Site Assessment

Florida Department of Environmental Protection

Petroleum Restoration Program

February 4-7, 2019

SITE ASSESSMENT

Site Assessment

Standard Operating Procedures (SOP)

More detailed information and links to rules, statutes, and guidance documents are included in the SOP: https://floridadep.gov/waste/petroleum-restoration/content/prp-site-manager-standard-operating-procedures-sop

Site Assessment

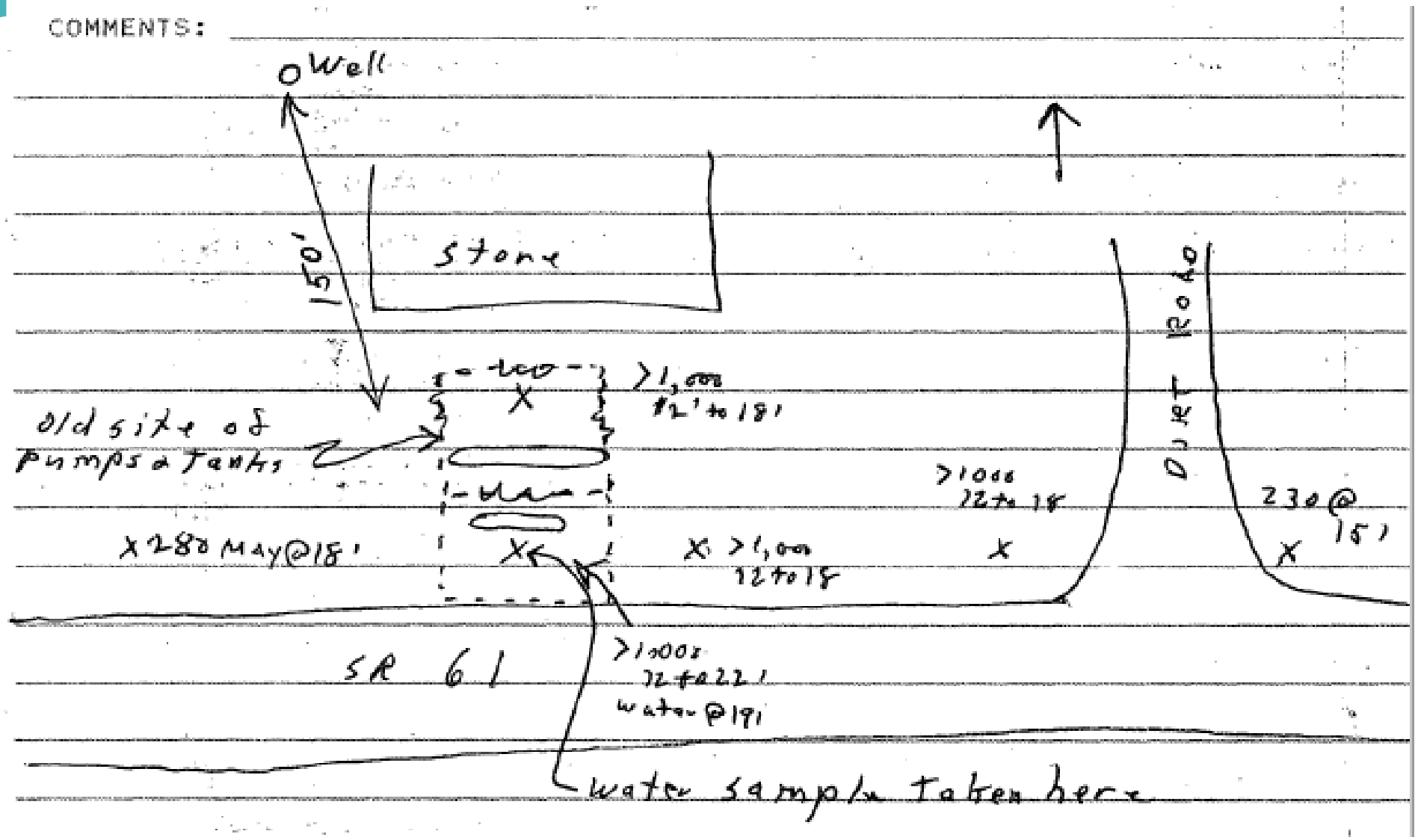
LSA/Initial Assessment with no Prior Data

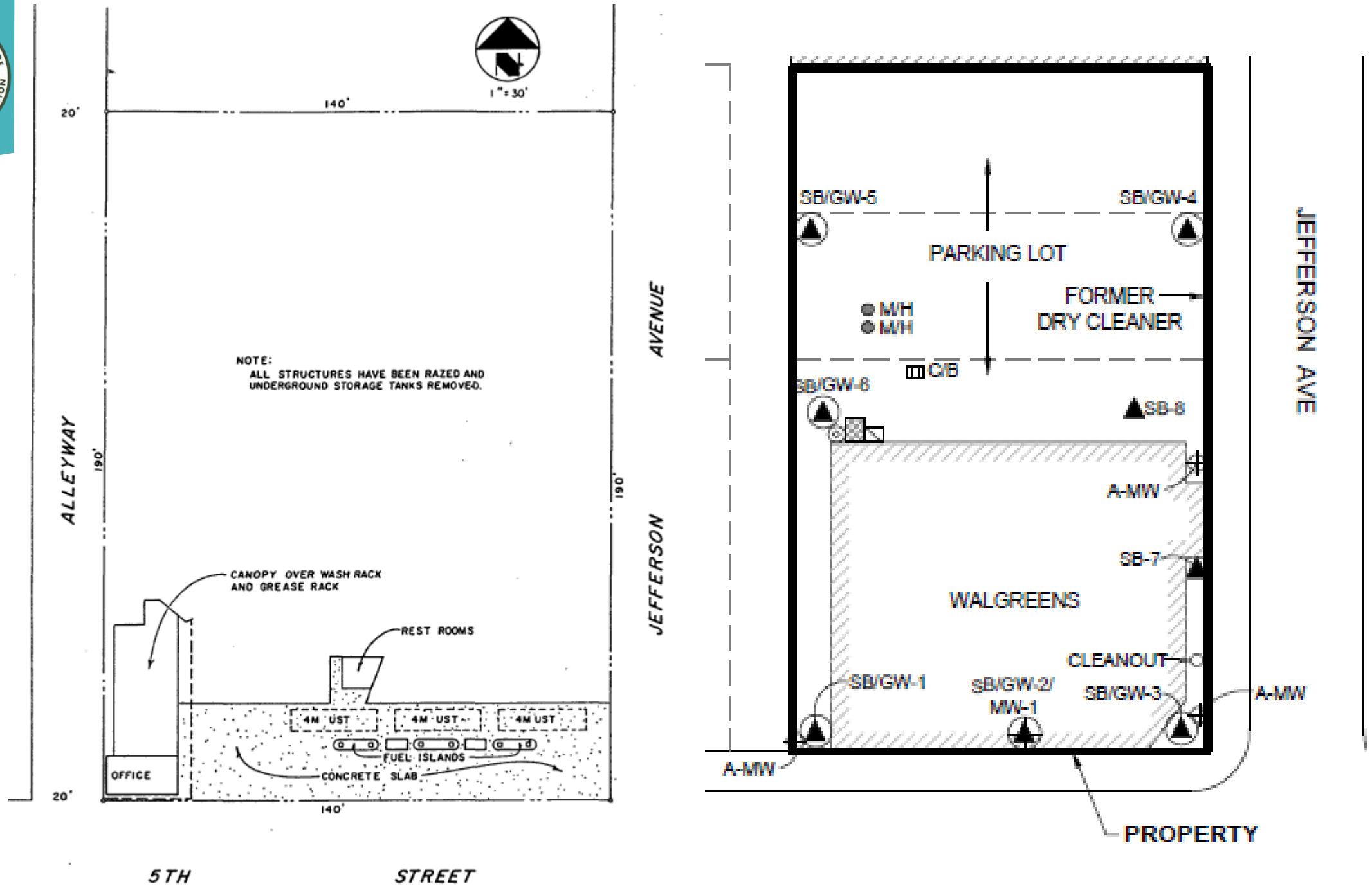
- Schedule a pre-work teleconference during Task 1 of the PO to discuss anticipated issues/questions
- Task 1 should include a File Review and Site Reconnaissance

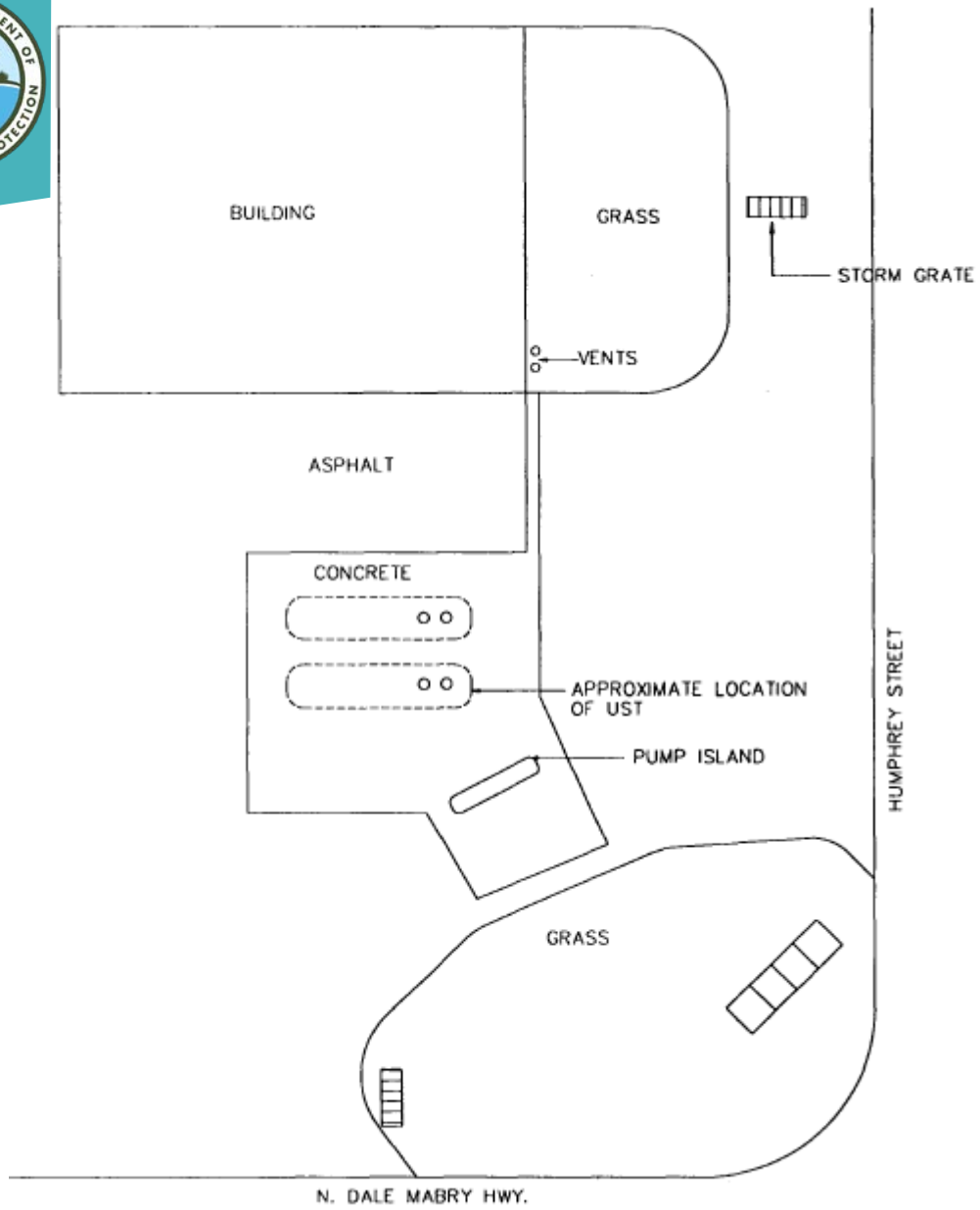
Site Assessment

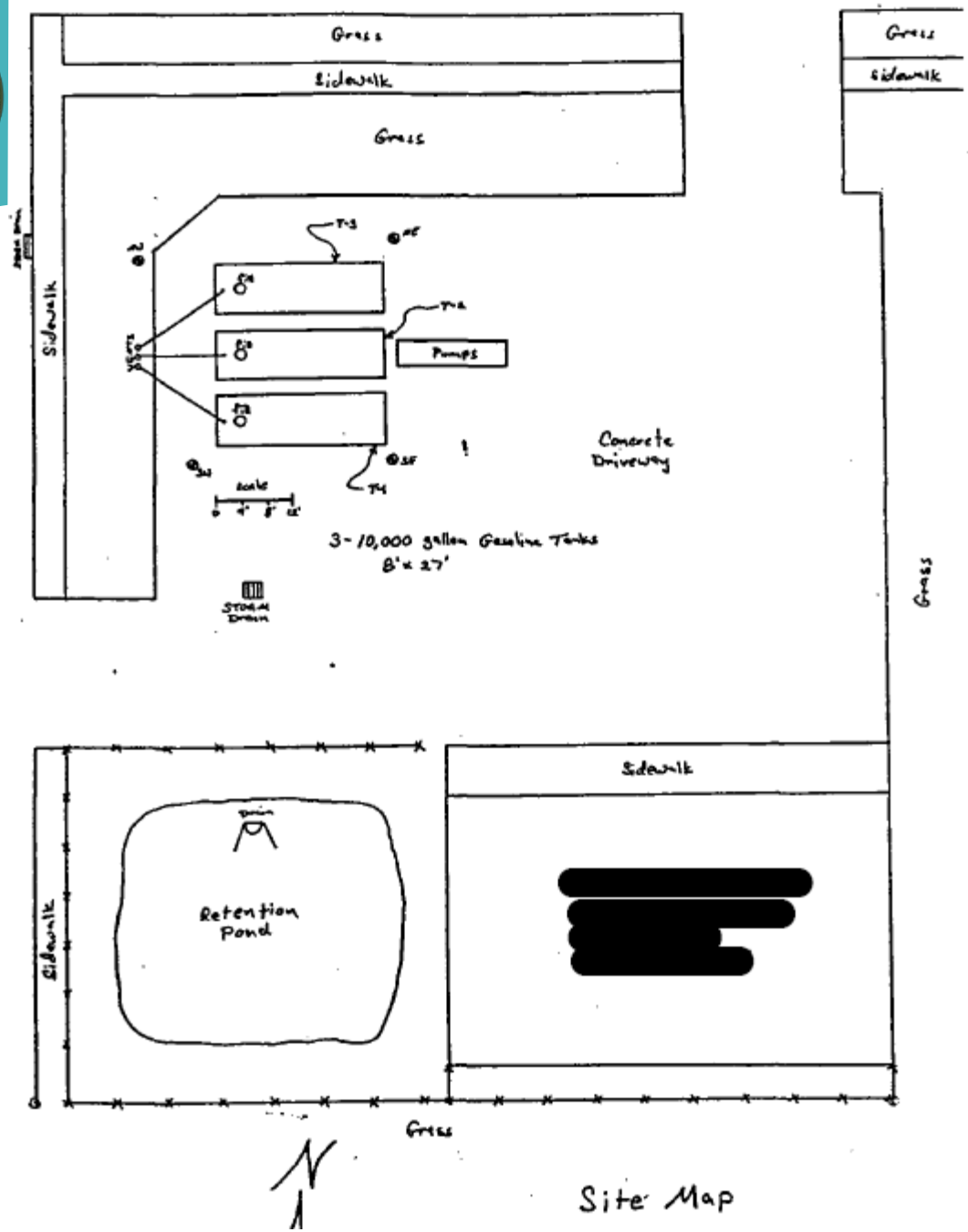
LSA/Initial Assessment with no Prior Data

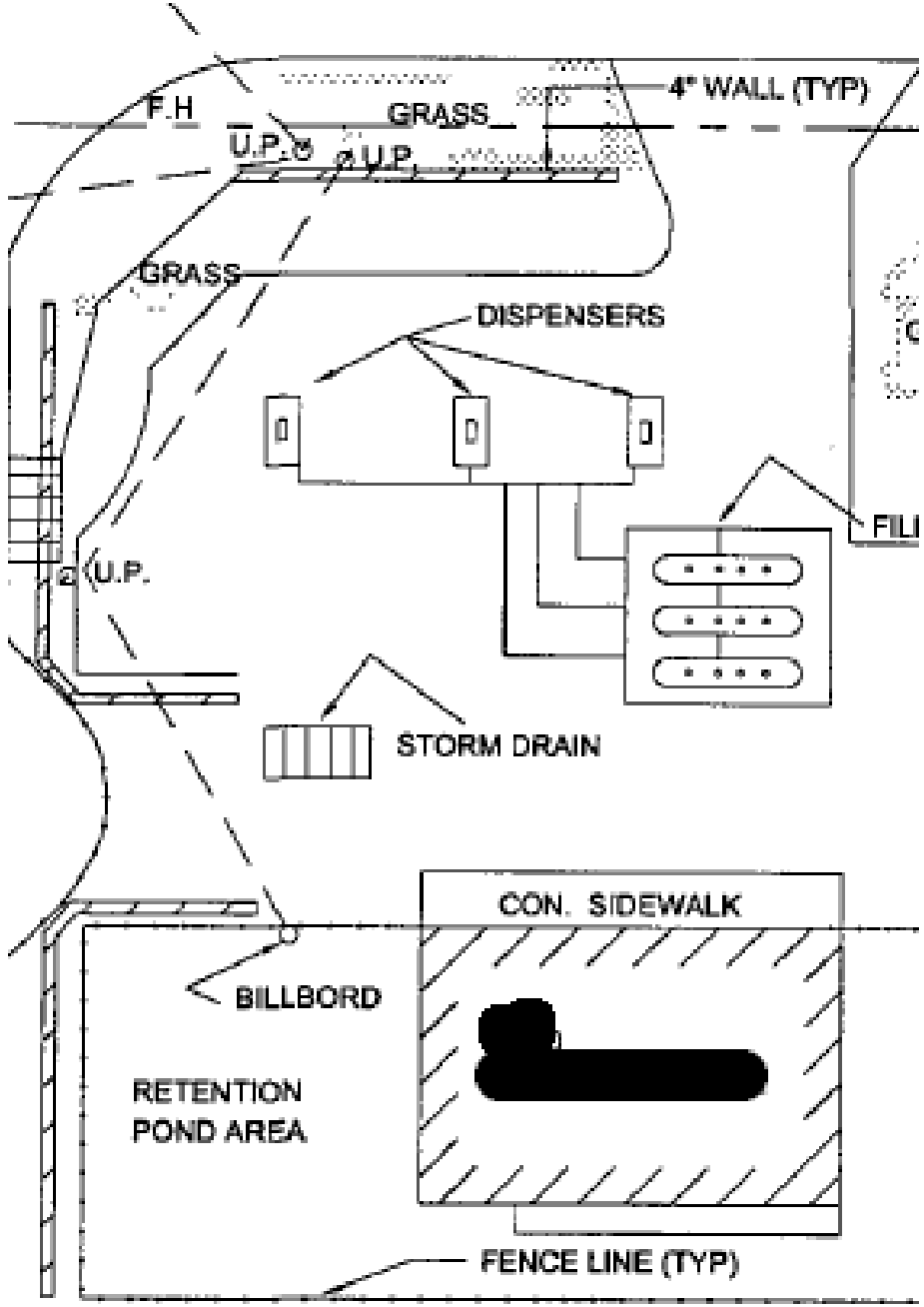
- DRF/eligibility package or other forms may indicate source/location of the discharge and a site sketch of the fuel system layout
- Inspections related to fuel system upgrades may include information on odors/staining, or show if tanks/system were removed

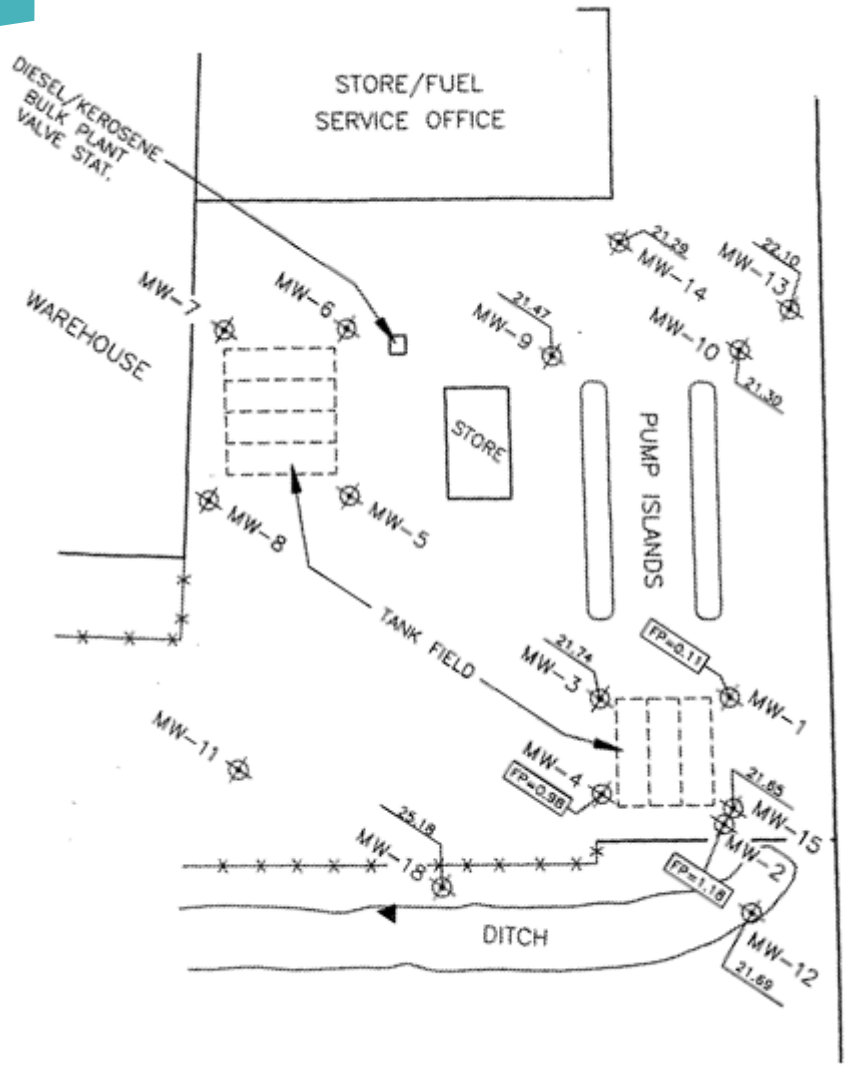

COMMENTS:
Well
150'
stone
old site of pumps & tanks
>1,000 12' to 18'
>1000 12 to 18
230 @ 15'
x280 May@18'
>1,000 12 to 18
>1000 12 to 22' water @19'
SR 61
water sample taken here

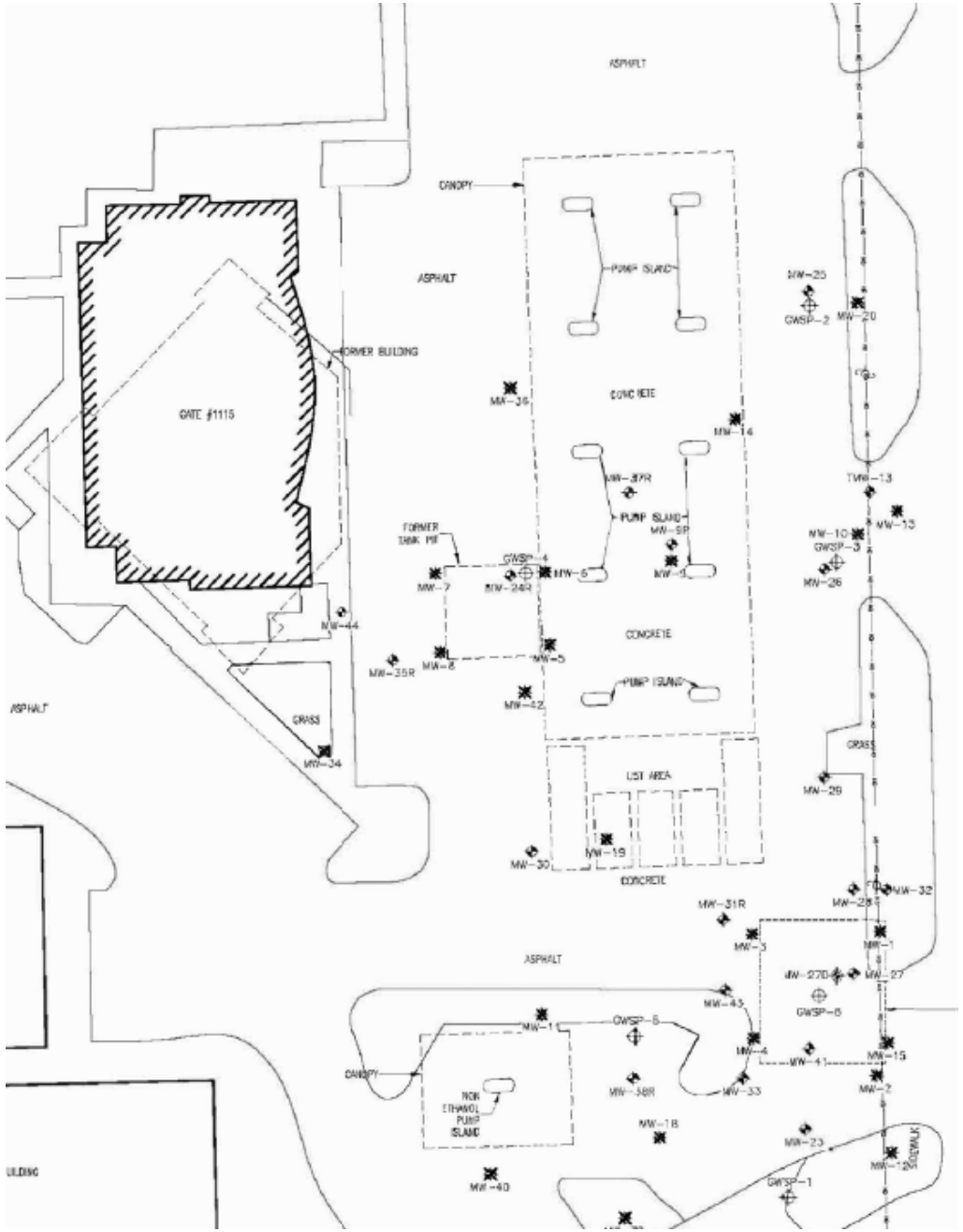

1"=30'
140'
20'
190'
ALLEYWAY
NOTE:
ALL STRUCTURES HAVE BEEN RAZED AND
UNDERGROUND STORAGE TANKS REMOVED.
CANOPY OVER WASH RACK
AND GREASE RACK
REST ROOMS
4M UST
4M UST
4M UST
FUEL ISLANDS
CONCRETE SLAB
OFFICE
JEFFERSON AVENUE
5TH STREET
SB/GW-5
SB/GW-4
PARKING LOT
FORMER
DRY CLEANER
M/H
M/H
C/B
SB/GW-6
SB-8
A-MW
SB-7
WALGREENS
CLEANOUT
SB/GW-1
SB/GW-2/
MW-1
SB/GW-3
A-MW
A-MW
JEFFERSON AVE
PROPERTY


BUILDING
GRASS
STORM GRATE
VENTS
ASPHALT
CONCRETE
APPROXIMATE LOCATION OF UST
PUMP ISLAND
HUMPHREY STREET
GRASS
N. DALE MABRY HWY.


