
# THE LIFE CYCLE OF OWTS INSTALLATION

KIM SEIPP, NAWT

# INTRODUCTIONS

- NAWT –
  - NATIONAL ASSOCIATION OF WASTEWATER TECHNICIANS
- KIM SEIPP
  - HIGH PLAINS SANITATION SERVICE – OWNER
  - NAWT – EDUCATIONAL COORDINATOR
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***The material being presented does not reflect the opinions of NOWRA***

- Introduction – Life Cycle & Principles of OWTS
- Beginning of the Life Cycle – Design Principles
- Beginning & Early Life – Installation Principles
- Mid-Life – Operations & Maintenance P
- Mid-Life – Inspection
- All during the Lif nciples
- After ment Principles
- Why we care and where we go from here

Beginning & Early Life – Installation Principles

# NAWT TRACK PLAN FOR TODAY

# NAWT – LIFE STAGES & INSTALLATION PRINCIPLES

- Introduction to Installation
- Unique Position of the Installer in the Life Cycle
- Understanding Soils, Wastewater and Treatment
- Understanding Basic Design Principles
- Being a Professional Installer

Introduction to Installation

Unique Position of the Installer in th

Understanding S
Treatm

Introduction to Installation

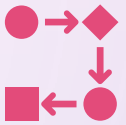
ding Basic Design Principles

Being a Professional Installer

# NAWT – LIFE STAGES & INSTALLATION PRINCIPLES

# INTRODUCTION TO THE ART OF INSTALLATION

Being professional



Understanding a Design, & What is a “Good System”

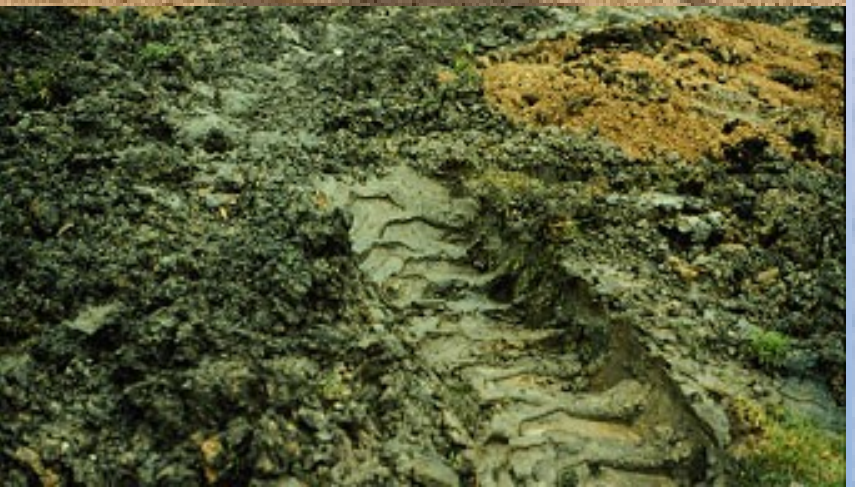
Developing an Installation Plan

Following Industry Standards and Working Safely

Finishing the Job

# BASIC CONSTRUCTION PRINCIPLES

# Good Construction is the Key to ‘Good Systems’



# CONSTRUCTION PRINCIPLES FOR SUCCESSFUL INSTALLATIONS

- KEEP IT DRY - KIDD
- KEEP IT NATURAL - KINN
- KEEP IT LEVEL – KILL
- KEEP IT SHALLOW - KISS

Introduction to Installation

Unique Position of the Installer in th

Understanding S… Treatment… …d

U… …ng Basic Design Principles

Being a Professional Installer

Unique Position of the Installer in the Life Cycle

# NAWT – LIFE STAGES & INSTALLATION PRINCIPLES

# WHAT IS A PROFESSIONAL INSTALLER

- DOING WHAT IS **BEST** FOR:
  - CUSTOMER
  - ENVIRONMENT
- BEING A PROFESSIONAL CONTRACTOR
- **ETHICS** FOR SEPTIC PROFESSIONALS

**'Good Systems'**

# INSTALLER RESPONSIBILITIES

- CREATE A PLAN FOR INSTALLATION
- FOLLOW THE DESIGN
  - SIZE, LOCATION & ELEVATION
- USE THE PROPER MATERIALS
- APPLY THE PROPER PRINCIPLES
- HAVE THE SYSTEM INSPECTED
- FOLLOW UP ON THE SYSTEM

# WHO ARE THE PLAYERS?

- HOMEOWNER
- INSPECTOR
- ENGINEER
- EQUIPMENT PROVIDERS
- OTHERS?

