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FREE Site Grading Vignette!

- | example vignette!
- | passing solution!
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SITE PLANNING & DESIGN

FREE SITE GRADING VIGNETTE

ARCHITECT REGISTRATION EXAM® STUDY GUIDE



AUBREY BURACCHIO RA

DAVID DOUCETTE AIA, LEED AP, NCARB

ERIC COREY FREED RA, LEED AP, Hon. FIGP

NOTES

“Continuously nature shows him the science
of her remarkable economy of structure
in mineral and vegetable constructions
to go with the unspoiled character
everywhere apparent in her forms.”

– Frank Lloyd Wright

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ARCHITECT EXAM PREP
SITE PLANNING & DESIGN VIGNETTE REVIEW GUIDE
FIRST EDITION

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Architect Exam Prep, LLC
5348 Vegas Drive, Suite 288
Las Vegas, Nevada 89108
(702) 518-1787
www.ArchitectExamPrep.com

ARCHITECT EXAM PREP PRESENTS

SITE PLANNING & DESIGN VIGNETTE REVIEW GUIDE

FIRST EDITION

Aubrey Buracchio
RA

David Doucette
AIA, LEED AP, NCARB

Eric Corey Freed
RA, LEED AP, Hon. FIGP



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TABLE OF CONTENTS

THE FINE PRINT

Copyright & Usage	iv
About This Book	iv
About the Authors	v
How to Use This Guide	vi
Printing Tips	vi
How this Guide is Organized	vi
Software Tools	vii

SITE GRADING VIGNETTE

Problem Explained	3
Points to Remember	3
How to Determine the Finished Floor Elevation	4
Sample Vignette One: Program	5
Sample Vignette One: Graphic Problem	6
Sample Vignette One: Passing Solution	7
Sample Vignette One: Failing Solution	8
Sample Vignette Two: Program	9
Sample Vignette Two: Graphic Problem	10
Sample Vignette Two: Passing Solution	11
Sample Vignette Two: Failing Solution	12

SITE DESIGN VIGNETTE

Problem Description	13
Points to Remember	13
In the Beginning	13
Scoring Considerations	14
Some Notes on Trees	14
Get Organized	15
Sample Vignette One: Program	16
Sample Vignette One: Parking Diagrams	18
Sample Vignette One: Tree Diagrams	19
Sample Vignette One: Graphic Problem	20
Sample Vignette One: Passing Solution	21
Sample Vignette One: Failing Solution	22
Sample Vignette Two: Program	23
Sample Vignette Two: Graphic Problem	24
Sample Vignette Two: Passing Solution	25
Sample Vignette Two: Failing Solution	26

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ABOUT THE AUTHORS



Aubrey Buracchio

Aubrey Buracchio is a licensed architect in California and received her Bachelors of Architecture from Cal Poly Pomona in 2008. While in school, she held two internships with well known architecture firms in Orange County - KTG Group, Inc. and Humphreys & Partners Architects. She has also worked quite extensively as a consultant for architects as well as electrical engineers, such as JVArchitecture and Q3 Inc. She currently has a position with a high-end residential design firm in Irvine, California - TCA Architects.

Aubrey began studying for and taking the ARE exams in January of 2011, completing all 7 exams in just five months. She completed and passed the California Supplemental Exam in March 2012. Through the help of a study group to pass the final exam, Aubrey discovered a passion for helping other candidates get over the obstacles of the exam process and finding success in becoming architects.

Aubrey hopes to pass her success on to others through the development of Architect Exam Prep. She lives in Orange County, California with her husband and enjoys running half marathons and 5ks as well as participating in charity events for the local community.



David Doucette

David Doucette, AIA, NCARB, LEED AP is founder of Architect Exam Prep and CSE Prep and has been helping candidates successfully prepare for and pass the California Supplemental Exam (CSE) for the last four years. He also hosts a podcast dedicated to preparing for the California Supplemental Exam as well as CSE Video Tips.