Grass
Sidewalk
Grass
Grass
Sidewalk
Sidewalk
T-3
T-2
T-1
Pumps
Concrete Driveway
3-10,000 gallon Gasoline Tanks
8' x 27'
STORM Drain
Grass
Sidewalk
Retention Pond
Sidewalk
Grass
N
Site Map


F.H
U.P.
U.P.
GRASS
4" WALL (TYP)
GRASS
DISPENSERS
U.P.
STORM DRAIN
CON. SIDEWALK
BILLBORD
RETENTION POND AREA
FENCE LINE (TYP)


STORE/FUEL
SERVICE OFFICE
DIESEL/KEROSENE
BULK PLANT
VALVE STAT.
WAREHOUSE
STORE
PUMP ISLANDS
TANK FIELD
DITCH
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-15
MW-18
21.29
22.10
21.47
21.30
21.74
21.85
25.18
21.69
FP=0.11
FP=0.98
FP=1.16

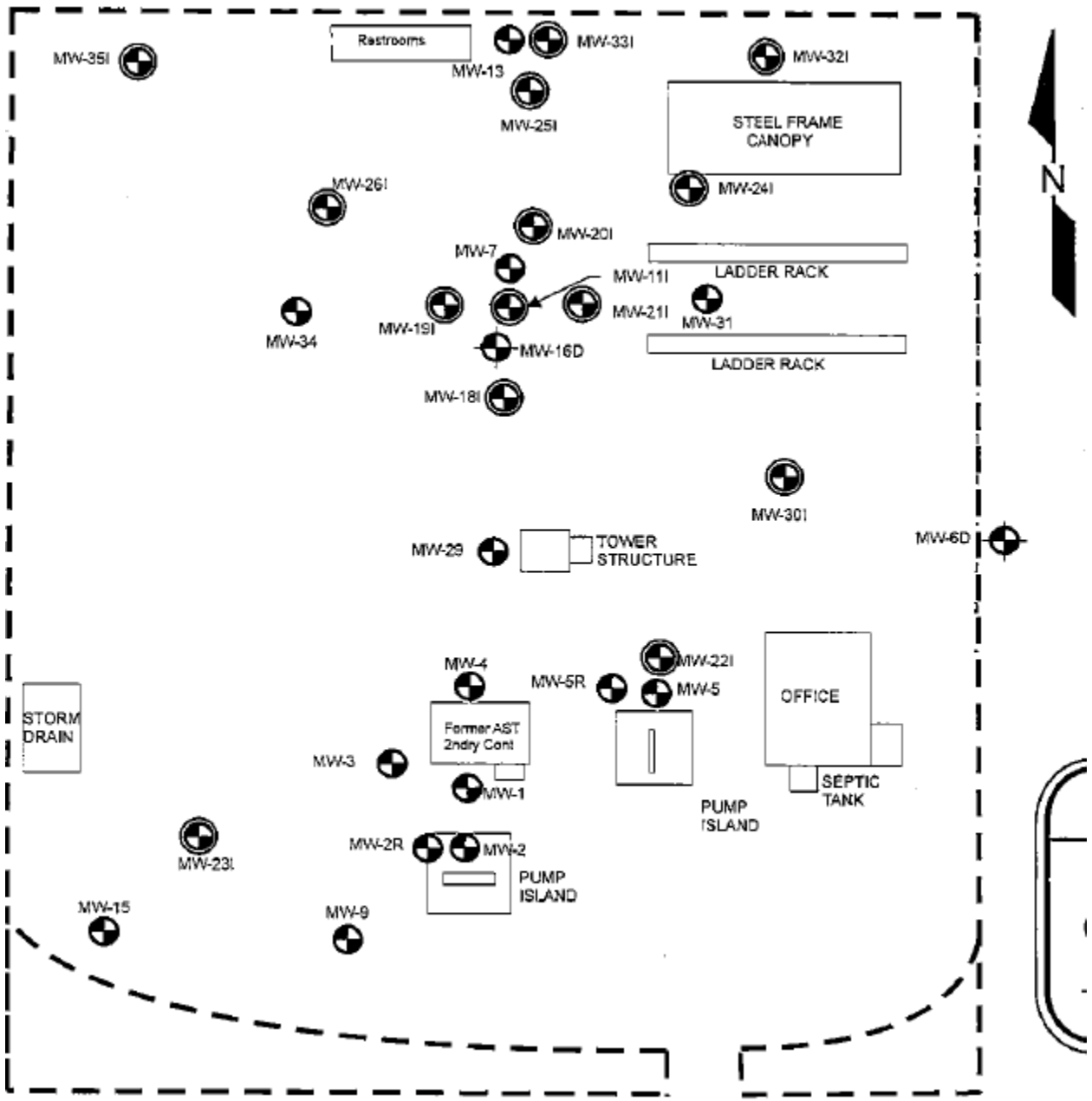

ASPHALT
CANOPY
PUMP ISLAND
FORMER BUILDING
GATE #1115
CONCRETE
FORMER TANK PIT
GRASS
LOT AREA
NON ETHANOL PUMP ISLAND
GWSP-1
GWSP-2
GWSP-3
GWSP-4
GWSP-5
GWSP-6
SIDEWALK

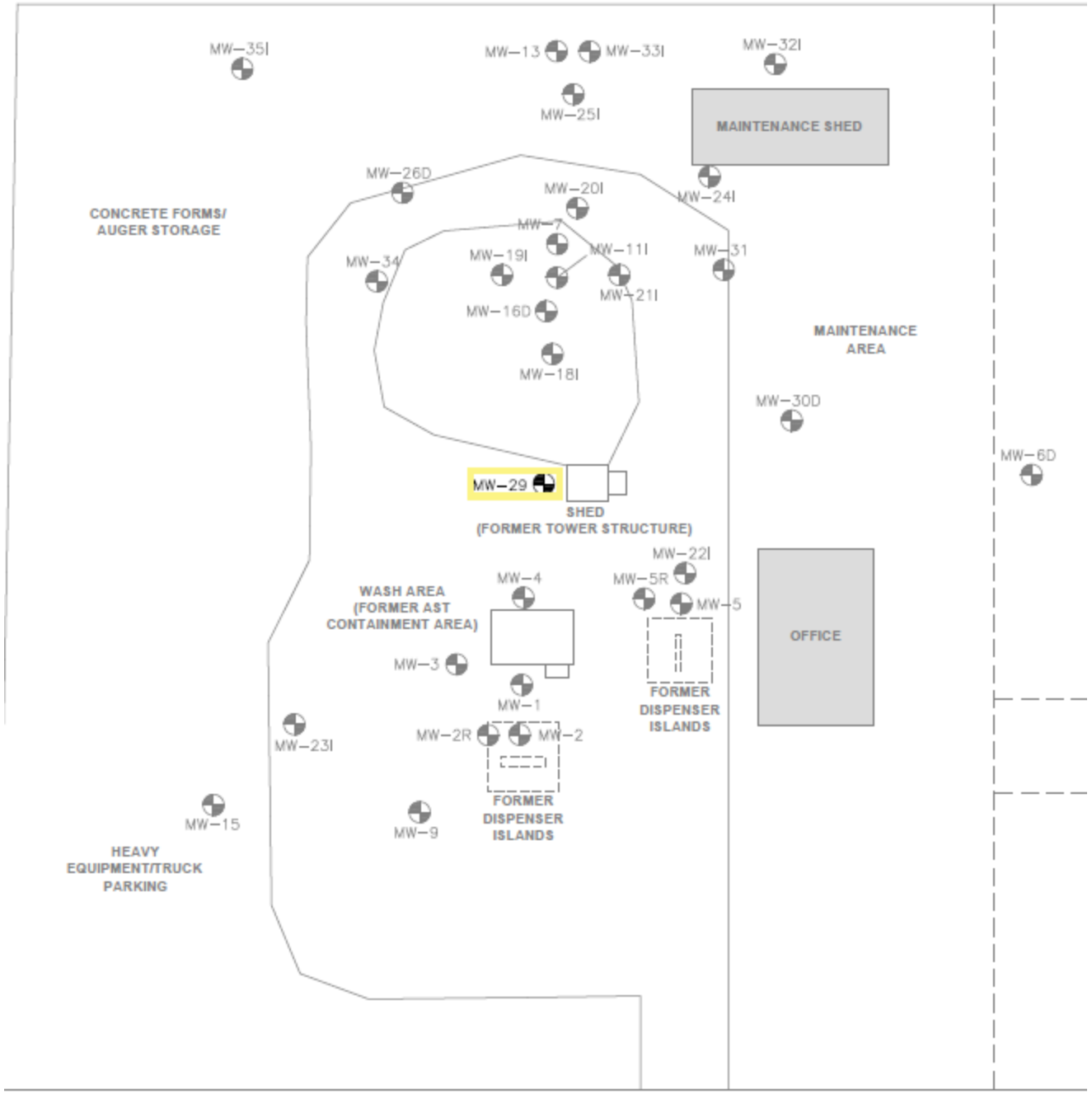
Site Assessment

LSA/Initial Assessment with no Prior Data

Site recon should include:

- Verify site layout compared to any historical site figures
- Verify any historical compliance/monitoring wells
- Make note of site access conditions for drill rigs

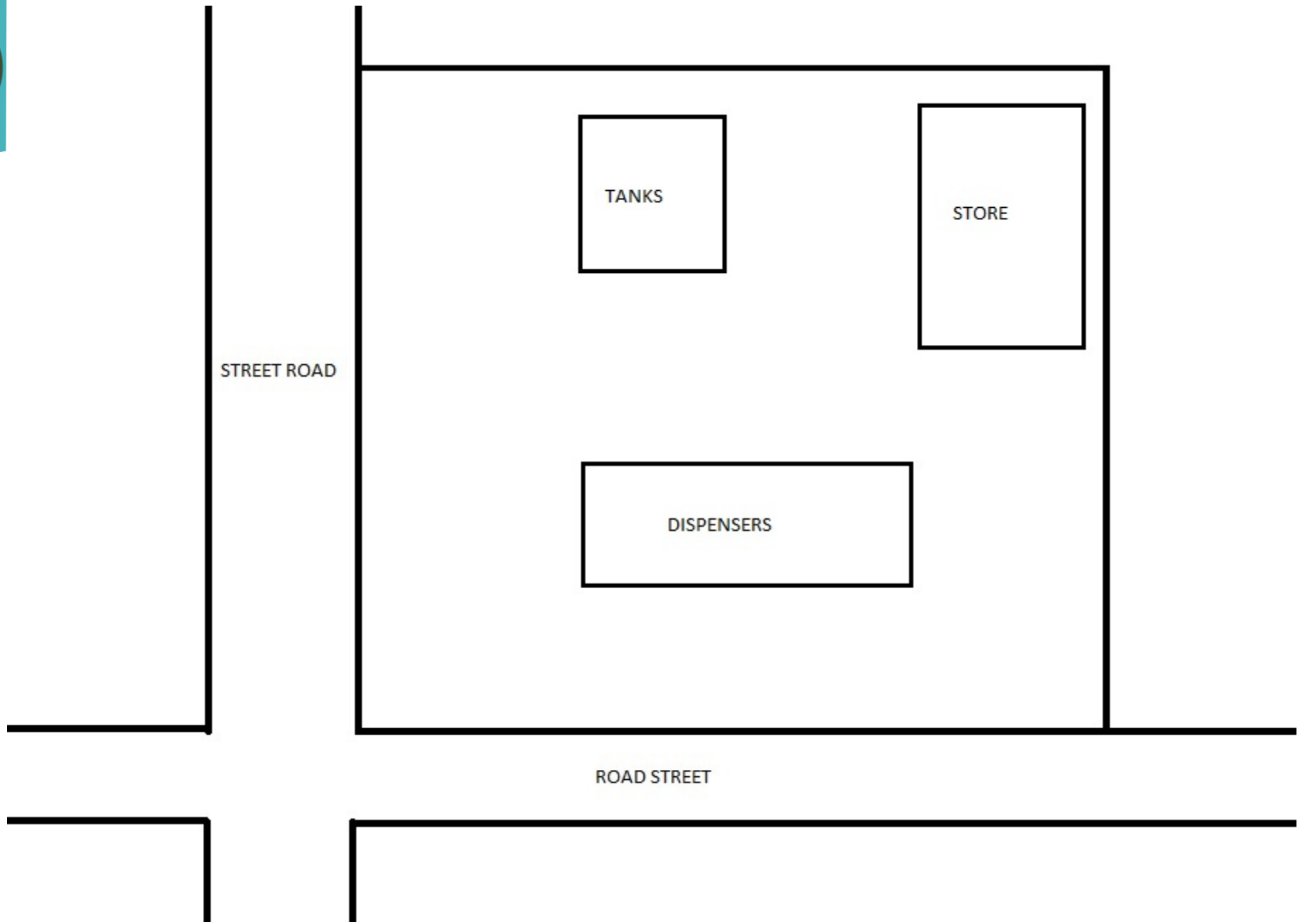

Restrooms
MW-35I
MW-13
MW-33I
MW-25I
MW-32I
STEEL FRAME CANOPY
MW-24I
MW-26I
MW-20I
MW-7
LADDER RACK
MW-11I
MW-21I
MW-31
MW-34
MW-19I
MW-16D
LADDER RACK
MW-18I
MW-30I
MW-29
TOWER STRUCTURE
MW-6D
N
MW-4
MW-22I
MW-5R
MW-5
OFFICE
STORM DRAIN
Former AST 2ndry Cont
MW-3
MW-1
SEPTIC TANK
PUMP ISLAND
MW-23I
MW-2R
MW-2
PUMP ISLAND
MW-15
MW-9


MW-35I
MW-13
MW-33I
MW-32I
MW-25I
MAINTENANCE SHED
MW-26D
MW-20I
MW-24I
CONCRETE FORMS/
AUGER STORAGE
MW-7
MW-34
MW-19I
MW-11I
MW-31
MW-21I
MW-16D
MAINTENANCE
AREA
MW-18I
MW-30D
MW-6D
MW-29
SHED
(FORMER TOWER STRUCTURE)
MW-22I
MW-4
MW-5R
MW-5
WASH AREA
(FORMER AST
CONTAINMENT AREA)
OFFICE
MW-3
MW-1
FORMER
DISPENSER
ISLANDS
MW-23I
MW-2R
MW-2
FORMER
DISPENSER
ISLANDS
MW-15
MW-9
HEAVY
EQUIPMENT/TRUCK
PARKING

Site Assessment

LSA/Initial Assessment with no Prior Data

- Initial sampling should focus on the potential source areas (tanks, dispensers, and fuel lines)
- If the site layout has changed since the discharge, ensure you are assessing the correct area

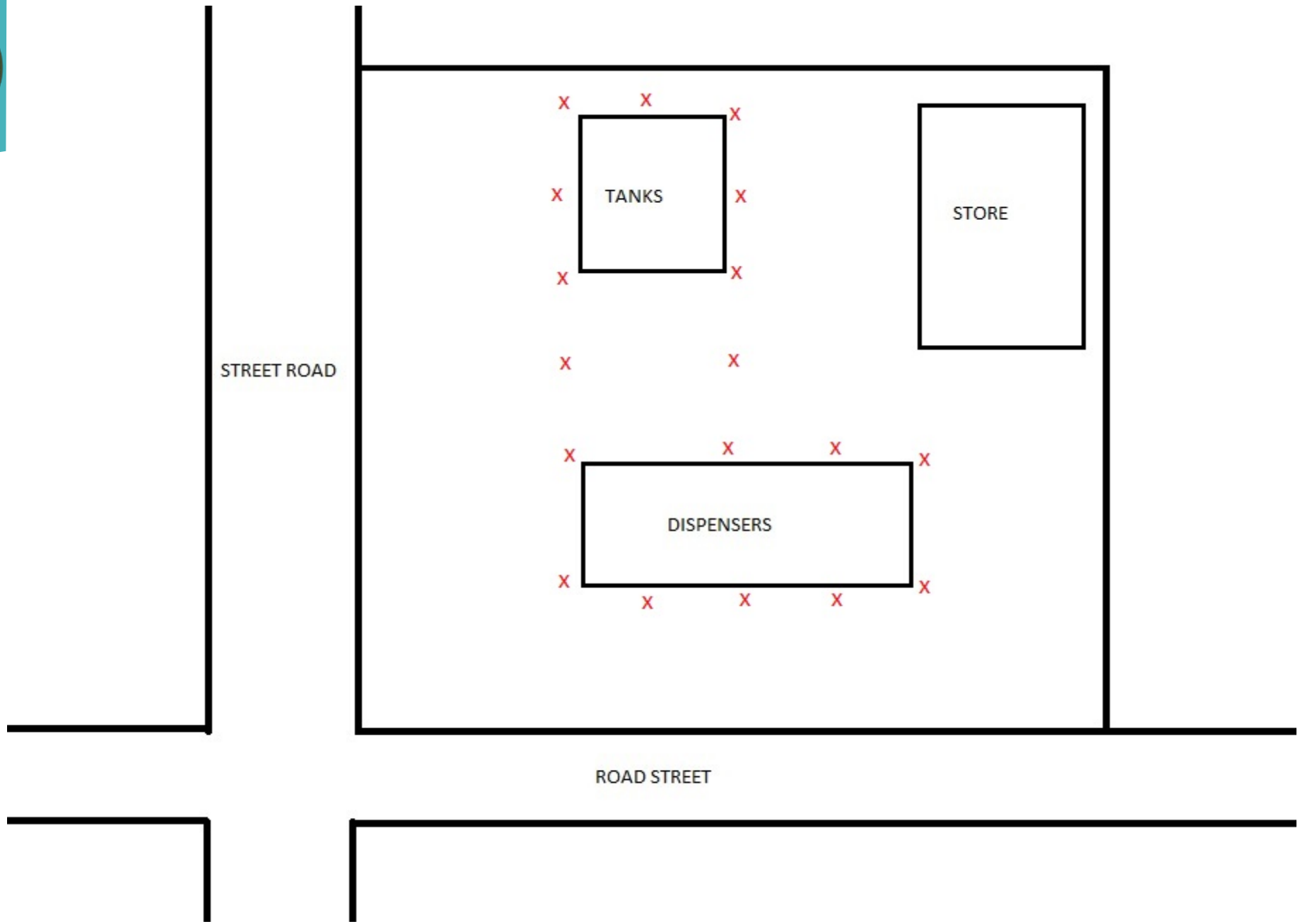

TANKS
STORE
STREET ROAD
DISPENSERS
ROAD STREET

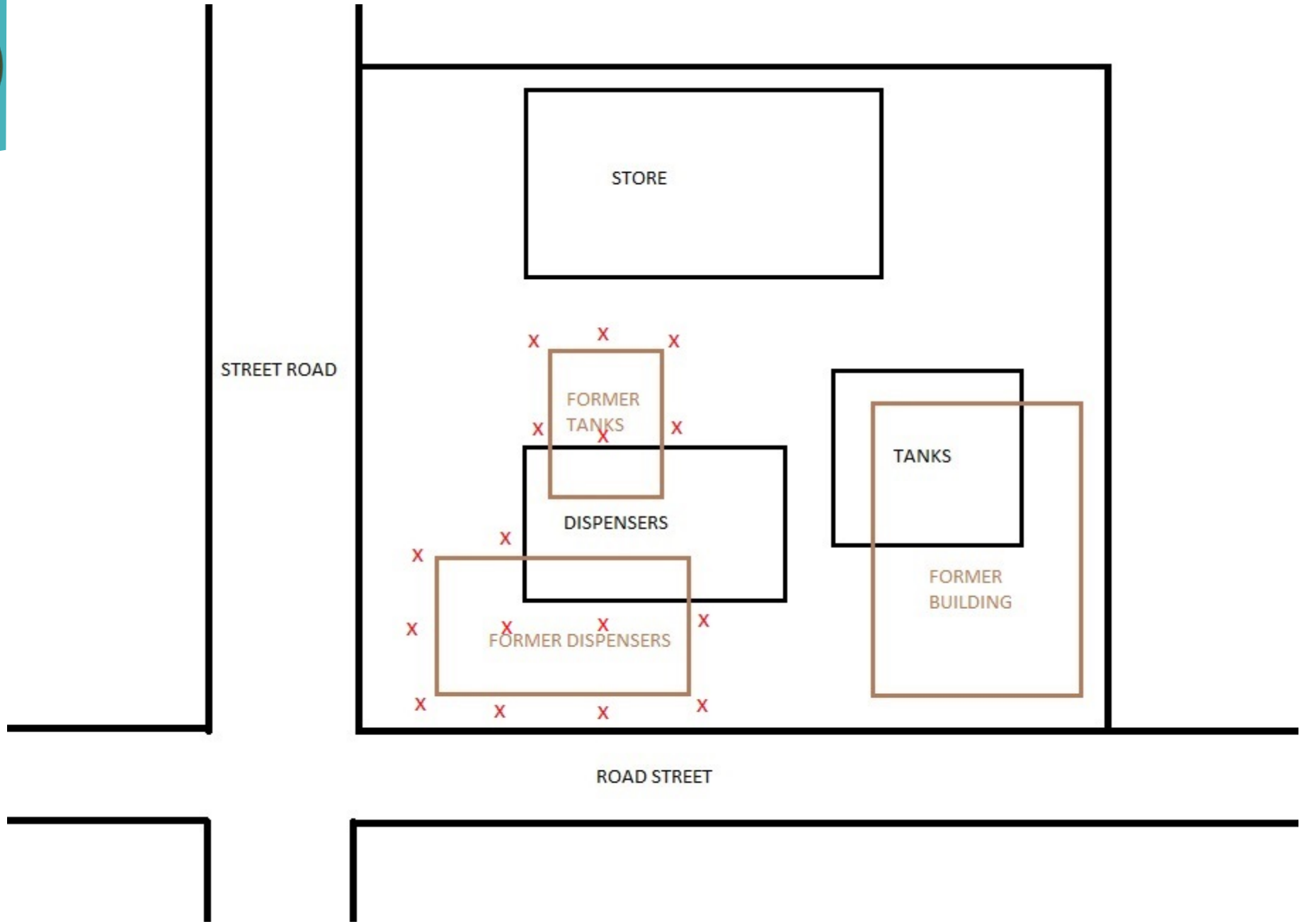
Site Assessment

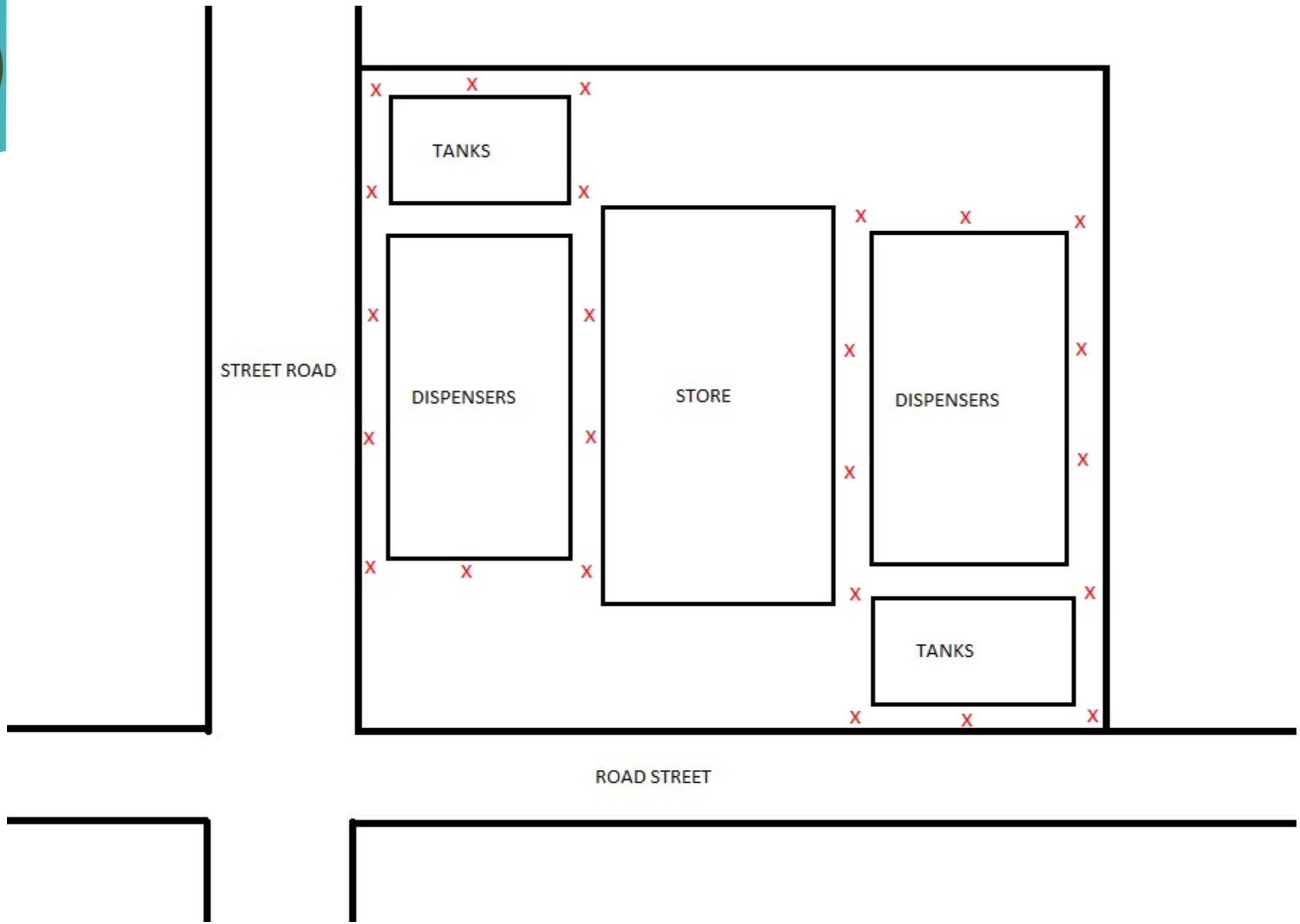
LSA/Initial Assessment with no Prior Data

