

**Volunteer**

**Professional**

**Volunteer + Professional**

# Turbo Till

Image Source: Ernst Conservation Seeds, with permission.





**The Turbo Till creates a low maintenance lawn tailored to Detroit. Anything can happen on top of the Turbo Till! Underneath and over time, this lot design creates healthier soils and allows water to infiltrate better.**

**The Turbo Till combines soil tilling and earthworms to improve on-site infiltration, bone meal to stabilize any lead that may exist in the soil (or make the lead chemically unavailable for consumption by humans) and finishes with a fescue grass seed mix. This family of floppy grasses is drought resistant and requires only one cutting per year.**

**For more information refer to [DFC-lots.com](https://dfc-lots.com)**

### What is the lot design likely to cost?

The estimated cost of the Turbo Till is high (\$2,500 – \$5,500) and based on utilizing volunteer labor, bone meal, earthworms, and casting. Residents can save money by composting their own earthworms (refer to page 9 for more information). The cost assumes that residents or volunteers have access to basic safety gear and garden tools. A tiller is required and may add additional cost.

### How much upkeep will this lot design require?

The Turbo Till is a low-maintenance lot design. If you are installing the low-maintenance lawn as a groundcover, it will require weekly watering and weeding during the germination period. The lawn should be mowed once a year in the early fall.

### Will the installation of this lot design require a professional?

The installation of this lot design should not require professional assistance if you, with the help and support of friends, family, or neighbors, would like to construct this lot design. Refer to the Step-By-Step section for guidance. If you do not have the required support or feel unable to tackle this lot design, please seek professional assistance.

### How long will it take to install this lot design?

While people tackle projects in different ways and at different speeds, the Field Guide estimates the installation time of this lot design to be one full weekend with the help of at least three to five healthy adults or youth. The Field Guide assumes the lot is 'construction ready,' and all equipment and materials required for the lot design have been acquired and are ready to use.

Cost	\$50 - 1,000	\$1,000 - 2,500	<b>\$2,500 - 5,500</b>	\$5,500 +
People	<b>Volunteer</b>		Professional	Volunteer + Professional
Experience	Beginner	<b>Intermediate</b>		Advanced
Upkeep	<b>Low</b>		Medium	High
Stormwater	Good	<b>Better</b>		Best
Location	<b>All Lots in Full Sun or Shade</b>			

# Turbo Till

## Examples of Materials Found in Turbo Till



1 - Soil



2 - Compost



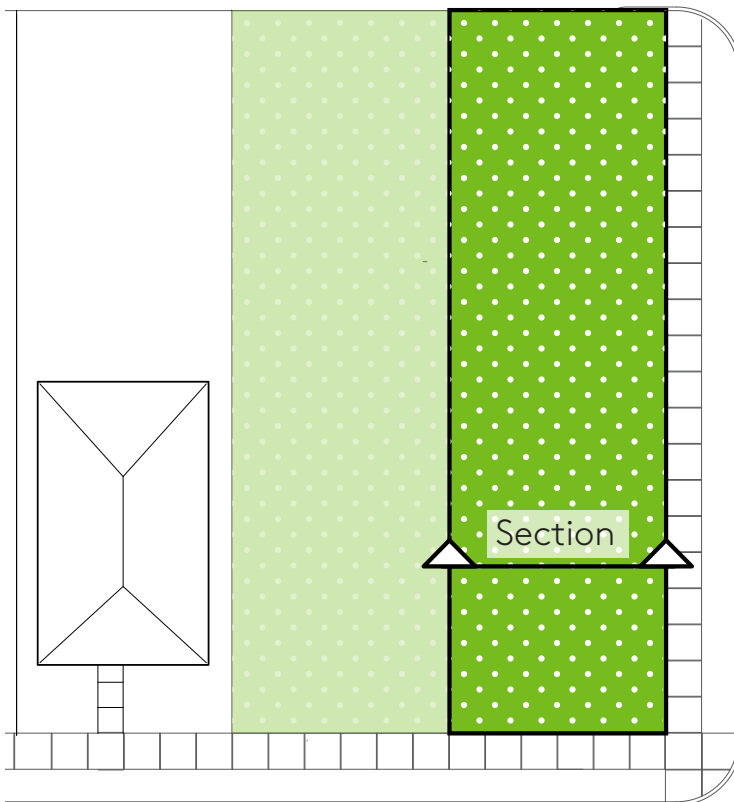
3 - Red Wiggler Worms

## Section



Grass Area, Full Lot coverage

## Where Do I Grow?



The Turbo Till is suitable for all properties. This design improves the health of soils and contributes to the health of the Great Lakes. Most of the action happens below the surface!

