What to Consider When Evaluating Sites for Expansion

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Introduction

- Overview of GEAPS Courses written and presented by Fred Fairchild

- GEAPS 550 – Materials Handling I (Material Flow/ Spouting, Screw Conveyors)
- GEAPS 551 – Materials Handling II (Conveying Equipment)
- GEAPS 552 – Materials Handling III (Liquid Systems)
- GEAPS 510 – Grain Facilities Planning and Design I (Basic Design Requirements and Simple Facility Design)
- GEAPS 511 - Grain Facilities Planning and Design II (Expanding Existing Facilities)

Overview of GEAPS 511 Grain Facilities Planning and Design II

- Lesson 1 – Site Requirements
- Lesson 2 – Rail Planning and Track Layout
- Lesson 3 – Selection and Application of Sensing Units
- Lesson 4 – How to Use and Manage Sensor Information
- Lesson 5 - Designing for Safety

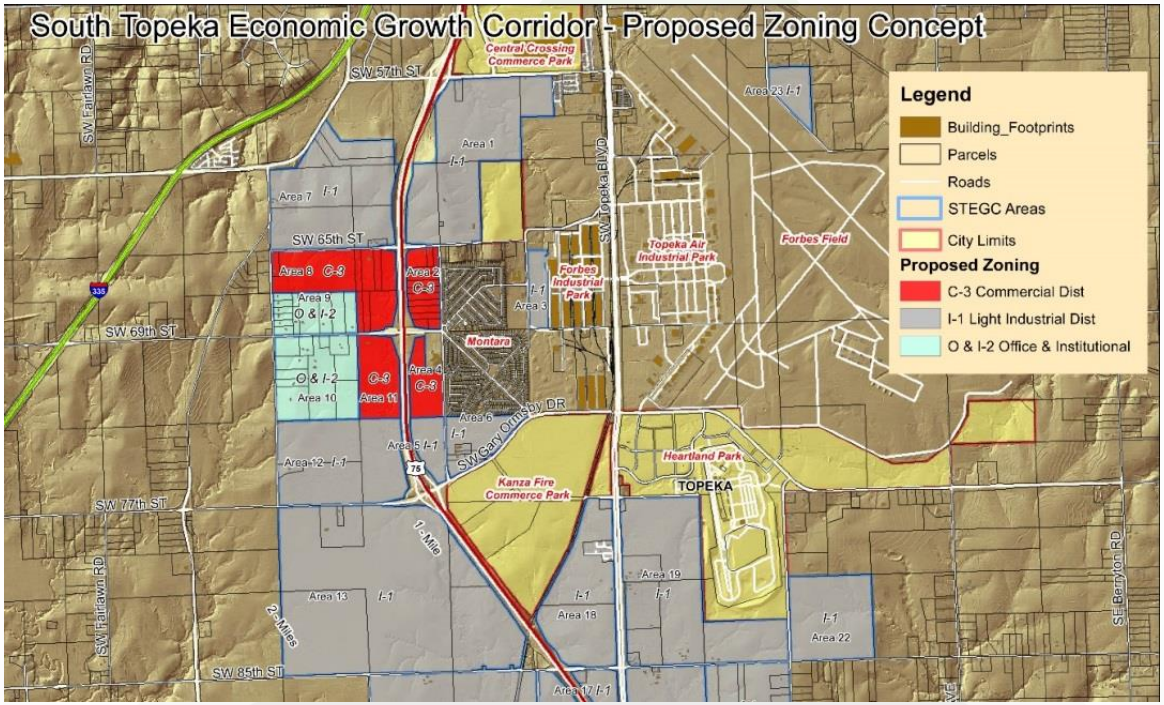
Overview of GEAPS 511 Grain Facilities Planning and Design II

- Lesson 6 – Designing for Security
- Lesson 7 – Planning for Retrofit and Expansion
- Lesson 8 - Roofing Design, Waterproofing and Coatings
- Lesson 9 – Temporary Storage
- Lesson 10 - Utilities

Overview of GEAPS 511 Lesson I – Site Requirements

- Objectives:
  - Allowable uses and regulations
  - Physical characteristics and limitations
  - Proposed use and purpose
  - Required function and area
  - Topography and neighbors
  - Future additions