# NAWT – LIFE STAGES & INSTALLATION PRINCIPLES

- Introduction to Installation
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  Treatm
- Understanding Basic Design Principles
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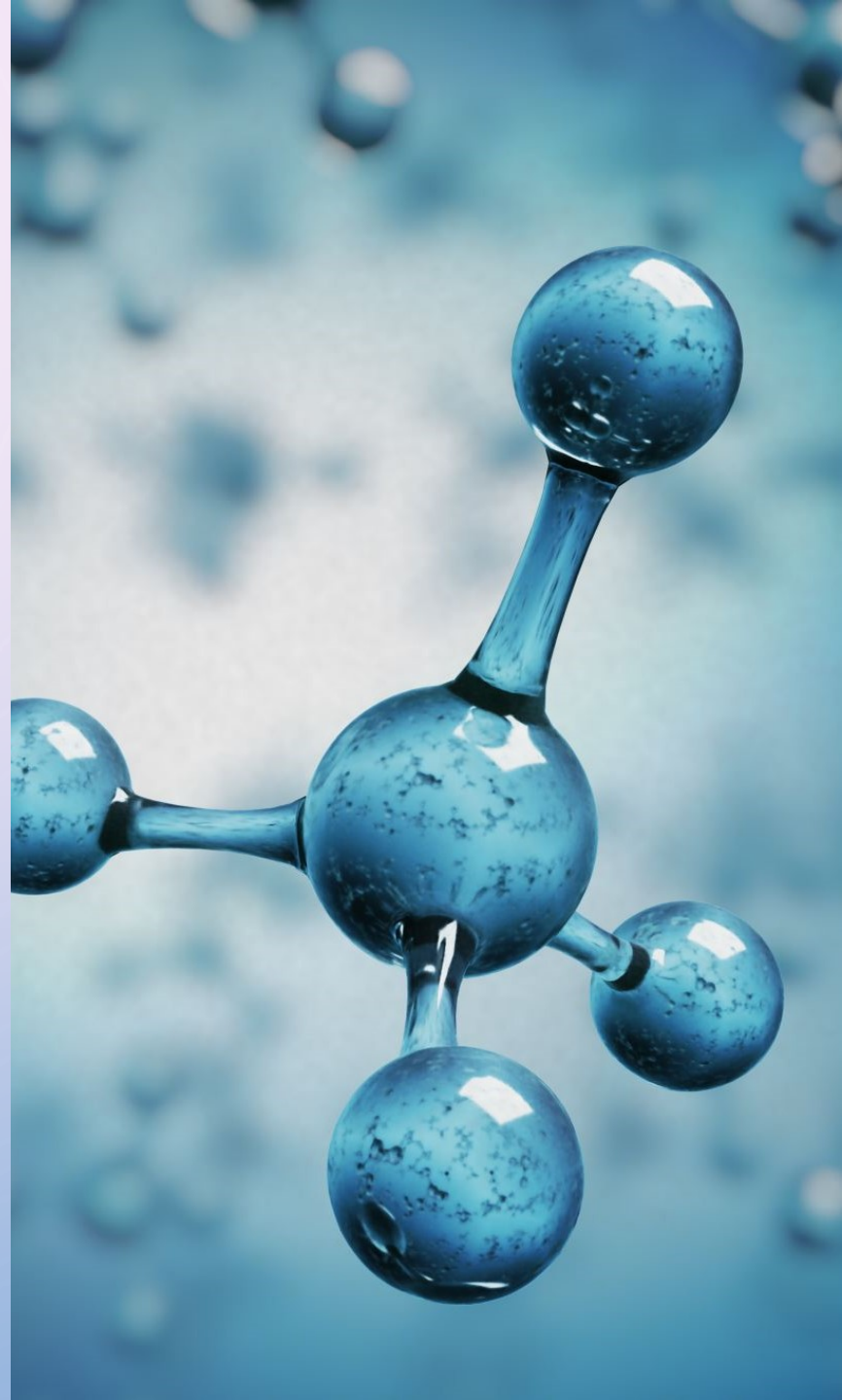
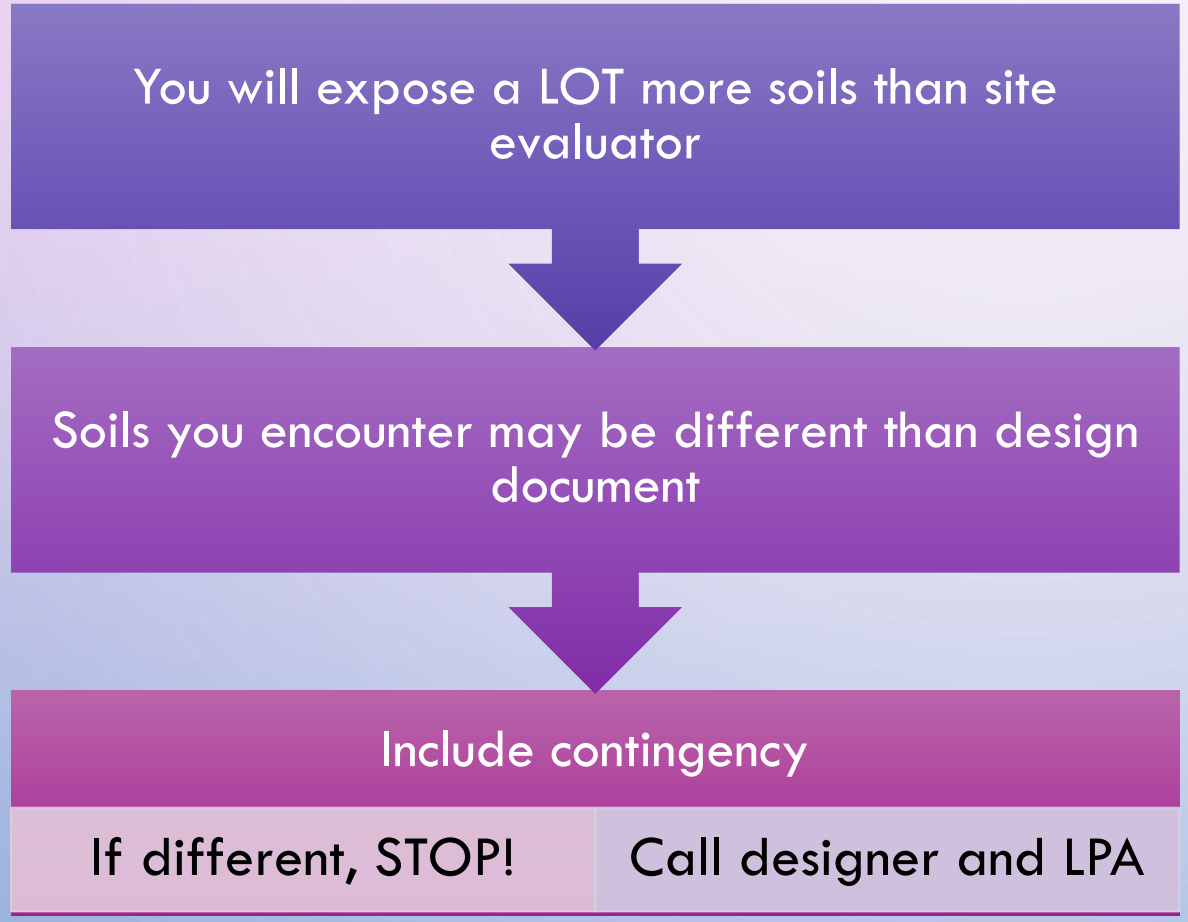
Understanding Soils, Wastewater and Treatment

