Hurst-Rosche, Inc
Jame W. Roth, PE, PLS
President

Date: 4/2/2025

SBC # 166/054-01-2023 Welding and Auto Additions
Tennessee College of Applied Technology - Hohenwald
Hohenwald, Lewis County, Tennesse

State of Tennessee
Tennessee Board of Regents
for Tennessee College of Applied Technology - Hohenwald

RE: Bidding Document Clarifications

1) Pre-Bid Meeting Agenda attached to this document.
2) Pre-Bid Meeting Attendance Record attached to this document.
3) This project requires a commissioning agent which will be provided by the Owner.
4) For liquidated damages referenced in the draft contract see Project Manual Bid Form - 00 41 13.
5) On the Bid Form and the Draft Contract there are references to allowances and alternates; at this time there are no allowances or alternates in the project. Any additions of allowances or alternates will be issued via addendum.
6) On the Bid Form and the Draft Contract there are references to unit prices; at this time there are no allowances or alternates in the project. Any additions of unit prices will be issued via addendum.
7) The Invitation to Bid and the Pre-Bid Meeting Agenda incorrectly listed the Bid Opening date. The correct Bid Opening date is April 16, 2025.
8) A Geotechnical Engineering Report dated January 9, 2024 is attached to this document for reference only and is not a part of the Bidding Documents.
9) Asbestos information is located in the Project Manual section 02 82 33 including specifications and drawings.
10) Doors OH301-A,B,C,D,E, & F are coiling doors and are not fire-rated.
11) The facility does not have a Building Automation System. All HVAC controls are local.
12) Copper Type L is acceptable for above grade domestic water.
13) Copper Type K shall be used for argon welding gas distribution.
14) Survey dated 2/08/2024 is attached to this document.

David D. Pool, AIA, NCARB

Ralph W. Eide, AIA, NCARB,
LEED AP BD&C

200 N. Market St.
Marion, IL 62959
(t)618.998.0075

www.hurst-rosche.com

# A52 PRE-BID MEETING AGENDA

3/27/2025

1. **Welding and Auto Additions, Tennessee College of Applied Technology – Hohenwald** Hohenwald, Lewis County, Tennessee. SBC Project No. 166/054-01-2023

2. **Meeting purpose** – to give prospective bidders an opportunity to view the project site and existing conditions.

3. **Introduction of attendees as appropriate – All attendees are requested to fill out the record of attendance form.**

4. **Bid opening time and place:** Attention Rilla Froggatt, Tennessee Board of Regents, Office of Facilities Development, 3rd Floor, 1 Bridgestone Park, Nashville, TN 37214, 2:00 PM local time on 4/16/2025.

5. **Availability of Electronic Documents and Addenda** to-date including Instructions to Bidders, Bid Form, Construction Bid Envelope, and Drug-Free Workplace Affidavit.
   a. Documents are available through the following plan rooms:
      i. Nashville Contractors Association, Associated General Contractors: ncaplanroom.com
      ii. ConstructConnect: Cmdgroup.com
      iii. Memphis Builders Exchange: Memphisbx.com
      iv. Hurst-Rosche, Inc.: Hurst-Rosche.com/projectsbid.html

6. **Applicability of all documents in bid preparation.** Bidders are solely responsible for misinterpretations resulting from using an incomplete set of the documents.

7. **Owner's prohibition of the use of services of an illegal immigrant** and the related attestation on the Bid Form.

8. **Unless confirmed in writing by Addendum** no changes are binding, and no interpretations or clarifications are reliable.

9. **Sequence and timetable** for questions of interpretation or clarification and issuance of Addenda.

10. **Requests for interpretation or clarification** must be (1) in writing, (2) to a designated email address, and (3) prior to a set deadline.

11. **Proper bid submittal requirements** including the following:
    a. **Bid Form**
    b. **Construction Bid Envelope** including identification of Subcontractors and filling in the Subcontractor name or Bidder name if any work is required for a category
    c. **Bid Security**
    d. **Drug-Free Workplace Affidavit**

12. **Alternates and Unit Prices** if applicable in this bid

13. **Special administration –** Tennessee Certification for Diverse Business:
    1. Go-DBE is the State of Tennessee certification for diverse business. All state agencies are required to actively solicit bids and proposals from diverse owned businesses. These diversity businesses categories include: Women Owned, Minority Owned, Service-disabled Veterans, Persons with Disabilities, and Small Business. Our certification website is: www.tn.diversitysoftware.com

2. Our Certification is Free of cost and it also lasts 3 years.

3. Once you are certified with our office besides receiving the certification, your business is added to our Certified Directory of Businesses online. By being in our directory it helps your business be more visible with the state. Agencies can look that you are certified with our office, and you receive notifications for bids.

4. TBR's assigned Procurement Outreach and Diversity Specialist for the State of Tennessee Go DBE Program is Kimberly Fox
Email: Kimberly.fox@tn.gov Phone: 615-253-3835

14. **Scope of Work and Contract Time** – Time from Notice to Proceed to Substantial Completion – 360 days.
15. **Structured phases** and related scopes and schedule milestones, if applicable.
    a. Review of Owner's Priority Work Areas
16. **General Conditions Article 11** insurance requirements.
17. **Builders' Risk insurance** required by General Conditions Article 11.
18. **Major demolition projects insurance** required by Supplementary Conditions.
19. **General Conditions Article 7** requirements regarding changes in the Work including limits on costs for Direct Payroll Expense, overhead, and profit.
20. **Roof Bond** in the amount as specified in the Project Manual and
**Total Roofing System Warranty** requirements. – 30 year total roof system requirement.
21. **Stormwater Pollution Prevention Plan**, (SWPPP) if applicable.
22. **Site access, construction staging areas**, construction work force parking arrangements, on-going user operations, car/bus/delivery traffic that must be accommodated, and expectations for construction personnel courtesy and decorum toward site occupants and the public.
    a. Coordination with the Owner is required as students, faculty, and staff will be using the facility simultaneously with the Contractor.
23. **Conditional or qualified bids** are unacceptable.
24. **Requirement to visit the site** and become familiar with the local conditions under which the work is to be performed and to correlate all observations with the requirements of the Bidding Document.
25. **Opportunities to tour the site**
26. **Substitution request** procedures in the Instructions to Bidders
27. **Reading of previously received questions** and responses as appropriate
28. **Questions -** requiring name, company affiliation, Project Manual Specification Section Number and/or drawing sheet and detail number to be given with the question.
    a. Submit questions in writing to:
        i. Ralph Eide, Hurst-Rosche, Inc., reide@hurst-rosche.com

**END**

HURST-ROSCHE, INC.

# ATTENDANCE RECORD

Project No.: SBC 166/054-01-2023, HR 365-1183
Project: Welding and Auto Additions, Tennessee College of Applied Technology - Hohenwald, Hohenwald, TN

Meeting Description: Pre-Bid Meeting
Date: 3/27/2025
Time: 1:00 PM CDST

**Attendant**

| | Name | Representing | Phone | E-mail |
|---|---|---|---|---|
| 1. | Ralph Eide | Hurst-Rosche | 615.454.6615 | reide@hurst-rosche.com |
| 2. | Eric Kantorik | W.E. O'Neil Const | 615-913-0691 | ekantorik@weoneil.com |
| 3. | Kendall Bell | Steelhead | 931-494-7243 | Kbell@steelheadbg.com |
| 4. | Brian Ambrose | Schaffer Plumb | 615-806-3903 | Brian@schafferplumbing.com |
| 5. | Gary S. New | Crain Construction | 615-878-6779 | gnew@crainconstructioninc.com |
| 6. | Bobby Teddlie | Pro HVAC, Inc. | 931-229-7099 | Bobby@pro-hvacinc.com |
| 7. | Austin Gee | Pro-HVAC, Inc. | 931-229-7099 | Austin@pro-hvacinc.com |
| 8. | Ariel Walton | W.E. O'Neil | 479-973-9748 | ~~Ariel.W~~ Arielwal2030@gmail.com |
| 9. | Alex Robinson | Nabholz | 615-981-0[illegible] | Alex.Robinson@Nabholz.com |
| 10. | Chris Ream | Nabholz | 629-273-0097 | Chris.ream@nabholz.com |
| 11. | Joe Dudley | Tibbetts | 615 920 9230 | joseph.dudley@tibbetts-electric.com |
| 12. | Eric McKinney | Century | 615 405-0946 | EMCKINNEY@CENTURYCG.COM |
| 13. | Kelli Kea-Carroll | TCAT Hohenwald | 931-796-5351<br>931-306-9246 | kelli.keacarroll@tcathohenwald.edu |
| 14. | Becca Smith | Bartram electric | 702-588-8614 | Becca@Bartramelectric.com |
| 15. | Ronald Mathis | Sunbelt Rentals | 828-734-8736 | Ronald.Mathis@sunbeltrentals.com |
| 16. | Ricky Murr | United Mech | 615-446-9369 | RMURR@UNITEDME.COM |
| 17. | Randy Young | TCAT Hohenwald | 731-549-5717 | randy.young@tcathohenwald.edu |
| 18. | Michael Hamilton | UM&E | 615-545-1882 | mhamilton@unitedme.us |
| 19. | Rob Deliello | SM Lawrence | 615-248-2413 | rdeliello@smlawrence.com |
| 20. | | | | |

HURST-ROSCHE, INC.

# ATTENDANCE RECORD

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| 20. | | | | |

# TCAT Hohenwald Campus Addition

## Geotechnical Engineering Report

January 9, 2024 | Terracon Project No. E5235105

**Prepared for:**

Hurst-Rosche, Inc.
1101 Kermit Drive, Suite 620
Nashville, TN 37217

289 Production Avenue
Madison, AL 35758
P (256) 584-5461
**Terracon.com**

January 9, 2024

Hurst-Rosche, Inc.
1101 Kermit Drive, Suite 620
Nashville, TN 37217

Attn: Alex Grenhoff, Architectural Designer
P: (618) 998-0075
E: Agrenhoff@hurst-rosche.com

Re: Geotechnical Engineering Report
TCAT Hohenwald Campus Addition
813 West Main Street
Hohenwald, Lewis County, TN
Terracon Project No. E5235105

Dear Mr. Grenhoff:

We have completed the scope of Geotechnical Engineering services for the above referenced project in general accordance with Terracon Proposal No. PE5235105 dated November 27, 2023. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs, and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

**Terracon**

Clifton Braxton, E.I.
Staff Engineer

Frank Whitman, P.E.
Senior Engineer

# Table of Contents



## Figures



## Attachments

## Supporting Information

**Note:** This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the Terracon logo will bring you back to this page. For more interactive features, please view your project online at **client.terracon.com**. Refer to each individual Attachment for a listing of contents.

# Introduction

This report presents the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed TCAT Hohenwald campus additions to be located on 813 West Main Street in Hohenwald, Lewis County, TN. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Seismic site classification per IBC
- Site preparation and earthwork
- Foundation design and construction
- Floor slab design and construction
- Pavement Design and Construction

The geotechnical engineering Scope of Services for this project included the advancement of test borings, laboratory testing, engineering analysis, and preparation of this report.

Drawings showing the site and boring locations are shown on the **Site Location** and **Exploration Plan**, respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the boring logs and as separate graphs in the **Exploration Results** section.

# Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

| Item | Description |
|---|---|
| **Information Provided** | A site plan was provided to us by Alex Grenhoff with Hurst-Rosche, Inc. |
| **Project Description** | The project includes the following additions and expansion:<br>■ Proposed welding addition<br>■ Proposed automotive addition<br>■ Proposed multipurpose space<br>■ Proposed parking expansion and relocated driveway |

| Item | Description |
|---|---|
| **Building Construction** | ▪ Concrete slab-on-grade<br>▪ Load-bearing masonry and/or Pre-engineered Metal Building (PEMB)<br>▪ Shallow, soil-supported spread footings |
| **Finished Floor Elevation (FFE)** | Assumed to be at, or near present grades |
| **Maximum Loads (Assumed)** | In the absence of information provided by the design team, we used the following loads in estimating settlement based on our experience with similar projects.<br>▪ Columns: 150 kips<br>▪ Walls: 5 kips per linear foot (klf)<br>▪ Slabs: not exceeding 500 pounds per square foot (psf) |
| **Grading/Slopes** | No new slopes taller than 10 feet or steeper than 3:1 (H:V) |
| **Below-Grade Structures** | None |
| **Building Code** | 2018 IBC |

Terracon should be notified if any of the above information is inconsistent with the planned construction, especially the grading limits, as modifications to our recommendations may be necessary.

# Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic maps.

| Item | Description |
|---|---|
| **Parcel Information** | The project is located on the Tennessee College of Applied Technology property at 813 West Main Street in Hohenwald, Lewis County, TN.<br>Latitude/Longitude (approximate): 35.5515, -87.5738<br>See **Site Location** |
| **Existing Improvements** | Existing fill for an active campus in the previously developed area with a 3 to 4 feet cinder-blocked retaining wall near the maintenance shop on the north end of campus. |
| **Current Ground Cover** | Asphalt and gravel paving, grassed areas, several single-story structures. |

| Item | Description |
|---|---|
| **Existing Topography** | Per Google Earth, the project area slopes south and east with elevations ranging from 947 to 955 feet (MSL). |
| **USGS Bedrock Geology** | The site is underlain by the Tuscaloosa or St. Louis and Warsaw Limestone Formations. |

# Geotechnical Characterization

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** and the GeoModel can be found in the **Figures** attachment of this report.

| Model Layer | Layer Name | General Description |
|---|---|---|
| **1** | **Fill – Gravel and Lean Clays** | Typically dark tan, red, and/or gray in color. N values from 6 to 10 blow per foot, with variable sand, gravel, and/or clay content. |
| **2** | **Silty Clays** | Typically brown and/or tan in color. This material was soft in consistency. |
| **3** | **Lean Clays** | Typically red, tan and/or gray in color. This material had a medium-stiff or better consistency and varying amounts of sand and gravel. |
| **4** | **Fat Clays (Moderate Plasticity)** | Typically red, tan and/or gray in color. This material had a stiff or better consistency and varying amounts of sand and gravel. |
| **5** | **Fat Clays (High Plasticity)** | Typically red, tan and/or gray in color. This material had a very stiff or better consistency and varying amounts of sand and gravel. |
| **6** | **Weathered Limestone** | Limestone, weathered in place, was penetrated with difficulty with soil auger. |

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Groundwater seepage was not observed within any of the borings at the time of our field exploration. Groundwater conditions may be different at the time of construction. Mapping by the Natural Resources Conservation Service (NRCS) indicates a seasonal groundwater table of approximately 6½ feet below present grades.

Groundwater conditions may change because of seasonal variations in rainfall, runoff, and other conditions not apparent at the time of drilling. Long-term groundwater monitoring was outside the scope of services for this project.

# Geologic Hazards

The Tuscaloosa and St. Louis and Warsaw Limestone Formations underlying the subject site are carbonate-based rocks and are therefore soluble in slightly acidic groundwater. On a geologic time scale, weathering is typified by a chemical solutioning process that progresses along joints, fractures and bedding planes in the bedrock.

This process often results in a highly irregular rock profile that contains deep weathered slots filled with soft soils. Voids or caves may also be present in the bedrock. Surface depressions or sinkholes are formed when the soil overburden is lost into these subsurface voids.

It should be noted that this study does not preclude the possibility of future sinkhole occurrence within the area. Even an extensive drilling and test pit exploration program could not rule out the possibility of future sinkhole formation at the site. The owner must accept that there is some degree of risk in developing over carbonate rock

# Seismic Site Class

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil properties observed at the site and as described on the exploration logs and results, our professional opinion is for that a **Seismic Site Classification of C** be considered for the project. Subsurface explorations at this site were extended to a maximum depth of 20 feet.

# Corrosivity

Mapping by the NRCS includes qualitative severity of corrosion to concrete and steel. Based on this source, the near-surface materials are rated “moderate to high” for corrosion to concrete and steel.

# Geotechnical Overview

The subsurface materials generally consisted of Fill (Gravels and Lean Clays), Silty Clays, native Lean Clays, and moderate to high plasticity Fat Clays, extending to auger refusal depths on weathered limestone.

Generally, the materials representative of GeoModel Layers 3 and 4 are suitable for direct support of pavements, slabs, and foundations with some moisture conditioning and compactive effort as necessary. The existing Fill material, representative of GeoModel Layer 1, generally appears adequate at the boring locations, pending review at the time of construction by the Geotechnical Engineer.

