



## Quantity Take-Off Brief Guide

Quantity take-off lab

*CM 20. Fall 2020.*

This document summarizes the quantity take-off activities that you learned in this lab

In the upper left corner of each page you will find information about the different items that we addressed in the lab:

- ✓ General
- ✓ Demolition and removal
- ✓ Excavation
- ✓ Pavement
- ✓ Landscape
- ✓ Piers
- ✓ Metal siding and wall panels

General

Quantity Take-Off Brief Guide

CM 20. Fall 2020.

Always check the scales and use each one in the related drawing

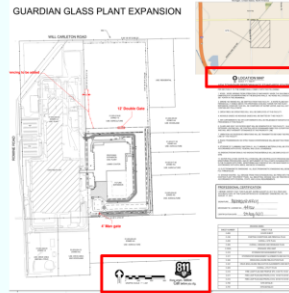
1. Select Measurements Tool

2. Select Calibrate

3. Select either preset or custom

4. Input corresponding scale

5. Apply scale to page



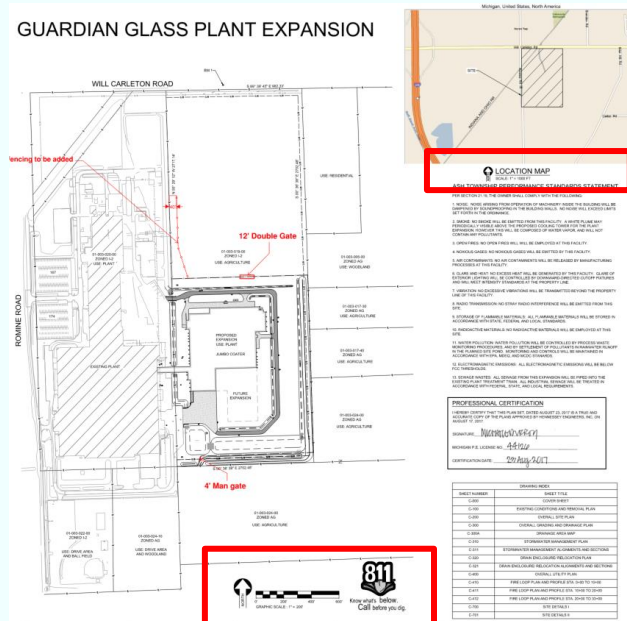
Bluebeam tips



- Case 1. Sediment basin
- Case 2. Culvert
- Case 3. Dich

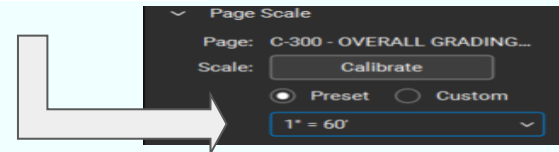
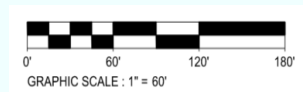
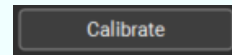
- Drilling
- Concrete
- Rebars