Allowable Land Uses Zoning



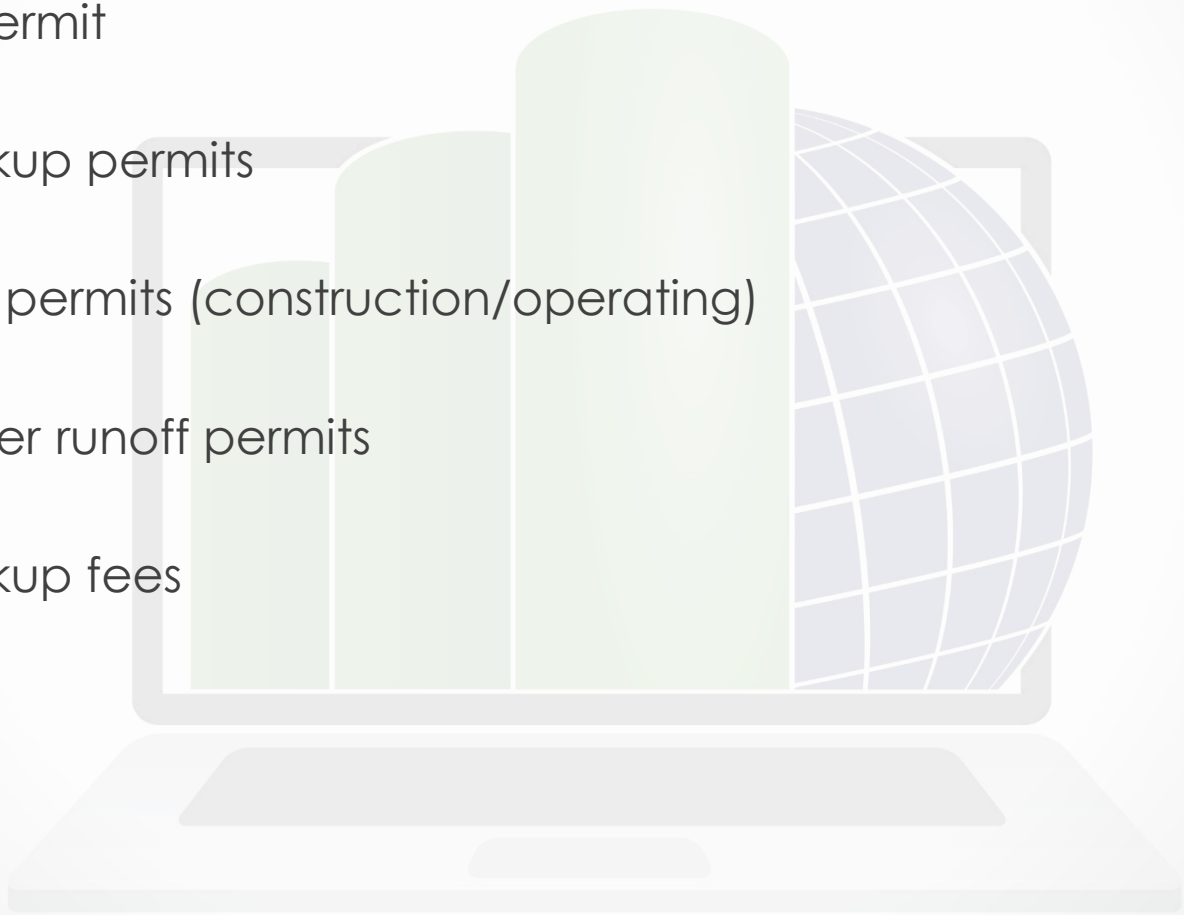
Governments control of physical development of land and the allowable uses for each individual property.

Allowable Land Uses Zoning

- Most frequently-used zoning groups :
  - Agricultural
  - Residential
  - Commercial
  - Industrial
- Variances may be obtained in some cases

Allowable Land Uses Required Permits

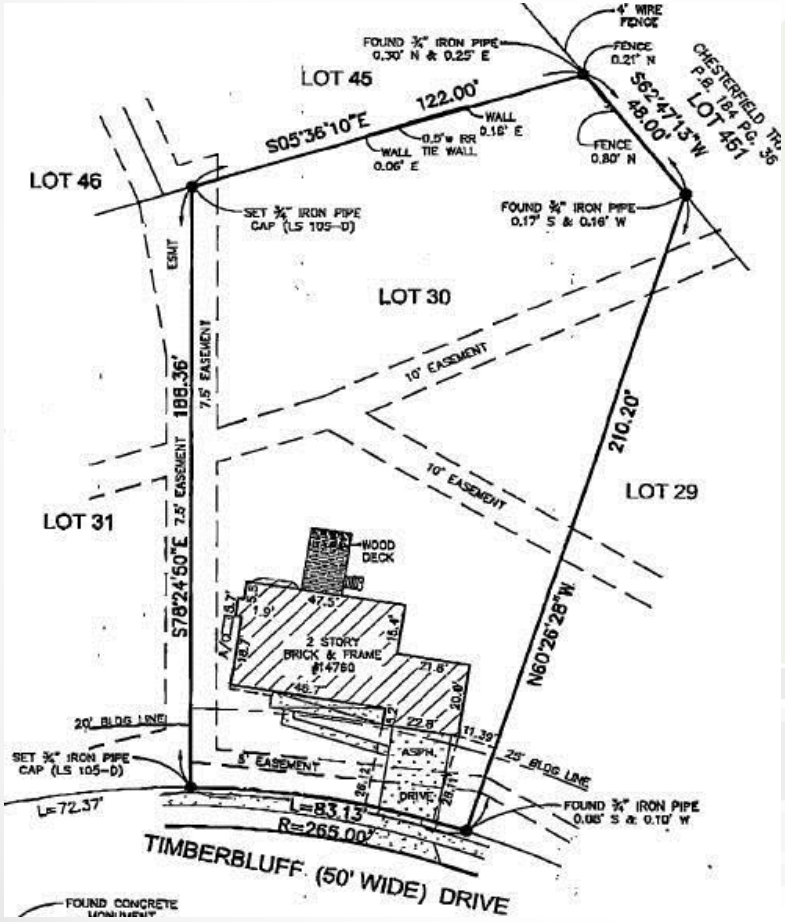
- Building permit
- Utility hookup permits
- Air quality permits (construction/operating)
- Storm water runoff permits
- Utility hookup fees
- Other



Allowable Land Uses Building Codes

- Building Codes
  - Laws that regulate the deign and construction of buildings
  - Grain elevators included
- Use and Occupancy Classifications:
  - Grain handling facilities classified as "Hazardous" due to presence of grain dust and have special requirements