During earthwork and construction, if the existing fill material is determined to be unsuitable for support of foundations or slabs, this material should be removed to a firm existing subgrade or GeoModel layers 3 or 4. After the initial undercut, the exposed subgrade for the should be evaluated by a Geotechnical Engineer, or qualified personnel. If it is determined to be adequate, engineered fill can be placed up to final soil subgrade.

The Silty Clays and high plasticity Fat Clays, representative of GeoModel layer 2 and 5, are not adequate for immediate support of foundations, pavements, or floor slabs. The soft Silty Clay should be completely removed until firm soil is encountered. If high plasticity Fat Clays are present near final soil subgrade or foundation bearing elevation, the high plasticity Fat Clays should be removed to 2 feet below final soil subgrade and can be replaced with approved engineered fill during earthwork and construction.

Support of foundations and slabs on or above existing fill materials is discussed in this report. However, even with the recommended construction procedures, there is inherent risk for the owner that compressible fill or unsuitable material, within or buried by the fill, will not be discovered. This risk of unforeseen conditions cannot be eliminated without completely removing the existing fill, but can be reduced by following the recommendations contained in this report. To take advantage of the cost benefit of not removing the entire amount of undocumented fill, the owner must be willing to accept the risk associated with building over the undocumented fills following the recommended reworking of the material.

All new engineered fill, imported or on-site, should meet the criteria listed in the **Earthwork** section. Additionally, new approved engineered fill should be expected for on-site grading activities if the existing fill material is determined to be unsuitable at the time of earthwork.

Based on the conditions encountered and estimated load-settlement relationships, the proposed structures can be supported on conventional continuous or spread footings.

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the **Exploration Results**), engineering analyses, and our current understanding of the proposed project. The **General Comments** section provides an understanding of the report limitations.

# Earthwork

Earthwork is anticipated to include demolition, excavation, and engineered fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations, floor slabs, and pavements.

## Site Preparation

Following the stripping of the topsoil and removal of asphalt within pavement and building areas, the subgrade should be compacted and subsequently proofrolled with an adequately loaded vehicle such as a fully-loaded tandem-axle dump truck. The proofrolling should be performed under the observation of the Geotechnical Engineer or representative. Areas excessively deflecting under the proofroll should be delineated and subsequently addressed by the Geotechnical Engineer. Such unstable areas should either be removed and replaced. Excessively wet or dry material should either be removed or moisture conditioned and recompacted.

Once a stable subgrade is achieved, compacted structural fill soils should then be placed to the proposed design grade and the moisture content and compaction of subgrade soils should be maintained until foundation or pavement construction.

Due to the clayey nature of the onsite soils, the workability of the soils will be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying.

## Excavation

We anticipate that excavations for the proposed construction can be accomplished with conventional earthmoving equipment. The bottom of excavations should be thoroughly cleaned of loose soils and disturbed materials prior to backfill placement and/or construction.

## Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below, or within 10 feet of structures, pavements or constructed slopes. General fill is material used to achieve grade outside of these areas.

**Reuse of On-Site Soil:** The excavated soils, representative of GeoModel Layers 3 and 4, appears suitable for use and general or structural fill. The on-site clayey soils will be sensitive to moisture conditions (particularly during seasonally wet periods) and may require moisture conditioning (i.e., drying) for reuse when above optimum moisture content.

Material property requirements for on-site soil for use as general fill and structural fill are noted in the table below:

| Property | General Fill | Structural Fill |
|---|---|---|
| Composition | Free of deleterious material | Free of deleterious material |
| Maximum particle size | 6 inches (or 2/3 of the lift thickness) | 4 inches |
| Plasticity | Not limited | Liquid Limit less than 50<br>Plasticity index less than 30 |
| GeoModel Layer Expected to be Suitable[1] | 1[1], 2, 3, 4, 5 | 3, 4 |

1. While this material is suitable for general fill, usage as structural fill should be determined in the field at time of construction.

**Imported Fill Materials:** Imported fill materials should meet the following material property requirements. Regardless of its source, compacted fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade.

| Soil Type [1] | USCS Classification | Acceptable Parameters (for Structural Fill) |
|---|---|---|
| Low to Moderate Plasticity Cohesive | CL, and some select CH | Liquid Limit less than 50 Plasticity index less than 30 |

| Soil Type [1] | USCS Classification | Acceptable Parameters (for Structural Fill) |
|---|---|---|
| Granular | GW, GP, GM, GC, SW, SP, SM, SC | Less than 50% passing No. 200 sieve |

1. Structural and general fill should consist of approved materials free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site. Additional geotechnical consultation should be provided prior to use of uniformly graded gravel on the site.

## Fill Placement and Compaction Requirements

Structural and general fill should meet the following compaction requirements.

| Item | Structural Fill | General Fill |
|---|---|---|
| **Maximum Lift Thickness** | 8 inches or less in loose thickness when heavy, self-propelled compaction equipment is used<br>4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used | Same as structural fill |
| **Minimum Compaction Requirements** [1] | 98% of max. | 95% of max. |
| **Water Content Range** [1] | -2% to +2% of optimum | As required to achieve min. compaction requirements |

1. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D 698).

## Utility Trench Backfill

Any soft or unsuitable materials encountered at the bottom of utility trench excavations should be removed and replaced with structural fill or bedding material in accordance with public works specifications for the utility be supported. This recommendation is particularly applicable to utility work requiring grade control and/or in areas where subsequent grade raising could cause settlement in the subgrade supporting the utility.

On-site materials are considered suitable for backfill of utility and pipe trenches from 1 foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of engineered fill discussed in this report.

For low permeability subgrades, utility trenches are a common source of water infiltration and migration. Utility trenches penetrating beneath the building should be effectively sealed to restrict water intrusion and flow through the trenches, which could migrate below the building. The trench should provide an effective trench plug that extends at least 5 feet from the face of the building exterior. The plug material should consist of cementitious flowable fill or low permeability clay. The trench plug material should be placed to surround the utility line. If used, the clay trench plug material should be placed and compacted to comply with the water content and compaction recommendations for structural fill stated previously in this report.

## Grading and Drainage

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least 10 feet from the building.

Exposed ground should be sloped and maintained at a minimum 5% away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structure’s maintenance program. Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

## Earthwork Construction Considerations

Shallow excavations for the proposed structure are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of grade-supported improvements such as floor slabs and pavements. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety or the contractor's activities; such responsibility shall neither be implied nor inferred.

Excavations or other activities resulting in ground disturbance have the potential to affect adjoining structures. Our scope of services does not include review of available final grading information or consider potential temporary grading performed by the contractor for potential effects such as ground movement beyond the project limits. A preconstruction/ precondition survey should be conducted to document nearby property/infrastructure prior to any site development activity. Excavation or ground disturbance activities adjacent to or near property lines should be monitored or instrumented for potential ground movements that could negatively affect adjoining property and/or structures.

## Construction Observation and Testing

The earthwork efforts should be observed by the Geotechnical Engineer (or others under their direction). Observation should include documentation of adequate removal of surficial materials (vegetation, topsoil, and pavements), evaluation and remediation of existing fill materials, as well as proofrolling and mitigation of unsuitable areas delineated by the proofroll.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, as recommended by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. Where not specified by local ordnance, one density and water content test should be performed for every 100 linear feet of compacted utility trench backfill and a minimum of one test performed for every 12 vertical inches of compacted backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated by the Geotechnical Engineer. If unanticipated conditions are observed, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

# Shallow Foundations

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

## Design Parameters – Compressive Loads

| Item | Description |
|---|---|
| **Maximum Net Allowable Bearing Pressure** [1, 2] | 2,500 psf |
| **Required Bearing Stratum** [3] | structural fill, or stiff or better native soils |
| **Minimum Foundation Dimensions** | Spread footings: 24 inches<br>Wall Footings: 18 inches |
| **Ultimate Passive Resistance**[4] **(equivalent fluid pressures)** | 320 pcf (cohesive backfill)<br>420 pcf (granular backfill) |
| **Sliding Resistance** [5] | 0.30 (On-site soils)<br>0.35 (granular material) |
| **Minimum Embedment below Finished Grade** [6] | Exterior footings: 18 inches<br>Interior footings: 12 inches |
| **Estimated Total Settlement from Structural Loads** [2] | Less than about 1 inch |
| **Estimated Differential Settlement** [2, 7] | About 3/4 of total settlement |

| Item | Description |
|---|---|

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2. Values provided are for maximum loads noted in **Project Description**. Additional geotechnical consultation will be necessary if higher loads are anticipated.
3. Unsuitable or soft soils should be overexcavated and replaced per the recommendations presented in **Earthwork**.
4. Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted structural fill be placed against the vertical footing face. Assumes no hydrostatic pressure.
5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Frictional resistance for granular materials is dependent on the bearing pressure which may vary due to load combinations. For fine-grained materials, lateral resistance using cohesion should not exceed ½ the dead load.
6. Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
7. Differential settlements are noted for equivalent-loaded foundations and bearing elevation as measured over a span of 50 feet.

## Construction Adjacent to Existing Building

Differential settlement between the additions and the existing building is expected to approach the magnitude of the total settlement of the addition. Expansion joints should be provided between the existing building and the proposed addition to accommodate differential movements between the two structures. Underground piping between the two structures should be designed with flexible couplings and utility knockouts in foundation walls should be oversized so minor deflections in alignment do not result in breakage or distress. Care should be taken during excavation adjacent to existing foundations to avoid disturbing existing foundation bearing soils.

New footings should bear at or near the bearing elevation of immediately adjacent existing foundations. Depending upon their locations and current loads on the existing footings, footings for the new addition could cause settlement of adjacent walls. To reduce this concern and risk, clear distances at least equal to the new footing widths should be maintained between the addition’s footings and footings supporting the existing building.

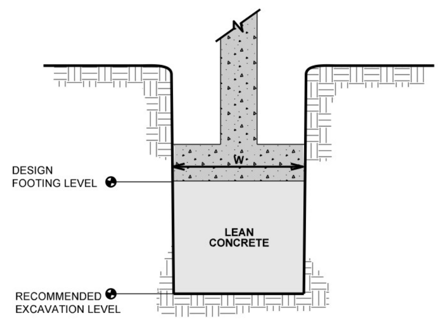
## Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the observation of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

Based on our borings, we expect some building foundation excavations could engage the bedrock surface and soil at the foundation bearing elevation, which would result in footings bearing on dissimilar materials (bedrock vs. soil) across a short distance. This situation is expected to create potential for differential settlement equal to total settlement and possibly minor cracking in masonry walls or brick veneer due to the uneven support and dissimilar subgrades between two extremes. To help mitigate this potential, we recommend that where bedrock is exposed in isolated areas, overexcavate the bedrock 1 foot below planned foundation bearing elevation and backfill with a compacted cohesive soil.

Sensitive soils exposed at the surface of footing excavations may require surficial compaction with hand-held dynamic compaction equipment prior to placing structural fill, steel, and/or concrete. Should surficial compaction not be adequate, construction of a working surface consisting of either crushed stone or a lean concrete mud mat may be required prior to the placement of reinforcing steel and construction of foundations.

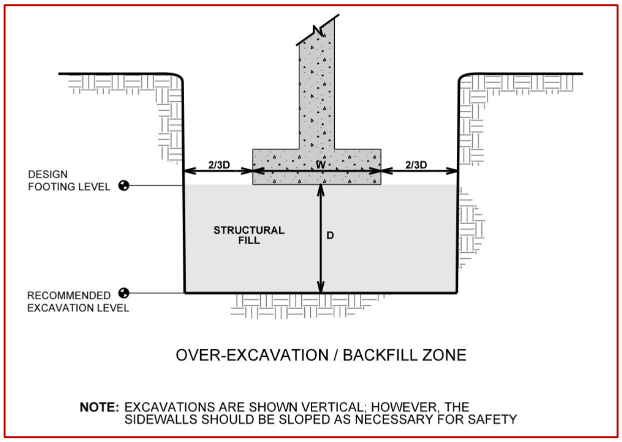
If unsuitable bearing soils are observed at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. The lean concrete replacement zone is illustrated on the sketch below.




LEAN CONCRETE BACKFILL

**NOTE:** EXCAVATIONS ARE SHOWN VERTICAL; HOWEVER, THE SIDEWALLS SHOULD BE SLOPED AS NECESSARY FOR SAFETY

Overexcavation for structural fill placement below footings should be conducted as shown below. The overexcavation should be backfilled up to the footing base elevation, with describe soil type placed, as recommended in the **Earthwork** section.




# Floor Slabs

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

## Floor Slab Design Parameters

| Item | Description |
|---|---|
| **Floor Slab Support**[1] | Subgrade compacted to recommendations in **Earthwork**<br>Minimum 4 inches of free-draining (less than 5% passing the U.S. No. 200 sieve) [3]<br>Approved existing fill, medium stiff or better native soil, or new engineered fill underlying the free-draining crushed aggregate |
| **Estimated Modulus of Subgrade Reaction** [2] | 100 pounds per square inch per inch (psi/in) for point loads |

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.
3. Free-draining granular material should have less than 5% fines (material passing the No. 200 sieve). Other design considerations such as cold

| Item | Description |
|---|---|
| | temperatures and condensation development could warrant more extensive design provisions. |

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, when the project includes humidity-controlled areas, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut contraction joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations, refer to the ACI Design Manual. Joints or cracks should be sealed with a waterproof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Settlement of floor slabs supported on existing fill materials cannot be accurately predicted but could be larger than normal and result in some cracking. Mitigation measures, as noted in **Existing Fill** within **Earthwork**, are critical to the performance of floor slabs. In addition to the mitigation measures, the floor slab can be stiffened by adding steel reinforcement, grade beams, and/or post-tensioned elements.

## Floor Slab Construction Considerations

Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should observe the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

# Pavements

## General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

## Pavement Design Parameters

The values used in our design were empirically derived based upon our experience with similar soil types, expected subgrade soils, and our expectation of the quality of the subgrade as prescribed by the **Site Preparation** conditions as outlined in **Earthwork**.

## Pavement Section Thicknesses

The following table provides our opinion of minimum thickness for AC sections:

**Asphaltic Concrete Design**

| Layer | Thickness (inches) | |
|---|---|---|
| | Light Duty Pavements | Heavy Duty Pavements |
| AC [1, 2] | 3 | 4 |
| Aggregate Base | 6 | 8 |

1. All materials should meet the current Alabama Department of Transportation (ALDOT) Standard Specifications for Highway and Bridge Construction.
2. A minimum 1.5-inch surface course should be used on ACC pavements.

The following table provides our estimated minimum thickness of PCC pavements.

**Portland Cement Concrete Design**

| Layer | Thickness (inches) | |
|---|---|---|
| | Light Duty Pavements | Heavy Duty Pavements |
| PCC [1] | 4 | 5 |
| Aggregate Base | 4 | 4 |

1. All materials should meet the current Alabama Department of Transportation (ALDOT) Standard Specifications for Highway and Bridge Construction.

Areas for parking of heavy vehicles, concentrated turn areas, and start/stop maneuvers could require thicker pavement sections. Edge restraints (i.e. concrete curbs or aggregate shoulders) should be planned along curves and areas of maneuvering vehicles.

Although not required for structural support, a minimum 4-inch thick base course layer is recommended to help reduce potential for slab curl, shrinkage cracking, and subgrade pumping through joints. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. Joints should be sealed to prevent entry of foreign material and doweled where necessary for load transfer. PCC pavement details for joint spacing, joint reinforcement, and joint sealing should be prepared in accordance with ACI 330 and ACI 325.

Where practical, we recommend early-entry cutting of crack-control joints in PCC pavements. Cutting of the concrete in its “green” state typically reduces the potential for micro-cracking of the pavements prior to the crack control joints being formed, compared to cutting the joints after the concrete has fully set. Micro-cracking of pavements may lead to crack formation in locations other than the sawed joints, and/or reduction of fatigue life of the pavement.

Openings in pavements, such as decorative landscaped areas, are sources for water infiltration into surrounding pavement systems. Water can collect in the islands and migrate into the surrounding subgrade soils thereby degrading support of the pavement. Islands with raised concrete curbs, irrigated foliage, and low permeability near-surface soils are particular areas of concern. The civil design for the pavements with these conditions should include features to restrict or collect and discharge excess water from the islands. Examples of features are edge drains connected to the stormwater collection system, longitudinal subdrains, or other suitable outlets and impermeable barriers preventing lateral migration of water such as a cutoff wall installed to a depth below the pavement structure.

## Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

## Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic upkeep should be anticipated. Preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Pavement care consists of both localized (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Additional engineering consultation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur, and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum 2%.
- Subgrade and pavement surfaces should have a minimum 2% slope to promote proper surface drainage.
- Install pavement drainage systems surrounding areas anticipated for frequent wetting.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- Place compacted, low permeability backfill against the exterior side of curb and gutter.
- Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

# General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly effect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

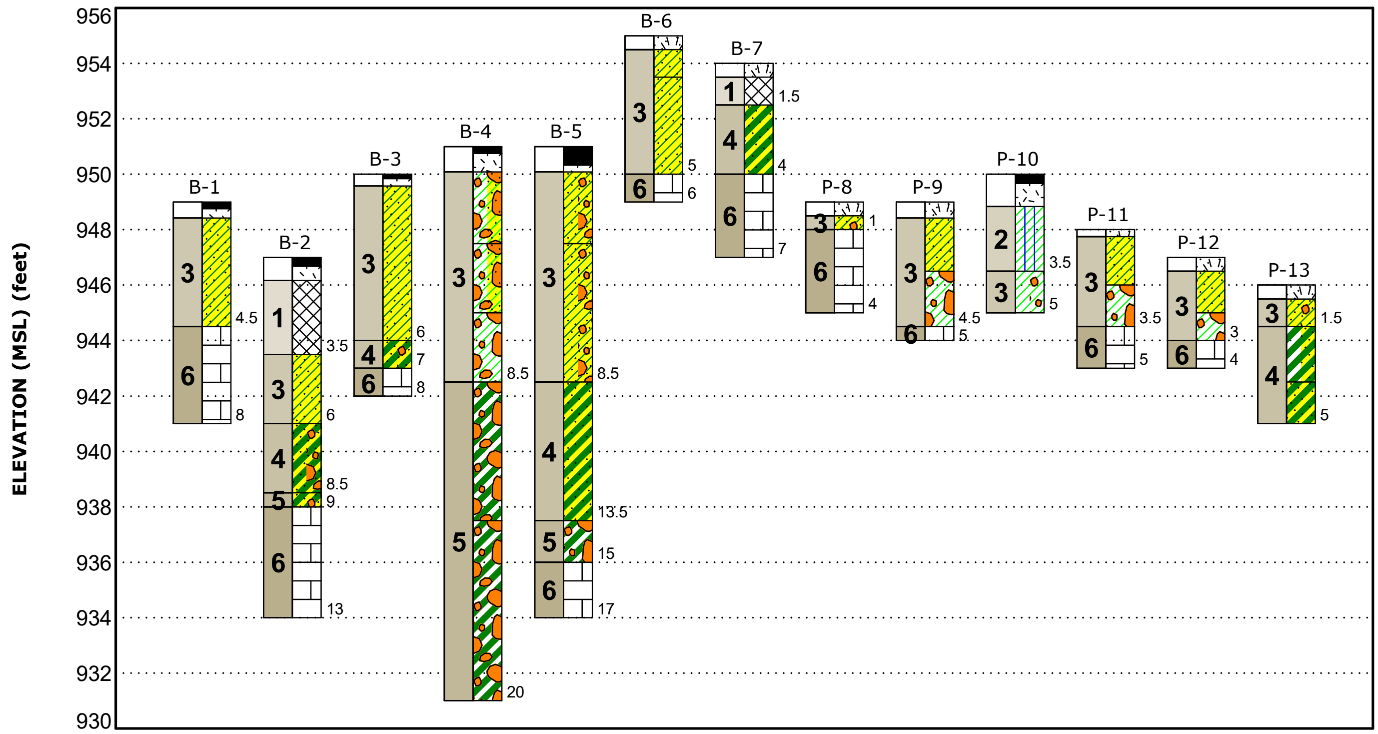
# Figures

**Contents:**

TCAT Hohenwald Campus Addition
813 West Main Street | Hohenwald, TN
Terracon Project No. E5235105

Terracon
289 Production Ave
Madison, AL

# GeoModel




This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

| Model Layer | Layer Name | General Description |
|---|---|---|
| 1 | Fill - Gravel and Lean Clays | Typically dark tan, red, and/or gray in color. N values from 6 to 10 blow per foot, with variable sand, gravel, and/or clay content. |
| 2 | Silty Clays | Typically brown and/or tan in color. This material was soft in consistency. |
| 3 | Lean Clays | Typically red, tan and/or gray in color. This material had a medium-stiff or better consistency and varying amounts of sand and gravel. |
| 4 | Fat Clays (Moderate Plasticity) | Typically red, tan and/or gray in color. This material had a stiff or better consistency and varying amounts of sand and gravel. |
| 5 | Fat Clays (High Plasticity) | Typically red, tan and/or gray in color. This material had a very stiff or better consistency and varying amounts of sand and gravel. |
| 6 | Weathered Limestone | Limestone, weathered in place, was penetrated with difficulty with soil auger. |

**Legend**

| | |
|---|---|
| Asphalt | Base |
| Sandy Lean Clay | Limestone |
| Fill | Sandy Fat Clay with Gravel |
| Gravelly Lean Clay with Sand | Gravelly Lean Clay |
| Gravelly Fat Clay | Sandy Lean Clay with Gravel |
| Sandy Fat Clay | Topsoil |
| Silty Clay | Lean Clay with Gravel |
| Fat Clay with Sand | |

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.

# Attachments

# Exploration and Testing Procedures

## Field Exploration

| Borings | Approximate Boring Depth (feet) | Location |
|---|---|---|
| B-1 to B-5 | 8 feet (refusal) to 20 feet (termination) | Proposed Building Area |
| B-6 and B-7 | 6 to 7 feet (refusal) | Proposed New Road |
| P-8 to P-13 | 4 feet (refusal) to 5 feet (termination) | Proposed New Parking Lot |

**Boring Layout and Elevations:** Terracon personnel provided the boring layout using handheld GPS equipment (estimated horizontal accuracy of about ±8 feet) and referencing existing site features. Approximate ground surface elevations were obtained by interpolation from the client provided topographical site survey. If elevations and a more precise boring layout are desired, we recommend borings be surveyed.

**Subsurface Exploration Procedures:** We advanced the borings with an ATV-mounted rotary drill rig using continuous flight augers (hollow stem). Four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

## Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture content
- Grain size analysis
- Atterberg limits

The laboratory testing program often included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

# Site Location and Exploration Plans

**Contents:**



Note: All attachments are one page unless noted above.

## Site Location

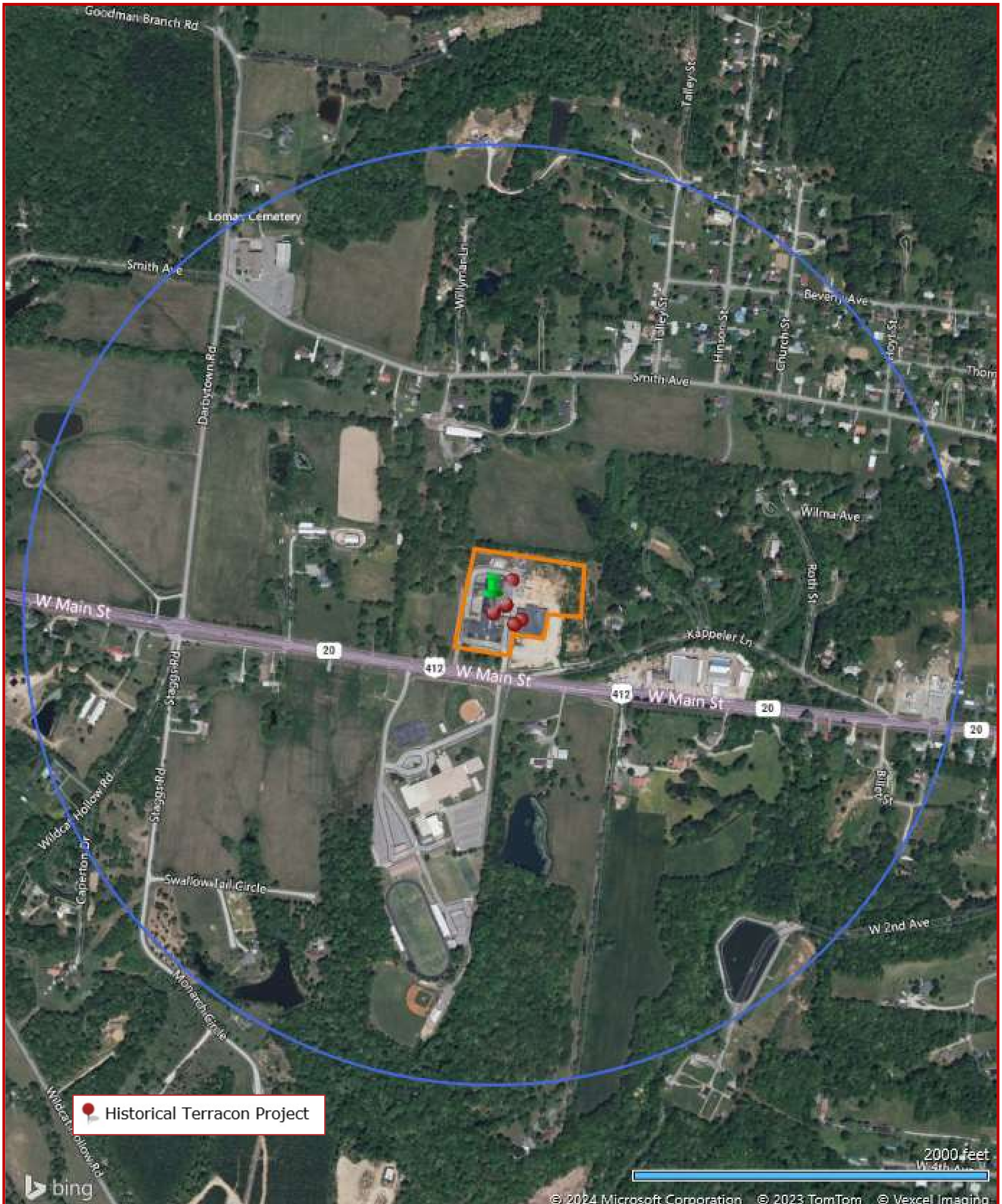



DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES MAP PROVIDED BY MICROSOFT BING MAPS

## Exploration Plan

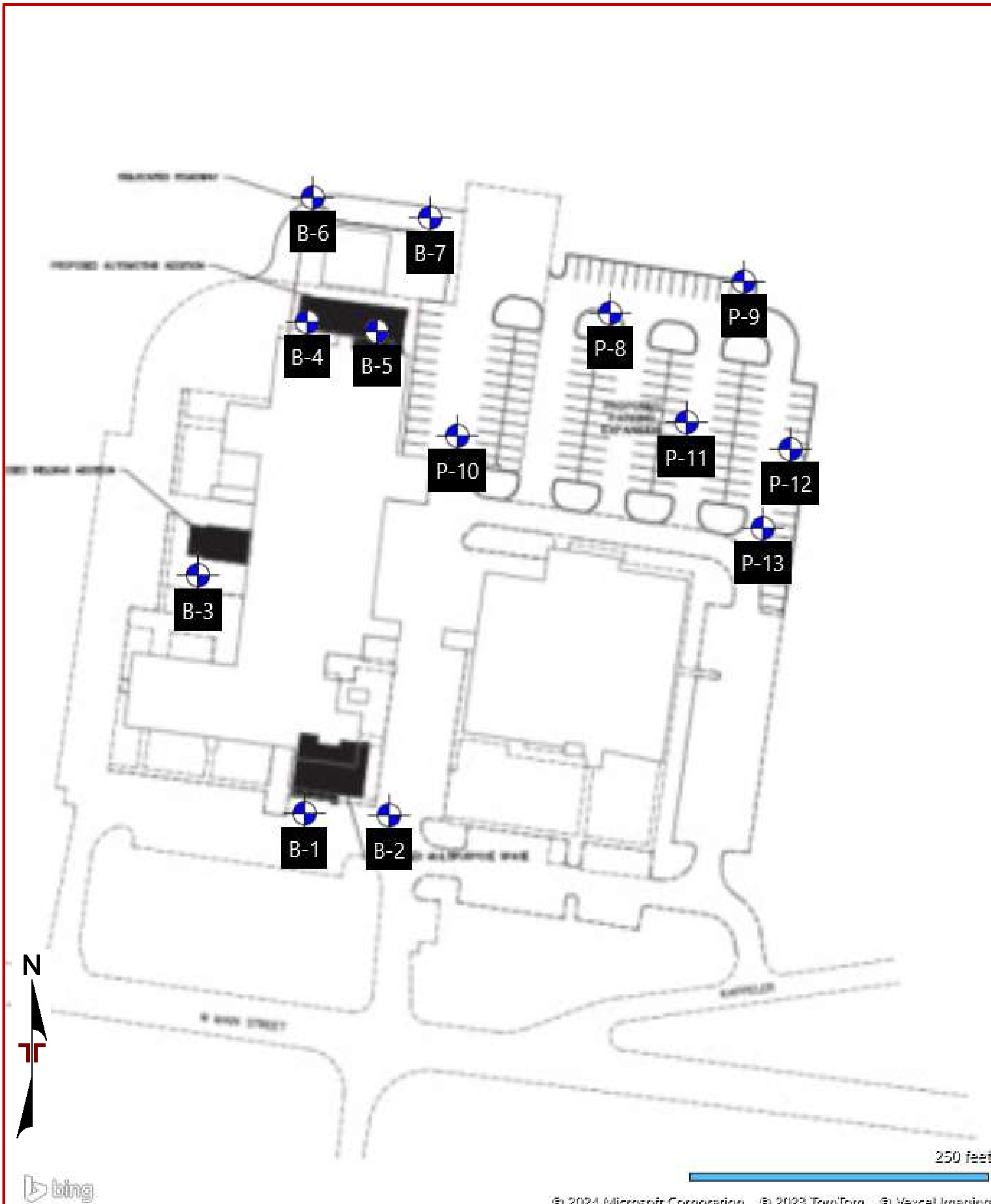



DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES MAP PROVIDED BY MICROSOFT BING MAPS

# Exploration and Laboratory Results

**Contents:**



Note: All attachments are one page unless noted above.

