

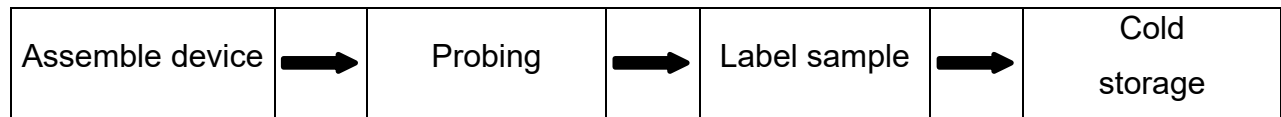
# SOP: Giddings Coring and Sectioning

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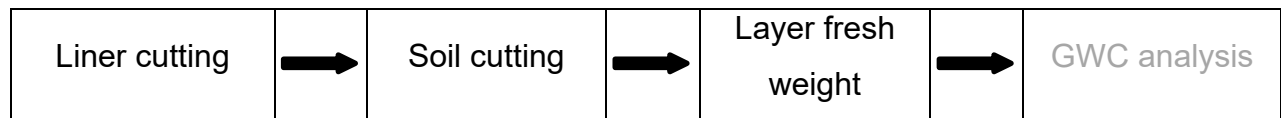
## Overview:

This standard operating procedure (SOP) describes a protocol for subsurface soil coring and sectioning cores at target depth. The procedures contained in this document are to be used by field personnel when collecting and handling soil samples in the field. These methods are similar to those employed using direct-push approaches, but with the added advantage of measuring bulk density to enable calculation of soil stocks.

### Giddings Coring



### Sectioning



## Safety:

All standard safety protocols and online safety training via UIUC [Division of Research Safety \(DRS\)](#) are required.

Personal protection (PPE) for this procedure include:

Body Protection: Comfortable field working boots

Hand Protection: Gloves

## Instrumentation & Consumables:

### General

- Sharpie
- Wire flags (short ones are best)
- Personal protective equipment
- Site sampling plan
- Global Positioning System (GPS)
- Tape measure

## Giddings Coring Equipment

- Giddings rig with the following:
  - Adapter
  - Adapter Pin (take a few extra)



- Soil Tube (solid metal tube used with liners; not the slotted one)
- Bit



- Plastic Liners and red/black liner caps



- Needle-nose pliers
- Soil Tube Wire cleaning brush; Drill with battery
- PVC/Wooden Push probe cleanout 'device'/stick/rod

## Sectioning Supplies:

- Stainless steel knife (any knife that can cut soil)
- Base to hold core in place—tighten to the table
  - If not available, cut a PVC pipe in half length-wise and to correct length to support core. Label PVC to appropriate length of sample depth if necessary
- Meter stick
- Geoprobe liner cutter



- Resalable plastic bags
- Sharpies
- Pens/pencils to record weights
- Data recording sheets. For example:

Site	Core ID	Layer (cm)	Core length (cm)	A horizon (cm)	Layer fresh weight (g)	Tin (g)	Fresh mass + tin (g)	OD mass + tin (g)	OD mass (g)	GWC
Douglas	1	0-15								
Douglas	1	15-30								
Douglas	1	30-45								
Douglas	1	45-60								
Douglas	1	60-75								
Douglas	1	75-90								
Douglas	1	90-105								
Douglas	1	105 -								

- Scale

### Detailed Procedure:

## Assembly/Field preparations

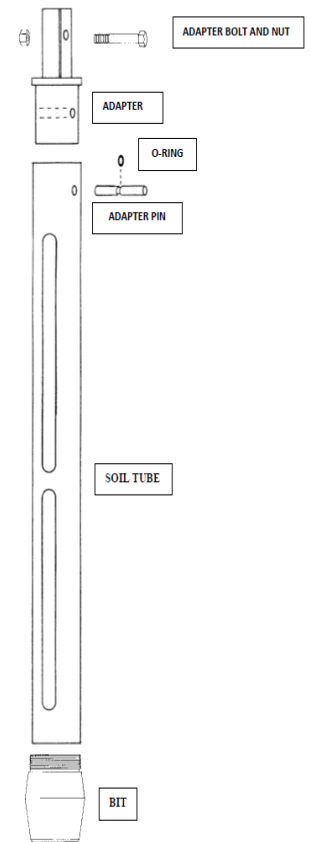
1. Assemble the sampling device as follows:
  - Lower the Kelly bar (not pictured) to sampling height (as opposed to raised transport height). Attach adapter to the Kelly bar with bolt & nut. Screw bit onto the soil tube.
  - Slide a plastic liner inside the tube from opposite end of the bit.
  - Attach the soil tube to the adapter using a pin.