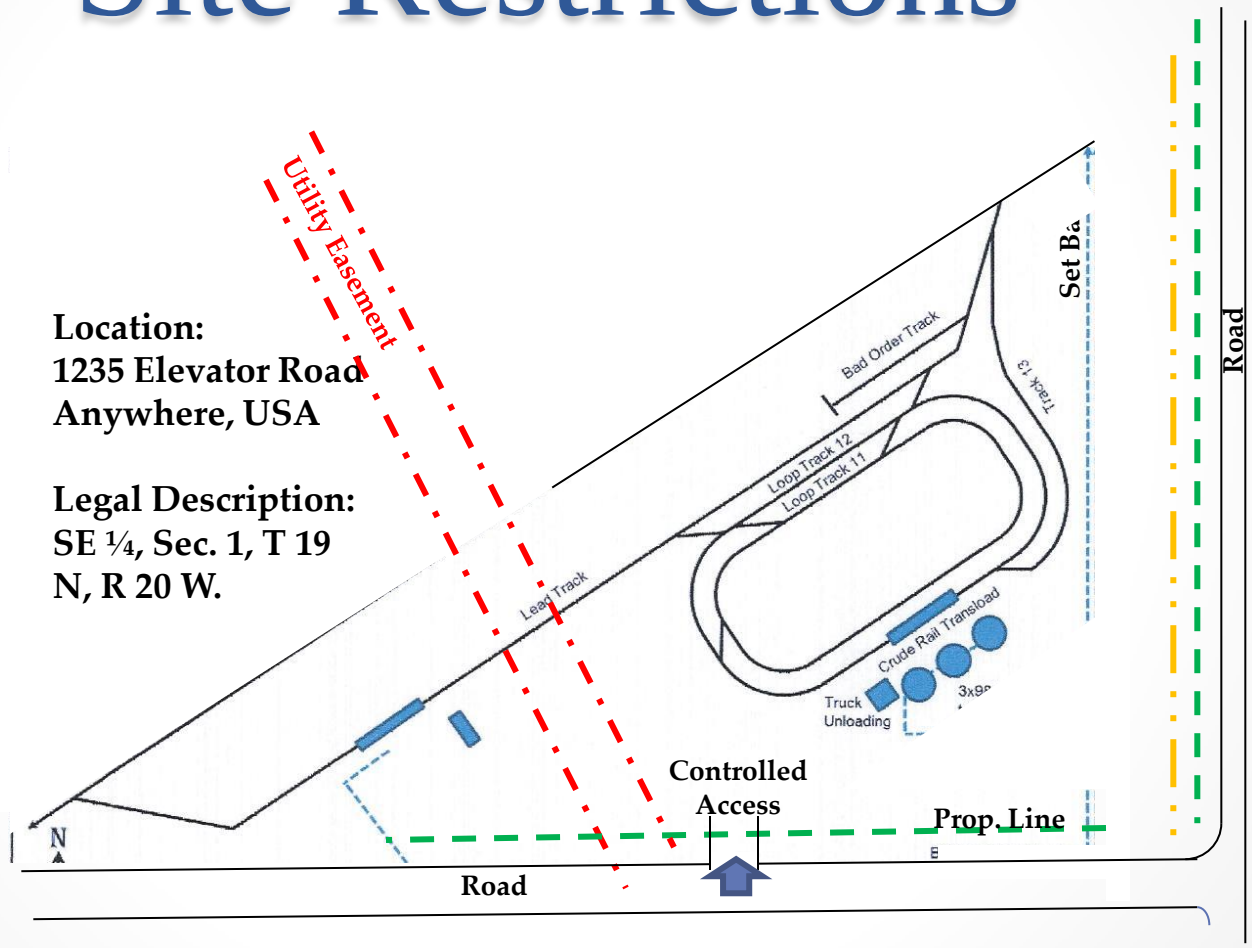
Allowable Land Uses Easements and Restrictions