Terracon
289 Production Ave
Madison, AL

# Boring Log No. B-1

Location: See Exploration Plan

Latitude: 35.5513° Longitude: -87.5738°

Elevation.: 949 (Ft.)

| Model Layer | Depth (Ft.) | Material Description | Elevation (Ft.) | Depth (Ft.) | Water Level Observations | Sample Type | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.3 | **ASPHALT** | 948.75 | | | | | | | |
| | 0.6 | **BASE** | 948.42 | | | | | | | |
| 3 | | **SANDY LEAN CLAY (CL)**, tan, gray, and red, stiff | | | | | 3-5-7 N=12 | 19.8 | | |
| 3 | 4.5 | very stiff | 944.5 | | | | 10-12-50/3" | 20.2 | | |
| 6 | 8.0 | **WEATHERED LIMESTONE** | 941 | 5 | | | 50/8" | | | |

***Auger Refusal at 8 Feet***

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

Terracon
289 Production Ave
Madison, AL

# Boring Log No. B-2

Location: See Exploration Plan

Latitude: 35.5513° Longitude: -87.5735°

Elevation.: 947 (Ft.)

| Model Layer | Depth (Ft.) | Material Description | Elevation (Ft.) | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|
| | 0.3 | **ASPHALT** | 946.67 | | | | |
| | 0.8 | **BASE** | 946.17 | | | | |
| 1 | 3.5 | **FILL - CLAYEY GRAVEL WITH SAND**, dark tan, red, and gray, 30% gravel, 24% sand | 943.5 | 6-2-8 N=10 | 18.5 | 55-21-34 | 46 |
| 3 | 6.0 | **SANDY LEAN CLAY (CL)**, tan, gray, and red, very stiff | 941 | 4-8-10 N=18 | 18.6 | | |
| 4 | 8.5 | **SANDY FAT CLAY WITH GRAVEL (CH)**, tan and red, very stiff, moderate plasticity | 938.5 | 11-11-15 N=26 | 25.4 | | |
| 5 | 9.0 | **SANDY FAT CLAY WITH GRAVEL (CH)**, tan and red, very stiff, high plasticity | 938 | 11-50/2" | 32.8 | | |
| 6 | 13.0 | **WEATHERED LIMESTONE** | 934 | | | | |

***Auger Refusal at 13 Feet***

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

Terracon
289 Production Ave
Madison, AL

# Boring Log No. B-3

Location: See Exploration Plan

Latitude: 35.5518° Longitude: -87.5741°

| Model Layer | Graphic Log | Depth (Ft.) | Material Description | Elevation.: 950 (Ft.) | Depth (Ft.) | Water Level Observations | Sample Type | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.2 | **ASPHALT** | 949.84 | | | | | | | |
| | | 0.4 | **BASE** | 949.58 | | | | | | | |
| 3 | | 6.0 | **SANDY LEAN CLAY (CL)**, tan, red, and gray, very stiff | 944 | | | X | 3-7-8 N=15 | 17.6 | | |
| | | | | | 5 | | X | 9-10-11 N=21 | 19.1 | | |
| 4 | | 7.0 | **SANDY FAT CLAY WITH GRAVEL (CH)**, tan, red, and gray, hard, moderate plasticity | 943 | | | X | 10-21-50/1" | 21.3 | | |
| 6 | | 8.0 | **WEATHERED LIMESTONE** | 942 | | | | | | | |

***Auger Refusal at 8 Feet***

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

Terracon
289 Production Ave
Madison, AL

# Boring Log No. B-4

Location: See Exploration Plan

Latitude: 35.5524° Longitude: -87.5737°

Elevation.: 951 (Ft.)

| Model Layer | Depth (Ft.) | Material Description | Elevation (Ft.) | Sample Depth (Ft.) | Water Level Observations | Sample Type | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.3 | **ASPHALT** | 950.75 | | | | | | | |
| | 0.9 | **BASE** | 950.08 | | | | | | | |
| 3 | 3.5 | **GRAVELLY LEAN CLAY WITH SAND (CL)**, tan and red, very stiff | 947.5 | | | X | 6-10-13 N=23 | 18.2 | 46-21-25 | |
| 3 | 6.0 | **GRAVELLY LEAN CLAY WITH SAND (CL)**, tan and red, very stiff, 18% gravel, 17% sand | 945 | 5 | | X | 7-12-50/3" | 19.0 | 38-17-21 | 64 |
| 3 | 8.5 | **GRAVELLY LEAN CLAY (CL)**, tan and red, hard | 942.5 | | | X | 13-18-50/2" | 15.8 | | |
| 5 | 13.5 | **GRAVELLY FAT CLAY (CH)**, tan and red, very stiff, high plasticity | 937.5 | 10 | | X | 12-13-15 N=28 | 29.3 | | |
| 5 | 20.0 | **GRAVELLY FAT CLAY (CH)**, tan and red, very stiff, some alluvium, high plasticity | 931 | 15 | | X | 8-12-14 N=26 | 32.6 | | |
| | | | | 20 | | X | 11-13-14 N=27 | 44.8 | | |

***Boring Terminated at 20 Feet***

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

# Boring Log No. B-5

Location: See Exploration Plan

Latitude: 35.5524° Longitude: -87.5736°

Elevation.: 951 (Ft.)

| Model Layer | Depth (Ft.) | Material Description | Elevation (Ft.) | Water Level Observations | Sample Type | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|---|---|
| | 0.7 | **ASPHALT** | 950.33 | | | | | | |
| | 0.9 | **BASE** | 950.08 | | | | | | |
| 3 | 3.5 | **SANDY LEAN CLAY WITH GRAVEL (CL)**, red and tan, very stiff | 947.5 | | X | 4-9-12 N=21 | 16.5 | | |
| 3 | 8.5 | **SANDY LEAN CLAY WITH GRAVEL (CL)**, red and tan, hard | 942.5 | | X | 13-15-50/1" | 15.9 | | |
| | | | | | X | 15-50/5" | 18.0 | | |
| 4 | 13.5 | **SANDY FAT CLAY (CH)**, reddish tan and gray, hard, moderate plasticity | 937.5 | | X | 10-15-50/2" | 19.6 | | |
| 5 | 15.0 | **GRAVELLY FAT CLAY (CH)**, reddish tan and gray, very stiff, high plasticity | 936 | | X | 15-50/1" | 21.1 | | |
| 6 | 17.0 | **WEATHERED LIMESTONE** | 934 | | | | | | |

***Auger Refusal at 17 Feet***

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

Terracon
289 Production Ave
Madison, AL

# Boring Log No. B-6

Location: See Exploration Plan

Latitude: 35.5527° Longitude: -87.5737°

Elevation.: 955 (Ft.)

| Model Layer | Depth (Ft.) | Description | Elevation (Ft.) | Sample Depth (Ft.) | Water Level Observations | Sample Type | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.5 | **TOPSOIL** | 954.5 | | | | | | | |
| 3 | 1.5 | **SANDY LEAN CLAY (CL)**, tan, medium-stiff | 953.5 | | | X | 2-3-4 N=7 | 31.4 | | |
| 3 | 5.0 | **SANDY LEAN CLAY (CL)**, red and tan, very stiff | 950 | | | X | 6-8-11 N=19 | 21.1 | | |
| | | | | 5 | | X | 5-6-11 N=17 | 19.3 | | |
| 6 | 6.0 | **WEATHERED LIMESTONE** | 949 | | | | | | | |

***Auger Refusal at 6 Feet***

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

289 Production Ave
Madison, AL

# Boring Log No. B-7

Location: See Exploration Plan

Latitude: 35.5526° Longitude: -87.5734°

Elevation.: 954 (Ft.)

| Model Layer | Depth (Ft.) | Material Description | Elevation (Ft.) | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|
| | 0.5 | **TOPSOIL** | 953.5 | | | | |
| 1 | 1.5 | **FILL - SANDY LEAN CLAY**, dark tan | 952.5 | 2-3-3 N=6 | 21.4 | | |
| 4 | 4.0 | **SANDY FAT CLAY (CH)**, dark tan, stiff, moderate plasticity | 950 | 3-4-6 N=10 | 26.3 | | |
| | | | | 50/5" | 15.1 | | |
| 6 | 7.0 | **WEATHERED LIMESTONE** | 947 | 50/0" | | | |

***Auger Refusal at 7 Feet***

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

Terracon
289 Production Ave
Madison, AL

# Boring Log No. P-8

Location: See Exploration Plan

Latitude: 35.5524° Longitude: -87.5729°

Depth (Ft.) Elevation.: 949 (Ft.)

| Model Layer | Graphic Log | Depth (Ft.) | Description | Elevation (Ft.) | Water Level Observations | Sample Type | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.5 | **TOPSOIL** | 948.5 | | | | | | |
| 3 | | 1.0 | **SANDY LEAN CLAY WITH GRAVEL (CL)**, red, tan, and gray, very stiff | 948 | | | 5-10-50/5" | 15.7 | | |
| 6 | | 4.0 | **WEATHERED LIMESTONE** | 945 | | | 50/0" | | | |

***Auger Refusal at 4 Feet***

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

Terracon
289 Production Ave
Madison, AL

# Boring Log No. P-9

Location: See Exploration Plan

Latitude: 35.5525° Longitude: -87.5725°

| Model Layer | Graphic Log | Depth (Ft.) | Description | Elevation.: 949 (Ft.) | Depth (Ft.) | Water Level Observations | Sample Type | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.6 | **TOPSOIL** | 948.42 | | | | | | | |
| 3 | | | **SANDY LEAN CLAY (CL)**, tan and red, stiff | | | | | 3-4-5 N=9 | 28.9 | | |
| | | 2.5 | very stiff | 946.5 | | | | 3-12-50/3" | 20.2 | | |
| | | 4.5 | **GRAVELLY LEAN CLAY (CL)**, red and tan, hard | 944.5 | | | | 50/5" | 21.7 | | |
| 6 | | 5.0 | **WEATHERED LIMESTONE** | 944 | 5 | | | | | | |

***Boring Terminated at 5 Feet***

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

Terracon
289 Production Ave
Madison, AL

# Boring Log No. P-10

Location: See Exploration Plan

Latitude: 35.5521° Longitude: -87.5733°

| Model Layer | Graphic Log | Depth (Ft.) | Description | Elevation.: 950 (Ft.) | Depth (Ft.) | Water Level Observations | Sample Type | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.3 | **ASPHALT** | 949.67 | | | | | | | |
| | | 1.2 | **BASE** | 948.83 | | | | | | | |
| 2 | | 3.5 | **SILTY CLAY (CL-ML)**, grayish brown, soft | 946.5 | | | X | 1-2-2 N=4 | 26.7 | | |
| 3 | | 5.0 | **LEAN CLAY WITH GRAVEL (CL)**, dark red, very stiff | 945 | 5 | | X | 6-8-9 N=17 | 19.8 | | |

***Boring Terminated at 5 Feet***

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

289 Production Ave
Madison, AL

# Boring Log No. P-11

Location: See Exploration Plan

Latitude: 35.5522° Longitude: -87.5727°

| Model Layer | Depth (Ft.) | Material Description | Elevation: 948 (Ft.) | Depth (Ft.) | Water Level Observations | Sample Type | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.3 | **TOPSOIL** | 947.75 | | | | | | | |
| 3 | | **SANDY LEAN CLAY (CL)**, red and tan, stiff | | | | X | 2-3-5 N=8 | 16.0 | | |
| | 2.0 | | 946 | | | | | | | |
| 3 | | **GRAVELLY LEAN CLAY (CL)**, tan and red, hard | | | | X | 5-15-50/1" | 18.5 | | |
| | 3.5 | | 944.5 | | | | | | | |
| 6 | | **WEATHERED LIMESTONE** | | | | X | 50/6" | 23.4 | | |
| | 5.0 | | 943 | 5 | | | | | | |

***Boring Terminated at 5 Feet***

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

terracon
289 Production Ave
Madison, AL

# Boring Log No. P-12

Location: See Exploration Plan

Latitude: 35.5521° Longitude: -87.5724°

| Model Layer | Graphic Log | Depth (Ft.) | Description | Elevation.: 947 (Ft.) | Depth (Ft.) | Water Level Observations | Sample Type | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.5 | **TOPSOIL** | 946.5 | | | | | | | |
| 3 | | | **SANDY LEAN CLAY (CL)**, tan and red, very stiff | | | | X | 4-10-50/3" | 25.1 | | |
| | | 2.0 | | 945 | | | | | | | |
| 3 | | | **GRAVELLY LEAN CLAY (CL)**, tan and red, hard | | | | | | | | |
| | | 3.0 | | 944 | | | | | | | |
| 6 | | | **WEATHERED LIMESTONE** | | | | | | | | |
| | | 4.0 | | 943 | | | | | | | |
| | | | ***Auger Refusal at 4 Feet*** | | | | | | | | |

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

terracon
289 Production Ave
Madison, AL

# Boring Log No. P-13

Location: See Exploration Plan

Latitude: 35.5519° Longitude: -87.5725°

Elevation.: 946 (Ft.)

| Model Layer | Depth (Ft.) | Material Description | Elevation (Ft.) | Sample Depth (Ft.) | Water Level Observations | Sample Type | Field Test Results | Water Content (%) | Atterberg Limits LL-PL-PI | Percent Fines |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.5 | **TOPSOIL** | 945.5 | | | | | | | |
| 3 | 1.5 | **SANDY LEAN CLAY WITH GRAVEL (CL)**, red and tan, very stiff | 944.5 | | | X | 3-7-12 N=19 | 20.0 | | |
| 4 | 3.5 | **FAT CLAY WITH SAND (CH)**, dark red and gray, very stiff, moderate plasticity | 942.5 | | | X | 5-8-10 N=18 | 22.2 | | |
| 4 | 5.0 | **SANDY FAT CLAY (CH)**, red, tan, and gray, very stiff, moderate plasticity | 941 | 5 | | X | 7-10-13 N=23 | 23.9 | | |

***Boring Terminated at 5 Feet***

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

**Notes**

**Water Level Observations**
Groundwater not encountered

**Advancement Method**
Hollow Stem Auger

**Abandonment Method**
Boring backfilled with auger cuttings upon completion.

**Drill Rig**

**Driller**
Earthcore

**Logged by**
C. Braxton

**Boring Started**
12-20-2023

**Boring Completed**
12-20-2023

# Supporting Information

**Contents:**



Note: All attachments are one page unless noted above.

# General Notes

## Sampling

Standard Penetration Test

## Water Level

- Water Initially Encountered
- Water Level After a Specified Period of Time
- Water Level After a Specified Period of Time
- Cave In Encountered

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

## Field Tests

| | |
|---|---|
| N | Standard Penetration Test Resistance (Blows/Ft.) |
| (HP) | Hand Penetrometer |
| (T) | Torvane |
| (DCP) | Dynamic Cone Penetrometer |
| UC | Unconfined Compressive Strength |
| (PID) | Photo-Ionization Detector |
| (OVA) | Organic Vapor Analyzer |

## Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

## Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

## Strength Terms

| **Relative Density of Coarse-Grained Soils** (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance | | **Consistency of Fine-Grained Soils** (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance | | |
|---|---|---|---|---|
| **Relative Density** | **Standard Penetration or N-Value (Blows/Ft.)** | **Consistency** | **Unconfined Compressive Strength Qu (tsf)** | **Standard Penetration or N-Value (Blows/Ft.)** |
| Very Loose | 0 - 3 | Very Soft | less than 0.25 | 0 - 1 |
| Loose | 4 - 9 | Soft | 0.25 to 0.50 | 2 - 4 |
| Medium Dense | 10 - 29 | Medium Stiff | 0.50 to 1.00 | 4 - 8 |
| Dense | 30 - 50 | Stiff | 1.00 to 2.00 | 8 - 15 |
| Very Dense | > 50 | Very Stiff | 2.00 to 4.00 | 15 - 30 |
| | | Hard | > 4.00 | > 30 |

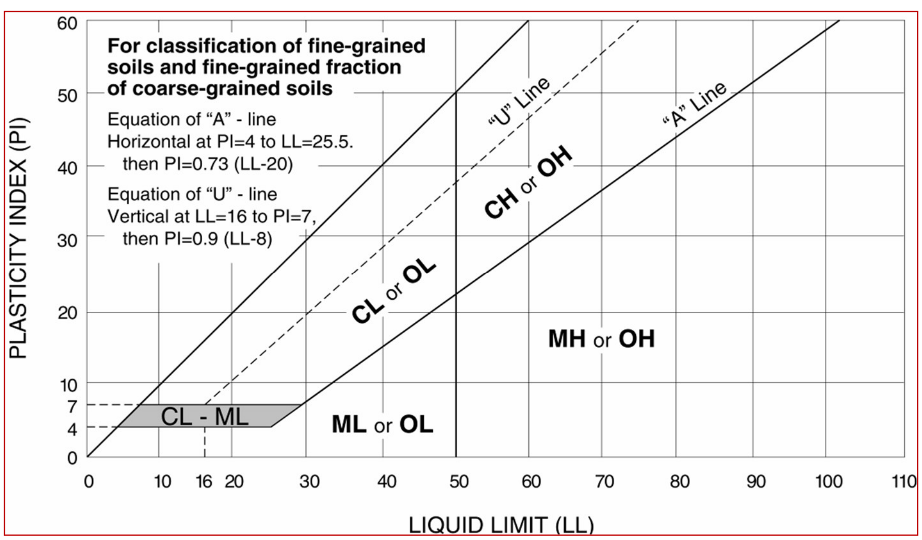
## Relevance of Exploration and Laboratory Test Results