Always check the scales and use each one in the related drawing

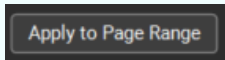


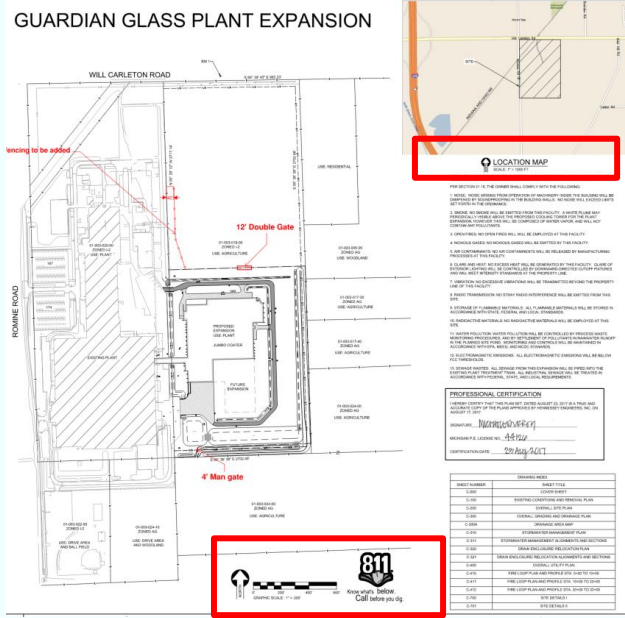
**Bluebeam tips**

1. Select Measurements Tool
2. Select Calibrate
3. Select either preset or custom
4. Input corresponding scale



5. Apply scale to page

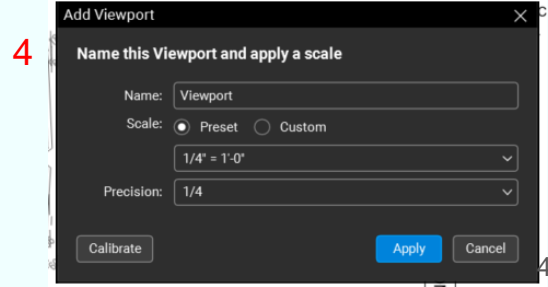
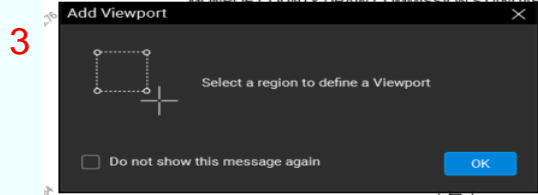
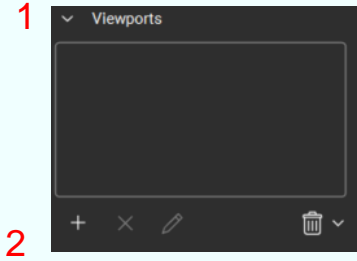


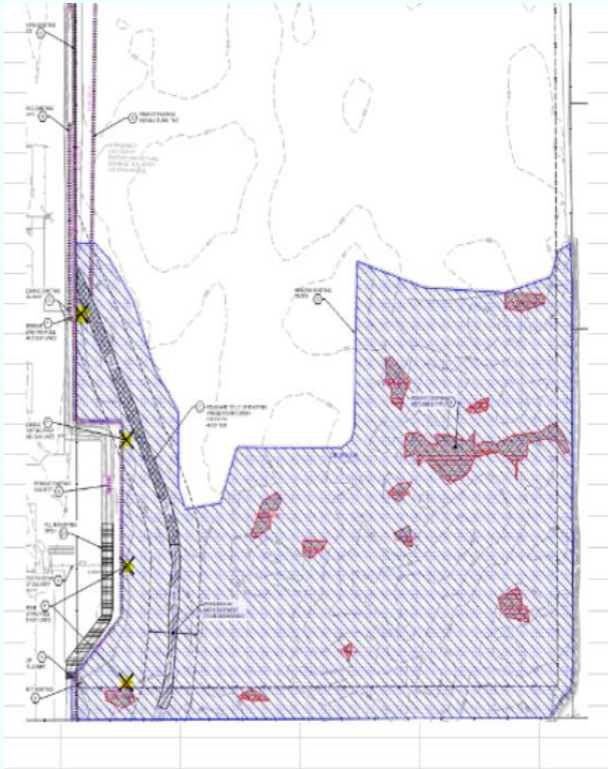


Drawings with multiple scales use the view ports tool

1. Under measurements select viewpoints
2. Select add viewpoint
3. Select viewpoint region
4. Select scale

Bluebeam tips





It is very important to measure everything that needs to be demolished and removed from the site before the construction of the project

## Areas

1. Calibrate scale as described in slide 1

2. Under measurements select area



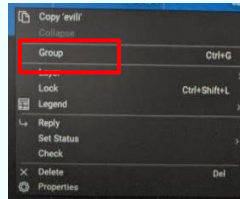
3. Measure area of interest and press enter or double click



4. To group multiple areas together select markups tab

5. Select all the areas you will like to group

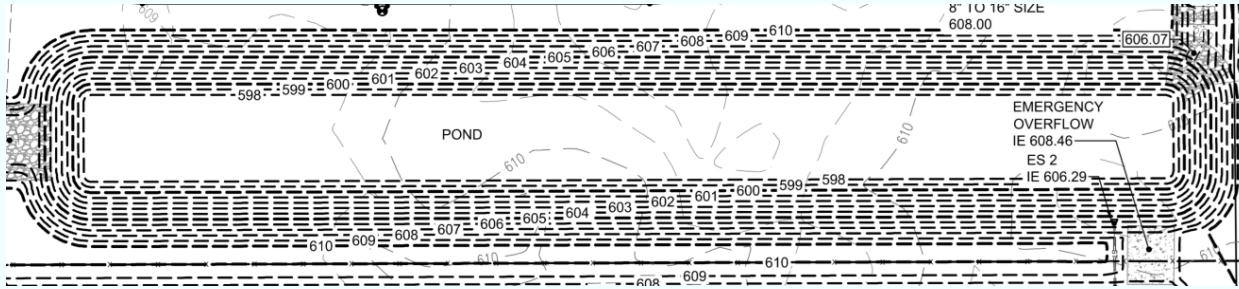
6. Right click and select group



## Bluebeam tips

				1,431'-5"	46,529.50 sf
Draft Print			nileshm		
Area Measuremen...	lntel		732'-9 3/4"	32,189.06 sf	
Area Measuremen...	lntel		317'-10"	6,314.00 sf	
Area Measuremen...	lntel		380'-9"	8,026.44 sf	