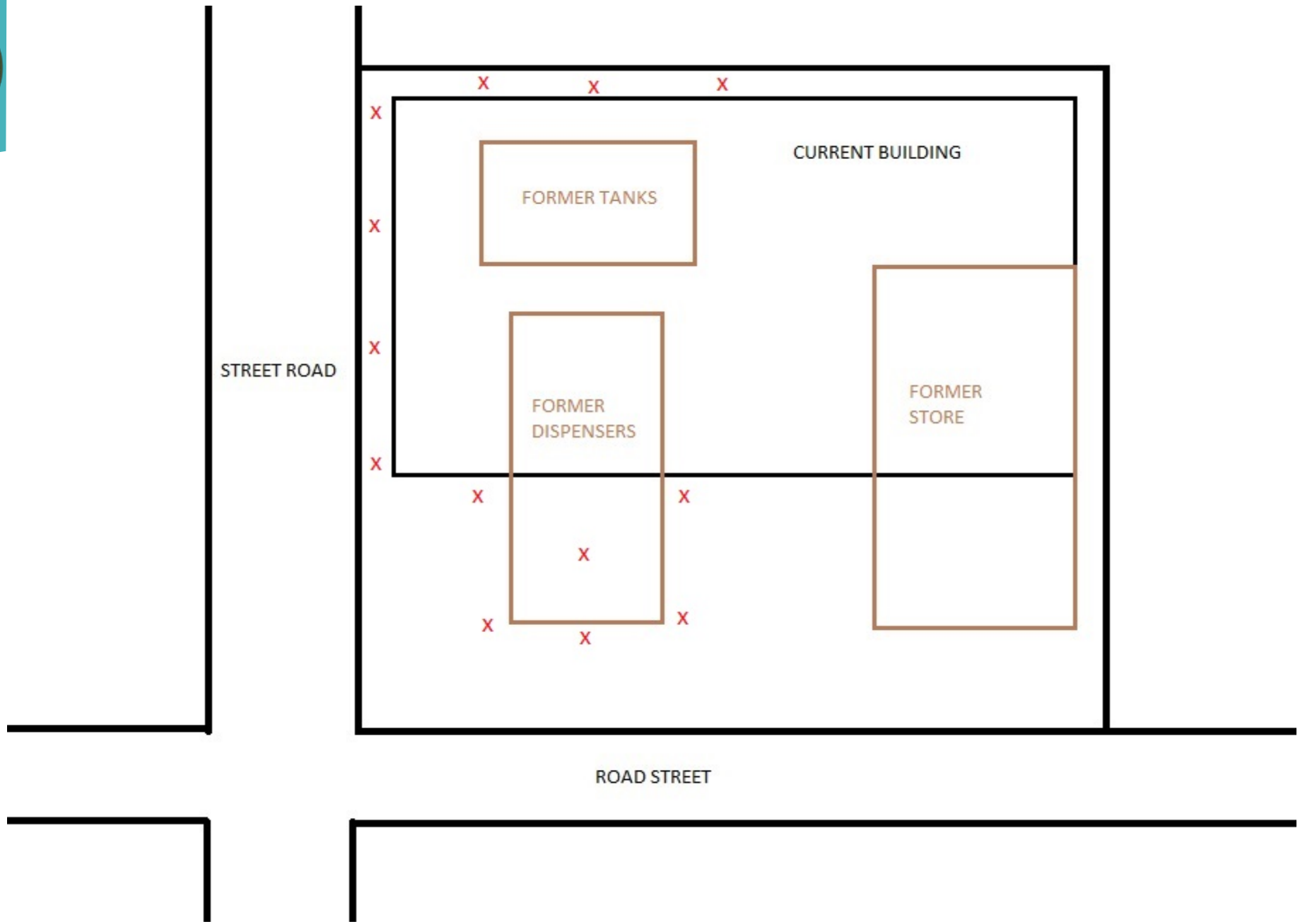
Soil Samples:

- Initial samples should be spaced approximately 10 to 15 feet apart
- Install borings around the perimeter of the UST area, as close to the dispensers as safe, along the piping runs if obvious/marked
- You can include some step-outs


TANKS
STORE
DISPENSERS
STREET ROAD
ROAD STREET


STORE
STREET ROAD
FORMER
TANKS
DISPENSERS
TANKS
FORMER
BUILDING
FORMER DISPENSERS
ROAD STREET


TANKS
DISPENSERS
STORE
DISPENSERS
TANKS
STREET ROAD
ROAD STREET


CURRENT BUILDING
FORMER TANKS
FORMER DISPENSERS
FORMER STORE
STREET ROAD
ROAD STREET

Site Assessment

LSA/Initial Assessment with no Prior Data

Groundwater Samples:

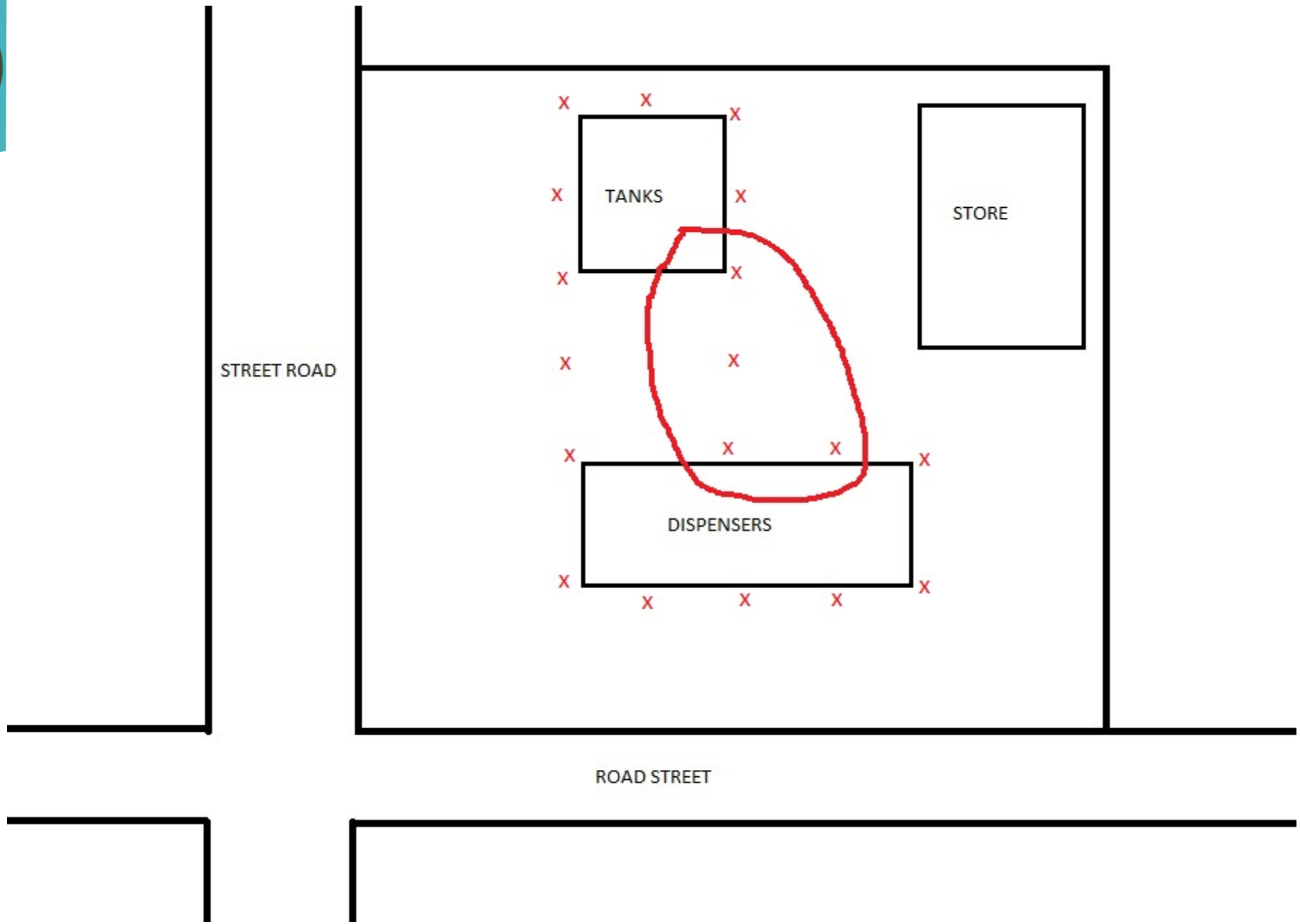
- Grab samples can be collected during soil boring installation
- Determine initial monitoring well placement based on soil lab results or grab sample results
- Additional soil assessment can be performed during well installation

Site Assessment

LSA/Initial Assessment with no Prior Data

Groundwater Samples (continued):

- Include at least one upgradient well, at least one downgradient well, and two sidegradient wells in the initial well installation activities
- Well spacing should be approximately 30 feet, based on accessibility


STREET ROAD
TANKS
STORE
DISPENSERS
ROAD STREET


TANKS
STORE
STREET ROAD
DISPENSERS
ROAD STREET

Site Assessment

LSA/Initial Assessment with no Prior Data

Laboratory Sampling:

- Laboratory sampling analytes should be selected based on the fuel types stored at the facility and the reported product discharged
- Refer to the SOP to determine which laboratory analytical methods are required

Site Assessment

LSA/Initial Assessment with no Prior Data

Initial Assessment Report:

- Typically the initial assessment will not fully delineate the soil and groundwater plumes
- The report for the initial assessment task should include recommendations for step-out locations and additional sampling

Site Assessment

LSA/Initial Assessment with no Prior Data

Initial Assessment Report (continued):

- Additional assessment(s) can be approved in the next task by change order, or be the basis for the next purchase order
- Should be tasked as an Interim Assessment Report


TANKS
STORE
DISPENSERS
STREET ROAD
ROAD STREET


TANKS
STORE
STREET ROAD
DISPENSERS
ROAD STREET

Site Assessment

SSA for LSA

LSA is only intended to get a general idea of what petroleum impacts (if any) are present at the site. We only need to know if the site is clean, will require NAM or Active Remediation, or is an imminent threat

Site Assessment

SSA for LSA

An LSA does not require a full delineation of soil and groundwater plumes, only a general idea of the impacted area and concentrations, and whether the petroleum plumes are contained within the property boundaries

Site Assessment

SSA for LSA

- Soil borings should be spaced at 20- to 30-foot intervals when stepping out from confirmed screening or laboratory analytical exceedances
- At smaller sites, it may be appropriate to place step-out soil borings at the site boundaries

Site Assessment

SSA for LSA

- If the first set of step-out soil borings still show petroleum impacts, it may be appropriate to step-out to the property boundary
- Assessment should end at the property boundaries unless there is excessive contamination or a sensitive receptor downgradient

Site Assessment

SSA for LSA

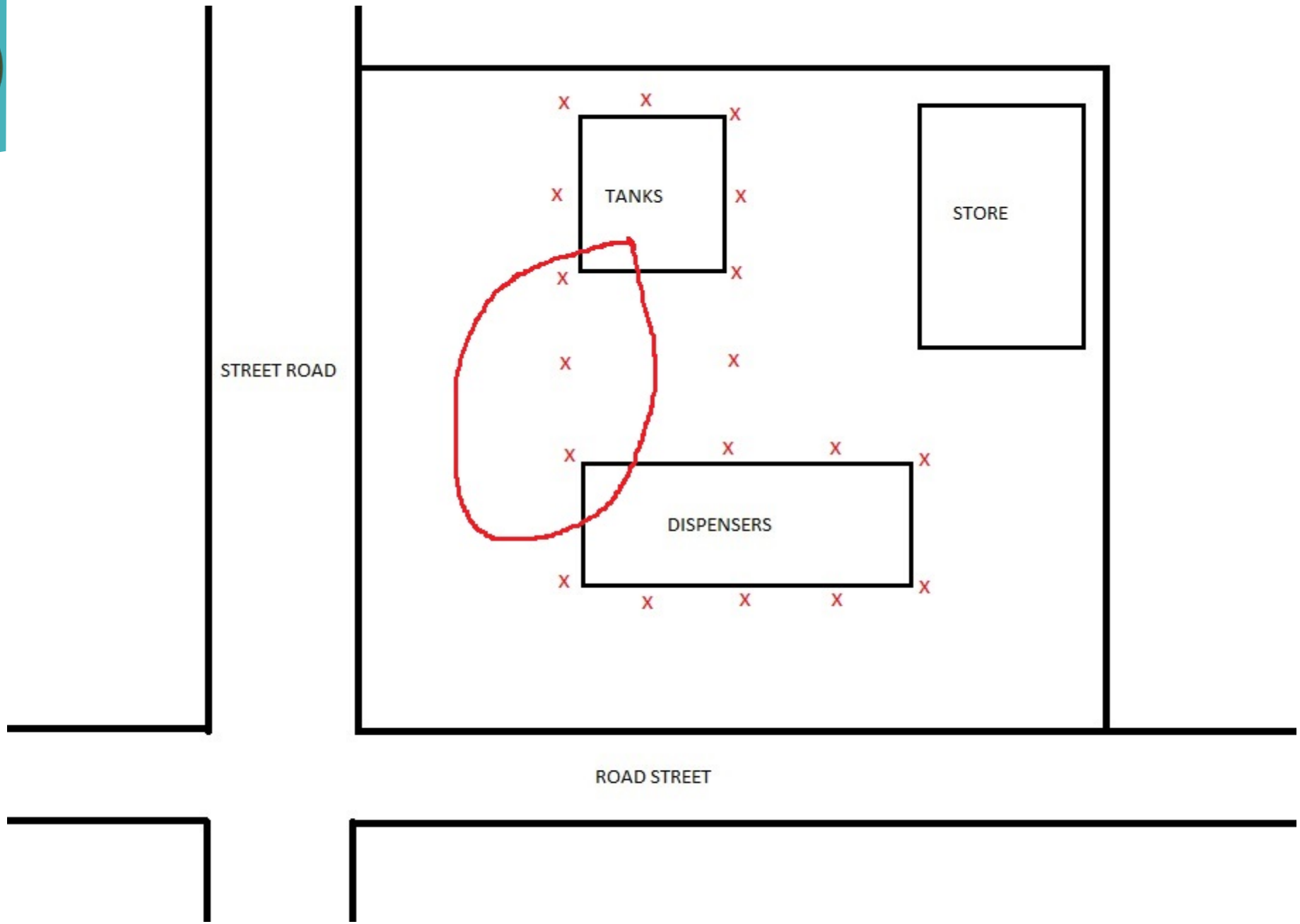
- Monitoring Wells should be spaced at 30- to 50-foot intervals when stepping out from confirmed screening or laboratory analytical exceedances
- At smaller sites, it may be appropriate to place step-out wells at the site boundaries

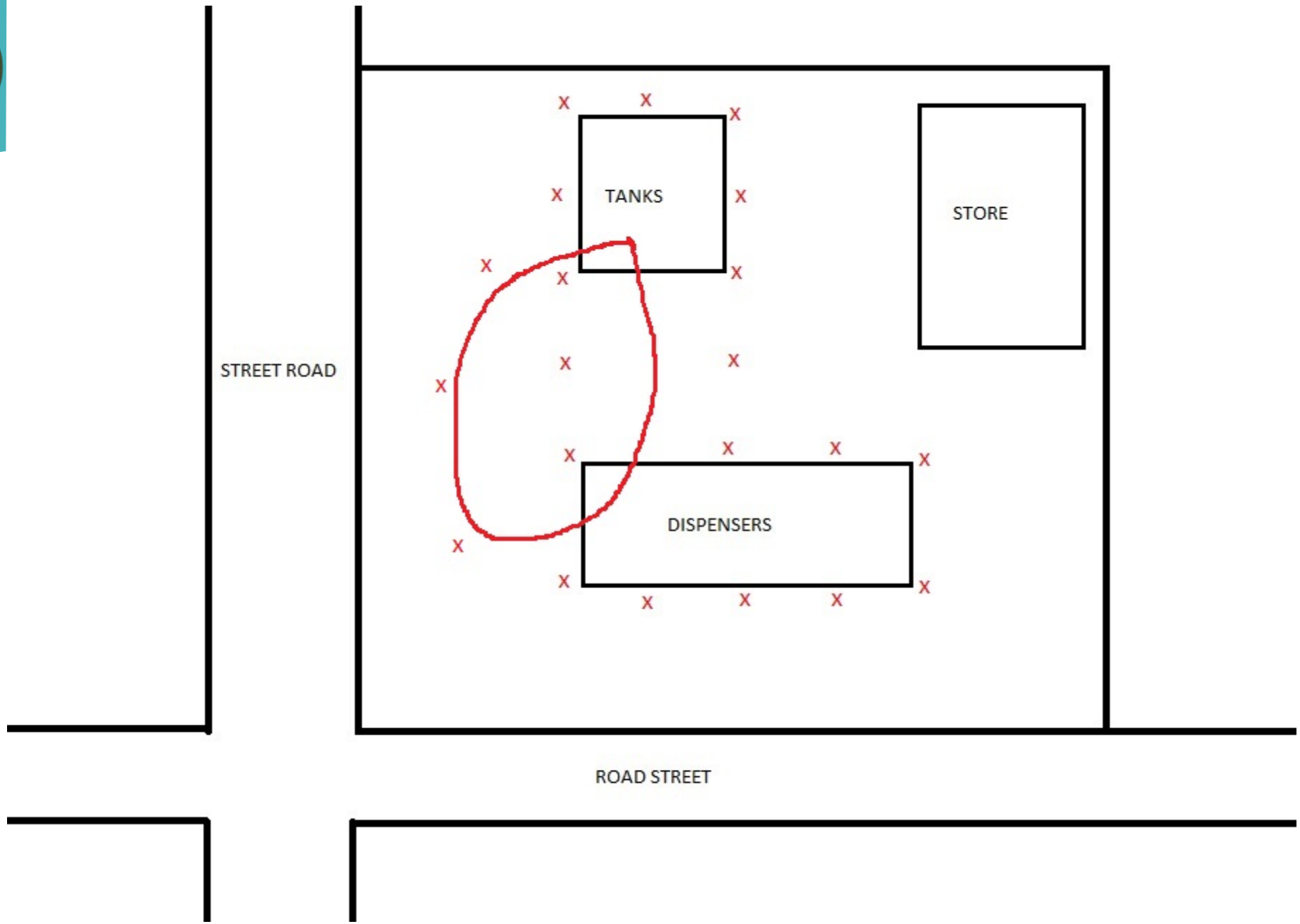
Site Assessment

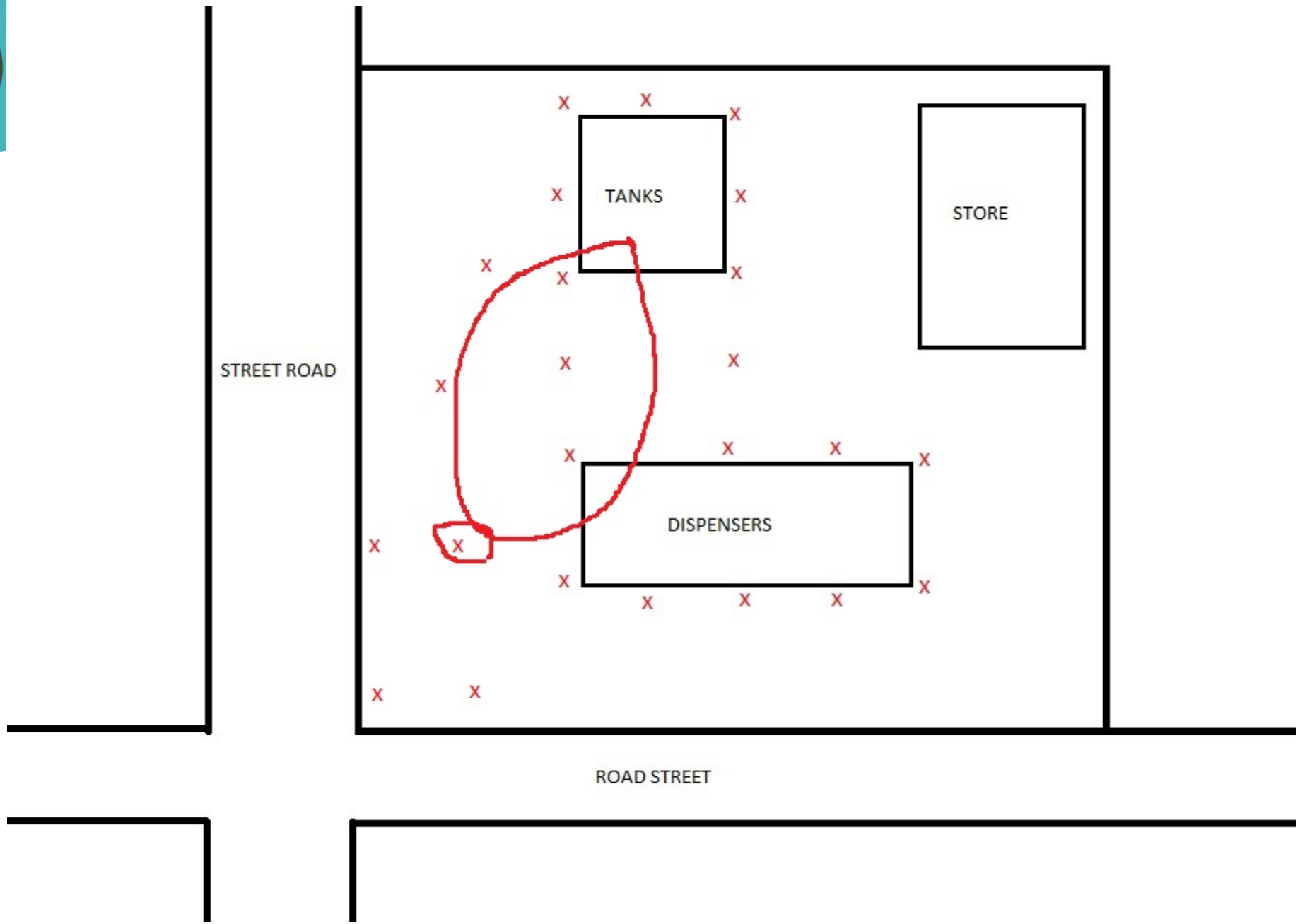
SSA for LSA

- If the first set of step-out wells still show petroleum impacts, it may be appropriate to step-out to the property boundary
- Assessment should end at the property boundaries unless there is excessive contamination or a sensitive receptor downgradient

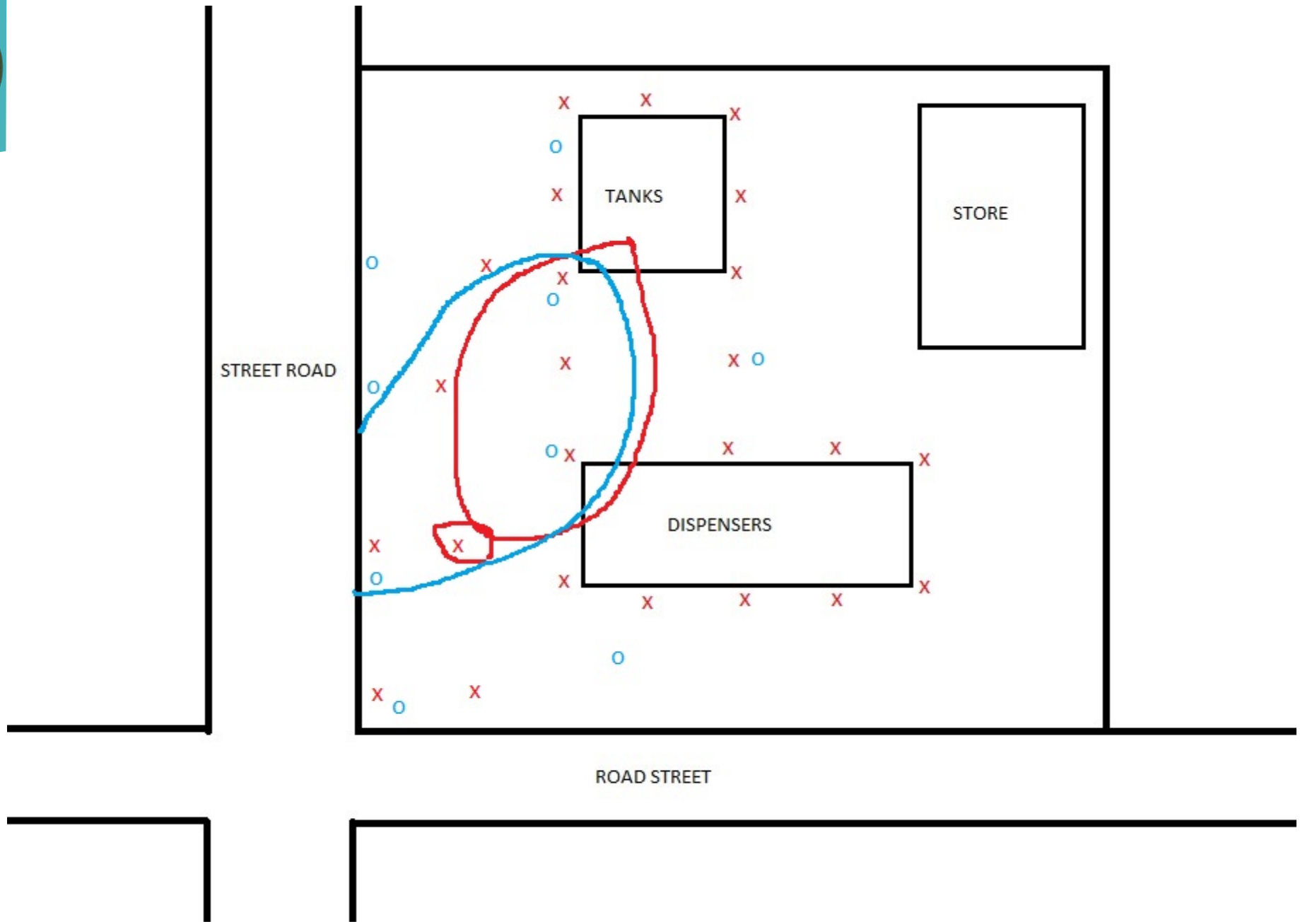

TANKS
STORE
DISPENSERS
STREET ROAD
ROAD STREET


TANKS
STORE
STREET ROAD
DISPENSERS
ROAD STREET


TANKS
STORE
STREET ROAD
DISPENSERS
ROAD STREET


TANKS
STORE
STREET ROAD
DISPENSERS
ROAD STREET


TANKS
STORE
STREET ROAD
DISPENSERS
ROAD STREET


TANKS
STORE
STREET ROAD
DISPENSERS
ROAD STREET

Site Assessment

SSA for LSA

- Generally, a deep monitoring well should not be required during an LSA unless there is excessive contamination or a sensitive receptor nearby

Site Assessment

SSA for SA/Remediation

Site Assessment

SSA for SA/Remediation

THE END

- SRCO with Conditions
- SRCO
  - Source Removal
  - Air Sparging/Soil Vapor Extraction
  - Multiphase Extraction
  - Injection

Site Assessment

SSA for SA/Remediation

- Factors for “THE END”
  - Lithology
  - Money
  - Structures
  - Planned use

THE END

Site Assessment

SSA for SA/Remediation

- When wrapping up assessment
  - Communication
    - Ask the owner what type of closure he wants needs/ planned property use
    - Ask your engineer to look at the site
    - Ask your ATC to have their engineer look at the site
    - What remedial strategy
    - What data does the engineer need

Site Assessment

SSA for SA/Remediation

- Site history on base map
  - Tank pits/dispensers
  - Previous excavations
  - Previous systems
  - Previous soil borings and wells
- Site history in tables
- Are the plumes defined?
- How old is the data?