Allowable Land Uses
Site Restrictions

- Setbacks
- Controlled access
- Utility easements
- Adjacent property access

Allowable Land Uses
Site Restrictions



Allowable Land Uses Height Restrictions

Airport Approach Patterns

Neighborhood Height Restrictions

Site Topography/Conditions

Terrain

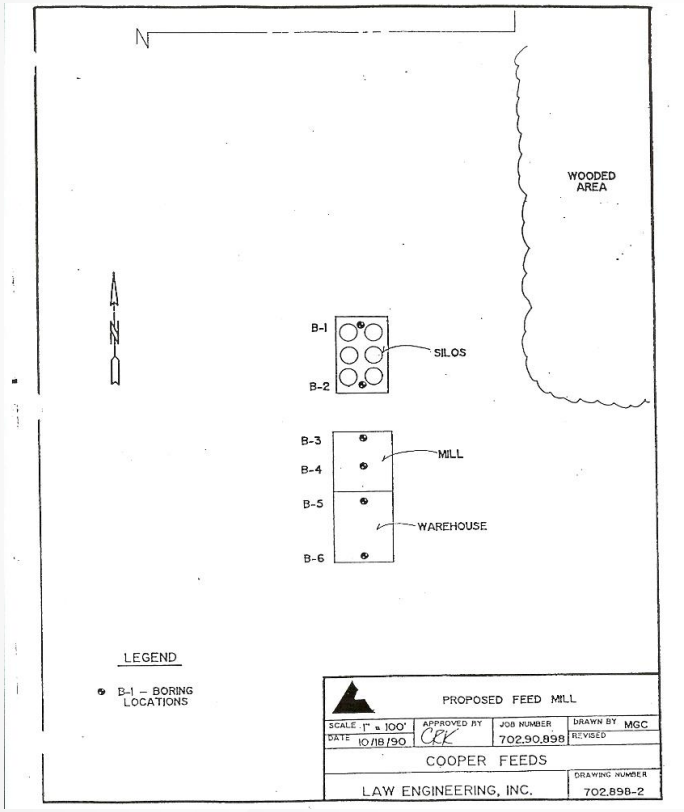
Drainage

Storm Water Retention Pond

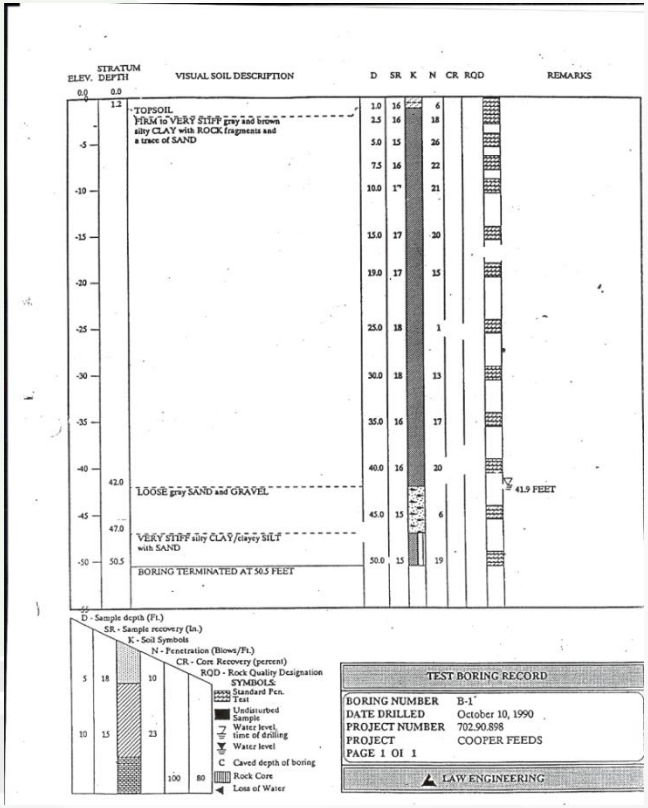
Soil Characteristics

- Soil Characteristics:
- Sand/Clay
- Rock
- Subterranean Conditions
- Fill
- Ground Water
- Bearing Capacity

Soil Testing



Boring Locations



Boring Log

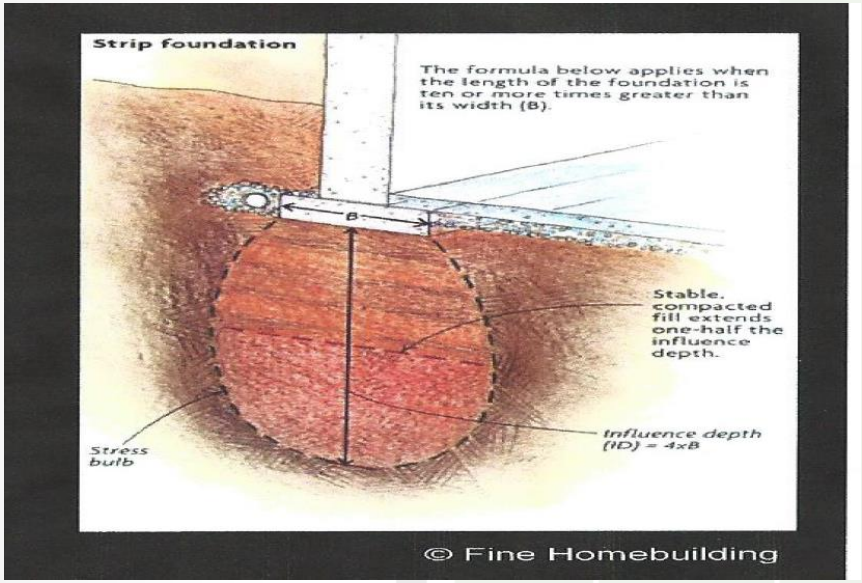
Soil Testing

Soil Test Boring Rig

Soil Test Information

- Soil reports provide:
  - Bearing capacity of soil
  - Foundation design recommendations
  - Compaction of soil
  - Lateral strength (active, passive, and coefficient of friction)
  - Permeability
  - Frost depth