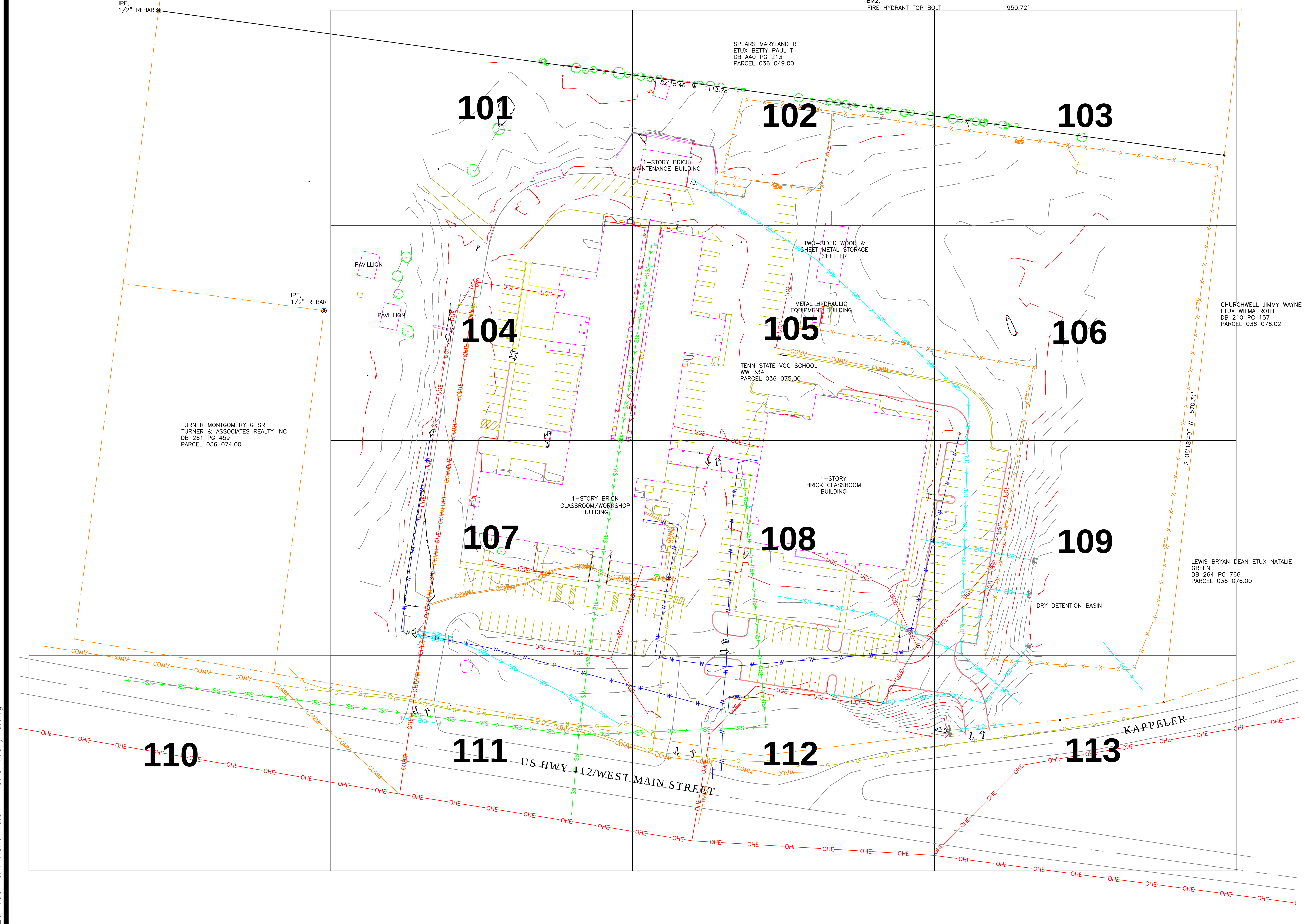
Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

# Unified Soil Classification System

| Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A] | | | | Soil Classification | |
|---|---|---|---|---|---|
| | | | | **Group Symbol** | **Group Name** [B] |
| **Coarse-Grained Soils:** More than 50% retained on No. 200 sieve | **Gravels:** More than 50% of coarse fraction retained on No. 4 sieve | **Clean Gravels:** Less than 5% fines [C] | Cu≥4 and 1≤Cc≤3 [E] | GW | Well-graded gravel [F] |
| | | | Cu<4 and/or [Cc<1 or Cc>3.0] [E] | GP | Poorly graded gravel [F] |
| | | **Gravels with Fines:** More than 12% fines [C] | Fines classify as ML or MH | GM | Silty gravel [F, G, H] |
| | | | Fines classify as CL or CH | GC | Clayey gravel [F, G, H] |
| | **Sands:** 50% or more of coarse fraction passes No. 4 sieve | **Clean Sands:** Less than 5% fines [D] | Cu≥6 and 1≤Cc≤3 [E] | SW | Well-graded sand [I] |
| | | | Cu<6 and/or [Cc<1 or Cc>3.0] [E] | SP | Poorly graded sand [I] |
| | | **Sands with Fines:** More than 12% fines [D] | Fines classify as ML or MH | SM | Silty sand [G, H, I] |
| | | | Fines classify as CL or CH | SC | Clayey sand [G, H, I] |
| **Fine-Grained Soils:** 50% or more passes the No. 200 sieve | **Silts and Clays:** Liquid limit less than 50 | **Inorganic:** | PI > 7 and plots above "A" line [J] | CL | Lean clay [K, L, M] |
| | | | PI < 4 or plots below "A" line [J] | ML | Silt [K, L, M] |
| | | **Organic:** | $\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$ | OL | Organic clay [K, L, M, N] |
| | | | | | Organic silt [K, L, M, O] |
| | **Silts and Clays:** Liquid limit 50 or more | **Inorganic:** | PI plots on or above "A" line | CH | Fat clay [K, L, M] |
| | | | PI plots below "A" line | MH | Elastic silt [K, L, M] |
| | | **Organic:** | $\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$ | OH | Organic clay [K, L, M, P] |
| | | | | | Organic silt [K, L, M, Q] |
| **Highly organic soils:** | Primarily organic matter, dark in color, and organic odor | | | PT | Peat |

[A] Based on the material passing the 3-inch (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.
[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.








## CONTROL POINTS:

| NAME/TYPE | N | E | Z |
|---|---|---|---|
| OPUS1 (CP 1) | | | |
| IPS | | | |
| [m SPC] | 136334.26 | 457437.28 | 289.12 (ortho) |
| [US FT] | 447289.97 | 1500775.46 | 948.56' |
| OPUS2 (CP 2) | | | |
| IPS | | | |
| [m SPC] | 136255.95 | 457345.64 | 288.71 (ortho) |
| [US FT] | 447033.08 | 1500474.83 | 947.03' |
| OPUS3 (CP 3) | | | |
| IPS | | | |
| [m SPC] | 136349.17 | 457238.46 | 291.19 (ortho) |
| [US FT] | 447338.90 | 1500123.17 | 955.29' |
| CP4, NWS | 447047.20 | 1500703.56 | 944.97' |
| CP5, NWS | 446996.64 | 1500208.75 | 949.38' |
| CP10, NWS | 447476.95 | 1500509.89 | 950.07' |
| CP11, MAGHUB | 447552.54 | 1500196.38 | 952.88' |
| CP12, NWS | 447215.43 | 1500461.43 | 950.4' (NOT LEVELED) |
| BM1, | | | |
| FIRE HYDRANT TOP BOLT | | | 954.33' |
| BM2, | | | |
| FIRE HYDRANT TOP BOLT | | | 950.72' |

## LAND SURVEYOR'S CERTIFICATION:

I DO HEREBY CERTIFY THAT THIS CATEGORY IV SURVEY WAS PREPARED UNDER MY DIRECTION IN COMPLIANCE WITH CURRENT TENNESSEE MININUM STANDARDS OF PRACTICE. THE RATIO OF PRECISION OF THE UNADJUSTED SURVEY USING RPA DOES NOT EXCEED H: 0.1', V: 0,5'. THE UNADJUSTED ERROR OF CLOSURE (HORIZONTAL) OF THE CONTROL TRAVERSE IS 1:15,553.1.

Abbie Jones

02/08/2024
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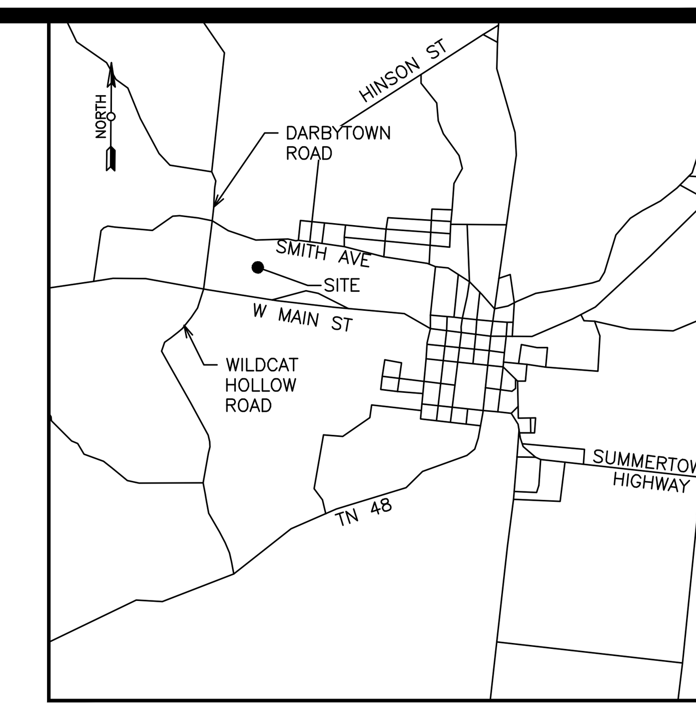
LEXINGTON, KY 40502
ABBIE JONES CONSULTING




## UTILITY OWNERS & AVAILABILITY:

811 CONFIRMATION #233411534

WATER:
HOHENWALD CITY WATER
HOHENWALD, TN
931.796.2231

ELECTRIC:
MERIWETHER LEWIS ELECTRIC COOPERATIVE
931.796.3116

NATURAL GAS:
HOHENWALD CITY GAS
HOHENWALD, TN
931.796.2231

LANDLINE PHONE/CATV/FIBER OPTIC:

AT&T DISTRIBUTION
888.901.2779

CHARTER COMMUNICATIONS
TULLAHOMA
888.406.7063

## LEGEND:

| | |
|---|---|
| | ADA STRIPING |
| | BENCHMARK |
| | BOLLARD |
| BW | BOTTOM OF WALL |
| | BORE |
| CATV | CABLE/TELEVISION |
| CO | CLEANOUT |
| COMM | COMMUNICATION |
| | COMMUNICATIONS BOX |
| UGT | COMM. LINE: UNDERGROUND |
| CONC | CONCRETE |
| | CONTROL POINT |
| CMP | CORRUGATED METAL PIPE (CIRCULAR) |
| DB PG | DEED BOOK & PAGE |
| DW | DRIVEWAY |
| E | ELECTRICAL BOX |
| E | ELECTRICAL MANHOLE |
| OHE | ELEC. LINE: OVERHEAD |
| UGE | ELEC. LINE: UNDERGROUND |
| | FENCE: CHAINLINK |
| X X | FENCE: WOOD PRIVACY |
| FFE | FINISHED FLOOR ELEVATION |
| FH | FIRE HYDRANT |
| FM | FORCE MAIN (SAN.) |
| GAS | GAS LINE |
| GM | GAS METER |
| GV | GAS VALVE |
| | GUARDRAIL |
| | GUY WIRE |
| PP GUY | GUY WIRE FOR POWER POLE |
| HW | HEADWALL |
| INV | INVERT |
| IPF | IRON PIN FOUND |
| IPC | IRON PIN FOUND WITH CAP |
| IPS | IRON PIN SET |
| PFND | IRON PIPE FOUND |
| LP | LIGHT POLE |
| NWF | MAG NAIL & WASHER FOUND |
| NWS | MAG NAIL & WASHER SET |
| MBX | MAILBOX |
| PB PG | PLAT BOOK & PAGE |
| PC PG | PLAT CABINET & PAGE |
| POB | POINT OF BEGINNING |
| PPF | POWER POLE FOUND |
| | PROPERTY LINE |
| | PROPERTY LINE: ADJOINING |
| RCP | REINFORCED CONCRETE PIPE |
| ROW | RIGHT-OF-WAY |
| SS | SANITARY SEWER LINE |
| SSMH | SANITARY SEWER MANHOLE |
| SW | SIDEWALK |
| | STORM DRAIN CURB INLET |
| | STORM DRAIN GRATE INLET |
| SD | STORM DRAIN LINE |
| SDMH | STORM DRAIN MANHOLE |
| TW | TOP OF WALL |
| | TREE: EVERGREEN & DECIDUOUS |
| | TREELINE |
| UNK | UNKNOWN/INACCESSIBLE |
| | UTILITY MARKER |
| VCP | VITRIFIED CLAY PIPE |
| W | WATER LINE |
| WM | WATER METER |
| WV | WATER VALVE |

## SURVEY NOTES:

1. THE PURPOSE OF THIS URBAN SURVEY IS TO PROVIDE VERIFICATION OF THE CURRENT CONDITION OF THE PROPERTY FOR DESIGN PURPOSES.
2. A FIELD SURVEY WAS PERFORMED BY A FIELD CREW DECEMBER 12–14 & 28, 2023 AND JANUARY 4, 7, 31, AND FEBRUARY 2, 2024. MONUMENTS WERE LOCATED AND CONTROL WAS SET USING A TRIMBLE S–5 ROBOTIC TOTAL STATION AND THEN DIFFERENTIALLY LEVELED.
3. TOPOGRAPHIC DATA WAS GATHERED USING A TRIMBLE R–12–I GPS WITH TDOT NETWORK, NAD83, NAVD88, GEOID 18 AND A TRIMBLE S–5 ROBOTIC TOTAL STATION.
4. FOR BOUNDARY AND TOPOGRAPHIC ASPECTS OF THIS SURVEY, STATIC AND RTK GPS POSITIONAL DATA WERE OBSERVED BETWEEN THE DATES OF 12–12–2023 AND 2–02–2023 UTILIZING A TRIMBLE R–12–I RECEIVER. THE GRID COORDINATES OF THE RTK POINTS SHOWN WERE DERIVED USING A VRS NETWORK OF CORS STATIONS REFERENCED TO NAD 83 (2011) (EPOCH 2010.00), GEOID 18. OPUS SOLUTIONS WERE ALSO CONDUCTED ON CONTROL POINTS 1–3 FOR 4 HOURS EACH WITH AN OVERALL RMS VALUE OF 0.017M, 67/68 OR 99% FIXED AMBIGUITIES. RELATIVE POSITIONAL ACCURACY OF THE DUPLICATE SINGLE VECTOR GPS OBSERVATIONS ON CP1–CP3 DOES NOT EXCEED: H 0.01', V0.05', COMBINED GRID FACTOR: 0.99959222 CENTERED ON FIXED STATION CONTROL POINT 1 AS SHOWN HEREON.
5. ONE FOOT CONTOUR INTERVALS SHOWN HEREON WERE CREATED USING CARLSON SURVEY 2020.
6. THE REFERENCED MERIDIAN IS FROM THE TDOT STATE PLANE COORDINATES, TN DATUM, US SURVEY FOOT, GRID DISTANCES, NAD83. THE BENCHMARKS SET FOR THIS PROJECT ARE 5/8" REBAR 18" LONG WITH PINK PLASTIC CAPS MARKED "AJC CONTROL" OR MAG NAILS WITH WASHERS STAMPED SAME.
7. NO PORTION OF THIS PROPERTY IS LOCATED IN A SPECIAL FLOOD HAZARD AREA ON FEMA FLOOD PANEL 47101C0125C, EFFECTIVE DATE JANUARY 20, 2010.
8. OTHER UNRECORDED EASEMENTS MAY EXIST THAT AFFECT THE PROPERTY.

