Soil Amendments: The Fast Food Approach to Building Soils

Dave Bauer, PSS, CPESC
MnDOT Metro Water Resources
The Fast Food Approach to Building Soils.

- Briefly explore the not-so-obvious link between the restaurant industry and soil.
- We will look at when & why soils need to be built.
- Use examples to show the variety of built soils with both successes and delayed successes.
Fine Dining & Fast Food

- Fine Dining:
  - Requires planning - need reservations
  - Requires time – one or two hours to eat
  - Flavors – both bold and subtle flavors, textures

- Fast Food
  - Requires little planning
  - Requires little time to eat
  - Strong flavors, but lacks complexity
Natural Soils & Built Soils

- **Natural Soil:**
  - Requires planning to develop and use
  - Requires time to create
  - Fertile with macro, micro, and trace nutrients – living soil

- **Built Soils**
  - Cuts down on need to find and match existing soil into plan
  - Days to build, versus thousands of years
  - Basics are there to support life, but can be light on life
Built Soils

- Or engineered, or designed, or magic...
- Any soil that is moved.
  - Structure is usually affected the moment soil is moved by more than a hand shovel (compaction).
  - Top soiling.

- Any soil that is mixed.
  - Includes mixes with natural soil
  - Includes mixes with compost & peat.
Top soil stock pile
Mixed soil
Mixed soil
Location, Location, Location

- First Rule of Fast Food
  - “What is close?”
  - Few exceptions

- Drives construction
  - Top soil nearby
Location, Location, Location

Top Soil Source

I-694, Snelling, US 10
Top soil spread on site
Top soil spread on site
Top soil successfully spread on site

- Spread and disc or till
- Agriculture has used surface tilling to reduce compaction for years
- Highly variable top soil often yields same results
Top Soil Information

- Definitions Vary
  - MnDOT top soil borrow and can consist of A and B horizons
  - City of Roseville needs it to be dark
- Sources Vary
  - Existing top soil stripped from site
  - Nearby excavation of organic soils
  - Old fill material
Top Soil Problem

- Builder and City agreed to top soil requirement – all exposed soils would have top soil applied before final stabilization.

- Builder interpreted “top soil” as upper horizons harvested on site.
Top Soil Problem

- City saw “top soil” as being dark and organic
- This difference was discovered after site was complete – builder had to redo.

- Builder delivered McDonalds when the city wanted Burger King
Top soil storage

- No thought is given for living soil health
- Stock piling likely changes soil life
- Can inoculate with organisms or just let nature happen
Consistency (fries & ball fields)

- McDonalds analyzes its potatoes to be sure that the sugar content is the same for all their fries
- Add or subtract sugar & other stuff
- *Fast Food Nation, Eric Schlosser, 2002*
Consistency (fries & ball fields)

- Built soil suppliers use similar quality control for athletic fields.
- More eyes on the field, more at stake.
- Mix of sand and compost or mix sand and peat
- Built for drainage and sustaining vegetation
Mahtomedi Schools

- Soccer field construction
- Samples rejected for high pH and low organics.
- Added more compost.
- Samples rejected for higher pH.
- Discovered the compost used was high in pH.
- Solution was reduced compost and increased peat.
Mahtomedi Schools

- Too much compost in infiltration?
- Compost swells, then seals
Raingarden Variety, Made to Order

- Nearly all fast food offers some sort of made to order.

- Variety of opinions on how to build raingardens pushes suppliers to make their soils to order.
Raingarden Variety

- 33% compost and 66% sand
  + Lots of CEC, nutrient management, water storage
  - Can leach P, compost can clog infiltration after absorbing water and expanding

- 20% Peat and 80% Sand
  + Lots of CED, nutrient management, water storage
  - Peat not seen as renewable.

- <10% compost and >90% sand
  + Water disappears within 48 hours
  - Not enough water is retained to treat stormwater
Piles of sorted sand

Plaisted Companies, Inc. Elk River
Sorting sand and mixing peat
Even the compost is managed for consistency.
Raingarden Variety - Sources

• Compost
  • Grass Clippings
  • Leaf Waste
  • Consistency is important

• Peat
  • Mined (vacuumed) in Minnesota
  • Each operation tends to be consistent in plant species

• Sand
  • Outwash deposits are sorted
Recap

- Fast food and built soils are needed when space and time do not allow for fine dining and natural soils.

- Built soils include top soil spreading and soil mixes.

- Top soil spreading usually has many paths to success, though little effort is made to preserve the living soil.

- Turf management has high degree of specification.

- Compost is leading additive to sand to make a raingarden soil, though peat is gaining ground.
Photos and Examples Provided By:

Plaisted Companies, Inc.
Weiss Builders, Inc.
MnDOT
Rice Creek Watershed District
City of Roseville
Mahtomedi Schools
Kraus Anderson Construction