If you only have grade lines ( example: sediment basin)



## Method 1

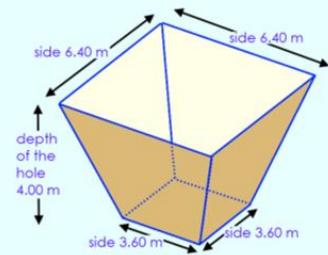
Use geometric figures from which you can calculate the volume using a formula

Measure A1 and A2 in your drawing and apply the formula

The frustum of a square pyramid is a square pyramid with the top truncated (chopped off).

1. Calculate the **volume of the earth to be removed**.

hole dug in the form of a frustum of a square pyramid



*Volume of Frustum*

$$V = \left(\frac{h}{3}\right) * (A_1 + A_2 + \sqrt{A_1 * A_2})$$

*V = volume of frustum*

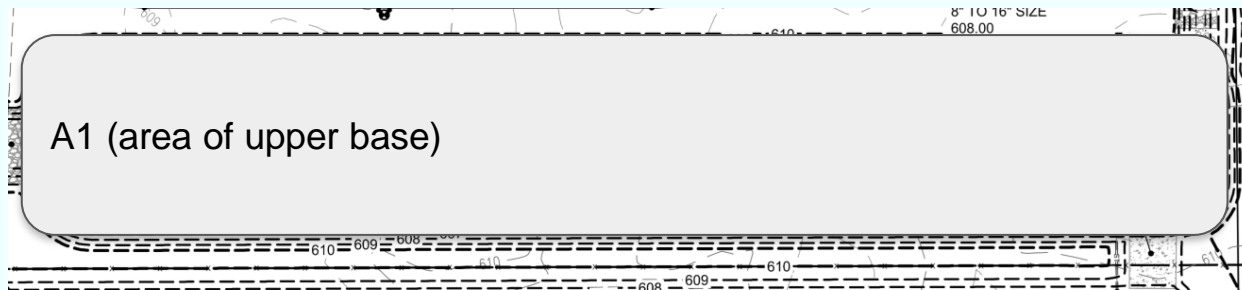
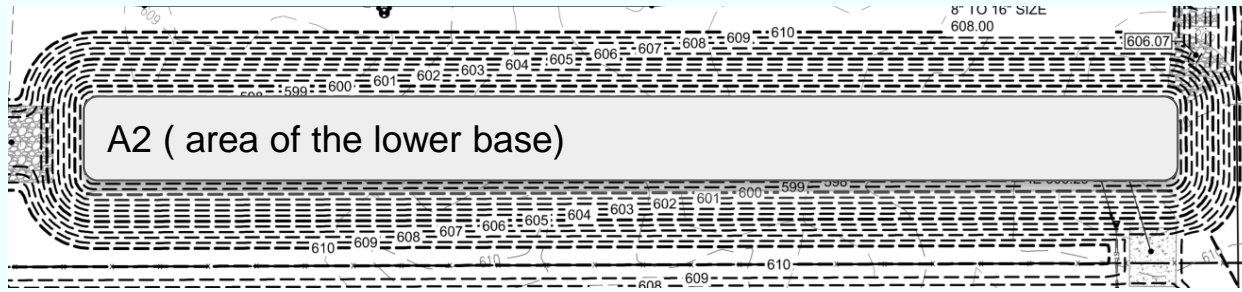
*h = height of frustum*

*A<sub>1</sub> = area of upper base*

*A<sub>2</sub> = area of lower base*

If you only have grade lines ( example: sediment basin)

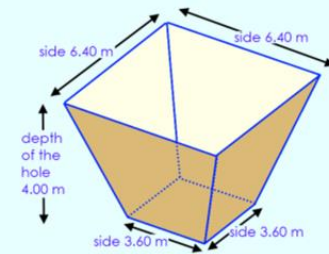
### Method 1



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hole dug in the form of a frustum of a square pyramid



