DISCOVER 200
1824 – 2024
ALACHUA COUNTY BICENTENNIAL

SITE ASSESSMENT REPORT TECHNICAL REVIEW

Ted Goodman, P.G.
LP-01 Alachua

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SITE ASSESSMENT

Technical Report Review

Goals

- Technical accuracy and completeness of all documents.
- Horizontal and vertical delineation of contaminants in all media.
- 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.

We Set the Standard!

SITE ASSESSMENT

Chapter 62-780.600(8) Site Assessment Report (SAR) Requirements

SAR Contents

- Complete site history.
- Summary of tasks completed.
- Descriptions of investigative methods.
- Site-specific geology/stratigraphy.
- Site-specific hydrogeology.
- Results of testing and data collection.
- Data analysis and interpretation.
- Summary of findings.
- Recommendations.

SITE ASSESSMENT

Chapter 62-780.600(8) SAR Requirements

Site History Summary

- Property and facility owners.
- Past and present operations, including tank history.
- Description of known products used, stored, or manufactured.
- Summary of environmental permits and enforcement actions.
- Discharge history.
- Prior assessment and remediation history.
- Free product recovery.
- Interim source removals/Initial Remedial Action (IRAs).

SITE ASSESSMENT

Chapter 62-780.600(8) SAR Requirements

Required Figures

- USGS topographic site location map.
- Site vicinity map including locations of public water supply wells within ½ mile radius and private potable wells within ¼ mile radius.
- **Scaled** site plan.
- Scaled site map(s) showing water-level elevations at each monitoring point, estimated groundwater elevation contours, and estimated direction of groundwater flow.
    - Use separate maps for different aquifer zones (e.g., shallow, intermediate, deep).

SITE ASSESSMENT

Chapter 62-780.600(8) SAR Requirements

Required Figures - Continued

- At least two geologic cross sections (structural or stratigraphic).
- Well construction diagram(s) – typical shallow and deep.
- Scaled site map(s) showing soil sample locations and horizontal **and** vertical extent of vadose soil contamination.
- 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.
    - Separate maps for each constituent > Groundwater Cleanup Target Levels (GCTLs).
    - Use separate maps for different aquifer zones (shallow, intermediate, deep, etc.).

SITE ASSESSMENT

Chapter 62-780.600(8) SAR Requirements

Required Tables

- Well construction.
- Soil screening summary (Organic Vapor Analyzer (OVA) data).
- Groundwater elevation summary.
- Soil analytical summary.
    - Volatile Organic Aromatics (VOAs), Total Recoverable Petroleum Hydrocarbons (TRPH) & Metals
    - Non-carcinogenic Polynuclear Aromatic Hydrocarbons (PAHs)
    - Carcinogenic PAHs
    - TRPH fractionation

Chapter 62-780.600(8) SAR Requirements

Required Tables

- Groundwater analytical summary
    - Volatile Organic Compounds (VOCs) & Metals
    - PAHs & TRPH

Technical Report Review

Report Review Process Flow

- Appendices
  - Field notes, boring logs, sampling logs, lab reports complete.
  - Verify Schedule of Pay Items (SPI) quantities.
  - Verify Required Documents from SPI.
- Tables
  - Match field notes, boring logs, sampling logs, and lab reports.

Technical Report Review

Report Review Process Flow - Continued

- Figures
  - Match tables.
  - Technically correct.
  - Match tables.
  - Technically correct.
  - Borings and Monitoring Wells (MWs) located and spaced to assess all potential source areas and complete horizontal delineation.
  - Vertical extent well location in/near most likely source area.

Technical Report Review

Report Review Process Flow - Continued

- Text
  - Summarizes work completed.
  - Presents data and analysis.
- Conclusions supported by data in the tables, figures, and appendices.
- Recommendations are reasonable and appropriate.

SITE ASSESSMENT

Technical Report Review

Appendices

- Field notes
    - Personnel, vehicle(s)/equipment, start/stop times.
    - Important for evaluating requests for per diem fees.
    - Static depth to water.
    - Top-of-casing survey.
- Groundwater sampling logs
    - Proper purge method – partially or fully submerged well screen.
    - Purge rate, including during sample collection.
    - Purge volume.
    - Drawdown.
    - Stabilization parameters within established criteria.

Technical Report Review

Appendices - Continued

- Equipment calibration records
  - Calibration type (Initial Calibration (IC), Initial Calibration Verification (ICV), Continuing Calibration Verification (CCV)).
  - Lot numbers/expiration dates for standards.
  - Results, including Standard Deviation where required.
- Lab reports
  - Sample temperature & hold times.
  - Quality Assurance (QA) issues – refer to case narrative.
  - Method Detection Limits (MDLs) met.

Technical Report Review

Appendices - Continued

- Boring logs
  - Header info.
  - Blow counts (if standard penetration tests (SPTs) used for sample collection).
  - Field screening data.
  - Unified Soil Classification System (USCS) codes (SC ≠ sandy clay!!).

SITE ASSESSMENT

Technical Report Review

Appendices - Continued

- Well construction and development logs
    - Well construction info complete and tables match.
    - Well development times.
- Photo-documentation
    - Drum fill photos.
    - Special or unusual circumstances.

Technical Report Review – Figures & Tables

Why So Important

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

Accurate Figures And Tables Are Essential For Making Sound Remediation Decisions And For Site Rehabilitation Completion Order (SRCO)!

Technical Report Review – Tables

Tables - General

- Use most current formats from the Department of Environmental Protection.
- Must be cumulative – include ALL historical data.
- Confirm transcription of data against field notes, boring logs, and lab reports.

Technical Report Review – Tables

Groundwater Elevation Tables

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

$$\mathbf{CGWE = (TOC\text{-}DTW) + [(DTW\text{-}DTP) * \rho_{(LNAPL)}]}$$

Where: GGWE = Corrected Groundwater Elevation
TOC = Top of Casing Elevation
DTW = Depth to Water Below TOC
DTP = Depth to Product Below TOC
$\rho_{(LNAPL)}$ = Density of Product (0.79 g/ml)

$\rho_{(Gasoline)}$ = 0.755 avg

$\rho_{(Diesel)}$ = 0.85 avg

Technical Report Review – Tables

Analytical Data Tables

- Identify units of measure.
- Show cleanup target levels.
- Include lab qualifiers.
  - Include description in the table notes/footnotes section.
- Confirm unit conversions (µg to mg).
- Significant figures, especially trailing zeroes.
- Soil analytical data tables should not be used to report field OVA data..

Technical Report Review – Tables

Analytical Data Tables - Cautions

- Pre-1996, common practice was to sum the concentrations of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene and report as Total Naphthalenes.
  - 1-MNAPH and 2-MNAPH reported as “NA” or left blank in historic data tables.
  - Individual concentrations are shown in lab reports.
  - Agency Term Contractors (ATC’s) should update historical tables to show these data.

Technical Report Review – Tables

Analytical Data Tables - Cautions

- Watch for unnecessary rounding of data.
  - May be used for determining Cleanup Target Levels (CTL) exceedances and evaluating closure eligibility.
  - Should not be applied to data tables.
- Watch for unit conversions – most often seen with TRPH data.

More info on analytical data rounding for site closure is available here:
https://floridadep.gov/waste/petroleum-restoration/documents/rounding-analytical-data-site-rehabilitation-completion

Technical Report Review – Figures

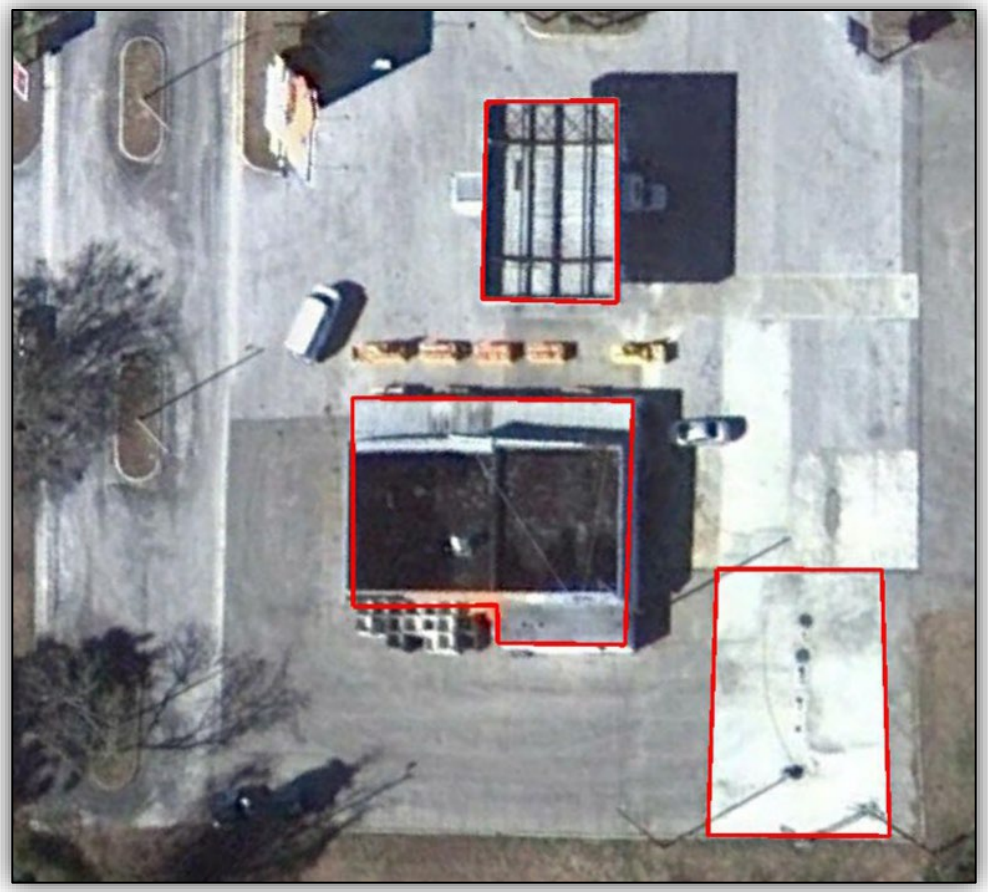
Site Plans

- Drawn to scale.
- Detailed – should include site boundaries; current and historical tank, piping, and dispenser locations; buildings and structures; driveways; utilities; location(s) of any source removals; paved and unpaved areas; large trees including canopy drip edge; objects that have the potential to restrict or obstruct access; etc.
- Site plan using only an aerial photo is NOT acceptable.

SITE ASSESSMENT

Technical Report Review – Figures

Why no Aerials?