# WASTEWATER TREATMENT PROCESSES

- OXYGEN STATE
  - AEROBIC VS. ANAEROBIC
- PROCESSES
  - PHYSICAL
  - CHEMICAL
  - BIOLOGICAL






# MOST OF OWTS IS BELOW GROUND SURFACE

# HERE IS WHAT HAPPENS WHEN YOU DON'T STOP

# KNOW WHAT SOILS TO EXPECT

- REVIEW SOILS INVESTIGATION REPORT
- SITE VISIT
  - OBSERVE ROAD & DRIVEWAY CUTS
  - OBSERVE FOUNDATION EXCAVATION
- IS THERE A LIMITING LAYER?

UNIVERSITY OF MINNESOTA

# OSTP Soil Observation Log

Project ID: 11.018.050 0 v 02.12.2017

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Client/ Address: | Katie & Marty Sampson | | | Legal Description/ GPS: | 36233 425TH AVE | | |
| Soil parent material(s): (Check all that apply) | ☐ Outwash | ☐ Lacustrine | ☐ Loess | ☐ Till | ☑ Alluvium | ☐ Bedrock | ☐ Organic Matter |
| Landscape Position: (check one) | ☐ Summit | ☐ Shoulder | ☐ Back/Side Slope | ☑ Foot Slope | ☐ Toe Slope | Slope shape | Linear, Linear |
| Vegetation | Woods/Grove | Soil survey map units | 463 | Slope% | 1.0 | Elevation: | 101 |
| Weather Conditions/Time of Day: | Sunny & 80 deg | | | | Date | 06/07/17 | |
| Observation #/Location: | Soil Pit 1 | | | | Observation Type: | Soil Pit | |

| Depth (in) | Texture | Rock Frag. % | Matrix Color(s) | Mottle Color(s) | Redox Kind(s) | Indicator(s) | Structure: Shape | Structure: Grade | Structure: Consistence |
|---|---|---|---|---|---|---|---|---|---|
| 0-25 | Sandy Loam | 5 | 10YR 2/2 | None | NA | — | Granular | Moderate | Friable |
| 25-48 | Sand | 5 | 3/2<br>10YR 4/4<br>5/3 | None | NA | — | Single grain | Structureless | Loose |
| 48+ | Loam | 5 | 10YR 3/1 | 10YR 4/1 | Depletions | S1 | Blocky | Moderate | Friable |
| | | | | 7.5YR 3/4 | Concentrations | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