Volume of Frustum

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*V = volume of frustum*

*h = height of frustum*

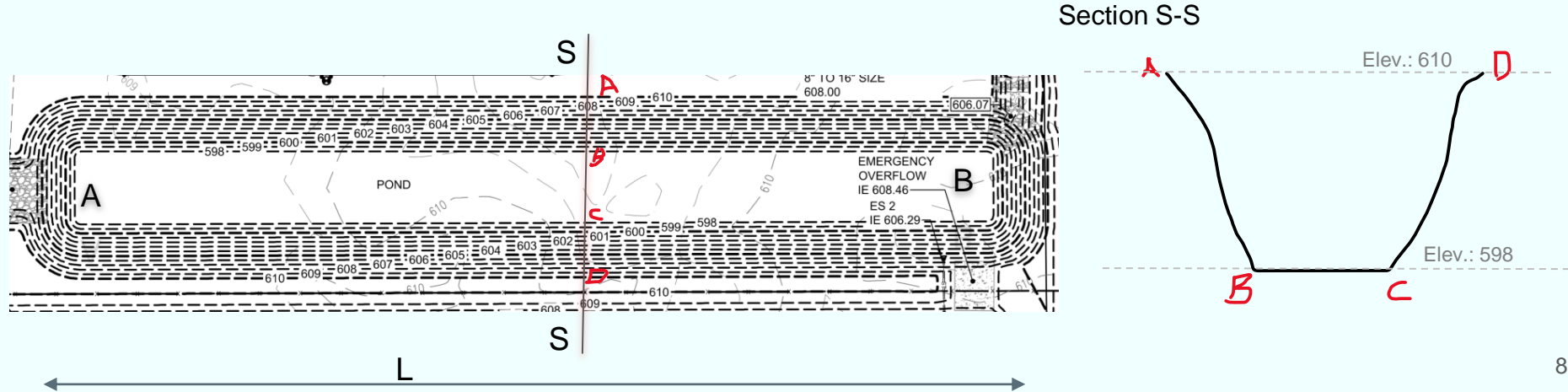
*A<sub>1</sub> = area of upper base*

*A<sub>2</sub> = area of lower base*

If you only have grade lines ( example: sediment basin)

## Method 2

1. Using the cross-section method ( this will be less accurate because A and B sides have slope)
2. Draw the section S-S & calculate the area ( Polygon A-B-C-D)
3. Multiply the section by the length L ( measure the length in the sediment basin scheme)





If you only have a general section ( example: culvert # 5)

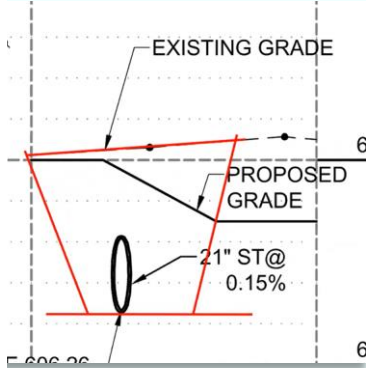
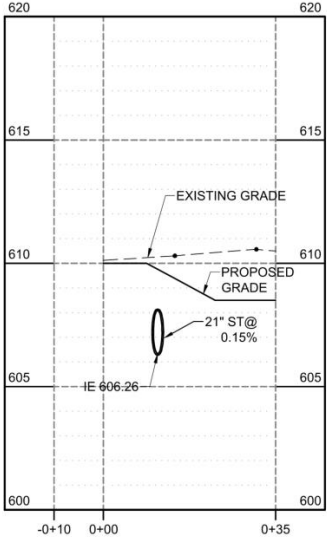
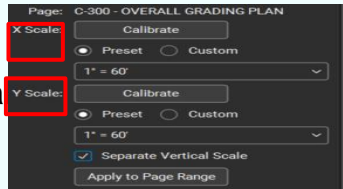
**Bluebeam tips**

**Heads up!**

You have two scales.  
You need to calibrate both



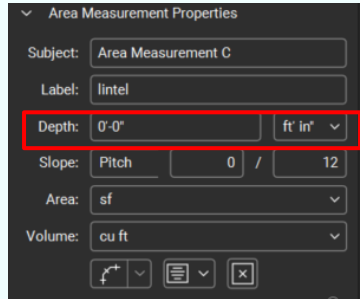
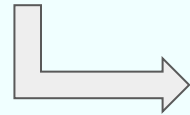
1. Select Separate Vertical Scale
2. Input X ( Horizontal) scale and Y(vertica



Create the area of your excavation. This is all the section that we need to excavate to place the culvert at the defined elevation.