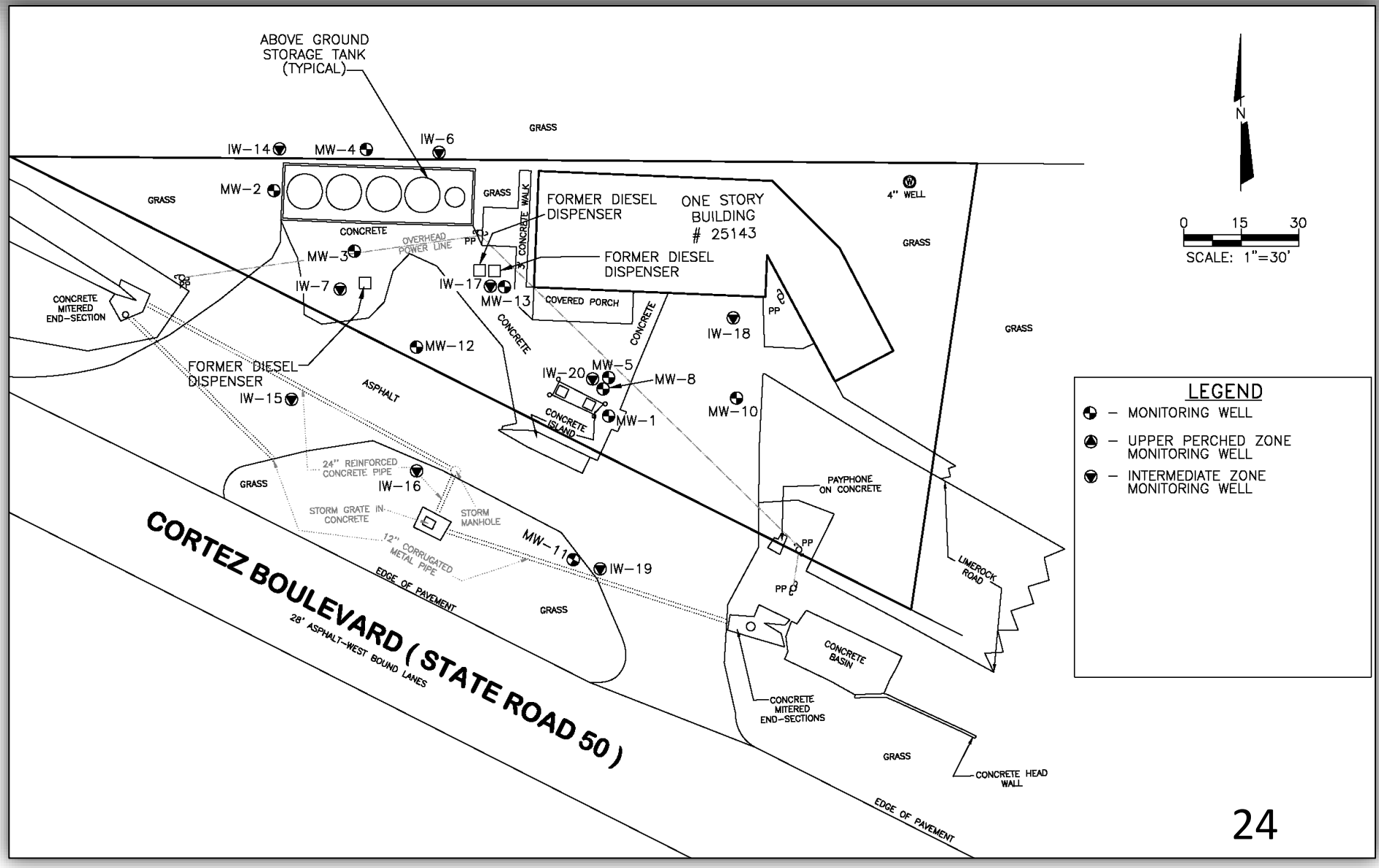
2011

2018

SITE ASSESSMENT

Good Site Plan

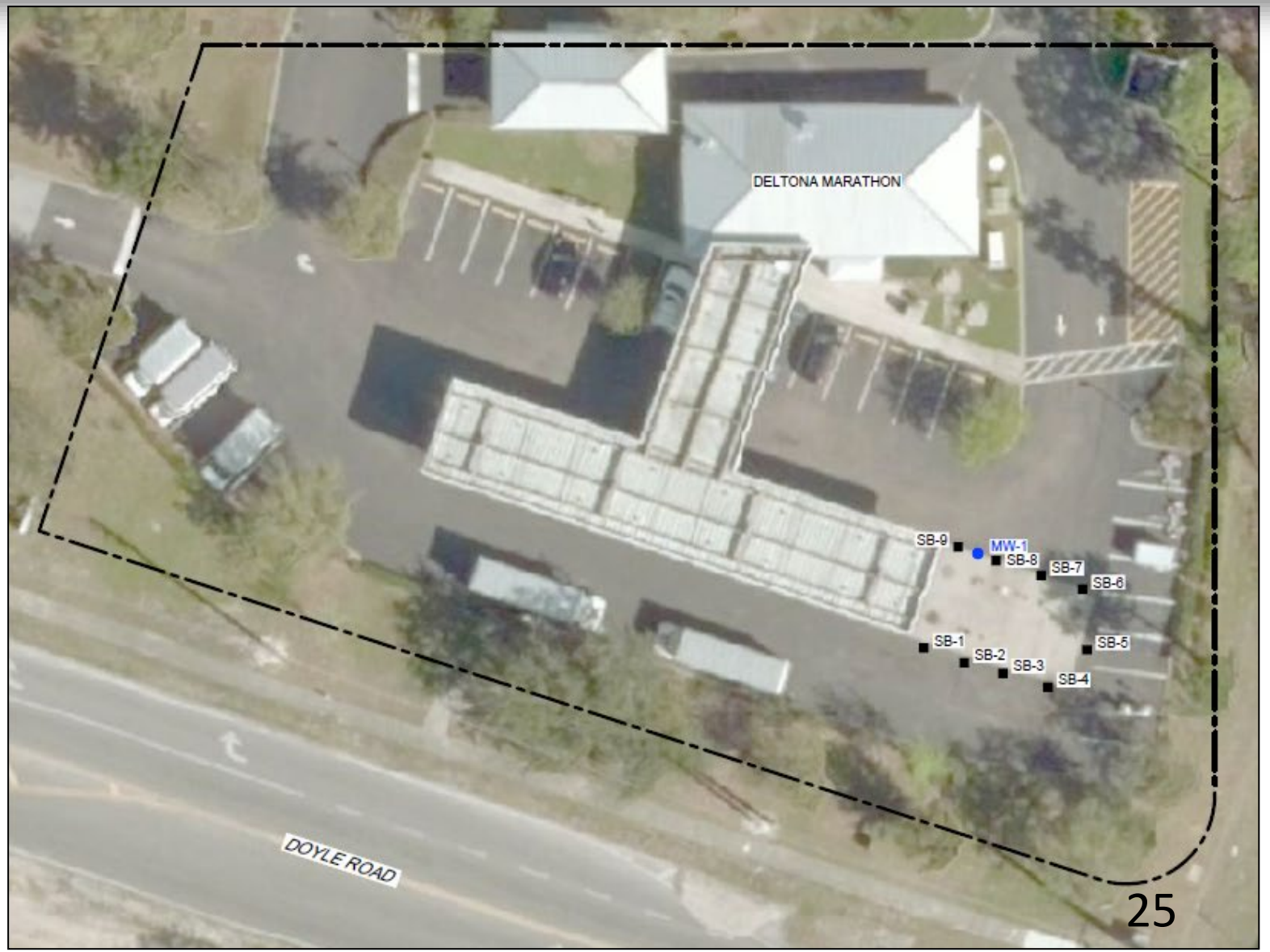
- Site boundary.
- Properly scaled.
- Good details.
- Structures.
- Monitoring wells.
- Utilities.



SITE ASSESSMENT

Poor Site Plan

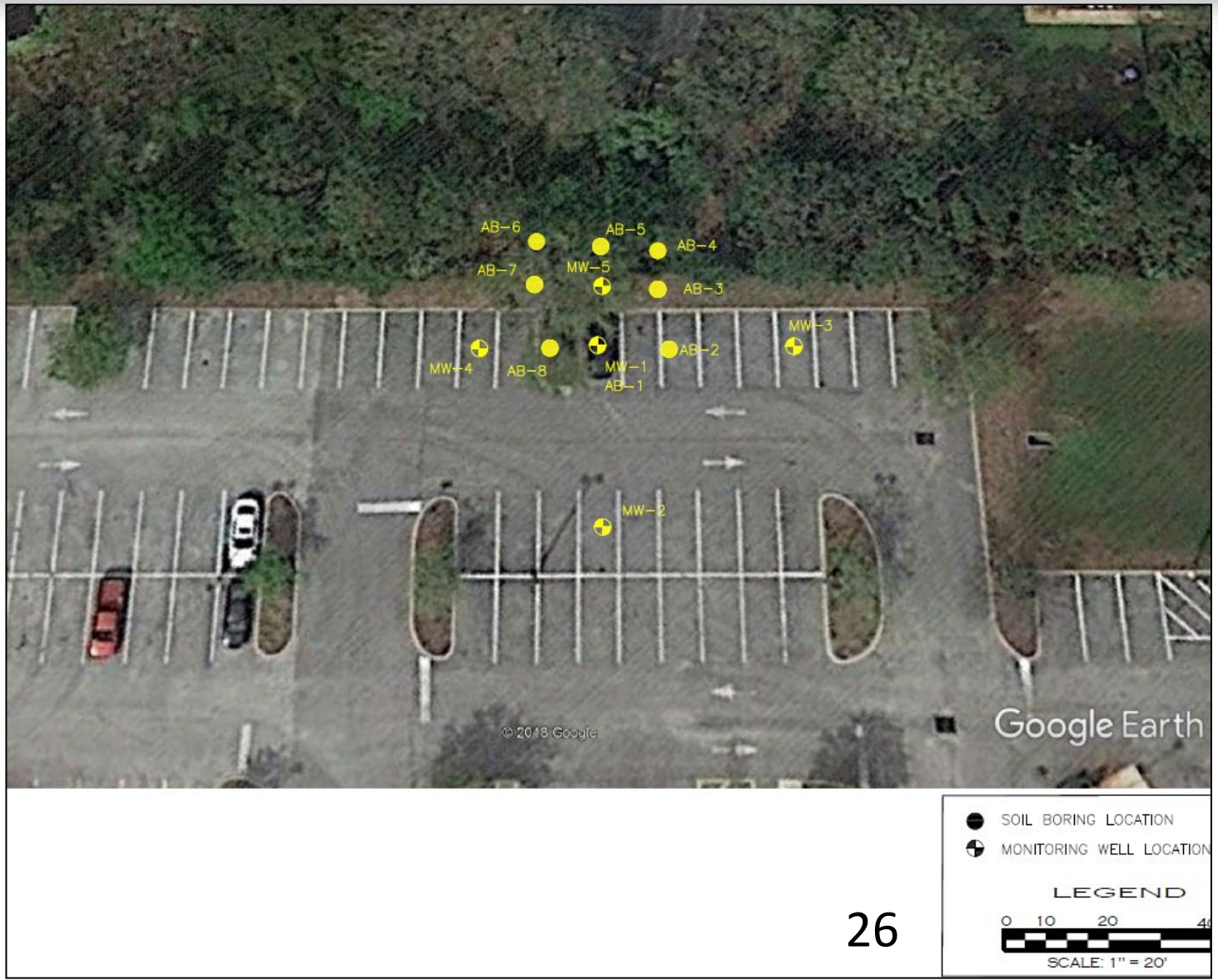
- Site boundary.
- Uses an aerial photo for the base map.
- No site details.