# TOPOGRAPHIC SURVEY OF THE TCAT HOHENWALD CAMPUS

LOCATED AT: 813 W MAIN STREET, HOHENWALD, TN 38462
LEWIS COUNTY

CLIENT: HURST-ROSCHE, INC, 200 N MARKET STREET, MARION, IL 62959
OWNER: TENNESSEE STATE VOC SCHOOL, 813 W MAIN STREET, HOHENWALD, TN 38462

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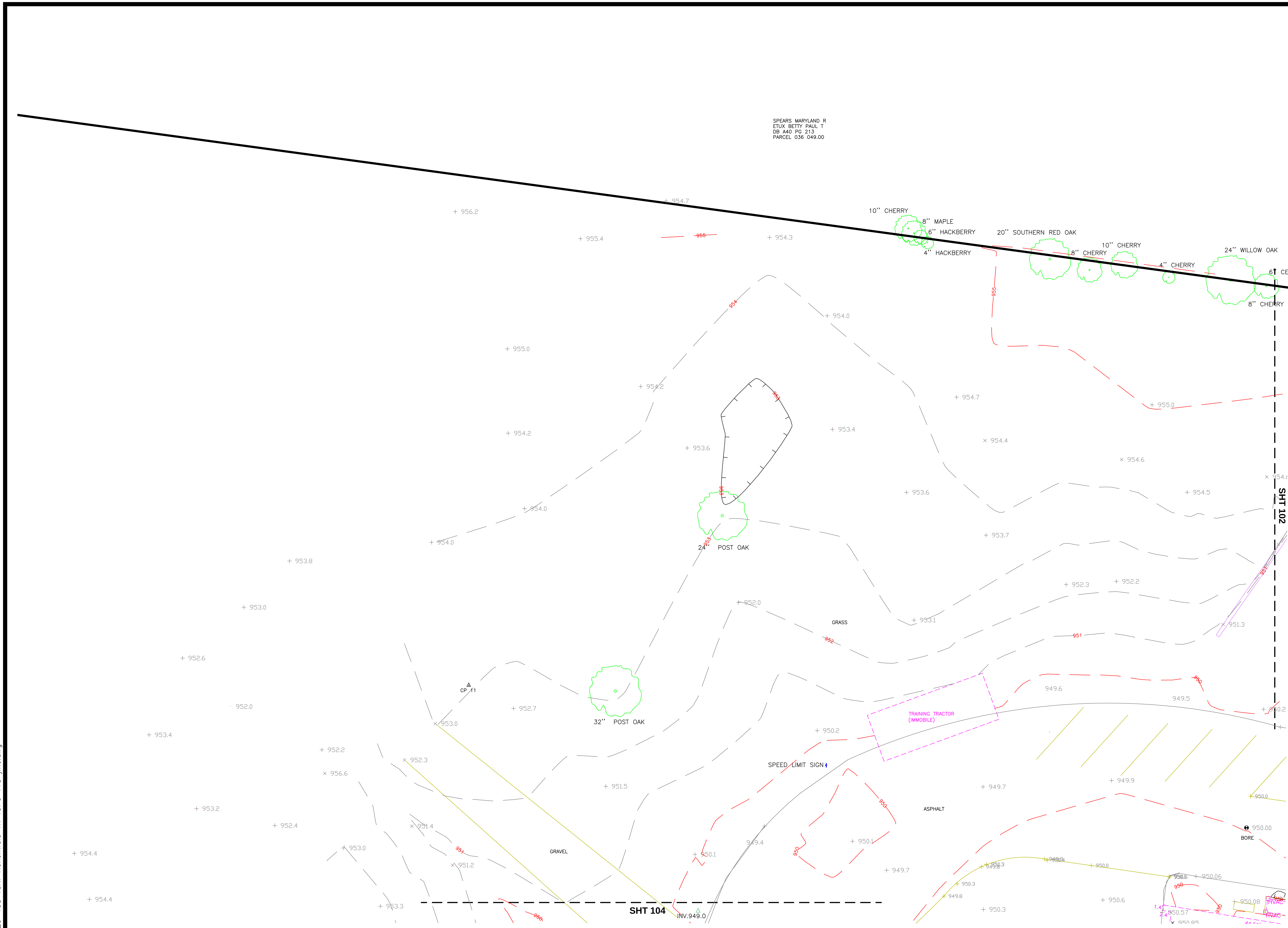
LEXINGTON, KY 40502
WWW.ABBIE-JONES.COM
859.559.3443

ABBIE JONES REGISTERED LAND SURVEYOR AGRICULTURE COMMERCE TENNESSEE NO. 2924

TDOT SPC GRID

0 50' 100'
SCALE: 1"=50'

DRAWN BY: JME
CHECKED BY: TDW
APPROVED BY: AMJ
PROJECT: 23-138
SCALE: 1"=50'
DATE: 02/08/2024
SIZE: 24x36
SHT: 100 OF 113

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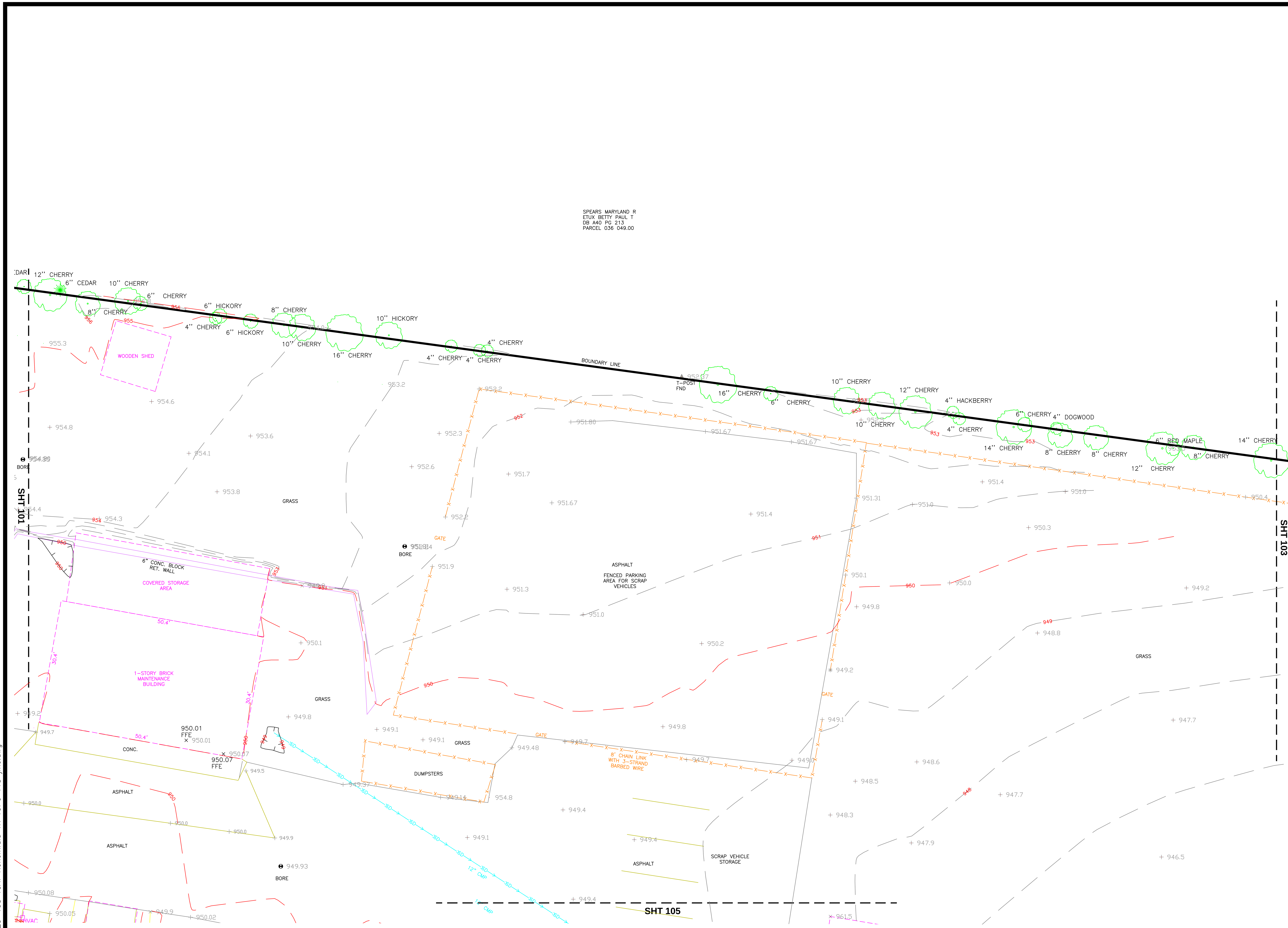


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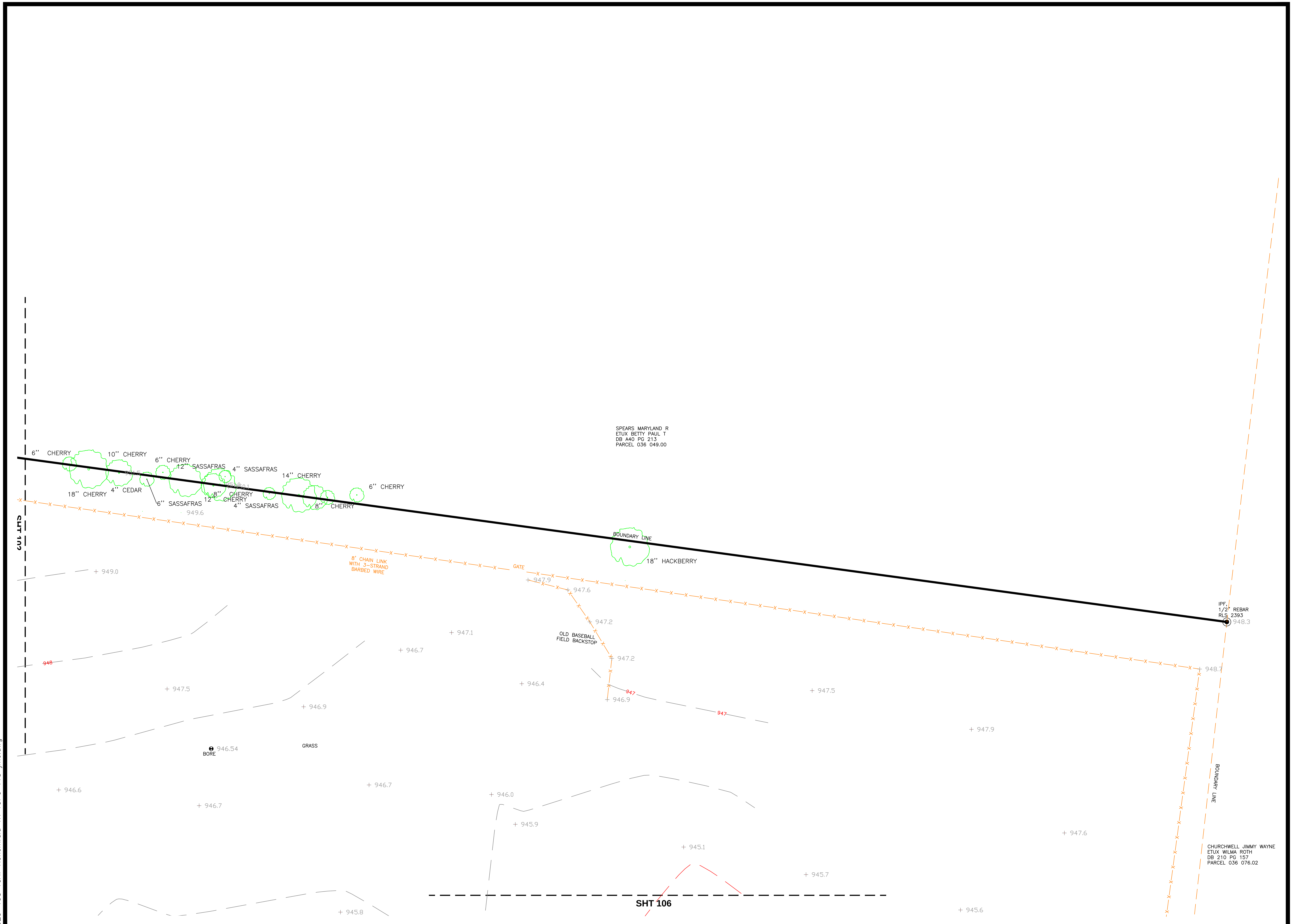


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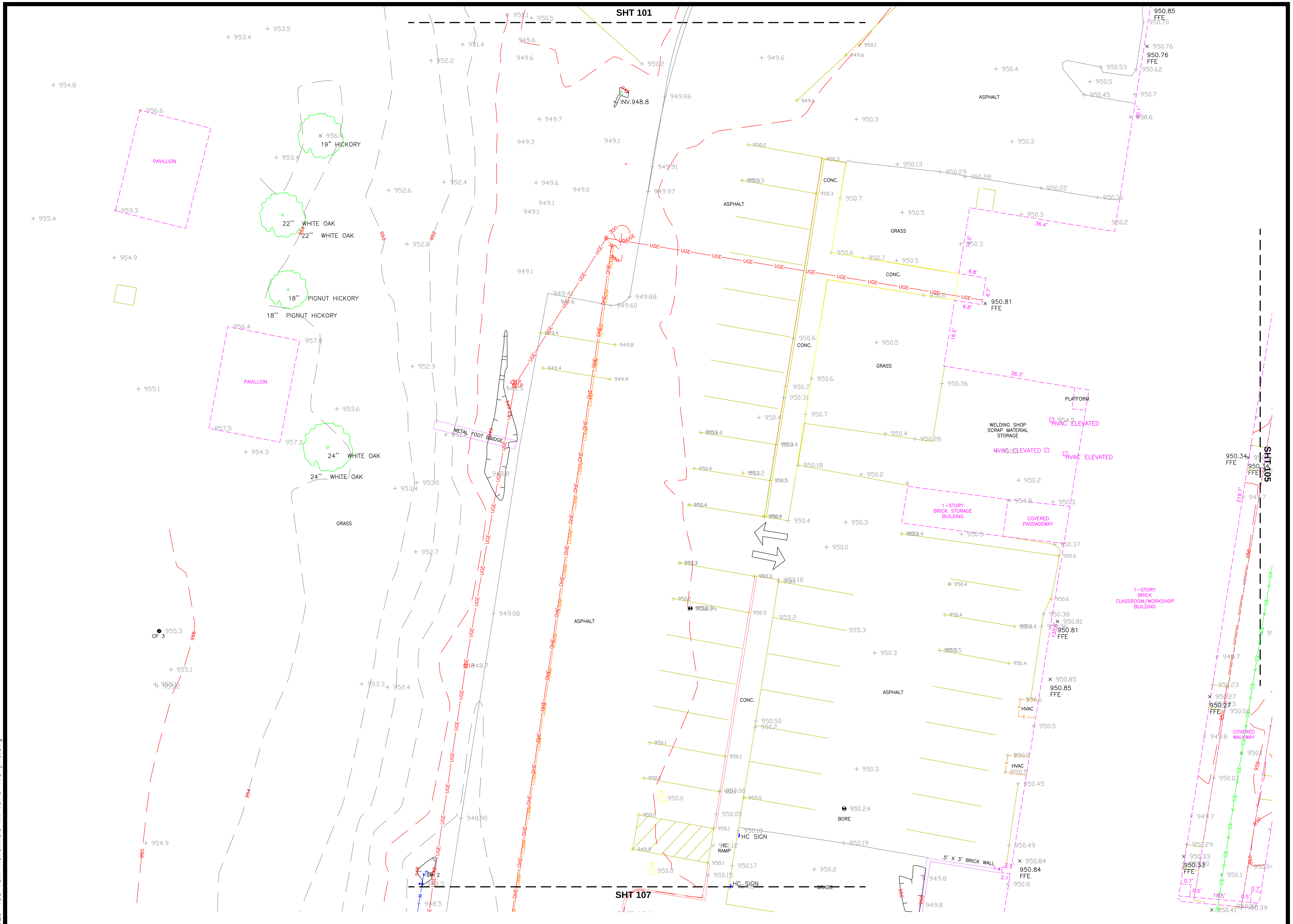