 Turbo Till Area

## Before You Start

### 'Construction Ready'

This lot design assumes that you have prepared the lot to a 'construction ready' state.

'Construction Ready' refers to a lot that is clean and clear of trash, hazardous objects, unwanted trees, brush and vegetation, fences, and other unwanted structures.

It may be necessary to remove grass in preparation for your lot design. Refer to the Remove Your Grass box located on the right hand side of this page for more information.

Is there an available water source near your lot? Consider how and where you will access water during and after construction to ensure that your plants can establish.

If your lot is not ready for construction, refer to the [Clean + Green](#) lot design.

You can find the lot design at [DFC-lots.com](http://DFC-lots.com).

### Call Before You Dig

Locate underground utilities before beginning your lot design. MISS DIG provides a free service to Michigan residents by locating and marking utilities on requested properties. Call (800) 482-7171 or 811 at least three days before you plan to start digging on your lot.

### Test Your Soil

Harmful pollutants have made their way into many urban soils. To proceed with awareness, consider having your soil tested before construction. Two great options are available:

Soil testing is free to members of Keep Growing Detroit's Garden Resource Program. Call (313) 757-2635 for more information or visit [detroitagriculture.net](http://detroitagriculture.net).

If you are not yet a member, you can work directly with Michigan State University's (MSU) Extension Program. They have a Home Lawn and Garden Soil Test Mailer for \$25. For more information call (888) 678-3464 or visit [msusoiltest.com](http://msusoiltest.com).

If you are concerned about the presence of lead or other contaminants in your soil, call the Michigan Department of Health and Human Services at (866) 691-5323 or (800) 424-LEAD.

### Remove Your Grass

Need to remove grass in areas where you are constructing your lot design?

There are many ways to remove unwanted grass. The first is to remove the grass and its root system by digging up the grass. Another option is to cover your lot with cardboard or a plastic tarp to smother your grass in darkness. It will take several weeks, but after being covered, the dead grass will be easier to remove.

### Till Safely

Before you till, inspect your lot for signs of buried concrete or rubble that was not removed during the cleanup stage. Large debris can ruin tiller blades.

When tilling, wear appropriate safety gear, such as covered boots with socks, long pants, safety glasses, dust mask, and ear protection. Make sure you understand the safe operating procedures of your tiller. Refer to the user's manual.

## What You Need: Shopping List

### Shopping List

The shopping list provides a breakdown of potential materials, tools, and resources required to construct this lot design.

**This shopping list is designed for a single lot (30 by 100 feet).**

### Tools + Resources

#### Suggested Tools

- **Safety Gear:** Gloves, heavy work boots, tall socks, pants, long sleeve shirts, dust masks, protective eye wear, ear plugs, and hard hats (if using heavy machinery)
- **Garden Tools:** Spades, shovels, rakes, trash bags, and wheelbarrows
- **Tiller,** 6 inch depth

#### Potential Water Sources

- Garden Hose with potential extension hose
- Sprinkler
- Rain Barrel in addition to other water source

#### Field Guide Resources

Resources are available on the Field Guide's web site.

- Clean + Green
- Bulb Planting Detail

### Materials List

#### Materials

- **Bonemeal,** 120 pounds or 5 bags of 24 pounds of Bone Meal Plant Food
- **Organic Material,** 27 cubic yards (optional)
- **Red Wiggler Worms,** 126,000 worms
- **Worm Casting,** 214 pounds
- **Duff,** 27 cubic yards (60 bales of straw or shredded cardboard)

#### Groundcover

- **Low-Maintenance Fescue Mix,** 15 pounds of seed
- **Germination Blanket,** 4 rolls (8 by 112.5 feet)

Refer to page 10 for alternative groundcovers.