F-F CULVERT #5 SECTION  
C-310  
HORIZ: 1" = 20'  
VERT: 1" = 4'

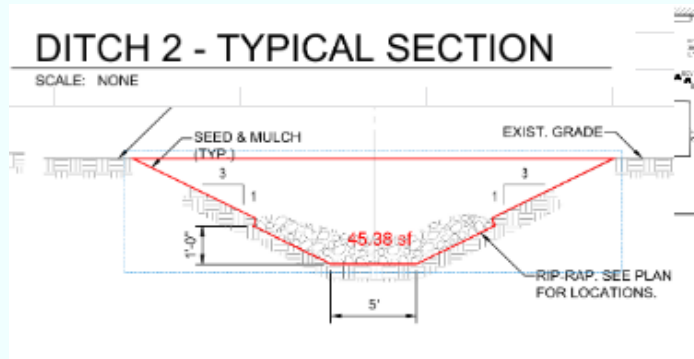
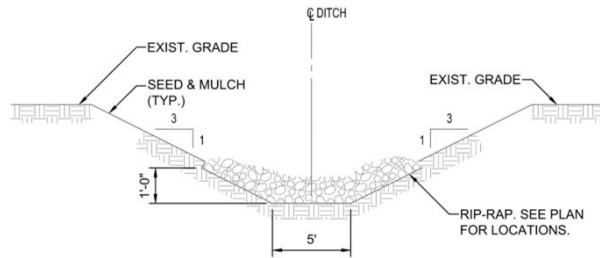
Multiply the area by the length of the culvert



If you only have the section ( example: ditch 2)

Obtain the are of the dich

Multiply the area by the length of the culvert

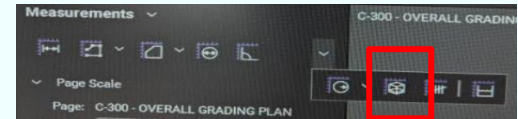


### Bluebeam tips

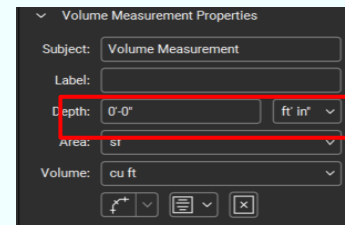
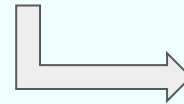
1. Select measurements
2. Under measurements tab select drop down arrow on the far right corner



