



Student
Chapters

NAHB Student Competition
Held in conjunction with the 2024 NAHB International Builders' Show
Problem Description Secondary Programs

Welcome to the 2024 NAHB Student Competition. Developed by the NAHB Student Chapters Advisory Board, the NAHB Student Competition is the highlight of the International Builders' Show (IBS) for student members. This year's problem will make for an exciting and challenging 2024 NAHB Student Competition.

The 2024 competition allows teams from Secondary Programs to compete in one of two tracks: Architecture or Construction Management. The Architecture track will develop a working set of drawings. The Construction Management track will not require a set of working drawings but will place greater emphasis on the estimating and scheduling for a more complex problem.

The information that you will use to develop your project and presentation is listed below and can be accessed through the NAHB Student Chapters web page [Secondary Problem](#). The Rules and Guidelines document includes the sample grading summary that the judges will use to score your project and presentation. *Please read all documents thoroughly.* If you have problems viewing any of the provided items, **please contact StudentChapters@nahb.org**:

- Rules and Guidelines
- Problem Description (included in this document)
- Plans
- Specifications for the Cabin B, Finish Package B, at Velvaere
- Estimate Template
- [Sponsor website](#)

Read and follow the instructions carefully and fulfill all the required elements of the exercise. Going beyond the required elements of the exercise, while it may show initiative, may hurt the overall team score if the basic exercise is not executed well.

I. Problem

The project is in Park City, Utah, in Velvaere, a Magleby Development community. Your team is an outside construction management contractor making a proposal to Magleby Development to build the assigned plan "Cabin B" on a pre-graded lot located at 10226 N LIV PL (lot C-07) within Velvaere. You must develop a complete set of working drawings (Architecture) or sketches specified below (Construction Management), a detailed cost estimate, and a complete construction schedule for the single story floor plan provided.

Teams on the Architecture track must develop a complete set of working drawings, a detailed materials and labor estimate, and a complete construction schedule for the two-story floor plan (basement + main level) provided.

Teams on the Construction Management track will create the sketches specified below, a detailed materials and labor estimate, and a complete construction schedule for the two-story floor plan (basement + main level) provided.

II. Design Criteria

The plan must allow for all items in the Specifications for the Cabin B at Velvaere, a Magleby Development community. Easements and setbacks are shown on the plot plan. The building has a basement and foundation is a 4” slab on grade with a typical 12” deep by 42” wide footing. All utilities are stubbed 5’ into the lot location for connection. Window schedule is provided below.