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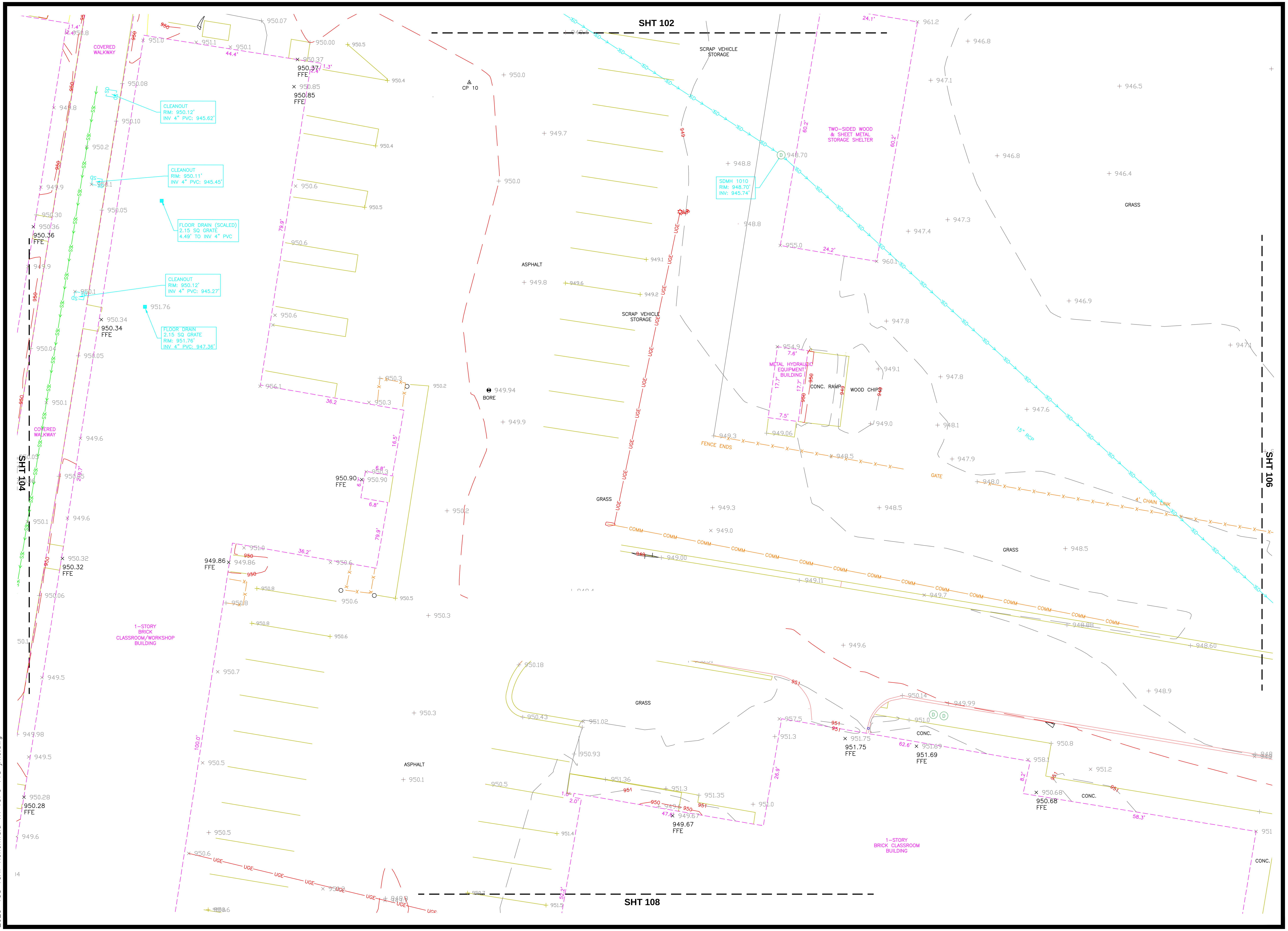


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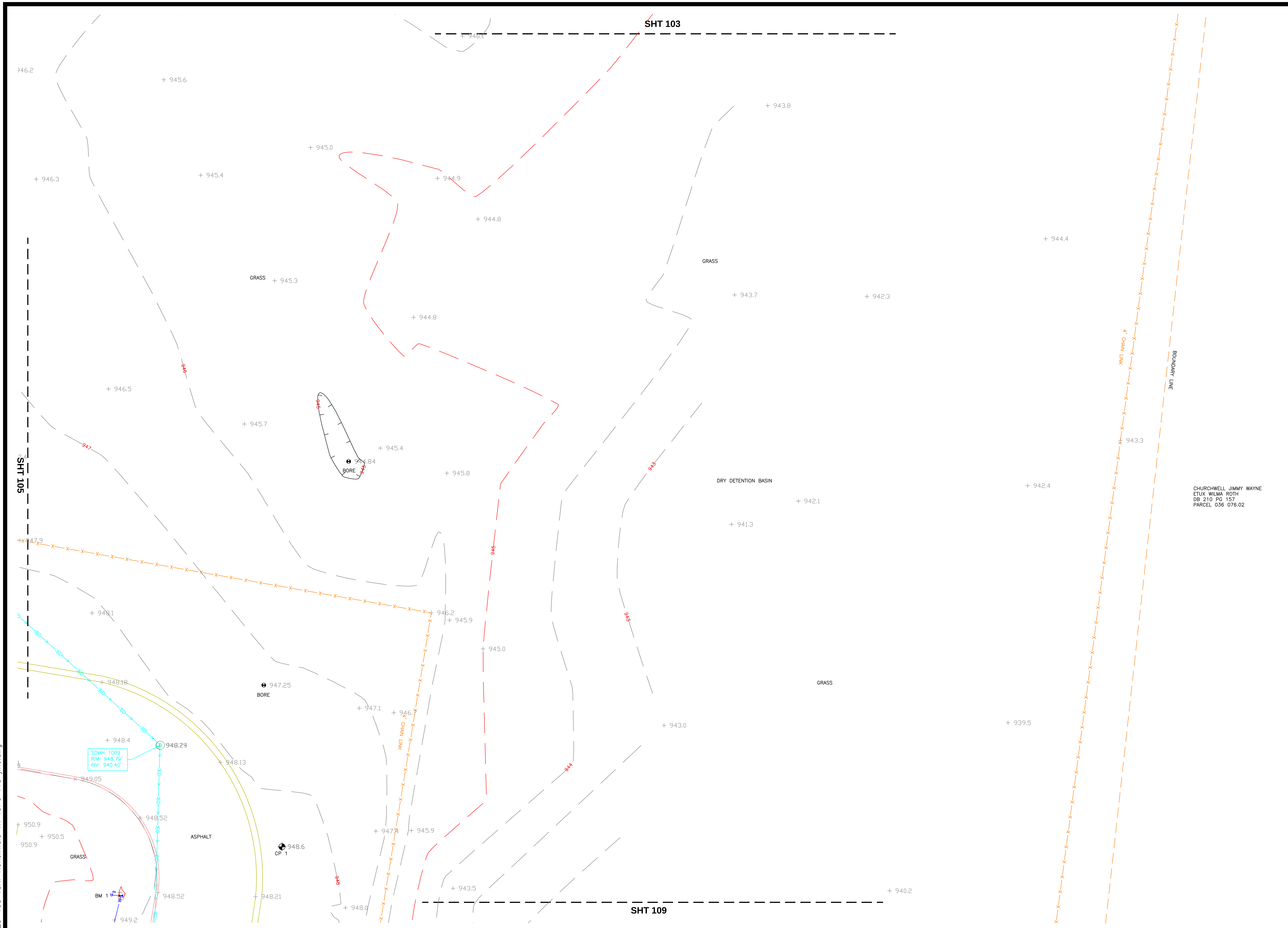


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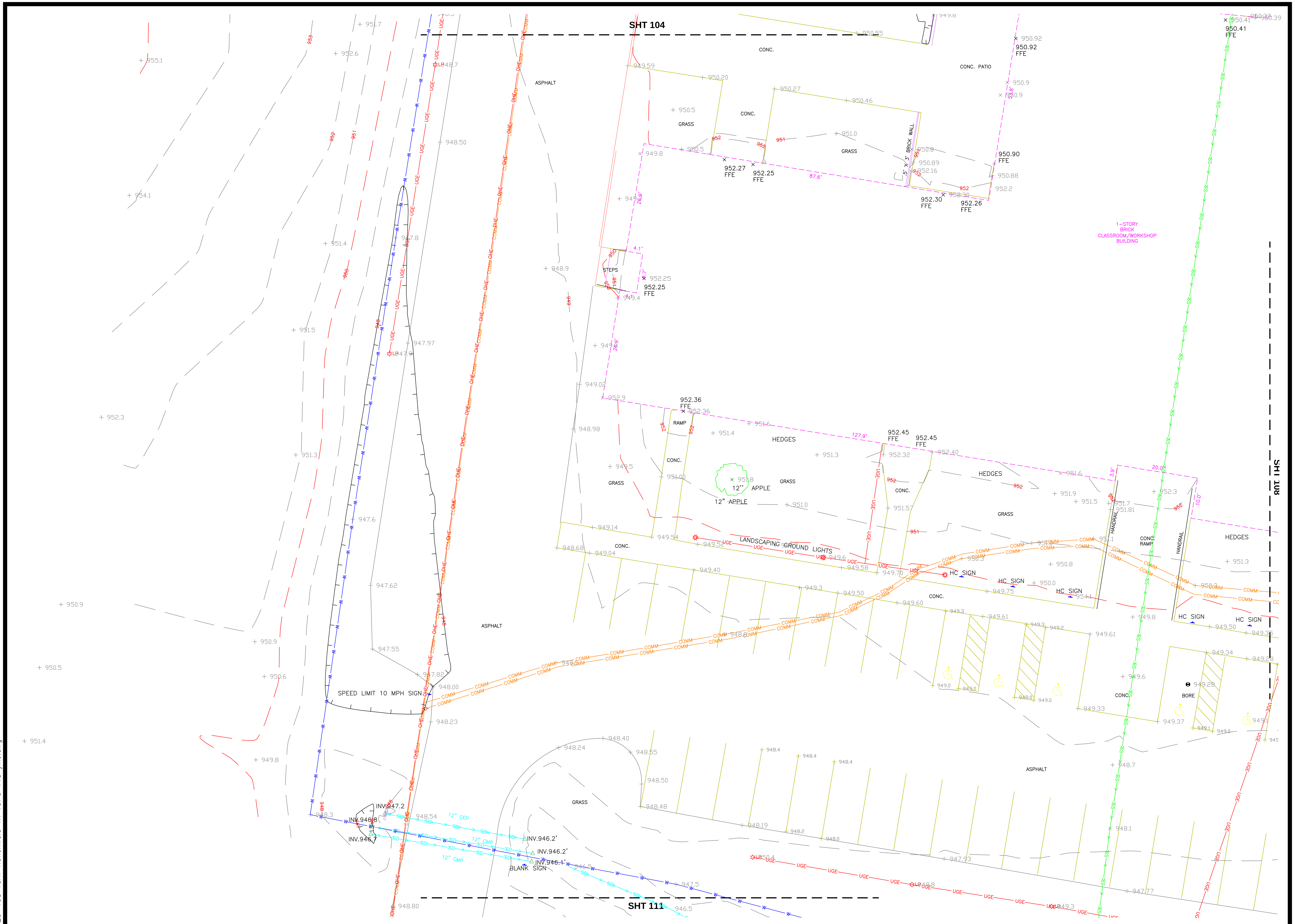


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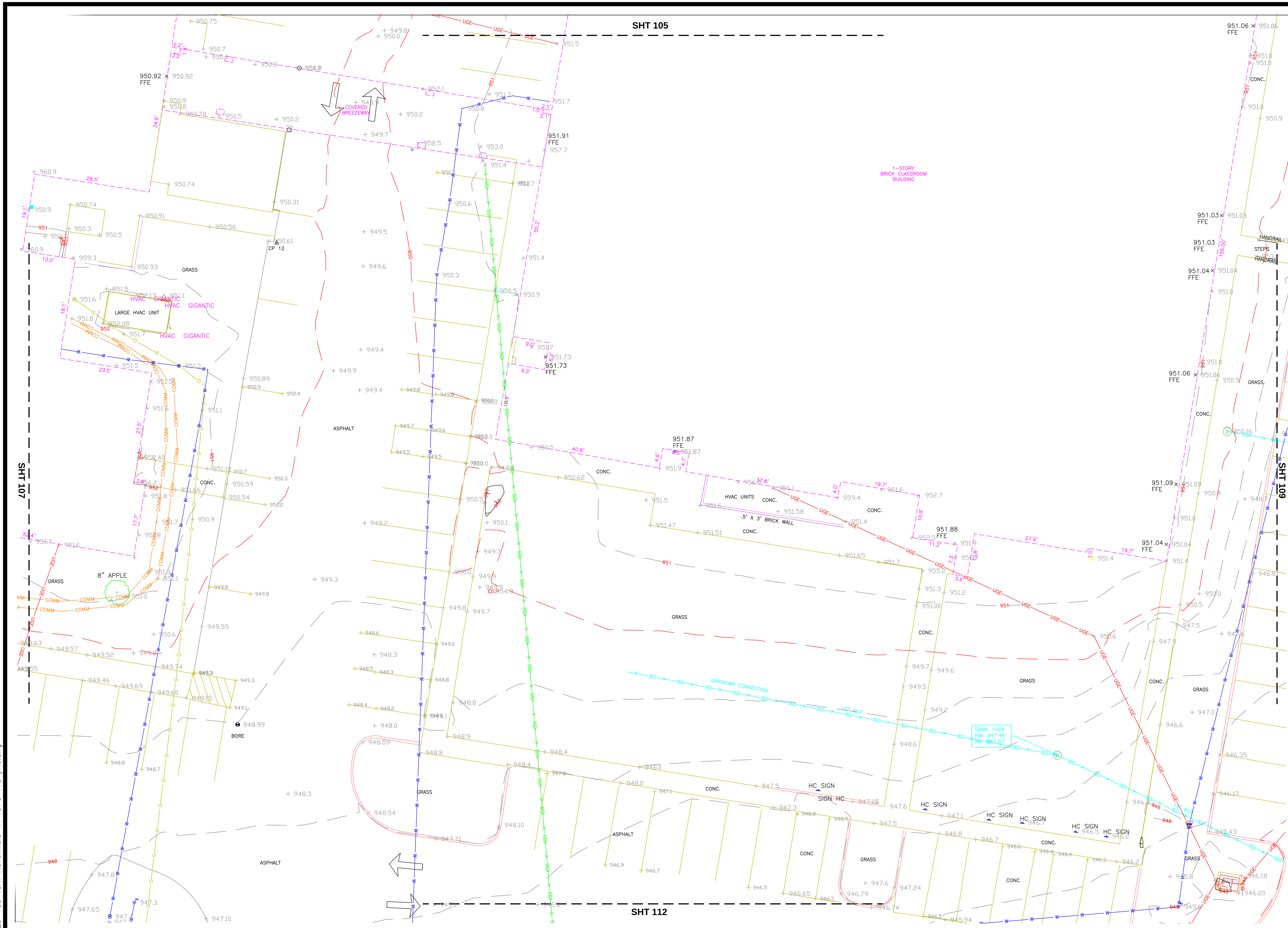


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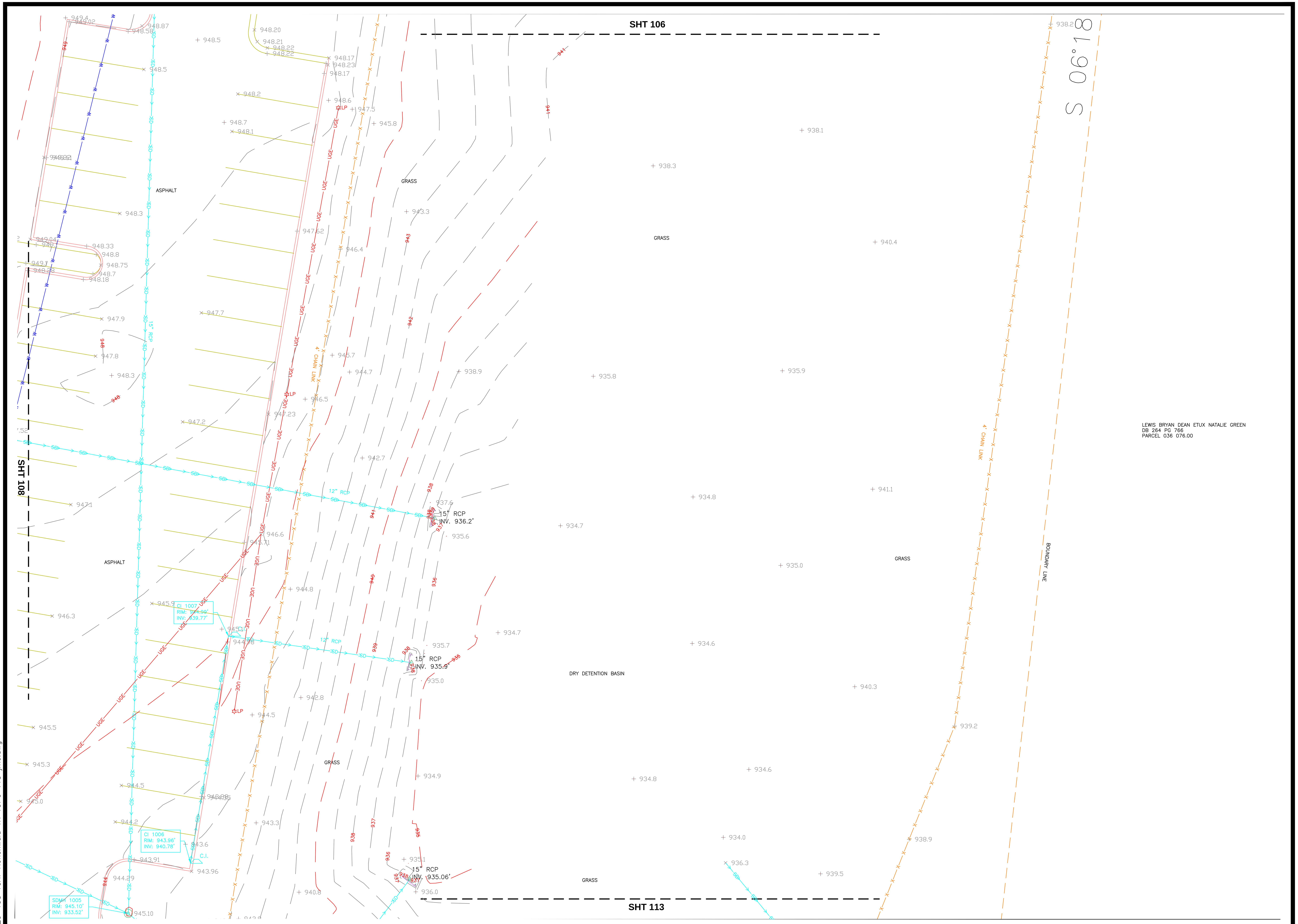