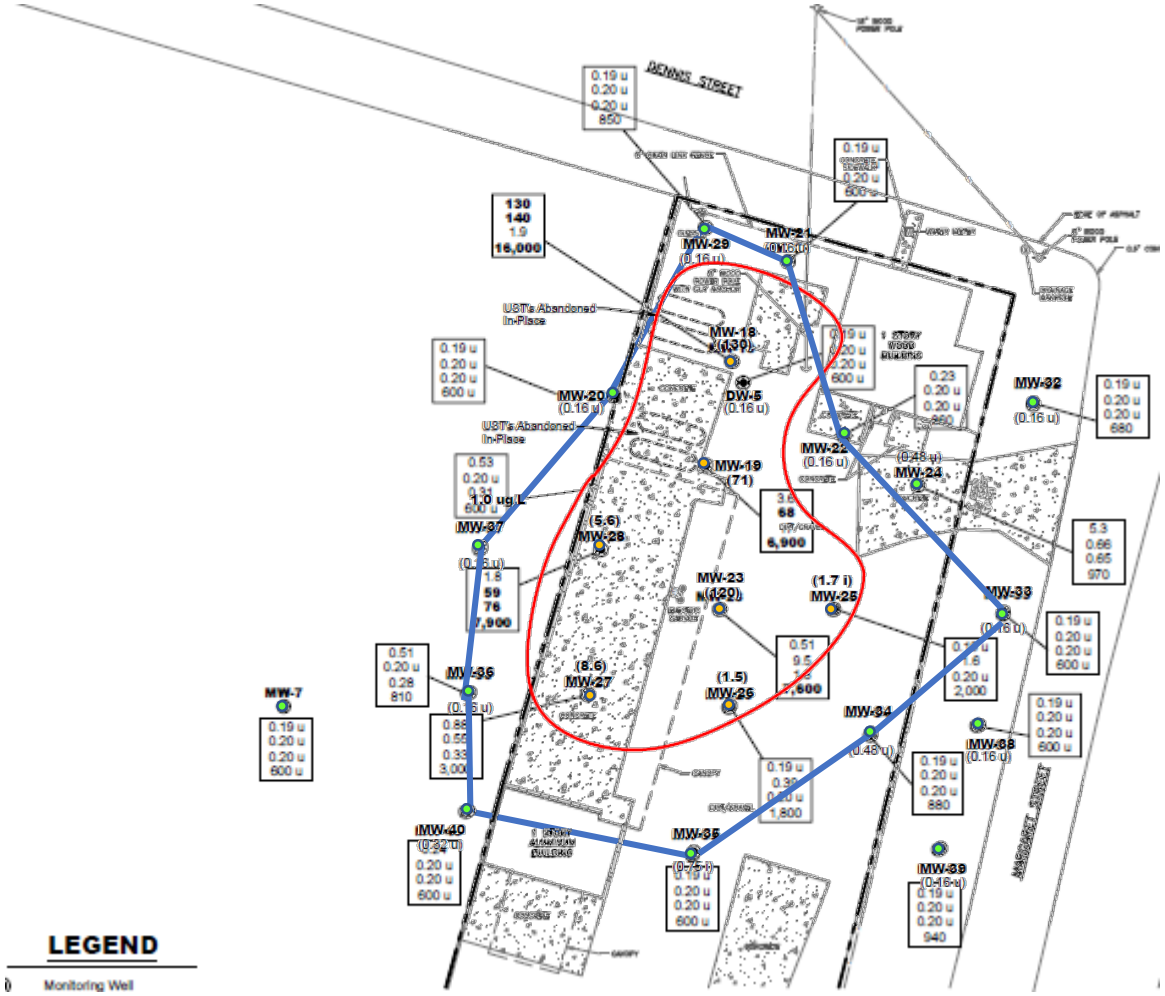
Site Assessment

SSA for SA/Remediation

- Groundwater Plume
  - Is it defined?
    - Connect the dots
  - Need wells?
    - To define the plume
    - To refine the plume
  - If planning a SR and need wells, may want to use grab sample in area being excavated

Site Assessment

SSA for SA/Remediation



Site Assessment

SSA for SA/Remediation

- Groundwater Plume
  - Age of data
    - For RAP design must be less than 9 months
  - Verifying old data / updating new
    - Sampling selected wells vs sampling all wells

Site Assessment

SSA for SA/Remediation

- What additional groundwater data do I need?
  - Injections – baseline for variance parameters
  - MPX – minerals that might foul the pump
  - Any outliers – lead

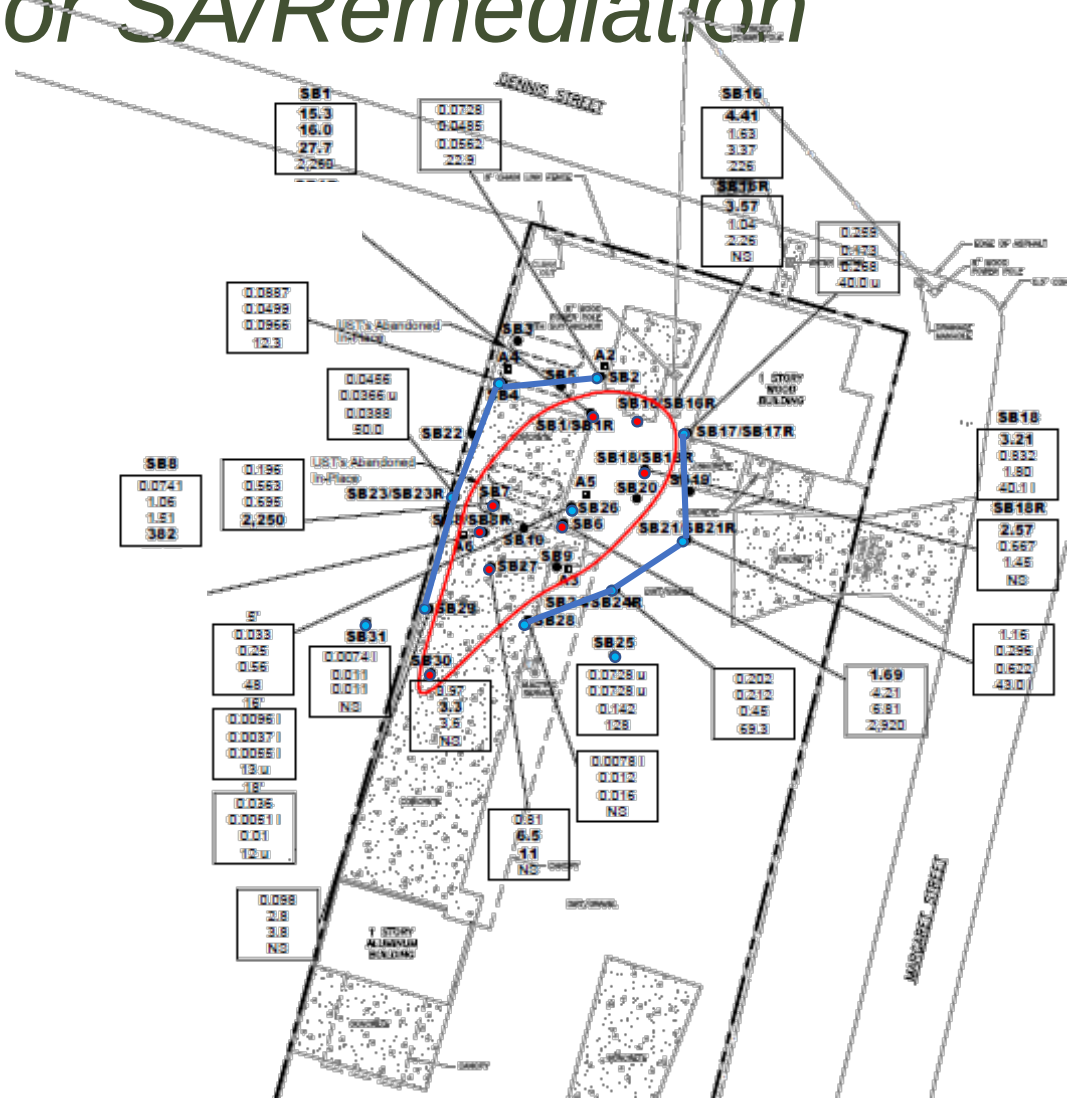
Site Assessment

SSA for SA/Remediation

- Soil Plume
  - Is it defined? Connect the dots.
  - AS/SVE & MPX
    - Edges
    - Mass
  - Soil removal
    - Much more data
    - Add soil borings to decrease area

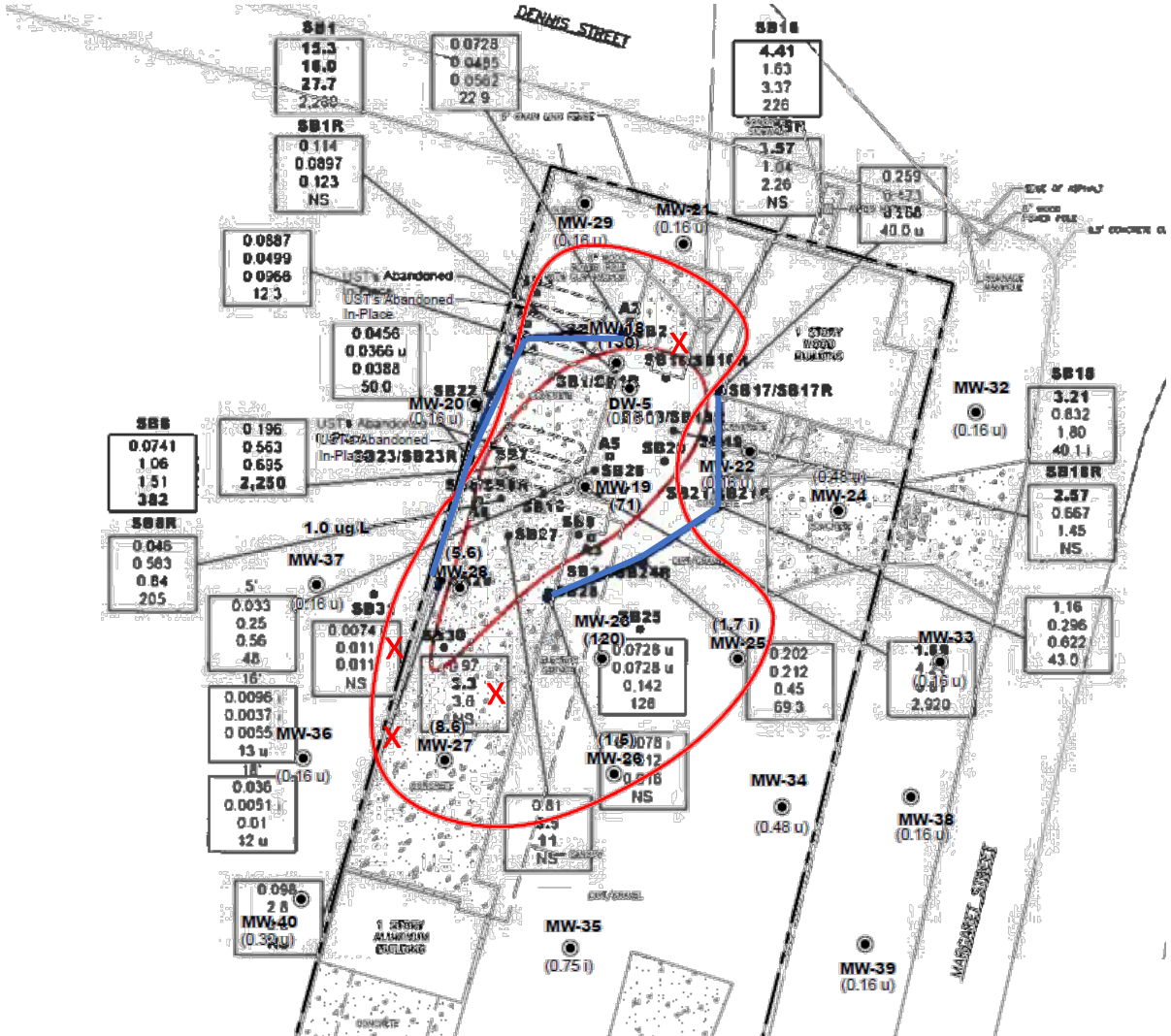
Site Assessment

SSA for SA/Remediation



Site Assessment

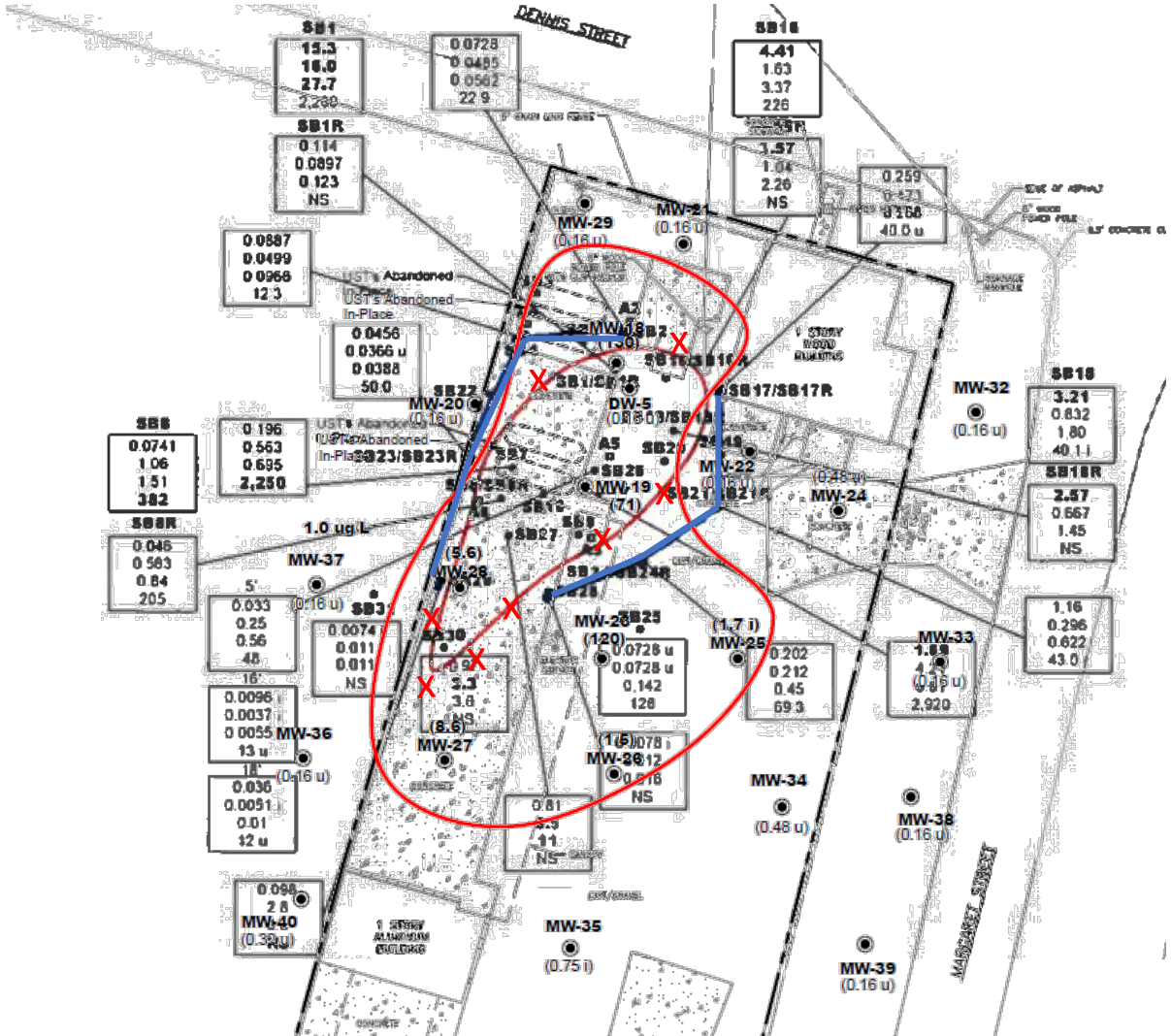
SSA for SA/Remediation



Where are soil borings needed for an AS/SVE system?

Site Assessment

SSA for SA/Remediation



Where are soil borings needed for a source removal?

Site Assessment

SSA for SA/Remediation

- Soil Plume
  - Age - generally no more than 3 years
  - Verifying old data
    - System – edges and mass
      - Check some, if changes, check more
    - Source removal – still hot at edges
      - Check some, if changes, check more
  - Direct Exposure

Site Assessment

SSA for SA/Remediation

- What additional soil data do I need?
  - Sidewall samples from historical excavations?
  - Total organic carbon ?
  - SPLP or fractionation
    - Reduce the area for source removal if soil plume not contained within groundwater plume

Site Assessment

SSA for SA/Remediation

- SRCO with conditions
  - Soil data
    - Plume - Direct exposure vs leachability
    - Defined in an area for controls
    - Surveyed
  - Groundwater data
    - Plume stable
    - Plume onsite vs onsite and ROW
    - No groundwater use

Site Assessment

SSA for SA/Remediation

- Plan the supplemental assessment with THE END in mind.

Site Assessment

Off-Site Assessment

- When soil or groundwater samples at the property boundary exceed CTLs, off-site assessment will be required
- Off-site noticing is not required until verified (by laboratory sampling) contamination is identified on off-site properties


STREET ROAD
TANKS
STORE
DISPENSERS
Property
Boundary
ROAD STREET

Site Assessment

Off-Site Assessment

- Off-site assessment will require Off-Site Property Access Agreement pay items (1-5) for adjacent properties and roadway rights-of-way
- Permit Fees (1-4) may be required for right-of-way work (FDOT, city roads)

Site Assessment

Off-Site Assessment

- Soil borings and monitoring wells should be installed as close to the inner property boundary as possible before moving off-site
- If the right-of-way is large enough, the first off-site wells should be installed on the same side of the road as the property


TANKS
STORE
DISPENSERS
STREET ROAD
ROAD STREET
Property
Boundary


TANKS
STORE
DISPENSERS
STREET ROAD
ROAD STREET
Property
Boundary

Site Assessment

Off-Site Assessment

- If the right-of-way is too small, or right-of-way sampling also reports contamination, step-out across roadways
- At least one off-site sampling location should be installed to delineate the downgradient plume

Site Assessment

Off-Site Assessment

- If the plume is large, or groundwater flow direction is variable, multiple off-site sampling locations may be required
- If permanent wells are not possible, grab sampling may be acceptable to delineate contamination

Site Assessment

Off-Site Assessment

- Spacing for off-site monitoring wells/soil borings should be 30- to 50-feet, contingent on accessibility
- Continue to step-out as needed to delineate the soil and groundwater plume


TANKS
STORE
DISPENSERS
STREET ROAD
ROAD STREET
Property
Boundary

Site Assessment

EXPECTATIONS/CONSISTENCY/TECHNICAL REPORT REVIEW

Site Assessment

Expectations/Consistency/Technical Report

GOALS

- Technical accuracy and completeness of all documents
- Meet requirements of Chapter 62-780.600(8) and associated guidance documents
- Adherence to established professional standards
- Consistency between site managers across the Department and Local Programs –
- **DO NOT ACCEPT SUBSTANDARD WORK PRODUCT**

Site Assessment

Expectations/Consistency/Technical Report

WHY SO IMPORTANT??

- Tables summarize all data in chronological order
- Critical for evaluating temporal trends
- Figures provide a graphical presentation of the data
- Vital to understanding the spatial distribution of contaminants
- Evaluate the movement of groundwater and contaminants in the environment
- Essential for good decision making

Site Assessment

Expectations/Consistency/Technical Report

REQUIRED FIGURES

- USGS topographic site location map
- Site vicinity map
- SCALED site plan
- At least 2 geologic cross
- Scaled site map(s) showing soil sample locations and horizontal AND vertical extend of vadose soil contamination

Site Assessment

Expectations/Consistency/Technical Report

REQUIRED FIGURES (Continued)

- Well construction diagram(s)
- Scaled site map showing horizontal extent of free product
- Scaled site map(s) showing groundwater and surface water sampling locations and the extent of contamination

Site Assessment

Expectations/Consistency/Technical Report

TABLES

- Use most current formats from Department
- Data tables must be cumulative – include ALL historical data
- Confirm transcription of data against field notes and lab reports

Site Assessment

Expectations/Consistency/Technical Report

GROUNDWATER ELEVATION SUMMARY TABLES

- Confirm groundwater elevation calculations
- If free product is present, groundwater elevations MUST be corrected for the thickness and density of product

Site Assessment

Expectations/Consistency/Technical Report

ANALYTICAL DATA TABLES

- Must identify units of measure
- Must include lab qualifiers
- Confirm unit conversions (µg to mg)
- Significant figures

Site Assessment

Expectations/Consistency/Technical Report

UNIT CONVERSIONS

- Most often seen on soils data, especially TRPH
- µg/kg to mg/kg or vice versa
- Confirm that the SCTLs are presented in the same units as the data

Site Assessment

Expectations/Consistency/Technical Report

SIGNIFICANT FIGURES

- Necessary to convey the degree of accuracy of measurement or analysis
- Common error whenever unit conversions are made
- Non-zero digits are always significant
- Zeros between 2 significant digits are significant
- A final zero or trailing zeroes in the decimal portion of a number are significant

Site Assessment

Expectations/Consistency/Technical Report

SIGNIFICANT FIGURES AND UNIT CONVERSIONS – EXAMPLES

0.01400 mg/kg = 14.00 µg/kg

0.0140 mg/kg = 14.0 µg/kg

0.014 mg/kg = 14 µg/kg

7.0 µg/kg = 0.0070 mg/kg, not 0.007 mg/kg

Site Assessment

Expectations/Consistency/Technical Report

SITE PLANS

- Drawn to scale
- Detailed – should include site boundaries; current and historical tank, piping, and dispenser locations; buildings and structures; driveways; utilities; paved and unpaved areas; etc.
- Site plan using only an aerial photo is NOT acceptable

Site Assessment

Expectations/Consistency/Technical Report

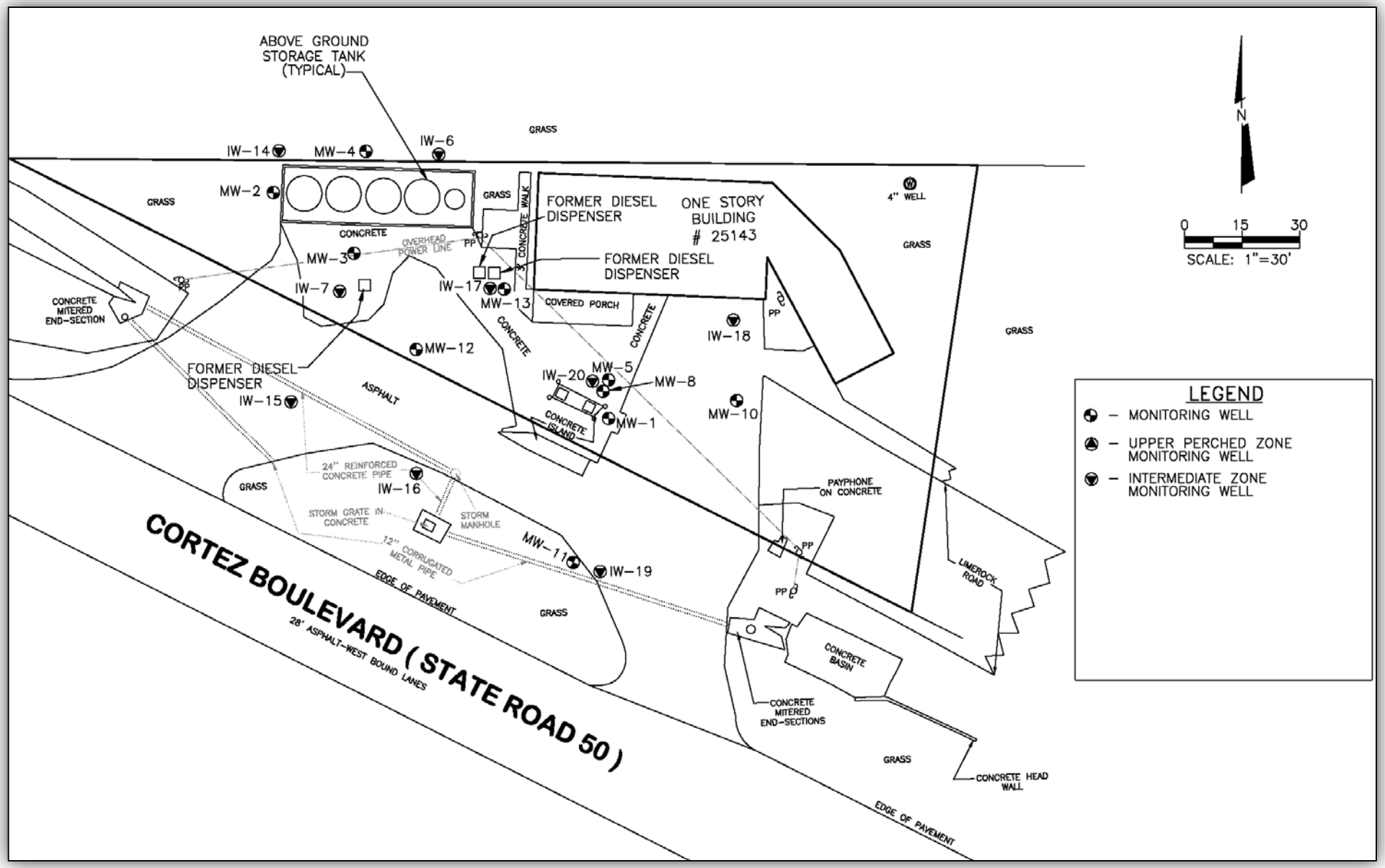
WHY NO AERIALS?