David received a professional Bachelors of Architecture from the Boston Architectural College (BAC). After working in Boston for eight years, David moved to New York City where he worked for two years. In 2000, he relocated to Los Angeles and worked with Dennis Gibbens Architect, specializing in high end residential design. David established his own firm in 2002 and, after receiving his California architect's license in 2006, created Reside Architecture that included the implementation of a design/build model for 3 years in which he achieved a Silver LEED rating for a major remodel to an existing residence.

He is a licensed architect, general contractor, and real estate broker in the State of California as well as a licensed architect in New York and Nevada. David lives on the Westside of Los Angeles with his two boys. He enjoys social media, hiking, backpacking, rockclimbing, scuba diving, sailing, and running marathons.

Follow David on Twitter [@residedavid](https://twitter.com/residedavid).

Eric Corey Freed



Eric Corey Freed, LEED AP, Hon. FIGP, is Principal of organicARCHITECT, an architecture and consulting firm in California, with 20 years of experience in green building. He is a licensed architect in California, Arizona and New Mexico.

Eric co-developed the Sustainable Design programs at the Academy of Art University and University of California Berkeley Extension. He is a founding board member and current Chair of the Coachella Valley branch of the US Green Building Council, and sits on the Sustainability Commission for the City of Palm Desert. When Eric was just 25 years old, noted architect and critic Philip Johnson described him as "one of the real brains of his generation".

Eric is the author of four books, including "Green Building & Remodeling for Dummies", a bestseller with over 200,000 copies in print, and "Sustainable School Architecture." His latest, "GreenSense for your Home" won the 2011 Outstanding Book Award from the American Society of Journalists and Authors.

Follow Eric on Twitter [@ericcoreyfreed](https://twitter.com/ericcoreyfreed).

GETTING STARTED

HOW TO USE THIS GUIDE

Welcome to the **Site Planning & Design (SPD)** Vignette Review Guide. To best prepare for your exam, you should pair this workbook with the DIY Workbook and the Multiple Choice Study Guide, however, we suggest studying for each portion individually in order to best focus your efforts.

Our vignette study materials have two parts: Vignette Review Guide and DIY Workbook. The Vignette Review Guide will explain NCARB's program for each Vignette, describe tips and important things to remember, and offer a passing and failing solution that will further enable you to spot errors and understand the program. The DIY Workbook will then allow you to put into practice what you have learned through a variety of sample Vignettes, a few which you will be able to solve using NCARB's software and a few which will require you to sketch the solution freehand, or draft it on the computer. Remember, repetition is key to understanding what is expected for each Vignette, so practice is vital!

PRINTING TIPS & INSTRUCTIONS

This guide is designed to be viewed on your screen, or printed in either black & white or color. We've already formatted it for you to print on a standard printer and even to be printed double-sided. No need to waste paper, right?!

HOW THIS GUIDE IS ORGANIZED

This guide is not designed to teach you critical thinking or problem solving. This guide is designed to walk you through the graphic vignette problems and understand how to solve them correctly. We hope to clarify what you will be tested on in these vignettes, how you will be scored, and what you can expect to find on testing day. So in addition to showing you a PASSING solution, we have included a FAILING version so you can also learn what not to do. We want you to get into the mind of the computer and understand how you will be graded.

VIGNETTE TESTING TIPS

You should not waste time and frustrate yourself trying to memorize the exact configurations. The software allows for certain tolerances, typically within ten percent. The NCARB software is not AutoCAD, so you will not be expected to get everything perfect. Practice using the software until you are comfortable.

The vignette is testing your ability to work within set constraints, but the software allows for a 10 percent tolerance. Knowing this ahead of time will increase your confidence and make solving the problems much easier. So if the problem asks for a room to be 300 square feet, rest comfortably in knowing you could draw it at 270 or 330 and still get the problem correct.

ABOUT THE SPD EXAM

The Site Planning and Design (SPD) graphics divisions contain two vignettes: Site Grading and Site Design.

Site Grading: the purpose of this problem is to test you to modify a site's topography characteristics responding to a specific set of programmatic and regulatory requirements.