3. Select volume measurement

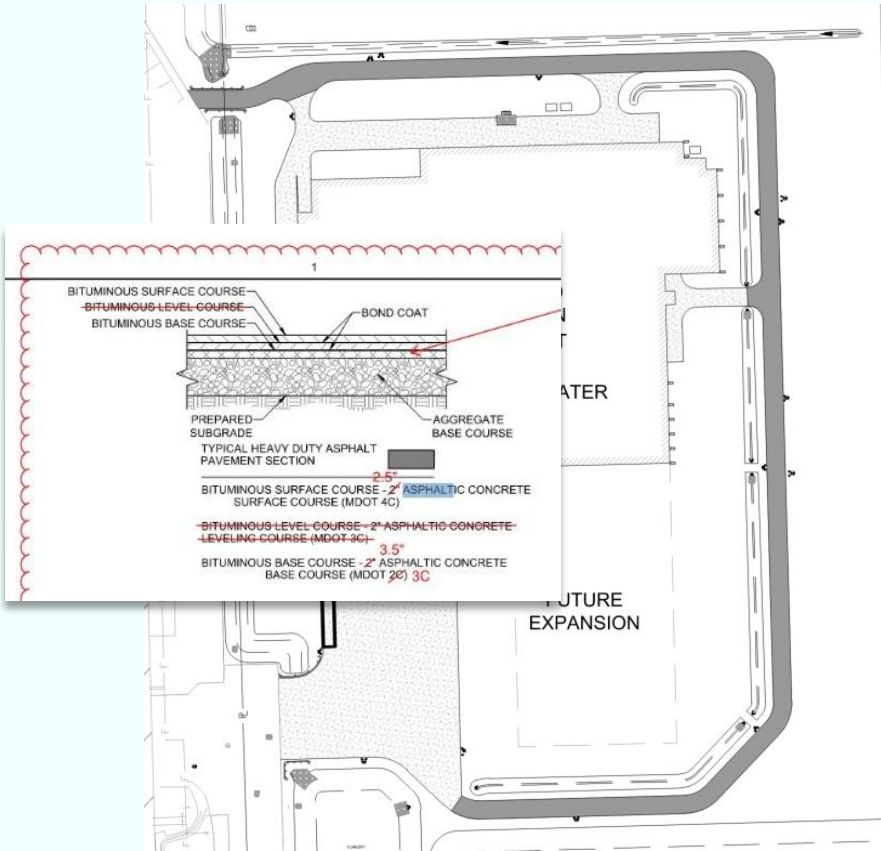


4. Input length


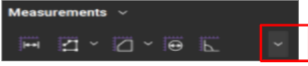
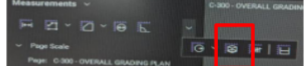
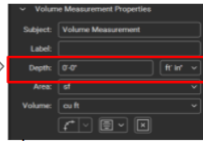


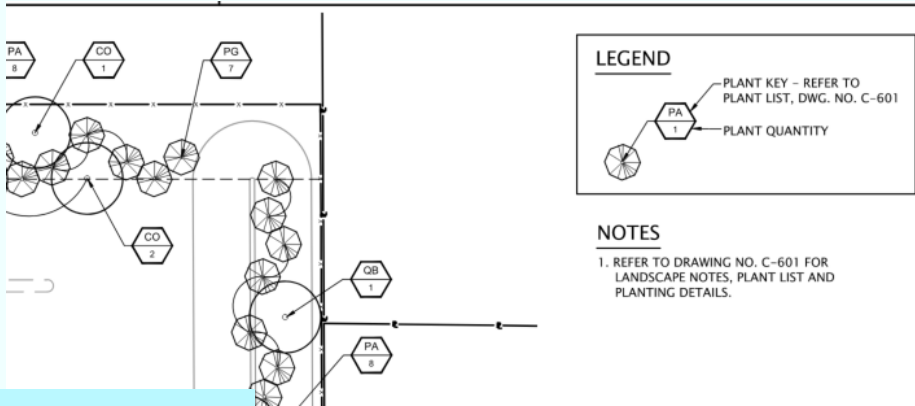
5. Measure cross section area and press enter

- You can calculate the volume of pavement by knowing the surface and the thickness of each layer.
- Different layers might have different price, so you need to quantify the volume of each layer separately.
- The volume will be the area multiplied by the thickness
- You will find the pavement thickness in the pavement's section



**Bluebeam tips**

1. Select measurements 
2. Under measurements tab select drop down arrow on the far right corner 
3. Select volume measurement 
4. Input thickness of pavement 
5. Measure area of pavement and press enter



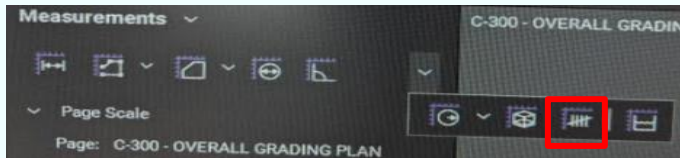
Each project will have different landscape design.

You need to review the different elements that you need to consider.

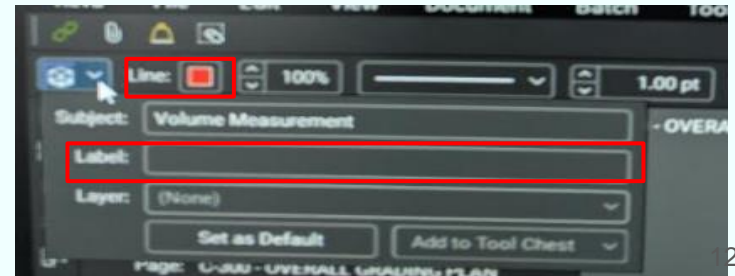
If you have different trees, you need to count them separately