### Compost Bed (Optional)

#### Materials

- **Cinder Blocks or Bricks,** to create a 6 by 4 by 2 foot raised bed
- **Chicken Wire,** 26 to 30 square feet
- **Duff,** 0.2 cubic yards (straw or shredded cardboard)
- **Red Wiggler Worms,** 12,000 worms
- **Worm Casting,** 2 pounds

## Turbo Till Step-By-Step

### Let's Start

**Want to create the Turbo Till but don't want to hire a professional? Here are a few guiding principles to help you construct your lot design.**

Check off tasks as you go along.

### Lot Design Steps

#### Volunteer Opportunities:

- Prepare Your Lot
- Add Soil Amendments + Till
- Spread Earthworms
- Sow Groundcover
- Maintain Your Lot Design

### Prepare Your Lot

Decide on the best location for your Turbo Till. **The Field Guide recommends using the full 30 by 100 foot lot.**

For this lot design, the Field Guide recommends removing all of your existing grass and plants, composting and tilling the soil, incorporating the soil amendments, and then sowing your lot with proposed groundcover.

**Adding bone meal to the lot design has the potential to help to stabilize lead but does not remove it from the soil.** If you are planning to plant an edible garden, be sure to get your soil tested for lead and other contaminants before planting.

### Add Soil Amendments + Till

Apply bone meal to the lot at a rate of four pounds per 100 square feet. **The Field Guide recommends 120 pounds of bone meal for a 30 by 100 foot lot.**

Bone Meal is available at nurseries or garden retailers. Bone meal will be a welcomed food source for earthworms and will help stabilize lead that may exist in the soil.

If available, it is recommended to add additional organic material such as coffee grounds, loose organic plant-based table scraps, crushed leaves, grass clippings, cow manure, or horse manure to the lot. Organic table scraps should not include dairy, oil, meat, citrus or hot peppers. **Three inches (27 cubic yards) of organic material spread across the lot will add significant nutrients to the soil and food source to earthworms.** Till the bone meal and organic material into the soil at approximately six to eight inches in depth.

Tilling will loosen soil for water infiltration and worm movement. Once the lot is tilled, rake and remove all clumps of existing vegetation. Tilling should not be done without an assessment of buried cement, debris, or large rocks. Be sure to select the appropriate size of machinery for the job.

## Turbo Till Step-By-Step

### ○ Spread Earthworms

Earthworms improve water infiltration. The Field Guide recommends using approximately 42 Red Wigglers (*Eisenia fetida*) per square foot and one pound of worm casting per 14 square feet. Worm castings are a mix of earthworm eggs and feces. **A full 30 by 100 foot lot requires 126,000 Red Wigglers and 214 pounds of worm casting for robust soil amendment purposes.**

Do not be intimidated by the number of worms required. Over 1,000 worms can fit in a small, six inch by four inch box.

Red Wigglers and castings are recommended for their rapid soil transformation as they live within the top layers of soil and their efforts are focused on topsoil quality.

Do not spray lot with Round-Up or chemicals six weeks prior to adding earthworms to the soil. Release your earthworms in the early morning or late afternoon; do not release earthworms into your lot in the hot sun.

Spread earthworms gently over the top of the prepared bedding (loosened soil), then let them enter the soil on their own or gently mix them with top soil. Distribute evenly throughout the lot.

**Place three inches of duff (27 cubic yards) on top of lot.** Duff is light fluffy material, such as straw or shredded cardboard. Be sure to water the duff layer immediately to prevent it from blowing away in the wind.

Wait three months for worms to establish and consume duff layer before sowing groundcover.



**Refer to "Turbo Till - Worms in Action!" on page 9 for more information on using and maintaining earthworms.**

### ○ Sow Groundcover

If you are seeking a lower maintenance alternative to a traditional lawn, the Field Guide recommends a fescue seed mix. This family of floppy grasses is drought resistant and requires one cutting (in August or September) per year. Soil should already be loosened and prepared for seeding through tilling of lot.

