

SETTING ELEVATIONS & LAYOUT

How to determining various elevation constraints within the space

When first looking at a landscape project to layout we must first understand what the set elevation constraints are. What are the things that cannot change within the space that we have to design around.

1. Main home elevations
 - a. Garage floor height
 - b. Access door elevations
 - c. Window Wells
 - d. Gas meters
 - e. Pool supplies
2. Roadways, curbs and sidewalks
3. Outbuildings - such as sheds, detached garages, Pool houses, etc
4. Existing patios, pools, pergolas, etc
5. Existing retaining walls and steps
6. Fences and gates
7. Existing trees and shrubs and hedges

The landscape package will be designed around these elements and all new elements will reference these points to ensure all aspects work within these constraints. Each one of these points will be marked and elevation will be shot to be entered into the landscape plan

How to determine project zero(s)

A project zero is a set elevation point that all other elevations for projects features are referenced off of. This is how we determine which height to install all patios, walls, shrub beds ,etc off of.

Picking the correct zero point within a project is critical to ensure all other features and elements can be referenced through the project without issue.

Typically a project zero is chosen from one of the constraint elevations listed above. You cannot just pick any point within this space as throughout the install process these elevations might be disrupted.

For example: If there is an existing concrete patio at the backdoor of a home, we will be replacing that patio with a paver patio but maintaining the same height. This seems like a good point to reference off of. However, once we remove that existing concrete pad our project zero will no longer be there to reference for the remainder of the project install.

It is crucial to pick a zero point within the existing elevations constraints that:

1. Will not change throughout the entirety of the project
2. Is in an area that will make it easily accessible throughout the project

There are cases where multiple project zeros are used to help simplify the layout and installation process. An example of this might be a front and back yard of a project. You don't have to have to run to the front of the house to get your project zero from the garage floor to get the backyard patio elevations. In this case you could pick a zero point for the front yard (the garage floor) and for the backyard (bottom of the rear patio door sill).

There is a feature a zip level has that allows you to leapfrog the base unit of a zip level through the space while maintaining the same zero point. This is especially helpful if you have a large backyard project where the zip level cannot reach across the entire space. Using this feature avoids any unnecessary math from having to pick another zero point throughout the space and making the necessary adjustments to the grades within the grading plan. This can avoid costly mistakes from avoidable errors. See the zip level SOP to learn how we can complete this process.

How to calculate square and methods for ensuring square

There are many ways to ensure you are square. Which method used is depends on what it is you are trying to square.

Firstly you need to determine what you will be referencing to find your square:

1. The wall of a house
 2. Another landscape feature within the yard (a shed, an existing retaining wall, a fence)
 3. A road or curbside
 4. A pool
 5. A property line
 6. Etc
1. To ensure you are square to a house, garage, existing retaining wall, etc when laying out a reference line that is parallel to the reference point:
 - A. Take the longest point possible on your reference.
 - a. For instance, if you are trying to layout a patio off of two reference walls in the properties backyard. One wall is 5' while the other is 20'.
 - b. Always reference the longest point possible in all situations.
 - B. Measure from one end of that feature out to the determined length as specified within your landscape plan and place a stake in the ground on that mark
 - C. Complete the same process for the other end of the measurement and place a stake in the at the opposing side of your intended line in which you are laying out.

- D. Run a string line between these newly placed stakes and ensure the string is as tight as possible without shifting the stakes or breaking the line. (see CRL's string line SOP to better understand how to attach and use string lines)

Using and string - <https://www.youtube.com/watch?v=cv6BdwMe560>

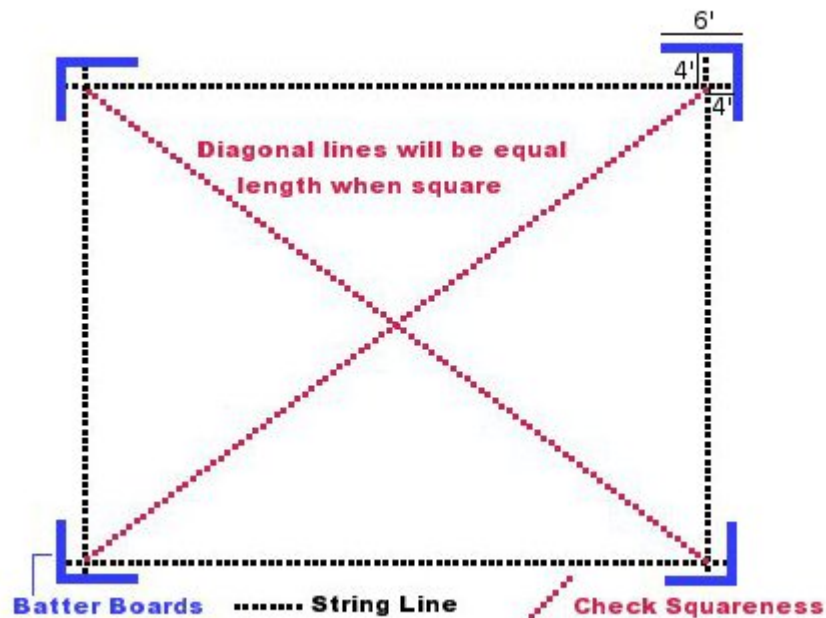
- E. Double check the measurement of each reference point and ensure your string is set exactly where your landscape plan has specified (when laying out patios or hard surfaces, ensure to include overprep requirements for the specified surface)

- 2. Ensuring you are square to a reference line that is perpendicular to that chosen reference line.