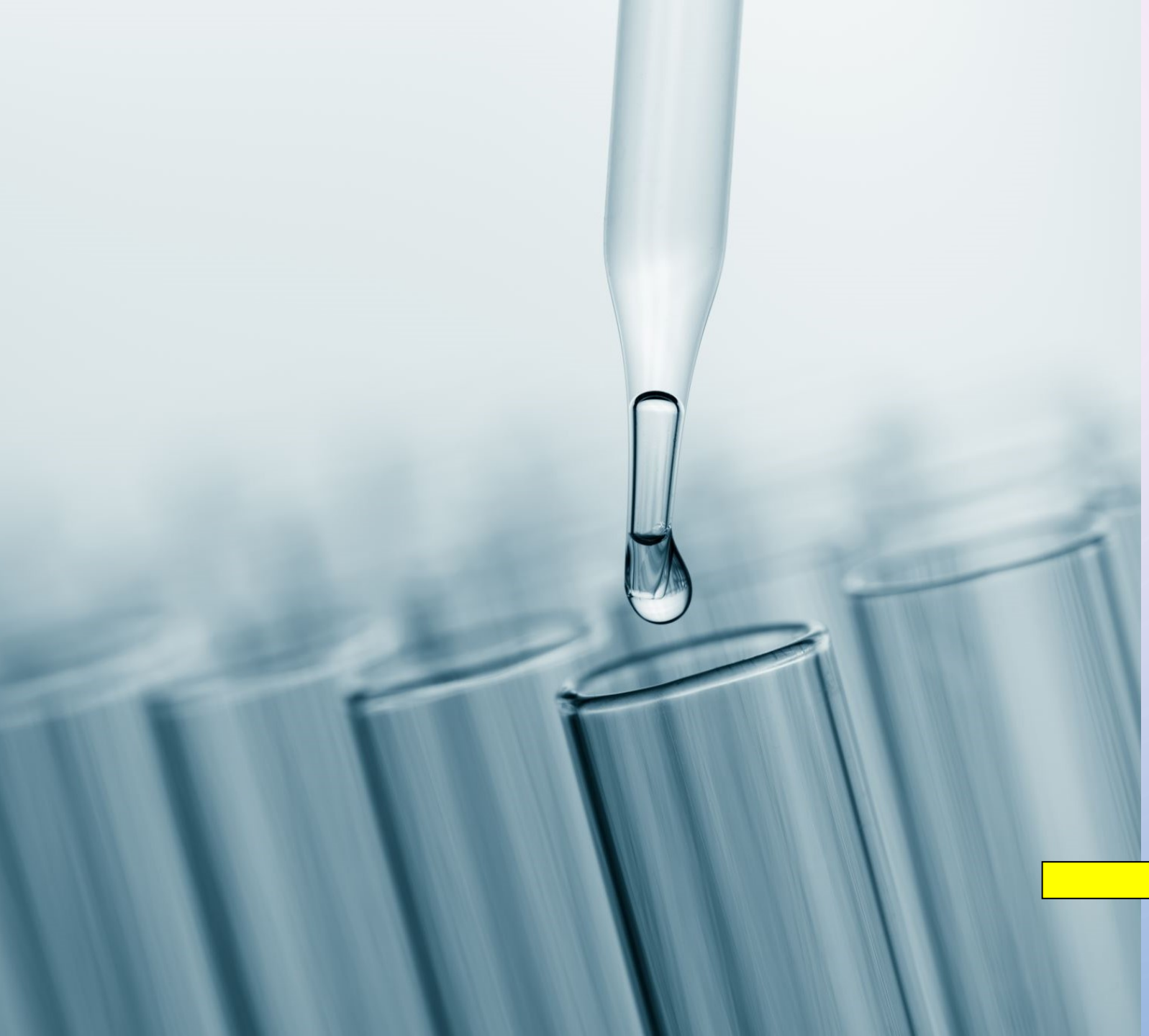
# What We Will Cover

- What is wastewater?
- Where does it come from?
- What's in it?
- How can we measure it?
- What are the treatment processes involved?