WINDOW SCHEDULE												WINDOWS ARE TYPICAL ON SCHEDULE. FOR SPECIFIC DETAIL REFERENCES, HEIGHTS, NOTES, ETC. SEE WINDOW GROUPS, ELEVATIONS AND DETAILS 4 & 5/A603 FOR APPLICABLE DETAIL REFERENCES.
MARK	UNIT SIZE		HEAD HEIGHT	OPERATION	MATERIAL	FINISH	DETAIL			GLAZING		COMMENTS
	WIDTH	HEIGHT					HEAD	JAMB	SILL	THICKNESS	TYPE	
	W003	3'-0"					2'-6"	10'-0"	FIXED	ALUMINUM	PAINT	
W004	9'-0"	9'-0"	8'-11"	DOOR SLIDER DOUBLE	ALUMINUM	PAINT	24/A504	22/A602	14/A602	PER MANUFACTURER	CARDINAL 366 LOWE	TEMPERED
W005	6'-0"	9'-0"	8'-11"	DOOR SLIDER DOUBLE	ALUMINUM	PAINT	11/A603	22/A602	14/A602	PER MANUFACTURER	CARDINAL 366 LOWE	TEMPERED
W006	9'-0"	9'-0"	8'-11"	DOOR SLIDER DOUBLE	ALUMINUM	PAINT	11/A603	22/A602	14/A602	PER MANUFACTURER	CARDINAL 366 LOWE	TEMPERED
W100	4'-6"	2'-6"	10'-0"	FIXED	ALUMINUM	PAINT	10/A603	16/A603	22/A603	PER MANUFACTURER	CARDINAL 366 LOWE	
W101	3'-0"	5'-0"	8'-0"	FIXED	ALUMINUM	PAINT	26/A603	16/A603	22/A603	PER MANUFACTURER	CARDINAL 366 LOWE	
W102	3'-0"	2'-0"	11'-0"	FIXED	ALUMINUM	PAINT	10/A603	16/A603	26/A603	PER MANUFACTURER	CARDINAL 366 LOWE	
W103	4'-0"	2'-0"	11'-0"	FIXED	ALUMINUM	PAINT	10/A603	16/A603	26/A603	PER MANUFACTURER	CARDINAL 366 LOWE	
W104	11'-10"	7'-11"	7'-11"	DOOR SLIDER TRIPLE	ALUMINUM	PAINT	26/A603	15/A603	24/A602	PER MANUFACTURER	CARDINAL 366 LOWE	TEMPERED
W105	4'-0"	6'-0"	9'-0"	CORNER WINDOW	ALUMINUM	PAINT	10/A603	17/A603	23/A603	PER MANUFACTURER	CARDINAL 366 LOWE	
W106	5'-0"	2'-0"	9'-0"	FIXED	ALUMINUM	PAINT	10/A603	16/A603	22/A603	PER MANUFACTURER	CARDINAL 366 LOWE	
W107	3'-0"	5'-0"	15'-0"	FIXED	ALUMINUM	PAINT	27/A603	16/A603	27/A603	PER MANUFACTURER	CARDINAL 366 LOWE	
W112	7'-10"	8'-0"	7'-11"	DOOR SLIDER DOUBLE	ALUMINUM	PAINT	26/A603	26/A602	24/A602	PER MANUFACTURER	CARDINAL 366 LOWE	TEMPERED

III. Problem Location

The project address is 10226 N LIV PL, Park City, Utah (lot C-07). The lot is graded, and the improvements are complete (streets, curb and gutter, and utilities to the lot).

IV. Applicable Building Codes

The plans shall be prepared to meet applicable building codes for Wasatch County and the State of Utah.

V. Specifications and Finish Schedules (See Specifications provided) Use Finish Package B for the Cabin B plan.

VI. Deliverables

A. Drawings

1. Architecture Track

Each team must produce a complete set of working drawings which are sufficient to allow a building permit to be obtained. **Your team should not change the shape of**

the home or the size and layout of rooms. Points will be deducted if these are altered.

Working drawings shall include the following:

- Cover Sheet
- Site Plan showing location of the home and utilities
- Foundation Plan(s) and Details
 - Replicate the Footing and Foundation Plan found on S201
 - Draw a Footing and Foundation Wall Detail for a “CW2” wall with a “FC33” Footing with a slab on grade. Example detail provided. Your detail should be dimensioned correctly as indicated by the wall and footing callout.
- Floor Plan(s)
 - Provide a floor plan for Level 0 (Basement)
 - Provide a floor plan for Level 1 (Main Floor)
- Framing to Foundation Detail
 - Provide a Foundation Wall to I-Joist Floor Detail. Sample provided.
- Elevations
 - Provide elevations of the North, East, South, and West sides of the structure. There is no need to provide any elevation views that are not captured by the general North, East, South, and West elevations. Example elevations are provided.
- Area calculations for heated and non-heated floor space under roof
- Roof Plan
 - Provide a Roof Plan. Example provided.
- Building Sections
 - Provide “Building Section 1”
 - Provide “Building Section 2”
- Drawings for Electrical, Plumbing and HVAC are **not** required.

Drawings shall be drafted using the following architectural standards:

- Sheet Title Block: Title block design shall be the same for each sheet, and

include the school's name, address, phone number, drawn by, checked by, revision space, sheet number, date drawn, date checked, sheet name and plan name.