## Bluebeam tips

1. Select measurement, under measurement tab select drop down arrow, select count tool



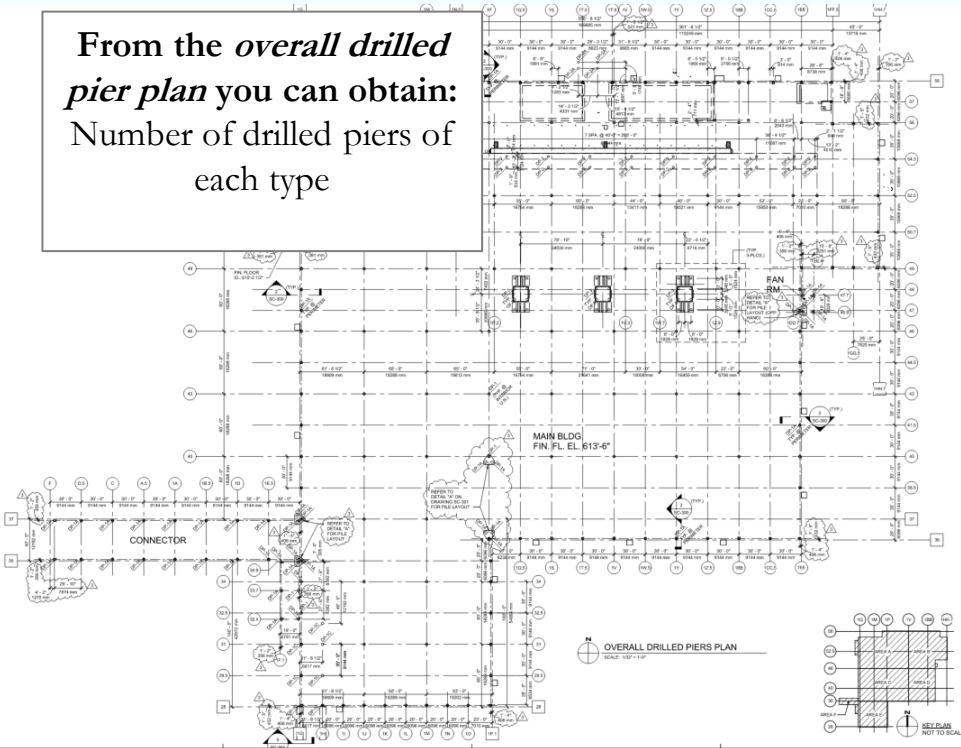
2. In the upper right corner select click on volume create label and color code to help you count as required.



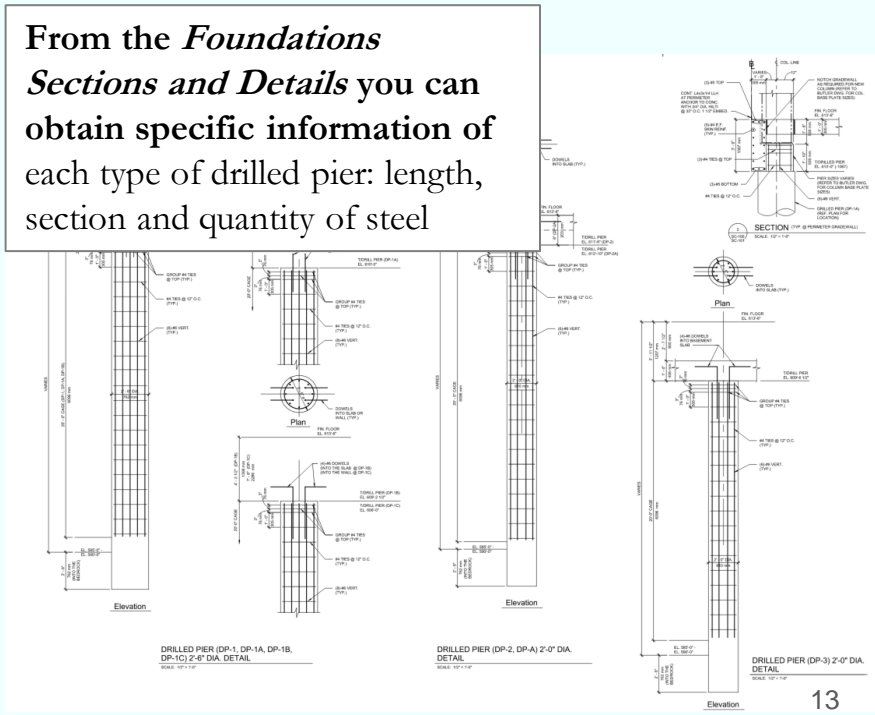
Drilling, rebar, concrete

- Drill : LF ( Length)
- Concrete CY (Volume)
- Rebar: LB ( Weight)

From the *overall drilled pier plan* you can obtain:  
 Number of drilled piers of each type



From the *Foundations Sections and Details* you can obtain specific information of each type of drilled pier: length, section and quantity of steel



**Drilling, rebar, concrete**

- Drill : LF ( Length)
- Rebar: LB ( Weight)
- Concrete CY (Volume)

Identify the types of piers defined in the project



Create your pier schedule for having the information organized and clear



Include: type of pier, diameter, vertical reinforcement, ties, length and minimum embedment