Fescue can be established in full sun to shade and should be seeded in spring (mid-March to mid-May) or fall (August to September). Seed mix should be applied to a damp lot. Sow seed across remaining lot by seed spreader or by hand. Spread seed mix evenly over entire lot. You may need to do this several times over the bed. A seed rate of five pounds per 1,000 square feet is recommended. **If you follow the Turbo Till lot design you will need approximately 15 pounds of seed mix for full 30 by 100 lot.**

Gently water seedlings daily until they are four to six inches in height. Placing a thin layer of straw or a germination blanket over seeded areas will help ensure that your seed establishes by keeping seeds from blowing away and protecting them from birds. **Four 8 by 112.5 foot rolls of single net germination blanket required for 30 by 100 lot.** Germination blankets or straw can be purchased at most nurseries and garden stores, including Detroit Farm and Garden.

Eco-Turf Low Maintenance Fescue Mix is one recommended seed mix and can be purchased through the Michigan Wildflower Farm.

**Other Field Guide lot designs can be used as groundcovers. Check out the web site for additional options and ideas.**

**Next Level:** If you would like to bring additional color to your grass, you can plant bluebells, crocuses and/or daffodils to create a decorative show in spring. Bulbs should be planted in the fall.

For more guidance on blub planting refer to the [Bulb Planting Detail](#).

## Turbo Till Step-By-Step

### ○ Maintain Your Lot Design

Red Wiggler earthworms are likely to last for three to five years. They do not burrow during winter and require winter care to stay alive.

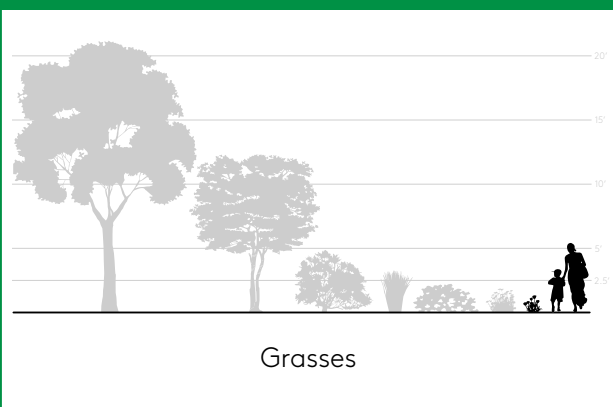
**Life expectancy can be prolonged in many ways.** You can add nitrogen to the soil, place tarp or cardboard over lot before frost and remove in spring, and/or add biomass such as leaves or straw over lot. Fresh castings applied to the soil over time will introduce more worms (through cocoons) and provide food.

Low-maintenance fescue mix should be watered daily until seedlings are four to six inches in height. Once established, grass will not require supplemental watering except during unusually dry periods. Cut grass once a year in August or September.



**Visit the Resources page on the Field Guide's web site (DFC-lots.com) to discover other vendors and places to purchase plants.**

### Average Height of Plants





## Turbo Till - Worms in Action!

### ○ Composting Bed with Earthworms

**Can't afford 42 earthworms per square foot or want to raise additional earthworms to add to your soil?**

Composting with earthworms is easy and fun. Earthworms love organic plant based table scraps! Organic table scraps should not include dairy, oil, meat, citrus, or hot peppers. Worm composters are available at nurseries and garden stores, or you can build your own!

**Create a six foot (length) by four foot (width) by two foot (deep) raised bed.** You can do this using cinder blocks, bricks or wood to create perimeter walls around soil.

Line the bottom of the bed with chicken wire. This will help keep vermin out of compost bed, but will allow worms to make their way into the soil once the bed gets too populated.

**Fill the raised bed with soil, loose organic table scraps, leaves, wood chips, straw, and/or grass clippings and 500 earthworms per square foot or 12,000 per raised bed, and mix together.**

This will cost approximately 300 dollars and can be a cheaper alternative to supplying a full lot with earthworms; however, this process will take years to change soil within your lot.