- Sheet Size 22x34: Ensure that if judges print 11x17 (HALF SIZE) copies of the plans, they print out to exactly one-half scale
- Dimensioning shall be consistent with industry practice
- Dimension and Annotation text height shall be 1/8" (minimum). Text on half-size drawings must be readable by judges
- Floor plans shall be drawn to a scale of 1/4" = 1'-0"
- Details shall be drawn to show complete information. Consider 1" = 1'-0" a minimum scale
- Do not dimension in increments less than 1/4" (except diagonal or squaring dimensions)

2. Construction Management Track

Each team must produce sketches and drawings to assist in developing the estimate and documenting the quantities. **Your team should not change the shape or room configuration of the floor plan. Points will be deducted if these are altered.**

Drawings shall include the following:

- Site Plan showing the location of the home and utilities
- Exterior Wall Details showing: (1) Wood Frame + Stone Masonry, (2) Wood Frame + Wood Siding, (3) Wood Frame + Metal Paneling
 - Wall sections should include the use of a continuous exterior insulation product (e.g. Rockwool)
 - Wood Frame + Stone Masonry wall section should include a window intersection
 - Provide R Values of each material for the Wood Frame + Stone Masonry wall section
- Footing/wall detail
 - Draw a Footing and Foundation Wall Detail for a "CW2" wall with a "FC33" Footing with a slab on grade. Example detail provided. Your detail should be dimensioned correctly as indicated by the wall and footing callout.
- Flashing window detail
 - Provide a typical window flashing detail. Example provided.

- For more instruction see: [Window Flashing Best Practices Installation - Construction Instruction](#)
- Drawings must be well organized, neat and legible. They may be drawn using a CAD program, other drawing software or by hand. Hand-drawn sketches should be created using a straight-edge and appropriate tools to ensure lines are perpendicular. Sketches should be drawn to scale with the scale indicated on the drawing.

B. Material and Labor Estimate

Each team must complete a detailed estimate of the required material and labor for their plan.

- The estimate must be market-based, i.e., adjusted to the market area.
- All estimates should reflect the Finish Package B design option.
- The estimate will be judged on clarity, accuracy, and overall conclusion.
- The estimate must be completed using sheets from the file *2024 NAHB Estimating Template.xlsx*. This is just a template and teams are expected to edit it as they see fit. Teams enter the takeoff quantity, unit cost, and amount total for each item based on the unit of measure provided. Format the sheets with page breaks or blank rows before printing to provide a well-organized copy for the judges. All columns must print on one sheet. Each sheet **MUST** include the team/school name and page number.
- Each team must justify that the quantities and pricing are reasonable for the problem. Document the sources used for this justification

C. Construction Schedule

- Each team must produce a complete construction time schedule for the project showing a logical construction sequence (i.e., footings before trusses).
- The schedule shall include activity durations and dependencies.
- The schedule will be judged on clarity in the construction process. Teams should focus primarily on process (dependencies) and less on durations.
- Each team must justify that the schedule is reasonable for the solution to the problem. Justification sources must also be documented.
- Plan for construction to begin 4/1/2024

D. Presentation

February 26 - February 27, 2024: The 2024 competition presentations resume to an in-person format at IBS. **There will not be a virtual presentation option.** Every effort will be made to schedule presentations according to the stated preference, but NAHB Student Chapters cannot guarantee a particular time slot. Teams will be notified of the preliminary schedule after the competition entry deadline.

Each presentation should include a description and explanation of their drawings, estimate and

schedule. The presentation will be made to a panel of industry professionals, including the project sponsor, Shea Homes. The format will be a 10-minute presentation followed by questions.

The following elements shall be included in the presentation to the judges:

- Introduction of your team members and the school's name
- Overview of the plans and or drawing details
- Overview of the cost estimate
- Overview of the schedule and possible issues or problems that may come up during this project

It is highly recommended that all team members participate in the presentation and answer the judge's questions.