SITE ASSESSMENT

Poor Site Plan

- Uses an oblique aerial photo.
- Cannot be properly scaled.
- No site boundary.
- No site details.



Technical Report Review – Figures

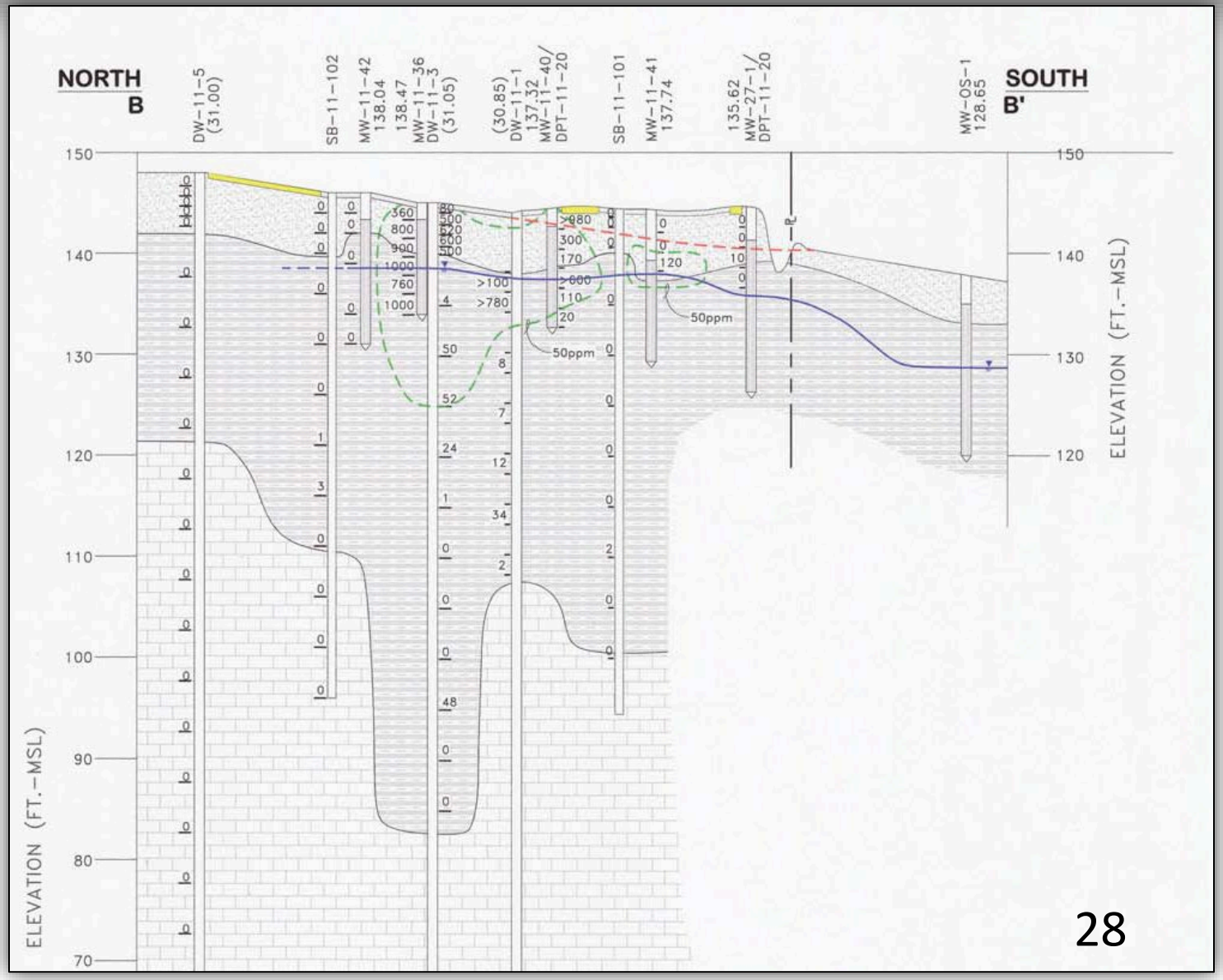
Geologic Cross Sections

- Soil/rock types.
- Contaminant concentrations (soil OVA, soil analytical, and groundwater analytical, including isocontours where possible).
- Depict soil borings & monitoring wells (including screened intervals).
- Water table.
- Structural and stratigraphic cross sections are both acceptable; structural is preferred.

SITE ASSESSMENT

Geologic Cross Section

- Ground surface elevation.
- Soil/rock types.
- Monitoring wells with screened intervals.
- Soil borings.
- OVA data and contours.
- Water table.



Technical Report Review – Figures

Groundwater Elevation Maps

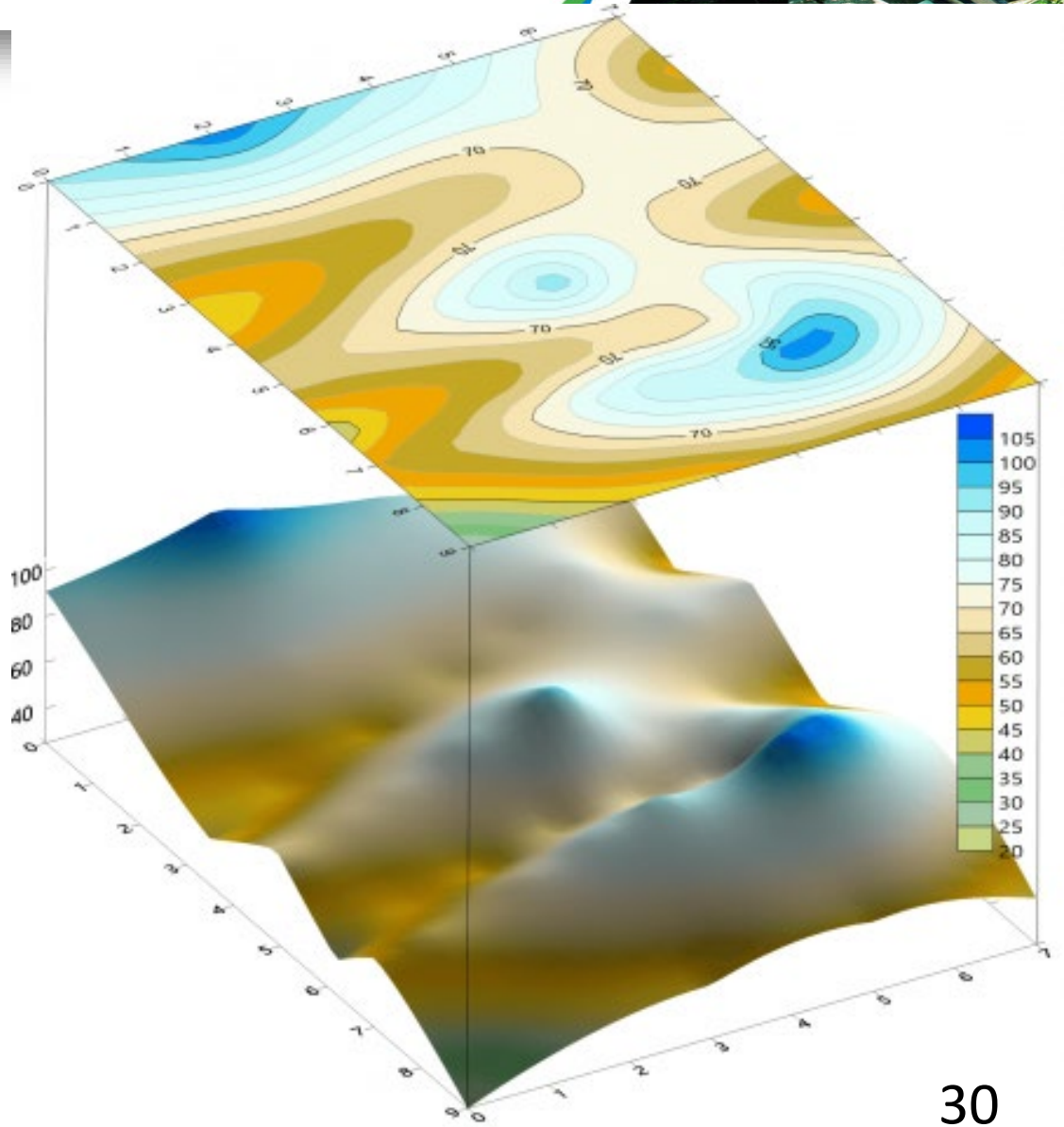
- Minimum of three data points.
- Data points spread out – i.e. NOT in a straight line.
- Data collected on same date.
- Data all from same aquifer zone – don't mix shallow and deep.
- Follow contouring rules.
- Contour lines extending outside of the data envelope are inferred and should be dashed.

SITE ASSESSMENT

Basic Geometry of Contouring

- Two points in space define a line.
- Cannot contour.
- Three points in space define a plane.
- Contours should be straight and evenly-spaced.
- >3 points needed to define a complex surface.