# DOMESTIC/RESIDENTIAL WASTEWATER

- FOOD PREPARATION (KITCHENS) **20%**
- BATHROOM (BATHING, SINKS, TOILETS) **60%**
- LAUNDRY **20%**

- Uniform in color and composition
- Gray in color and musty smelling
- Unusual colors or odors will typically indicate abnormal discharges



# BLACKWATER VS. GRAYWATER

- **BLACKWATER**- WASTEWATER FROM TOILETS AND FOOD PREPARATION AREAS (ORGANICS)
- **GRAYWATER**- WASTEWATER FROM ALL OTHER PLUMBING FIXTURES (INCLUDES LAUNDRY);
  - COLORADO REGULATION 86

BOTH WASTEWATERS CONTAIN THE SAME CONTAMINANTS


# WHAT'S IN WASTEWATER?

- 99.9 % WATER
- 0.1 % POLLUTANTS OR CONSTITUENTS OF CONCERN
  - ORGANICS/INORGANICS
  - SOLIDS
  - PATHOGENS
  - NUTRIENTS
  - FATS, OILS, GREASE
  - METALS
  - PERSISTENT ORGANIC CHEMICALS

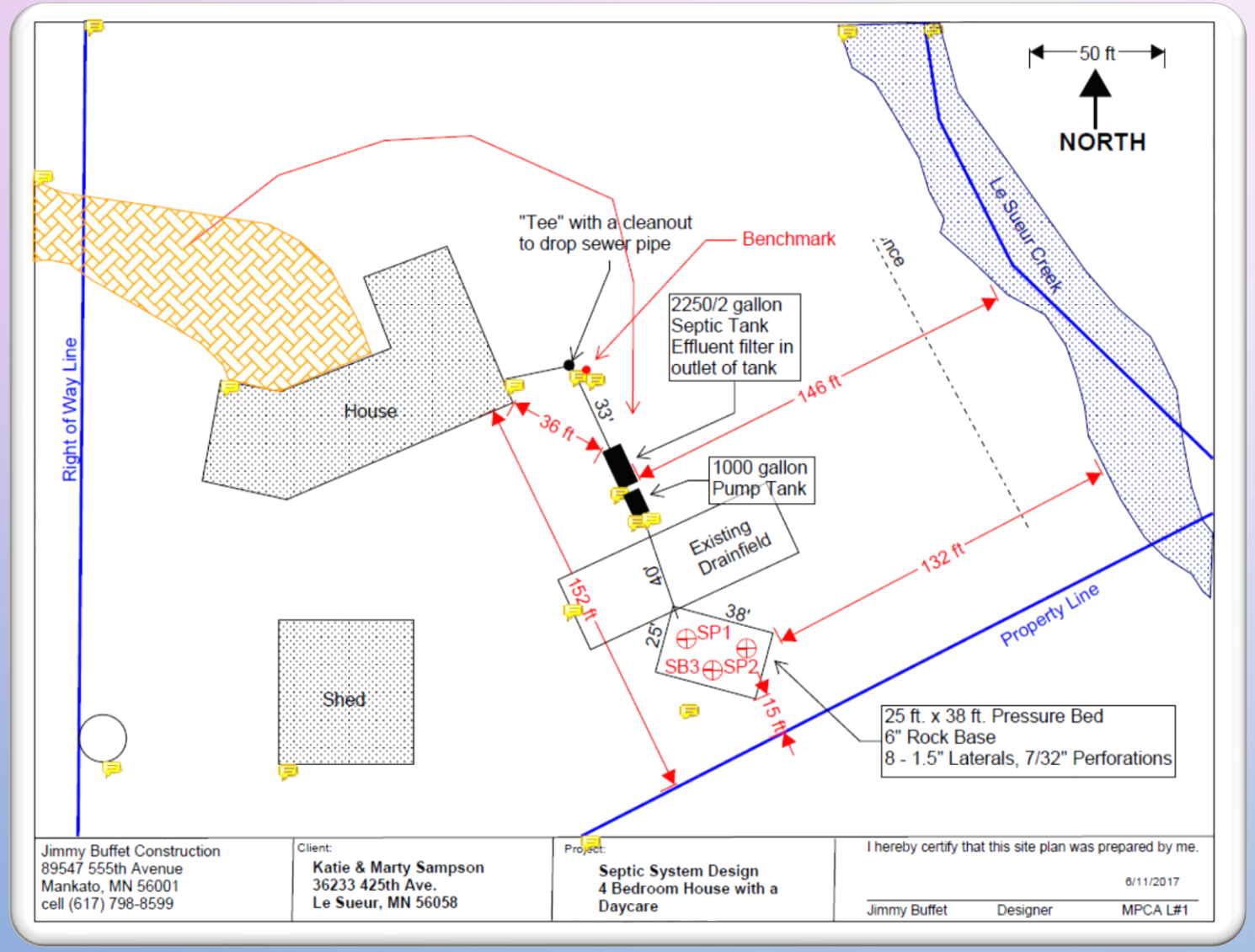
*MORE ABOUT EACH OF THESE…*

# NAWT – LIFE STAGES & INSTALLATION PRINCIPLES

- Introduction to Installation
- Unique Position of the Installer in the Life Cycle
- Understanding Soils, Wastewater and Treatment
- Understanding Basic Design Principles
- Professional Installer