Soil Pressures

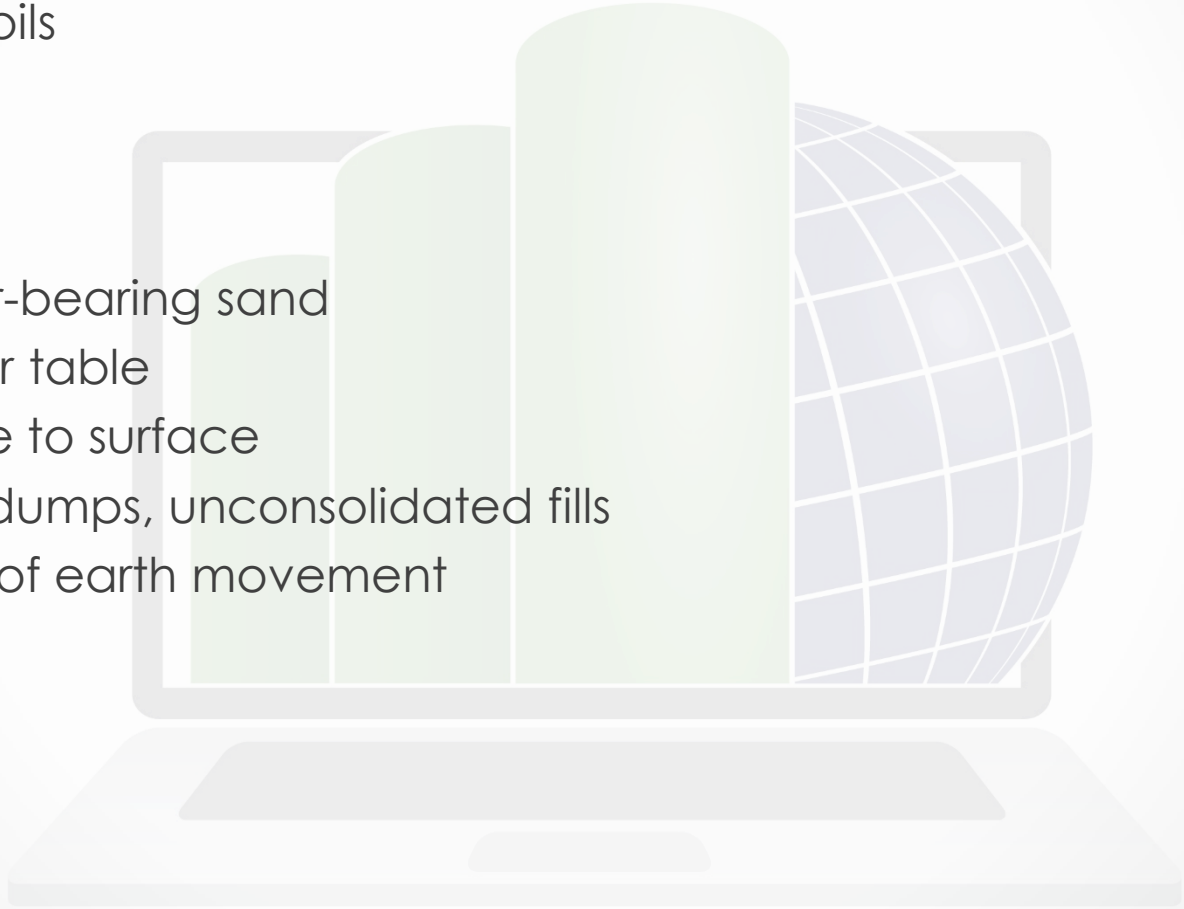


Footing Influence Zones

- Pressures of foundations cause soil pressures to great depths.
- Soil must have needed strength throughout depth to support applied foundation loads.

Problem Soil Conditions

- Organic soils
- Clays
- Silt clays
- Loose silts
- Fine water-bearing sand
- High water table
- Rock close to surface
- Land fills, dumps, unconsolidated fills
- Evidence of earth movement



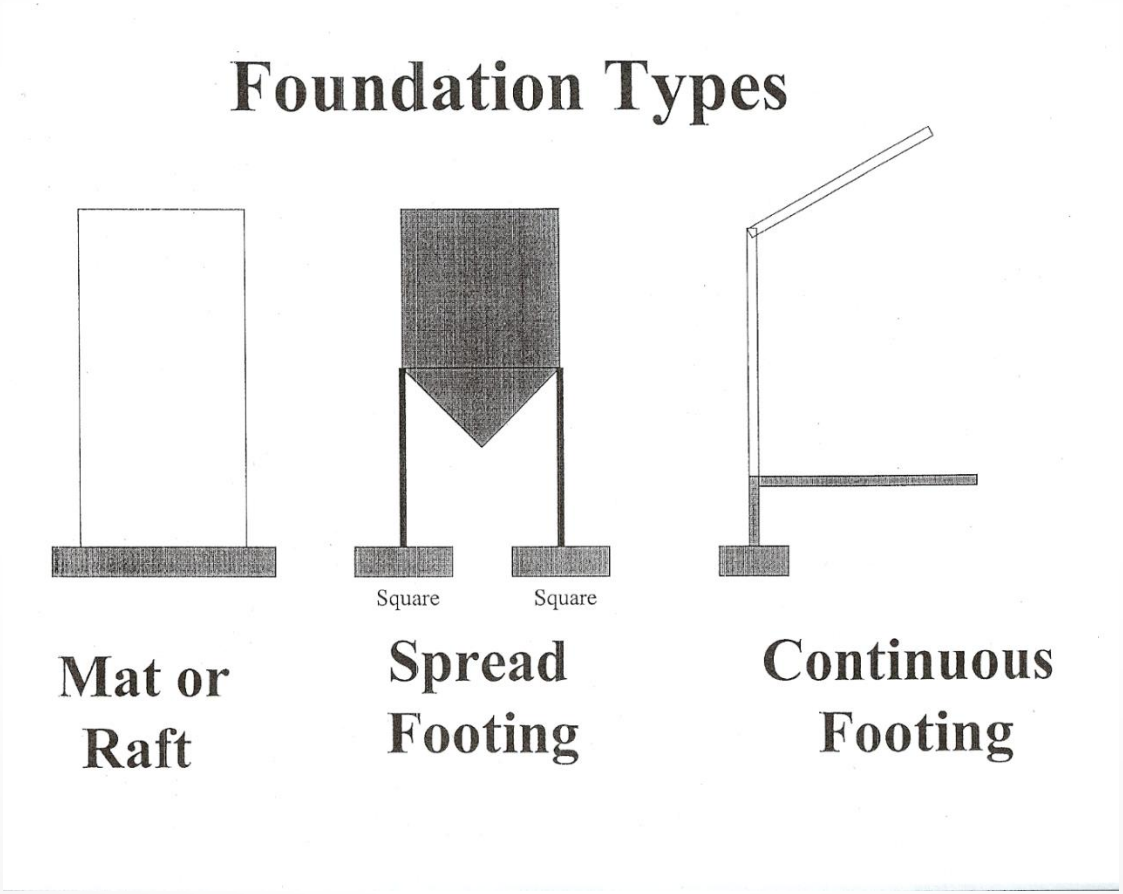
Soil Modifications

- Remove Unacceptable Soil
- Over Excavate and Backfill
- Matt Foundations
- Pilings or Piers