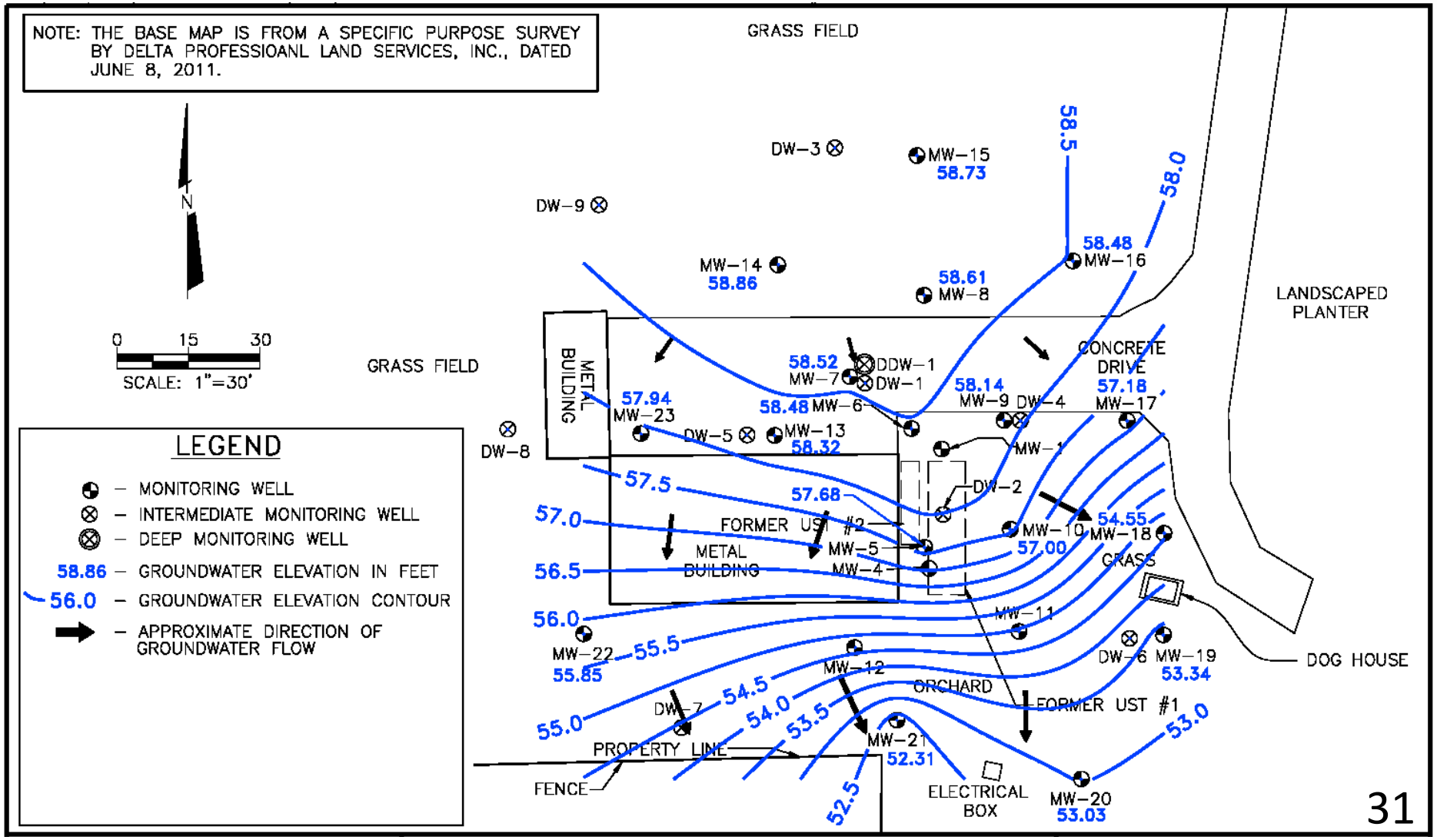
Remember: Two Points Define a Line, Three Points Define a Plane



SITE ASSESSMENT

Good GW Elevation Map

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

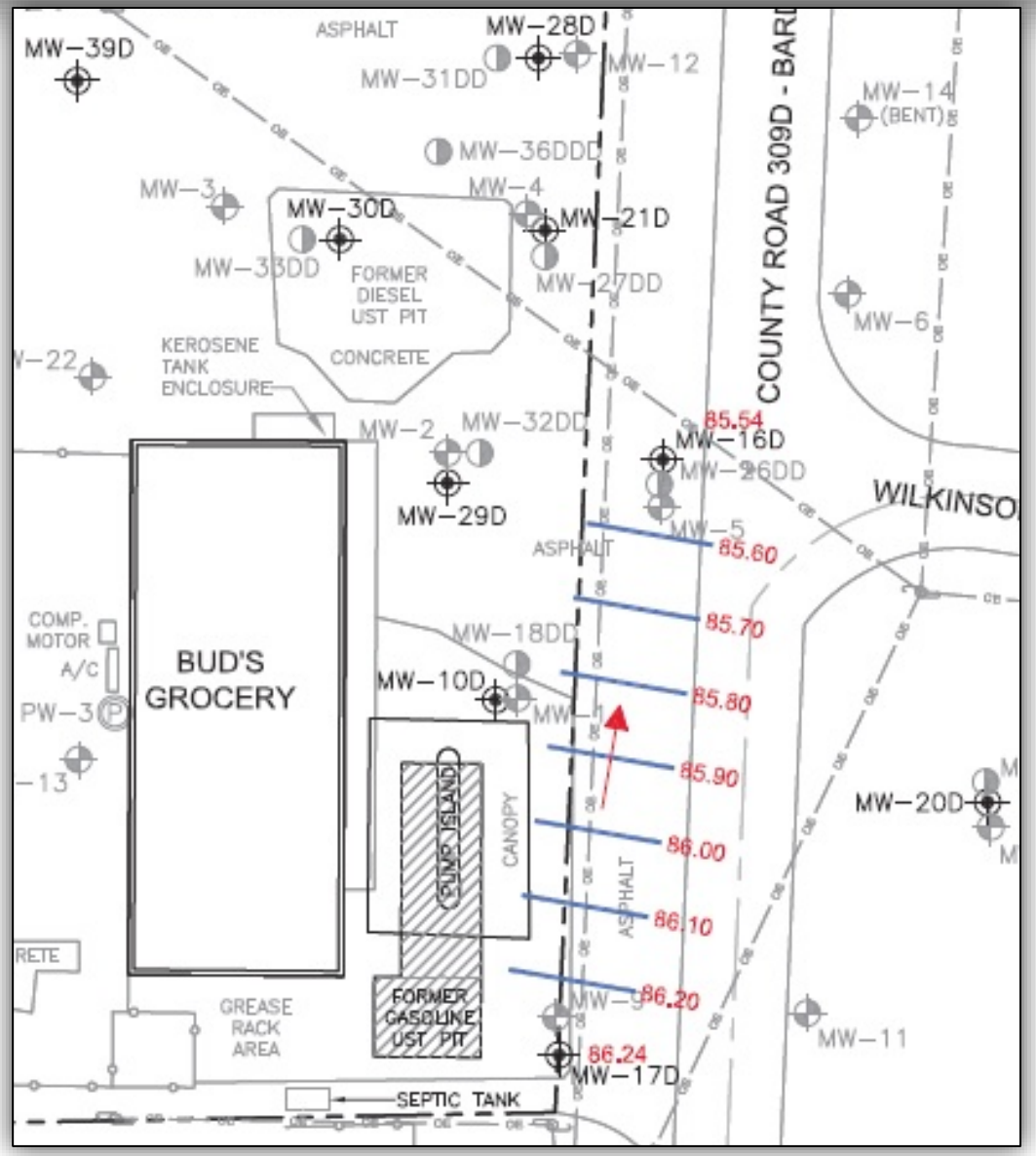


SITE ASSESSMENT

Poor GW Elevation Map

- Good base map.
- Constructed with only two data points.
- **Not a valid map!**

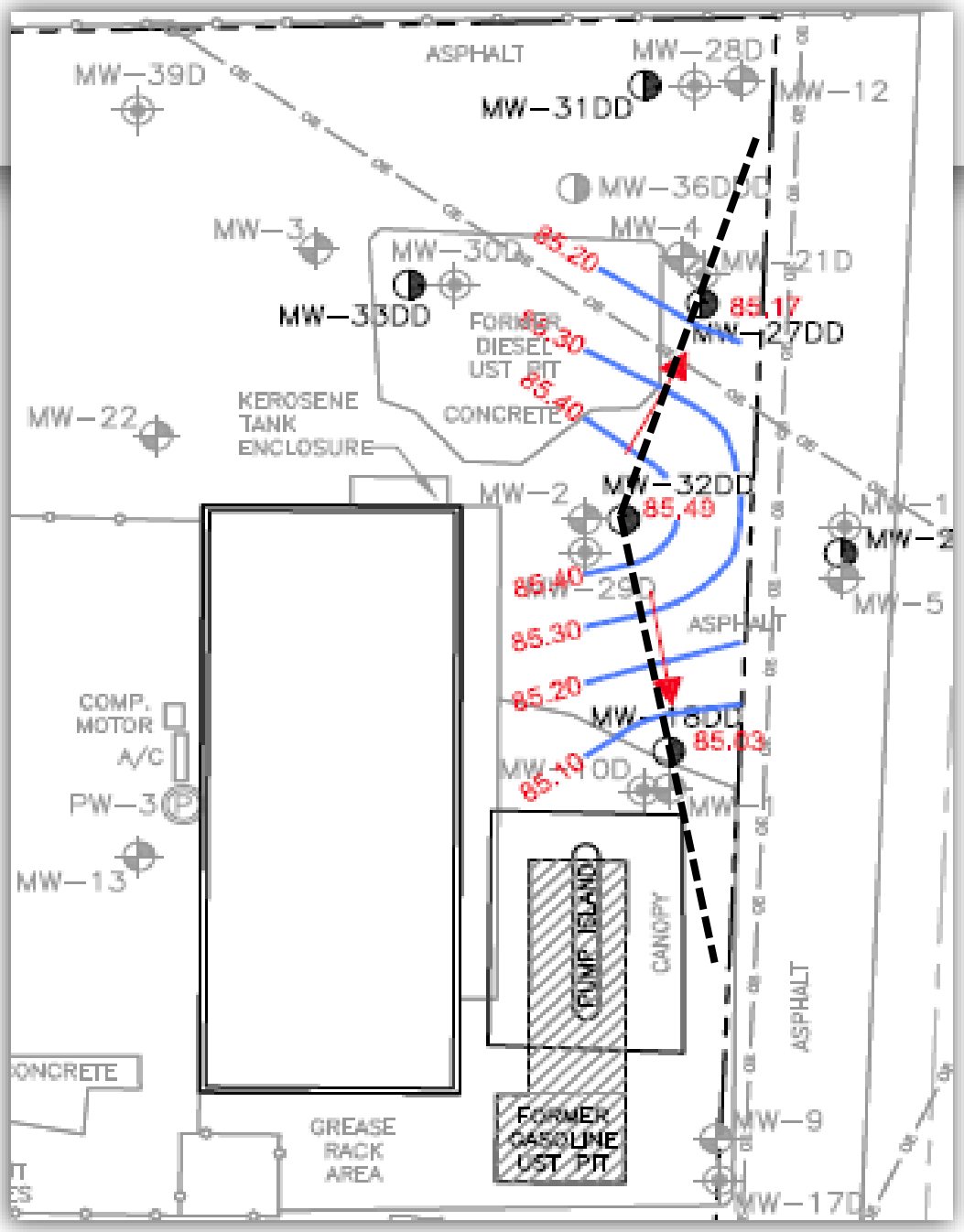
Two Points Define a Line!