# WHAT IS IMPORTANT?

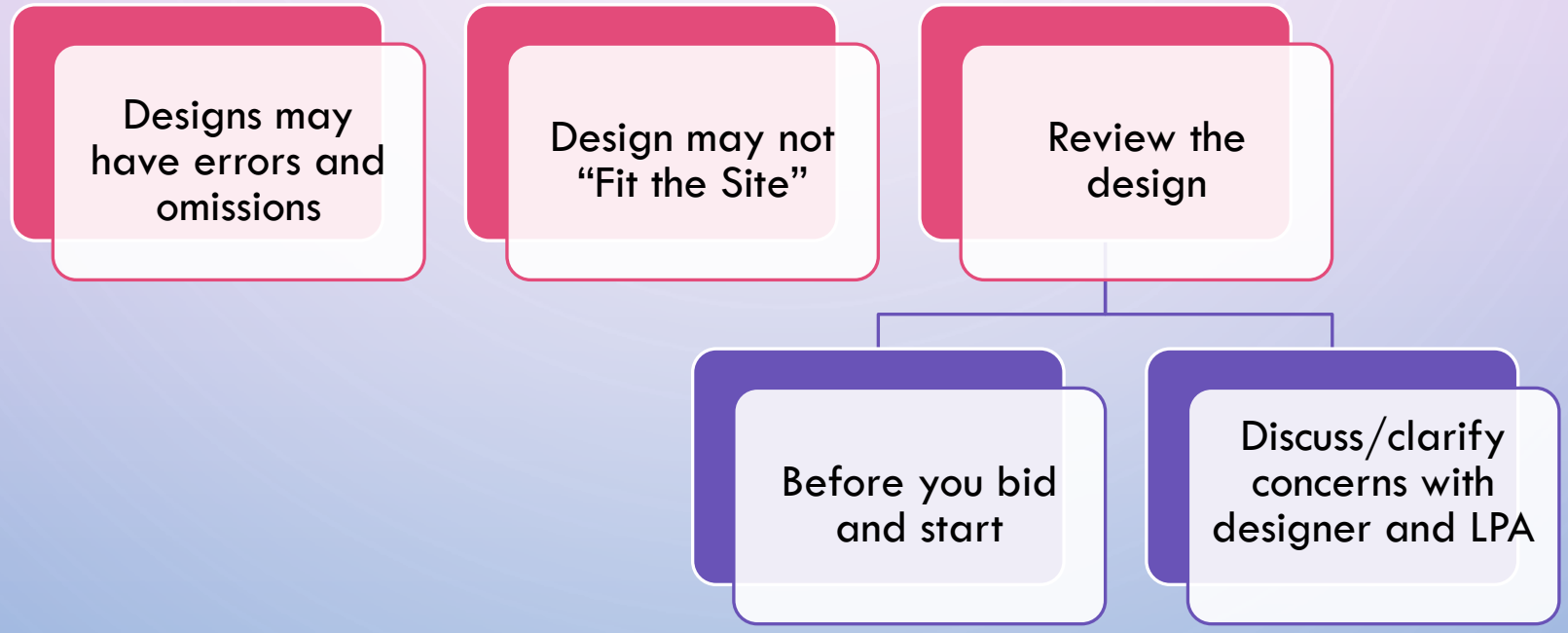
- ACCURATE DESIGN
- CONTRACTOR MUST UNDERSTAND DESIGN
- BENCHMARK-ELEVATIONS
- CONTOURS




# UNDERSTANDING A DESIGN

- WHAT IS A DESIGN
- SPECIFIC INFORMATION
- LOOKING FOR PROBLEMS

# DESIGNER AND REVIEW AGENCY ARE NOT INSTALLERS



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# PRINCIPLES: KIDD

- KEEP IT DRY

# Redox features

## SEPARATION

IF YOU ARE WONDERING, ASK!