2011

2018

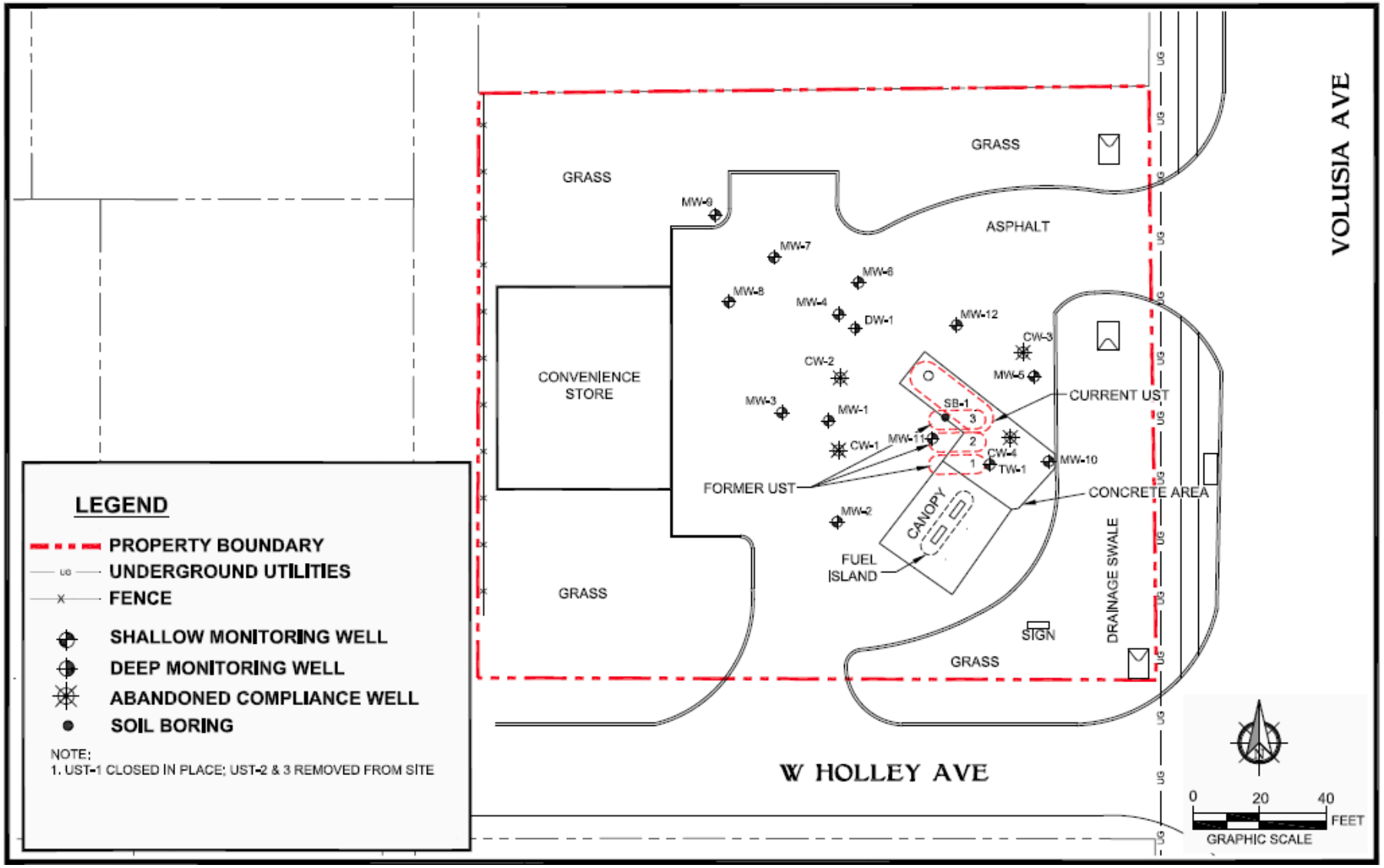
GOOD SITE PLAN

- Site boundary
- Properly scaled
- Good details
- Structures
- Monitoring wells
- Utilities



GOOD SITE PLAN

- Site boundary
- Properly scaled
- Good details
- Identified current and former USTs
- Structures
- Well locations
- Utilities

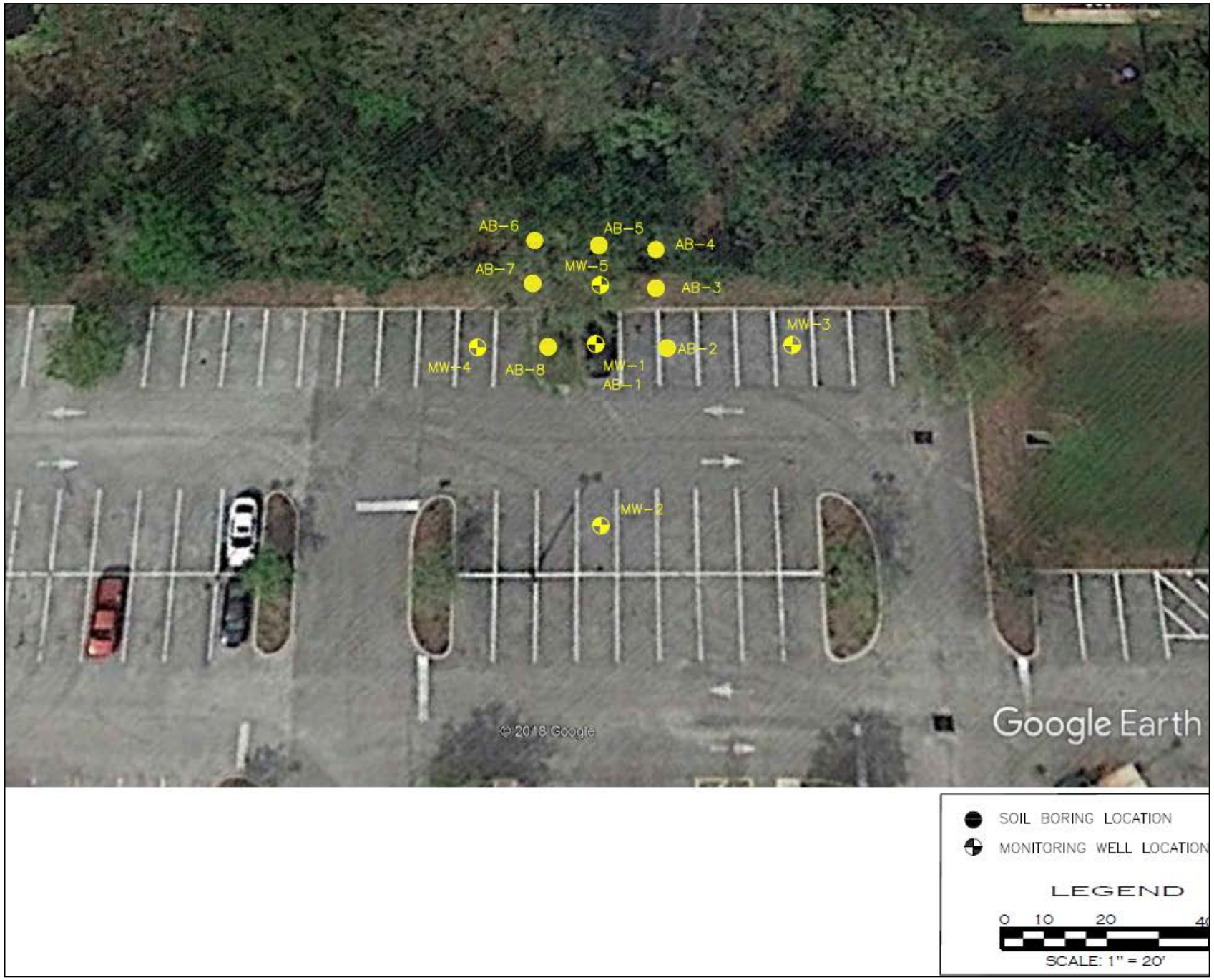


POOR SITE PLAN

- Site boundary
- Uses an aerial photo for the base map
- No site details

POOR SITE PLAN

- Uses an oblique aerial photo
- No site boundary
- No site details
- Not properly scaled



Site Assessment

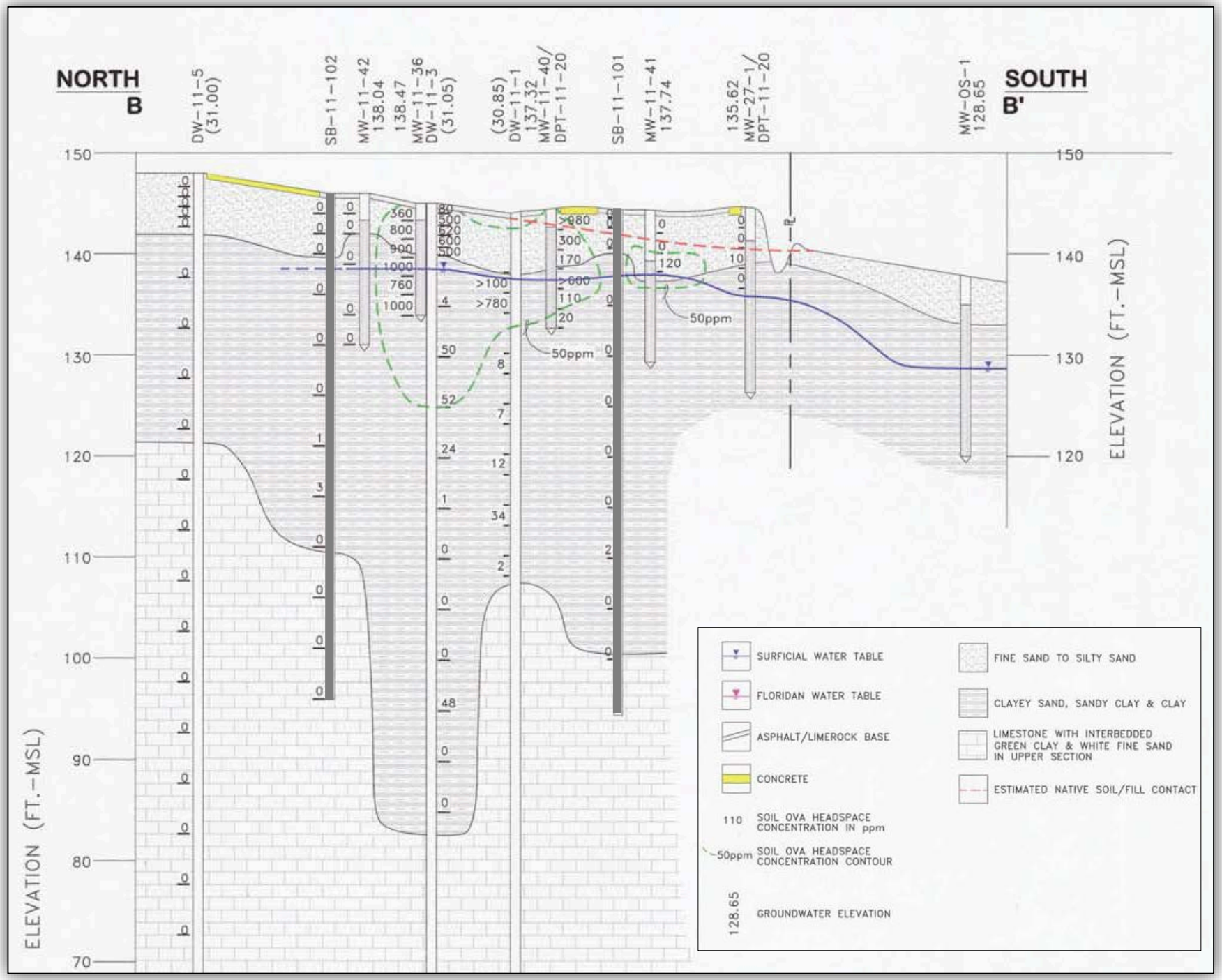
Expectations/Consistency/Technical Report

GEOLOGIC CROSS SECTIONS

- Stratigraphy
- Contaminant concentrations (soil OVA, soil analytical, and groundwater analytical, including isocontours where possible)
- Depict monitoring wells, including screened intervals
- Water table

GEOLOGIC CROSS SECTION

- Ground surface elevation
- Stratigraphy
- Monitoring wells with screened intervals
- Soil borings
- OVA data and contours
- Water table



Site Assessment

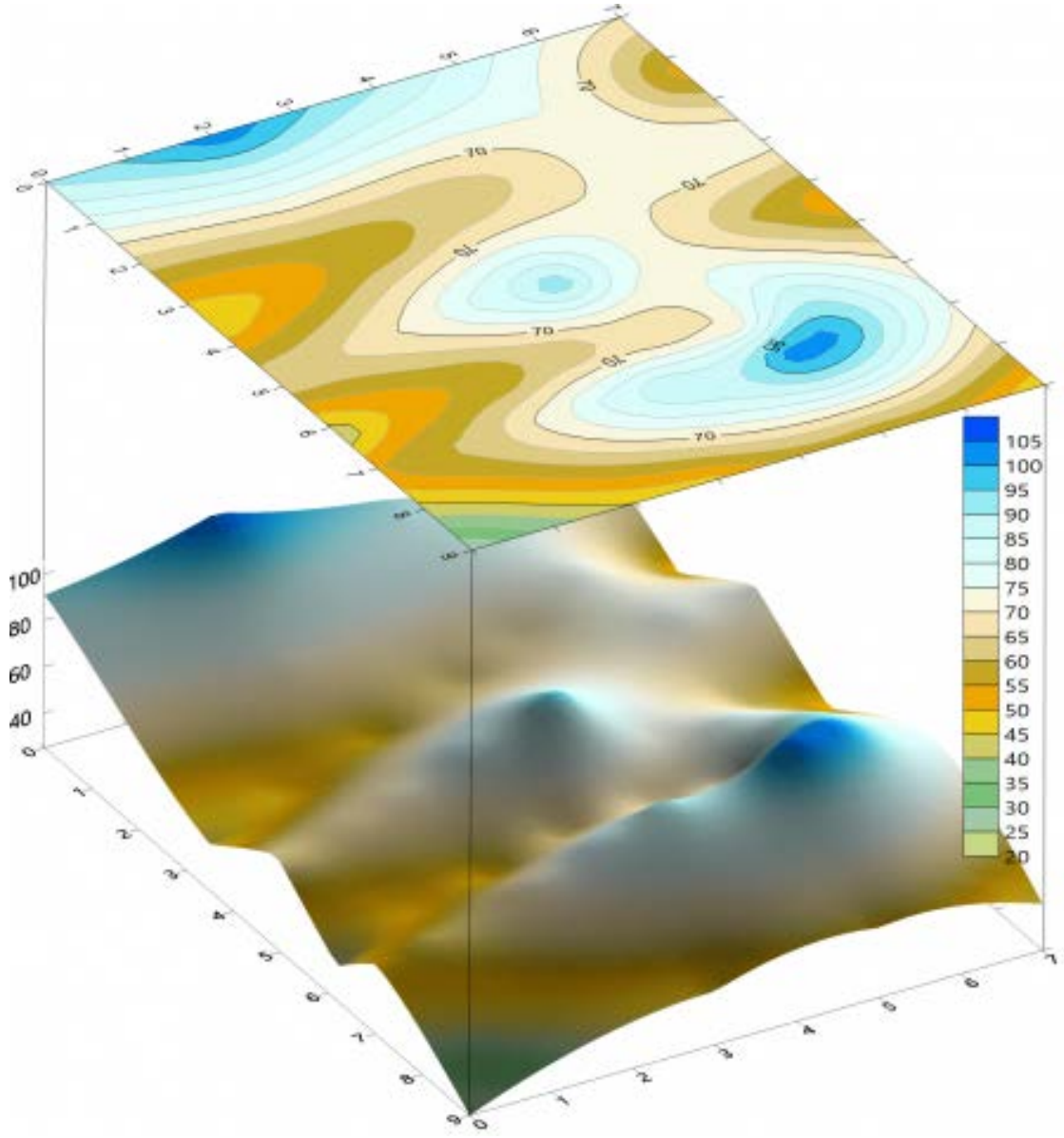
Expectations/Consistency/Technical Report

GROUNDWATER ELEVATION MAPS

- Minimum of 3 data points
- Data points spread out – i.e. NOT in a straight line
- Data collected on same date
- Follow contouring rules
- Contour lines extending outside of the data envelope are inferred and should be dashed

BASIC GEOMETRY OF CONTOURING

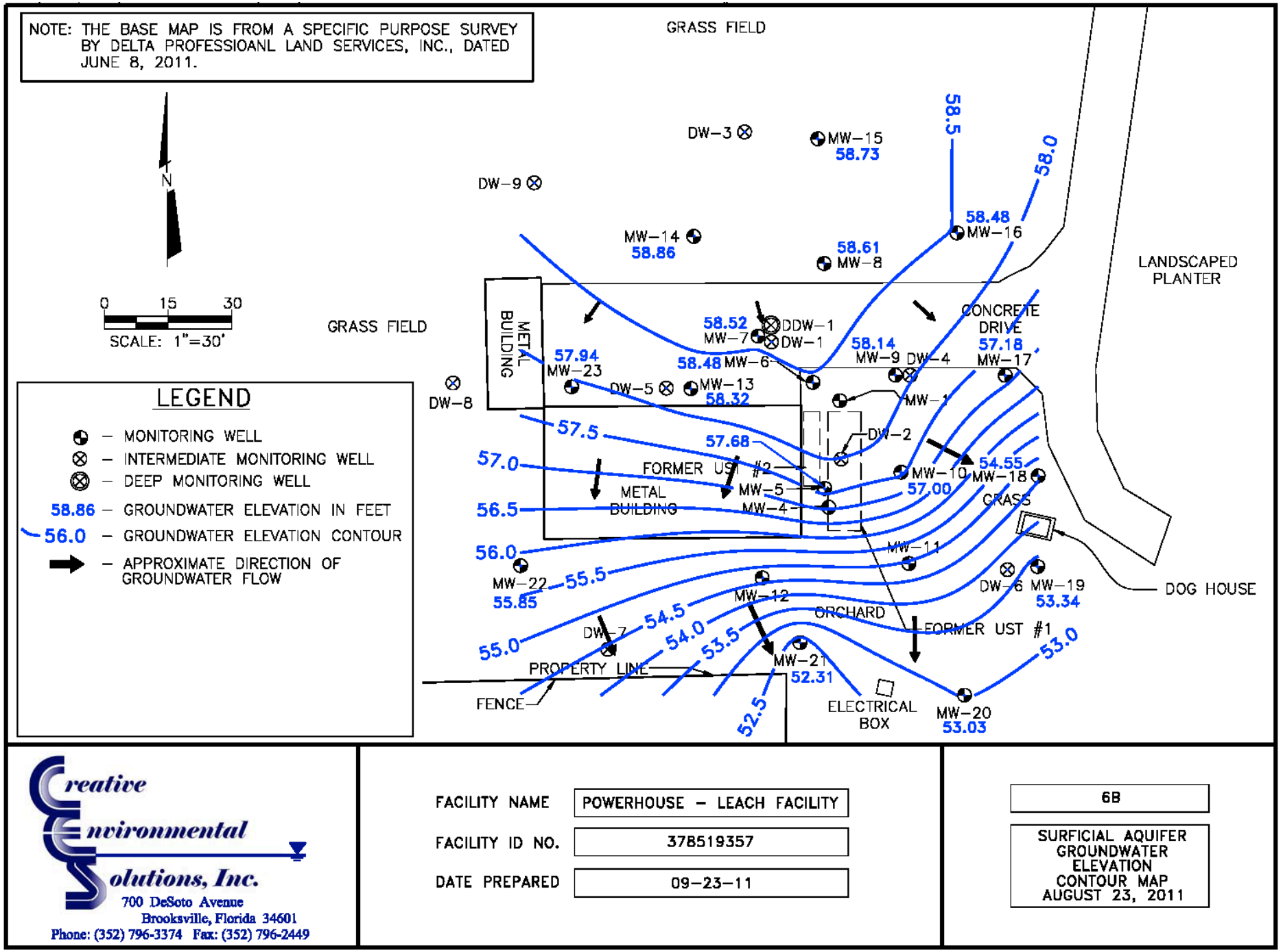
- 2 points in space define a line
- Cannot contour
- 3 points in space define a plane
- Contours = straight and evenly-spaced
- >3 points needed to define a surface



REMEMBER: 2 POINTS DEFINE A LINE, 3 POINTS DEFINE A PLANE

GOOD GW ELEVATION MAP

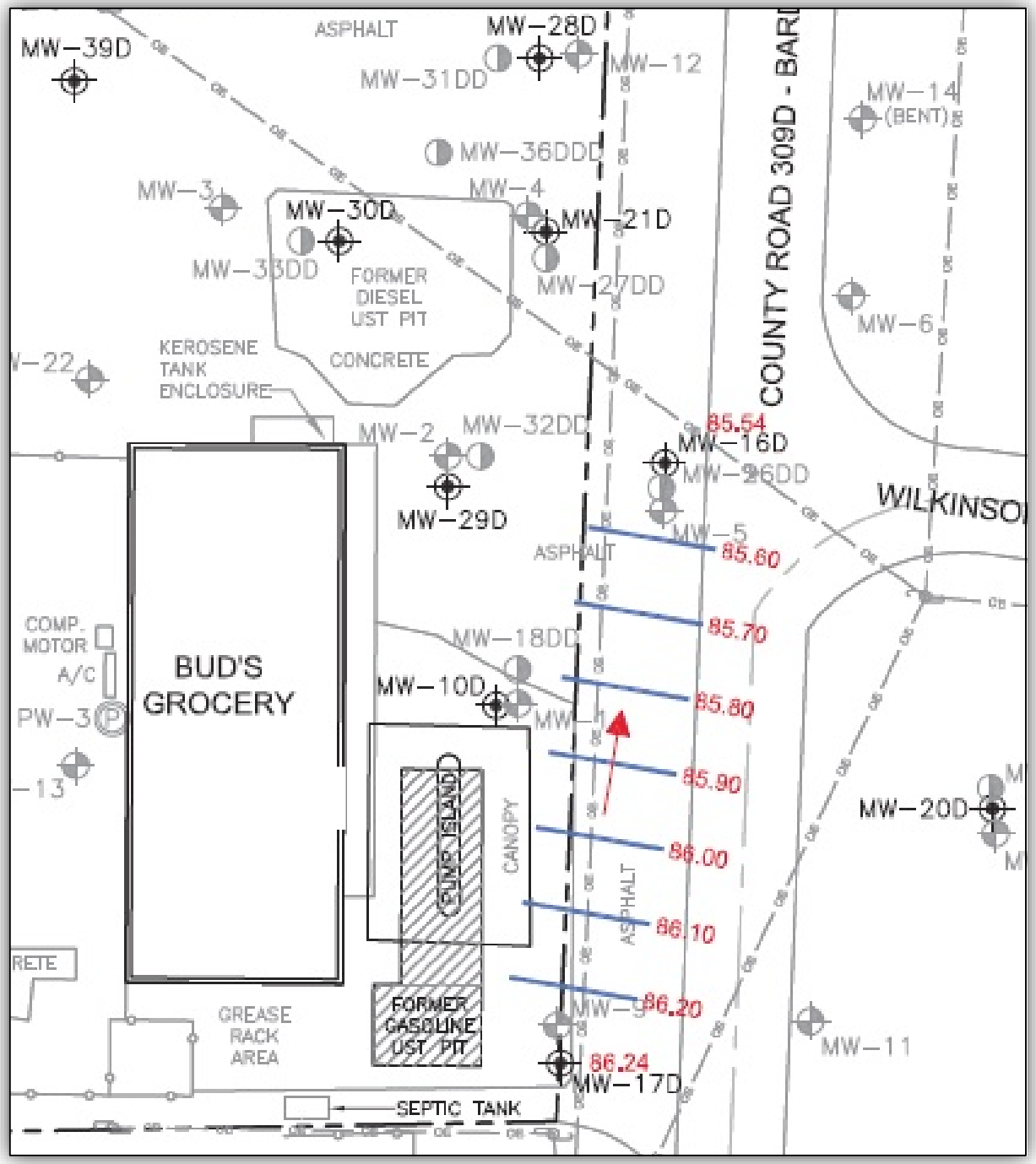
- Good base map
- Constructed with ≥3 well-spaced data points
- Follows contouring rules
- Arrows showing GW flow
- Contours within data envelope