### ○ Maintain Your Earthworms

Earthworms need continual feedings. A six by four by two foot box full of Red Wigglers and soil can consume five hundred pounds of organic material per week.

Under ideal conditions, the earthworm population can double every sixty days. Add table scraps and compost weekly, if not daily.

Earthworms will naturally filter into the earth; however, you can also transplant worms from the bed into your lawn to spread them throughout the lot.



**Six-by-four-by-two-foot boxes full of Red Wigglers and soil can consume five hundred pounds of organic material per week.**

## Planting: Alternative Groundcover

### For More Information

If you are seeking a more interesting groundcover than a low-maintenance fescue, try one of the alternative options listed on this page.

For more information on using any of the seed mixes on this page, refer to the lot designs below on the Field Guide web site:

#### Partially Shaded Area Roadside Seed Mix

Refer to [Syrup Maker](#) lot design

#### Native Grassland Meadow

Refer to [Grassland Habitat Maker](#) lot design

#### Butterfly Garden Mix

Refer to [Native Butterfly Meadow](#) lot design

#### Clay Mix

Refer to [Clay Soil Mix](#) lot design

These seed mixes, additional groundcovers, and lot designs can be found at [DFC-lots.com](http://DFC-lots.com).

### Seed Mix for Part Sun to Shade

#### Partially Shaded Area Roadside Seed Mix

Mixing two pounds of Partially Shaded Area Roadside Seed Mix (ERNMX-140) with three pounds of Annual Cover Crop seed mix (oats or grain rye depending on sowing season) is recommended if selected for the lot design groundcover.

You can buy these seeds premixed at Ernst Conservation Seeds.

### Seed Mix for Full Sun to Part Sun

#### Native Grassland Meadow

Mixing three pounds of Native Grassland Meadow seed mix (Eastern Native Habitat & CREP, ERNMX - 173) with three pounds of Annual Cover Crop seed mix is recommended if selected for the lot design groundcover.

You can buy these seeds premixed at Ernst Conservation Seeds.

### Seed Mix for Full Sun to Part Sun

#### Butterfly Garden Mix

Mixing 15 ounces Butterfly Garden Mix seed mix with 24 ounces Annual Cover Crop seed mix is recommended if selected for the lot design groundcover.

You can buy these seeds premixed at Michigan Wildflower Farm.

### Seed Mix for Full Sun to Part Sun

#### Clay Mix

Mixing 15 ounces Clay Mix seed mix with 24 ounces Annual Cover Crop seed mix is recommended if selected for the lot design groundcover.

You can buy these seeds premixed at Michigan Wildflower Farm.

### Plant Sizes



**Seeds:** All plants can be purchased in seed form.

## Did You Know?

### Professionals Can Help!

The Field Guide to Working With Lots provides a Construction Package for each lot design. The Construction Package includes information and details required for a professional to construct this design. On the Field Guide web site, use the [Construction Package](#) link located near the top of this lot design page to download and print. Your selected professional will then be able to provide a cost estimate and schedule based on the condition of your lot and the design you select.

### Want to Hire Locally?

DFC-lots.com has a growing list of Detroit-based professionals and suppliers of landscape materials and services.

Still unsure of where to start?

Call (313) 294-LOTS or email [fieldguide@detroitfuturecity.com](mailto:fieldguide@detroitfuturecity.com) for assistance.