## Soil Verification

# PLASTIC LIMIT

**Only Install when "Below PL"**

# PRINCIPLES: KINN

- KEEP IT NATURAL

# MAINTAINING NATURAL SOIL CONDITIONS

- SOIL LOCATED AT OR NEAR THE SOIL SURFACE IS GENERALLY THE BEST FOR:
  - TREATMENT
  - DISPERSAL
  - OXYGEN-TRANSFER
  - EVAPOTRANSPIRATION
  - NATURAL BIOLOGICAL ACTIVITY

# DURING CONSTRUCTION

# TODAY

# PRINCIPLES: KILL

KEEP IT LEVEL



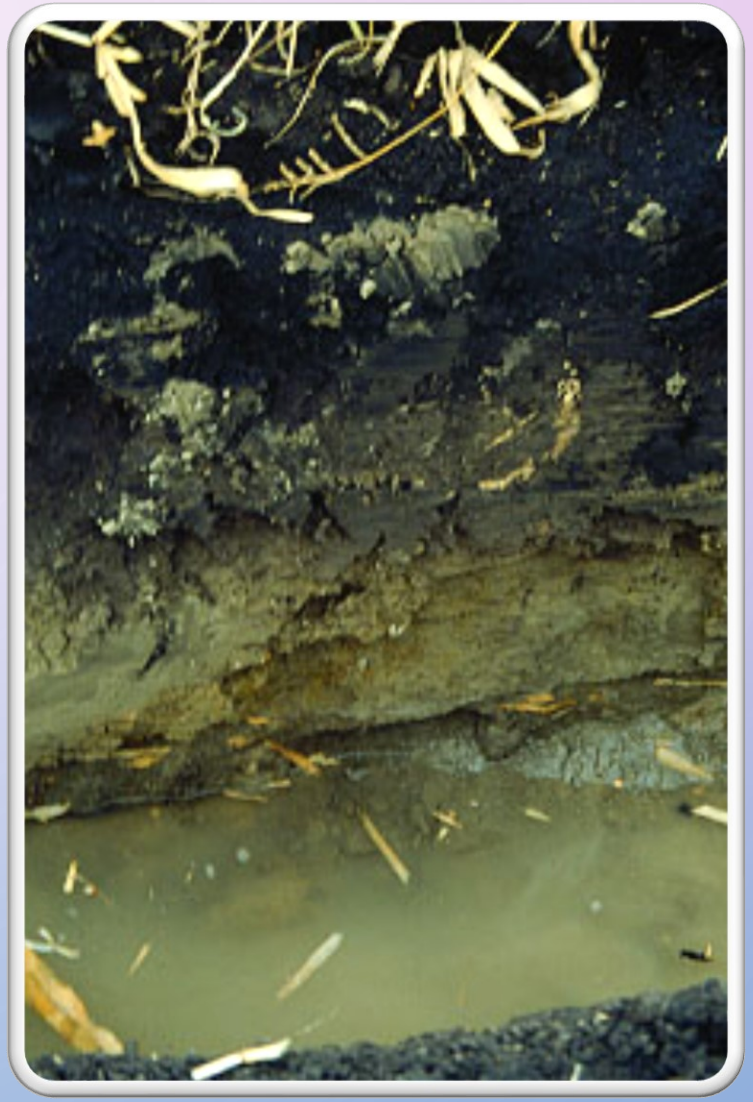
# LASER LEVELS

# PRINCIPLES: KISS

- KEEP IT ***SHALLOW***
- KEEP IT SERVICEABLE
- KEEP IT SIMPLE
- TANK
  - O&M
  - WATER
- STA
  - TREATMENT

# WHY SHALLOW?

- VERTICAL SEPARATION
  - TREATMENT
  - SATURATED SOIL
  - BEDROCK
- OXYGEN TRANSFER
- WATER MOVEMENT
  - SOILS- STRUCTURE
  - EVAPOTRANSPIRATION



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- B… …onal Installer
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# PRE-CONSTRUCTION

- SITE VISIT
- BIDDING PROCEDURES
- PERMIT REQUIREMENTS
- SYSTEM LAYOUT
- CONSTRUCTION SCHEDULING, STAGING

# REVIEW PERMIT REQUIREMENTS

READ THE PERMIT

REQUIRED INSPECTIONS; ENGINEER, LPA

OUT OF ORDINARY ITEMS?

WET SOIL RESTRICTIONS?