POOR GW ELEVATION MAP

- Good base map
- Constructed with only 2 data points
- NOT A VALID MAP

2 POINTS DEFINE A LINE!!

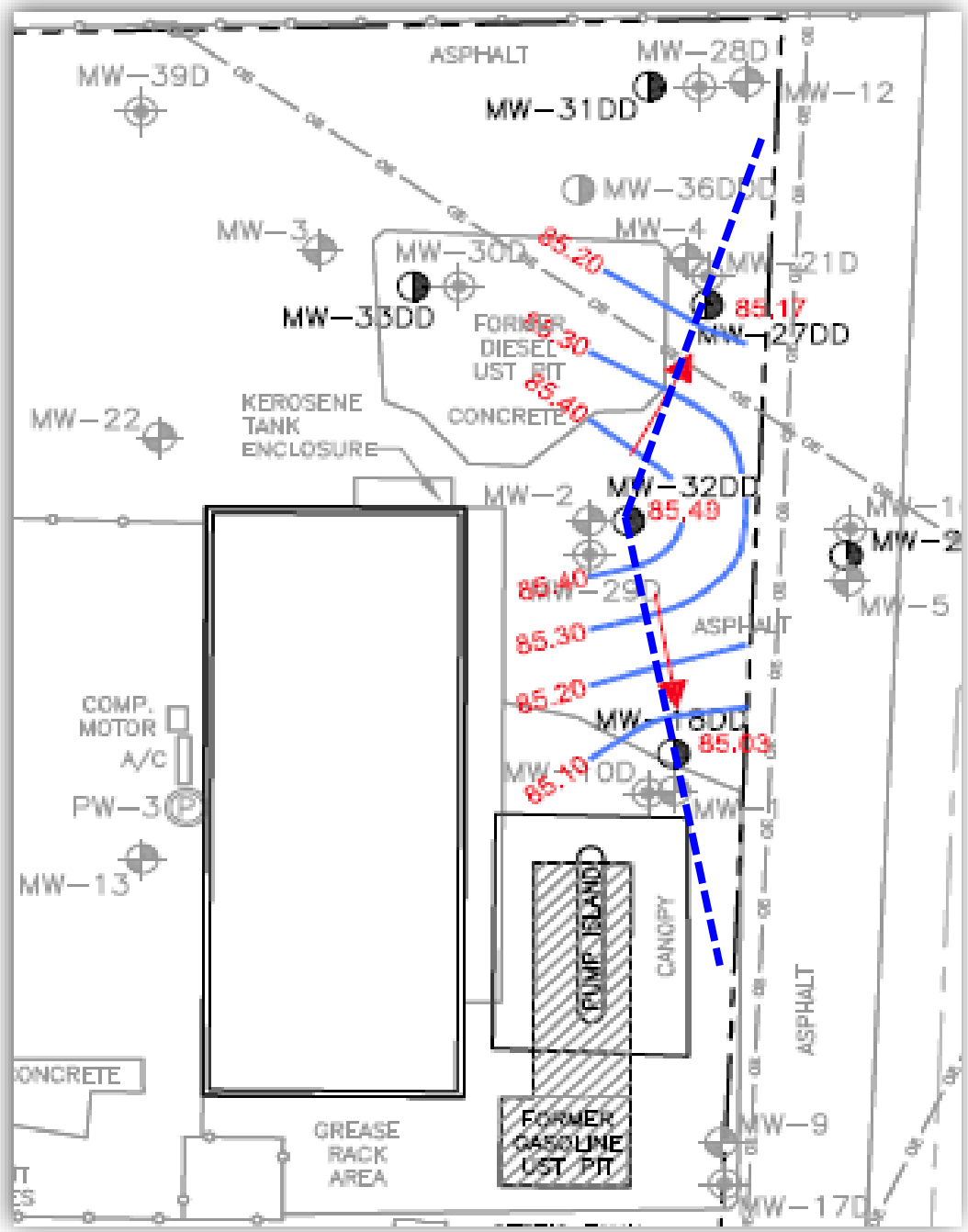


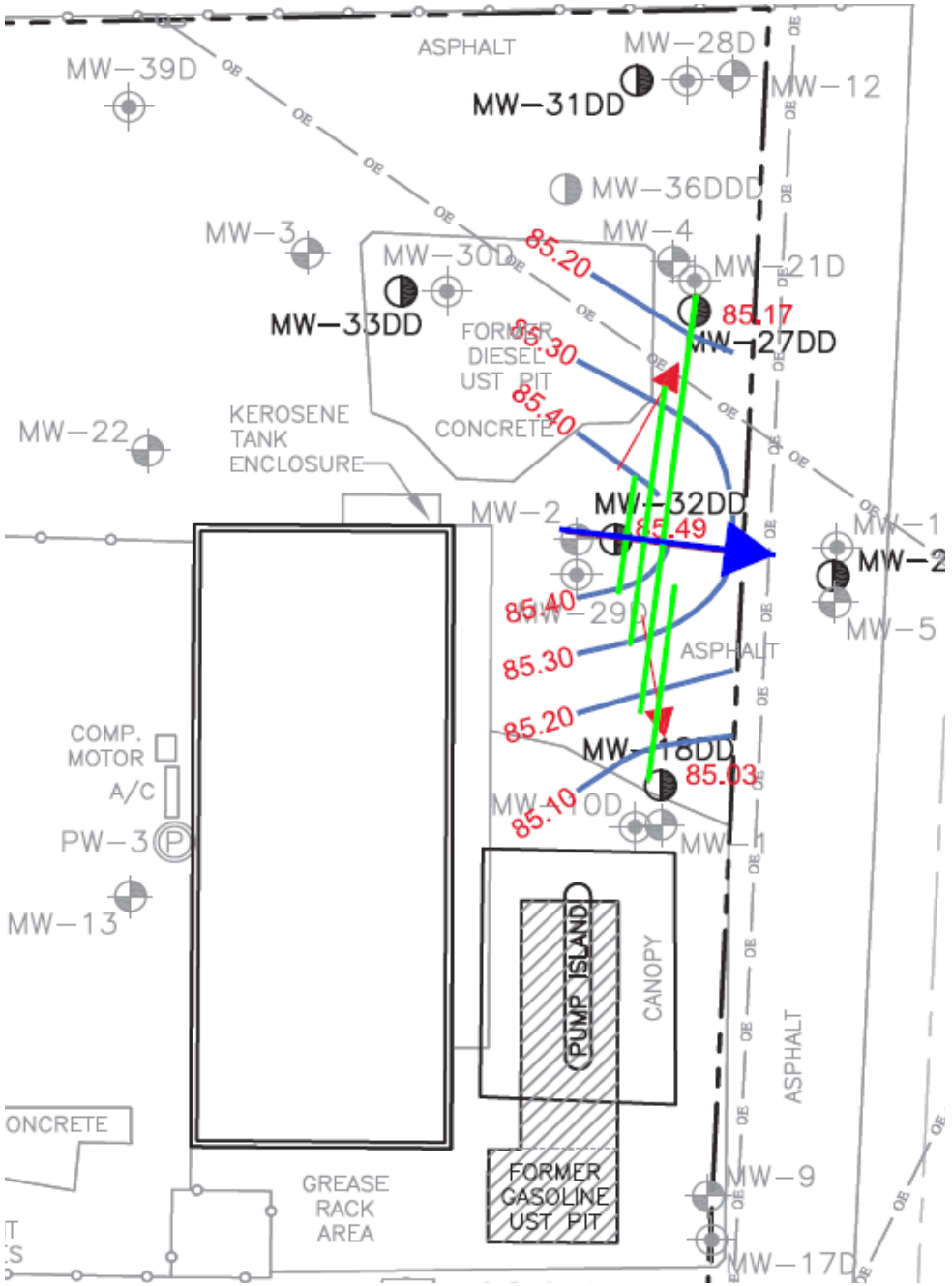
POOR GW ELEVATION MAP

- Good base map
- Constructed with ≥3 data points

BUT

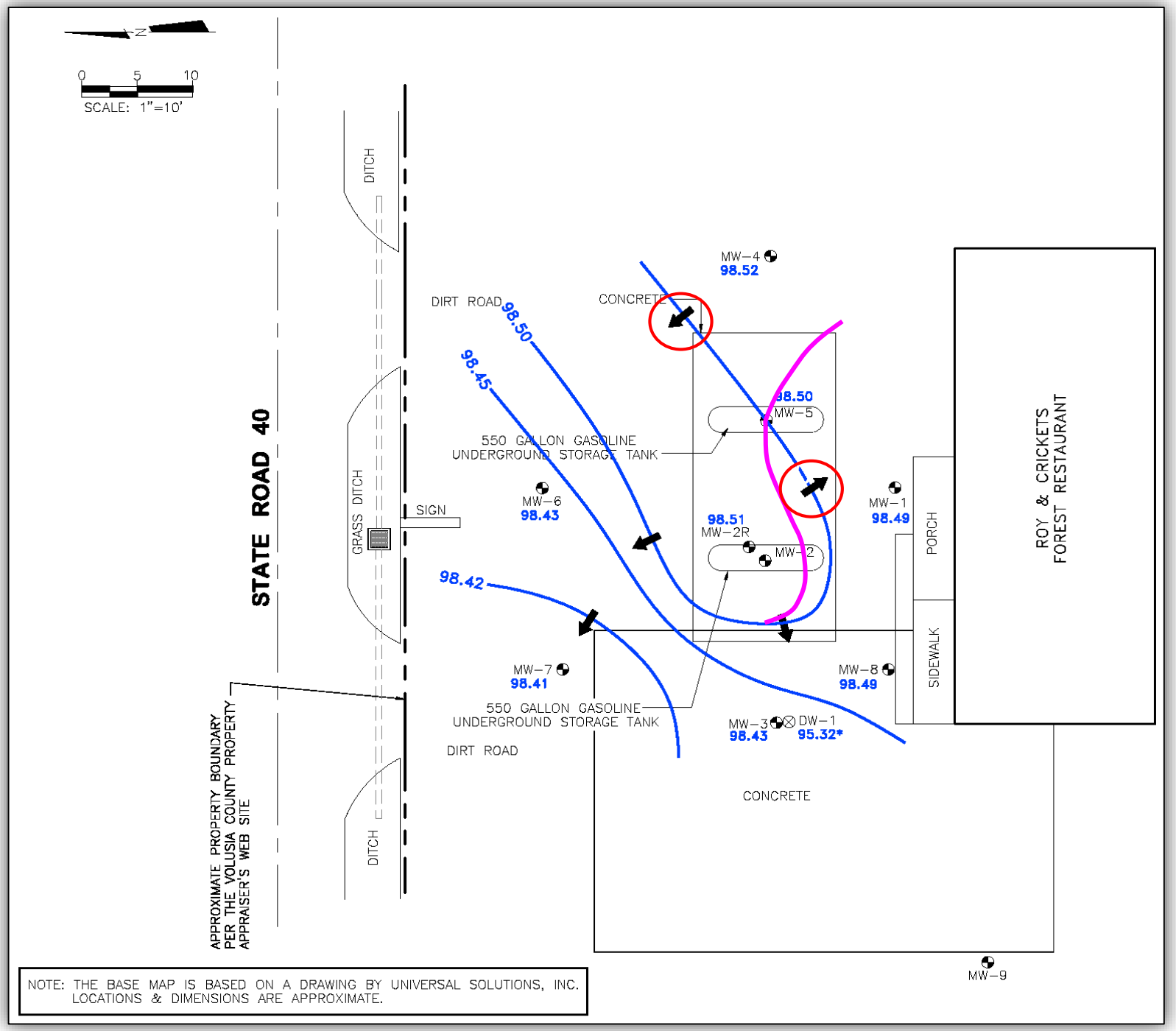
- Data points are nearly in a straight line
- 3 points define a plane, so contours can only be straight, equally spaced lines





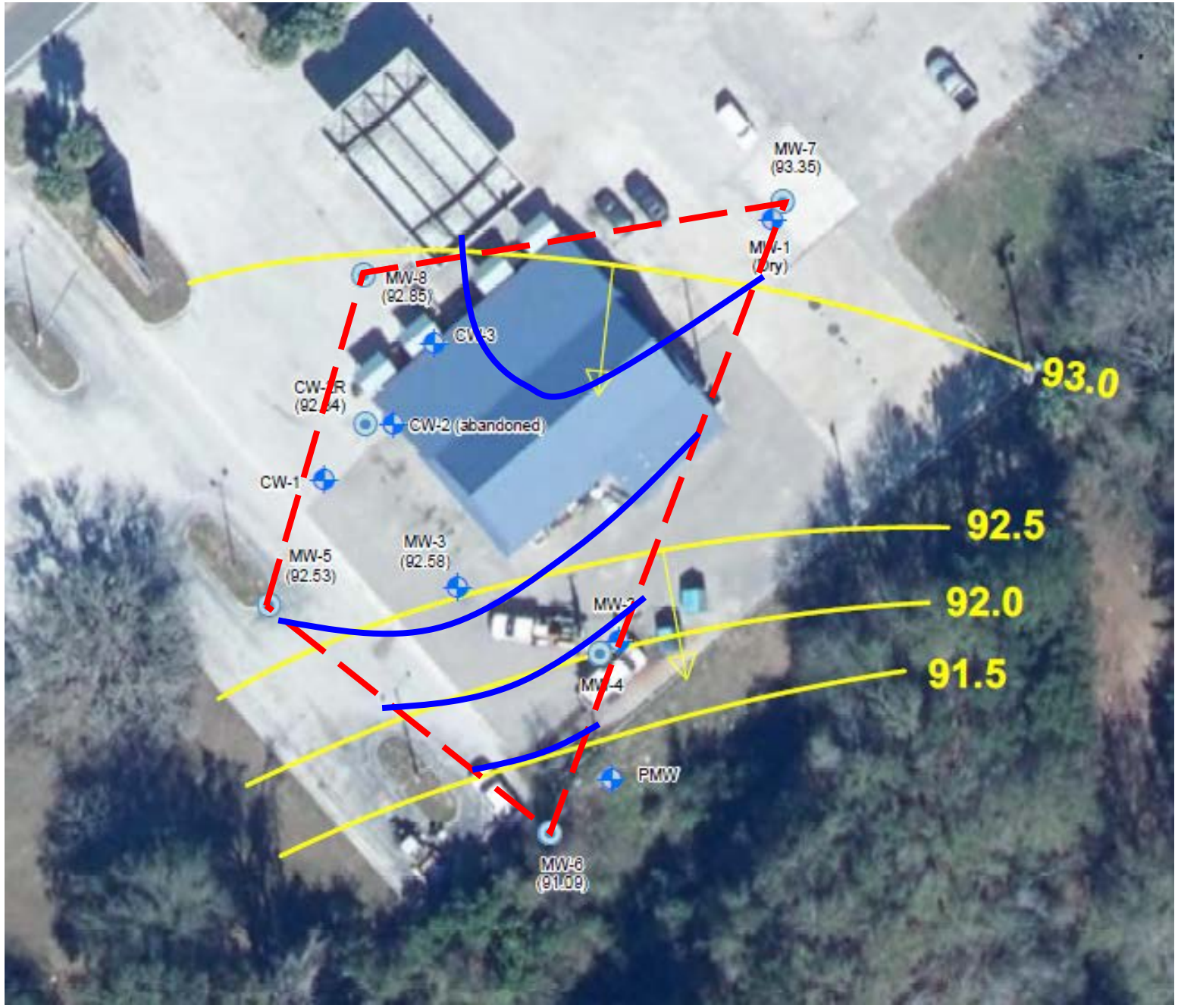
POOR GW ELEVATION MAP

- Good base map
- Constructed with ≥3 well-spaced data points
- Provided arrows showing GW flow
- Followed contouring rules…mostly!



POOR GW ELEVATION MAP

- Improper base map
- Does not follow contouring rules
- Contours extend well beyond the data envelope



Site Assessment

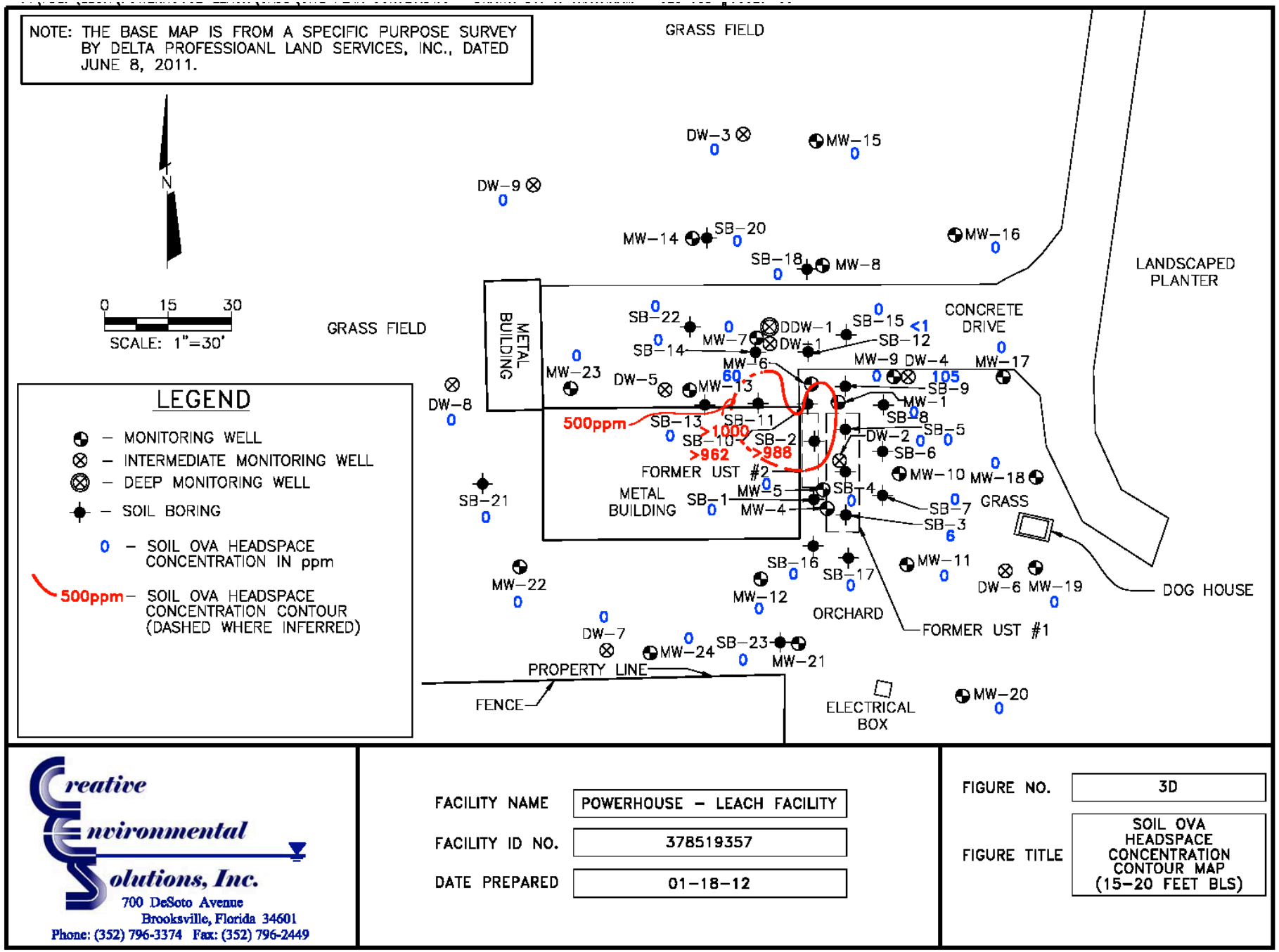
Expectations/Consistency/Technical Report

SOIL OVA MAPS

- When possible, should be constructed for discrete depth intervals, e.g. 0-5’, 5-10’, etc.
- Only use vadose zone samples
- Contour lines dashed where inferred

SOIL OVA MAP

- Single depth interval
- Only data for that interval posted



Site Assessment

Expectations/Consistency/Technical Report

SOIL ISOCONCENTRATION CONTOUR MAPS

- Where possible, individual maps for each constituent that exceeds SCTLs should be prepared
- Constructed for discrete depth intervals, e.g. 0-5’, 5-10’, etc.
- Contours for GWL, RDE, and CIDE SCTLs, as applicable
- In most cases, only use vadose zone samples
- Contour lines dashed where inferred
- A data post map is acceptable when limited data is available

Site Assessment

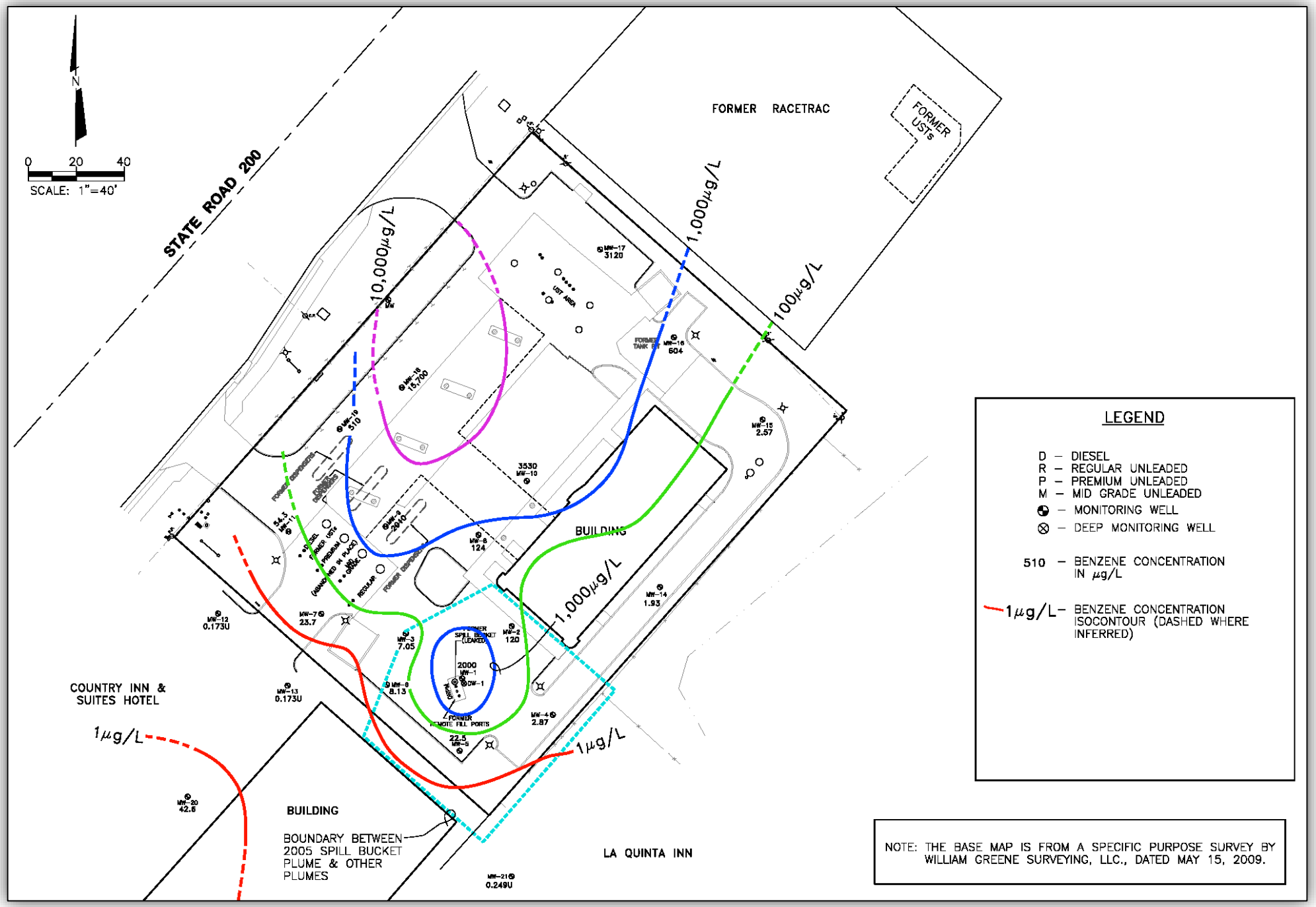
Expectations/Consistency/Technical Report

GROUNDWATER ISOCONCENTRATION CONTOUR MAPS

- Individual maps for each constituent that exceeds GCTLs
- Contours for GCTL and NADC
- Contour lines dashed where inferred
- Should not include data from different depth horizons, i.e. separate maps for shallow, intermediate, and deep zones, as needed

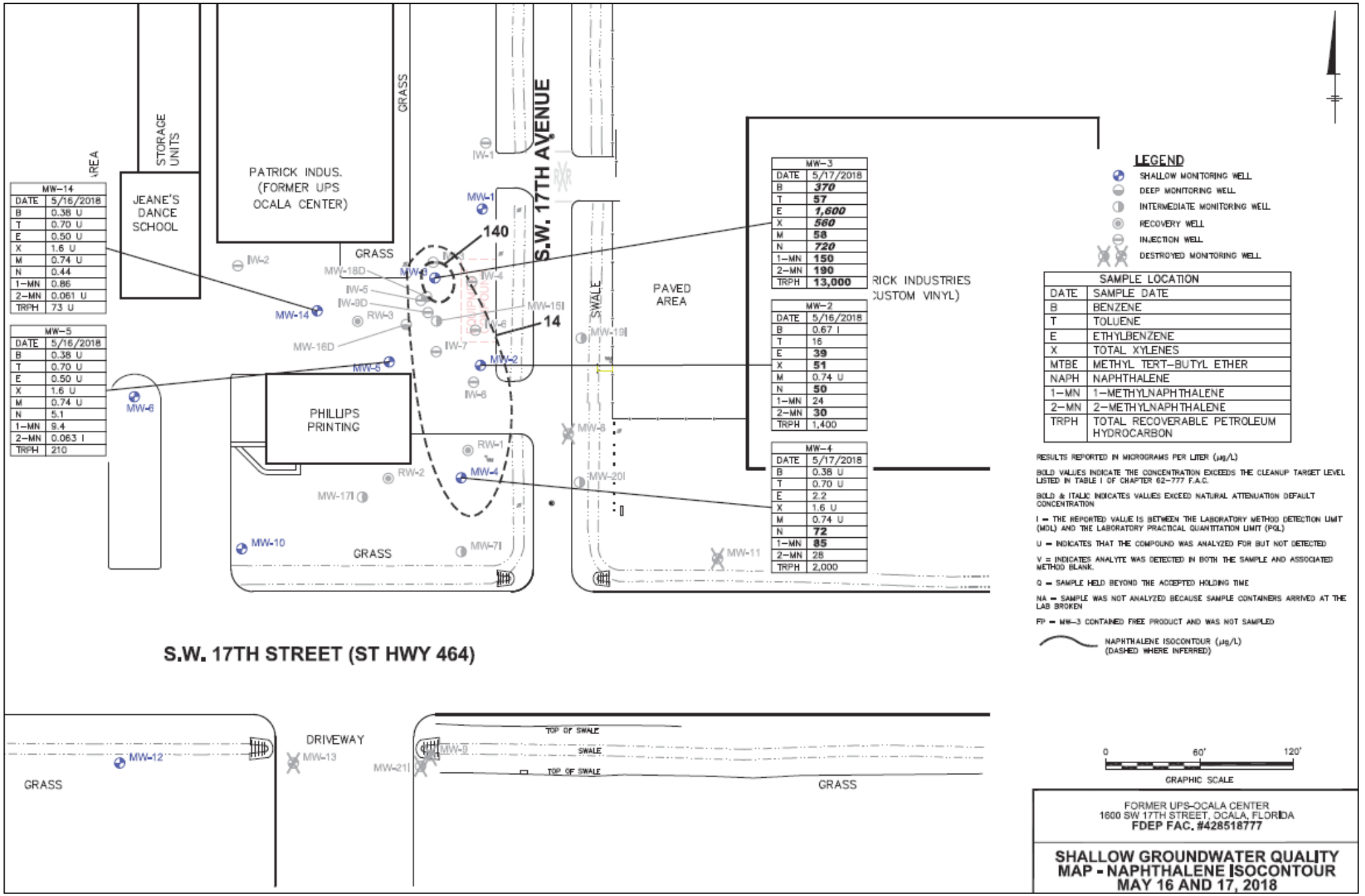
BEST MAP

- Un-cluttered and easy to read
- Wells easy to identify
- Map is for a single analyte
- Contours for GCTL and NADC
- Displays only data used to prepare the map.