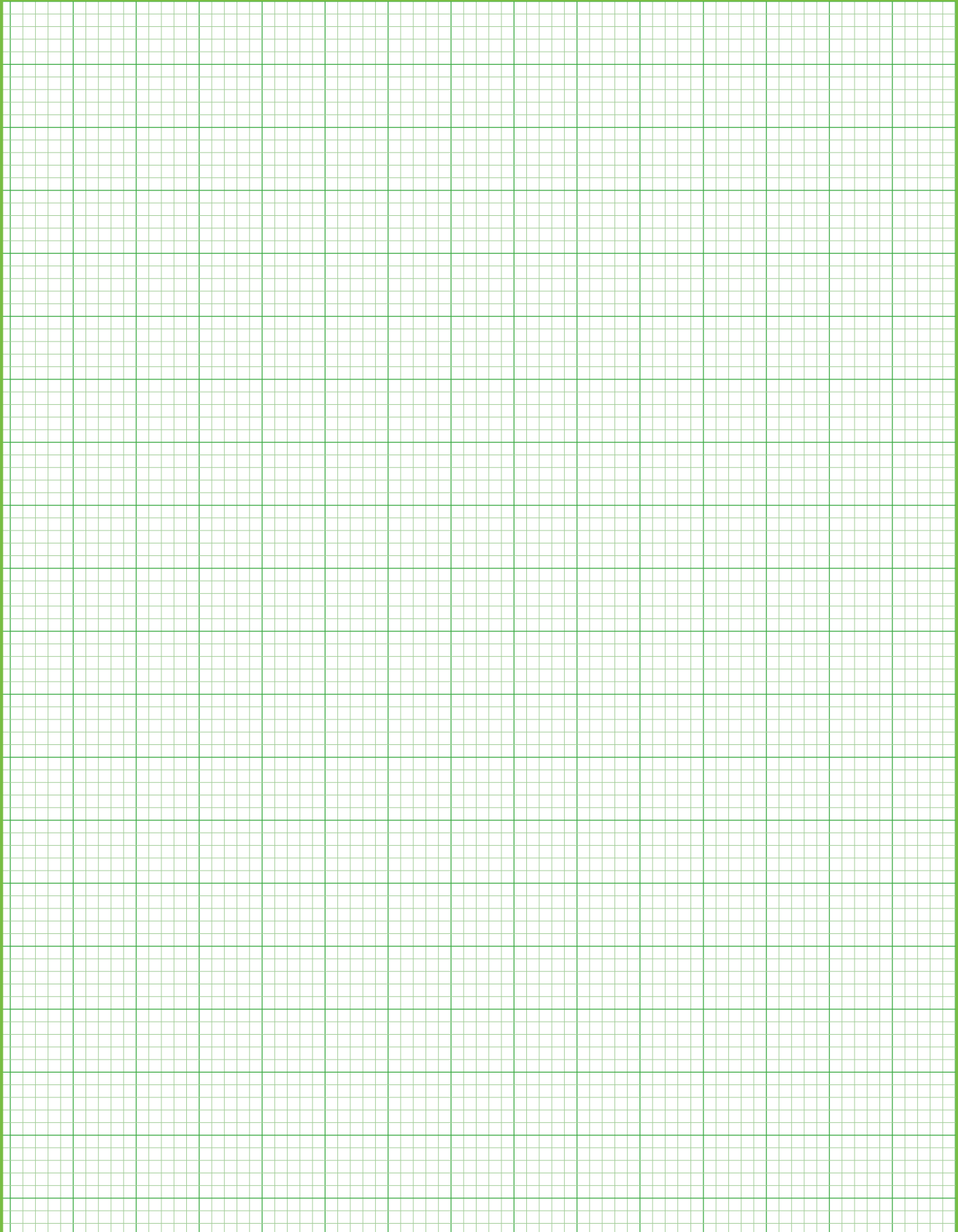
### Helpful Facts

- Earthworms improve the soil's water infiltration rates by turning up the soil as they move around. Over time, all the underground activity helps to break up compacted soils while also amending soil with nutrients from their castings.
- Keep bone meal away from children and pets. It can be dangerous if consumed.
- Bone meal is not kosher or halal.