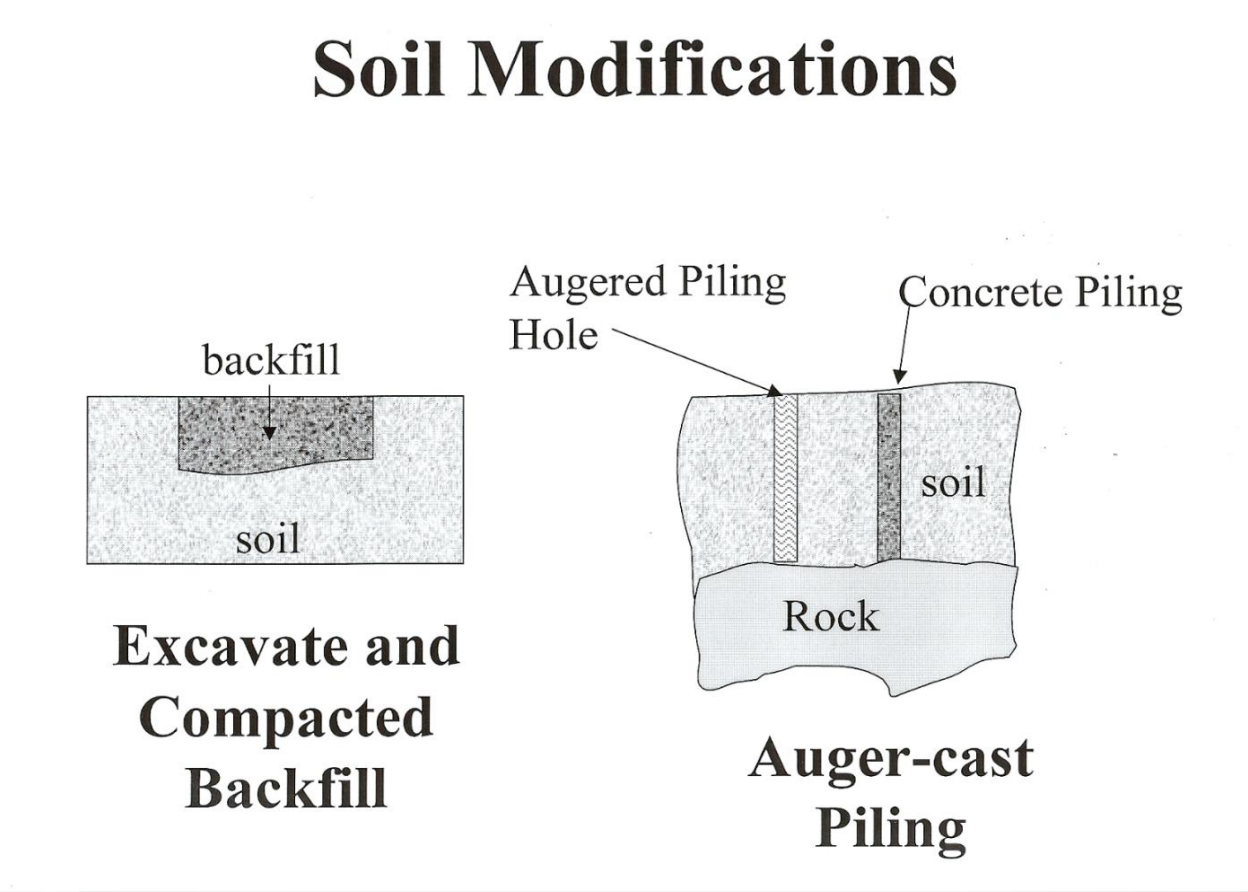
Allowable Types of Construction

- Soil strength, condition and available modifications determine maximum allowable load the soil will bear
- Weak soil conditions will influence whether concrete or steel storage may be used
- Taller bins add greater pressure on the soil unless larger footing imprints are used

Types of Foundation Footings



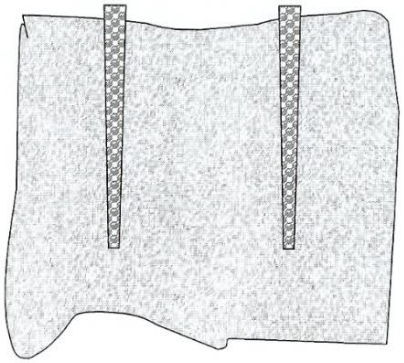
Overcoming Poor Soil Condition(s)



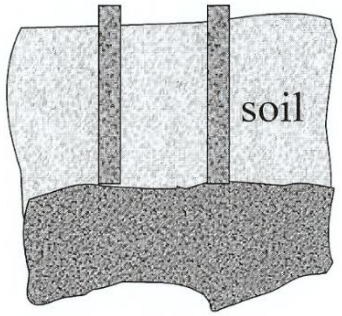
Overcoming Poor Soil Condition(s)