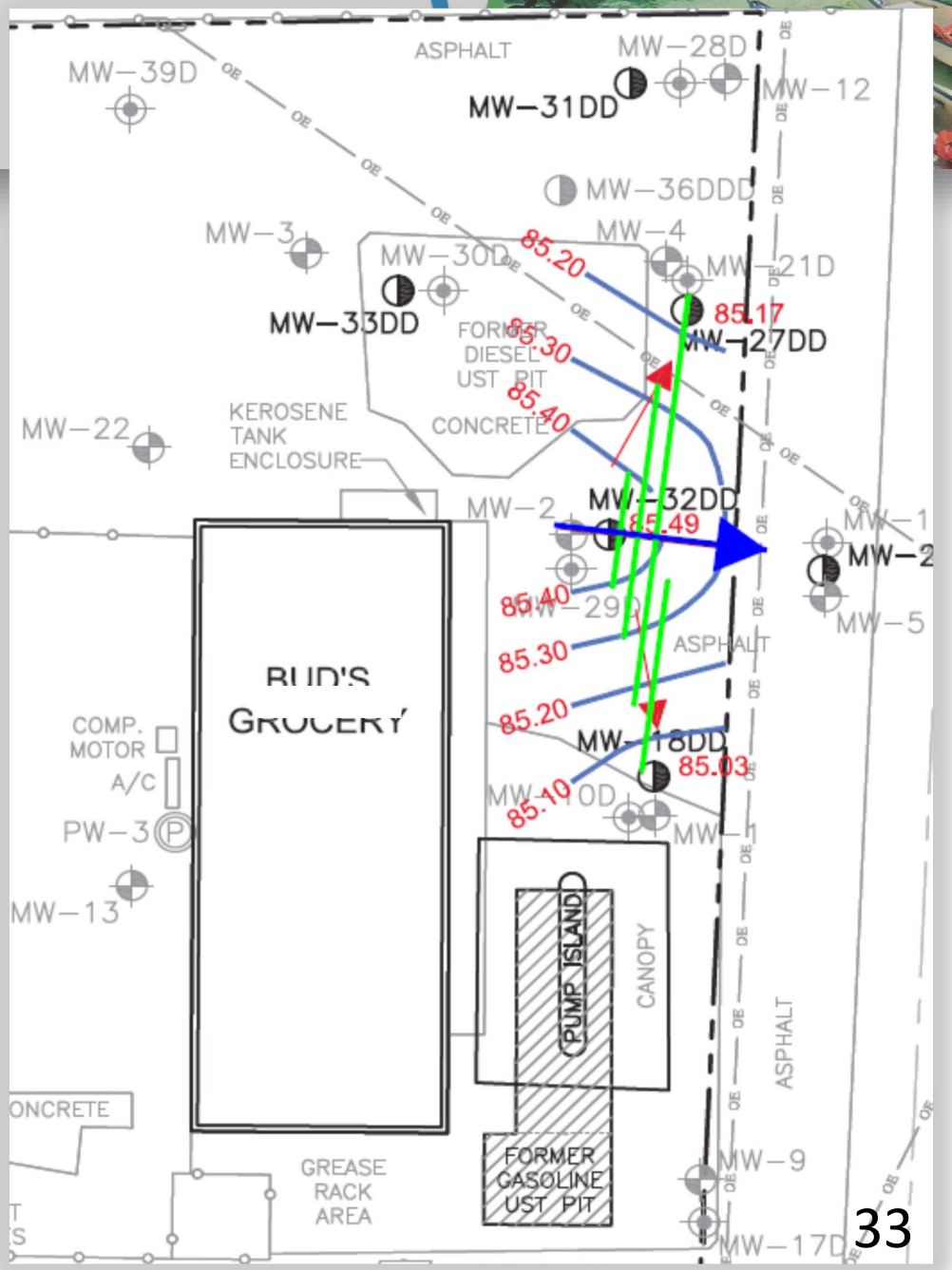


Poor GW Elevation Map

- Good base map
- Constructed with ≥3 data points

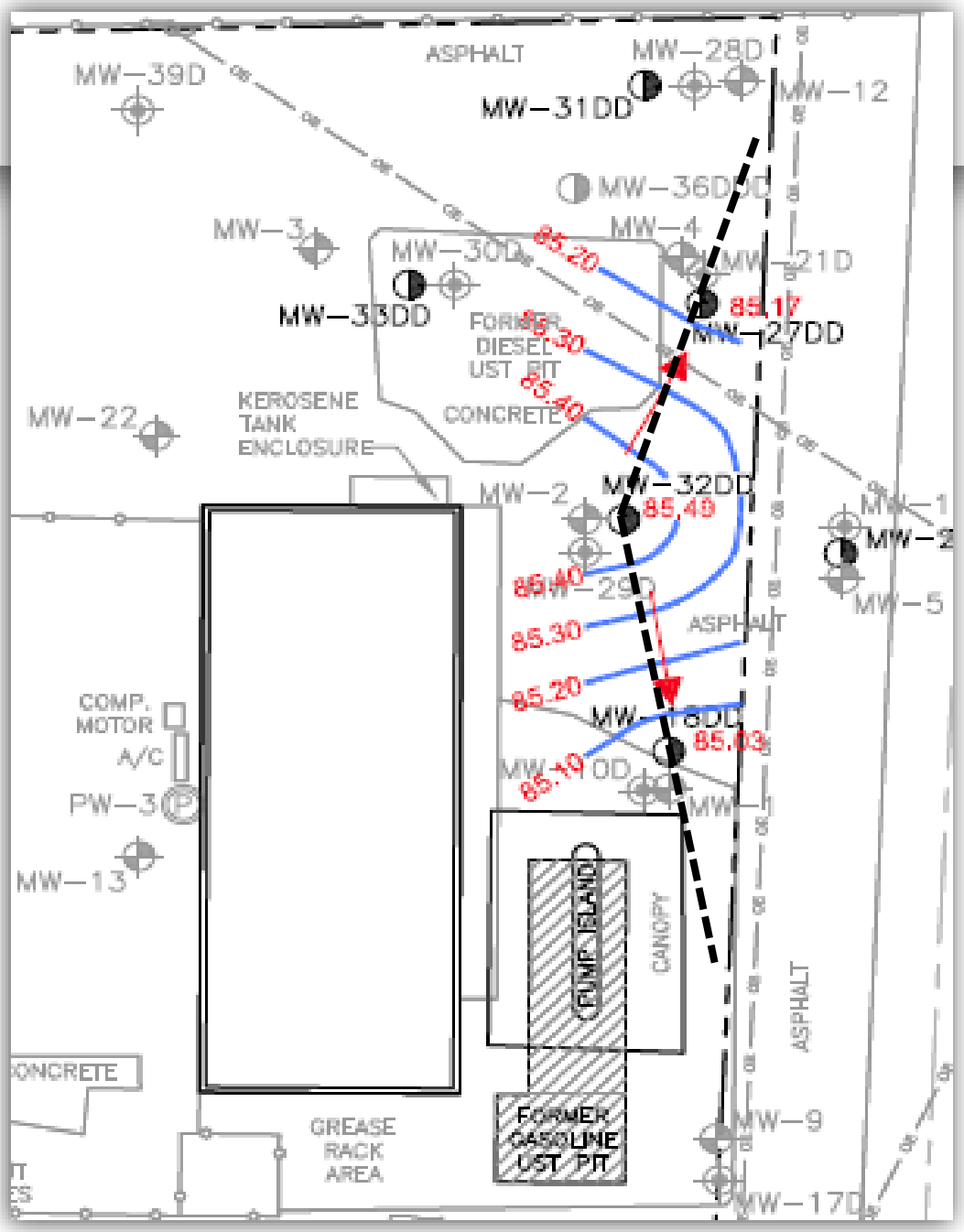
However

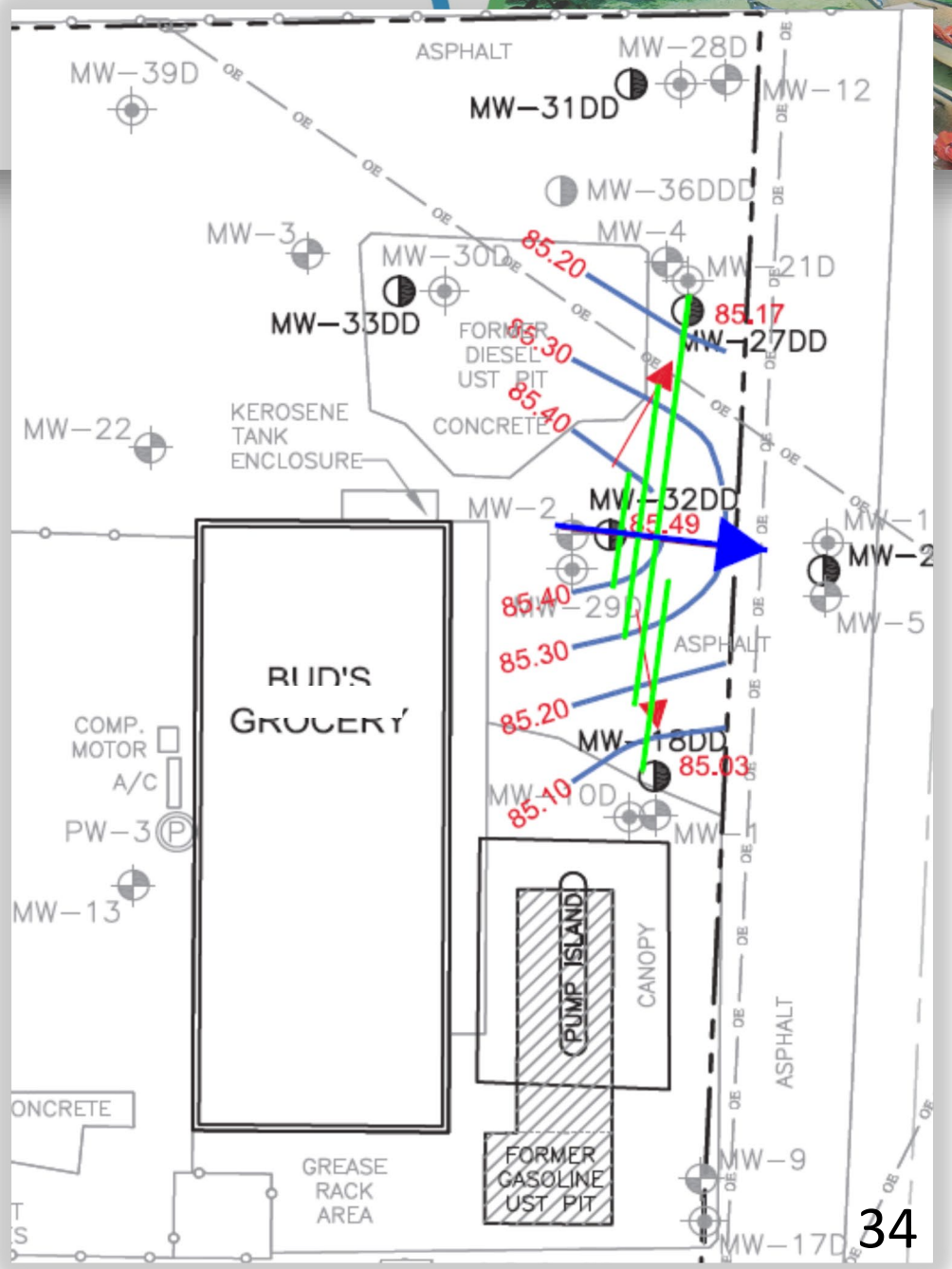




Poor GW Elevation Map

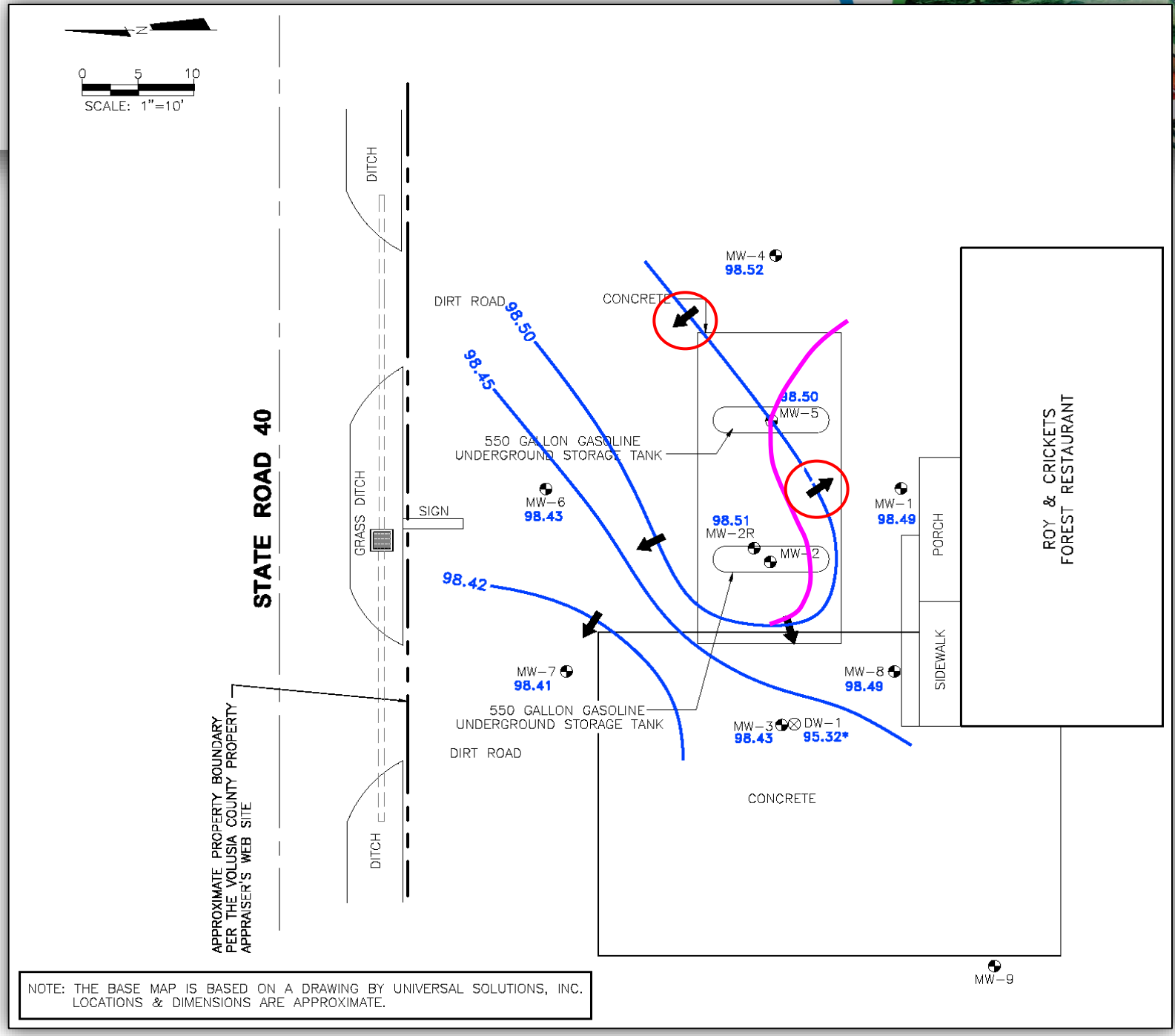
- Data points are nearly in a straight line.
- Three points define a plane, so contours may only be straight, equally spaced lines.





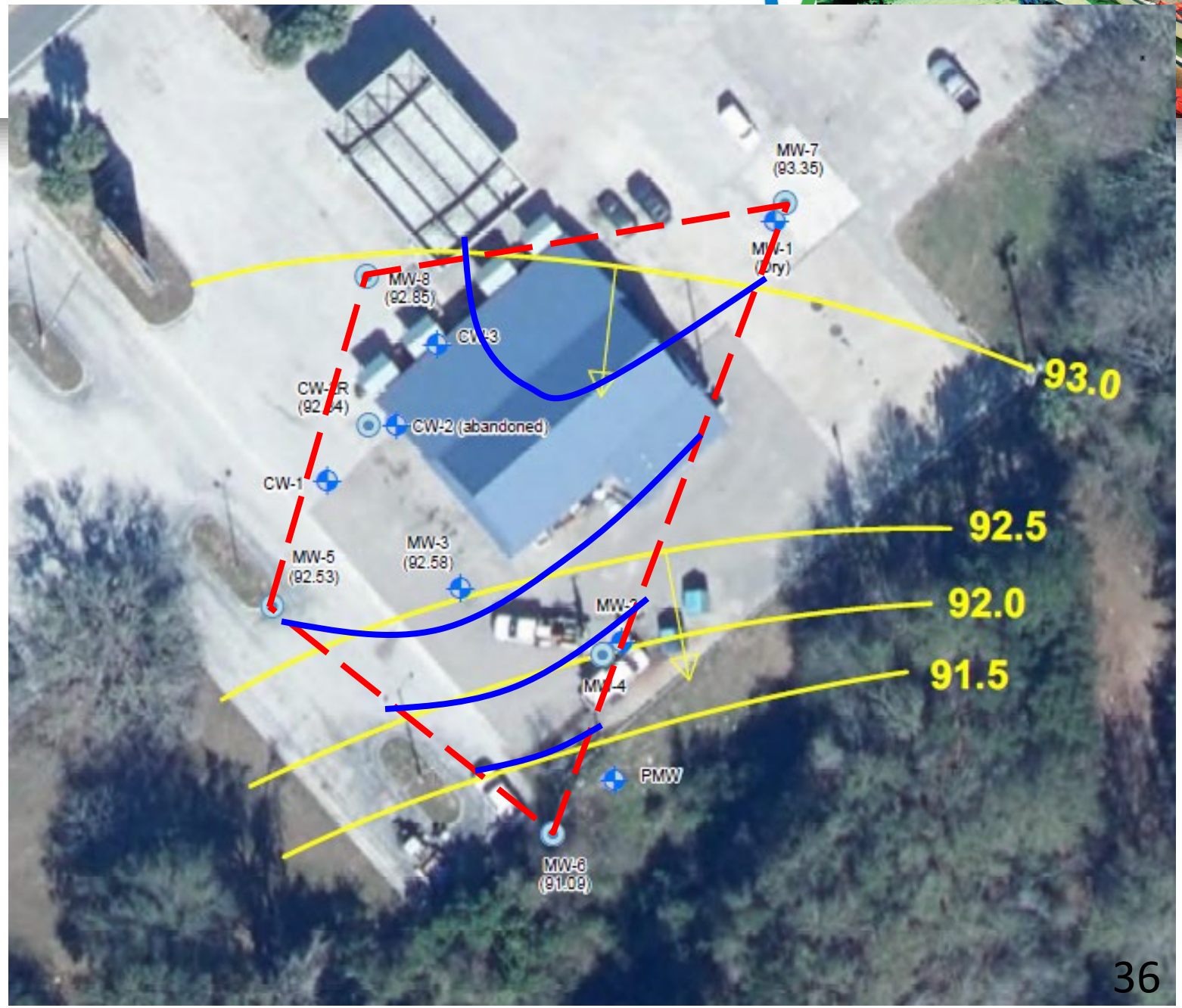
Poor GW Elevation Map