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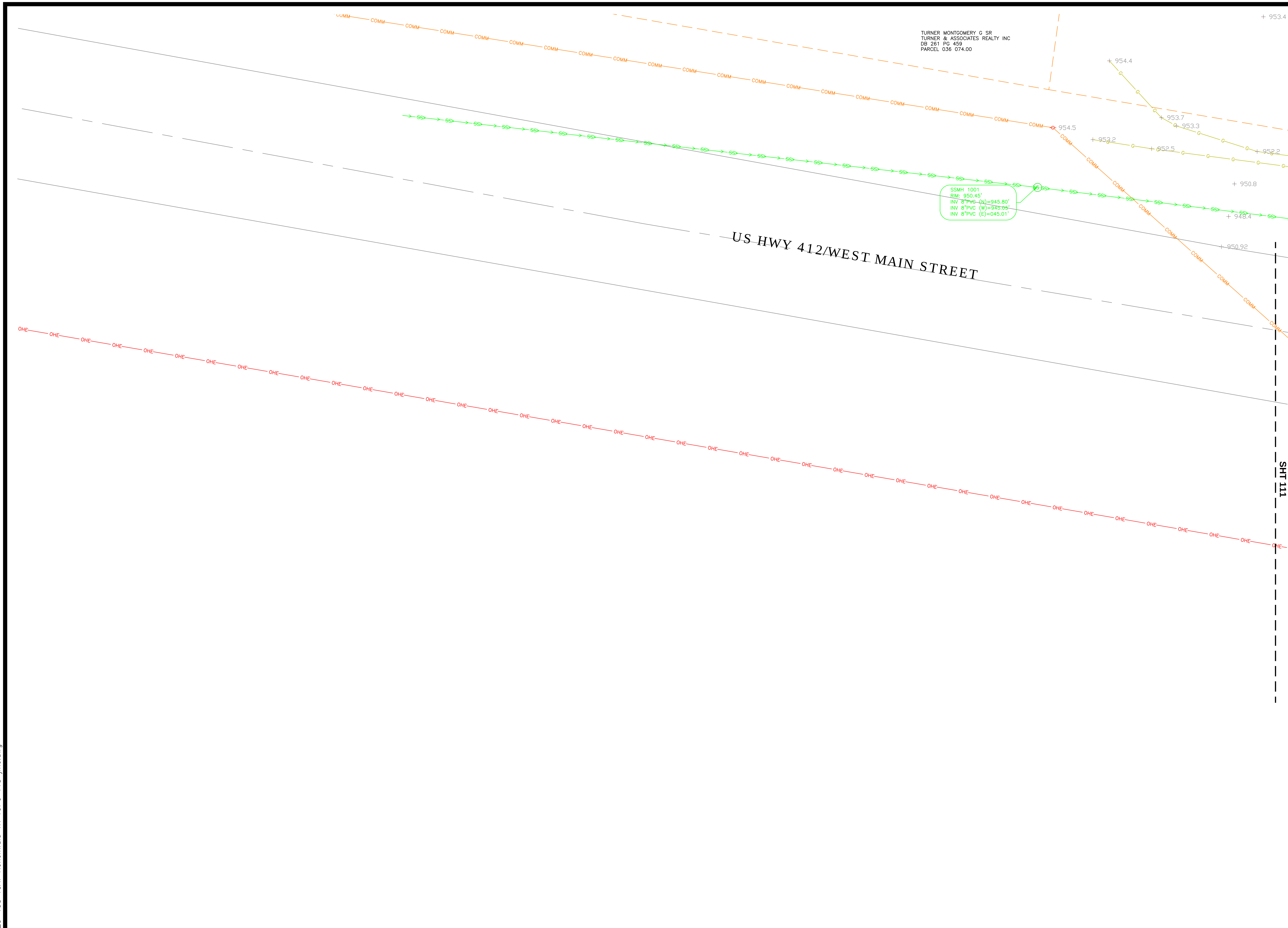


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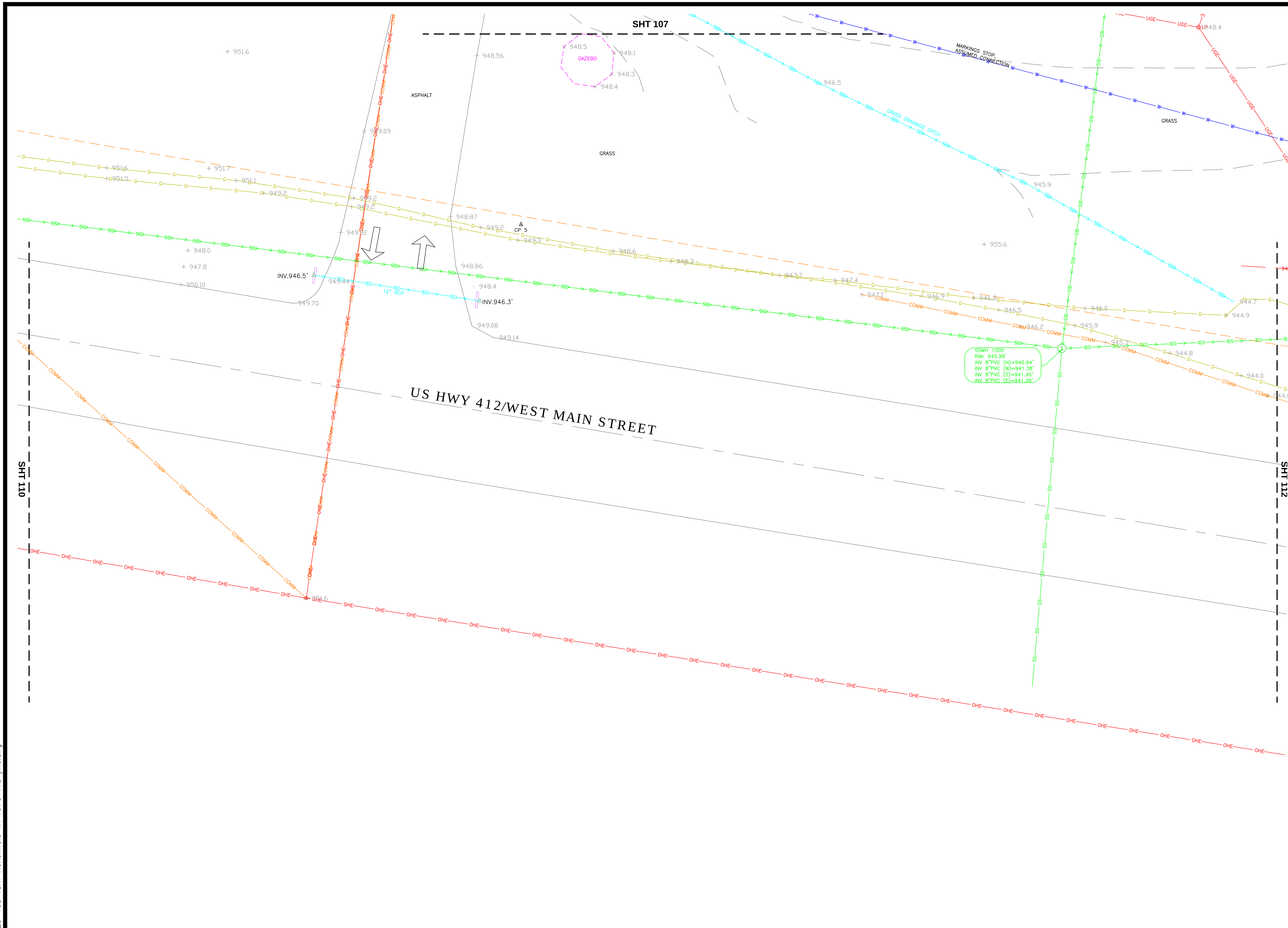


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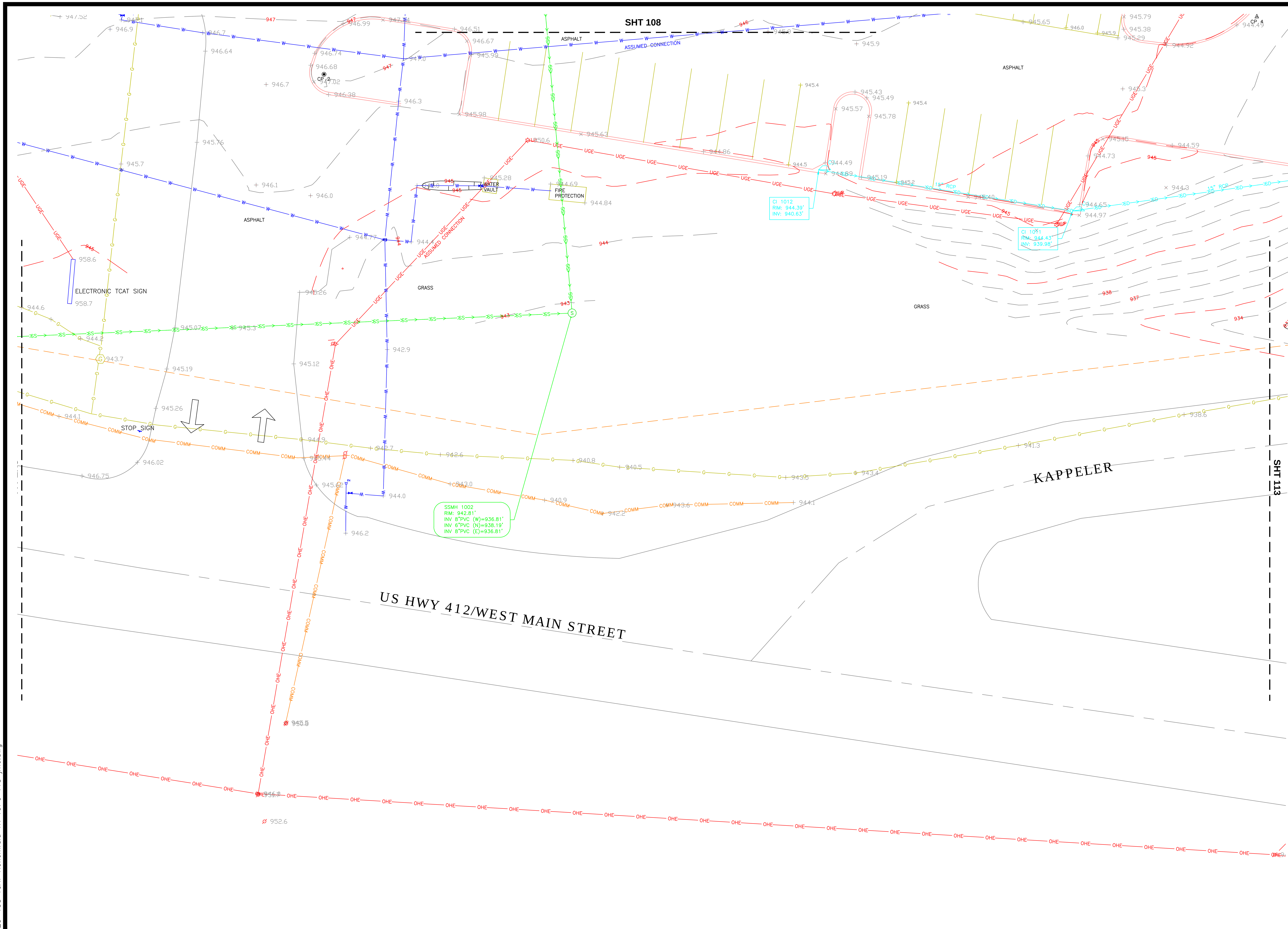


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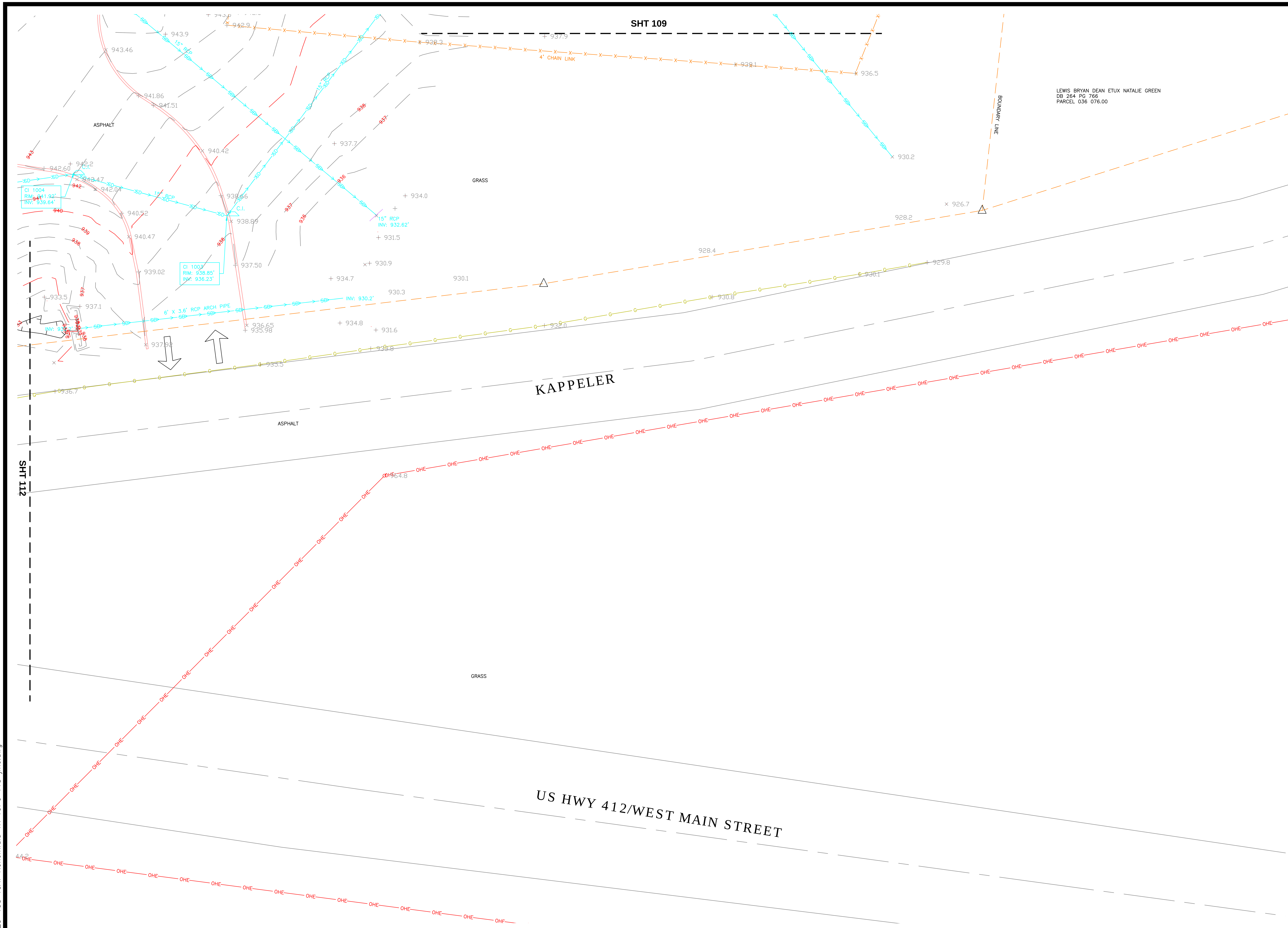


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