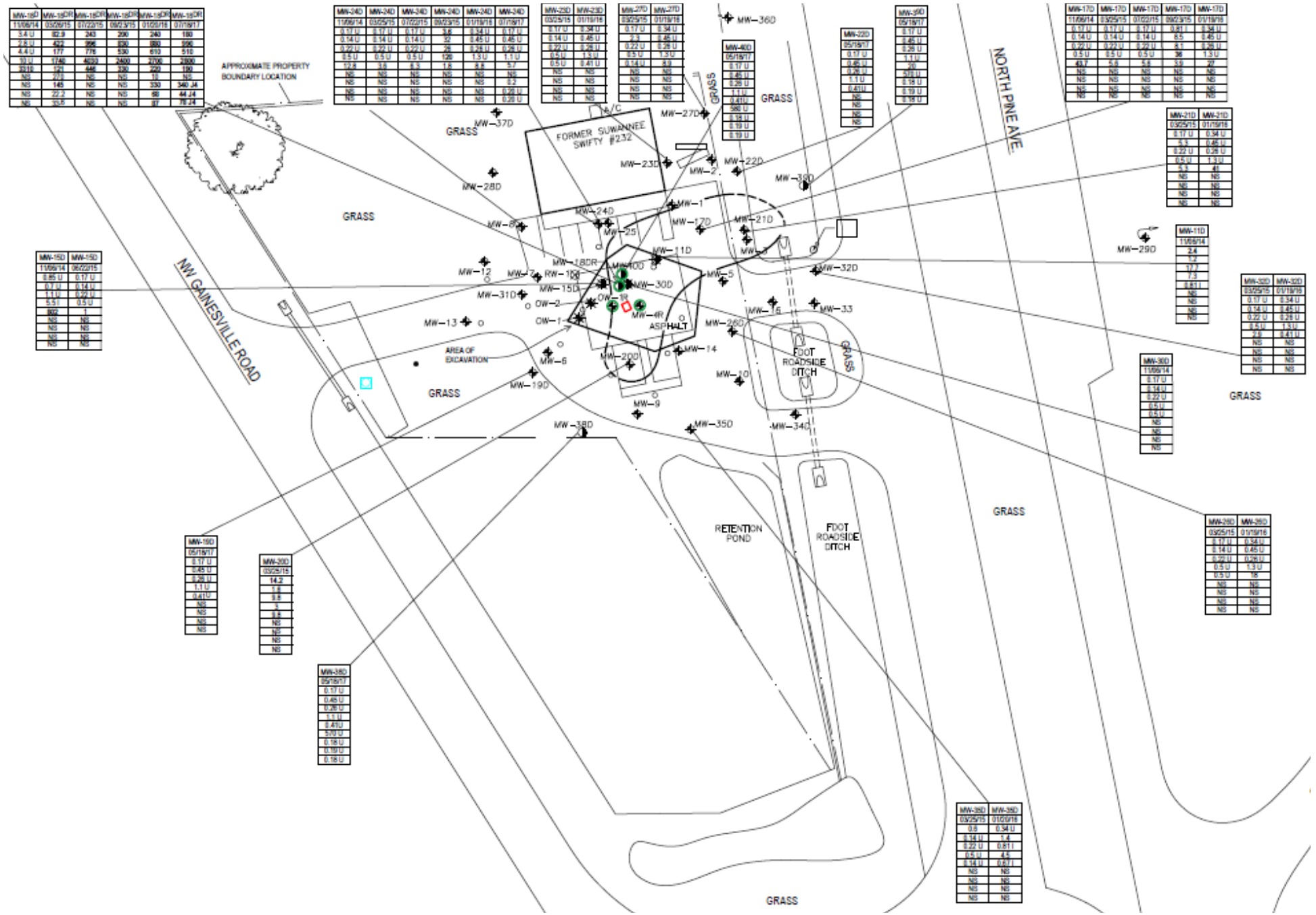
GOOD MAP

- Un-cluttered and easy to read
- Wells easy to identify
- Map is for a single analyte
- Contours for GCTL and NADC
- Uses data blocks



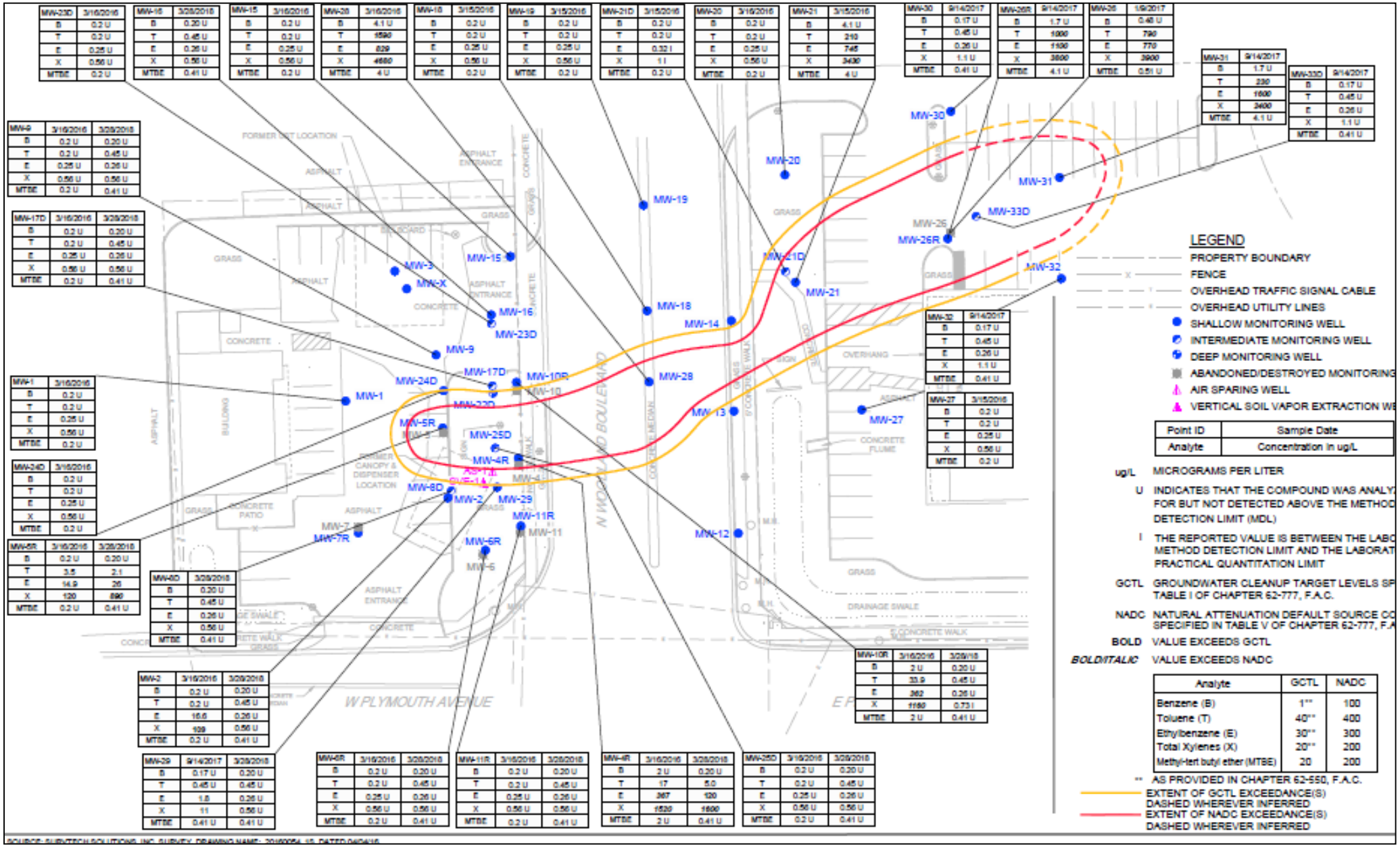
POOR MAP

- Data from multiple depth intervals
- Contours based on mixture of current and old data
- Small font - VERY difficult to read
- Too much wasted space



POOR MAP

- Most site features identifiable
- Wells easy to identify
- Individual contaminants not contoured



Site Assessment

Expectations/Consistency/Technical Report

SUMMARY

- Good maps and tables are essential
- Chronological presentation of data in tables allows quick analysis of concentration trends over time
- Accurate site plans and contaminant concentration maps are critical to making good assessment and remediation decisions


FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION

Groundwater Sampling Quality Assurance

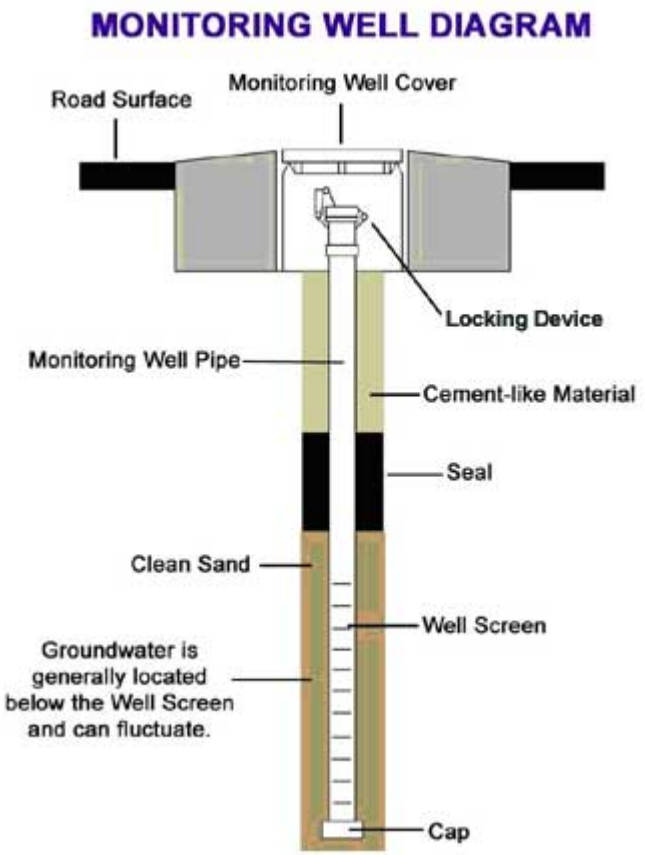
Jamie Lopez

Groundwater Sampling Goals

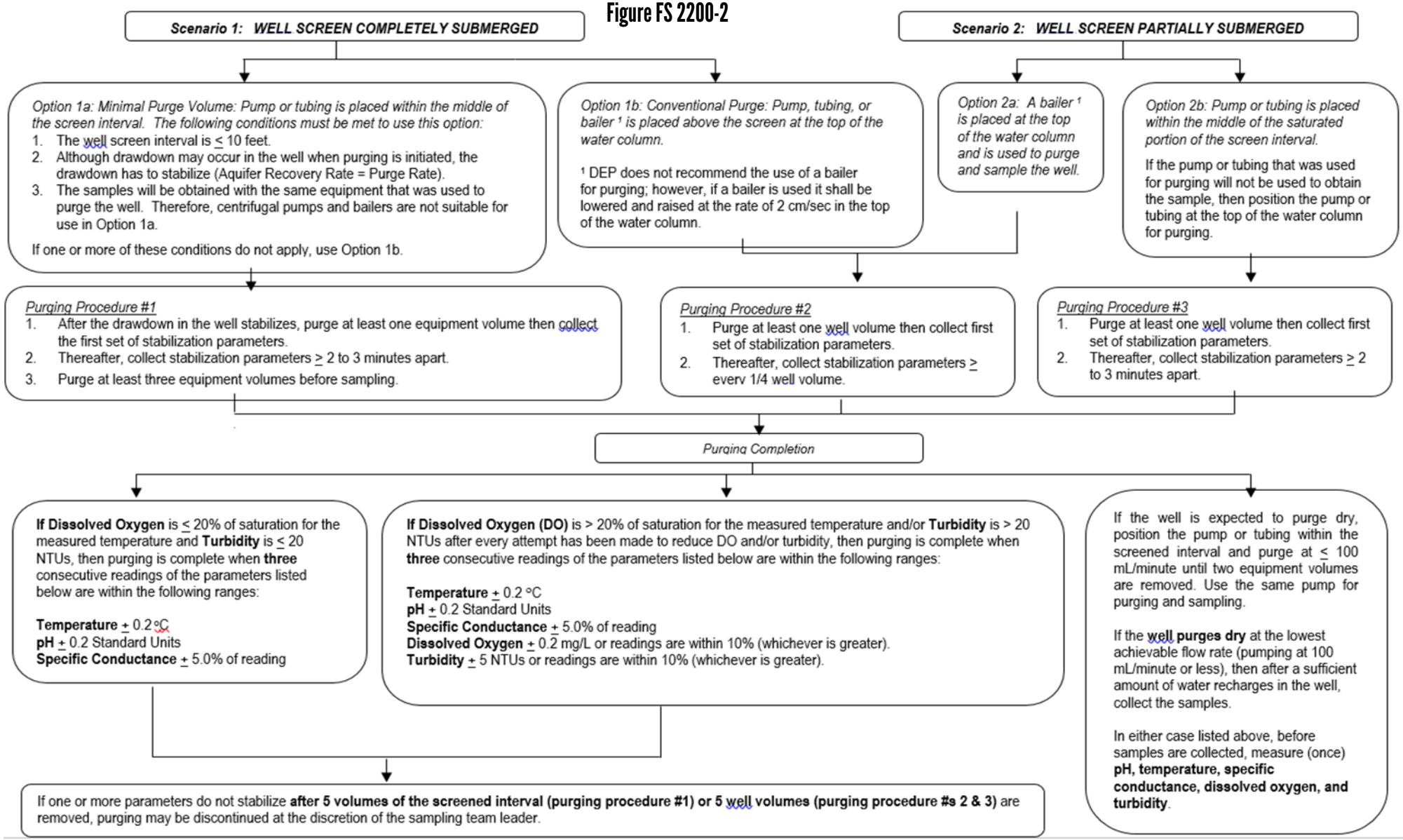
- *Representative Sample*
- *Collect fresh formation (aquifer water)*
- *No cross-contamination*
- *Proper placement of purging devices*
- *Appropriate equipment*
- *Proper purging completion*
- *Stable field measurement per SOP*

Typical Monitor Well Installation

Purpose of a well is to produce water representative of the groundwater surrounding the screened part of the well



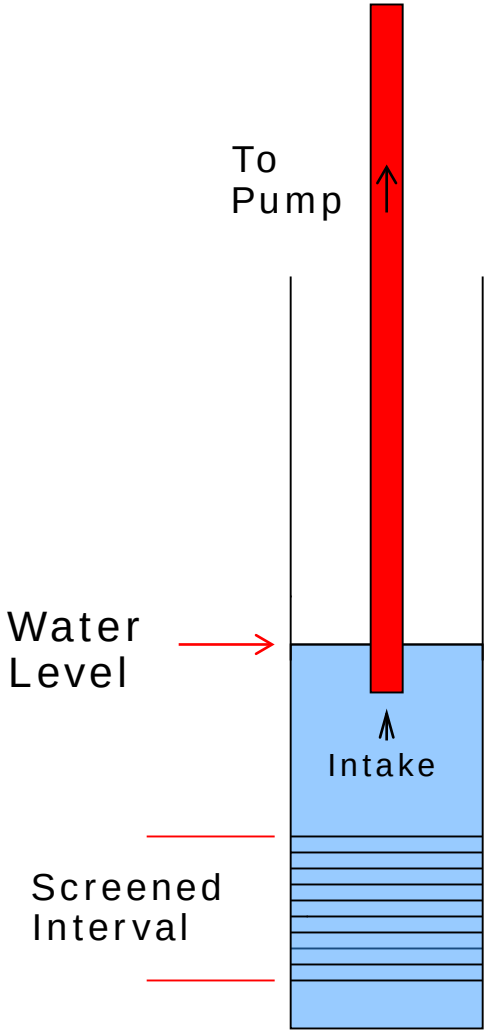
DEP SOP-001-01
FS 2200 Groundwater Sampling
Groundwater Purging Procedures
Figure FS 2200-2



Groundwater Sampling SOP Variances and Clarification

https://floridadep.gov/sites/default/files/BPSSVariances-Final-May02-2005.pdf

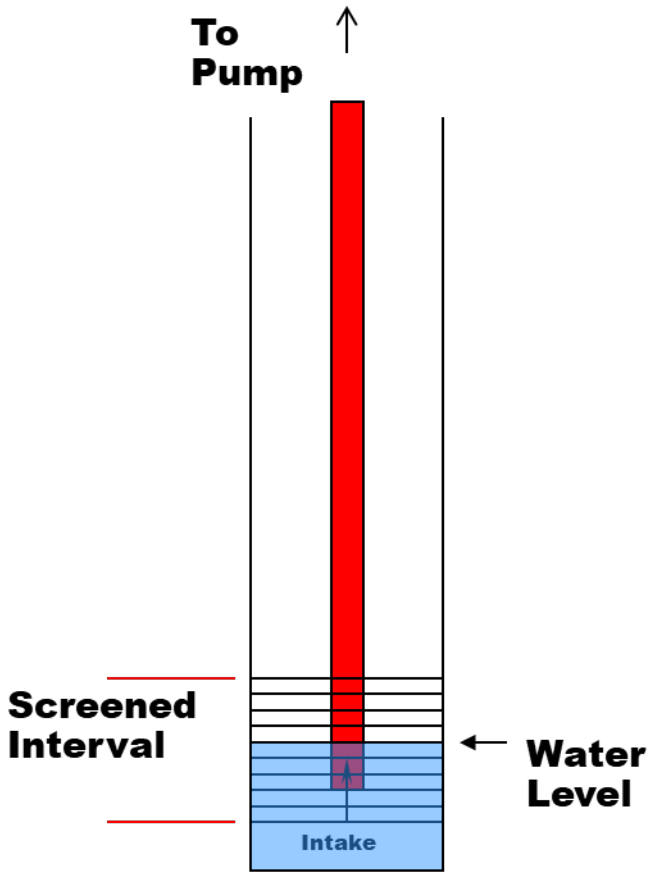
Fundamentals of Groundwater Purging



Conventional (Well Volume) Purge – Fully Submerged Screens

- *Intake is placed at top two feet of the water column*
- *Calculate the well volume*
- *Purge one well volume*
- *Measure stabilization parameter no sooner than each ¼ well volume interval*
- *Purge at least 1½ well volumes*

Fundamentals of Groundwater Purging



Conventional (Well Volume) Purge – Partially Submerged Screen

- *Intake is placed at the top 2' per PCS-005*
- *Calculate well volume*
- *Purge one well volume*
- *Measure stabilization parameters*
- *Collect additional measurement no sooner than every 2 minutes*

Facility Information

Well Volume Calculation

Purge Stabilization Information

Sample Collection Information

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME:	SITE LOCATION:	
WELL NO:	SAMPLE ID:	DATE:

PURGING DATA

WELL DIAMETER (inches):	TUBING DIAMETER (inches):	WELL SCREEN INTERVAL DEPTH: feet to feet	STATIC DEPTH TO WATER (feet):	PURGE PUMP TYPE OR BAILER:

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X gallons/foot = gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet):	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP** = Peristaltic Pump; **O** = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION:	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
PUMP OR TUBING DEPTH IN WELL (feet):	TUBING MATERIAL CODE:	FIELD-FILTERED: Y N Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP Y N	TUBING Y N (replaced)	DUPLICATE: Y N	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			

REMARKS:

MATERIAL CODES: **AG** = Amber Glass; **CG** = Clear Glass; **HDPE** = High Density Polyethylene; **LDPE** = Low Density Polyethylene; **PP** = Polypropylene; **S** = Silicone; **T** = Teflon; **O** = Other (Specify)

SAMPLING EQUIPMENT CODES: **APP** = After (Through) Peristaltic Pump; **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **RFPP** = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **O** = Other (Specify)

NOTES: 1. **The above do not constitute all of the information required by Chapter 62-160, F.A.C.**
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units **Temperature:** ± 0.2 °C **Specific Conductance:** ± 5% **Dissolved Oxygen:** all readings ≤ 20% saturation (see Table FS 2200-2; optionally, + 0.2 mg/L or + 10% (whichever is greater) **Turbidity:** all readings < 20 NTU; optionally + 5 NTU or + 10% (whichever is greater)

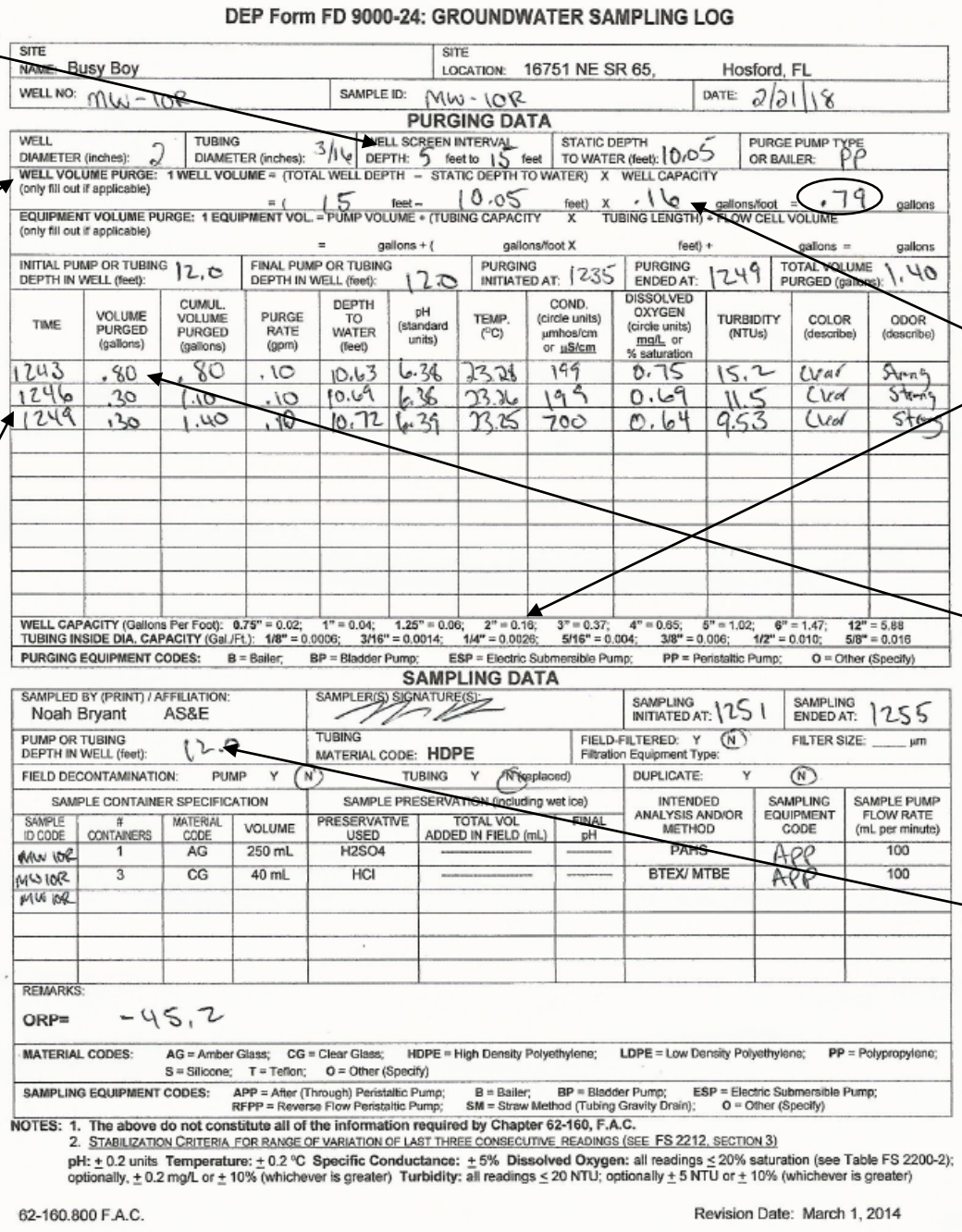
62-160.800 F.A.C. Revision Date: March 1, 2014

Well Capacity Conversion, Stabilization Criteria Sample Collection Information

Is screen partially submerged?