Soil Modifications
Piling Types

Piling Materials: Concrete, Steel Beams, Pipe, Wooden Poles



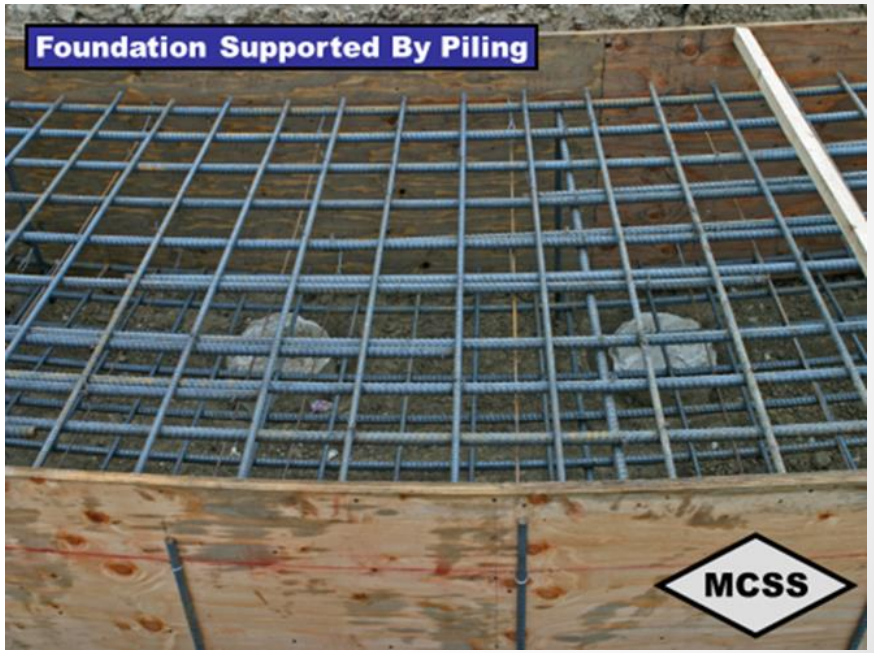
Friction Piling



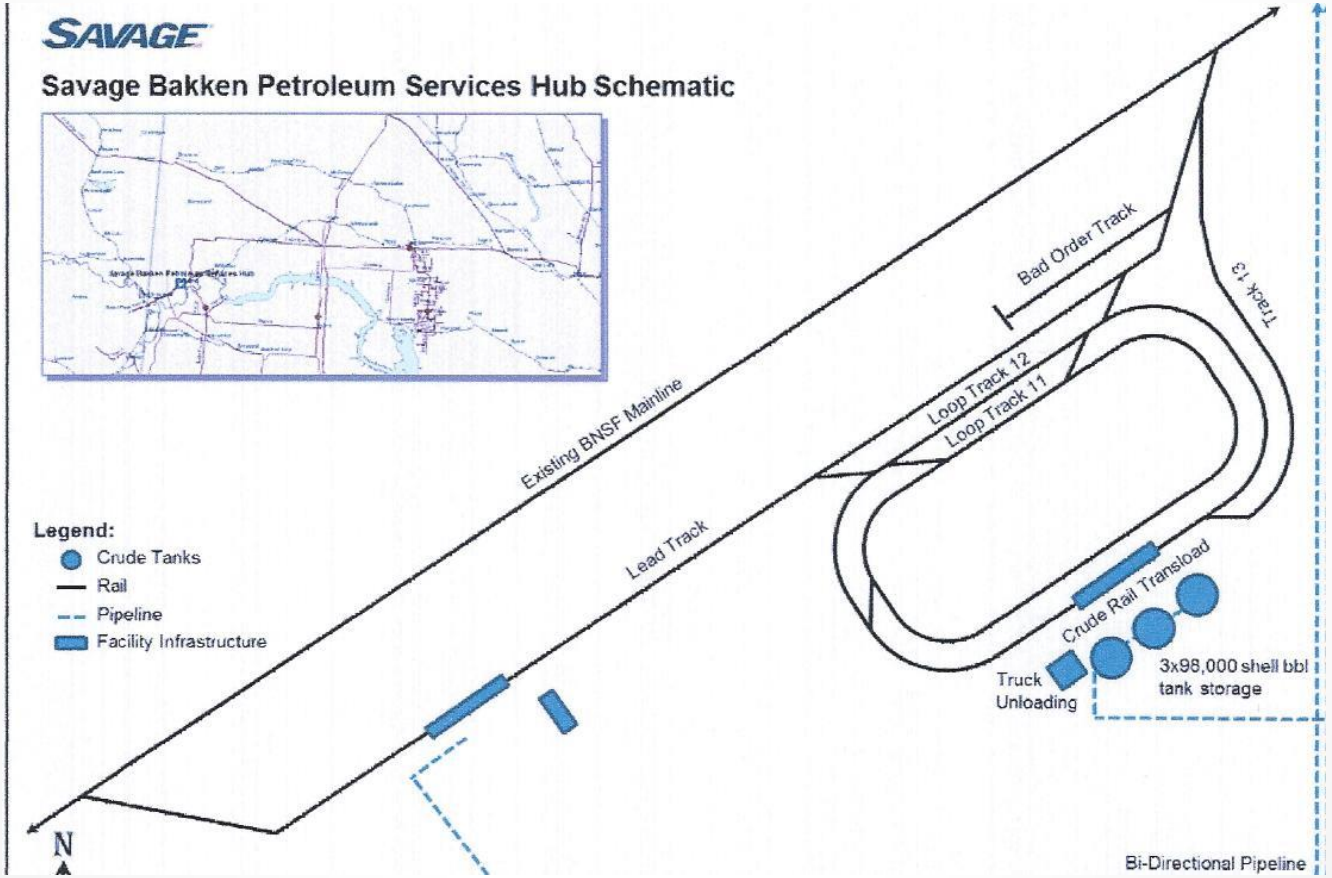
Bearing Piling

Normal Soil Preparation

Piling Foundation Support



Space Requirements



Initial Space Requirements

- Bin Area
- Truck Receiving/Load Out Areas
- Offices/Ancillary Buildings
- Vehicle Staging Areas
- Rail Receiving/Loading Areas
- Vehicle Parking

Additional Space Requirements

- Adequate Parking
  - Employee Parking
  - Customer Parking
  - Elevator Equipment
  - Truck Staging

Road Access

- Choose locations with:
  - Well built local roads
  - Good access to major highways
  - No city traffic

Railroad Access

- Locate on major rail line
- Required siding lengths
- Shipment sizes to be handled
- Allowable Loading/ Unloading Times