# PRE-CONSTRUCTION MEETING

- Engineer
- Homeowner
- Local Permitting Authority
- Other

# PRE-CONSTRUCTION PHOTOS

- WHAT WAS THERE INITIALLY
- WHAT IS OF IMPORTANCE TO THE HOMEOWNER

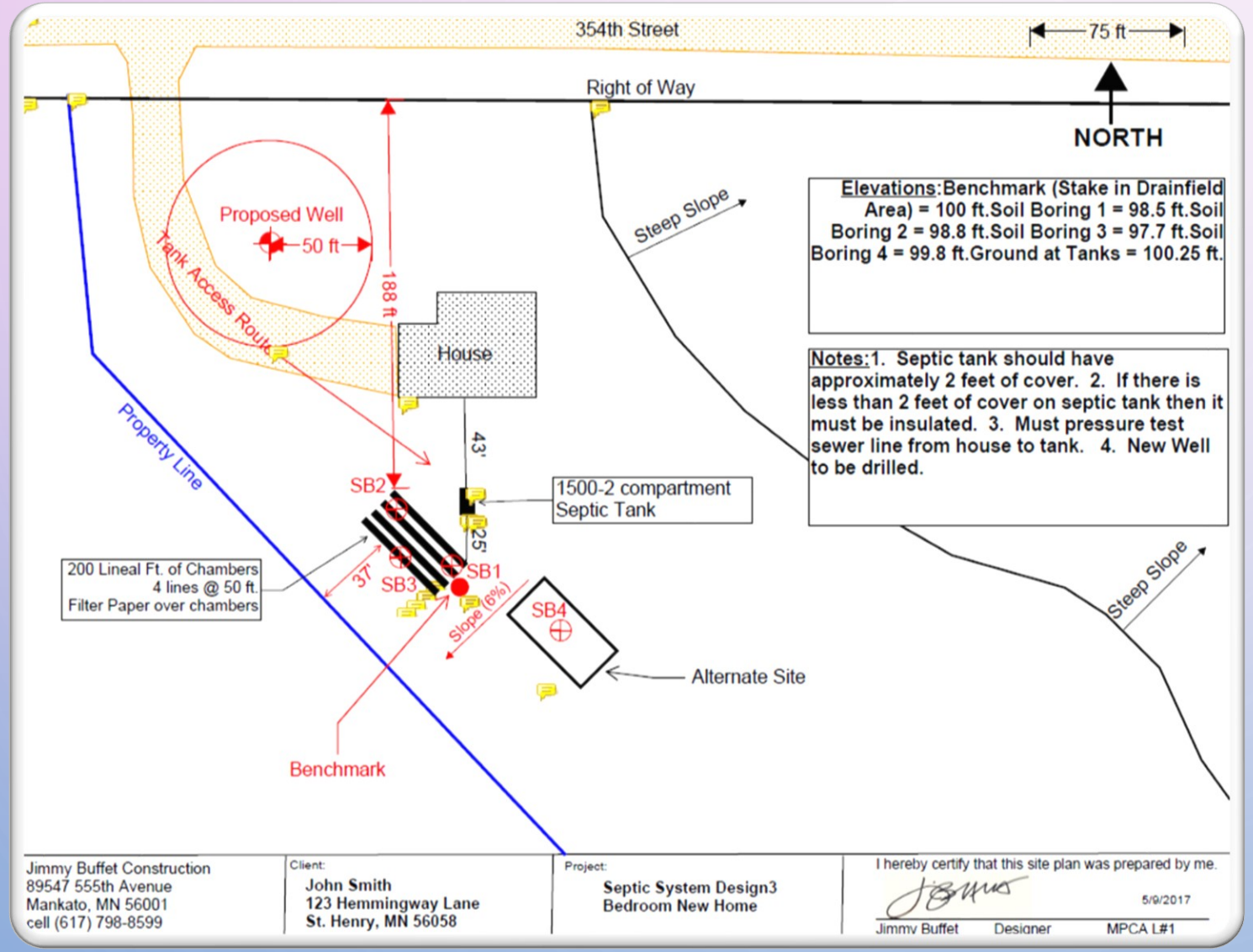
# CREATING AN INSTALLATION PLAN

## Things to Avoid!

- MATERIALS
- EQUIPMENT
- JOB STAGING
- WORKING WITH SUBCONTRACTORS
- TIMING

# MATERIALS: SELECTION

- SOILS
- FILL/BEDDING
- TOPSOIL
- TREATMENT MEDIA (SAND)
- DISTRIBUTION MEDIA
- TANKS & RISERS
- POWER
- PIPING
- EQUIPMENT
  - PUMPS
  - CONTROLS
- HIGHER LEVEL TREATMENT
- ELECTRICAL




# JOB STAGING

- INSTALLATION PROCESS
  - CONSTRUCTION PLANNING
- CONSTRUCTION STAGING
  - MATERIALS/EQUIPMENT
  - STA PROTECTION !!!
  - SPOILS


# TIMING THRU THE JOB

- AVAILABILITY OF MATERIALS
  - JOB SCHEDULING
  - INSPECTIONS (CALL AHEAD)
- SUBCONTRACTORS
  - ELECTRICAL
  - MATERIALS
    - HAULING
  - FINISHING [OWNER]

# MAJOR MODIFICATIONS

UNKNOWN SITE CONDITIONS

CONTACT ENGINEER, LPA, OWNER

TIME, COST

Introduction to Installation

Unique Position of the Installer in th

Understanding Soils
Treatment

B Installer

SUMMARY

NSTALLATION
PRINCIPLES