### Planting Tips

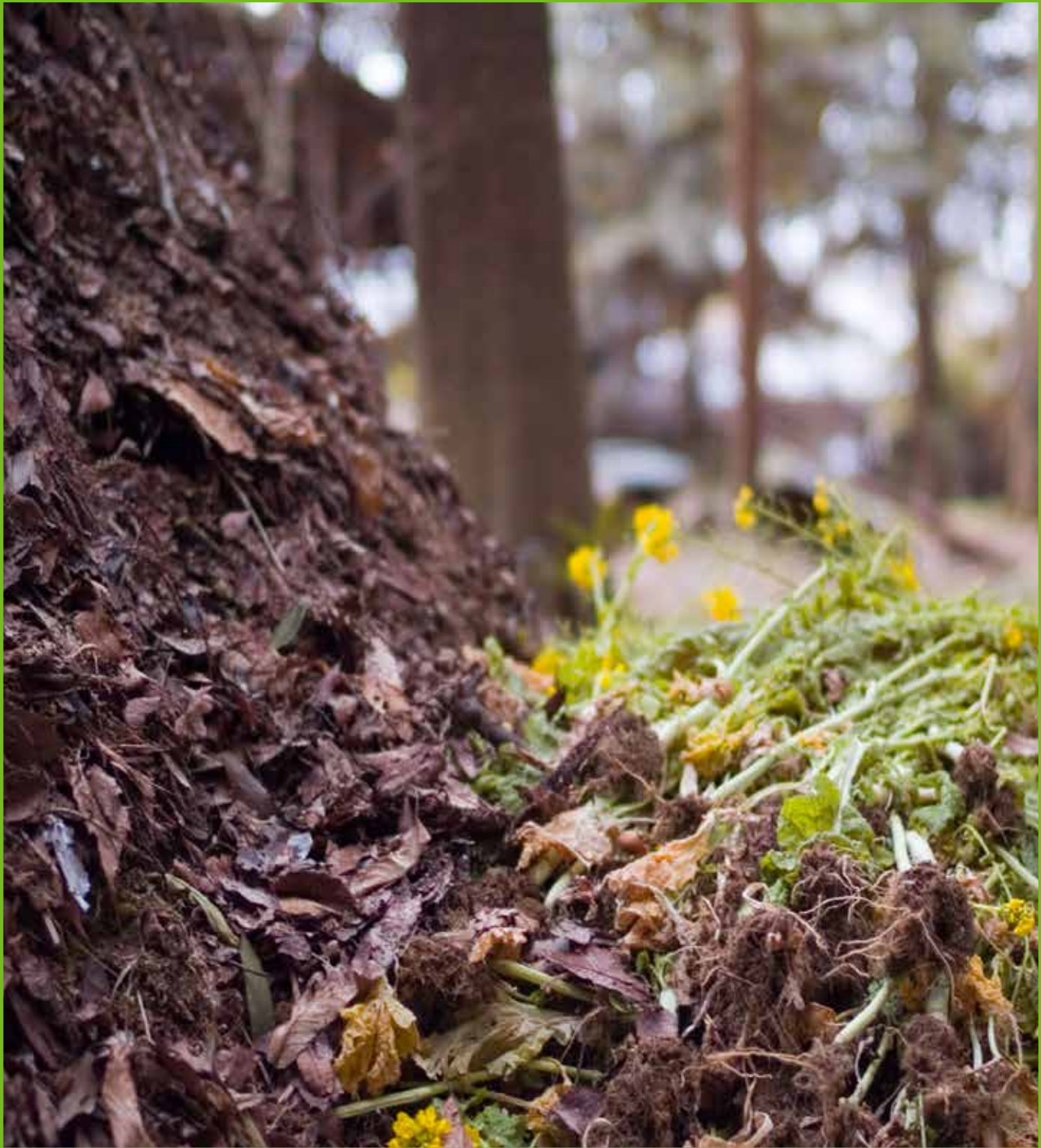
- Bone meal can be mixed with soil as an amendment before planting by adding four pounds per 100 square feet.
- The best time to plant is spring or fall.
- Do not plant in extreme heat.
- Water after planting and as needed.
- Weed weekly or as needed.

## Draw Your Lot



## Turbo Till Field Notes

A large, empty rectangular area with a thick green border, intended for taking field notes. The interior is white and completely blank.



**DETROIT  
FUTURE  
CITY**

**working  
with lots**  
A FIELD GUIDE

**Visit [DFC-lots.com](http://DFC-lots.com)  
#DFClots**

Image Source: Joi Ito, "Neighbor's Compost." 17 March 2007 via Flickr, CC BY 2.0.