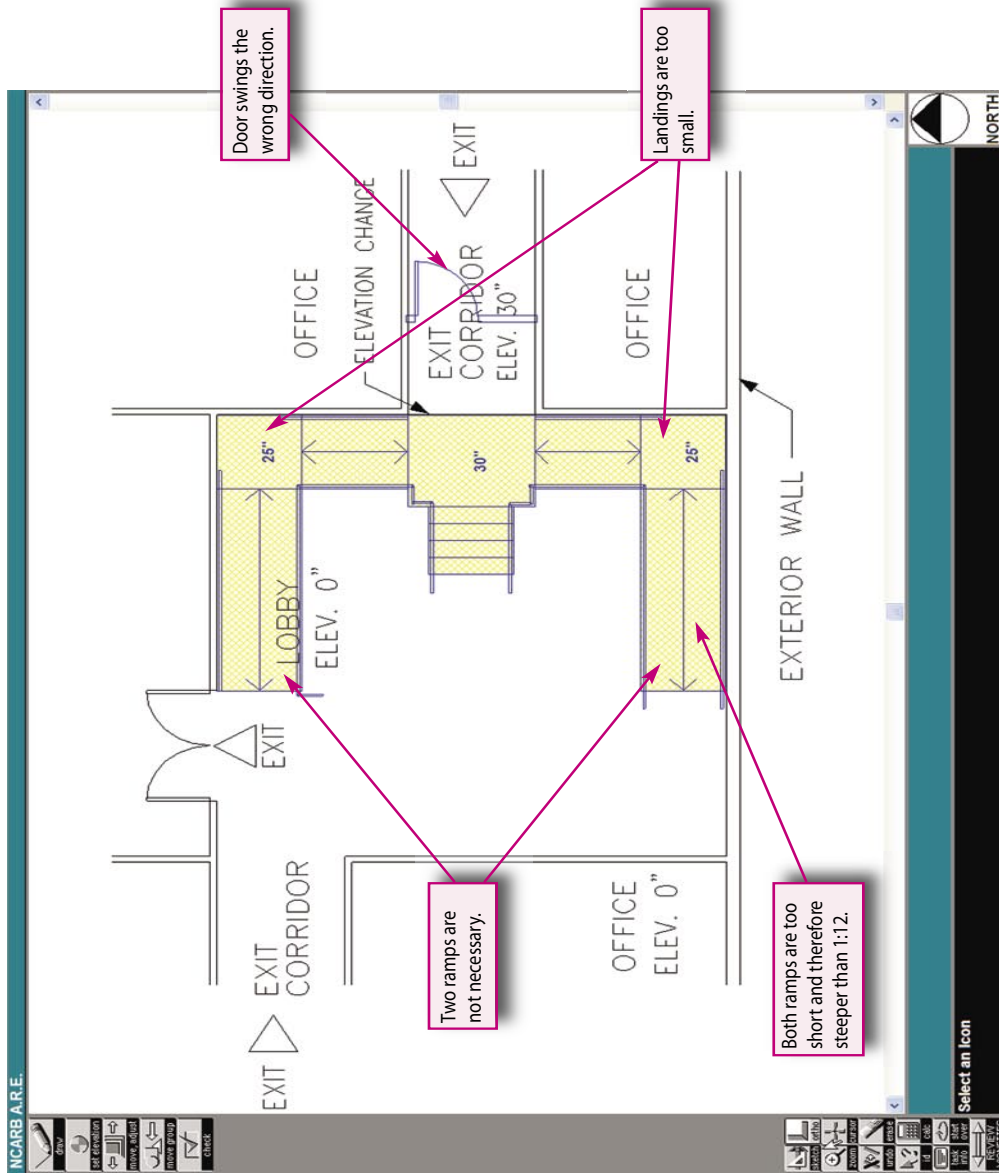
for the stairs. All necessary handrails are provided and extensions are correctly sized. The new door is the correct size and swings in the direction of egress travel.

### Procedural Tips

- ▶ Before you draw your stairs, you should calculate how many risers you need.
  - ▶ While you are drawing the stairs, the tread depth will be automatically calculated for you. This measurement is displayed in the **element information area** at the bottom of the work screen.
  - ▶ Be sure to keep scrolling until you have seen all of the Code information. Click on the down arrow on the scroll bar to ensure that you have seen all of the text.
  - ▶ When elements overlap, you may have trouble selecting a particular element. If this happens, keep clicking (without moving the mouse) until the desired element highlights.
  - ▶ **Check** overlaps while you are working through your solution.
- ### Warnings
- ▶ Be sure you are aware of the elevations of various parts of the base drawing.
- ### Tools You Might Find Useful
- ▶ **Zoom**
  - ▶ **Full-screen cursor**
  - ▶ **Sketch measure** or **sketch line** tools to lay out railings

# Building Design & Construction Systems

## ACCESSIBILITY/RAMP VIGNETTE - Sample Failing Solution



This solution creates an unusual system of two ramps with a stair between them. The ramps are only 11 feet long, making them steeper than the 1:12 maximum slope stated in the code. The top landings are too small and do not meet code requirements. Also, the new corridor door swings in the wrong direction.

Building Design & Construction Systems

85 MC Questions + 3 Vignettes

Overview

Sample Multiple-Choice Questions

Accessibility/Ramp Vignette

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