- Property Leases
- Owner of Track

Future Space Requirements

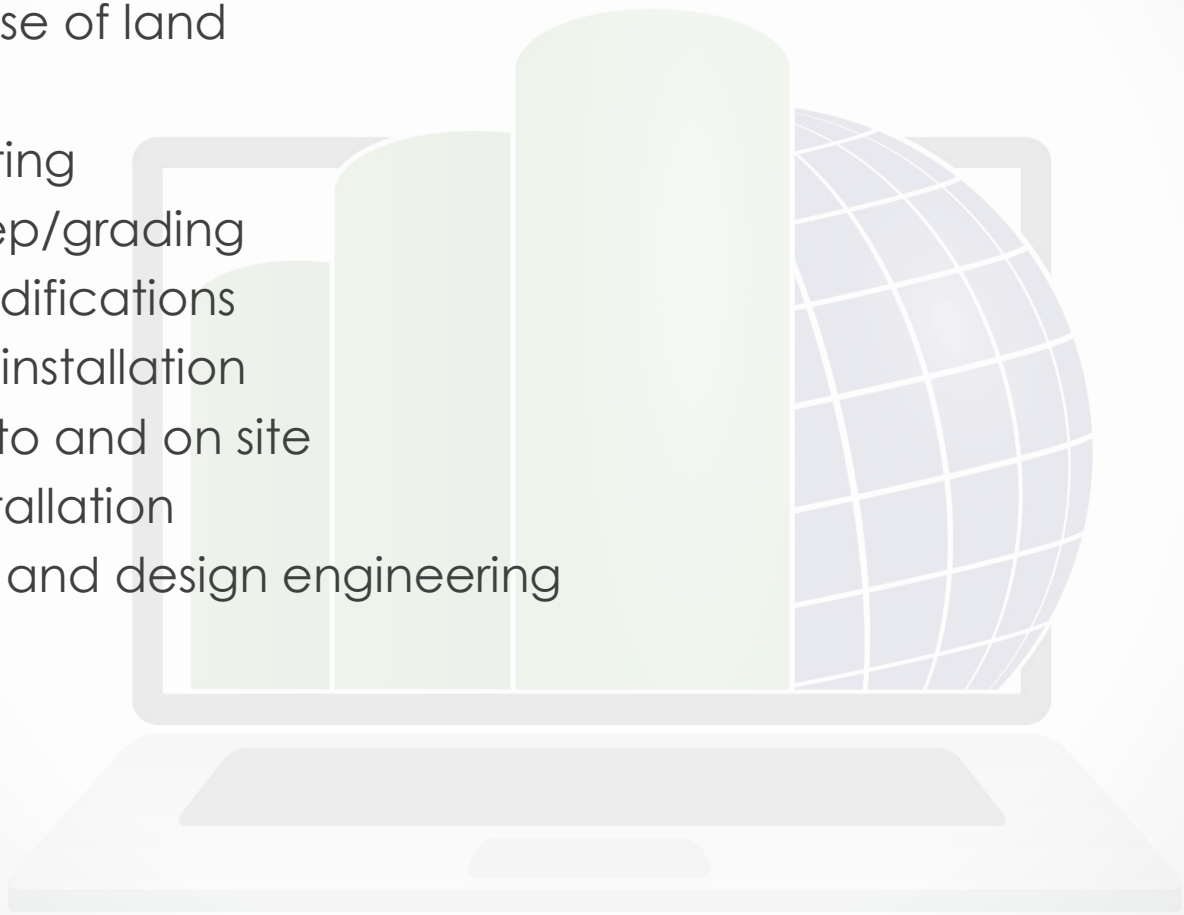
AgMark Co-Op Concordia, KS 4.75 million Bushels = 120,656 mt storage capacity

Future Space Requirements

Allow room for future storage bins and associated systems and equipment to receive, handle and ship grains.

Cost Considerations

- Purchase of land
- Permits
- Soil testing
- Site prep/grading
- Soil modifications
- Utilities installation
- Roads to and on site
- Rail installation
- Layout and design engineering



Summary

- Many things affect site selection for new facilities and future expansion.
- Each site must be investigated thoroughly to determine its suitability for the intended initial use and future additions.
- The total cost of building any additional structure or facility capacity upgrade includes many factors.

Questions?
&
Discussion