- Good base map.
- Constructed with ≥3 well-spaced data points.
- Arrows showing groundwater flow.
- Followed contouring rules…mostly!



Poor GW Elevation Map

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



Technical Report Review – Figures

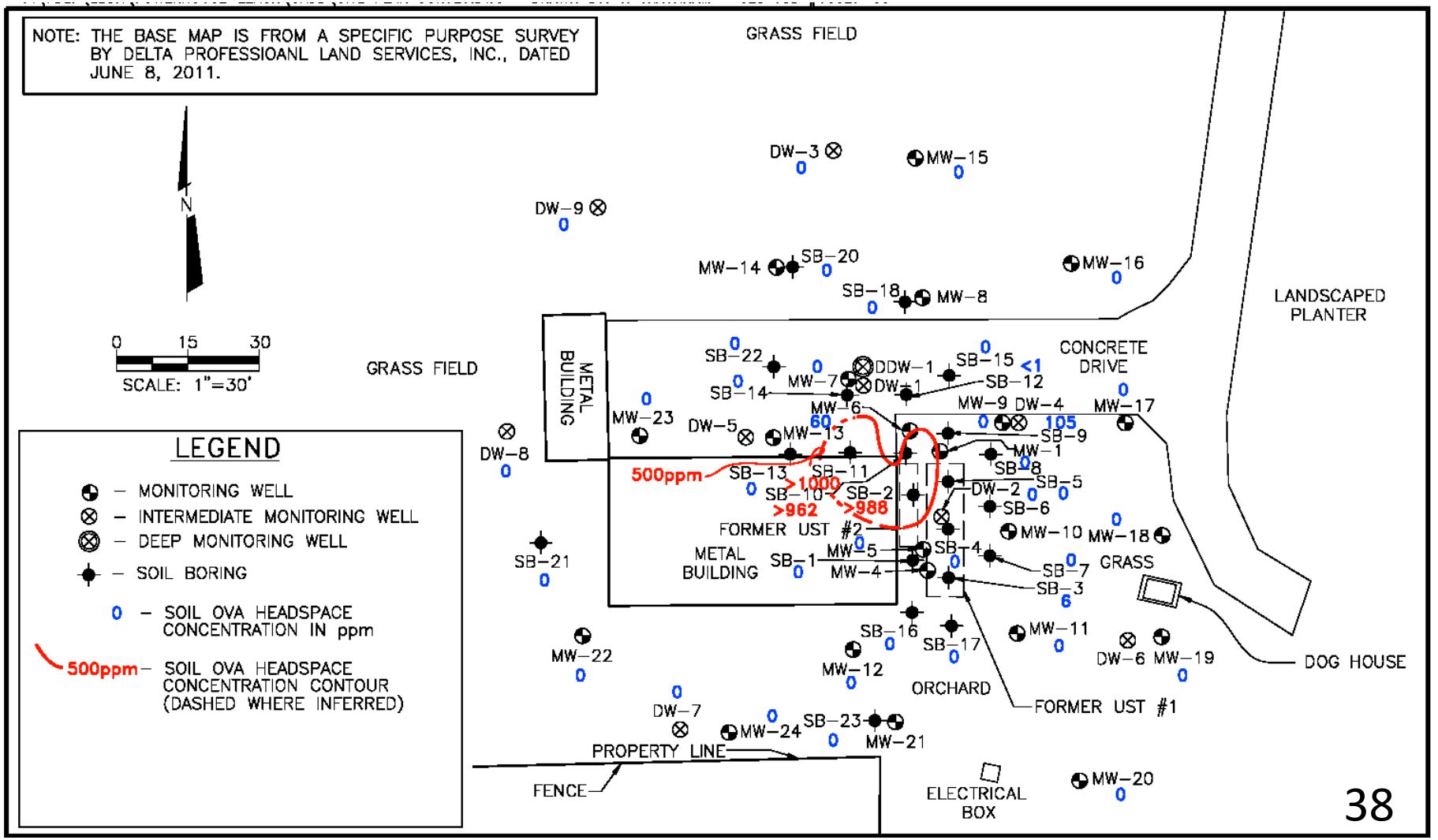
Soil OVA Maps

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

SITE ASSESSMENT

Soil OVA Map

- Single depth interval.
- Only data for that interval posted.