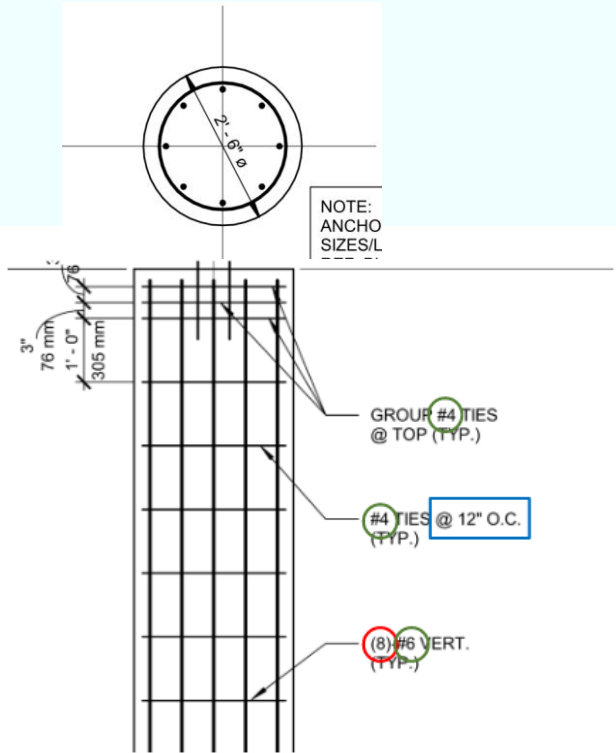
Pier Schedule

Type of Pier	Diameter (in)	Vertical reinforcement	Ties	Length (ft)	Minimum embedment (ft)
DP-1	30	(12) #6	#4 @ Top	20	2.5
			#4 @ 12" OC		
DP-1A	30	(12) #6	#4 @ Top	20	2.5
			#4 @ 12" OC		
DP-1B	30	(12) #6	#4 @ Top	20	2.5
			#4 @ 12" OC		
DP-1C	30	(12) #6	#4 @ Top	20	2.5
			#4 @ 12" OC		



# Rebars

- Rebar: LB ( Weight)



Separation  
Diameter  
Number

In each pier:

## Vertical rebars

- Count the number of rebars
- Measure their length
- Do not forget to consider the dowels

## Horizontal rebars

- Count the number of rebars
- Measure their length

## Heads up!

You need to check the length in the section.

The length of the ties might be the length of a circumference or a square like the pictures below

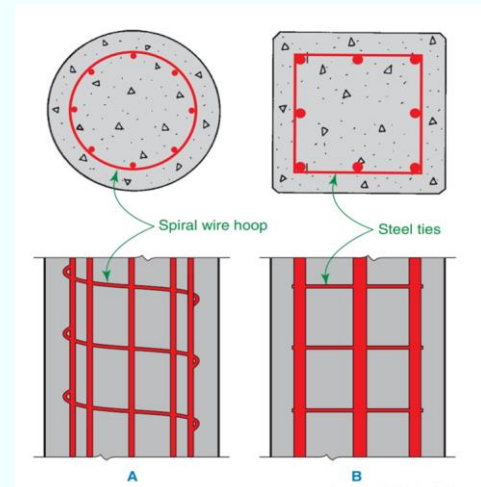


Figure 11-8. Two types of reinforced concrete columns. A—Spiral column. B—Tied column.

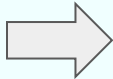


Rebars

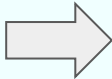
- Rebar: LB ( Weight)

Rebars weight of one type of piers

**Total length**  
 Number of piers  
 X  
 rebars' length per pier



**Weight/length coefficient**



**Total Weight**  
 Total length  
 X  
 weight/length coefficient



Rebar Weight

Rod Number	Rod Size (in)	Rod Weight (lb per linear foot)
2	0.250 = 1/4"	0.17
3	0.375 = 3/8"	0.38
4	0.500 = 1/2"	0.67
5	0.625 = 5/8"	1.04
6	0.750 = 3/4"	1.50
7	0.875 = 7/8"	2.04
8	1.000 = 1"	2.67
9	1.128 = 1 1/8"	3.40
10	1.270 = 1 1/4"	4.30
11	1.410 = 1 3/8"	5.31
14	1.693 = 1 3/4"	7.65
18	2.257 = 2 1/4"	13.60

• 1 in = 25.4 mm  
 • 1 lb/ft = 1.5 kg/m

Metal siding and insulated translucent wall panels



You need to measure the area of these elements

### Bluebeam tips

For measuring areas:

The following video will explain how you can use Bluebeam to help you measure multiple areas using the area and polygon cutout tools

<https://youtu.be/pifXqu6JyrY>