## Probing

2. Adjust probing unit so it is vertical/perpendicular/level with the ground.
3. Clean debris from where probe will penetrate soil.
4. Lower the support shoe using the hydraulic lever.
  - MAKE SURE THERE IS A LINER IN THE TUBE BEFORE PROCEEDING--**
5. Lower the probe/tube to the desired depth using the hydraulic lever.



## SOIL TUBE & COMPONENTS



6. Raise the probe then remove the adapter pin to remove the soil tube.

7. Use needle nose pliers to pull the plastic liner out of the tube, being careful not to lose any of the sample. Pushing the soil from the bit end of the probe may be necessary to help remove the liner (push gently to avoid soil compaction).

8. If sample is sufficient (i.e. target depth is achieved), place a labeled wire flag in the tube, then place a red cap on the surface/top end of the plastic tube and a black cap on the deep/bottom end of the tube. Label the outside of the tube as well.

A) Label the flag & liner with the appropriate sample information (e.g., sample identification, date/time of sample collection).

9. Clean out any soil that may be stuck in the bit (a push probe and/or wire cleanout brush on the drill may be necessary to get bit cleaned out appropriately).

10. Place a new liner in the tube and attach to the adapter again using pin. NEVER PLACE TUBE BACK ON ADAPTER WITHOUT A LINER.

11. Raise the support shoe.

12. **Repeat** procedure for each of the remaining samples.



## Storing

Store samples in a walk-in cooler at 4 degrees Celsius (PSL 1034) until samples are delivered to the designated analytical laboratory.

Note: labeling, drawing arrows

## Sectioning

### Liner cutting

1. Remove the caps from both ends of the soil core liner. Make sure you know which end is the top of the soil core. (set caps just off to the side of tube at respective end to keep from confusing this).

2. Place soil core on base so that the top of the soil is against the flat surface on the end, but try to avoid pushing hard enough to disturb the soil. The bottom of the core should be pointing towards the hook side of the base. Make sure that base is tightened to the table and does not move.

3. Place the core cutter so that the 2 blades are touching the end of the plastic sleeve at the bottom of the core. Press down and pull the core cutter towards you with consistent pressure. This should remove the top third of the plastic sleeve, exposing the soil sample.



4. Line up meter stick with the top of the soil core. Record depth of the A horizon and the length of the full core on data sheet.

### Soil cutting

5. Mark appropriate depths (e.g. 0-15 cm, 15-30, 30-40 cm, etc.) on the soil core with a knife or something sharp.

6. For each resealable plastic bag, write the sample number and depth of soil with a sharpie (or place printed label with all the info on the bag).

7. Tare the plastic bag on the scale.

8. Use knife to cut soil and place in the bag. Be careful not to spill or lose any soil; if soil is spilled, recover it and add to bag to ensure accurate calculate of bulk density.

### Layer fresh weight

9. Immediately weigh the soil and record the weight on the data sheet.

### GWC analysis

10. **Within 8 hours of sectioning**, weigh out a sub sample to oven dry for moisture content calculation.

- Label the tin.
- Record weight of the empty tin.
- Tare the scale and weigh out 15-20 g of field-fresh soil (record exact weight).

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- Repeat for all soil samples cut on that day.
- Place tins with soil samples in 105°C oven for a minimum of 24 hours.
- Immediately after removing tins from oven, record weights of tins with oven dried soil.

$$\text{GWC (\%)} = \frac{\text{Fresh mass} - \text{oven dry mass}}{\text{oven dry mass}} \times 100$$

### References:

Giddings Machine Company, <https://www.soilsample.com/>.

### Suggested Readings:

Direct Push Technology (DPT) Sampling,

[https://www.etec.energy.gov/Library/Cleanup\\_and\\_Characterization/Soil/Co-Located/SSFL%20SOP%204%20DPT%20Subsurface%20Sampling%20112012b\(Rev1\)%20\(2\).pdf](https://www.etec.energy.gov/Library/Cleanup_and_Characterization/Soil/Co-Located/SSFL%20SOP%204%20DPT%20Subsurface%20Sampling%20112012b(Rev1)%20(2).pdf)

### Citation:

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<https://margenot.cropsciences.illinois.edu/methods-sops/>

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