Technical Report Review – Figures

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 Groundwater Leachability (GWL), Residential Direct Exposure (RDE), and Commercial/Industrial Direct Exposure (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.

Technical Report Review – Figures

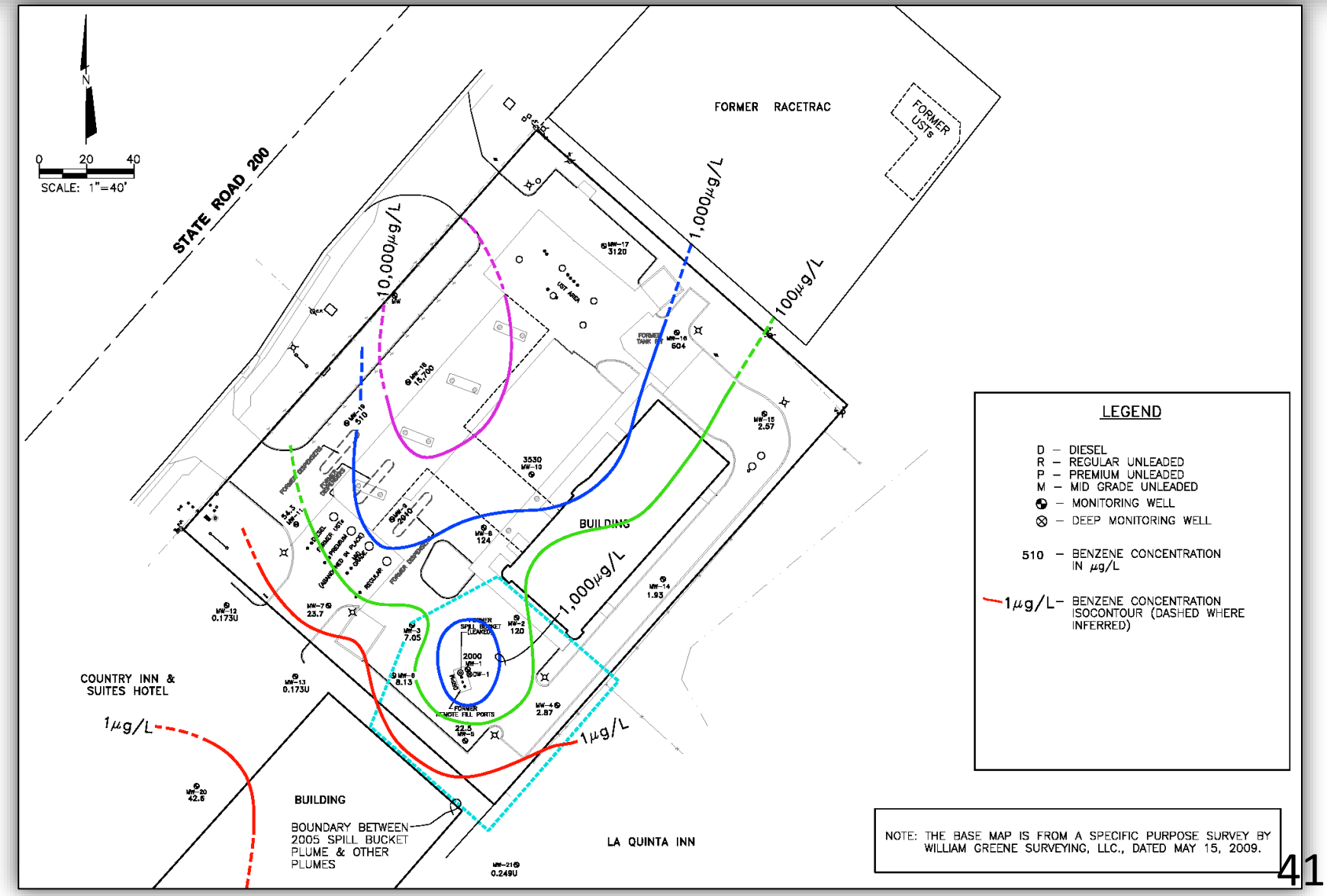
Groundwater Isoconcentration Contour Maps

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

SITE ASSESSMENT

Best Map

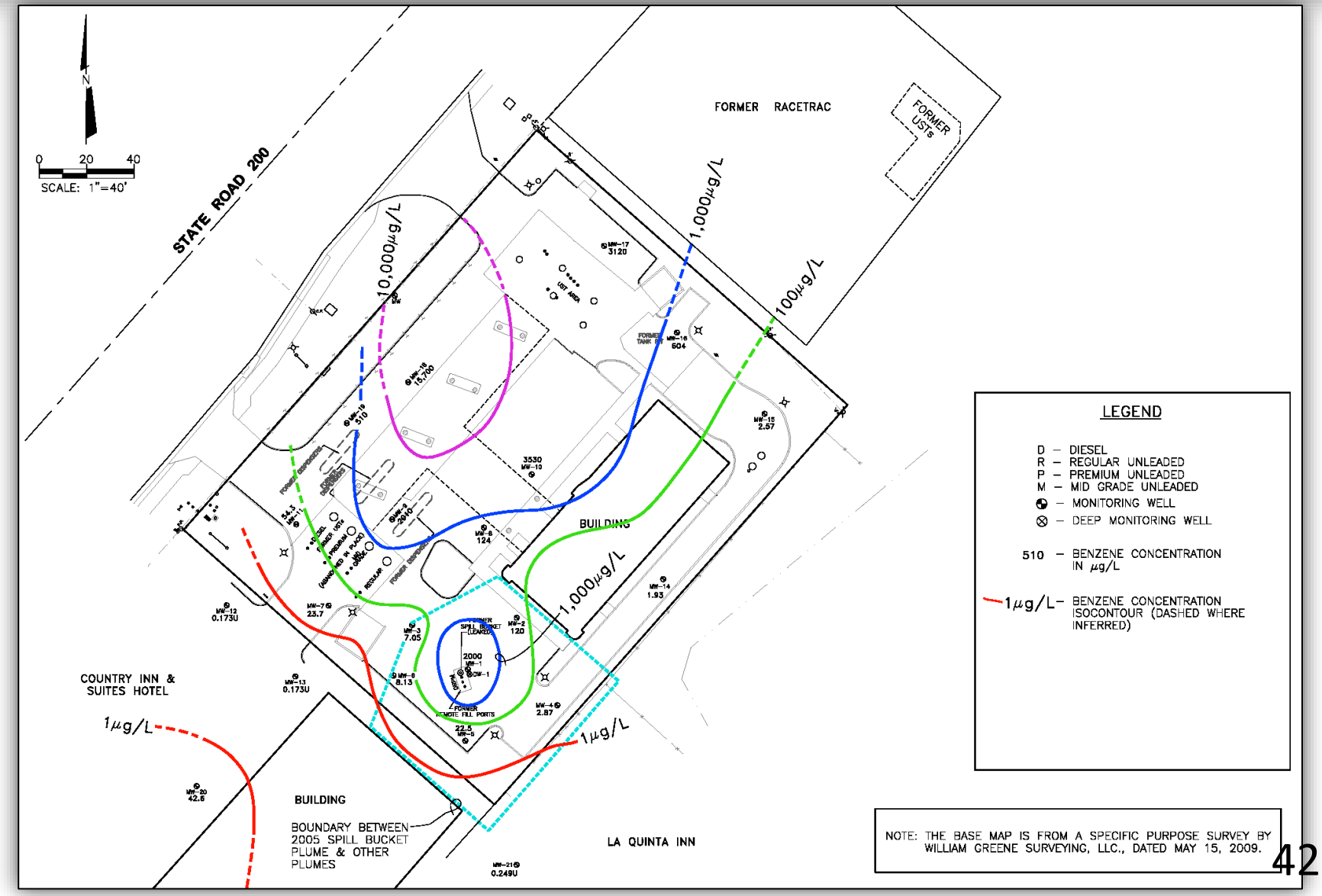
- Uncluttered and easy to read.
- Wells easy to identify.
- Map is for a single analyte.