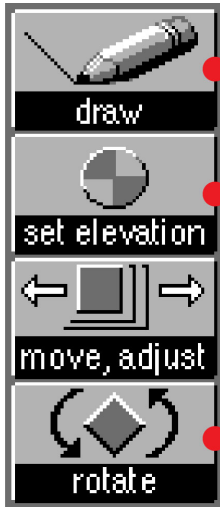
Site Design: the purpose of this problem is to test to see if you can design a site, including building placement, parking, vehicular circulation, pedestrian access, and respond to programmatic, functional, environmental and setback requirements. You have to do all of this while utilizing general principles of site planning.

You'll notice that no one is asking you design something pretty. Don't even try to create something beautiful, and definitely don't try to be innovative. You are not being tested on aesthetics. They want to see if you can apply requirements to solve a specific set of problems.

No one has ever won a Pritzker Prize from a vignette solution – so get over it and focus on passing!

Vignettes are graded by the computer and are not done on a pass or fail basis. The various parts of the program are weighted value in importance. Major elements are given more points than the small details. All of the parts are graded as acceptable, unacceptable or indeterminate. It is possible to get pieces of the vignette wrong and still pass the vignette. It's also possible to fail the vignette but pass the entire division.

SOFTWARE TOOLS



This tool is in every vignette and used to draw nearly everything, including trees, stairs, walls and entire objects. Once you insert an object, it is greyed out, which is a good way to make sure you've inserted everything in the program.

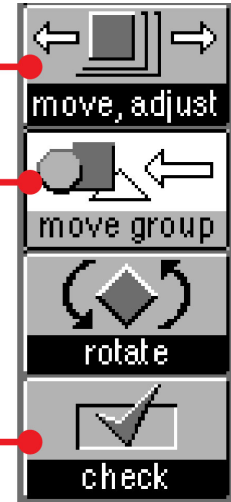
Click to set the elevation of your slab once it is in position. You can change the elevation after you've set it, so don't wait until the end to set your slab height.

Click this tool once, then click on any objects you want to rotate, then click on the tool again. All of the selected objects will rotate around their center. Move the mouse slowly for a more fine tuned angle rotation.

Once you've drawn something, this tool is used to adjust, resize, or move an object. Remember the software allows for a 10% tolerance so the size doesn't need to be perfect.

Click this tool once, then click on all of the objects you wish to move, then click on the tool again. All of the selected objects will move as a group. This is very useful for trying different layouts and moving them out of the way.

Click this tool to check to see if your drawing is meeting the requirements. This won't tell you if what you've drawn is correct, just that it completed the assignment.



Clicking on this tool will pop up a menu of options, including a useful grid and measurement tool. Here you can sketch circles or lines to use as a guide for your drawing. Sketched objects don't count, so double check your work.

This lets you zoom in and out, which is helpful for checking measurements. Don't waste too much time trying to get the measurements exact though. The software gives you a 10% allowance on size.

Similar to Erase, this tool deletes the last operation you performed. Speed tip: you can move something to see under it, and quickly hit undo to move it back.

This provides information about any object you select, including size, rotation angle, area, or type. If you've got extra time at the end, this is very helpful to check your work.

This button brings you back to the vignette program and instructions. You don't really need this though, as it is much faster to just use the space bar to toggle back and forth.



This tool locks your drawing into 90 degree mode, and should be used for most vignettes. Using this tool makes drawing faster, easier and much more accurate. Turn this on as soon as you enter the vignette.

After Ortho, this should be the next thing you click on. This is similar to the full screen cursor in AutoCAD and will help you draw faster. It will even help you find your cursor on the screen (easy to lose when you're rushing).

Click on this tool once, then click on all of the objects you wish to erase, then click Erase again. If you Erase something by accident, don't panic. Simply hit Undo.

Since you are not allowed to bring your own calculator into the testing center, this handy calculator includes scientific functions, such as sine and cosine. Speed tip: the numeric keypad on the keyboard can also be used to input numbers.

Don't use this tool unless nothing you did is worth saving and you just need to start again. This will erase everything you've drawn, including sketch lines. If you click it by mistake, then take a deep breath and hit Undo.

Once you've finished the problem and checked your work, click this button to jump to another vignette or exit the exam. Clicking this may also warn you that you haven't sufficiently completed the problem to submit it.

VIGNETTE REVIEW GUIDE FORMAT

These practice vignettes have been provided with both passing and failing solutions. As you review the problems, don't just look at the specific details of each problem, but instead focus on the approach to the problem. Your solution in the real exam will probably be completely different. There are usually many passing solutions.

Before you look at the passing and failing examples, attempt to solve the problem yourself. We've called out notes on each solution so you can understand why it was done that way and how it will be graded.

The **Site Planning & Design** Graphics Division consists of two vignettes: **Site Grading and Site Design**. They are taken together within a two-hour period, and you are allowed to switch back and forth between them by clicking on the "Review Vignettes" button in the left side toolbar. When (and only when) you are finished both vignettes, click the "Exit Section" button.

This exam is extremely focused, so review these sample problems completely. This way you'll know before the actual exam what type of problem you will be solving. Site Grading, for example, asks you to regrade a sloping site with adequate drainage. In Site Design, you are required to provide parking and access for vehicles. We have made all of our sample problems similar in approach to the actual test. We've also included NCARB sample problems which use the same program provided to candidates in the NCARB study guide. We tweaked these programs a little so you could practice with something slightly different than the NCARB practice vignette. These vignettes can be solved using the NCARB software as well.

Remember to use your notepaper and keep track of your time carefully. It's often silly mistakes in mathematics that will cause fatal errors. So breathe deeply, try to imagine yourself comfortably at work and tackle each problem carefully.

A detailed topographic map with contour lines of varying thickness and spacing, representing elevation changes across a terrain. The lines are black on a white background.

Site Planning & Design

Site Grading
Site Design

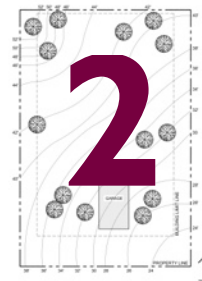
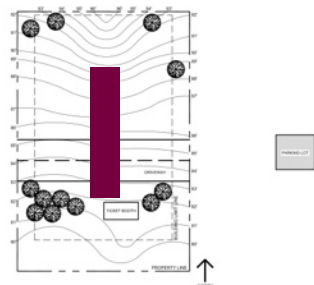
Exam Introduction	0:15
65 Multiple Choice Questions	1:30
Break	0:15
Graphics Introduction	0:15

GRAPHICS EXAMS:
Site Grading & Site Design 2:00

Exit Questionnaire	0:15
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Total Appointment Time	4:30
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NOTES



PROBLEM DESCRIPTION

This vignette is designed to test your understanding of basic grading and water drainage techniques. Being able to understand how topography, and the grading of contour lines, impacts a site and potential building is a fundamental skill every architect should be able to perform.

POINTS TO REMEMBER

The main issues being evaluated on this vignette are the following:

- **Does the candidate (that's you) follow the maximum and minimum slope requirements and draw them correctly?**
Use the formulas below to stay in compliance!
- **Is the site graded so that water will drain properly around all the site features as stated in the program? Don't over/under grade the site!**
- **Are any trees, rocks, existing site features, etc., protected and undisturbed as stated in the program?**
Keep contour alterations completely away from any protected features!
- **Are the contour alterations kept within the confines of the building limit and property lines? Don't alter contours outside of the property/building lines!**
- **Are the contours drawn correctly (no overlaps or missing sections, spaced evenly apart at flat site areas, etc.)?**
Keep to the minimum spacing and follow the slope!
- **Is the finish floor elevation indicated on the level area to be built?**
Don't forget to identify the finished floor elevation for your level area and follow the program requirements!

To make sure you keep these issues in mind and address them accurately, consider the following:

Minimum & Maximum Slopes - What do those percentages mean?

Check the contour intervals shown on the site plan. It may be drawn in increments of 1', 2', 5', etc. This information is VITAL in figuring out the minimum and maximum slopes for grading. Also remember to verify which direction the contours are sloping to make sure water drains in the right direction. In general, here are a few key things to remember:

- Swales are created when contour lines point up towards the higher level.
- Crowns are created when contour lines point down the slope. Crowns are useful when designing drainage on roadways to shed water off the road and into adjacent runoff basins.

To determine the minimum spacing between contours, use the following formula based on the maximum slope allowed on the site:

$$W = I / S$$

Where **W** is the spacing **WIDTH** required between contours;
I is the contour **INTERVAL** shown on the site;
and **S** is the maximum **SLOPE** gradient.

For example, if your site shows a contour interval of 1' with a maximum slope gradient of 10%, the minimum spacing required between separate contour lines (lines at different height elevations) would be

$$W = 1' / .10 = 10'$$

meaning that as you draw your contours, make sure they are spaced AT LEAST 10 feet apart or the slope will be too steep and therefore your solution will be incorrect. Using sketch circles with the diameter of the minimum slope width is a helpful tool to double check your spacing.

INTRODUCTION

HOW TO DETERMINE THE FINISHED FLOOR ELEVATION

Before beginning your solution, one of the first things you should decide is which contour line will be used to create the level area for the item to be placed. In some cases, a particular elevation or location on the site will work better than others. Finding a fairly evenly graded portion of the site is helpful as the contour lines will be easier to manipulate. Avoid areas with closely grouped contours as those indicate steeper sections of the site.

Once you choose your contour line, that becomes the base level you will use to determine your finished floor. For example, say you choose the contour line with an elevation of 86'. If the program states that the finished floor must be located at least 6" above the level area, your finished floor will be 86'-6".

Don't go crazy with this number... even though the NCARB program says AT LEAST 6" above, there is no need to exceed that requirement (remember efficiency!).

A word on swales...

Creating swales will likely be required in order to properly shed water away from the level area you will be instructed to design for. A swale is created by altering a contour line that is at one height elevation to form a channel for water to flow steadily down a slope.

To do this, you must alter the contour by redrawing some segment of it to form an arrow or ^ pointing uphill, all while maintaining your minimum spacing width between the adjacent intervals at different height elevations. However, you must be careful not to go overboard and draw your swales too long or large. In order to comply with the minimum slope requirement (remember we used the maximum slope in the above formula to find contour spacing), use the same formula, this time replacing the S value with the minimum slope requirement.

For example, if your site shows the same 1' contour interval with a minimum slope of 1%, the maximum spacing between contour lines would be:

$$W = 1' / .01 = 100'$$

which means that as you draw your swales, the furthest point on the swale must not be more than 100' from the nearest point on the adjacent swale.

Are you confused yet?

Don't worry, we'll break it down in the next example problems.

FREE VIGNETTE: SITE GRADING

PROGRAM

A new home will be built on an empty lot on a sloping site.

1. Place the building pad for the home on the site within the building limit lines.
 - Re-grade the site to create a level area for the building pad.
 - Indicate the finish floor elevation of the building pad. The finish floor elevation must be 4" above the level area.
2. Re-grade the site so that water will flow around and away from the building pad.
 - The slope of the re-graded portions of the site shall be at least 2% and no more than 15%.
 - Contour lines between property lines and building limit lines may be manipulated.
3. The existing garage and trees shall not be disturbed.
4. Changes in site topography not required for proper drainage should be avoided.

Start this one off just like the first one, using the program chart to get organized:

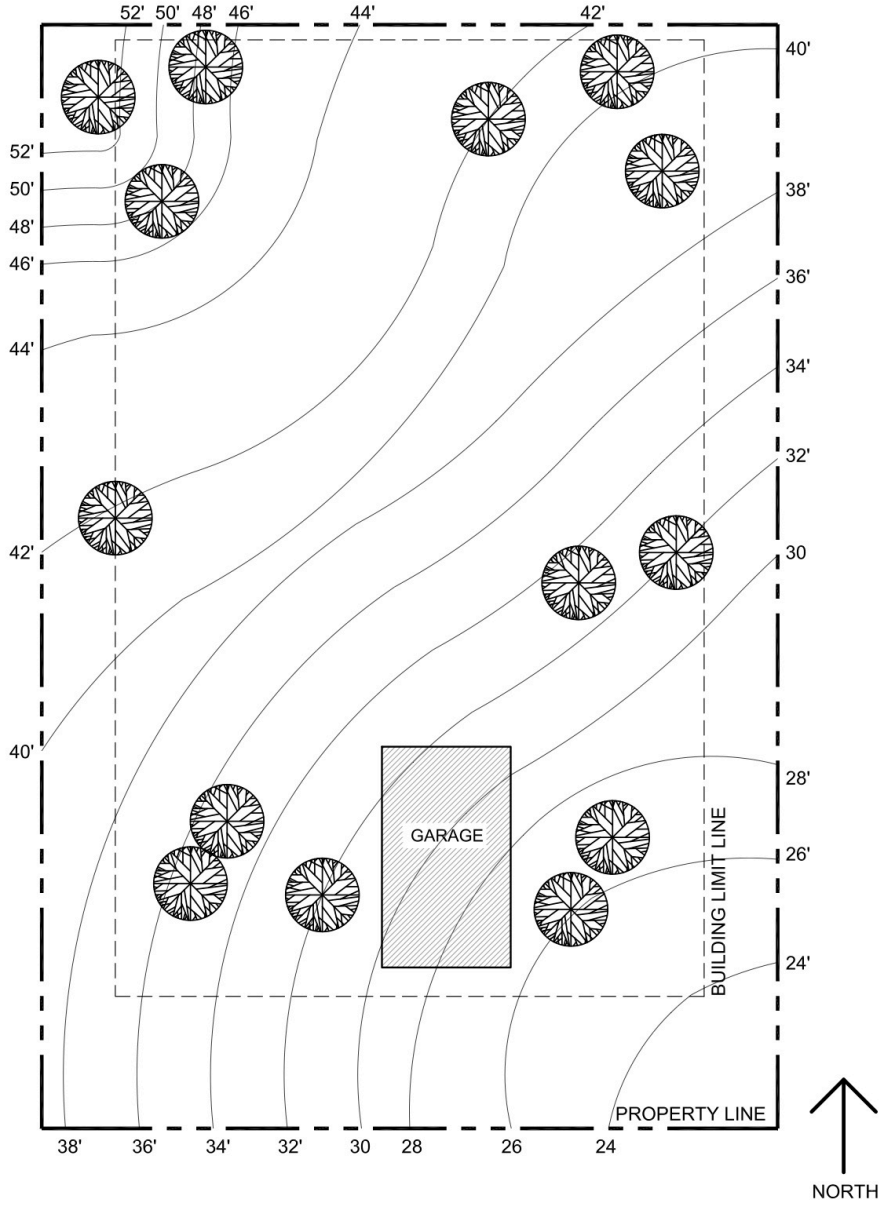
Contour Interval	Direction of Slope	Elevation of Finished Floor	Min. Spacing (W = I/S)	Max. Spacing (W = I/S)	Do Not Disturb	Notes
2	NW to SE	4" above level area	Max Slope = 15% W = 2'/.15 = 13.33'	Min Slope = 2% W = 2'/.02 = 100'	Garage, Trees	Avoid contours outside building line

Hmmm... this one looks tricky! After calculating our minimum spacing requirement, we get a fraction. In this case, we have two options: use the 13.33' value (which ends up being 13'-4"), or round up to the next whole number of 14' (round UP not down as this is a MINIMUM requirement).

The NCARB software does allow for slight tolerances in dimensions so the 8" difference should be ok. Also, since this is a MINIMUM requirement, you want to make sure to stay above the value and not fall below it and be subject to potential loss of points or, worse yet, triggering an automatic fail. Since we are dealing with minimum and maximum slope requirements (which is a HUGE part of this vignette), be sure to calculate your slopes carefully.

CAVEAT: A fractional minimum or maximum distance would likely not occur on the actual exam. We have included it here for discussion purposes of how to approach slope requirements and to make the problem a bit more difficult.

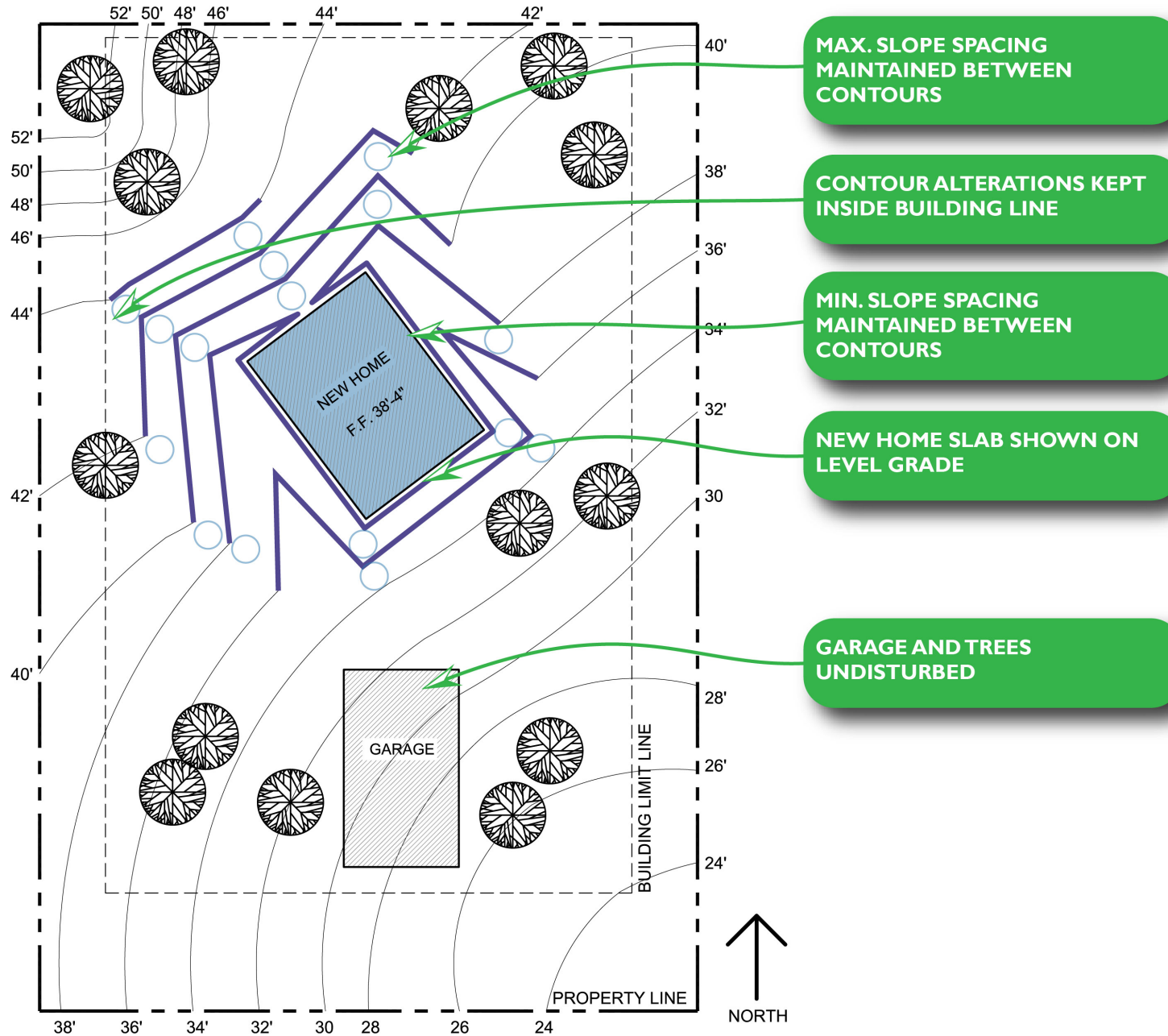
GRAPHIC PROBLEM



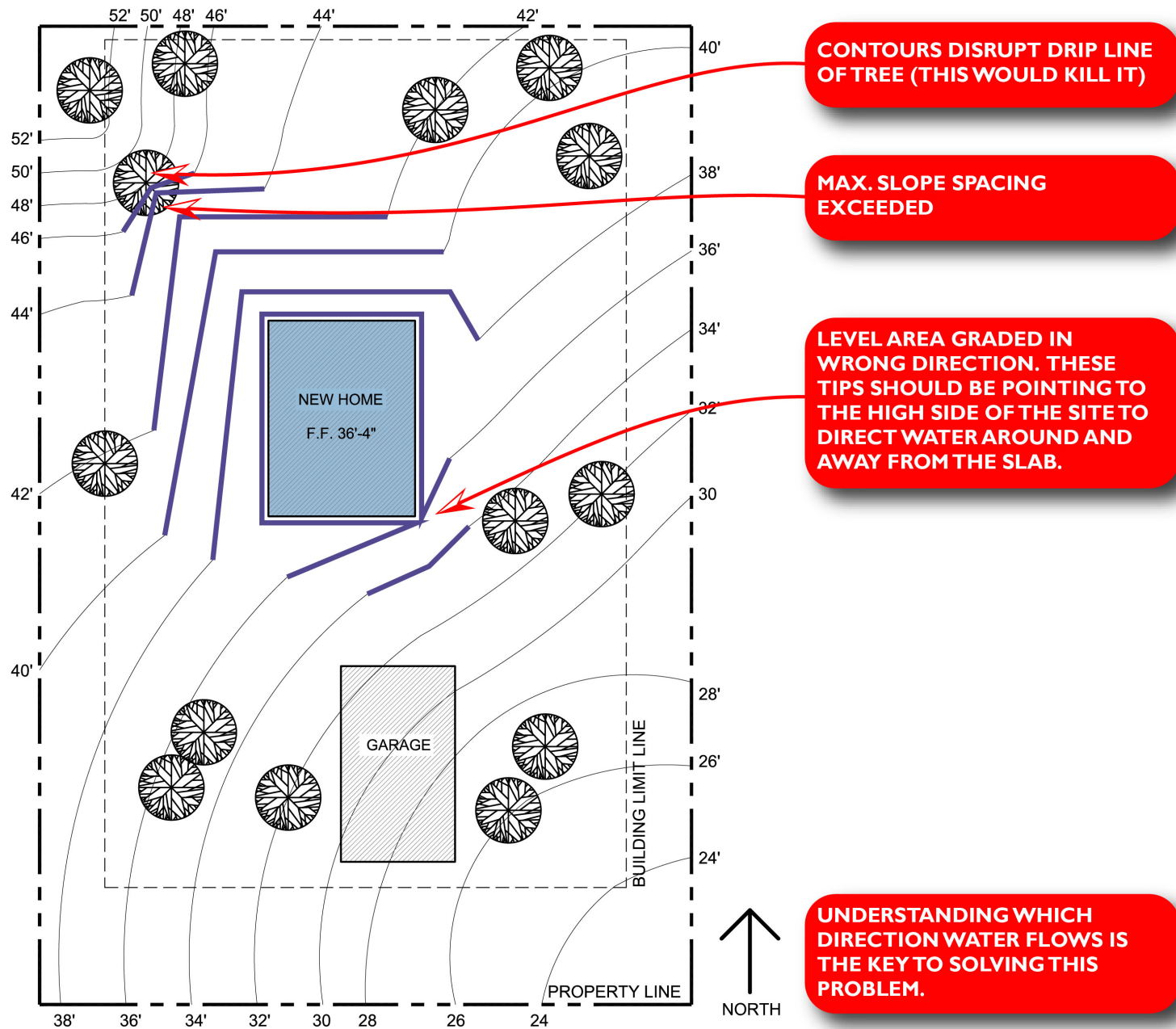
This vignette represents the blank problem you'll see as you open the vignette.

Print this out to try the problem by hand before jumping ahead and looking at the passing and failing solutions.

PASSING SOLUTION



FAILING SOLUTION



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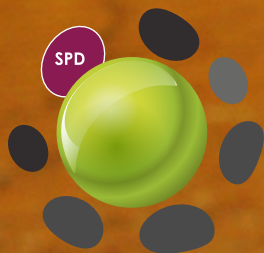
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