- a. If a perpendicular reference point already exists, use stakes and a string line as laid out above to mark this perpendicular line.
- b. If a perpendicular reference point does not exist use the 3-4-5 method to ensure you have a perfect 90 degree angle to your perpendicular reference line.

3 - 4 - 5 Method - <https://www.youtube.com/watch?v=69cslx6ER7k>

- c. Once you have confirmed your corner is square measure on an angle from one corner to the opposite opposing corners of your laid out area in a x pattern. If your area is perfectly square both these measurements will be the exact same.



Common abbreviations and symbols used to depict elevation plans

TOSG - Top of sub-grade
TOBG - Top of base grade
TOHS - Top of hard surface
TOFG - Top of finished grade
TOW - Top of wall
BOW - Bottom of wall
TOS - Top of stair
BOS - Bottom of stair
TODP - Top of Drain Pit
BODP - Bottom of drain Pit
TOD - Top of drain

Common excavation depths for various landscape aspects

Shrub beds -	15"
Turf areas -	8"
Paver hard surface -	8" + paving stone thickness
Paver edging -	8" + paving stone thickness
Concrete hard surface -	8" + concrete thickness
Asphalt hard surface -	8" + asphalt thickness
Block wall -	16"
Crusher chip - pedestrian -	4"
Crusher chip - Vehicular -	6"
Artificial turf -	8"
Post holes -	36"
Concrete footings -	24"
High voltage electrical -	18"
Irrigation wire -	10"
Lighting wire -	8"
Natural Gas Lines -	18"
Irrigation main line -	10"
Irrigation lateral line -	8"
Irrigation drip -	6"
Ram line -	Surface anchor
Irrigation conduits -	8"
Valve box/manifold -	16"
Bend a Board -	6"
Aluminum Edging -	4"

Laying out an excavation area and depth of various sections within a landscape plan

1. Go to the setting out page (L3) within your design package
2. Use the provided measurements to layout the specified area using a tape measure, paint, string lines, and stakes.
3. If the measurements are not shown clearly on the setting out plan, use 2 -3 reference points within the setting out plan to layout the area.
4. Go to CRL's standards page (L12) and review the standards relating to the specific area in which you are working.
5. Using CRL's Standards determine:
 - a. Width or area of excavation (including over prep if required)
 - b. The depth to top of sub-grade within the specific area you are working
 - c. Elevations in relation to the grading plans (L4) zero point
6. Move to the grading plan (L4) in your landscape package.

How to determining and set grade points within a landscape

Ensure you have the correct tools and supplies to set up your grade points within a landscape:

1. Landscape plan
2. Zip level
3. Stakes
4. Hammer
5. Pencil or sharpie
6. Marking paint
7. Tape measure 30' and 100'
8. 8" galvanized nails
9. String line
10. 6', 4', 2' level
11. Plum bob

Understanding typical grading stake language

1. Cuts stakes (C)
2. Fills stakes (F)
3. Offset (OS)
4. Carrot - line that mark physically on the stake that marks the height to grade to
5. Benchmark stake (BMK) - references a hub. A hud is a stake placed in the ground that is at a specific Height to reference within the property.
6. Hub - A hub is a stake placed in the ground that is at a specific Height to reference within the property.
7. Property line stake (PL)

How to read grade stakes: <https://www.youtube.com/watch?v=kdzcUAgU4f4>

Laying out grade points

1. Using your grading plan determine the area you want to mark out with grade stakes
2. Determine the scale specified within the grading plan sheet
3. Use a tape measure to determine the measurements that will be used to layout out your individual grade points within the area
4. Install a stake to mark the grade points you have measured
5. Determine whether you will need to offset your stakes to allow for excavation
6. Determine the need for a hub to reference while excavating
7. Label your stake for the specified grade point and mount the stake in that position
8. Continue setting your grape stakes until your area has been completely laid out

Practical Exercise:

We are going to layout a small block wall on the North side of the farm house using all of the above techniques.

Information we need: This is all the information you would find in a landscape package and where you would find it.

Materials (Landscape plan L1)

Valley stone block 18"L x 12"D x 8"H
Valley stone caps 18"L x 12"D x 4" H

Layout (Setting out plan L3) -

The block wall will start 8' inside the front and back corner of the farm house
The block wall will be set out 8' off the farm house and return to meet the north side wall of the farmhouse on both ends of the wall

Grades and Elevations (Grading plan L4)

Zero point = Top of the bottom sill of the basement window at the north east side of the farm house
TOW - will be set to +34 above zero

1. Layout and mark the block wall
2. Layout and mark the excavation zone for the block wall base
3. Determine how many rows of block will be needed to meet CRL's standards for block wall installation
4. Determine excavation depth to the TOSG (top of subgrade)
5. Layout and mark your grading stakes with a proper offset to allow excavation