SITE ASSESSMENT

Best Map

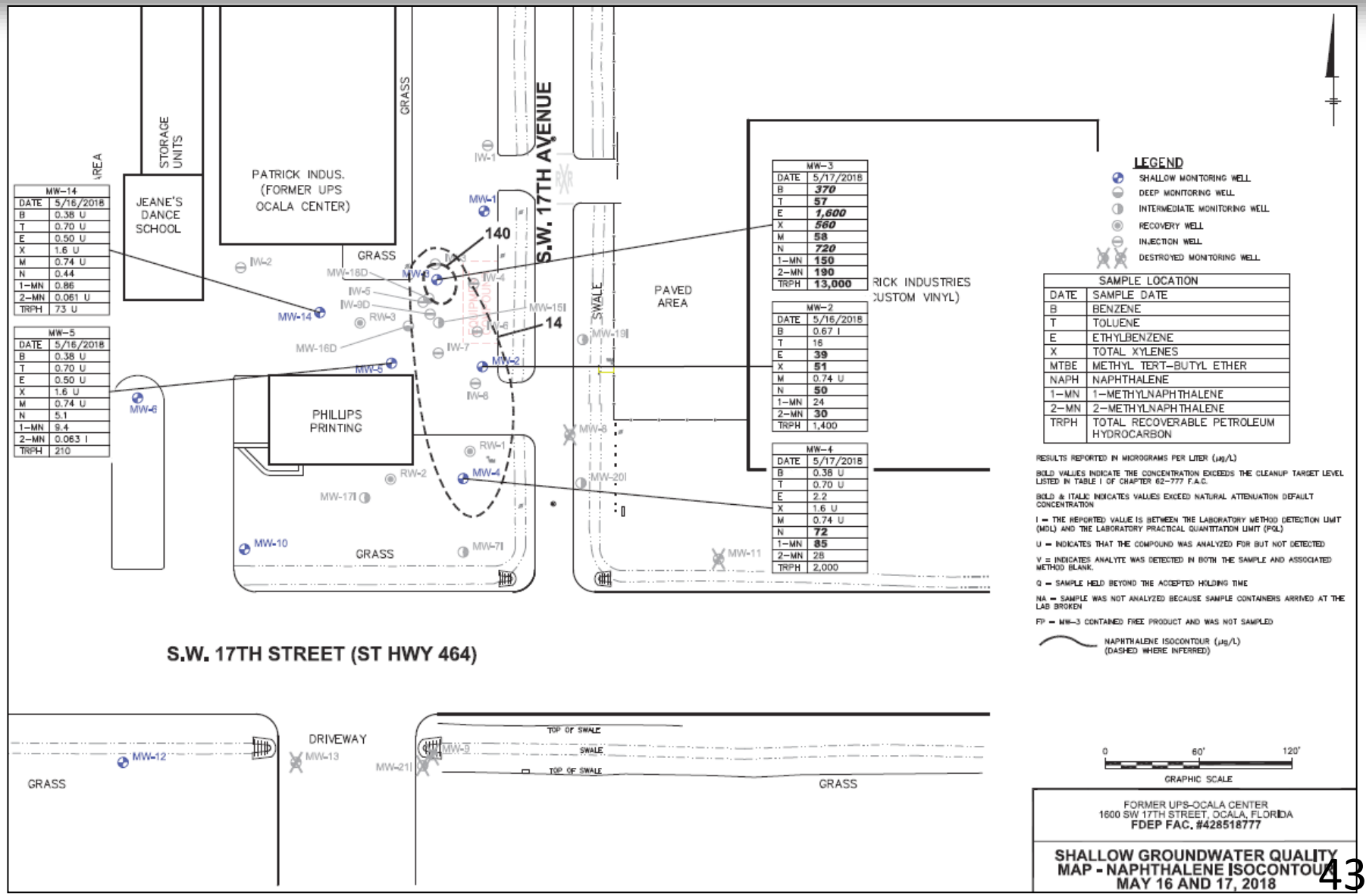
- Contours for GCTL and Natural Attenuation Default Concentration (NADC.)
- Displays only data specific to this analyte.



SITE ASSESSMENT

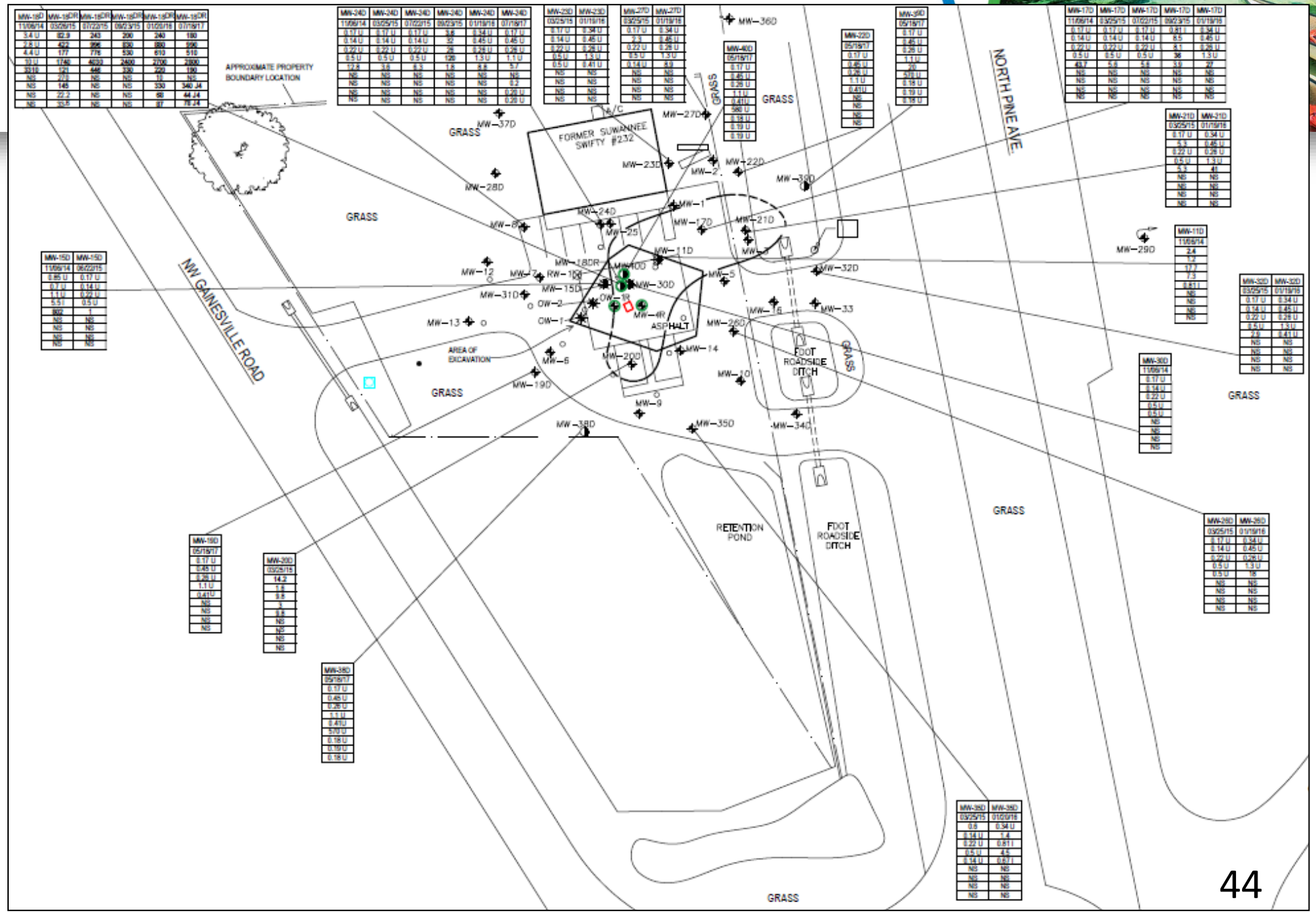
Good Map

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



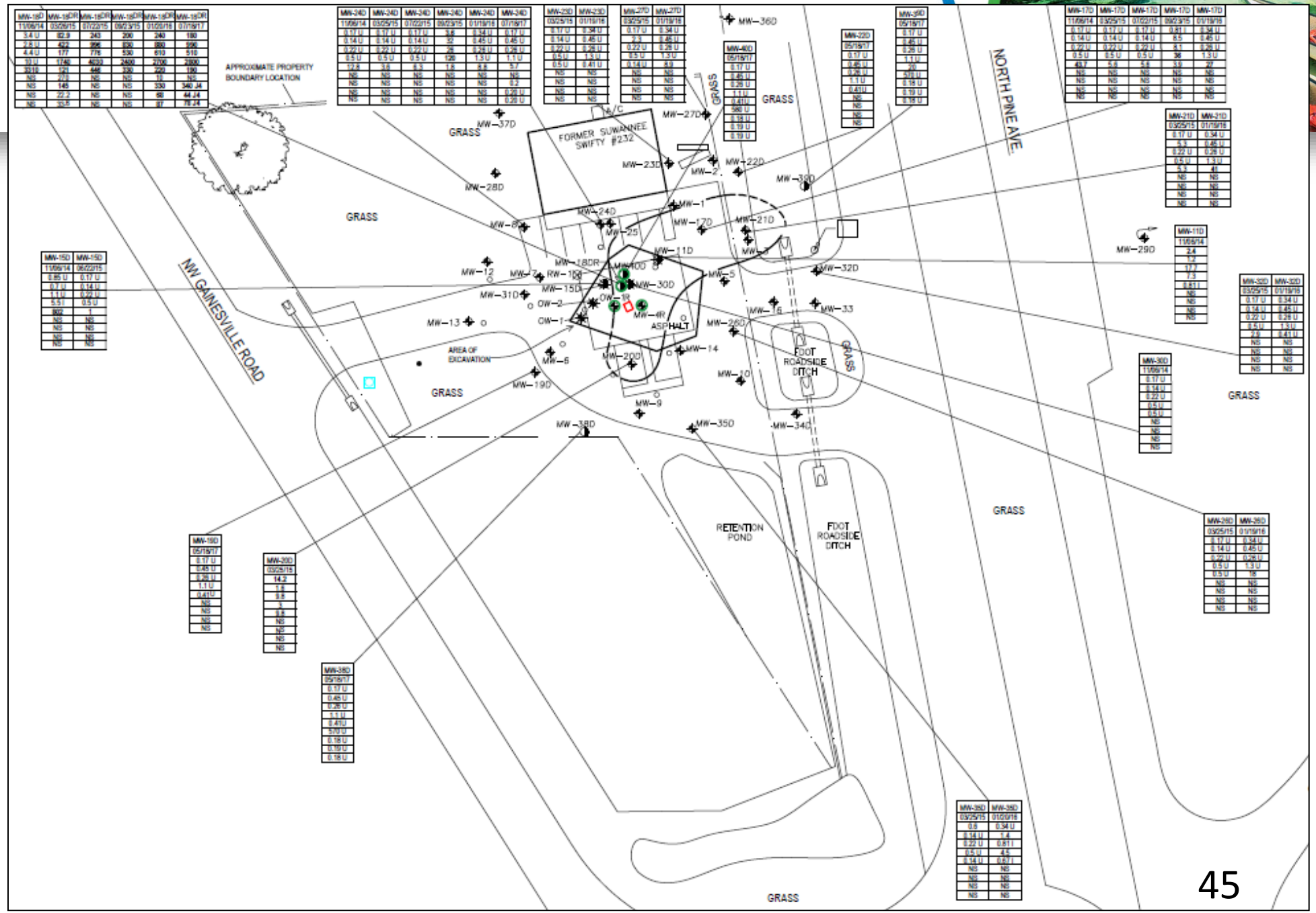
Poor Map

- Data from multiple depth intervals.
- Contours based on mixture of current and old data.



Poor Map

- 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

Technical Report Review

Summary

- Complete, accurate reports.
- Meet requirements of Chapter 62-780.600(8) and associated guidance documents.
- Adherence to established professional standards.
- Horizontal and vertical delineation in all media.

SITE ASSESSMENT

Technical Report Review

Summary

- Chronological presentation of data in tables allows quick analysis of concentration trends over time.
- Accurate site plans and concentration maps are critical for good assessment and remediation decisions.
- Consistency across the Petroleum Restoration Program.

Remember: We Set the Standard!

DISCOVER 200
1824 – 2024
ALACHUA COUNTY BICENTENNIAL

THANK YOU!!

Ted Goodman, P.G.
LP-01 Alachua

Contact Information:
352-264-6843
tgoodman@alachuacounty.us