Calculating Well Volume
V = [Gallons per foot of water] x h (height of water column in feet)

Collect parameters no sooner than every 2 minutes



DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Busy Boy | SITE LOCATION: 16751 NE SR 65, Hosford, FL
WELL NO: MW-10R | SAMPLE ID: MW-10R | DATE: 2/21/18

PURGING DATA

WELL DIAMETER (inches): 2 | TUBING DIAMETER (inches): 3/16 | WELL SCREEN INTERVAL DEPTH: 5 feet to 15 feet | STATIC DEPTH TO WATER (feet): 10.05 | PURGE PUMP TYPE OR BAILER: PP

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (15 feet − 10.05 feet) X .16 gallons/foot = .79 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet):	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):
12.0	12.0	1235	1249	1.40

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1243	.80	.80	.10	10.63	6.38	23.28	199	0.75	15.2	Clear	Strong
1246	.30	1.10	.10	10.69	6.36	23.26	193	0.69	11.5	Clear	Strong
1249	.30	1.40	.10	10.72	6.39	23.25	200	0.64	9.53	Clear	Strong

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016
PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Noah Bryant AS&E | SAMPLER(S) SIGNATURE(S): | SAMPLING INITIATED AT: 1251 | SAMPLING ENDED AT: 1255

PUMP OR TUBING DEPTH IN WELL (feet): 12.0 | TUBING MATERIAL CODE: HDPE | FIELD-FILTERED: Y (N) Filtration Equipment Type: | FILTER SIZE: ____ µm

FIELD DECONTAMINATION: PUMP Y (N) TUBING Y (N) (replaced) | DUPLICATE: Y (N)

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
MW 10R	1	AG	250 mL	H2SO4	———	———	PAHs	APP	100
MW 10R	3	CG	40 mL	HCl	———	———	BTEX/ MTBE	APP	100
MW 10R									

REMARKS:
ORP= -45.2

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; HDPE = High Density Polyethylene; LDPE = Low Density Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING EQUIPMENT CODES: APP = After (Through) Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); O = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) Turbidity: all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

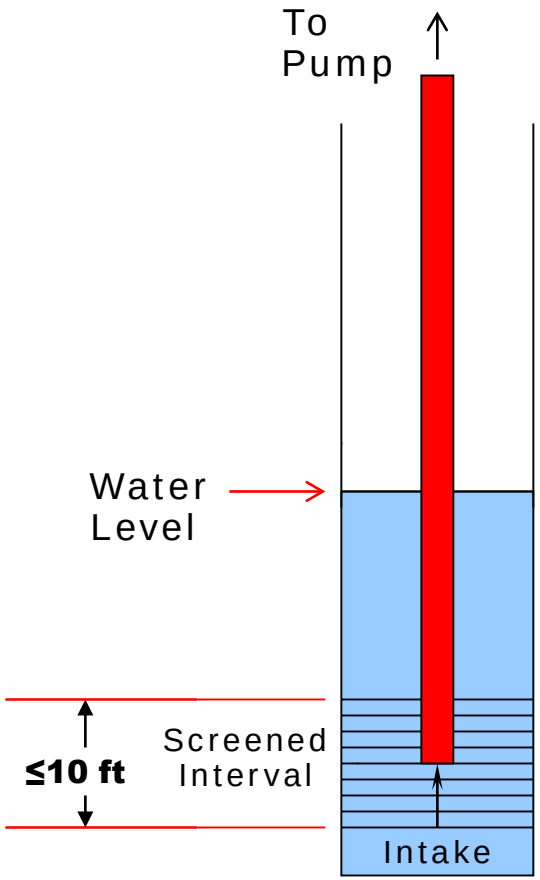
62-160.800 F.A.C. Revision Date: March 1, 2014

Well capacity for 2” wells is 0.16 Gallons per foot

Purge one volume prior to initiating parameters

Is tubing placed in the top 2’?

Fundamentals of Groundwater Purging



Minimized (Equipment Volume) Purge

- *Applicable only for wells designed with a fully submerged screen that are no more than 10 feet long*
- *Intake is placed in the middle of the screened interval*
- *The purge volume is calculated using the Equipment Volume Purge Formula provided on the form*
- *Purge one equipment volume*
- *Measure stabilization parameters*
- *Collect additional parameters no sooner than every 2 minutes*
- *Purge a minimum of 3 equipment volumes*

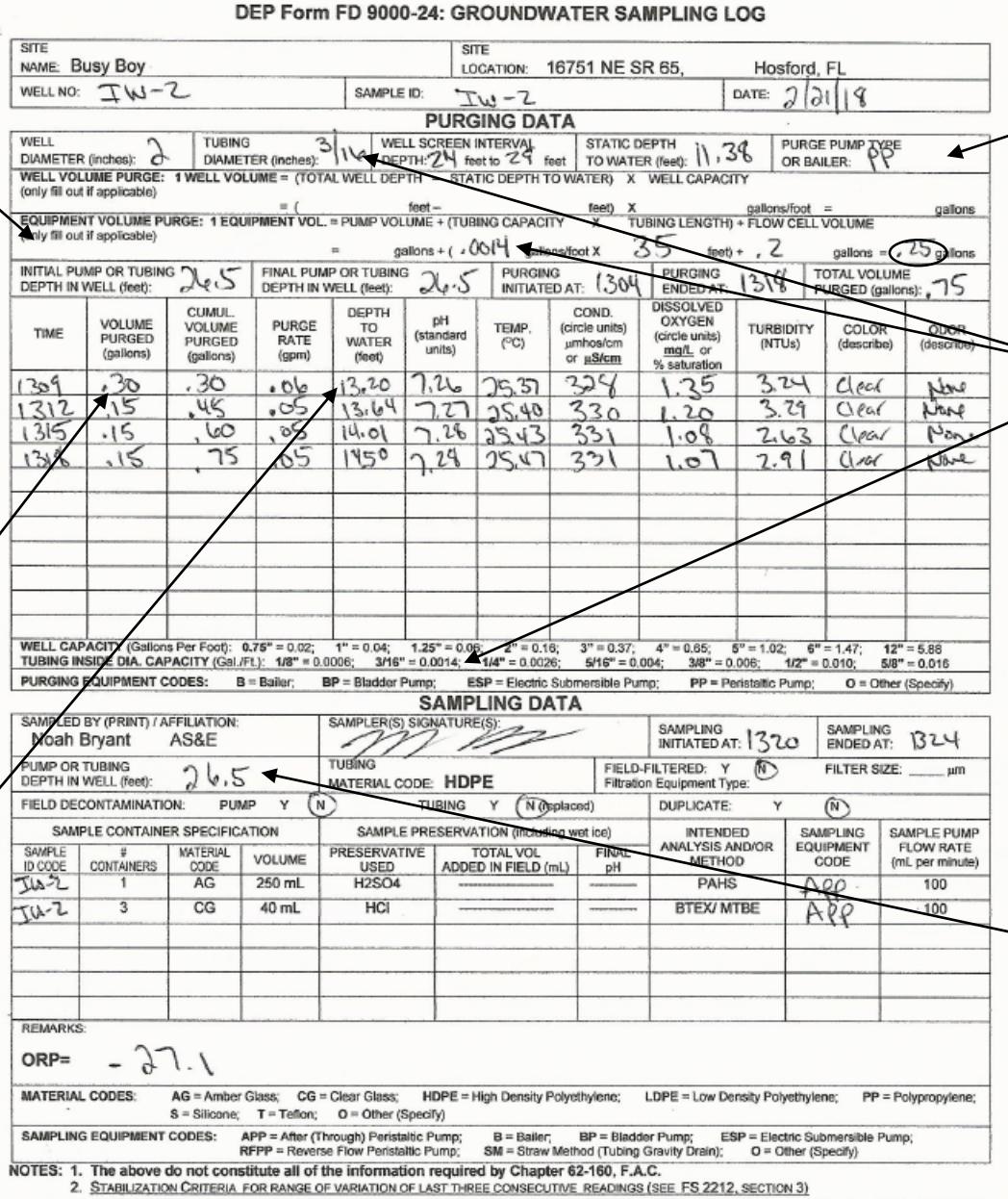
Calculating Equipment Volume purge

V = (tubing capacity x length)+ flow cell volume

Is the screen fully submerged?

Is the volume purged ≥ than the amount calculated?

Drawdown must be stabilized



DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Busy Boy | SITE LOCATION: 16751 NE SR 65, Hosford, FL

WELL NO: IW-2 | SAMPLE ID: IW-2 | DATE: 2/21/18

PURGING DATA

WELL DIAMETER (inches):	TUBING DIAMETER (inches):	WELL SCREEN INTERVAL DEPTH:	STATIC DEPTH TO WATER (feet):	PURGE PUMP TYPE OR BAILER:
2	3/16	24 feet to 29 feet	11.38	PP

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY (only fill out if applicable)

= (feet – feet) X gallons/foot = gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME (only fill out if applicable)

= gallons + (.0014 gallons/foot X 35 feet) + .2 gallons = .25 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet):	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):
26.5	26.5	1304	1318	.75

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1309	.30	.30	.06	13.20	7.26	25.37	324	1.35	3.24	Clear	None
1312	.15	.45	.05	13.64	7.27	25.40	330	1.20	3.29	Clear	None
1315	.15	.60	.05	14.01	7.28	25.43	331	1.08	2.63	Clear	None
1318	.15	.75	.05	1450	7.29	25.47	331	1.07	2.91	Clear	None

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88

TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Noah Bryant AS&E | SAMPLER(S) SIGNATURE(S): | SAMPLING INITIATED AT: 1320 | SAMPLING ENDED AT: 1324

PUMP OR TUBING DEPTH IN WELL (feet): 26.5 | TUBING MATERIAL CODE: HDPE | FIELD-FILTERED: Y (N) Filtration Equipment Type: | FILTER SIZE: ____ µm

FIELD DECONTAMINATION: PUMP Y (N) TUBING Y (N) (replaced) | DUPLICATE: Y (N)

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
IW-2	1	AG	250 mL	H2SO4	———	———	PAHS	APP	100
IW-2	3	CG	40 mL	HCl	———	———	BTEX/ MTBE	APP	100

REMARKS: ORP= -27.1

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; HDPE = High Density Polyethylene; LDPE = Low Density Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING EQUIPMENT CODES: APP = After (Through) Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); O = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.

2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)

pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) Turbidity: all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

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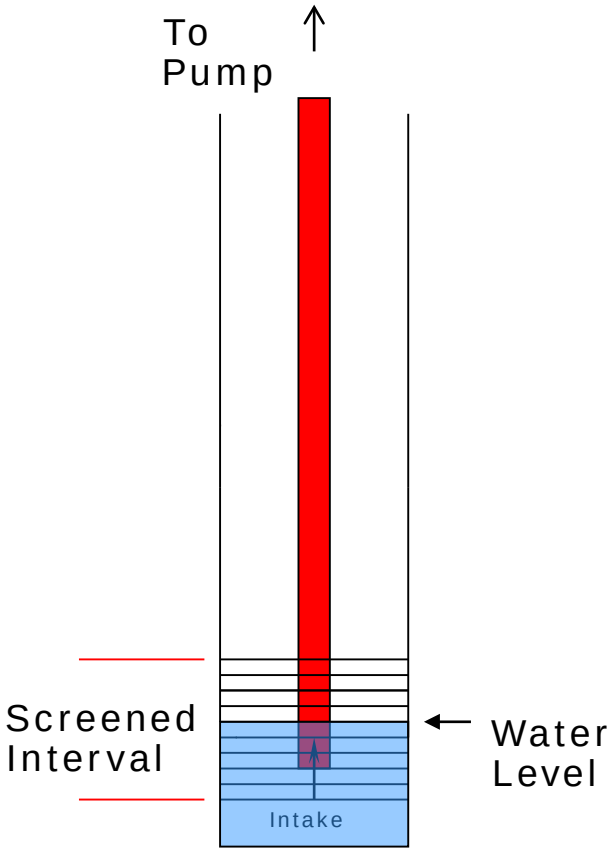
Indicate type of pump

Tubing capacity for 3/16” tubing is 0.0014 Gal/ft

Is tubing placed in the middle of the screened interval?

Fundamentals of Groundwater Purging



Purging and Sampling Low-Recharge Wells That Go Dry

- *Minimize equipment volume*
- *Use thick walled tubing*
- *Place intake at top of water column*
- *Purge <100 mL/min; follow drawdown*
- *Purge 2 equipment volumes if possible*
- *Measure stabilization parameters just before sampling.*
- *Collect samples immediately after purging (or after dry recharge)*

Purging completed/Sample collection

When three (3) consecutive measurements of the five (5) parameters listed are within the stated limits

Is PH within ±2.0 units?

Is Temp within ±2.0 units?

Is depth to water stabilized?

Compare Sampling Data information with Chain of Custody (COC)

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Busy Boy	SITE LOCATION: 16751 NE SR 65, Hosford, FL
WELL NO: MW-10R	SAMPLE ID: MW-10R DATE: 2/21/18

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: 5 feet to 15 feet	STATIC DEPTH TO WATER (feet): 10.05	PURGE PUMP TYPE OR BAILER: PP

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH − STATIC DEPTH TO WATER) X WELL CAPACITY (only fill out if applicable)
= (15 feet − 10.05 feet) X .16 gallons/foot = .79 gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME (only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 12.0	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 12.0	PURGING INITIATED AT: 1235	PURGING ENDED AT: 1249	TOTAL VOLUME PURGED (gallons): 1.40

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1243	.80	.80	.10	10.63	6.38	23.28	199	0.75	15.2	Clear	Strong
1246	.30	1.10	.10	10.69	6.36	23.26	193	0.69	11.5	Clear	Strong
1249	.30	1.40	.10	10.72	6.39	23.25	700	0.64	9.53	Clear	Strong

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016
PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Noah Bryant AS&E	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 1251	SAMPLING ENDED AT: 1255
PUMP OR TUBING DEPTH IN WELL (feet): 12.0	TUBING MATERIAL CODE: HDPE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING Y (N replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)					
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH	INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
MW 10R	1	AG	250 mL	H2SO4	———	———	PAHS	APP	100
MW 10R	3	CG	40 mL	HCl	———	———	BTEX/ MTBE	APP	100
MW 10R									

REMARKS:
ORP= -45.2

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; HDPE = High Density Polyethylene; LDPE = Low Density Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING EQUIPMENT CODES: APP = After (Through) Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); O = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) Turbidity: all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

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Is Specific Conductance with ±5.0% (10 units for all three readings)? (200 x .05= 10)

Is Dissolved Oxygen ±2.0 mg/L or ± 10%? Or compare with Table FS 2200-2

Is turbidity ≤ 20 NTU; optionally ±5 NTU or ± 10%?

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Busy Boy	SITE LOCATION: 16751 NE SR 65, Hosford, FL	
WELL NO: IW-2	SAMPLE ID: IW-2	DATE: 2/21/19

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: 24 feet to 29 feet	STATIC DEPTH TO WATER (feet): 11.38	PURGE PUMP TYPE OR BAILER: PP

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X gallons/foot = gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (.0014 gallons/foot X 35 feet) + .2 gallons = .25 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 26.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 26.5	PURGING INITIATED AT: 1304	PURGING ENDED AT: 1318	TOTAL VOLUME PURGED (gallons): .75

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1309	.30	.30	.06	13.20	7.26	25.37	324	1.35	3.24	Clear	None
1312	.15	.45	.05	13.64	7.27	25.40	330	1.20	3.29	Clear	None
1315	.15	.60	.05	14.01	7.28	25.43	331	1.08	2.63	Clear	None
1318	.15	.75	.05	1450	7.29	25.47	331	1.07	2.91	Clear	None

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Noah Bryant AS&E	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 1320	SAMPLING ENDED AT: 1324
PUMP OR TUBING DEPTH IN WELL (feet): 26.5	TUBING MATERIAL CODE: HDPE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING Y (N) (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
IW-2	1	AG	250 mL	H2SO4	----------	----------	PAHS	APP	100
IW-2	3	CG	40 mL	HCl	----------	----------	BTEX/ MTBE	APP	100

REMARKS:
ORP= -27.1

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; HDPE = High Density Polyethylene; LDPE = Low Density Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING EQUIPMENT CODES: APP = After (Through) Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); O = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) Turbidity: all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

62-160.800 F.A.C. Revision Date: March 1, 2014

DEP Form FD 9000-24: GROUNDWATER SAMPLING LOG

SITE NAME: Busy Boy	SITE LOCATION: 16751 NE SR 65, Hosford, FL	
WELL NO: Iw-5R	SAMPLE ID: Iw-5R	DATE: 2/21/18

PURGING DATA

WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 3/16	WELL SCREEN INTERVAL DEPTH: 25 feet to 30 feet	STATIC DEPTH TO WATER (feet): 11.21	PURGE PUMP TYPE OR BAILER: PP

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X gallons/foot = gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (.0014 gallons/foot X 34 feet) + .2 gallons = .25 gallons

INITIAL PUMP OR TUBING DEPTH IN WELL (feet): 27.5	FINAL PUMP OR TUBING DEPTH IN WELL (feet): 27.5	PURGING INITIATED AT: 1334	PURGING ENDED AT: 1345	TOTAL VOLUME PURGED (gallons): .55

TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1339	.25	.25	.05	11.25	7.71	25.89	389	0.47	4.64	Clear	None
1342	.15	.40	.05	11.25	7.71	25.90	389	0.38	4.53	Clear	None
1345	.15	.55	.05	11.25	7.71	25.77	389	0.36	4.20	Clear	None

WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016

PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)

SAMPLING DATA

SAMPLED BY (PRINT) / AFFILIATION: Noah Bryant AS&E	SAMPLER(S) SIGNATURE(S):	SAMPLING INITIATED AT: 1347	SAMPLING ENDED AT: 1351
PUMP OR TUBING DEPTH IN WELL (feet): 27.5	TUBING MATERIAL CODE: HDPE	FIELD-FILTERED: Y (N) Filtration Equipment Type:	FILTER SIZE: ____ µm
FIELD DECONTAMINATION: PUMP Y (N)	TUBING Y (N) (replaced)	DUPLICATE: Y (N)	

SAMPLE CONTAINER SPECIFICATION				SAMPLE PRESERVATION (including wet ice)			INTENDED ANALYSIS AND/OR METHOD	SAMPLING EQUIPMENT CODE	SAMPLE PUMP FLOW RATE (mL per minute)
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOL ADDED IN FIELD (mL)	FINAL pH			
Iw5R	1	AG	250 mL	H2SO4	----------	----------	PAHS	APP	100
Iw5R	3	CG	40 mL	HCl	----------	----------	BTEX/ MTBE	APP	100

REMARKS:
ORP= -43.9

MATERIAL CODES: AG = Amber Glass; CG = Clear Glass; HDPE = High Density Polyethylene; LDPE = Low Density Polyethylene; PP = Polypropylene; S = Silicone; T = Teflon; O = Other (Specify)

SAMPLING EQUIPMENT CODES: APP = After (Through) Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); O = Other (Specify)

NOTES: 1. The above do not constitute all of the information required by Chapter 62-160, F.A.C.
2. STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS (SEE FS 2212, SECTION 3)
pH: ± 0.2 units Temperature: ± 0.2 °C Specific Conductance: ± 5% Dissolved Oxygen: all readings ≤ 20% saturation (see Table FS 2200-2); optionally, ± 0.2 mg/L or ± 10% (whichever is greater) Turbidity: all readings ≤ 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

62-160.800 F.A.C. Revision Date: March 1, 2014

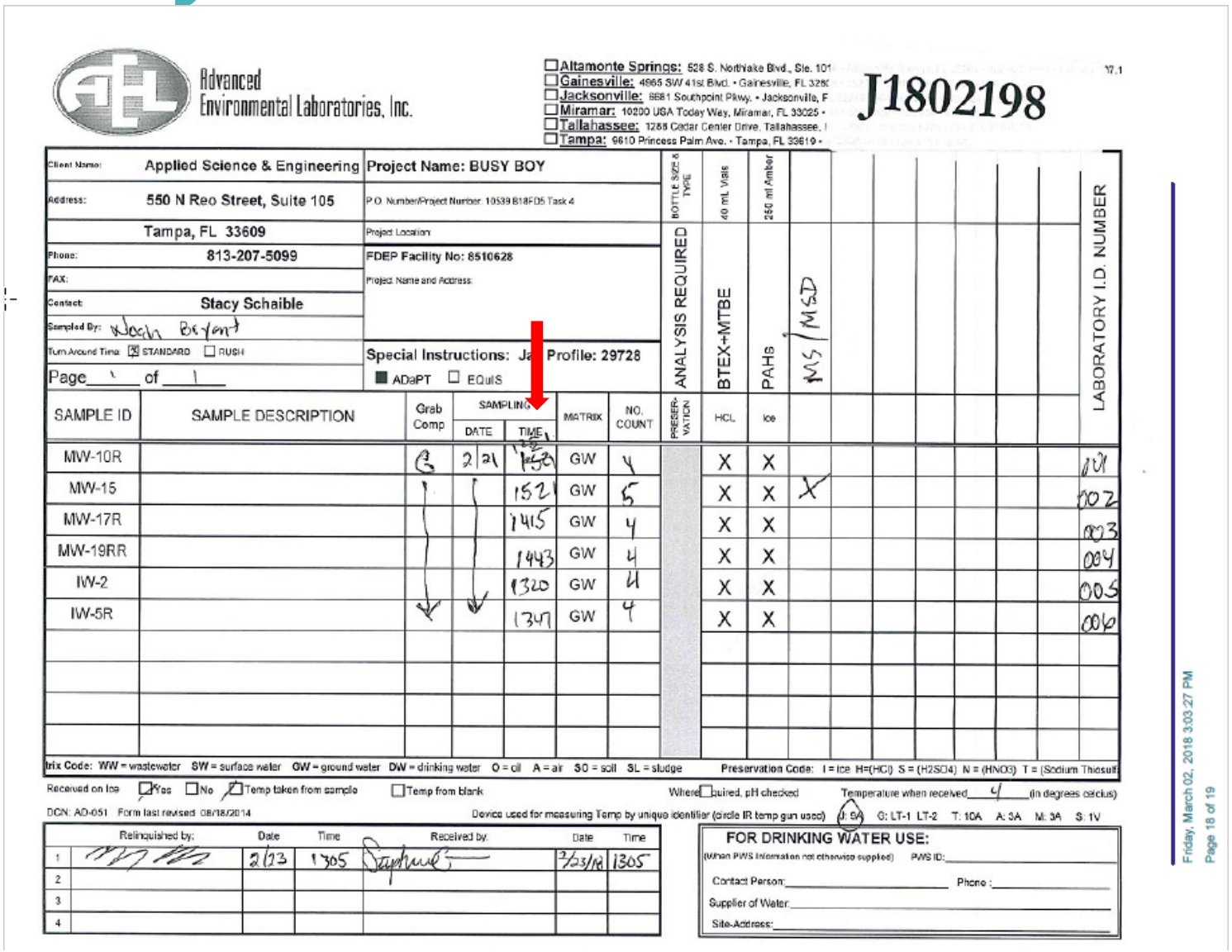
.25 x 3=0.75

Chain of Custody

- Collected samples must remain in the custody of the sampler until the samples are relinquished to another party
- Sample times should match GW Sample log and log book

Chain of Custody

Compare information with Groundwater Sampling Log, Sampling Data section



Advanced Environmental Laboratories, Inc.

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J1802198

Client Name:	Applied Science & Engineering
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	Tampa, FL 33609
Phone:	813-207-5099
FAX:	
Contact:	Stacy Schaible
Sampled By:	Josh Bryant
Turn Around Time:	☒ STANDARD ☐ RUSH
Page	1 of 1

Project Name: BUSY BOY
P.O. Number/Project Number: 10539.B18FD5 Task 4
Project Location:
FDEP Facility No: 6510628
Project Name and Address:
Special Instructions: J... Profile: 29728
■ ADaPT ☐ EQuIS

SAMPLE ID	SAMPLE DESCRIPTION	Grab / Comp	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. COUNT	PRESERVATION	ANALYSIS REQUIRED: BTEX+MTBE (40 mL Vials, HCL)	PAHs (250 ml Amber, Ice)	MS/MSD	LABORATORY I.D. NUMBER
MW-10R		G	2/21	1458	GW	4		X	X		001
MW-15				1521	GW	5		X	X	X	002
MW-17R				1415	GW	4		X	X		003
MW-19RR				1443	GW	4		X	X		004
IW-2				1320	GW	4		X	X		005
IW-5R				1347	GW	4		X	X		006

Matrix Code: WW = wastewater SW = surface water GW = ground water DW = drinking water O = oil A = air SO = soil SL = sludge
Preservation Code: I = Ice H=(HCl) S = (H2SO4) N = (HNO3) T = (Sodium Thiosulf

Received on Ice ☑ Yes ☐ No ☑ Temp taken from sample ☐ Temp from blank
Where ☐ uired, pH checked
Temperature when received 4 (in degrees celcius)

DCN: AD-051 Form last revised: 08/18/2014
Device used for measuring Temp by unique identifier (circle IR temp gun used) O: 5A G: LT-1 LT-2 T: 10A A: 3A M: 3A S: 1V

	Relinquished by:	Date	Time	Received by:	Date	Time
1		2/23	1305		2/23/18	1305
2						
3						
4						

FOR DRINKING WATER USE:
(When PWS Information not otherwise supplied) PWS ID:
Contact Person: Phone :
Supplier of Water:
Site Address:

Friday, March 02, 2018 3:03:27 PM
Page 18 of 19

Questions?

Contact: Jamie Lopez – Team 4
850-245-8925
Jamie.L.Lopez@dep.state.fl.us


FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION