

# **APPENDIX - G**

**Geotechnical Report**  
(for information only)

**PRELIMINARY  
GEOTECHNICAL REPORT**

**FORT LEONARD WOOD  
WEST GATE ACCESS ROAD**

**PULASKI COUNTY, MISSOURI**

**FOR**

**US ARMY CORPS OF  
ENGINEERS**

**NOVEMBER 2001**



# FORT LEONARD WOOD WEST GATE ACCESS ROAD

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## **1.0 INTRODUCTION – PROJECT DESCRIPTION**

The project will consist of the construction of approximately 4.5 miles of two-lane roadway, including a bridge structure over Roubidoux Creek. The alignment begins at Route H, approximately 1 mile south of Interstate 44, located at the northwest corner of Fort Leonard Wood, progresses eastwardly through the Fort Leonard Wood Military Reservation to the intersection of Pulaski Avenue and Indiana Avenue. The roadway limits begin at approximately Station 82+50 and end at Station 317+65.

The bridge over the Roubidoux Creek will be constructed between approximate stations 163+90 to 168+95. Two bridge alternatives are being proposed, a steel plate girder span alternative consisting of 5 bents, and a precast concrete span alternative consisting of 6 bents.

Box culverts and cross road culverts will be used to reestablish drainage. This project is planned to include the use of box culverts, reinforced concrete pipes, and small inlet pipes.

This report provides subsurface information and preliminary evaluation of the roadway, bridge, and drainage structure portions of the project.

## **2.0 SOIL TYPES AND GEOLOGICAL FORMATIONS**

The Clarksville Stony Loam and Clay Pockets were encountered in this survey. The Clarksville is derived from dolomite, is gravelly, and contains a thin stratum of silt with sands in the upper portion but is mostly made up of highly plastic clay. A thin A Horizon is present with total thicknesses ranging from 0 to 12 inches and typically consists of lean clays with organics. The C Horizon beneath the A Horizon consists typically of reddish brown to yellowish gray fat clay (CH) with differing percentages of residual chert gravel content, although silt with sand and lean clay (CL) soils were also encountered. Present also are fat clay pockets that are generally rock-free.

The on-site soils, classified as CH, display high potential volume change characteristics upon the addition of moisture. Group indices of the soils range from 16 to 20, calculated using the MSHC Geology and Soils Manual.

Representative samples obtained during drilling consisted of four bulk samples and one thin walled tube sample. Test assignments were made by HNTB and were tested by Terracon in accordance with AASHTO and/or ASTM Standards. The natural moisture content obtained from the tube sample was 22.4 percent corresponding to a dry unit weight of 100.2 pounds per cubic foot (pcf). Three Standard Proctors were performed with optimum moisture contents ranging from 22 % to 24.5 % and maximum dry densities ranging from 96 pcf to 100 pcf. Four sieve analyses and one California

Bearing Ratio (CBR) were performed. All test results are contained in Section 9.0 of this report. Table 1 provides a standard Summary for Soil Survey Sheet.

The proposed project is located within the Salem Plateau of the Ozark Plateaus Physiographic Province. Geologically, the area is an ancient, gently uplifted plateau where steep valleys have been eroded downward through the bedrock. Some areas adjacent to waterways have been eroded so as to expose steep rock bluffs.

Local relief in the area may be as great as 300 feet. The highest elevation on this project is just over 1150 feet above sea level. The lowest point in the project is in the vicinity of the Roubidoux Creek with an elevation of approximately 790 feet above sea level.

The uplands are characterized by forested, long, narrow tapering ridges. Typically, soil thickness varies from 0 to 5 feet. The soil thickness in general is greater on top of the ridges than on the slopes due to the nature of the weathering of the parent bedrock. The Roubidoux Creek occupies a broad flat valley filled with granular alluvium with bedrock exposed in the channel. The alluvial gravel is composed of mostly subrounded chert and dolomite with sand size and finer particles.

The proposed project area is underlain by a thick sequence of mostly carbonate rocks from the Ordovician age of the Canadian Series. The oldest formation encountered on the project is the Gasconade Dolomite. The Gasconade can be generally described as two units of light gray dolomite, an upper unit of thick-bedded coarsely crystalline dolomite, relatively chert free, and a lower very similar unit with higher percentages of chert. Total thickness of the Gasconade averages about 300 feet. The Gasconade is exposed in the lower elevations of the project area, namely along the valley walls adjacent to the Roubidoux Creek.

Above the Gasconade Dolomite is the Roubidoux Formation. The contact between the Roubidoux and the underlying Gasconade is not well defined, but the Roubidoux is composed of dolomite, cherty dolomite, sandstone, and very minor, very thin shale layers. The Roubidoux is encountered in most of the steep slopes and bluffs in the project area. Average thickness of the formation is about 120 feet.

The Jefferson City Formation is the youngest bedrock formation within the project area and it usually caps the hills. The lower contact between the Jefferson City and underlying Roubidoux is also difficult to distinguish. The lithology of the Jefferson City can be described as alternating layers of thin to medium bedded layers of light brown, cream, and tan, medium to finely crystalline dolomite, argillaceous dolomite, fine grained non crystalline ("cotton rock") dolomite, and thin sandstone. Small amounts of chert also occur throughout the formation.

Structurally the bedrock can be generalized as relatively flat lying layers of sedimentary rock. All formations display bedding and jointing of some sort. Regional dip is rather shallow and to the northwest although some complex flexure and dip is observed locally and is usually associated with the sink structures. Locally folded and sheared beds at

the sinks may display dips to near vertical. While faulting is not prominent, a few are noted to occur in the area. These ancient faults would trend northwest - southeast as in most of this region of Missouri.

A few karst features forming mostly in the Roubidoux Formation have been noted within the project area. Karst features develop when a carbonate rock such as dolomite and limestone have been dissolved by natural chemical processes to form small caves, springs, sinkholes, etc.

### **3.0 FIELD INVESTIGATIONS**

The field investigations for this preliminary geotechnical report were completed between August and October 2001. The drilling, sampling, and testing was performed under subcontract with Ocheja Engineering, Inc. (OEI), St. Louis, Mo.

Boring locations were staked in the field by licensed professional surveyors. Borings were taken generally every 200 feet at centerline and right and left outside ditchlines through each cut area to top of rock for the full four-lane roadway. In each cut area, one boring was accomplished to planned grade using coring techniques. A total of two borings were drilled in areas to receive fill, identified as boring BF-140 and BF-223. Some cut and fill locations were inaccessible for borings due to steep slopes, heavy trees, etc.

Bridge borings were advanced by Standard Penetration Test methods and one boring at each bent was rock cored.

Borings were completed using one of the following: a truck-mounted CME 75, rubber tired CME-750, track-mounted CME 850, or CME 450 truck-mounted drill rig. All borings were logged in the field by a HNTB geologist using ASTM visual/manual methods. Logs for these borings are included as Section 9.0 of this report.

Rock outcrops were identified by the field geologist. Fill areas were visually observed to identify any possible problem areas. Section 8.0 contains plan sheets with boring locations that also show rock outcrops and profile sheets that show centerline borings and include approximate top of rock.

### **4.0 PRELIMINARY GRADING RECOMMENDATIONS**

The moisture content of the soil at the time of compaction should be not less than optimum. Standard MoDOT placement procedures should be adequate. Lift thickness and compaction requirements for both soil and rock are covered under MoDOT Standard Specifications (Standard Specification 203).

Site soils considered A Horizon soils were limited; however, contain organics. A Horizon soils are unacceptable for use as fill material. After clearing and grubbing the area the A Horizon soils should be scalped according to MoDOT Standard Specifications (Standard

Specification 203.2.6). The scalped materials should be used as final cover on slopes to facilitate growth of vegetation.

Project borings indicate excavations will be both Class A, fat clay with chert gravel, and Class C, rock (weathered to intact dolomite). The Class A materials are highly plastic and have high swell potentials when exposed to moisture. These Class A clays commonly contain 20 to 30 percent chert gravel, with pockets of red, highly plastic, generally rock-free fat clays present. Class A soils shall be considered an acceptable material for embankment construction provided these soils are compacted to not less than optimum moisture content. Where rock-free Class A deposits are encountered, these soils should be wasted or thoroughly broken down and mixed with more gravelly Class A materials if used in the embankments. Class C rock materials can be utilized in fill areas, but should not be placed in the center of fills but rather located where free drainage is allowed.

In fill areas, where rock outcrops are encountered, or in other areas where water or wet conditions are present, it is recommended that a 2-foot thick rock fill blanket be placed at the base of these fills. The blanket is to allow passage of any seepage waters, and should extend and daylight from outside slope to outside slope. The rock fill should meet the requirements of Section 611.10 of the Standard Specifications.

In cut excavations, undergrading throughout the alignment in both Class A materials and Class C rock should be considered to provide a uniform subgrade beneath pavements. Rock within roadbed limits shall be removed to the limits of undergrading and replaced with rock fill base or granular base materials. Compacting in cut is covered in MoDOT Standard Specifications 203.3.7 and 203.3.8.

Review of the profile grade suggests deep fill depths on the order of 40 to 90 feet will be required to achieve subgrade elevation. Embankment control should be administered in these deep fill areas.

The mouth of an underground tunnel and Boundary Pit Cave are present within the project area, and were located by others. These cavities were not investigated, nor were sinkholes, other caves, or springs investigated within the construction limits during subsurface investigations. Final design plans should address the handling of these features should they be encountered during construction.

#### **4.1 PRELIMINARY EARTHWORK FACTORS**

Shrinkage as taken from the MoDOT Soils and Geology Manual for Clarksville Horizon C soils ranges from 0.98 to 1.28 depending on the percentage of chert gravel. A majority of the Horizon C soils contained chert gravel; however, scattered pockets of rock free highly plastic clays were present. Review of preliminary boring logs, laboratory data, and previous experience with similar soils indicates a preliminary earthwork factor of 1.12 for Horizon C soils.

Rock materials swell in volume when taken from cut to fill. A preliminary swell factor of 1.20 is recommended for Class C excavation materials.

## **5.0 PRELIMINARY SLOPES**

### **5.1 FILL SLOPES**

A majority of the excavations will be within the Class A fat clay soil materials that contained admixed chert gravel. Utilizing these soils and rock materials, all fill slopes should not be constructed steeper than 2H:1V. Bridge approach and spill slopes should be no steeper than 3:1 (H:V). Station limits of the 3:1 (H:V) slopes should be between stations 160+75 to 164+00 and stations 168+95 to 183+00.

Fill heights up to 90 feet, between stations 100 to 130, will be placed and compacted to achieve final subgrade elevation. It is the intent that between these stations the embankment be constructed of rock fill with slopes no steeper than 2H:1V. Site subsurface conditions indicate a significant quantity of rock cut to be present from approximate stations 130 to 160 that could be available to use in constructing this embankment section.

Occasionally, deep fills placed to achieve grade cover ravines that are parallel to the alignment. During final design, should fills cover a ravine, consideration should be given to placement of a rock blanket in the ravine, prior to filling to the anticipated grade.

With exception of the deep fills, it is assumed no major sorting of soil and rock materials in the fills other than the rock blanket at the base of the embankments. Care should be taken during construction to avoid internal pockets of rock material that contain voids, and should be mixed thoroughly with finer materials.

### **5.2 CUT SLOPES**

#### **5.2.1 SOIL**

Soil backslopes above rock should be cut no steeper than 2H:1V. Where pinnacled rock is encountered within primarily soil cuts, the rock can be cut back as for a soil or placed as for rock cuts if stable.

#### **5.2.2 ROCK**

Stable rock encountered in cuts can be cut with maximum 30-foot height vertical faces from the low point of the cut with horizontal benches 20-feet wide in between each vertical cut. A 15-foot bench should be placed at the top of rock between the rock face and soil backslope.

A minimum eight-foot flat bottom ditch width is to be used at the toe of all rock cuts. The ditch depth of three feet from the shoulder should be sufficient to contain rock

fall. Presplitting is recommended at all final rock faces to promote long term stability, safety, and reduced maintenance.

## **6.0 PRELIMINARY FOUNDATIONS**

### **6.1 BRIDGE FOUNDATIONS**

A two-laned bridge is planned to span Roubidoux Creek. Two options were considered for bridge beam design and include a 5 span steel option and 6 span concrete option. The bridge width is 38 feet 8 inches. A summary of preliminary recommended foundation types, elevations, and allowable capacities are included in Section 8.0 of this report.

#### **6.1.1 SUBSURFACE EXPLORATIONS**

A total of 25 borings were drilled by Meyer Drilling, 3 at each bent and an additional 2 borings drilled at the end bents for design of the wingwalls, to obtain subsurface data for foundation design. In general, only one boring at each bent was cored and others were auger borings. The core borings include rock recovery and rock quality determinations (RQD), along with unconfined compression tests on selected rock core samples.

#### **6.1.2 PRELIMINARY FOUNDATION ANALYSIS AND RECOMMENDATIONS**

Preliminary recommendations for foundation types are provided on Table 2 included in Section 8.0 of this report. Interpretation and analyses is based on 25 borings. The following recommendations are based upon the borings drilled at the locations specified on sheets 08 and 08a. These preliminary foundation design recommendations are practical at the boring locations shown on these plans; however, other foundation types including spread footings and piling driven to rock may be feasible.

For End Bent 1, End Bent 5 for the steel option and End Bent 6 for the concrete option, driven H-pile foundations are feasible. Piles should be prebored, the pile then inserted, the prebore hole backfilled with concrete to the recommended elevation and then driven to practical refusal on dolomite prior to concrete set. Backfill above the concreted level should be with sand or concrete as per the design requirements. Wingwalls requiring foundations will be H-piling similar to the appropriate End Bent.

Cast-steel pile points are recommended on all piles to reduce the potential for damage and help insure seating of the piles into the highly weathered bedrock surface. Piles should be spaced center-to-center no less than 3 pile diameters or 3 feet, whichever is greater. No rock fill should be placed in the area of the piles. The pile driving operation should be monitored carefully to ensure that overdriving does not occur and result in damage to the piles.

For Bents 2, 3, 4 or 5, drilled shafts with rock sockets are feasible. Rock sockets are recommended to be designed for axial loading using side shear in competent dolomite with no end bearing. Preliminary recommended design top of drilled shaft, top of rock, top of rock socket, and allowable side shear values are provided in Table 2. The plan rock socket bottom elevation should be the lower of the computed design axial load elevation and the minimum elevation for lateral load requirements.

Groundwater was present within the borings during drilling operations, and; therefore underwater methods of construction using tremie concrete placement is anticipated. Temporary casing should be used above the top of rock socket for all drilled shafts to seal off the overburden and facilitate dry hole construction and inspection. Removal of water by pumping may be required to facilitate final cleanout, inspection and concrete placement.

A full-time qualified inspector who has knowledge of the geology of the site and design conditions should perform inspection of the drilled shaft construction. Primary inspection of the rock socket sides and bottom is anticipated to be by visual means or television camera if the shaft is considered unsafe to enter or not dry. The borings suggest rather consistent top of rock elevations, however, adjustments in the rock socket lengths during construction may be required.

Highly plastic clays such as encountered,  $PI > 48$ , should be excluded from the approach fills and backfill altogether. Rock can be used in the approach embankment fills; however, no rock should be placed in the areas of the planned piling. As a minimum, a 2-foot thick rock blanket should be placed at the bottom of the approach fills in low areas and over exposed rock outcrop areas and extended to daylight at the base of the fill for drainage.

## **6.2 DRAINAGE STRUCTURES**

To reestablish drainage, box culverts, cross-road reinforced concrete culverts, and median drainpipes are planned.

Depending on the flow line of the culverts, review of the available preliminary borings suggests both Class C rock and Class A fat clay admixed with chert gravel may be encountered within the bottoms of the culverts. Class C excavation should be anticipated.

For box culverts, based upon the subsurface conditions, bottom slabs will likely be needed. Standard Specification Section 206 applies to box culvert construction.

For reinforced concrete pipe culverts, backfilling and bedding material are important factors in long term performance. These items are covered under MoDOT Standard Specification 726.

## **7.0 PAVEMENTS**

Pavements provide a level and durable surface that will support imposed traffic loads. The performance and durability of roadways is directly related to the design, quality, and construction of the underlying subgrade as well as the overlying pavement surface.

Pavements can be separated into either flexible or rigid types. Flexible pavements consist of a thin bituminous wearing surface overlying a bituminous base course. Rigid pavements are constructed of Portland Cement concrete. Factors in final selection of pavement type include economics, material availability, traffic volume and type, and soil characteristics.

Pavements are classified as Heavy Duty Pavements, Medium Duty Pavements, and Light Duty Pavements according to MoDOT. The classification of pavement is based on the accumulated number of Equivalent Single Axle Loads (ESAL's) in a 35-year period. The classification of pavement for this project is Medium Duty.

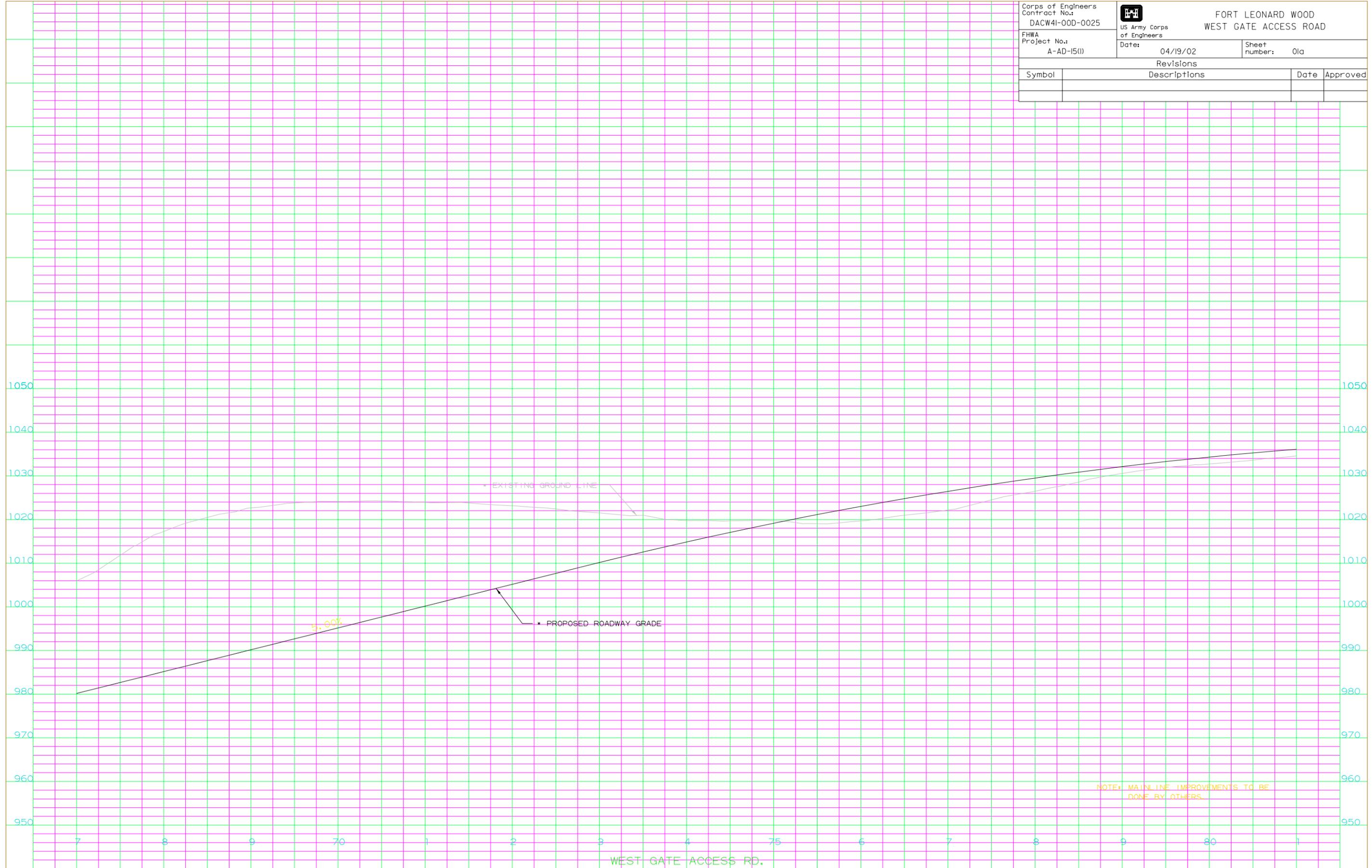
For both rigid and flexible pavement types, either rock base (minimum 2 feet in thickness) or Type 5 aggregate base (minimum 4 inches in thickness) are to be placed beneath Medium Duty pavement. For the alignment shown on the plan and profile sheets, it appears that a suitable quantity of rock base material is not available from the cuts to provide 2 feet of material to support the entire roadway pavement.

For final pavement design, Chapter VI of MoDOT's *Project Development Manual* covers the design of pavement structures for both pavement alternatives, and the *Missouri Standard Specifications for Highway Construction* covers construction requirements.

## **8.0 TABLES AND SHEETS**



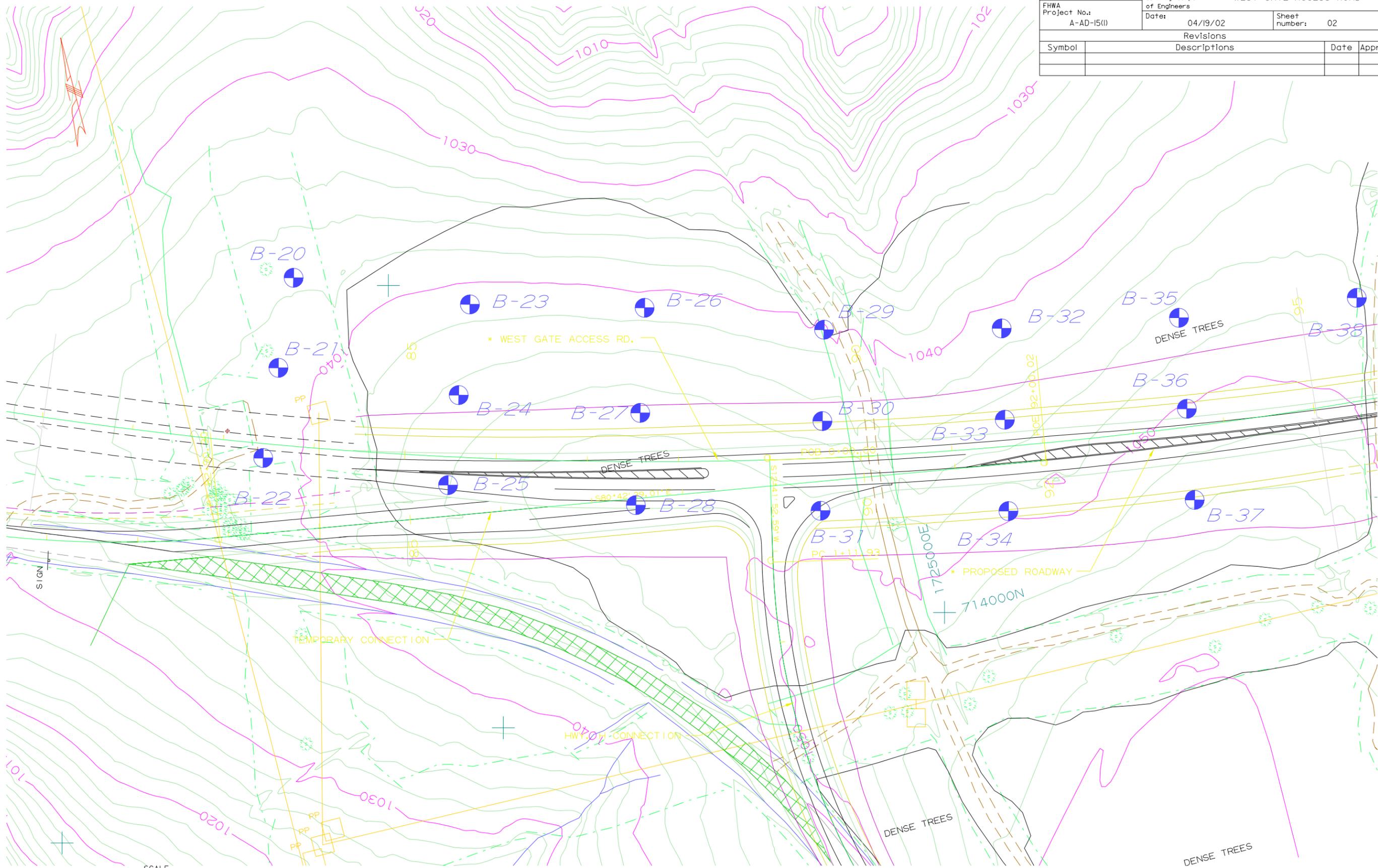
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FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: 01a
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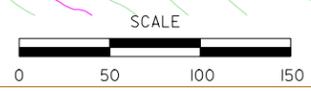


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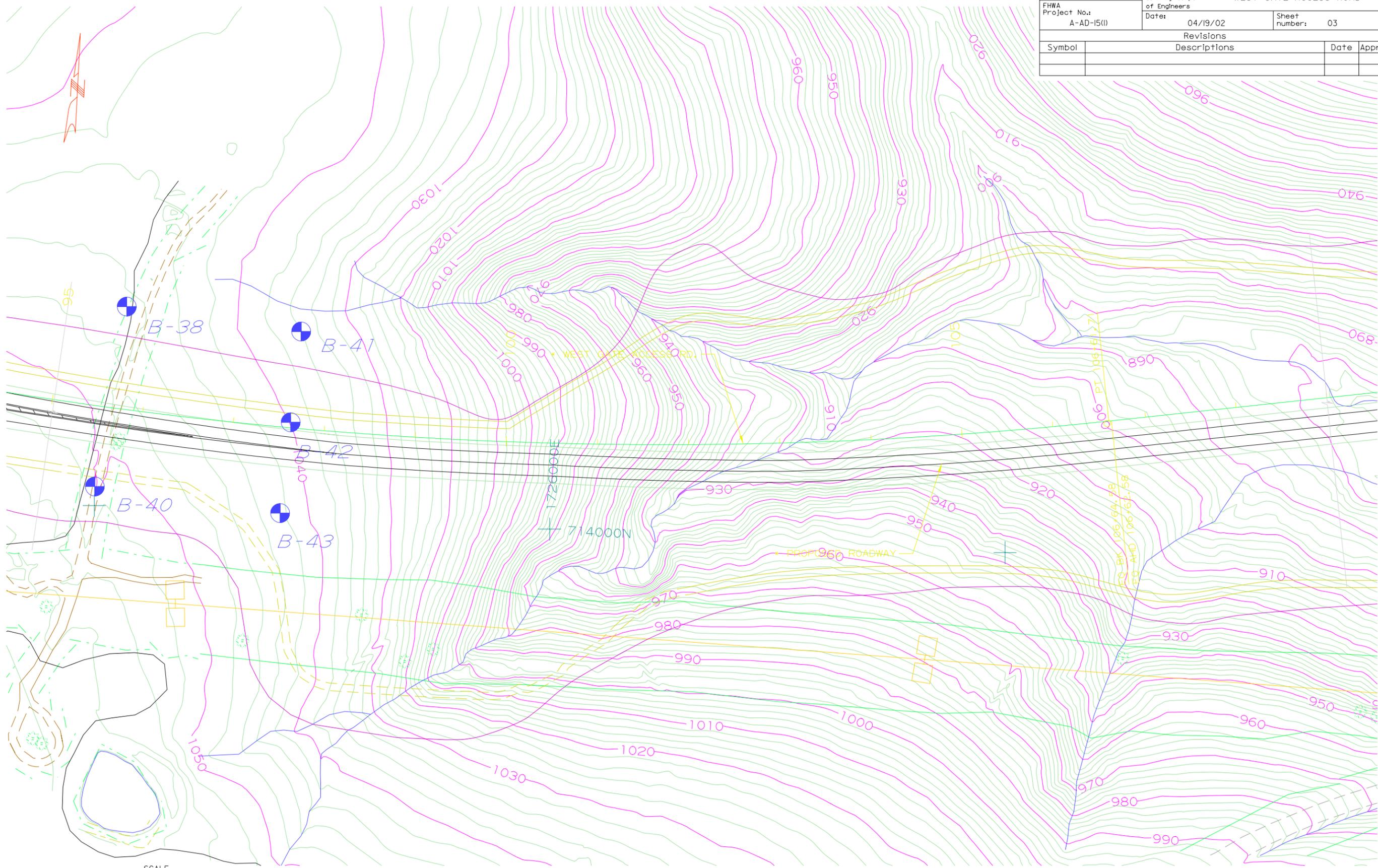
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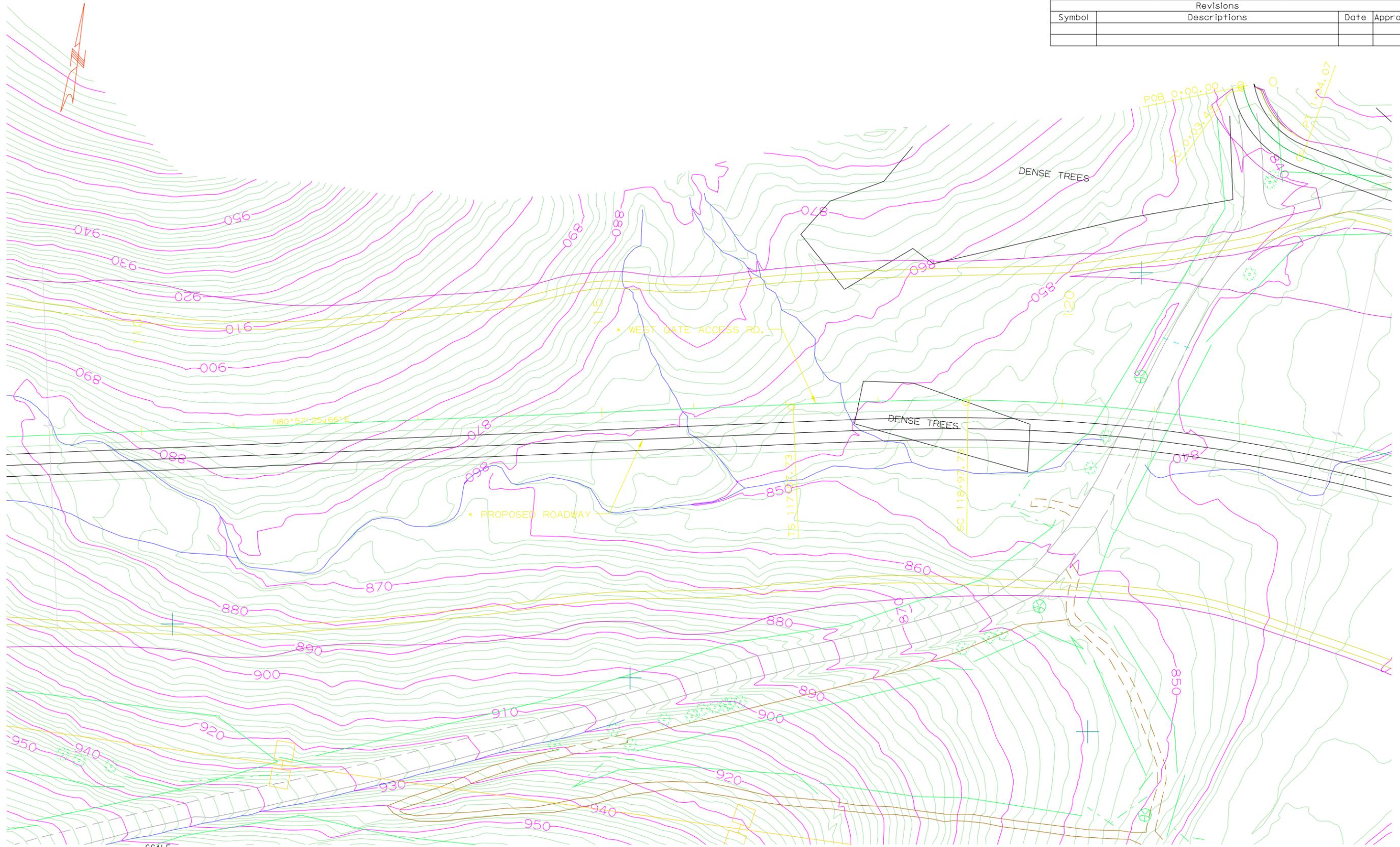


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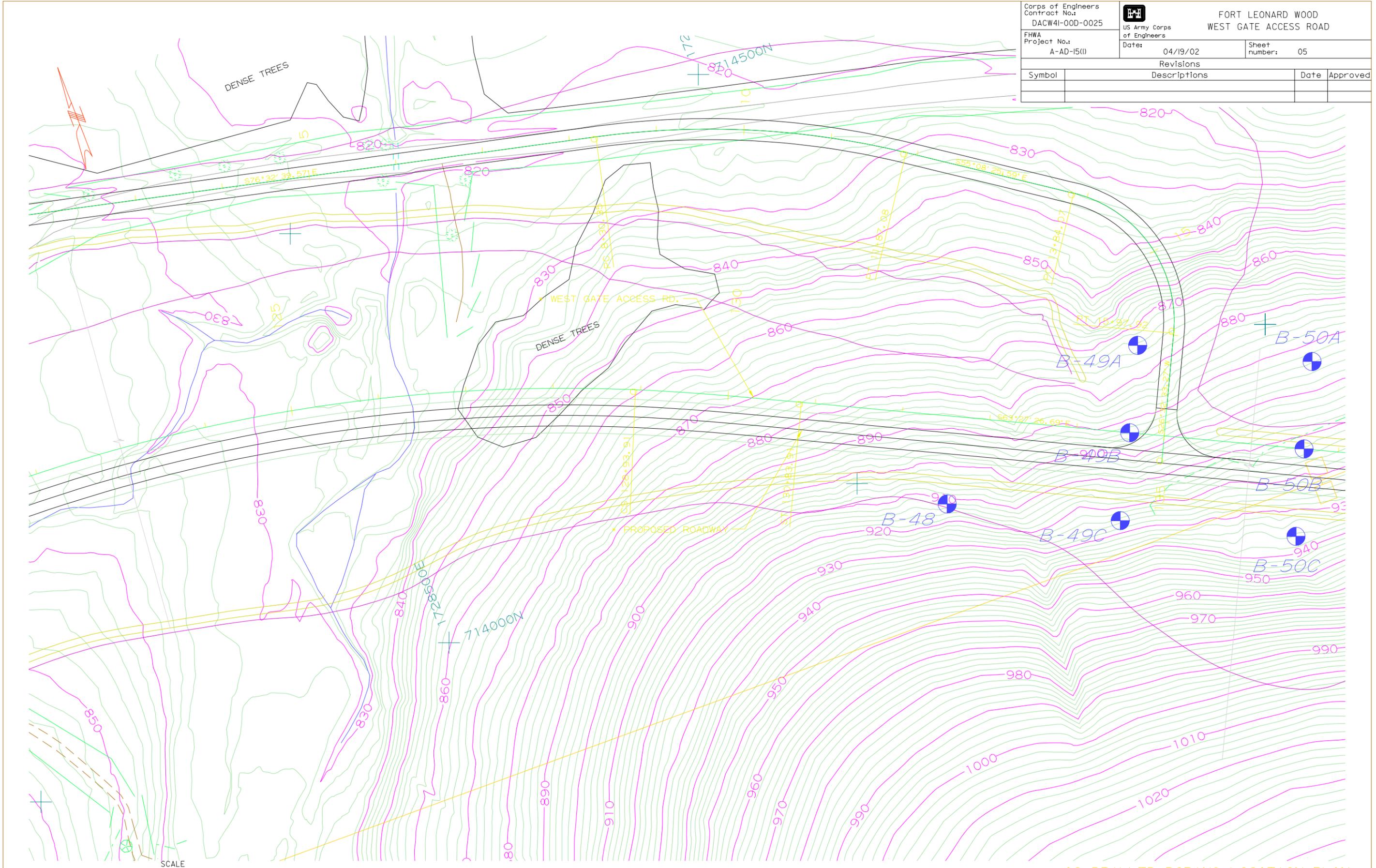
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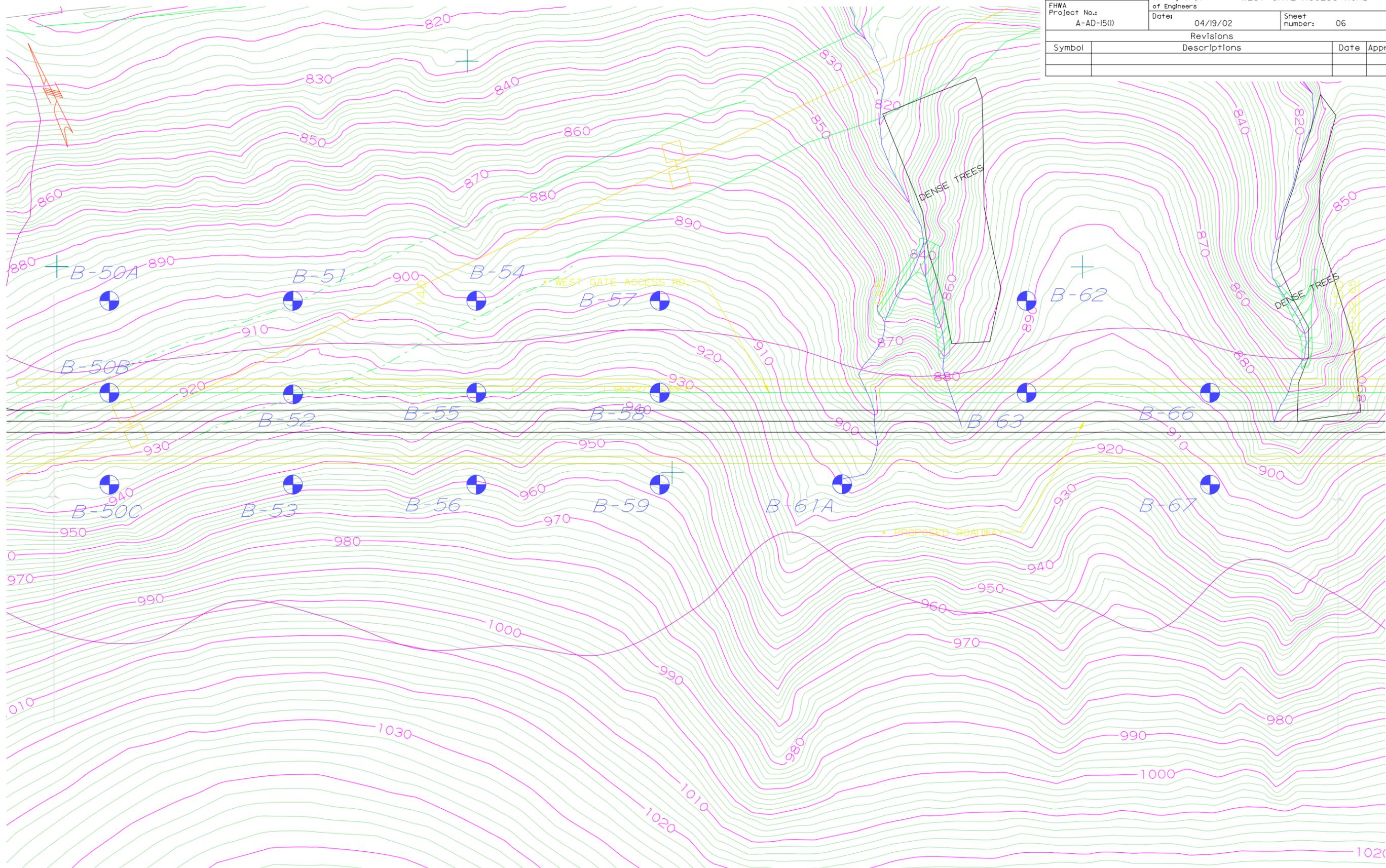
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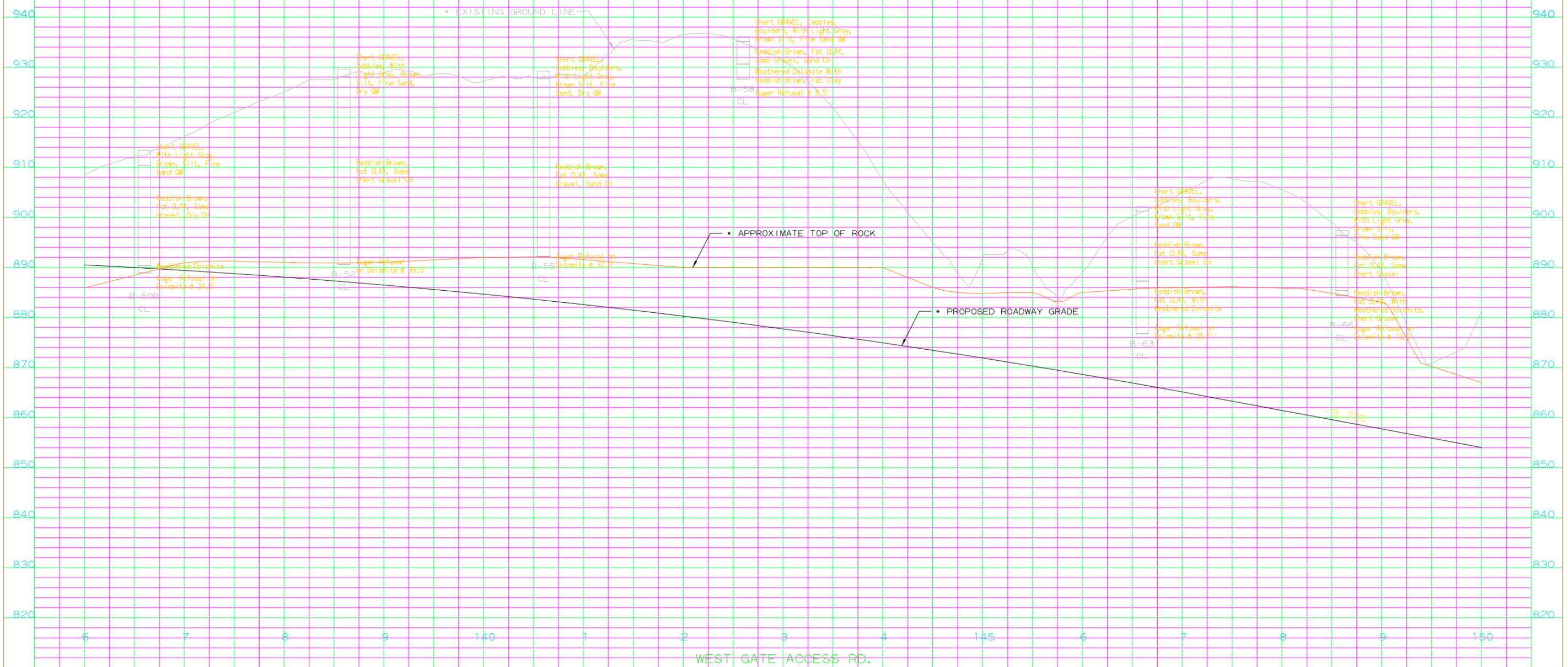


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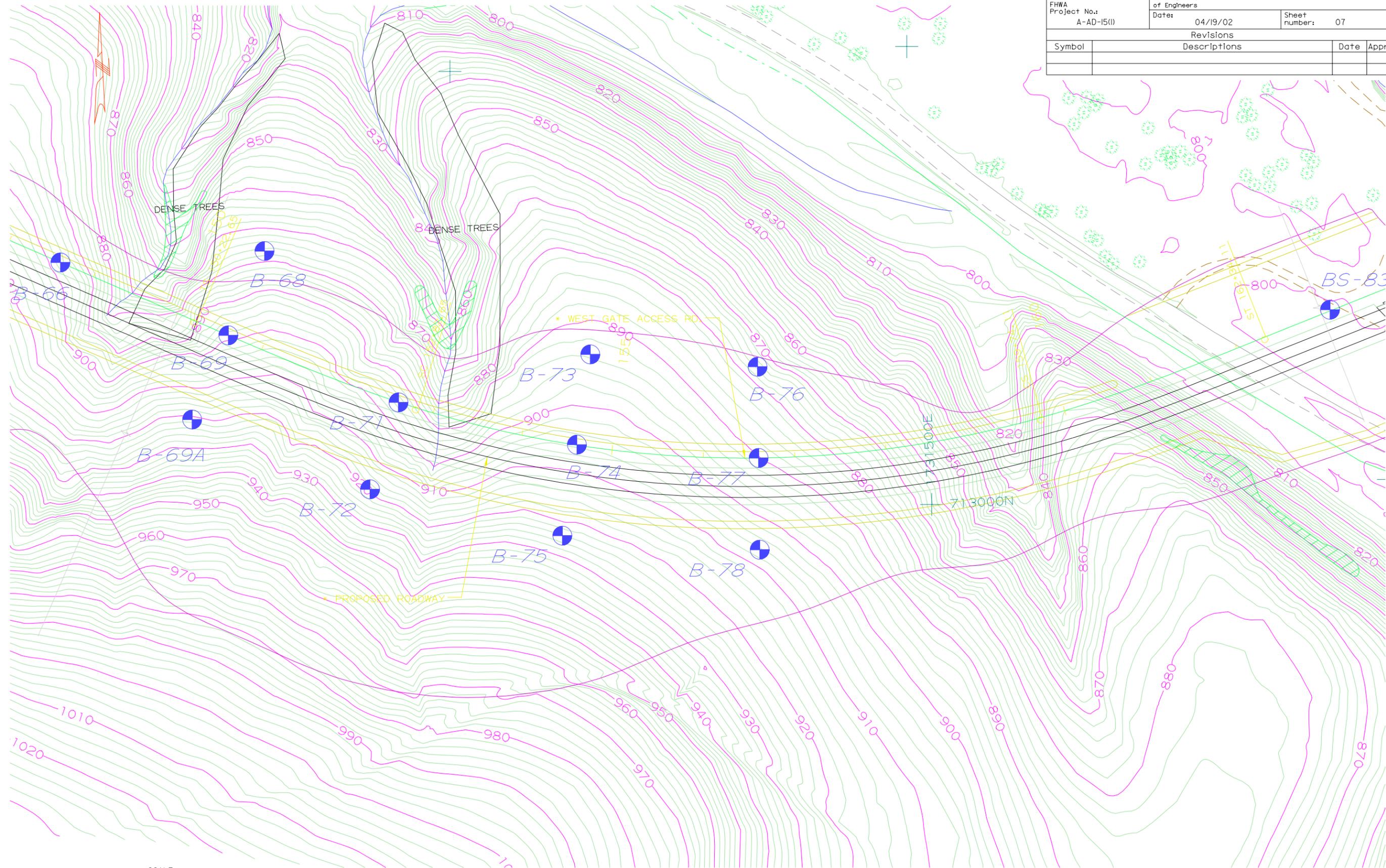


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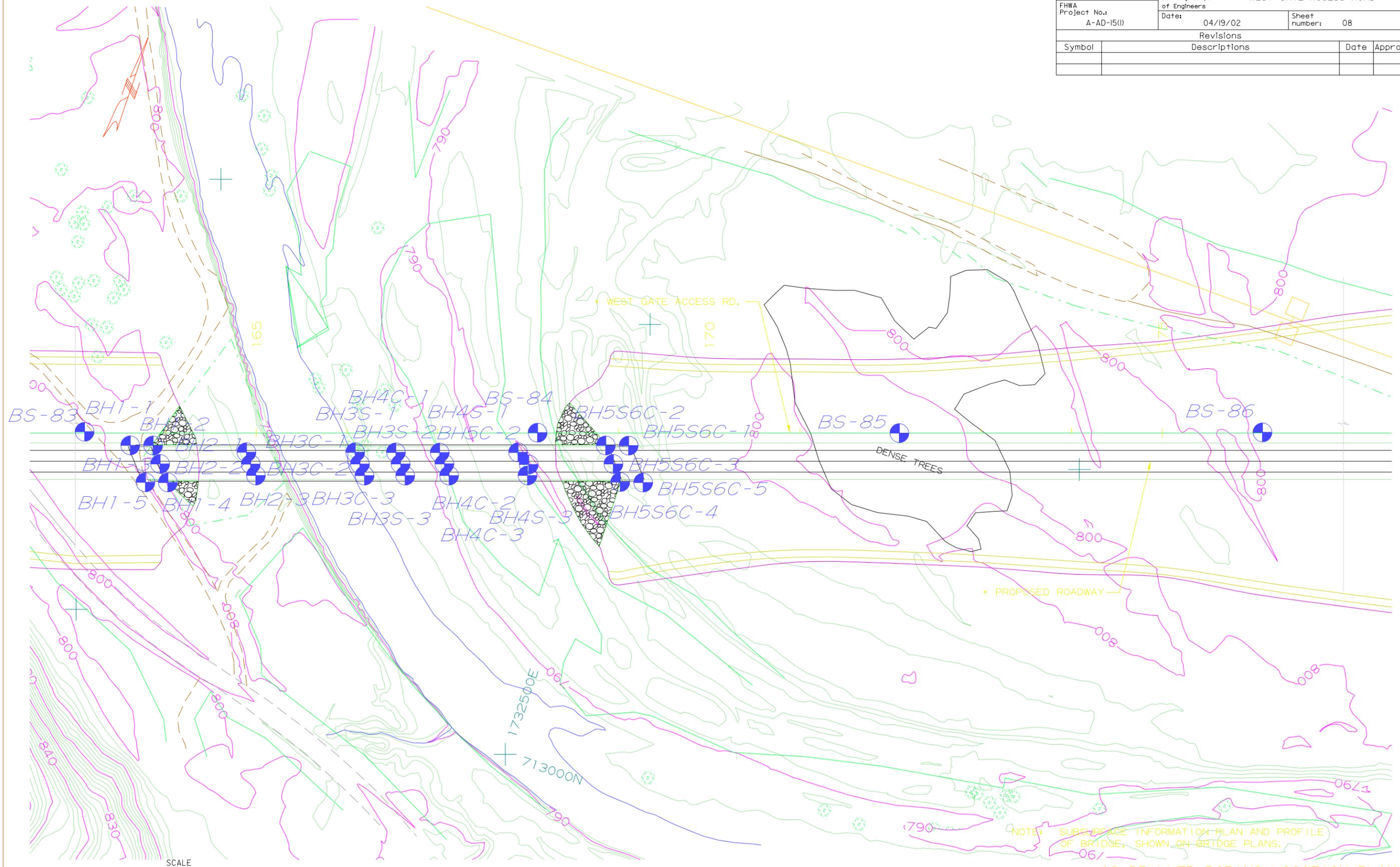
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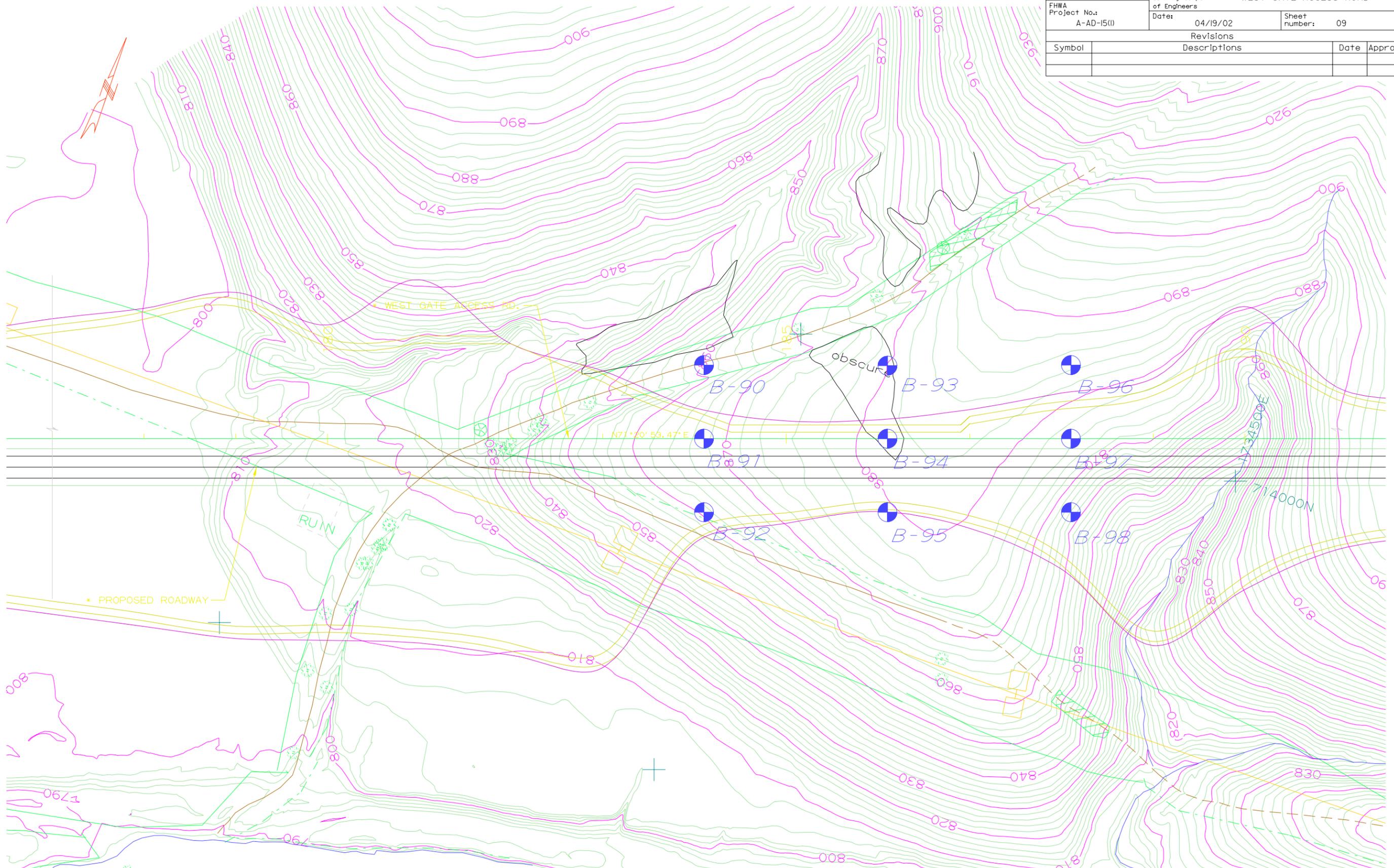


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BH3C-1  
21' RT.

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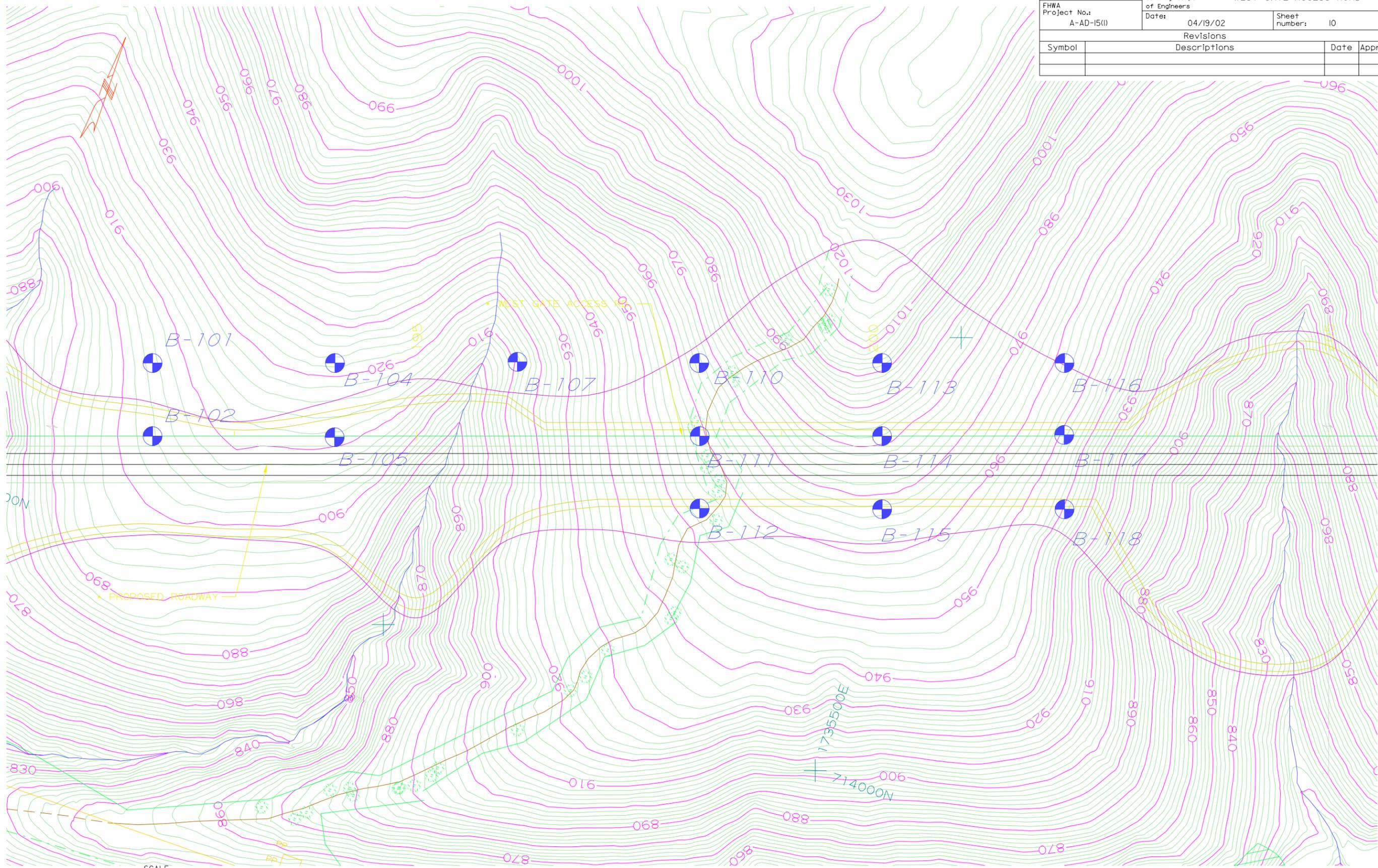


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WEST GATE ACCESS RD.

Corps of Engineers Contract No.: DACW41-00D-0025		 FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: 10
Revisions			
Symbol	Descriptions	Date	Approved



AS-DRILLED BORING LOCATION PLAN

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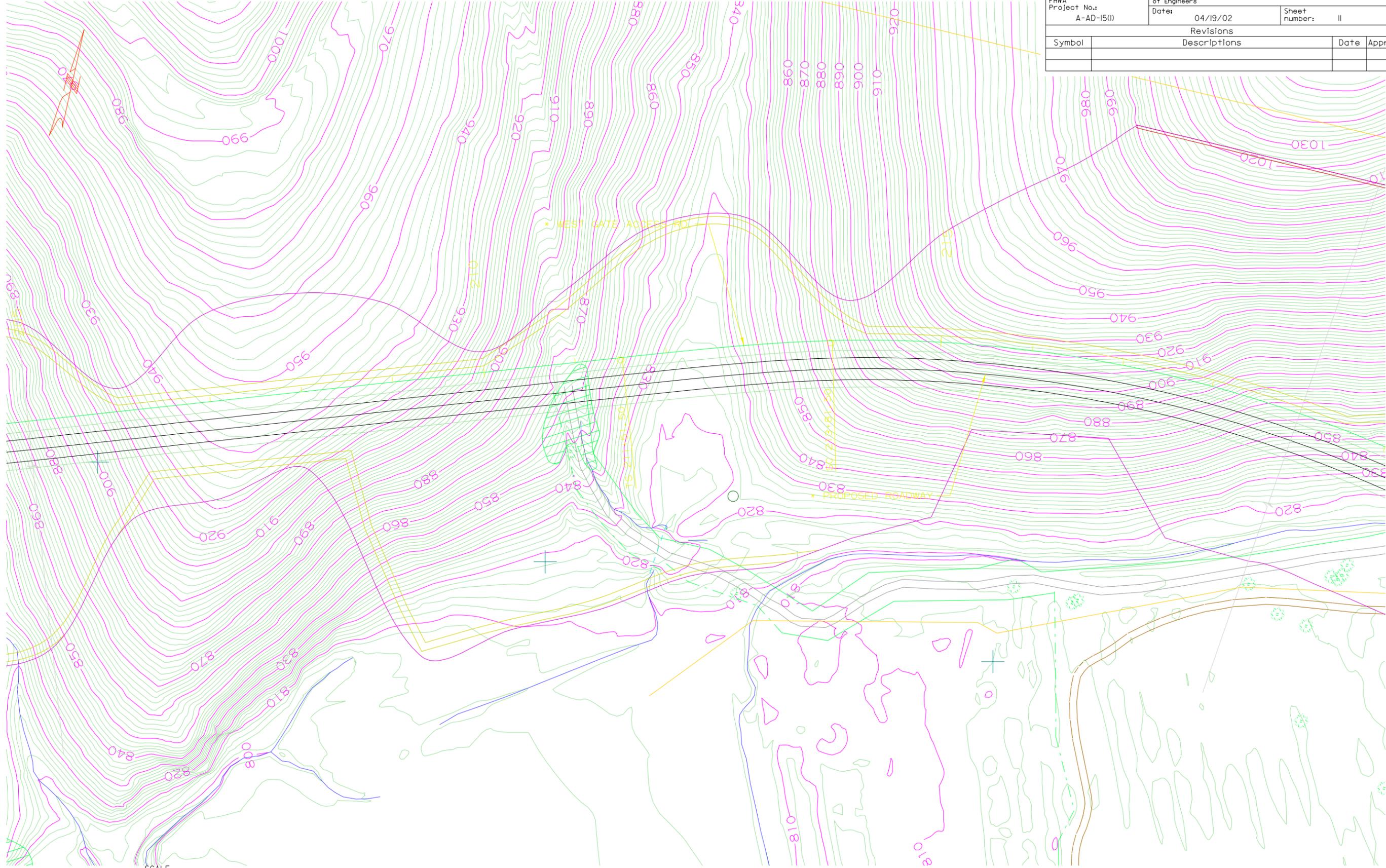
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FHWA Project No.: A-AD-15(I)		Date:	04/19/02	Sheet number: 10a	
Revisions					
Symbol	Descriptions			Date	Approved



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Corps of Engineers Contract No.: DACW41-00D-0025		 FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: II
Revisions			
Symbol	Descriptions	Date	Approved



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AS-DRILLED BORING LOCATION PLAN

Corps of Engineers Contract No.: DACW41-00D-0025		US Army Corps of Engineers		FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: Ila		
Revisions					
Symbol	Descriptions			Date	Approved



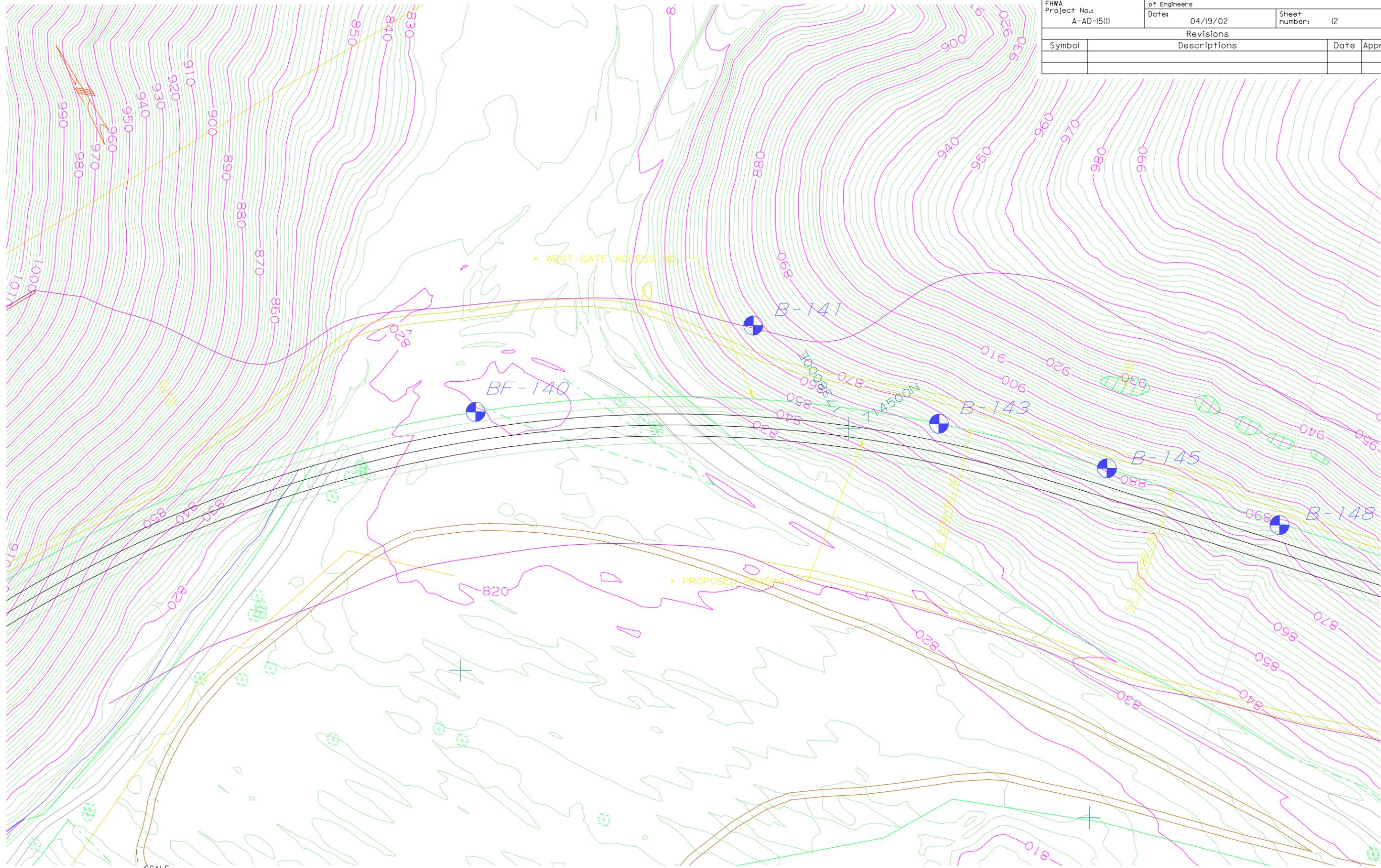
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WEST GATE ACCESS RD.

REV.

Corps of Engineers Contract No.: DACW41-00D-0025		 FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: 12
Revisions			
Symbol	Descriptions	Date	Approved



AS-DRILLED BORING LOCATION PLAN

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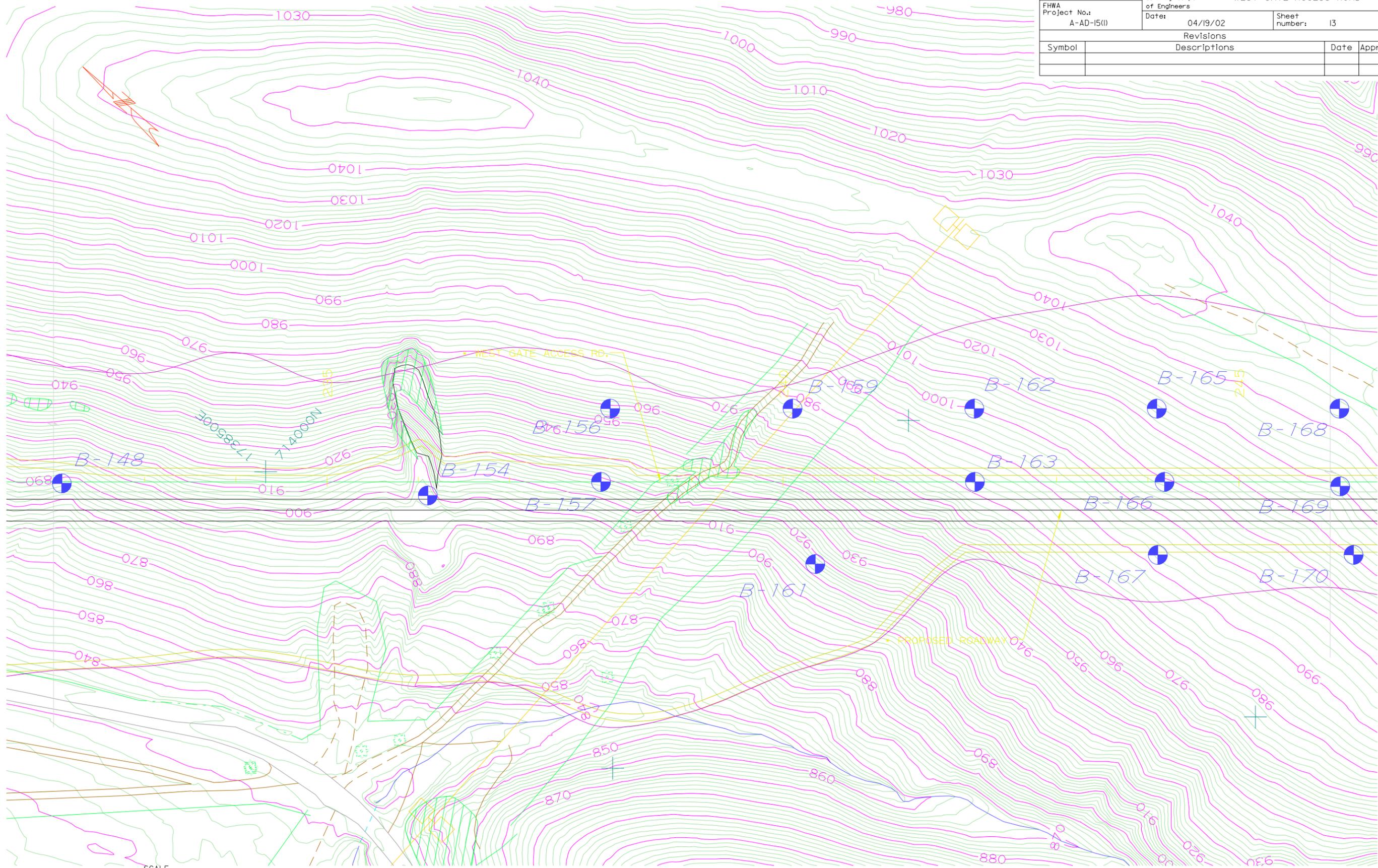
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Revisions					
Symbol	Descriptions			Date	Approved



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Corps of Engineers Contract No.: DACW41-00D-0025		 FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: 13
Revisions			
Symbol	Descriptions	Date	Approved



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AS-DRILLED BORING LOCATION PLAN

Corps of Engineers Contract No.: DACW41-00D-0025		 FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: 13a
Revisions			
Symbol	Descriptions	Date	Approved

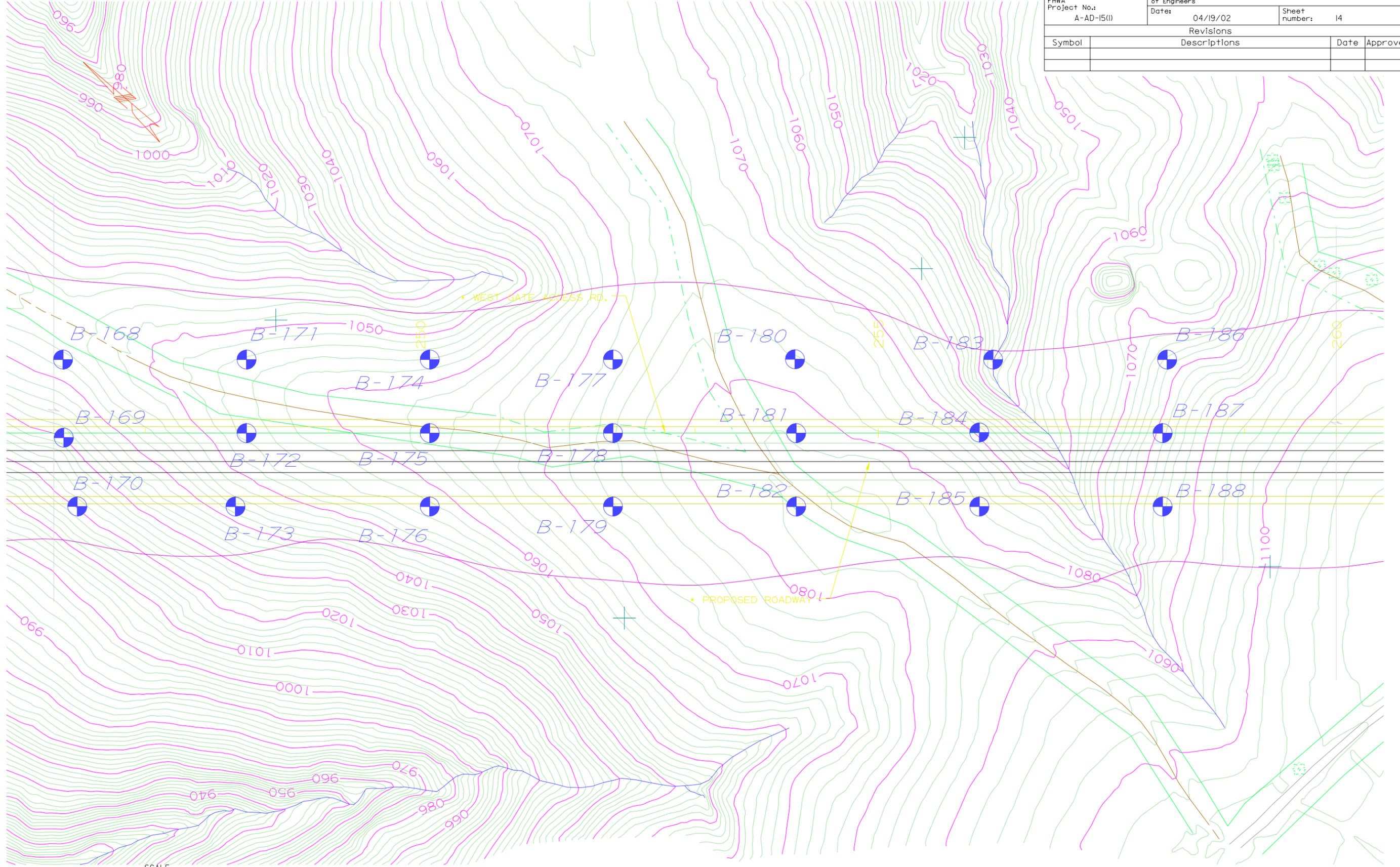


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REV.

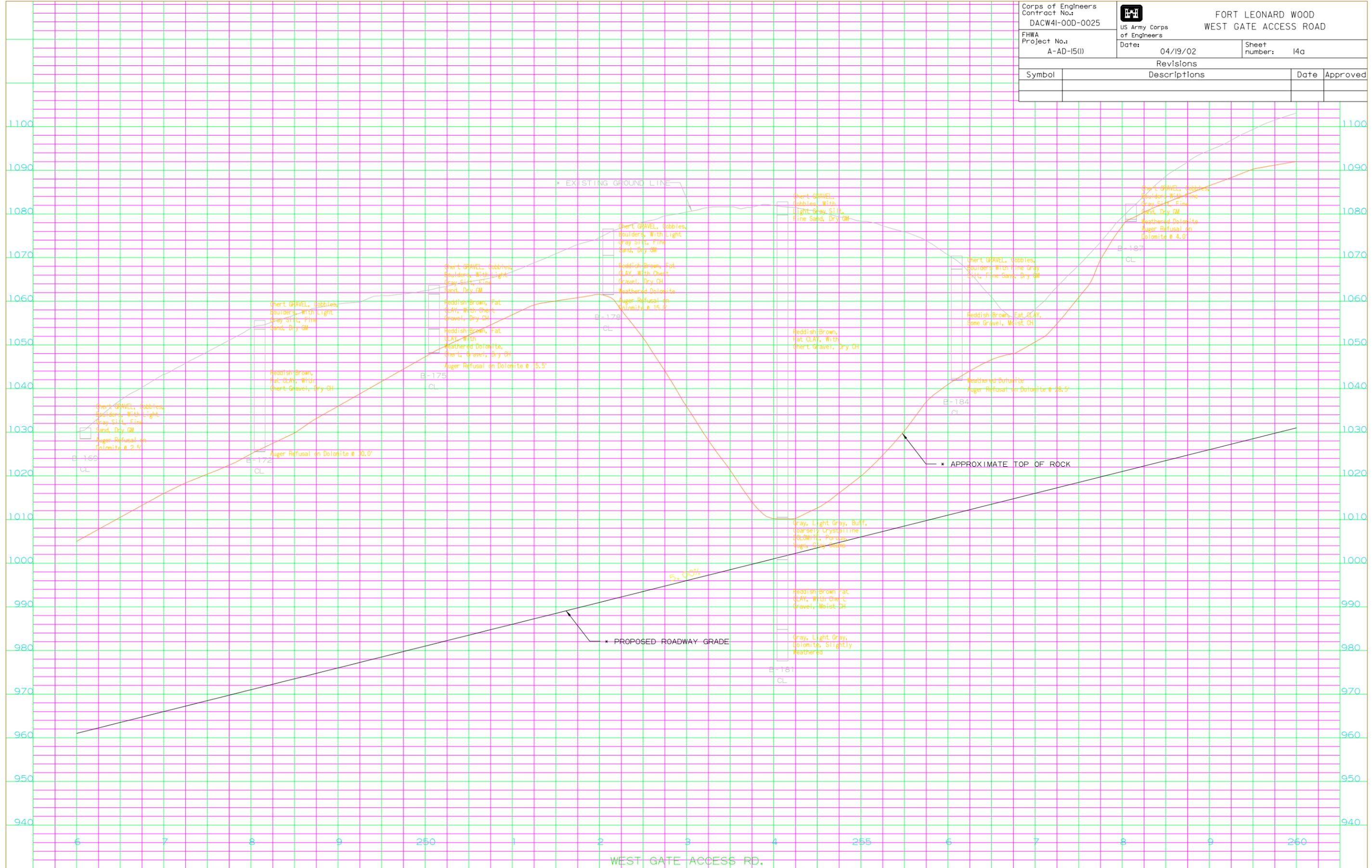
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FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: 14
Revisions			
Symbol	Descriptions	Date	Approved



AS-DRILLED BORING LOCATION PLAN

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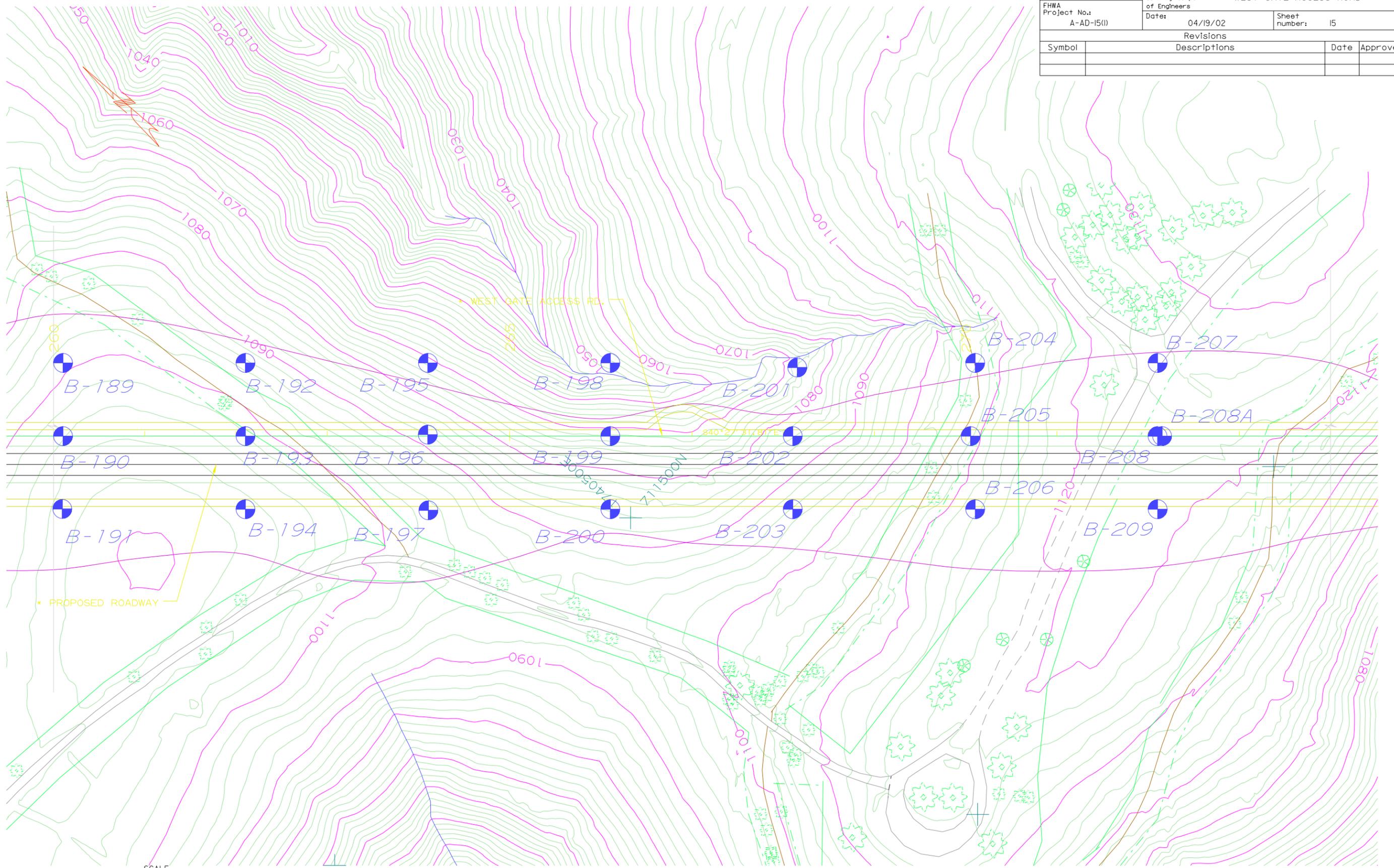


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REV.

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FHWA Project No.: A-AD-15(1)		Date: 04/19/02	Sheet number: 15
Revisions			
Symbol	Descriptions	Date	Approved



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AS-DRILLED BORING LOCATION PLAN

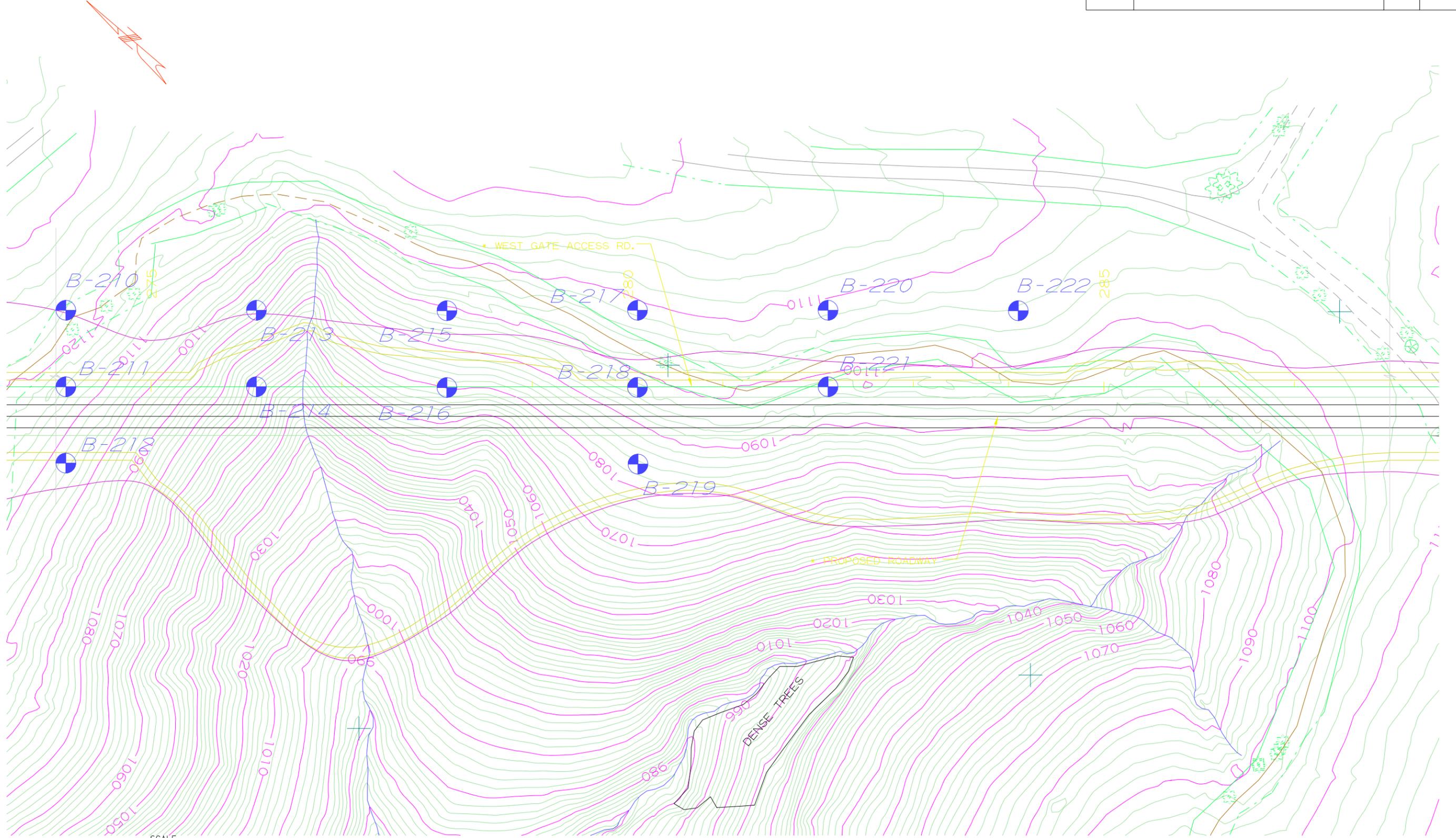


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WEST GATE ACCESS RD.

Corps of Engineers Contract No.: DACW41-00D-0025		US Army Corps of Engineers	FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)			Date: 04/19/02	Sheet number: 16
Revisions				
Symbol	Descriptions		Date	Approved

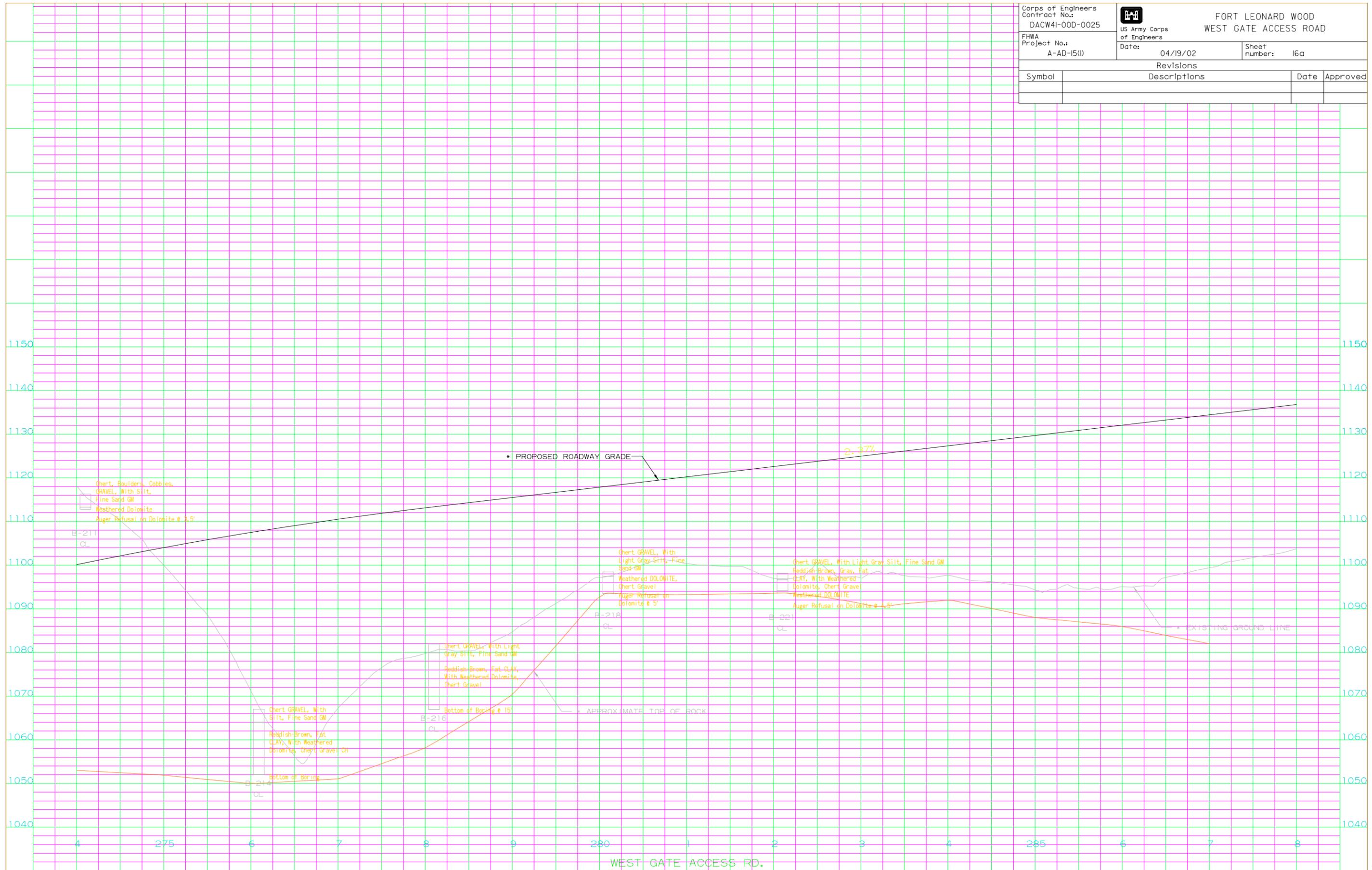


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AS-DRILLED BORING LOCATION PLAN

Corps of Engineers Contract No.: DACW41-00D-0025		 FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: I6a
Revisions			
Symbol	Descriptions	Date	Approved

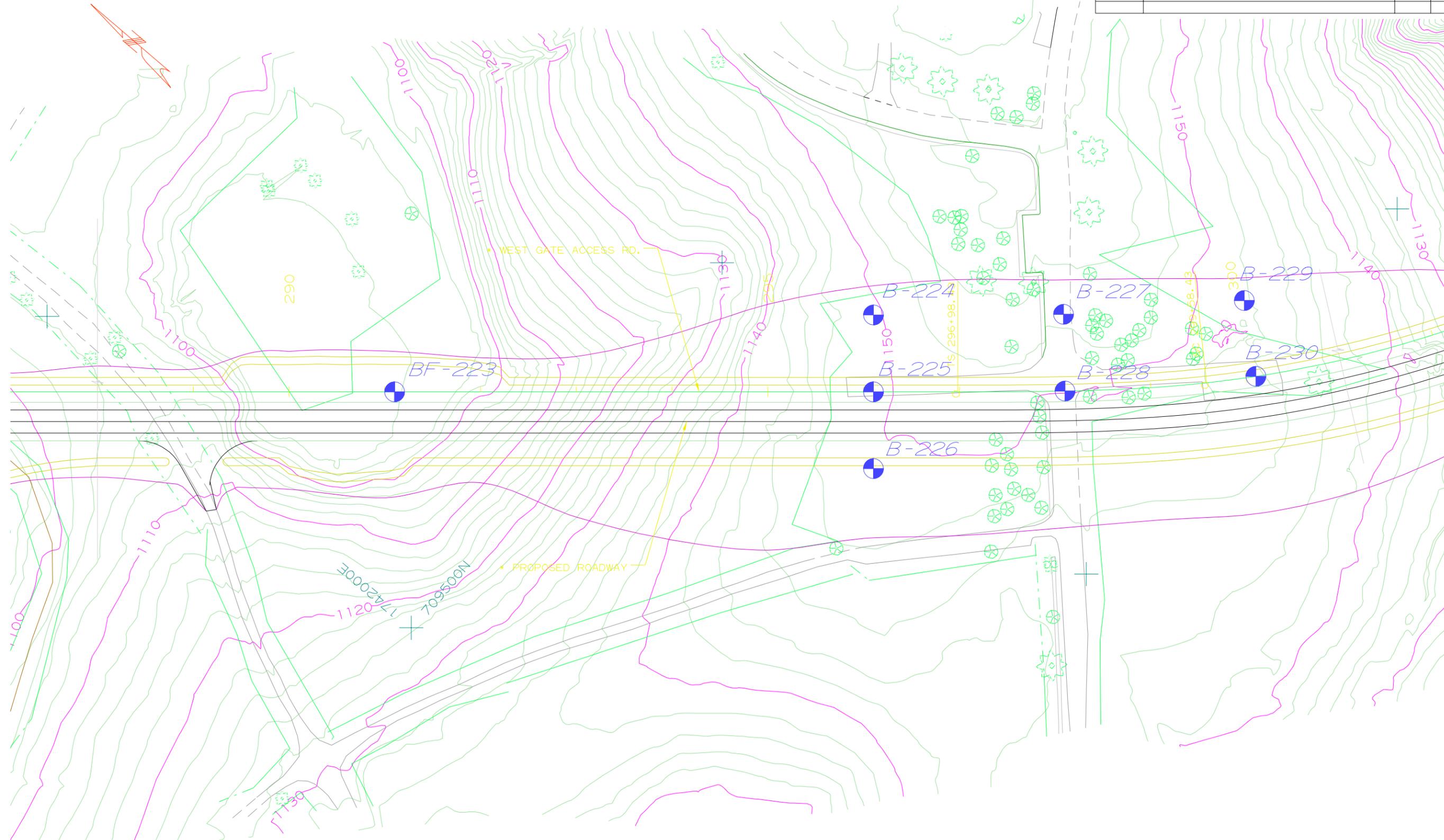


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REV.

Corps of Engineers Contract No.: DACW41-00D-0025		 FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: 17
Revisions			
Symbol	Descriptions	Date	Approved

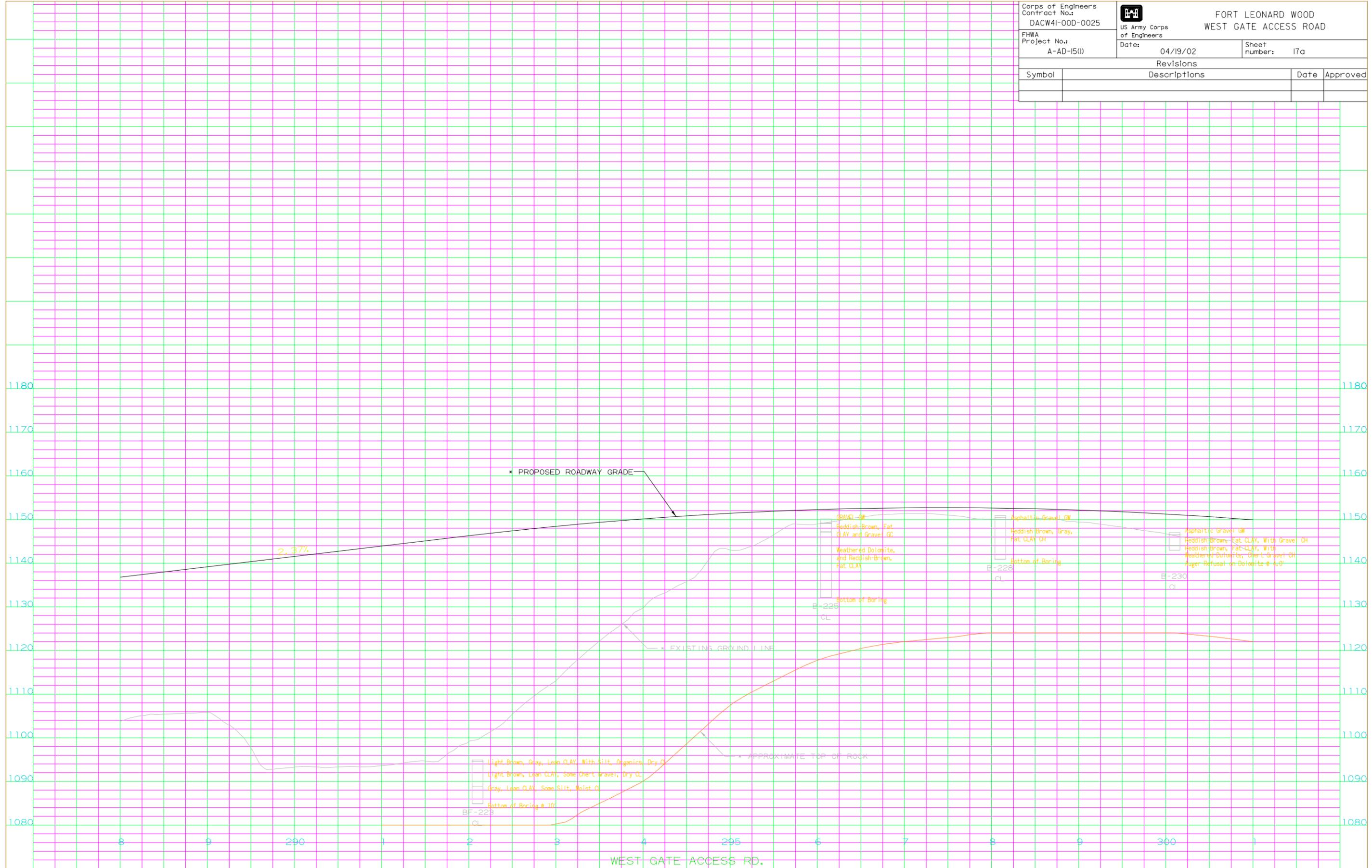


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AS-DRILLED BORING LOCATION PLAN

Corps of Engineers Contract No.: DACW41-00D-0025		 FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: 17a
Revisions			
Symbol	Descriptions	Date	Approved

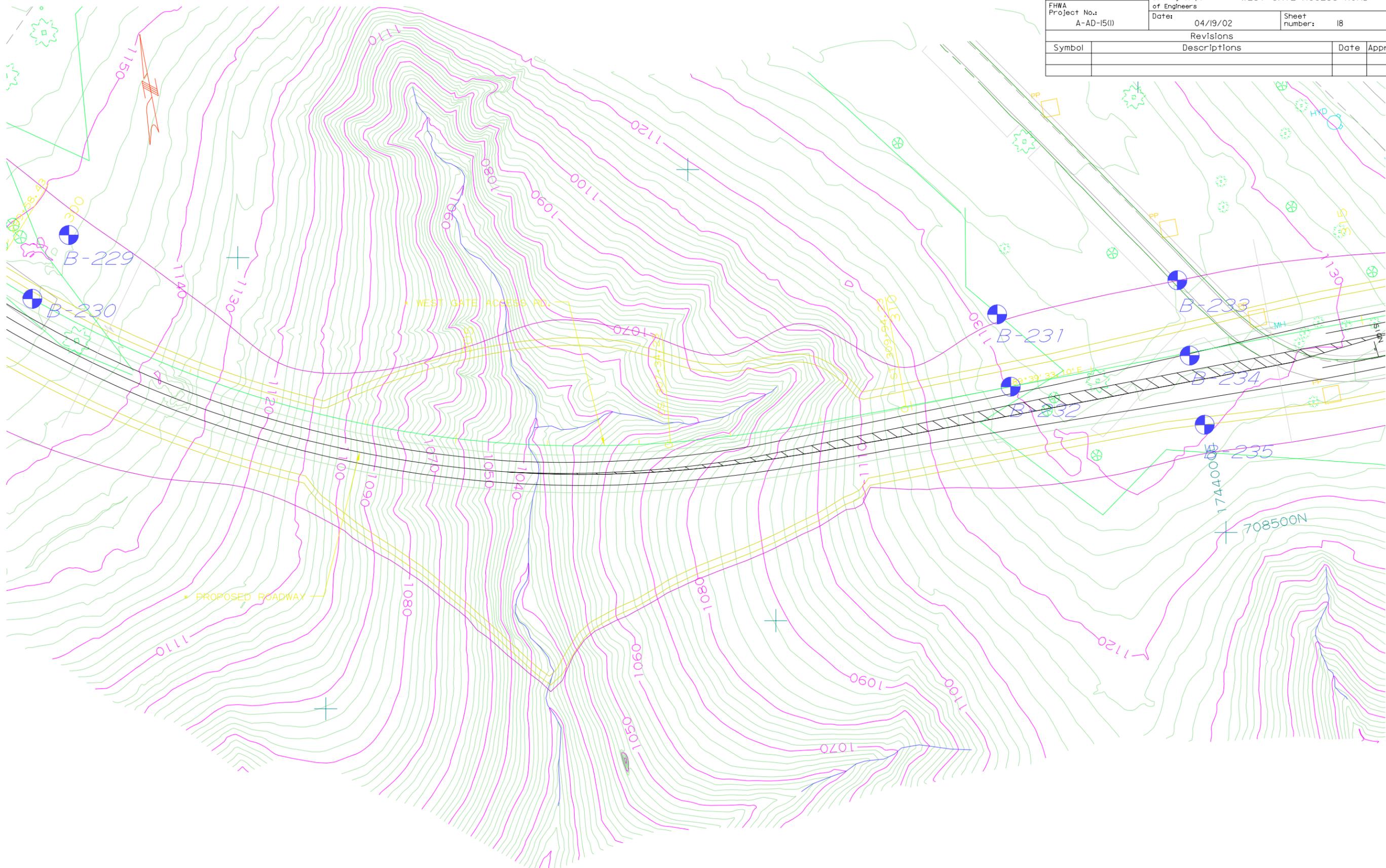


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REV.

Corps of Engineers Contract No.: DACW41-00D-0025		 FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: 18
Revisions			
Symbol	Descriptions	Date	Approved



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AS-DRILLED BORING LOCATION PLAN

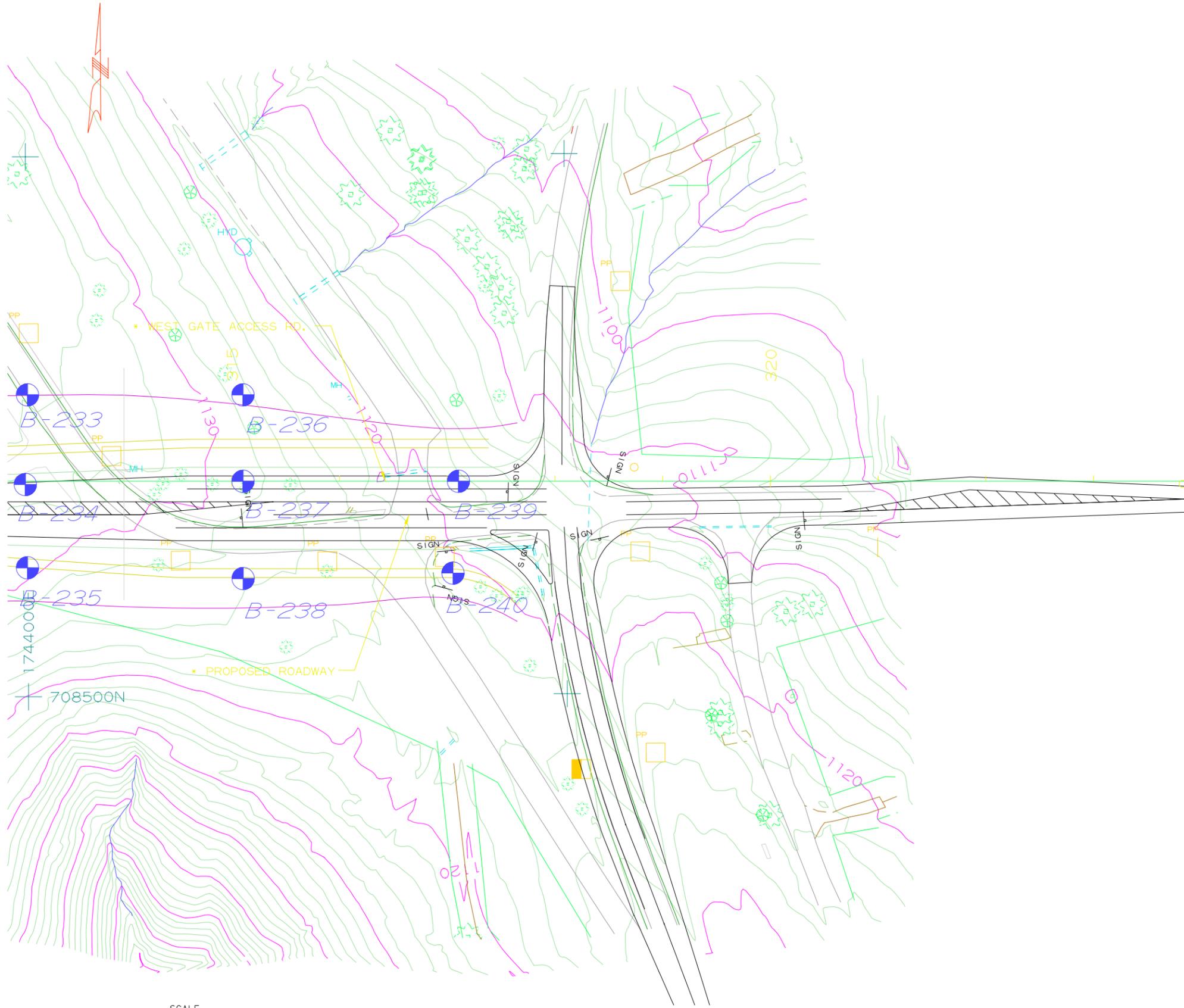
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Revisions			
Symbol	Descriptions	Date	Approved



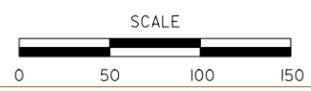
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Corps of Engineers Contract No.: DACW41-00D-0025		 FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: 19
Revisions			
Symbol	Descriptions	Date	Approved



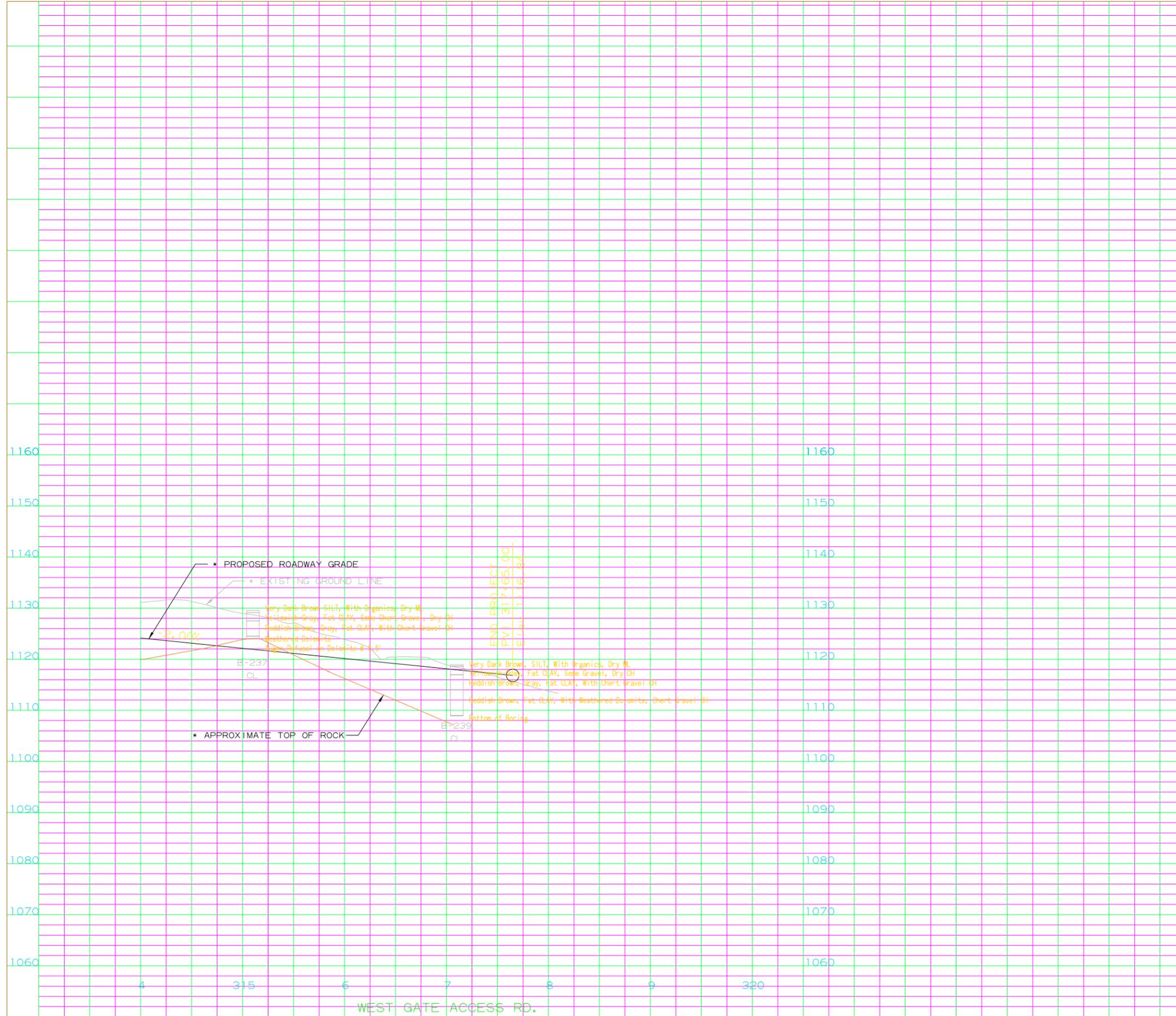
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AS-DRILLED BORING LOCATION PLAN

REV.

Corps of Engineers Contract No.: DACW41-00D-0025		 FORT LEONARD WOOD WEST GATE ACCESS ROAD	
FHWA Project No.: A-AD-15(I)		Date: 04/19/02	Sheet number: 19a
Revisions			
Symbol	Descriptions	Date	Approved



USER NAME \$username\$, DATE \$date\$, IP PROJ. NO. \$projno\$,  
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## **9.0 BORING LOGS AND LABORATORY TEST DATA**

# HNTB

BORING LOGS  
West Gate Access Road  
Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-1 through B-19*											*Borings eliminated, area to be drilled by MDOT
B-20	83+61	184' LT.	1038.03	0	3.0	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/13/2001	
				3.0	25.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry	Bulk	CH			Bulk sample taken for Proctor and Atterberg Limits
				25.0	25.5	Weathered Dolomite					
				25.5		Auger Refusal on Dolomite @ 25.5'					
B-21	83+53	84' LT.	1039.69	0.0	2.0	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/13/2001	
				2.0	7.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				7.0	7.5	Weathered Dolomite					
				7.5		Auger Refusal on Dolomite @ 7.5'					
B-22	83+45	16' RT.	1040.13	0.0	2.5	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/13/2001	
				2.5	5.0	Chert GRAVEL, With Brown, Reddish-Brown, Clay, Dry		GC			
				5.0	20.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				20.5		Auger Refusal on Dolomite @ 20.5'					
B-23	85+64	168' LT.	1041.25	0.0	2.0	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/13/2001	
				2.0	16.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				16.0	18.0	Weathered Dolomite					
				18.0		Auger Refusal on Dolomite @ 18'					
B-24	85+56	68' LT.	1044.71	0	3.5	Yellowish-Gray, Fat CLAY, Little Chert Gravel, Dry		CH	SP	09/17/2001	
				3.5	18.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Weathered Dolomite		CH			
				18.5		Auger Refusal on Dolomite @ 18.5'					
B-25	85+49	31' RT.	1046.36	0.0	4.0	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/17/2001	
				4.0	15.0	Reddish-Brown, Fat CLAY, With Chert Gravel		CH			
				15.0	17.0	Weathered Dolomite					
				17.0		Auger Refusal on Dolomite @ 17'					
B-26*	87+63	168' LT.	1041.8*	0.0	1.0	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/17/2001	*Boring moved 15' away from CL
				1.0	12.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Weathered Dolomite		CH			
				12.5		Auger Refusal on Dolomite @ 12.5'					
B-27	87+58	53' LT.	1047.26	0.0	2.5	Yellowish-Gray, Fat CLAY, Little Chert Gravel, Dry		CH	SP	09/17/2001	
				2.5	15.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				15.0	16.0	Weathered Dolomite					
				16.0		Auger Refusal on Dolomite @ 16.0'					
B-28	87+53	48' RT.	1049.41	0.0	2.0	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/17/2001	
				2.0	25.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				25.0		Auger Refusal on Dolomite @ 25'					
B-29	89+66	140' LT.	1040.55	0.0	8.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH	SP	09/17/2001	
				8.5		Auger Refusal on Dolomite @ 8.5'					
B-30	89+60	41' LT.	1045	0.0	3.0	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/17/2001	
				3.0	27.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				27.5		Bottom of Boring @ 27.5'					

# HNTB

**BORING LOGS**  
**West Gate Access Road**  
**Ft. Leonard Wood, Pulaski County, Missouri**

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-31	89+54	57' RT.	1048.69	0	1.5	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/18/2001	
				1.5	15.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				15.0	15.5	Weathered Dolomite					
				15.5		Auger Refusal on Dolomite @ 15.5'					
B-32	91+66	129' LT.	1041.23	0.0	1.0	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/18/2001	
				1.0	12.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Weathered Dolomite, Dry		CH			
				12.0	14.0	Weathered Dolomite					
				14.0		Auger Refusal on Dolomite @ 14.0'					
B-33	91+61	29' LT.	1044.86	0.0	2.5	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/18/2001	
B-34	91+56	71' RT.	1049.51	0.0	1.5	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/18/2001	
				1.5	12.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
B-35	93+66	120' LT.	1046.78	0.0	2.0	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/18/2001	
				2.0	9.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				9.0	10.0	Weathered Dolomite					
				10.0		Auger Refusal on Dolomite @10.0'					
B-36	93+62	20' LT.	1050.34	0.0	2.0	Yellowish-Gray, Fat CLAY, Little Chert Gravel, Dry		CH	SP	09/18/2001	
				2.0	9.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Weathered Dolomite, Dry		CH			
				9.5		Auger Refusal on Dolomite @ 9.5'					
				0.0	1.5	Yellowish-Gray, Fat CLAY, Dry		CH			
B-37	93+57	80' RT.	1053.75	1.5	18.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH	SP	09/18/2001	
				18.0	19.0	Weathered Dolomite					
				19.0		Auger Refusal on Dolomite @ 19.0'					
				0.0	1.5	Yellowish-Gray, Fat CLAY, With Chert Gravel, Dry		CH			
B-38	95+67	112' LT.	1046.85	0.0	1.5	Yellowish-Gray, Fat CLAY, With Chert Gravel, Dry		CH	SP	09/18/2001	
				1.5	19.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Weathered Dolomite, Dry		CH			
				19.0		Auger Refusal on Dolomite @ 19.0'					
						Core Hole					
B-39*									10/15/2001	*Core boring eliminated due to alignment change	
B-40	95+59	88' RT.	1050.76	0.0	0.5	Chert GRAVEL, Cobbles (Roadway)		GC	SP	09/18/2001	
				0.5	1.0	Yellowish-Gray, Fat CLAY, With Chert Gravel, Dry		CH			
				1.0	24.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				24.0		Auger Refusal on Dolomite @ 24.0'					
B-41	97+65	106' LT.	1036.68	0.0	2.0	Yellowish-Gray, Fat CLAY, With Chert Gravel, Dry		CH	SP	09/18/2001	
				2.0	6.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				6.0	7.5	Weathered Dolomite					
				7.5		Auger Refusal on Dolomite @7.5'					
B-42	97+63	6' LT.	1040.62	0.0	1.0	Yellowish-Gray, Fat CLAY, Little Chert Gravel, Dry		CH	SP	09/18/2001	
				1	6.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				6.0	8.0	Weathered Dolomite					
				8.0		Auger Refusal on Dolomite @ 8.0'					
B-43	97+60	94' RT.	1043.36	0.0	1.5	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH	SP	09/18/2001	
				1.5		Auger Refusal on Dolomite @ 1.5'					

# HNTB

## BORING LOGS West Gate Access Road Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-44*									SP	09/18/2001	*Inaccessible boring location
B-45*									SP	09/18/2001	*Inaccessible boring location
B-46*									SP	09/18/2001	*Inaccessible boring location
B-47*									SP	10/15/2001	*Boring eliminated
B-48	132+60	100' RT.	913.31	0	1.0	Brown, Light Gray, SILT, Fine Sand, Gravel, Moist		ML	SP	10/11/2001	
				1.0	16.0	Reddish-Brown, Fat CLAY, Some Gravel, Fine Sand, Dry		CH			
				16.0	16.5	Weathered Dolomite					
				16.5		Auger Refusal on Dolomite @ 16.5'					
B-49A	134+60	100' LT.	876.79	0.0	1.8	Brown, Light Gray, SILT, Fine Sand, Gravel, Moist		ML	SP	10/11/2001	
				1.8	6.0	Reddish-Brown, Fat CLAY, With Gravel, Dry		CH			
				6.0	8.0	Weathered Dolomite With Reddish-Brown, Fat CLAY					
				8.0	17.0	Reddish-Brown, Fat CLAY, Some Gravel, Dry					
				17.0		Bottom of Boring @ 17.0'					
B-49B	134+60	CL	895.44	0.0	1.0	Brown, Light Gray, SILT, Fine Sand, Moist		ML	SP	10/11/2001	
				1.0	17.0	Reddish-Brown, Fat CLAY, Some Gravel, Dry		CH			
				17.0		Bottom of Boring @ 17.0'					
B-49C	134+59	100' RT.	926.23	0.0	2.5	Chert GRAVEL, With Light Gray, Brown, Silt, Fine Sand		GM	SP	10/11/2001	
				2.5	15.0	Reddish-Brown, Fat CLAY, Some Gravel, Dry		CH			
				15.0	17.5	Weathered Dolomite					
				17.5		Bottom of Boring @ 17.5'					
B-50A	136+60	100' LT.	894.61	0.0	3.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown, Silt, Fine Sand		GM	SP	10/11/2001	
				3.0	17.5	Reddish-Brown, Fat CLAY, Some Gravel, Dry		CH			
				17.5		Bottom of Boring @ 17.5'					
B-50B	136+60	CL	913.41	0.0	3.0	Chert GRAVEL, With Light Gray, Brown, Silt, Fine Sand		GM	SP	10/11/2001	
				3.0	23.0	Reddish-Brown, Fat CLAY, Some Gravel, Dry		CH			
				23.0	24.5	Weathered Dolomite					
				24.5		Auger Refusal on Dolomite @ 24.5'					
B-50C	136+60	100' RT.	937.99	0.0	1.0	Light Gray, Brown SILT, With Fine Sand, Gravel		ML	SP	10/11/2001	
				1.0	20.5	Reddish-Brown, Fat CLAY, Some Gravel, Dry	Bulk				Bulk Sample obtained for Proctor and Atterberg Limits
				20.5	21.0	Weathered Dolomite					
				21.0		Auger Refusal on Dolomite @ 21.0'					
B-51	138+60	100' LT.	904.04	0	2.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand, Dry		GM	SP	10/12/2001	
				2.0	23.5	Reddish-Brown, Fat CLAY, Some Gravel		CH			
				23.5		Bottom of Boring @ 23.5'					
B-52	138+60	2' RT.	929.62	0.0	1.5	Chert GRAVEL, Cobbles, With Light Gray, Brown Silt, Fine Sand, Dry		GM	SP	10/12/2001	
				1.5	39.0	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				39.0		Auger Refusal on Dolomite @ 39.0'					
B-53	138+60	100' RT.	957.01	0.0	1.0	Chert GRAVEL, Cobbles, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/12/2001	
				1.0	8.0	Reddish-Brown, Fat CLAY, Some Gravel, Sand		CH			
				8.0	12.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite					
				12.5		Auger Refusal on Dolomite @ 12.5'					

# HNTB

## BORING LOGS West Gate Access Road Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-54	140+60	100' LT.	902.49	0.0	2.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/12/2001	
				2.0	23.5	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				23.5		Bottom of Boring @ 23.5'					
B-55	140+60	CL	929.21	0.0	1.5	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand, Dry		GM	SP	10/12/2001	
				1.5	37.0	Reddish-Brown, Fat CLAY, Some Gravel, Sand		CH			
				37.0		Auger Refusal on Dolomite @ 37.0'					
B-56	140+60	100' RT.	961.66	0.0	1.0	Chert GRAVEL, Cobbles, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/12/2001	
				1.0	43.5	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				43.5		Auger Refusal on Dolomite @ 43.5'					
B-57	142+60	100' LT.	913.6	0	1.5	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/15/2001	
				1.5	43.5	Reddish-Brown, Fat CLAY, Some Gravel, Sand		CH			
				43.5		Bottom of Boring @ 43.5'					
B-58	142+60	CL	936.13	0.0	1.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/15/2001	
				1.0	5.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Sand		CH			
				5.5	8.5	Weathered Dolomite With Reddish-Brown, Fat Clay					
				8.5		Auger Refusal @ 8.5'					
B-59	142+60	100' RT.	957.94	0.0	1.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/15/2001	
				1.0	22.0	Reddish-Brown, Fat CLAY, Some Gravel, Sand		CH			
				22.0	51.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Some Gravel, Sand					
				51.0	52.0	Weathered Dolomite					
				52.0		Auger Refusal on Dolomite @ 52.0'					
B-60*								SP	10/15/2001	*Inaccessible boring location	
B-61*								SP	10/15/2001	*Inaccessible boring location	
B-61A	144+59	100' RT.	911.18	0.0	3.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/15/2001	
				3.0	24.5	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				24.5	26.0	Weathered Dolomite					
				26.0		Auger Refusal on Dolomite @ 26.0'					
B-62	146+60	100' LT.	890.58	0	1.0	Chert GRAVEL, Cobbles, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/16/2001	
				1.0	5.0	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				5.0	20.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel					
				20.0		Auger Refusal on Dolomite @ 20.0'					
B-63	146+60	CL	902.26	0.0	1.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/15/2001	
				1.0	15.0	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				15.0	25.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite					
				25.5		Auger Refusal on Dolomite @ 25.5'					

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## BORING LOGS West Gate Access Road Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-64*									SP	10/16/2001	*Inaccessible boring location
B-65*									SP	10/16/2001	*Inaccessible boring location
B-66	148+60	CL	897.43	0.0	1.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/16/2001	
				1.0	12.0	Reddish-Brown, Fat CLAY, Some Chert Gravel					
				12.0	13.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel					
				13.0		Auger Refusal on Dolomite @ 13.0'					
B-67	148+60	100' RT.	913.34	0.0	1.0	Chert GRAVEL, Cobbles, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/16/2001	
				1.0	30.0	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				30.0	31.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel					
				31.5		Auger Refusal on Dolomite @ 31.5'					
B-68	150+60	100' LT.	877.97	0.0	1.0	Chert GRAVEL, Cobbles, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/16/2001	
				1.0	5.0	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				5.0	6.0	Weathered Dolomite					
				6.0		Auger Refusal on Dolomite @ 6.0'					
B-69	150+60	CL	899.37	0.0	1.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/16/2001	
				1.0	32.5	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				32.5	34.5	Weathered Dolomite					
				34.5		Auger Refusal on Dolomite @ 34.5'					
B-69A	150+60	100' RT.	921.59	0.0	1.0	Chert GRAVEL, Cobbles, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/16/2001	
				1.0	35.0	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				35.0	43.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel					
				43.5		Auger Refusal on Dolomite @ 43.5'					
B-70*								SP	10/16/2001	*Inaccessible boring location	
B-71	152+60	CL	895.9	0.0	2.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/16/2001	
				2.0	12.0	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				12.0	15.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite					
				15.5		Auger Refusal on Dolomite @ 15.5'					
B-72	152+60	100' RT.	920.22	0.0	2.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/16/2001	
				2.0	37.0	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				37.0	41.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite					
				41.5		Auger Refusal on Dolomite @ 41.5'					
B-73	154+60	100' LT.	894.65	0	2.0	Chert GRAVEL, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/17/2001	
				2.0	14.5	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				14.5	16.5	Weathered Dolomite					
				16.5		Auger Refusal on Dolomite @ 16.5'					

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## BORING LOGS West Gate Access Road Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-74	154+60	CL	907.18	0.0	2.0	Chert GRAVEL, With Light Gray, Brown Silt, Fine Sand		GM	SP	10/17/2001	
				2.0	16.0	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				16.0	16.5	Weathered Dolomite					
				16.5		Auger Refusal on Dolomite @ 16.5'					
B-75	154+60	100' RT.	924.46	0.0	2.0	Brown, Light Gray SILT, Fine Sand, Some Gravel, Cobbles, Little Clay		ML	SP	10/17/2001	
				2.0	29.5	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				29.5		Auger Refusal on Dolomite @ 29.5'					
B-76	156+60	100' LT.	879.42	0.0	2.0	Brown, Light Gray SILT, Fine Sand, Some Gravel, Little Clay		ML	SP	10/17/2001	
				2.0	6.0	Reddish-Brown, Fat CLAY, Some Chert Gravel					
				6.0	19.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite					
				19.5		Auger Refusal on Dolomite @ 19.5'					
B-77	156+60	CL	891.35	0.0	2.5	Brown, Light Gray SILT, Fine Sand, Some Gravel, Little Clay		ML	SP	10/17/2001	
				2.5	13.5	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				13.5	15.5	Weathered Dolomite					
				15.5		Auger Refusal on Dolomite @ 15.5'					
B-78	156+60	100' RT.	907.39	0.0	1.5	Brown, Light Gray SILT, Fine Sand, Some Gravel, Little Clay		ML	SP	10/17/2001	
				1.5	15.5	Reddish-Brown, Fat CLAY, Some Chert Gravel		CH			
				15.5	16.0	Weathered Dolomite					
				16.0		Auger Refusal on Dolomite @ 16.0'					
B-79*								SP	10/17/2001	*Inaccessible boring location	
B-79A*								SP	10/17/2001	*Inaccessible boring location	
B-80*								SP	10/17/2001	*Inaccessible boring location	
B-81*								SP	10/17/2001	*Inaccessible boring location	
B-82*								SP	10/17/2001	*Inaccessible boring location	
BS-83	163+10	CL	801.5			SPT Boring			SP	08/28/2001	
BS-84	168+10	CL	792.3			SPT Boring			SP	09/05/2001	
BS-85	172+10	CL	801			SPT Boring			SP	09/05/2001	
BS-86	176+10	CL	801.4			SPT Boring			SP	09/05/2001	
B-87*									SP	09/19/2001	* Boring eliminated due to grade change
B-88*									SP	09/19/2001	* Boring eliminated due to grade change
B-89*									SP	09/19/2001	* Boring eliminated due to grade change
B-90	184+10	80' LT.	861.66	0	0.5	Chert GRAVEL, With Clay (Roadway)		GC	SP	09/19/2001	
				0.5	4.0	Chert GRAVEL, With Light Brown, Gray Silt, Dry		GM			
				4.0	12.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				12.0	16.5	Weathered Dolomite					
				16.5		Auger Refusal on Dolomite @ 16.5'					
B-91	184+10	CL	868.23	0.0	2.5	Chert GRAVEL, Cobbles, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/19/2001	
				2.5	15.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel, Dry		CH			
				15.5		Auger Refusal on Dolomite @ 15.5'					

**BORING LOGS**  
**West Gate Access Road**  
**Ft. Leonard Wood, Pulaski County, Missouri**

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-92	184+10	80' RT.	862.13	0.0	2.0	Chert GRAVEL, Cobbles, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/19/2001	
				2.0	8.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Weathered Dolomite, Dry		CH			
				8.5		Auger Refusal on Dolomite @ 8.5'					
B-93	186+10	79' LT.	881.09	0.0	1.5	Chert GRAVEL, Cobbles, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/19/2001	
				1.5	16.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				16.0	18.5	Weathered Dolomite					
B-94	186+10	CL	882.29	0.0	2.0	Chert GRAVEL, Cobbles, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/19/2001	
				2.0	13.0	Reddish- Brown, Fat CLAY, With Chert Gravel, Dry	Bulk	CH			Bulk Sample for Proctor and Atterberg Limits
				13.0	16.5	Reddish- Brown Fat CLAY, With Weathered Dolomite, Dry		CH			
B-95	186+10	80' RT.	880.6	0.0	18.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Weathered Dolomite, Dry		CH	SP	09/19/2001	
				18.0		Auger Refusal on Dolomite @ 18.0'					
B-96	188+10	80' LT.	885.26	0.0	1.0	Yellowish-Gray, Fat CLAY, With Chert Gravel, Dry		CH	SP	09/19/2001	
				1.0	22.0	Reddish-Brown, Fat CLAY, Some Chert Gravel, Dry		CH			
				22.0	23.0	Weathered Dolomite					
B-97	188+10	CL	877.51	0.0	1.0	Chert GRAVEL, Cobbles, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/19/2001	
				1.0	7.5	Reddish-Brown, Fat CLAY, Some Chert Gravel, Dry		CH			
				7.5		Auger Refusal on Dolomite @ 7.5'					
B-98	188+10	80' RT.	865.03	0.0	2.0	Chert GRAVEL, Cobbles, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/19/2001	
				2.0	16.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				16.0		Auger Refusal on Dolomite @ 16.0'					
B-99*											* Boring eliminated due to grade change
B-100*											* Boring eliminated due to grade change
B-101	192+10	80' LT.	905.83	0	1.0	Chert GRAVEL, Cobbles, With Silt, Fine Sand, Dry		GM	SP	09/20/2001	
				1.0	12.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				12.5		Auger Refusal on Dolomite @ 12.5'					
B-102	192+10	CL	904.12	0.0	1.0	Chert GRAVEL, Cobbles, With Silt, Fine Sand, Dry		GM	SP	09/20/2001	
				1.0	6.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				6.0		Auger Refusal on Dolomite @ 6.0'					
B-103*								SP	09/20/2001		* Boring eliminated due to grade change
B-104	194+10	80' LT.	923.16	0.0	1.5	Chert GRAVEL, Cobbles, Boulders, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/20/2001	
				1.5	20.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				20.0		Auger Refusal on Dolomite @ 20.0'					

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## BORING LOGS West Gate Access Road Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-105	194+10	CL	912.16	0.0	0.5	Chert GRAVEL, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/20/2001	
				0.5	21.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				21.0		Bottom of Boring @ 21.0'					
B-106*									SP	09/20/2001	* Boring eliminated due to grade change
B-107	196+10	81' LT.	912.07	0.0	2.5	Chert GRAVEL, Cobbles, Boulders, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/20/2001	
				2.5	10.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				10.5		Auger Refusal on Dolomite @ 10.5'					
B-108*									SP	09/20/2001	* Boring eliminated due to grade change
B-109*									SP	09/20/2001	* Boring eliminated due to grade change
B-110	198+10	80' LT.	966.26	0.0	2.0	Chert GRAVEL, Cobbles, Boulders, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/20/2001	
				2.0	27.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				27.0	28.0	Weathered Dolomite					
				28.0		Auger Refusal on Dolomite @ 28.0'					
B-111	198+10	CL	960.7	0.0	1.5	Chert GRAVEL, Cobbles, Boulders, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/20/2001	
				1.5	13.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				13.0	14.5	Weathered Dolomite					
				14.5		Auger Refusal on Dolomite @ 14.5'					
B-112	198+10	80' RT.	954.99	0	1.5	Chert GRAVEL, Cobbles, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/19/2001	
				1.5	16.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				16	17.5	Weathered Dolomite					
				17.5		Auger Refusal on Dolomite @ 17.5'					
B-113	200+10	80' LT.	1001.50*			CORE			SP	10/03/2001	*Boring moved 10' downstation and 8' Rt.
B-114	200+10	CL	981.92	0.0	7.5	Reddish- Brown, Fat CLAY, With Chert Gravel, Dry		CH	SP	09/19/2001	
				7.5	9.0	Weathered Dolomite					
				9		Auger Refusal on Dolomite @ 9.0'					
B-115	200+10	80' RT.	967.57	0.0	5.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH	SP	09/19/2001	
				5.0	6.0	Weathered Dolomite					
				6.0		Auger Refusal on Dolomite @ 6.0'					
B-116	202+10	80' LT.	959.02	0.0	2.0	Chert GRAVEL, Cobbles, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/19/2001	
				2.0	7.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				7.5	12.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Dry		CH			
				12.0	14.5	Weathered Dolomite					
				14.5		Auger Refusal on Dolomite @ 14.5'					

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## BORING LOGS West Gate Access Road Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-117	202+10	1' LT.	949.52	0.0	1.5	Chert GRAVEL, Cobbles, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/19/2001	
				1.5	17.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				17.0	20.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Dry		CH			
				20.5		Auger Refusal on Dolomite @ 20.5'					
B-118	202+10	80' RT.	941.45	0.0	1.0	Chert GRAVEL, Cobbles, With Light Brown, Gray Silt, Fine Sand, Dry		GM	SP	09/19/2001	
				1.0	7.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				7.5	9.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite		CH			
				9.5		Auger Refusal on Dolomite @ 9.5'					
B-119*								SP	09/13/2001	* Boring eliminated due to grade	
B-120*								SP	09/13/2001	* Boring eliminated due to grade	
B-121*								SP	09/13/2001	* Boring eliminated due to grade	
B-122*								SP	09/13/2001	* Boring eliminated due to grade	
B-123*								SP	09/13/2001	* Boring eliminated due to grade	
B-124*								SP	09/13/2001	* Boring eliminated due to grade	
B-125*								SP	09/13/2001	* Boring eliminated due to grade	
B-126*								SP	09/13/2001	* Boring eliminated due to grade	
B-127*								SP	09/13/2001	* Boring eliminated due to grade	
B-128*								SP	09/13/2001	* Boring eliminated due to grade	
B-129*								SP	09/13/2001	* Boring eliminated due to grade	
B-130*								SP	09/13/2001	* Boring eliminated due to grade	
B-131*								SP	09/13/2001	* Boring eliminated due to grade	
B-132*								SP	09/13/2001	* Boring eliminated due to grade	
B-133*								SP	09/13/2001	* Boring eliminated due to grade	
B-134*								SP	09/13/2001	* Boring eliminated due to grade	
B-135*								SP	09/13/2001	* Boring eliminated due to grade	
B-136*								SP	09/13/2001	* Boring eliminated due to grade	
B-137*								SP	09/13/2001	* Boring eliminated due to grade	
B-138*								SP	09/13/2001	* Boring eliminated due to grade	
B-139*								SP	09/13/2001	* Boring eliminated due to grade	
BF-140	223+10	CL	821.86	0.0	5.0	Brown, Lean CLAY, With Chert Gravel, Fine Sand, Dry		CL	SP	09/13/2001	
				5.0	13.5	Chert GRAVEL, With Brown Clay, Fine Sand, Dry		GC			
				13.5		Bottom of Boring @ 13.5'					
B-141	226+10	80' LT.	868.2	0.0	3.0	Chert GRAVEL, Cobbles, Boulders, With Silt, Fine Sand, Dry		GM	SP	09/13/2001	
				3.0	3.5	Weathered Dolomite					
				3.5		Auger Refusal on Dolomite @ 3.5'					
B-142*								SP	09/13/2001	* Boring eliminated due to grade change	
B-143	228+20	CL	864.8*	0.0	2.0	Chert GRAVEL, Cobbles, Boulders, With Silt, Fine Sand, Dry		GM	SP	09/13/2001	*Boring moved 10' upstation, no change in elevation
				2.0	6.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				6.0	7.5	Weathered Dolomite					
				7.5		Auger Refusal on Dolomite @ 7.5'					
B-144*								SP	09/12/2001	*Inaccessible boring location	
B-145	230+10	CL	881.93	0	3.5	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand, Dry		GM	SP	09/12/2001	
				3.5		Auger Refusal on Dolomite @ 3.5'					

**BORING LOGS**  
**West Gate Access Road**  
**Ft. Leonard Wood, Pulaski County, Missouri**

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-146*											*Boring eliminated due to grade change
B-147*											*Inaccessible boring location
B-148	232+09	2' RT.	888.32	0.0	4.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray, Brown Silt, Fine Sand, Dry		GM	SP	09/12/2001	
				4.0	12.5	Weathered Dolomite					
				12.5		Auger Refusal on Dolomite @ 12.5'					
B-149*									SP	09/11/2001	*Boring eliminated due to grade change
B-150*									SP	09/11/2001	*Inaccessible boring location
B-151*									SP	09/11/2001	*Inaccessible boring location
B-152*									SP	09/11/2001	*Boring eliminated due to grade change
B-153*									SP	09/11/2001	*Inaccessible boring location
B-154	236+10	15' RT.	899.0*	0.0	4.5	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/11/2001	*Boring moved 15' Rt. of CL
				4.5		Auger Refusal on Dolomite @ 4.5'					
B-155*									SP	09/11/2001	*Boring eliminated due to grade change
B-156	238+10	80' LT.	972*			CORE			SP	10/09/2001	*Boring moved 35' Lt.
B-157	238+00	CL	920.7*	0.0	3.5	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/11/2001	*Boring moved 10' down Station
				3.5		Auger Refusal on Dolomite @ 3.5'					
B-158*									SP	09/11/2001	* Boring eliminated due to grade change
B-159	240+10	80' LT.	979*	0	3.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/10/2001	*Boring moved 30' Downstation
				3.0	14.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				14.0		Auger Refusal on Dolomite @ 14.0'					
B-160*									SP	09/11/2001	*Inaccessible boring location
B-161	240+35	90' RT.	910.3*	0.0	3.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/11/2001	*Boring moved 25' upstation and 10' out from CL
				3.0	4.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				4.5		Auger Refusal on Dolomite @ 4.5'					
B-162	242+10	80' LT.	1000.99	0.0	3.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/10/2001	
				3.0	11.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				11.0		Auger Refusal on Dolomite @ 11.0'					
B-163	242+10	CL	983.77	0.0	3.5	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/10/2001	
				3.5	21.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				21.0		Auger Refusal on Dolomite @ 21.0'					
B-164*									SP	09/10/2001	*Inaccessible boring location

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## BORING LOGS West Gate Access Road Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-165	244+10	80' LT.	1026.2	0	4.0	Chert GRAVEL, Cobblers, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/07/2001	
				4.0	16.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				16.0	20.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel, Dry		CH			
				20.0		Auger Refusal on Dolomite @ 20.0'					
B-166	244+19	CL	1011.8*	0.0	3.5	Chert GRAVEL, Cobblers, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/07/2001	*Boring moved 8' toward CL
				3.5	12.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				12.0	33.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Moist (Joint Material)		CH			
				33.5		Auger Refusal on Dolomite @ 33.5'					
B-167	244+10	80' RT.	993.83	0.0	2.0	Chert GRAVEL, Cobblers, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/07/2001	
				2.0	8.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				8.0	12.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel, Dry		CH			
				12.0		Auger Refusal on Dolomite @ 12.0'					
B-168	246+10	80' LT.	1044.48	0.0	5.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/07/2001	Snapped off Auger bit in hole
				5.0	46.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				46.0	48.0	Weathered Dolomite					
				48.0		Bottom of Boring @ 48.0'					
B-169	246+10	5' RT.	1031.0*	0	2.5	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/06/2001	*Moved 5' away from centerline
				2.5		Auger Refusal on Dolomite @ 2.5'					
B-170	246+25	80' RT.	1020.0*	0.0	4.5	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/06/2001	*Moved 15' up station
				4.5		Auger Refusal on Dolomite @ 4.5'					
B-171	248+10	80' LT.	1055.71	0.0	3.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/06/2001	
				3.0	5.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				5.0	6.5	Weathered Dolomite					
				6.5		Auger Refusal on Dolomite @ 6.5'					
B-172	248+10	CL	1055.62	0.0	2.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/06/2001	
				2.0	30.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				30.0		Auger Refusal on Dolomite @ 30.0'					
B-173	247+98	80' RT.	1046.0*	0.0	2.5	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/06/2001	*Moved 12' down station
				2.5		Auger Refusal on Dolomite @ 2.5'					
B-174	250+10	80' LT.	1057.71	0.0	3.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/06/2001	
				3.0	5.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				5.0	6.5	Weathered Dolomite					
				6.5		Auger Refusal on Dolomite @ 6.5'					

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## BORING LOGS West Gate Access Road Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-175	250+10	CL	1063.68	0.0	2.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/06/2001	
				2.0	10.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				10.0	15.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel, Dry		CH			
				15.5		Auger Refusal on Dolomite @ 15.5'					
B-176	250+10	80' RT.	1059.17	0.0	4.5	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/06/2001	
				4.5	7.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				7.0	7.7	Weathered Dolomite					
				7.7		Auger Refusal on Dolomite @ 7.7'					
B-177	252+10	80' LT.	1073.84	0.0	4.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/06/2001	
				4.0	6.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				6.0	7.5	Weathered Dolomite					
				7.5		Auger Refusal on Dolomite @ 7.5'					
B-178	252+10	CL	1076.55	0.0	6.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/06/2001	
				6.0	14.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				14.5	15.0	Weathered Dolomite					
				15.0		Auger Refusal on Dolomite @ 15.0'					
B-179	252+10	80' RT.	1074.9	0.0	1.0	Organics			SP	09/06/2001	
				1.0	4.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM			
				4.0	14.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				14.0	18.2	Weathered Dolomite					
				18.2		Auger Refusal on Dolomite @ 18.2'					
B-180	254+09	80' LT.	1079.15	0.0	1.5	Light Gray SILT, Some Fine Sand, Little Gravel, Dry		ML	SP	09/06/2001	
				1.5	48.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				48.0		Bottom of Boring @ 48.0'					
B-181	254+10	CL	1082.81			CORE			SP	10/09/2001	
B-182	254+10	80' RT.	1083.6	0.0	5.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	09/06/2001	
				5.0	11.5	Reddish-Brown, Fat CLAY, With Chert Gravel, Dry		CH			
				11.5		Auger Refusal on Dolomite @ 11.5'					
B-183	256+25	80' LT.	1047.0*	0	4.0	Chert GRAVEL, Cobbles, Boulders With Light Gray Silt, Fine Sand, Dry		GM	SP	09/05/2001	*Boring moved 15' up station
				4.0	49.0	Reddish-Brown, Fat CLAY, Some Gravel, Moist		CH			
				49.0		Bottom of Boring @ 49.0'					
B-184	256+10	CL	1070.36	0.0	3.0	Chert GRAVEL, Cobbles, Boulders With Light Gray Silt, Fine Sand, Dry		GM	SP	09/05/2001	
				3.0	28.0	Reddish-Brown, Fat CLAY, Some Gravel, Moist		CH			
				28.0	28.5	Weathered Dolomite					
				28.5		Auger Refusal on Dolomite @ 28.5'					

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## BORING LOGS West Gate Access Road Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-185	256+10	80' RT.	1079.03	0.0	3.5	Chert GRAVEL, Cobbles, Boulders With Light Gray Silt, Fine Sand, Dry		GM	SP	09/05/2001	
				3.5	5.0	Weathered Dolomite					
				5.0		Auger Refusal on Dolomite @ 5.0'					
B-186	258+15	80' LT.	1079.0*	0.0	4.0	Chert GRAVEL, Cobbles, Boulders With Light Gray Silt, Fine Sand, Dry		GM	SP	09/05/2001	*Boring moved 5' up station
				4.0	12.0	Reddish-Brown, Fat CLAY, Some Gravel, Moist		CH			
				12.0	12.5	Weathered Dolomite					
				12.5		Auger Refusal on Dolomite @ 12.5'					
B-187	258+10	CL	1082.29	0.0	3.5	Chert GRAVEL, Cobbles, Boulders With Light Gray Silt, Fine Sand, Dry		GM	SP	09/05/2001	
				3.5	4.0	Weathered Dolomite					
				4.0		Auger Refusal on Dolomite @ 4.0'					
B-188	258+10	80' RT.	1086.32	0.0	4.0	Chert GRAVEL, Cobbles, Boulders With Light Gray Silt, Fine Sand, Dry		GM	SP	09/05/2001	
				4.0	4.5	Weathered Dolomite					
				4.5		Auger Refusal on Dolomite @ 4.5'					
B-189	260+10	80' LT.	1100.37	0	4.0	Chert GRAVEL, Cobbles, With Silt, Fine Sand, Dry		GM	SP	08/30/2001	
				4.0	8.0	Weathered DOLOMITE, With Reddish-Brown, Fat Clay					
				8.0		Auger Refusal on Dolomite @ 8'					
B-190	260+10	CL	1104.79	0.0	4.0	Light Gray, SILT, Fine Sand, Some Chert Gravel, Dry		ML	SP	08/30/2001	
				4.0	13.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
				13.0	26.5	Weathered DOLOMITE, With Reddish-Brown, Fat Clay					
				26.5		Auger Refusal on Dolomite @ 26.5'					
B-191	260+10	80' RT.	1107.92	0.0	3.0	Light Gray, SILT, With Chert Gravel, Dry		ML	SP	08/30/2001	
				3.0	4.8	Weathered DOLOMITE, With Reddish-Brown, Fat Clay					
				4.8		Auger Refusal on Dolomite @ 4.8'					
B-192	262+10	80' LT.	1095.65	0.0	2.5	Chert GRAVEL, Cobbles, With Light Gray Silt, Fine Sand, Dry		GM	SP	08/30/2001	
				2.5	6.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel					
				6.0	23.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Little Weathered Dolomite,					
				23.0		Auger Refusal on Dolomite @23'					
B-193	262+10	CL	1103.12	0.0	2.0	Light Gray SILT, Some Fine Sand, Chert Gravel, Dry		ML	SP	08/30/2001	
				2.0	6.0	Reddish-Brown, Gray, Fat CLAY, With Chert Gravel, Weathered Dolomite		CH			
				6.0	13.0	Reddish-Brown, Fat CLAY, With Chert Gravel		CH			
				13.0	26.4	Weathered DOLOMITE, With Reddish-Brown, Fat Clay					
				26.4		Auger Refusal on Dolomite @ 26.4'					
B-194	262+10	80' RT.	1107.5	0.0	1.5	Light Gray SILT, Some Fine Sand, Chert Gravel, Dry		ML	SP	08/30/2001	
				1.5	4.0	Weathered DOLOMITE, With Reddish-Brown, Fat Clay					
				4.0		Auger Refusal on Dolomite @ 4.0'					
B-195	264+10	80' LT.	1072.31	0.0	4.0	Chert GRAVEL, Cobbles, With Light Gray Silt, Fine Sand, Dry		GM	SP	08/30/2001	
				4.0		Auger Refusal on Dolomite @ 4.0'					

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## BORING LOGS West Gate Access Road Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-196	264+10	2'LT.	1088.88	0.0	2.0	Chert GRAVEL, Cobbles, With Light Gray Silt, Fine Sand, Dry		GM	SP	08/30/2001	
				2.0	3.4	Weathered DOLOMITE					
				3.4		Auger Refusal on Dolomite @ 3.4'					
B-197	264+11	81' RT.	1097.97	0.0	2.0	Chert GRAVEL, Cobbles, With Light Gray Silt, Fine Sand, Dry		GM	SP	08/30/2001	
				2.0	5.0	Weathered DOLOMITE					
				5.0	31.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Weathered Dolomite,		CH			
				31.0	34.4	Weathered DOLOMITE					
				34.4		Auger Refusal on Dolomite @ 34.4'					
B-198	266+10	80' LT.	1054.46	0.0	4.0	Chert GRAVEL, Boulders, Cobbles, With Light Gray Silt, Fine Sand, Dry		GM	SP	08/30/2001	
				4.0	14.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
				14.0	16.0	Weathered Dolomite					
				16.0		Auger Refusal on Dolomite @16'					
B-199	266+10	CL	1073.39	0.0	1.0	Leaves, Wood, Organics			SP	0/30/2001	
				1	4.0	Chert GRAVEL, Boulders, Cobbles, With Light Gray Silt, Fine Sand, Dry		GM			
				4.0	30.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
				30.0	34.0	Weathered DOLOMITE					
				34.0		Auger Refusal on Dolomite @ 34'					
B-200	266+10	80' RT.	1086.75	0.0	1.5	Chert GRAVEL, Boulders, Cobbles, With Light Gray Silt, Fine Sand, Dry		GM	SP	08/30/2001	
				1.5	3.0	Weathered DOLOMITE					
				3.0		Auger Refusal on Dolomite @ 3.0'					
B-201	268+15	75' LT.	1076.1*	0.0	4.0	Chert GRAVEL, Boulders, Cobbles, With Light Gray Silt, Fine Sand, Dry		GM	SP	08/30/2001	Boring moved 5' up station and 5' toward centerline
				4.0	44.0	Reddish-Brown, Fat CLAY, With Chert Gravel, Weathered Dolomite		CH			
				44.0	46.0	Weathered Dolomite, With Reddish-Brown, Fat Clay					
				46.0		Auger Refusal on Dolomite @ 46.0'					
B-202	268+10	CL	1084.88	0.0	2.0	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry		GM	SP	08/30/2001	
				2.0	39.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel	Bulk	CH			Bulk Sample for Proctor and Atterberg Limits
				39.0		Auger Refusal on Dolomite @ 39.0'					
B-203	268+10	80' RT.	1095.33	0.0	2.5	Chert GRAVEL, Boulders, Cobbles, With Light Gray Silt, Fine Sand, Dry		GM	SP	08/30/2001	
				2.5	50.0	Reddish-Brown, Fat CLAY, With Chert Gravel		CH			Note: Nothing came out of Boring after 15'. Augers were clean and dry, no void
				50.0		Bottom of Boring @ 50.0'					

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BORING LOGS  
West Gate Access Road  
Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-204	270+10	80' LT.	1107.05	0	1.5	Chert, GRAVEL, With Silt Fine Sand		GM	SP	08/29/2001	
				1.5	10.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, and Gravel		CH			
				10.0	12.4	Weathered Dolomite			SP	08/29/2001	
				12.4		Auger Refusal on Dolomite @ 12.4'					
B-205	270+05	CL	1107.8*	0.0	2.5	Weathered Dolomite			SP	08/29/2001	*Boring moved 5' down hill
				2.5		Auger Refusal on Dolomite @ 2.5'					
B-206	270+10	80' RT.	1114.74	0.0	3.0	Weathered Dolomite			SP	08/29/2001	
				3.0		Auger Refusal on Dolomite @ 3.0'					
B-207	272+10	80' LT.	1125.91	0.0	0.2	Asphaltic Concrete		GM	SP	08/29/2001	
				0.2	2.5	Chert GRAVEL, With Silt, Fine Sand					
				2.5	12.4	Reddish-Brown, Fat CLAY, With Chert Gravel		CH			
				12.4		Auger Refusal on Dolomite @ 12.4'					
B-208	272+10	CL	1123.81			CORE			SP	10/05/2001	
B-208A	272+15	CL	1123.81			CORE			SP	10/08/2001	Moved 5' upstation
B-209	272+10	80' RT.	1122.31	0.0	3.0	Chert GRAVEL, With Silt, Sand		GM	SP	08/29/2001	
				3.0		Auger Refusal on Dolomite @ 3.0'					
B-210	274+10	80' LT.	1122.35	0.0	2.5	Chert GRAVEL, Boulders, Cobbles, With Silt, Fine Sand		GM	SP	08/29/2001	
				2.5	9.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
				9.5	10.0	Weathered Dolomite					
				10.0		Auger Refusal on Dolomite @ 10.0'					
B-211	274+10	CL	1116.3	0.0	3.0	Chert GRAVEL, Boulders, Cobbles, With Silt, Fine Sand		GM	SP	08/29/2001	
				3.0	3.5	Weathered Dolomite					
				3.5		Auger Refusal on Dolomite @ 3.5'					
B-212	274+10	80' RT.	1107.79	0.0	2.5	Chert GRAVEL, Boulders, Cobbles, With Silt, Fine Sand		GM	SP	08/29/2001	
				2.5	9.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
				9.0	9.5	Weathered Dolomite					
				9.5		Auger Refusal on Dolomite @ 9.5'					
B-213	276+10	80' LT.	1093.1	0.0	5.0	Chert GRAVEL, Boulders, Cobbles, With Silt, Fine Sand		GM	SP	08/29/2001	
				5.0	16.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
				16.0		Auger Refusal on Dolomite @ 16.0'					
B-214	276+09	CL	1067.0*	0.0	3.0	Chert GRAVEL, With Silt, Fine Sand		GM	SP	08/29/2001	*Boring moved 1' down hill
				3.0	15.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
				15.0		Bottom of Boring @ 15.0'					
B-215	278+10	80' LT.	1099.93	0.0	2.0	Chert GRAVEL, Boulders, Cobbles, With Light Gray Silt, Fine Sand		GM	SP	08/29/2001	
				2.0	4.0	Reddish-Brown, Gray, Fat CLAY, With Weathered Dolomite, Chert Gravel					
				4.0	7.5	Weathered Dolomite					
				7.5		Auger Refusal on Dolomite @ 7.5'					

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BORING LOGS  
West Gate Access Road  
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Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-216	278+10	CL	1081.92	0	2.0	Chert GRAVEL, With Light Gray Silt, Fine Sand		GM	SP	08/29/2001	
				2.0	15.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel					
				15.0		Bottom of Boring @ 15.0'					
B-217	280+10	80' LT.	1109.39	0.0	1.5	Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt		GM	SP	08/29/2001	
				1.5	11.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite		CH			
				11.0	12.0	Weathered Dolomite					
				12.0		Auger Refusal on Dolomite @ 12.0'					
B-218	280+10	CL	1098.45	0.0	1.0	Chert GRAVEL, With Light Gray Silt, Fine Sand		GM	SP	08/29/2001	
				1.0	5.0	Weathered DOLOMITE, Chert Gravel					
				5.0		Auger Refusal on Dolomite @ 5.0'					
B-219	280+10	80' RT.	1084.45	0.0	1.5	Chert GRAVEL, With Light Gray Silt, Fine Sand		GM	SP	08/29/2001	
				1.5	5.5	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel					
				5.5	6.0	Weathered Dolomite					
				6.0		Auger Refusal on Dolomite @ 6.0'					
B-220	282+10	80' LT.	1109.62	0.0	1.0	Chert GRAVEL, With Light Gray Silt, Fine Sand		GM	SP	08/29/2001	
				1.0	5.0	Reddish-Brown, Gray, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
				5.0	6.0	Weathered DOLOMITE					
				6.0		Auger Refusal on Dolomite @ 6.0'					
B-221	282+10.	CL	1098.13	0.0	1.5	Chert GRAVEL, With Light Gray Silt, Fine Sand		GM	SP	08/29/2001	
				1.5	4.0	Reddish-Brown, Gray, Fat CLAY, With Weathered Dolomite, Chert Gravel					
				4.0	4.5	Weathered DOLOMITE					
				4.5		Auger Refusal on Dolomite @ 4.5'					
B-222	284+10	80' LT.	1106.46	0.0	1.0	Light Gray Lean CLAY with Fine Sand, Organics		CL	SP	08/29/2001	
				1.0	4.5	Light Brown, Lean CLAY, Some Silt, Chert, Dry		CL			
				4.5		Auger Refusal on Dolomite @ 4.5'					
BF-223	292+10	CL	1094.91	0.0	0.3	Light Brown, Gray, Lean CLAY, With Silt, Organics, Dry		CL	SP	08/29/2001	
				0.3	6.0	Light Brown, Lean CLAY, Some Chert Gravel, Dry		CL			
				6.0	10.0	Gray, Lean CLAY, Some Silt, Moist		CL			
				10.0		Bottom of Boring @ 10.0'					
B-224	296+10	80' LT.	1150.47	0.0	1.0	Dolomite, Chert, GRAVEL		GP	SP	08/28/2001	
				1.0	2.0	Reddish-Brown, Fat CLAY, And Gravel		GC			
				2.0	2.5	Weathered DOLOMITE					
				2.5		Auger Refusal on Dolomite @ 2.5'					
B-225	296+10	CL	1150.15	0.0	1.0	GRAVEL		GP	SP	08/28/2001	
				1.0	3.0	Reddish-Brown, Fat CLAY and Gravel		GC			
				3.0	18.0	Weathered Dolomite, and Reddish-Brown, Fat CLAY					
				18.0		Bottom of Boring @ 18.0'					
B-226	296+10	80' RT.	1150.35	0.0	1.0	Dolomite, Chert, GRAVEL		GP	SP	08/28/2001	
				1.0	6.0	Reddish-Brown, Fat CLAY, With Chert Gravel		CH			
				6.0	13.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel					
				13.0		Bottom of Boring @ 13.0'					

# HNTB

## BORING LOGS West Gate Access Road Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-227	298+10	80' LT.	1153.45	0.0	0.5	Asphaltic Gravel		GP	SP	08/28/2001	
				0.5	15.0	Gray, Reddish-Brown, Fat CLAY, With Gravel, Dry		CH			
				15.0		Bottom of Boring @ 15.0'					
B-228	298+10	CL	1150.91	0.0	0.5	Asphaltic Gravel		GP	SP	08/28/2001	
				0.5	10.0	Reddish-Brown, Gray, Fat CLAY, With Chert Gravel	Bag	CH			Grab bag sample from 1-10
				10.0		Bottom of Boring @ 10.0'					
B-229	300+10	80' LT.	1148.91	0.0	3.0	Yellowish-Gray, Fat CLAY, With Gravel		CH	SP	08/28/2001	
				3.0	7.5	Reddish-Brown, Gray, Fat CLAY, With Weathered Dolomite, Chert Gravel		GC			
				7.5		Auger Refusal on Dolomite @ 7.5'					
B-230	300+10	CL	1146.99	0.0	0.5	Asphaltic Gravel		GP	SP	08/28/2001	
				0.5	3.0	Reddish-Brown, Fat CLAY, With Gravel		CH			
				3.0	4.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
B-231	311+10	80' LT.	1133.24	0.0	0.4	Very Dark Brown, Lean CLAY, With Organics, Dry		CL	SP	08/29/2001	
				0.4	3.0	Yellowish-Gray, Fat CLAY, With Gravel		CH			
				3.0	10.0	Reddish-Brown, Fat CLAY, With Chert Gravel		CH			
B-232	311+10	CL	1131.09	0.0	0.4	Very Dark Brown, Lean CLAY, With Organics, Dry		CL	SP	08/29/2001	
				0.4	4.0	Yellowish-Gray, Fat CLAY, With Chert Gravel, Dry		CH			
				4.0	9.0	Reddish-Brown, Fat CLAY, With Chert Gravel		CH			
B-233	313+10	80' LT.	1135.31	0.0	0.3	Asphaltic Concrete			SP	08/29/2001	
				0.3	5.5	Reddish-Brown, Fat CLAY, With Chert Gravel		CH			
				5.5	20.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
B-234	313+10	5' RT.	1133.0*	0.0	0.4	Very Dark Brown, SILT, With Organics, Dry		ML	SP	08/29/2001	*Boring Moved 5' South
				0.4	8.0	Reddish-Brown, Gray, Fat CLAY, With Chert Gravel	Bulk	CH			Bulk Sample / ST Refusal on Chert
				8.0	15.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
B-235	313+10	80' RT.	1131.35	0.0	0.4	Very Dark Brown SILT, With Clay, Organics, Dry		ML	SP	08/29/2001	
				0.4	5.0	Reddish-Brown, Gray, Fat CLAY, With Chert Gravel		CH			
				5.0	15.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
B-236	315+10	80' LT.	1127.62	0.0	0.2	Very Dark Brown SILT, With Organics, Dry		ML	SP	08/29/2001	
				0.2	2.0	Yellowish-Gray, Fat CLAY, Some Gravel, Dry		CH			
				2.0	6.0	Reddish-Brown, Gray, Fat CLAY, With Chert Gravel		CH			
				6.0	15.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
				15.0		Bottom of Boring @ 15.0'					

# HNTB

BORING LOGS  
West Gate Access Road  
Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
B-237	315+10	CL	1129.51	0.0	0.4	Very Dark Brown SILT, With Organics, Dry		ML	SP	08/29/2001	
				0.4	2.0	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH			
				2.0	5.0	Reddish-Brown, Gray, Fat CLAY, With Chert Gravel		CH			
				5.0	5.5	Weathered Dolomite					
				5.5		Auger Refusal on Dolomite @ 5.5'					
B-238	315+10	85' RT.	1126.8*	0.0	0.4	Very Dark Brown, SILT, With Organics, Dry		CL	SP	08/29/2001	* Boring Moved 5' South
				0.4	1.5	Yellowish-Gray, Fat CLAY, With Chert Gravel, Dry		CH			
				1.5	4.5	Reddish-Brown, Gray, Fat CLAY, With Chert Gravel		CH			
				4.5	13.0	Reddish-Brown, Gray, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
				13.0		Auger Refusal on Dolomite @ 13.0'					
B-239	317+10	CL	1118.96	0.0	0.3	Very Dark Brown, SILT, With Organics, Dry		ML	SP	08/29/2001	
				0.3	2.0	Yellowish-Gray, Fat CLAY, Some Gravel, Dry		CH			
				2.0	5.0	Reddish-Brown, Gray, Fat CLAY, With Chert Gravel		CH			
				5.0	10.0	Reddish-Brown, Fat CLAY, With Weathered Dolomite, Chert Gravel		CH			
				10.0		Bottom of Boring @ 10.0'					
B-240	317+05	85' RT.	1122.1*	0.0	0.3	Very Dark Brown, SILT, With Organics, Dry		ML	SP	08/29/2001	* Boring Moved 5' South and 5' West of Staked Location
				0.3	2.0	Yellowish-Gray, Fat CLAY, Some Chert Gravel, Dry		CH			
				2.0	10.0	Reddish-Brown, Gray, Fat CLAY, With Chert Gravel		CH			
				10.0		Bottom of Boring @ 10.0'					

# HNTB

**BORING LOGS**  
**West Gate Access Road**  
**Ft. Leonard Wood, Pulaski County, Missouri**

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
BH1-1	163+61	14' RT.	800.79	0	22.5	Brown, Fine To Coarse GRAVEL, With Sand, Silt Auger Refusal on Dolomite @ 22.5'		GP	SP	09/21/2001	
BH1-5	163+78	54' RT.	801.55	0.0	24.0	Brown, Fine To Coarse GRAVEL, With Sand, Silt Auger Refusal on Dolomite @ 24.0'		GP	SP	09/21/2001	
BH1-2	163+86	14' RT.	800.3			CORE			SP	10/01/2001	
BH1-3	163+94	34' RT.	801.28	0.0	23.0	Brown, Fine To Coarse GRAVEL, With Sand, Silt Auger Refusal on Dolomite @ 23.0'		GP	SP	09/21/2001	
BH1-4	164+02	55' RT.	801.31	0	23.5	Brown, Fine To Coarse GRAVEL, Some Sand, Dry Auger Refusal on Dolomite @ 23.5'		GP	SP	09/25/2001	
BH2-1	164+89	21' RT.	799.4	0.0	9.0	Brown, Dark Brown, Fine to Medium Coarse, SAND, Some Silt		SM	SP	09/25/2001	
				9.0	21.0	Brown, Fine To Coarse GRAVEL, With Clay		GC			
				21.0	22.0	Weathered Dolomite					
				22.0		Auger Refusal on Dolomite @ 22.0'					
BH2-2	164+94	34' RT.	799.13	0	6.0	Brown, Dark Brown, Fine To Medium Coarse SAND, Some Silt		SM	SP	09/25/2001	
				6.0	21.5	Brown, Fine To Coarse GRAVEL, Some Silt, Clay		GC			
				21.5		Auger Refusal on Dolomite @ 21.5'					
BH2-3	164+99	47' RT.	799.58			CORE			SP	10/02/2001	
BH3C-1	166+09	21' RT.	788.53			CORE			SP	09/26/2001	
BH3C-2	166+14	34' RT.	788.41	0.0	9.0	Brown, Light Brown, White, Fine To Coarse, Chert GRAVEL, Cobbles, Some Sand		GP	SP	09/21/2001	
				9.0	9.5	Weathered Dolomite					
				9.5		Auger Refusal on Dolomite @ 9.5'					
BH3C-3	166+19	47' RT.	788.06	0.0	10.5	Brown, Light Brown, White, Fine To Coarse, Chert GRAVEL, Cobbles, Some Sand		GP	SP	09/21/2001	
				10.5	17.5	Weathered Dolomite					
				17.5		Auger Refusal on Dolomite @ 17.5'					
BH3S-1	166+54	21' RT.	789.86	0.0	9.0	Brown, Light Brown, White, Fine To Coarse, Chert GRAVEL, Cobbles, Some Sand		GP	SP	09/21/2001	
				9.0		Auger Refusal on Dolomite @ 9.0'					
BH3S-2	166+59	34' RT.	790.03	0.0	9.5	Brown, Light Brown, White, Fine To Coarse, Chert GRAVEL, Cobbles, Some Sand		GP	SP	09/21/2001	
				9.5		Auger Refusal on Dolomite @ 9.5'					
BH3S-3	166+64	47' RT.	789.87			CORE			SP	09/26/2001	
BH4C-1	167+02	22' RT.	793.18			CORE			SP	09/27/2001	
BH4C-2	167+08	34' RT.	793.42	0.0	3.0	Brown, Dark Brown, Fine To Medium Coarse SAND, Some Gravel		SP	SP	09/21/2001	
				3.0	11.0	Brown, Light Brown, White, Fine To Coarse, Chert GRAVEL, Cobbles, Some Sand		GP			
				11.0	12.5	Weathered Dolomite					
				12.5		Auger Refusal on Dolomite @ 12.5'					

# HNTB

BORING LOGS  
West Gate Access Road  
Ft. Leonard Wood, Pulaski County, Missouri

Boring No.	Station	Offset	Elevation	Depth (Ft)		Log of Materials	Samples	USCS	Logged By:	Date	Comments
				From	To						
BH4C-3	167+13	47' RT.	793.57	0.0	3.5	Brown, Dark Brown, Fine To Medium Coarse SAND, Some Gravel, Silt		SP	SP	09/21/2001	
				3.5	13.5	Brown, Fine To Coarse, Chert GRAVEL, Cobbles, Some Sand, Silt		GP			
				13.5		Auger Refusal on Dolomite @ 13.5'					
BH4S-1	167+89	21' RT.	791.13	0.0	10.0	Brown, Fine To Coarse, Chert GRAVEL, Cobbles, With Sand		GP	SP	09/21/2001	
				10.0		Auger Refusal on Dolomite @ 10.0'					
BH5C-2	168+01	35' RT.	790.81	0.0	9.0	Brown, Fine To Coarse, Chert GRAVEL, Cobbles, With Sand		GP	SP	09/21/2001	
				9.0		Auger Refusal on Dolomite @ 9.0'					
BH4S-3	167+99	47' RT.	791.83			CORE			SP	09/28/2001	
BH5S6C-2	168+86	14' RT.	798.14			CORE			SP	10/01/2001	
BH5S6C-3	168+94	34' RT.	797.38	0.0	1.0	Brown, Fine To Coarse SAND, With Silt, Organics		SM	SP	09/21/2001	
				1.0	16.5	Brown, Fine To Coarse GRAVEL, With Sand, Silt		GP			
				16.5	17.0	Weathered Dolomite					
				17.0		Auger Refusal on Dolomite @ 17.0'					
BH5S6C-4	169+01	54' RT.	796.89	0.0	2.5	Brown, Fine To Coarse SAND, Some Silt, Organics		SM	SP	09/21/2001	
				2.5	16.0	Brown, Fine To Coarse GRAVEL, With Sand		GP			
				16.0		Auger Refusal on Dolomite @ 16.0'					
BH5S6C-1	169+11	14' RT.	799.3	0.0	2.0	Brown, Fine To Coarse SAND, With Silt, Organics		SM	SP	09/21/2001	
				2.0	19.0	Brown, Fine To Coarse GRAVEL, With Sand, Silt		GP			
				19.0		Auger Refusal on Dolomite @ 19.0'					
BH5S6C-5	169+27	55' RT.	797.65	0.0	1.0	Brown, Fine To Coarse SAND, Some Silt, Organics		SM	SP	09/21/2001	
				1.0	22.0	Brown, Fine To Coarse, Chert GRAVEL, With Sand		GP			
				22.0	23.5	Weathered Dolomite					
				23.5		Auger Refusal on Dolomite @ 23.5'					



LOG OF BORING

BORING NO.	BS-83	
SHEET	1	OF 1

PROJECT West Gate Access Road STATION 163+10  
Ft. Leonard Wood, Pulaski County, Missouri OFFSET Centerline  
 EXPLORATION CONTRACTOR OEI/Terracon Consultants, Inc. STARTED 8-28-2001  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston COMPLETED 8-28-2001

<b>GROUNDWATER</b> ENCOUNTERED DURING DRILLING AT <u>6.0</u> HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____	<b>BORING METHOD</b> <input type="checkbox"/> HAND AUGER <input checked="" type="checkbox"/> HOLLOW STEM AUGER <input type="checkbox"/> CONTINUOUS FLIGHT AUGER <input type="checkbox"/> DRIVING CASING <input type="checkbox"/> ROTARY (MUD) DRILLING DEPTH MUD STARTED _____	<b>SAMPLE TYPE AND DATA</b> <input checked="" type="checkbox"/> Split Barrel <u>1 3/8" I.D.</u> <input checked="" type="checkbox"/> Undisturbed Sample <u>2" O.D.</u> <input checked="" type="checkbox"/> Auger <u>6 1/4" O.D.</u> <input checked="" type="checkbox"/> Rock Core _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
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DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM NAVD 88 ELEV. (feet)
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
0	A								Chert GRAVEL, Some Sand, Little Clay, Cobbles, Dry (GP)	801.5	
5	S	J-1	0		4	2	2	4	Fine to Coarse, Loose, Chert GRAVEL, with Brown Lean Clay, Little Silt, Moist (GC)	800.0	
10	A								Shelby Tube Refusal on Gravel		
15	U	U-1	6								
15	A								Fine to Coarse, Medium Dense, Chert GRAVEL, with Brown Lean Clay, Moist (GC)		
20	S	J-2	8		10	8	8	16			
20	A								Fine to Coarse, Loose, Chert GRAVEL, with Brown Lean Clay, Moist (GC)		
20	S	J-3	6		2	3	6	9			
20	A										
22.0									Auger Refusal on Dolomite @ 22.0' Boring Backfilled with Cuttings 8/28/2001	779.5	

REMARKS:



LOG OF BORING

BORING NO. **BS-84**  
 SHEET **1** OF **1**

PROJECT **West Gate Access Road** STATION **168+10**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **Centerline**  
 EXPLORATION CONTRACTOR **OEI/Terracon Consultants, Inc.** STARTED **9-5-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **9-5-2001**

<b>GROUNDWATER</b> ENCOUNTERED DURING DRILLING AT <u>8.00</u> HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____	<b>BORING METHOD</b> <input type="checkbox"/> HAND AUGER <input checked="" type="checkbox"/> HOLLOW STEM AUGER <input type="checkbox"/> CONTINUOUS FLIGHT AUGER <input type="checkbox"/> DRIVING CASING <input type="checkbox"/> ROTARY (MUD) DRILLING DEPTH MUD STARTED _____	<b>SAMPLE TYPE AND DATA</b> <input checked="" type="checkbox"/> Split Barrel <u>1 3/8" I.D.</u> <input type="checkbox"/> Undisturbed Sample _____ <input checked="" type="checkbox"/> Auger <u>6 1/4" O.D.</u> <input type="checkbox"/> Rock Core _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
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DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION <small>(Color, Consistency, Modifier, MATERIAL, Moisture, Classification)</small> Soil Classification System <u>Unified (Visual)</u>	ELEV DATUM <u>NAVD 88</u>  ELEV. (feet) <u>792.3</u>
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
5	A								Brown, Medium Dense, Fine to Coarse, Chert GRAVEL, With Sand, Dry (GP)		
	S	J-1	8		5	6	7	13			
10	A								Brown, Loose, Fine to Coarse, Chert GRAVEL, With Sand, Wet (GP)		
	S	J-2	6		7	3	2	5			
12.0									Weathered DOLOMITE	780.3	
12.5									Auger Refusal on Dolomite @ 12.5' Boring Backfilled 9/5/2001	779.8	

REMARKS:



LOG OF BORING

BORING NO. **BS-85**  
 SHEET **1** OF **1**

PROJECT **West Gate Access Road** STATION **172+10**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **Centerline**  
 EXPLORATION CONTRACTOR **OEI/Terracon Consultants, Inc.** STARTED **9-5-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **9-5-2001**

<b>GROUNDWATER</b> ENCOUNTERED DURING DRILLING AT <u>Dry</u> _____ HOURS AFTER DRILLING _____ _____ HOURS AFTER DRILLING _____ _____ HOURS AFTER DRILLING _____	<b>BORING METHOD</b> <input type="checkbox"/> HAND AUGER <input checked="" type="checkbox"/> HOLLOW STEM AUGER <input type="checkbox"/> CONTINUOUS FLIGHT AUGER <input type="checkbox"/> DRIVING CASING <input type="checkbox"/> ROTARY (MUD) DRILLING _____ DEPTH MUD STARTED	<b>SAMPLE TYPE AND DATA</b> <input checked="" type="checkbox"/> Split Barrel <u>1 3/8" I.D.</u> <input type="checkbox"/> Undisturbed Sample _____ <input checked="" type="checkbox"/> Auger <u>6 1/4" O.D.</u> <input type="checkbox"/> Rock Core _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
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DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM  NAVD 88  ELEV. (feet)
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
0-0.5	A								Organics	801.0	
0.5-5	S	J-1	8		4	3	6	9	Brown, Loose, Fine to Coarse Chert GRAVEL, With Sand, Dry (GP)	800.5	
5-10	S	J-2	10		8	11	14	25			
10-15	S	J-3	6		4	5	50/1				
15-16.5	A									Weathered DOLOMITE	785.5
16.5-20									Auger Refusal on Dolomite @ 16.5' Boring Backfilled 9/5/2001	784.5	

REMARKS:



# LOG OF BORING

BORING NO. **BS-86**  
 SHEET **1** OF **1**

PROJECT **West Gate Access Road** STATION **176+10**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **Centerline**  
 EXPLORATION CONTRACTOR **OEI/ Terracon Consultants, Inc.** STARTED **9-5-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **9-5-2001**

**GROUNDWATER**  
 ENCOUNTERED DURING  
 DRILLING AT Dry  
 \_\_\_\_\_ HOURS AFTER DRILLING \_\_\_\_\_  
 \_\_\_\_\_ HOURS AFTER DRILLING \_\_\_\_\_  
 \_\_\_\_\_ HOURS AFTER DRILLING \_\_\_\_\_  
 \_\_\_\_\_ HOURS AFTER DRILLING \_\_\_\_\_

**BORING METHOD**  
 HAND AUGER  
 HOLLOW STEM AUGER  
 CONTINUOUS FLIGHT AUGER  
 DRIVING CASING  
 ROTARY (MUD) DRILLING  
 \_\_\_\_\_ DEPTH MUD STARTED \_\_\_\_\_

**SAMPLE TYPE AND DATA**  
 Split Barrel  
 Undisturbed Sample  
 Auger 6 1/4" O.D.  
 Rock Core  
 \_\_\_\_\_  
 \_\_\_\_\_

DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY(in) CORE RECOVERY(%)	ROD(%)	Blows per Interval (inches)			"N" Value			ELEV. (feet)
					0-6	6-12	12-18				
					NAVD 88						
0										801.4	
0.6									Organics	800.8	
14.0									Brown, Fine to Coarse, Chert GRAVEL, With Sand, Dry (GP)	787.4	
16.7									Brown, Fine to Coarse, Chert GRAVEL, With Clay, Sand, Moist (GC)	784.7	
16.7									Auger Refusal on Dolomite @ 16.7 Boring Backfilled 9/5/2001		

REMARKS:



# LOG OF BORING

BORING NO. **B-113**  
 SHEET **1** OF **3**

PROJECT **West Gate Access Road** STATION **200+10**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **80 Lt.**  
 EXPLORATION CONTRACTOR **OEI/ Meyer Drilling** STARTED **10-2-2001**  
 ENGINEERS REP **S. Preston** LOGGED BY **S. Preston** COMPLETED **10-3-2001**

**GROUNDWATER**  
 ENCOUNTERED DURING  
 DRILLING AT Dry  
 \_\_\_\_\_ HOURS AFTER DRILLING \_\_\_\_\_  
 \_\_\_\_\_ HOURS AFTER DRILLING \_\_\_\_\_  
 \_\_\_\_\_ HOURS AFTER DRILLING \_\_\_\_\_  
 \_\_\_\_\_ HOURS AFTER DRILLING \_\_\_\_\_

**BORING METHOD**  
 HAND AUGER  
 HOLLOW STEM AUGER  
 CONTINUOUS FLIGHT AUGER  
 DRIVING CASING  
 ROTARY (MUD) DRILLING  
 \_\_\_\_\_ DEPTH MUD STARTED \_\_\_\_\_

**SAMPLE TYPE AND DATA**  
 Split Barrel \_\_\_\_\_  
 Undisturbed Sample \_\_\_\_\_  
 Auger **8" O.D.** \_\_\_\_\_  
 Rock Core **NQ Series** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION <small>(Color, Consistency, Modifier, MATERIAL, Moisture, Classification)</small> Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY(in) CORE RECOVERY(%)	ROD(%)	Blows per Interval (inches)			"N" Value			ELEV. (feet)
					0-6	6-12	12-18				
0-5	A								Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry (GP)	1001.5	
5-8.5									Reddish-Brown, Fat CLAY, Some Chert Gravel, Dry (CH)	999.0	
8.5-15	C	C-1	52	25						993.0	
15-20											
20-25	C	C-2	100	75					Gray, Light Gray, Buff DOLOMITE, Porous, Vugs, Greenish-Gray Sandy Lenses, Reddish Brown Staining		

REMARKS:



LOG OF BORING

BORING NO. **B-113**  
 SHEET **2** OF **3**

PROJECT **West Gate Access Road** STATION **200+10**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **80 Lt.**  
 EXPLORATION CONTRACTOR **OEI/ Meyer Drilling** STARTED **10-2-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **10-3-2001**

DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM NAVD 88 ELEV. (feet) 1001.5
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
	C	C-2	100	75							
30	C	C-3	85	51							
35											
40	C	C-4	99	82							
45											
50	C	C-5	71	48							
55	C	C-6	71	0							
	C	C-7	93	66							

Gray, Light Gray, Buff DOLOMITE, Porous, Vugs, Greenish-Gray Sandy Lenses, Reddish Brown Staining

Fractured Chert Nodules

REMARKS:



LOG OF BORING

BORING NO. **B-113**  
 SHEET **3** OF **3**

PROJECT **West Gate Access Road**

**Ft. Leonard Wood, Pulaski County, Missouri**

STATION **200+10**

EXPLORATION CONTRACTOR **OEI/ Meyer Drilling**

OFFSET **80 Lt.**

ENGINEERS REP. **S. Preston**

LOGGED BY **S. Preston**

STARTED **10-2-2001**

COMPLETED **10-3-2001**

DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM NAVD 88 ELEV. (feet) 1001.5
	INTERVAL AND TYPE	NUMBER	RECOVERY(in) CORE RECOVERY(%)	ROD(%)	Blows per Interval (Inches)			"N" Value			
					0-6	6-12	12-18				
60	C	C-7	93	66					Gray, Light Gray, Buff DOLOMITE, Porous, Vugs, Greenish-Gray Sandy Lenses, Reddish Brown Staining  Abundant Chert		
70	C	C-8	98	73							
75	Bottom of Boring @ 75.2' Boring Backfilled 10/3/2001									75.2	926.3
80											
85											

REMARKS:



LOG OF BORING

BORING NO.	B-156	
SHEET	1	OF 2

PROJECT West Gate Access Road STATION 238+10  
Ft. Leonard Wood, Pulaski County, Missouri  
 EXPLORATION CONTRACTOR OEI/ Meyer Drilling OFFSET 80 Lt.  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston STARTED 10-9-2001  
 COMPLETED 10-10-2001

<b>GROUNDWATER</b> ENCOUNTERED DURING DRILLING AT <u>Dry</u> _____ HOURS AFTER DRILLING _____ _____ HOURS AFTER DRILLING _____ _____ HOURS AFTER DRILLING _____ _____ HOURS AFTER DRILLING _____	<b>BORING METHOD</b> <input type="checkbox"/> HAND AUGER <input checked="" type="checkbox"/> HOLLOW STEM AUGER <input type="checkbox"/> CONTINUOUS FLIGHT AUGER <input type="checkbox"/> DRIVING CASING <input type="checkbox"/> ROTARY (MUD) DRILLING _____ DEPTH MUD STARTED _____	<b>SAMPLE TYPE AND DATA</b> <input checked="" type="checkbox"/> Split Barrel _____ <input checked="" type="checkbox"/> Undisturbed Sample _____ <input checked="" type="checkbox"/> Auger 8" O.D. _____ <input checked="" type="checkbox"/> Rock Core <u>NQ Series</u> <input type="checkbox"/> _____ <input type="checkbox"/> _____
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DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY(in) CORE RECOVERY(%)	RQD(%)	Blows per Interval (inches)			"N" Value			ELEV. (feet)
					0-6	6-12	12-18				
0-2.5									Chert GRAVEL, Cobbles, Boulders, With Light Gray Silt, Fine Sand, Dry (GM)	971.9	
2.5-8.5	A								Reddish-Brown, Fat CLAY, With Chert Gravel, Dry (CH)	969.4	
8.5-15	C	C-1	90	71					Weathered Dolomite With Reddish-Brown, Fat Clay	963.4	
15-20	C	C-2	69	31					Buff, Slightly Weathered DOLOMITE, Porous, With CHERT		
20-25	C	C-3	61	0							

REMARKS:



LOG OF BORING

BORING NO.	B-156	
SHEET	2	OF 2

PROJECT West Gate Access Road STATION 238+10  
Ft. Leonard Wood, Pulaski County, Missouri OFFSET 80 Lt.  
 EXPLORATION CONTRACTOR OEI/ Meyer Drilling STARTED 10-9-2001  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston COMPLETED 10-10-2001

DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System Unified (Visual)	ELEV. DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY(in) CORE RECOVERY(%)	ROD(%)	Blows per Interval (inches)			*N* Value			ELEV. (feet)
					0-6	6-12	12-18				
	C									971.9	
30	C	C-4	30	0							
35	C	C-5	88	59							
40											
45	C	C-6	88	61							
46.7									Lost Circulation last 1.3' Probable area of Core Loss.	46.7	925.2
50									Bottom of Boring @ 46.7' Boring Backfilled 10/10/2001		
55											

REMARKS:



LOG OF BORING

BORING NO.	B-181	
SHEET	1	OF 4

PROJECT West Gate Access Road STATION 254+10  
Ft. Leonard Wood, Pulaski County, Missouri OFFSET Centerline  
 EXPLORATION CONTRACTOR OEI/ Meyer Drilling STARTED 10-8-2001  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston COMPLETED 10-9-2001

<b>GROUNDWATER</b> ENCOUNTERED DURING DRILLING AT <u>Dry</u> _____ HOURS AFTER DRILLING _____ _____ HOURS AFTER DRILLING _____ _____ HOURS AFTER DRILLING _____ _____ HOURS AFTER DRILLING _____	<b>BORING METHOD</b> <input type="checkbox"/> HAND AUGER <input checked="" type="checkbox"/> HOLLOW STEM AUGER <input type="checkbox"/> CONTINUOUS FLIGHT AUGER <input type="checkbox"/> DRIVING CASING <input type="checkbox"/> ROTARY (MUD) DRILLING _____ DEPTH MUD STARTED _____	<b>SAMPLE TYPE AND DATA</b> <input checked="" type="checkbox"/> Split Barrel <input checked="" type="checkbox"/> Undisturbed Sample <input checked="" type="checkbox"/> Auger <u>8" O.D.</u> <input checked="" type="checkbox"/> Rock Core <u>NQ Series</u> <input type="checkbox"/> <input type="checkbox"/>
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DEPTH BELOW SURFACE (feet)	SAMPLE					PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM  NAVD 88  ELEV. (feet)
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			*N* Value				
					0-6	6-12	12-18					
0											1082.8	
3.0										Chert GRAVEL, Cobbles, With Light Gray Silt, Fine Sand, Dry (GM)	1079.8	
5										Reddish-Brown, Fat CLAY, With Chert Gravel, Dry (CH)		
10												
15												
20												
25												

REMARKS:



LOG OF BORING

BORING NO **B-181**  
 SHEET **2** OF **4**

PROJECT **West Gate Access Road**  
**Ft. Leonard Wood, Pulaski County, Missouri**

STATION **254+10**  
 OFFSET **Centerline**  
 STARTED **10-8-2001**  
 COMPLETED **10-9-2001**

EXPLORATION CONTRACTOR **OEI/ Meyer Drilling**

ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston**

DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION  (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM  NAVD 88  ELEV. (feet)  1082.8
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY(%)	ROD(%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
30									Reddish-Brown, Fat CLAY, With Chert Gravel, Dry (CH)		
35											
40	A										
45											
50											
55											

REMARKS:



LOG OF BORING

BORING NO. **B-181**  
 SHEET **3** OF **4**

PROJECT **West Gate Access Road** STATION **254+10**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **Centerline**  
 EXPLORATION CONTRACTOR **OEI/ Meyer Drilling** STARTED **10-8-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **10-9-2001**

DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION <small>(Color, Consistency, Modifier, MATERIAL, Moisture, Classification)</small> Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM <hr/> NAVD 88 <hr/> ELEV. (feet)
	INTERVAL AND TYPE	NUMBER	RECOVERY(in) CORE RECOVERY(%)	ROD(%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
60	A								Reddish-Brown, Fat CLAY, With Chert Gravel, Dry (CH)	1082.8	
72.3	C	C-1	62	14					Gray, Light Gray, Buff, Coarsely Crystalline DOLOMITE, Porous, Vugs, Clay Seams	1010.5	
80	C	C-2	40	14					Reddish-Brown, Fat CLAY, With Chert Gravel, Moist (CH)	1000.8	
85	C										

REMARKS:



LOG OF BORING

BORING NO.	B-181	
SHEET	4	OF 4

PROJECT West Gate Access Road STATION 254+10  
Ft. Leonard Wood, Pulaski County, Missouri OFFSET Centerline  
 EXPLORATION CONTRACTOR OEI/ Meyer Drilling STARTED 10-8-2001  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston COMPLETED 10-9-2001

DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (F) or TORVANE (T) (test)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			"N" Value			ELEV. (feet)
					0-6	6-12	12-18				
90	C	C-3	0	0							
95											
100	C	C-4	52	47							
105											
110											
115											
120											

REMARKS:



LOG OF BORING

BORING NO. **B-208**  
 SHEET **1** OF **2**

PROJECT **West Gate Access Road** STATION **272+10**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **Centerline**  
 EXPLORATION CONTRACTOR **OEI/ Meyer Drilling** STARTED **10-4-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **10-8-2001**

<b>GROUNDWATER</b> ENCOUNTERED DURING DRILLING AT <u>Dry</u> HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____	<b>BORING METHOD</b> <input type="checkbox"/> HAND AUGER <input checked="" type="checkbox"/> HOLLOW STEM AUGER <input type="checkbox"/> CONTINUOUS FLIGHT AUGER <input type="checkbox"/> DRIVING CASING <input type="checkbox"/> ROTARY (MUD) DRILLING DEPTH MUD STARTED _____	<b>SAMPLE TYPE AND DATA</b> <input checked="" type="checkbox"/> Split Barrel <input checked="" type="checkbox"/> Undisturbed Sample <input checked="" type="checkbox"/> Auger <b>8" O.D.</b> <input checked="" type="checkbox"/> Rock Core <b>NQ Series</b> <input type="checkbox"/> _____ <input type="checkbox"/> _____
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DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM  NAVD 88  ELEV. (feet)
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
0-5	A								Yellowish-Gray, Fat CLAY, Dry (CH)	1123.8	
5-5.5									Reddish-Brown, Fat CLAY, Some Chert Gravel, Dry, (CH)	1121.3	
5.5-5.9									Weathered DOLOMITE, Chert Nodules, With Reddish-Brown, Fat Clay	1118.3	
9.0-9.4	C	C-1	80	0						1114.8	
9.4-9.8	C	C-2	33	0							
13.1-13.5	C	C-3	30	0							
15.1-15.5									Light Gray, White, Coarsely Crystalline DOLOMITE	1108.7	
15.5-15.9										1107.7	
20.0-20.4	C	C-4	12	0					Reddish-Brown, Tan, Fat CLAY With Chert Gravel, Cobbles, (CH)		
23.1-23.5	C	C-5	1	0							

REMARKS:



LOG OF BORING

BORING NO.	B-208	
SHEET	2	OF 2

PROJECT West Gate Access Road STATION 272+10  
Ft. Leonard Wood, Pulaski County, Missouri OFFSET Centerline  
 EXPLORATION CONTRACTOR OEI/ Meyer Drilling STARTED 10-4-2001  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston COMPLETED 10-8-2001

DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM NAVD 88  ELEV. (feet)
	INTERVAL AND TYPE	NUMBER	RECOVERY(in) CORE RECOVERY(%)	RQD(%)	Blows per Interval (inches)			*N* Value			
					0-6	6-12	12-18				
	C										1123.8
30	C	C-6	0	0						Reddish-Brown, Tan, Fat CLAY With Chert Gravel, Cobbles, (CH)	
35											
40	C	C-7	21	0							
45	C	C-8	77	16							
	C	C-9	18	18							
50											49.3 1074.5
										Bottom of Boring @ 49.3' Boring Backfilled 10/8/2001	
55											

REMARKS:



LOG OF BORING

BORING NO. **B-208A**  
 SHEET **1** OF **3**

PROJECT **West Gate Access Road** STATION **272+15**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **Centerline**  
 EXPLORATION CONTRACTOR **OEI/Meyer Drilling** STARTED **10-8-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **10-8-2001**

<b>GROUNDWATER</b> ENCOUNTERED DURING DRILLING AT <u>45.0</u> HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____	<b>BORING METHOD</b> <input type="checkbox"/> HAND AUGER <input checked="" type="checkbox"/> HOLLOW STEM AUGER <input type="checkbox"/> CONTINUOUS FLIGHT AUGER <input type="checkbox"/> DRIVING CASING <input type="checkbox"/> ROTARY (MUD) DRILLING _____ DEPTH MUD STARTED	<b>SAMPLE TYPE AND DATA</b> <input checked="" type="checkbox"/> Split Barrel _____ <input checked="" type="checkbox"/> Undisturbed Sample _____ <input checked="" type="checkbox"/> Auger <b>8" O.D.</b> _____ <input checked="" type="checkbox"/> Rock Core _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
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DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			"N" Value			ELEV (feet)
					0-6	6-12	12-18				
0										1123.8	
1.5									Yellowish-Gray, Fat CLAY, Dry (CH)	1122.3	
4.5									Reddish-Brown, Fat CLAY, With Chert Gravel, Dry (CH)	1119.3	
10.0									Weathered DOLOMITE, With Reddish-Brown, Fat Clay	1113.8	
15	A								Reddish-Brown, Fat CLAY, With Chert Gravel, Sand, Dry (CH)		
25											

REMARKS:



# LOG OF BORING

BORING NO.	B-208A	
SHEET	2	OF 3

PROJECT West Gate Access Road STATION 272+15  
Ft. Leonard Wood, Pulaski County, Missouri OFFSET Centerline  
 EXPLORATION CONTRACTOR OEI/Meyer Drilling STARTED 10-8-2001  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston COMPLETED 10-8-2001

DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (lbf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			*N*			NAVD 88
					0-6	6-12	12-18	Value			ELEV. (feet)
											Value
30											
35											
40	A										
45											
50											
55											

Reddish-Brown, Fat CLAY, With Chert Gravel, Sand, Dry (CH)

REMARKS:



LOG OF BORING

BORING NO. **B-208A**  
 SHEET **3** OF **3**

PROJECT **West Gate Access Road** STATION **272+15**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **Centerline**  
 EXPLORATION CONTRACTOR **OEI/Meyer Drilling** STARTED **10-8-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **10-8-2001**

DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS			POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM		
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)					"N" Value	NAVD 88	
					0-6	6-12	12-18					ELEV. (feet)
60	A								1123.8			
65								Reddish-Brown, Fat CLAY, With Chert Gravel, Sand, Moist (CH)	65.0 1058.8			
67.2								Weathered DOLOMITE, With Reddish-Brown, Fat Clay	67.2 1056.6			
70								Auger Refusal on Dolomite @ 67.2' Boring Backfilled 10/8/2001				
75												
80												
85												

REMARKS:



LOG OF BORING

BORING NO.	BH1-2	
SHEET	1	OF 2

PROJECT West Gate Access Road STATION 163+86  
Ft. Leonard Wood, Pulaski County, Missouri OFFSET 14 Ft.  
 EXPLORATION CONTRACTOR OEI/ Meyer Drilling STARTED 10-1-2001  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston COMPLETED 10-1-2001

<b>GROUNDWATER</b> ENCOUNTERED DURING DRILLING AT <u>17.00</u> HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____	<b>BORING METHOD</b> <input type="checkbox"/> HAND AUGER <input checked="" type="checkbox"/> HOLLOW STEM AUGER <input type="checkbox"/> CONTINUOUS FLIGHT AUGER <input type="checkbox"/> DRIVING CASING <input type="checkbox"/> ROTARY (MUD) DRILLING DEPTH MUD STARTED _____	<b>SAMPLE TYPE AND DATA</b> <input checked="" type="checkbox"/> Split Barrel <u>1 3/8" I. D.</u> <input type="checkbox"/> Undisturbed Sample _____ <input checked="" type="checkbox"/> Auger <u>8" O.D.</u> <input checked="" type="checkbox"/> Rock Core <u>NQ Series</u> <input type="checkbox"/> _____ <input type="checkbox"/> _____
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DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION <small>(Color, Consistency, Modifier, MATERIAL, Moisture, Classification)</small> Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY(%)	RQD(%)	Blows per interval (inches)			"N" Value			ELEV. (feet)
					0-6	6-12	12-18				
5	A S A	J-1	6		12	12	17	29	Brown, Dense, Fine To Coarse GRAVEL, With Fine To Coarse Sand, Dry (GP)	800.3	
10	A S A	J-2	6		18	30	26	56	Gray, Brown, Dense, Fine To Coarse GRAVEL, With Fine To Coarse Sand, Dry (GP)		
15	A S A	J-3	4		4	7	5	12	Gray, Brown, Medium Dense, Fine To Coarse GRAVEL, With Fine To Coarse Sand, Trace Silt, Moist (GP)		
20	A S A	J-4	10		5	5	16	21	Brown, Medium Dense, Fine To Coarse SAND, With Fine To Coarse Gravel Little Silt, Moist (SP)		
25	C	C-1	100	25					Gray, Light Gray, Buff, Coarsely Crystalline DOLOMITE, Porous, Vugs, Chert Nodules	22.3 778.0	

REMARKS:



LOG OF BORING

BORING NO	BH1-2		
SHEET	2	OF	2

PROJECT West Gate Access Road STATION 163+86  
Ft. Leonard Wood, Pulaski County, Missouri OFFSET 14 Rt.  
 EXPLORATION CONTRACTOR OEI/ Meyer Drilling STARTED 10-1-2001  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston COMPLETED 10-1-2001

DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System <u>Unified (Visual)</u>	ELEV DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			"N" Value			ELEV. (feet)
					0-6	6-12	12-18				
	C	C-1	100	25						800.3	
30	C	C-2	100	90							
35										36.1	
40										764.2	
45											
50											
55											

REMARKS:



LOG OF BORING

BORING NO. **BH2-3**  
 SHEET **1** OF **2**

PROJECT **West Gate Access Road** STATION **164+99**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **47 Rt.**  
 EXPLORATION CONTRACTOR **OEI/ Meyer Drilling** STARTED **10-2-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **10-2-2001**

<b>GROUNDWATER</b> ENCOUNTERED DURING DRILLING AT <u>16.00</u> HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____		<b>BORING METHOD</b> <input type="checkbox"/> HAND AUGER <input checked="" type="checkbox"/> HOLLOW STEM AUGER <input type="checkbox"/> CONTINUOUS FLIGHT AUGER <input type="checkbox"/> DRIVING CASING <input type="checkbox"/> ROTARY (MUD) DRILLING <input type="checkbox"/> DEPTH MUD STARTED		<b>SAMPLE TYPE AND DATA</b> <input checked="" type="checkbox"/> Split Barrel 1 3/8" I.D. <input type="checkbox"/> Undisturbed Sample _____ <input checked="" type="checkbox"/> Auger 8" O.D. <input type="checkbox"/> Rock Core NQ Series <input type="checkbox"/> _____ <input type="checkbox"/> _____	
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DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM  NAVD 88  ELEV. (feet)
	INTERVAL AND TYPE	NUMBER	RECOVERY(in) CORE RECOVERY(%)	ROD(%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
5	A S	J-1	10		7	5	6	11	Brown, Medium Dense SILT, With Fine Sand, Dry (ML)	799.6	
7.0	A									792.6	
10	S	J-2	10		6	7	8	15	Brown, Medium Dense, Fine To Coarse SAND, With Fine Gravel, Moist (SP)		
15	A										
15	S	J-3	8		8	9	11	20	Brown, Medium Dense, Fine To Coarse SAND, With Fine To Coarse Gravel, Moist (SP)		
20	A										
20	S	J-4	10		5	17	17	34	Brown, Light Brown, Gray, Dense, Fine To Coarse SAND, With Fine To Medium Coarse Gravel, Moist (SP)	779.0	
25	C	C-1	81	34					Gray, Light Gray, Buff, Coarsely Crystalline DOLOMITE, Porous, Vugs, Chert Nodules		

REMARKS:



LOG OF BORING

BORING NO.	BH2-3	
SHEET	2	OF 2

PROJECT West Gate Access Road STATION 164+99  
Ft. Leonard Wood, Pulaski County, Missouri OFFSET 47 Rt.  
 EXPLORATION CONTRACTOR OEI/ Meyer Drilling STARTED 10-2-2001  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston COMPLETED 10-2-2001

DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			*N*			ELEV. (feet)
					0-6	6-12	12-18	Value			
30	C	C-1	81	34						Gray, Light Gray, Buff, Coarsely Crystalline DOLOMITE, Porous, Vugs, Chert Nodules	799.6
35	C	C-2	90	80							
40	C	C-3	100	87							
50	C	C-4	100	96							
55											56.4 743.2

Bottom of Boring @ 56.4'  
 Boring Backfilled 10/2/2001

REMARKS:



LOG OF BORING

BORING NO. **BH3C-1**  
 SHEET **1** OF **2**

PROJECT **West Gate Access Road** STATION **166+09**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **21 Rt.**  
 EXPLORATION CONTRACTOR **OEI/ Meyer Drilling** STARTED **9-26-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **9-26-2001**

**GROUNDWATER**

ENCOUNTERED DURING  
 DRILLING AT **5.00**  
 HOURS AFTER DRILLING \_\_\_\_\_  
 HOURS AFTER DRILLING \_\_\_\_\_  
 HOURS AFTER DRILLING \_\_\_\_\_  
 HOURS AFTER DRILLING \_\_\_\_\_

**BORING METHOD**

- HAND AUGER
- HOLLOW STEM AUGER
- CONTINUOUS FLIGHT AUGER
- DRIVING CASING
- ROTARY (MUD) DRILLING
- DEPTH MUD STARTED \_\_\_\_\_

**SAMPLE TYPE AND DATA**

- S Split Barrel **1 3/8" I.D.**
- U Undisturbed Sample
- A Auger **8' O.D.**
- C Rock Core **N Series**
- \_\_\_\_\_
- \_\_\_\_\_

DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION <small>(Color, Consistency, Modifier, MATERIAL, Moisture, Classification)</small> Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM NAVD 88  ELEV. (feet) 788.5
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			"N" Value			
					0-8	6-12	12-18				
5	A S	J-1	2		4	8	6	14	Brown, Gray, White, Medium Dense, Fine To Coarse GRAVEL, Some Sand, Wet (GP)	9.1	779.4
10	A S	J-2	2	50/3							
15	C	C-1	100	0							
15	C	C-2	74	0							
20	C	C-3	100	22					18' - 19' High Angle Fracture Filled with Clay.		
20	C	C-4	87	0							
25	C	C-5	95	70							

REMARKS:



LOG OF BORING

BORING NO.	BH3C-1	
SHEET	2	OF 2

PROJECT West Gate Access Road STATION 166+09  
Ft. Leonard Wood, Pulaski County, Missouri OFFSET 21 Rt.  
 EXPLORATION CONTRACTOR OEI/ Meyer Drilling STARTED 9-26-2001  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston COMPLETED 9-26-2001

DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			*N			ELEV. (feet)
					0-6	6-12	12-18	Value			
30	C	C-5	95	70						788.5	
35	C	C-6	100	72					31' - 34' Weathered, Fractured Clay Seam at 33'		
40	C	C-7	98	96							
45										41.3 747.2	
50											
55											
Bottom of Boring @ 41.3' Boring Backfilled 9/26/2001											

REMARKS:



LOG OF BORING

BORING NO. **BH3S-3**  
 SHEET **1** OF **2**

PROJECT **West Gate Access Road** STATION **166+64**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **47 Rt.**  
 EXPLORATION CONTRACTOR **OEI/ Meyer Drilling** STARTED **9-26-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **9-26-2001**

**GROUNDWATER**  
 ENCOUNTERED DURING  
 DRILLING AT 7.00  
 HOURS AFTER DRILLING \_\_\_\_\_  
 HOURS AFTER DRILLING \_\_\_\_\_  
 HOURS AFTER DRILLING \_\_\_\_\_  
 HOURS AFTER DRILLING \_\_\_\_\_

**BORING METHOD**  
 HAND AUGER  
 HOLLOW STEM AUGER  
 CONTINUOUS FLIGHT AUGER  
 DRIVING CASING  
 ROTARY (MUD) DRILLING  
 \_\_\_\_\_ DEPTH MUD STARTED

**SAMPLE TYPE AND DATA**  
 Split Barrel 1 3/8" O.D.  
 Undisturbed Sample \_\_\_\_\_  
 Auger 8" O.D.  
 Rock Core NQ Series  
 \_\_\_\_\_  
 \_\_\_\_\_

DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (pcf)	SOIL DESCRIPTION <small>(Color, Consistency, Modifier, MATERIAL, Moisture, Classification)</small> Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM NAVD 88 ELEV. (feet)
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
5	A S	J-1	1		3	6	5	11	Brown, Medium Dense, Fine To Coarse GRAVEL, Some Sand, (GP)	789.9	
10	A S	J-2	2	50/4.5					Gray, Light Gray, Coarsely Crystalline, DOLOMITE, Vugs, Chert Nodules	9.2 780.7	
15	C	C-1	94	36					Clay Seam 15' - 15.6'		
20	C	C-2	90	58							
25											

REMARKS:



LOG OF BORING

BORING NO.	BH3S-3	
SHEET	2	OF 2

PROJECT West Gate Access Road STATION 166+64  
Ft. Leonard Wood, Pulaski County, Missouri OFFSET 47 Rt.  
 EXPLORATION CONTRACTOR OEI/ Meyer Drilling STARTED 9-26-2001  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston COMPLETED 9-26-2001

DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM NAVD 88 ELEV (feet) 789.9
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
30	C	C-2	90	58					 <p>Gray, Light Gray, Coarsely Crystalline, DOLOMITE, Vugs, Chert Nodules</p> <p>29.9' - 30.8' Tan, Reddish-Brown, Fat CLAY</p>		
35	C	C-3	100	80							
40	C	C-4	100	94						41.4	748.5
45										Bottom of Boring @ 41.4' Boring Backfilled 9/26/2001	
50											
55											

REMARKS:



LOG OF BORING

BORING NO. BH4C-1

SHEET 1 OF 2

PROJECT West Gate Access Road

Ft. Leonard Wood, Pulaski County, Missouri

STATION 167+02

EXPLORATION CONTRACTOR OEI/ Meyer Drilling

OFFSET 22 Rt.

ENGINEERS REP. S. Preston

LOGGED BY S. Preston

STARTED 9-27-2001

COMPLETED 9-27-2001

GROUNDWATER

ENCOUNTERED DURING

DRILLING AT Dry

HOURS AFTER DRILLING

HOURS AFTER DRILLING

HOURS AFTER DRILLING

HOURS AFTER DRILLING

BORING METHOD

- HAND AUGER
- HOLLOW STEM AUGER
- CONTINUOUS FLIGHT AUGER
- DRIVING CASING
- ROTARY (MUD) DRILLING
- DEPTH MUD STARTED

SAMPLE TYPE AND DATA

- S Split Barrel 1 3/8" I.D.
- U Undisturbed Sample
- A Auger 8" O.D.
- C Rock Core NQ Series
- 
- 

DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM  NAVD 88  ELEV. (feet)
	INTERVAL AND TYPE	NUMBER	RECOVERY(m) CORE RECOVERY(%)	ROD(%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
0-5	A								Brown, Fine To Coarse SAND, Some Silt, Dry, (SP)	793.2	
5-10	S	J-1	6		5	12	29	41	Brown, Medium Dense, Fine To Coarse SAND, Some Gravel, Silt, Dry (SP) (Gravel In Shoe High Blow Count)	3.5 789.7	
10-15	S	J-2	0		3	3	4	7	No Recovery Brown, Fine To Coarse GRAVEL, With Fine To Coarse Sand	13.5 779.7	
15-20	S	J-3	8		10	12	50/4		Weathered Dolomite Chert Gravel (Bent Spoon Destroyed Shoe) Gray, Light Gray, DOLOMITE, Porous, Vugs, Chert Nodules		
20-25	C	C-1	100	72							
25	C	C-2	99	77							

REMARKS:



LOG OF BORING

BORING NO. BH4C-1

SHEET 2 OF 2

PROJECT **West Gate Access Road**

STATION **167+02**

**Ft. Leonard Wood, Pulaski County, Missouri**

OFFSET **22 Rt.**

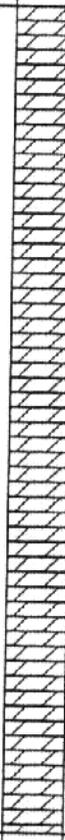
EXPLORATION CONTRACTOR **OEI/ Meyer Drilling**

STARTED **9-27-2001**

ENGINEERS REP. **S. Preston**

LOGGED BY **S. Preston**

COMPLETED **9-27-2001**

DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(F) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM  NAVD 88  ELEV (feet)  793.2
	INTERVAL AND TYPE	NUMBER	RECOVERY(in) CORE RECOVERY(%)	RQD(%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
30	C	C-2	99	77					 Gray, Light Gray, DOLOMITE, Porous, Vugs, Chert Nodules  36.5' - 36.7' Tan CLAY pocket		
35	C	C-3	100	82							
45	C	C-4	100	92							
46.7	Bottom of Boring @ 46.7' Boring Backfilled 9/27/2001									46.7	746.5

REMARKS:



LOG OF BORING

BORING NO. **BH4S-3**  
 SHEET **1** OF **2**

PROJECT **West Gate Access Road** STATION **167+99**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **47 Rt.**  
 EXPLORATION CONTRACTOR **OEI/ Meyer Drilling** STARTED **9-28-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **9-28-2001**

**GROUNDWATER**

ENCOUNTERED DURING  
 DRILLING AT 8.00  
 HOURS AFTER DRILLING \_\_\_\_\_  
 HOURS AFTER DRILLING \_\_\_\_\_  
 HOURS AFTER DRILLING \_\_\_\_\_  
 HOURS AFTER DRILLING \_\_\_\_\_

**BORING METHOD**

- HAND AUGER
- HOLLOW STEM AUGER
- CONTINUOUS FLIGHT AUGER
- DRIVING CASING
- ROTARY (MUD) DRILLING
- \_\_\_\_\_ DEPTH MUD STARTED

**SAMPLE TYPE AND DATA**

- S Split Barrel 1 3/8" I.D.
- U Undisturbed Sample \_\_\_\_\_
- A Auger 8" O.D.
- C Rock Core NQ Series
- \_\_\_\_\_
- \_\_\_\_\_

DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification)  Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM NAVD 88  ELEV. (feet)  791.8
	INTERVAL AND TYPE	NUMBER	RECOVERY(in) CORE RECOVERY(%)	ROD(%)	Blows per Interval (inches)			"N" Value			
					0-6	6-12	12-18				
5	A S	J-1	0		4	5	7	12		Brown, Medium Dense, Fine To Coarse SAND, Some Gravel, Dry, (SP)  No Recovery	
10.5	A										781.3
15	C	C-1	89	13						Gray, Light Gray, Buff, Coarsely Crystalline DOLOMITE, Porous, Vugs, Chert Nodules	
	C	C-2	82	0							
	C	C-3	91	27							
20	C	C-4	100	62							
25	C	C-5	99	85							

REMARKS:



LOG OF BORING

BORING NO.	BH4S-3	
SHEET	2	OF 2

PROJECT West Gate Access Road STATION 167+99  
Ft. Leonard Wood, Pulaski County, Missouri OFFSET 47 Rt.  
 EXPLORATION CONTRACTOR OEI/ Meyer Drilling STARTED 9-28-2001  
 ENGINEERS REP. S. Preston LOGGED BY S. Preston COMPLETED 9-28-2001

DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			*N* Value			ELEV. (feet)
					0-6	6-12	12-18				
30	C	C-5	99	85						791.8	
35			100	90							
42.1										42.1	749.7
45											
50											
55											

REMARKS:



# LOG OF BORING

BORING NO. **BH5S6C-2**  
 SHEET **1** OF **2**

PROJECT **West Gate Access Road** STATION **168+86**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **14 Rt.**  
 EXPLORATION CONTRACTOR **OEI/ Meyer Drilling** STARTED **10-1-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **10-1-2001**

<b>GROUNDWATER</b> ENCOUNTERED DURING DRILLING AT <u>13.00</u> HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____ HOURS AFTER DRILLING _____		<b>BORING METHOD</b> <input type="checkbox"/> HAND AUGER <input checked="" type="checkbox"/> HOLLOW STEM AUGER <input type="checkbox"/> CONTINUOUS FLIGHT AUGER <input type="checkbox"/> DRIVING CASING <input type="checkbox"/> ROTARY (MUD) DRILLING DEPTH MUD STARTED _____		<b>SAMPLE TYPE AND DATA</b> <input checked="" type="checkbox"/> Split Barrel <u>1 3/8" I.D.</u> <input type="checkbox"/> Undisturbed Sample _____ <input checked="" type="checkbox"/> Auger <u>8" O.D.</u> <input checked="" type="checkbox"/> Rock Core <u>NQ Series</u> <input type="checkbox"/> _____ <input type="checkbox"/> _____	
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DEPTH BELOW SURFACE(feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION <small>(Color, Consistency, Modifier, MATERIAL, Moisture, Classification)</small> Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM NAVD 88 ELEV. (feet)	
	INTERVAL AND TYPE	NUMBER	RECOVERY(in) CORE RECOVERY(%)	RQD(%)	Blows per Interval (inches)			"N" Value				
					0-6	6-12	12-18					
0-5	A								Organics, Leaves, Grass, Roots	0.4	797.7	
5-10	S A	J-1	6		4	4	8	12	Brown, Medium Dense, Fine To Coarse GRAVEL, With Fine to Medium Coarse Sand, Dry (GP)			
10-15	S A	J-2	4		4	6	9	15	Brown, Medium Dense, Fine To Coarse SAND, With Fine to Medium Coarse Gravel, Dry (SP)			
15-20	S A	J-3			3	1	0	1	No Recovery			
20-21.5	A	J-4		50/4							19.4	778.7
21.5-25	C C	C-1 C-2	89 75	64 42					Gray, Light Gray, Buff, Coarsely Crystalline, DOLOMITE, Porous, Vugs, Chert Nodules 21' - 21.5' Drill Stem Dropped- Possible area of Core Loss			

REMARKS:



LOG OF BORING

BORING NO. **BH5S6C-2**  
 SHEET **2** OF **2**

PROJECT **West Gate Access Road** STATION **168+86**  
**Ft. Leonard Wood, Pulaski County, Missouri** OFFSET **14 Rt.**  
 EXPLORATION CONTRACTOR **OEI/ Meyer Drilling** STARTED **10-1-2001**  
 ENGINEERS REP. **S. Preston** LOGGED BY **S. Preston** COMPLETED **10-1-2001**

DEPTH BELOW SURFACE (feet)	SAMPLE				PENETRATION TEST RESULTS				POCKET PENETROMETER (P) or TORVANE (T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System <u>Unified (Visual)</u>	ELEV. DATUM
	INTERVAL AND TYPE	NUMBER	RECOVERY (in) CORE RECOVERY (%)	ROD (%)	Blows per Interval (inches)			*N*			ELEV. (feet)
					0-6	6-12	12-18	Value			
27 - 27.1'	C	C-2	75	42						798.1	
30 - 31.4'	C	C-3	100	43					27' - 27.1' Tan CLAY Pocket	766.7	
31.4' - 31.4'									Bottom of Boring @ 31.4' Boring Backfilled 10/1/2001		

REMARKS:

WESTGATE; FORT LEONARDWOOD, MO

15015084

10/17/01

TEST RESULTS

<u>BORING NO.</u>	<u>DEPTH, feet</u>	<u>NATURAL WATER CONTENT, percent</u>	<u>DRY UNIT WEIGHT, pcf</u>
234	2.5 - 3.0	22.4	100.2

## Laboratory Compaction Characteristics of Soil

2220 Welsch Industrial Ct  
St. Louis, Missouri 63146  
(314) 692-8811

Client Name: OEI  
Project Name: Westgate  
Location: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Source Material: Bulk sample, Boring 202 (1-45')  
Sample Description: FAT CLAY: Reddish brown, with gravel  
\_\_\_\_\_  
Material Designation: P-1 Sample date: 8/30/01  
Test Method: ASTM D698  
Test Procedure: A  
Sample Preparation: wet  
Rammer:      Mechanical   X   Manual

Project No.: 15015084 Date: 10/11/01

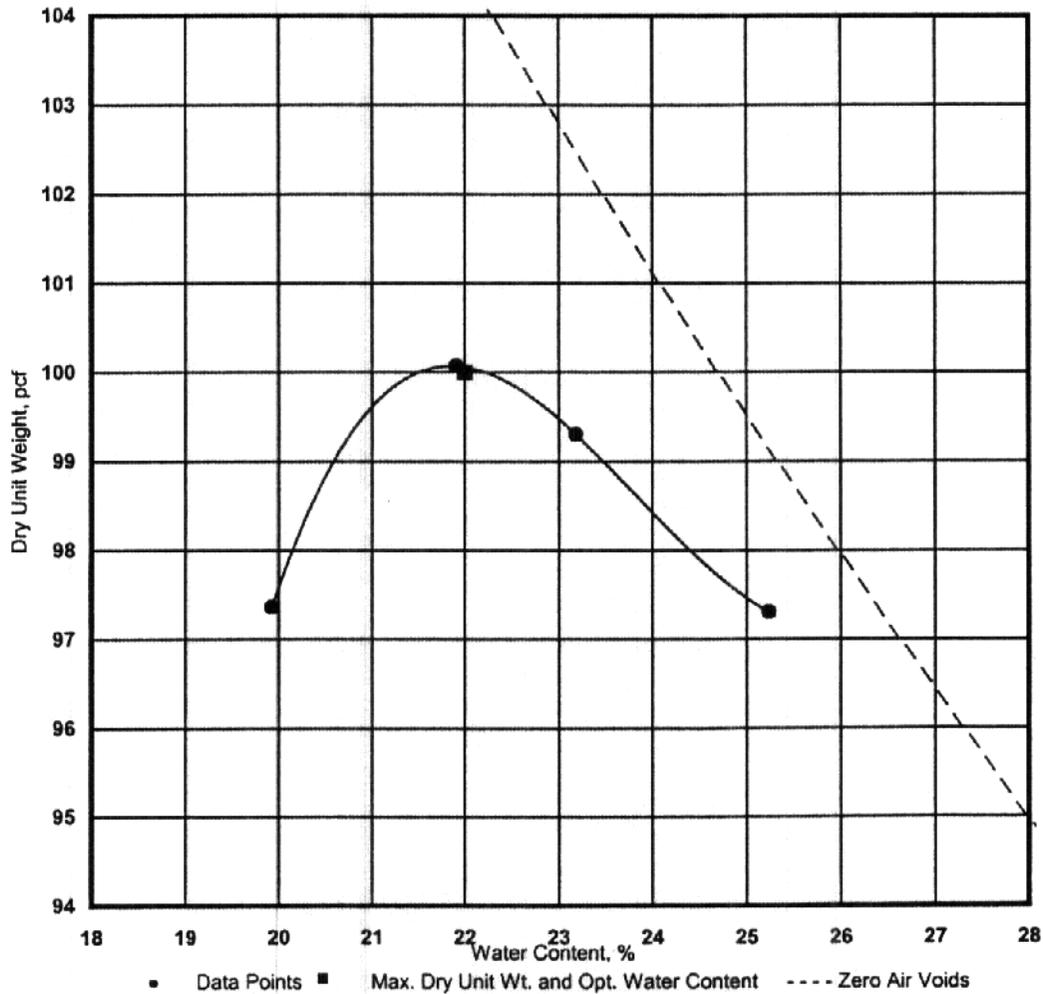
**TEST RESULTS**

Maximum Dry Unit Wt.: 100.0 pcf  
Optimum Water Content: 22.0 %

Liquid Limit: 70 Plastic Limit: 25  
Plasticity Index: 45  
% Passing #200 Sieve: 63

Reviewed by: \_\_\_\_\_  
Doug Waldeier, E.I.T.

Zero air voids for specific gravity of 2.65



## Laboratory Compaction Characteristics of Soil

2220 Welsch Industrial Ct  
 St. Louis, Missouri 63146  
 (314) 692-8811

Client Name: OEI

Project No.: 15015084 Date: 10/15/01

Project Name: Westgate

Location: \_\_\_\_\_

Source Material: Bulk sample, Boring 20

Sample Description: FAT CLAY: Reddish brown, with gravel

Material Designation: P-2 Sample date: 8/30/01

Test Method: ASTM D698

Test Procedure: A

Sample Preparation: wet

Rammer:  Mechanical  Manual

**TEST RESULTS**

Maximum Dry Unit Wt.: 99.5 pcf  
 Optimum Water Content: 22.0 %

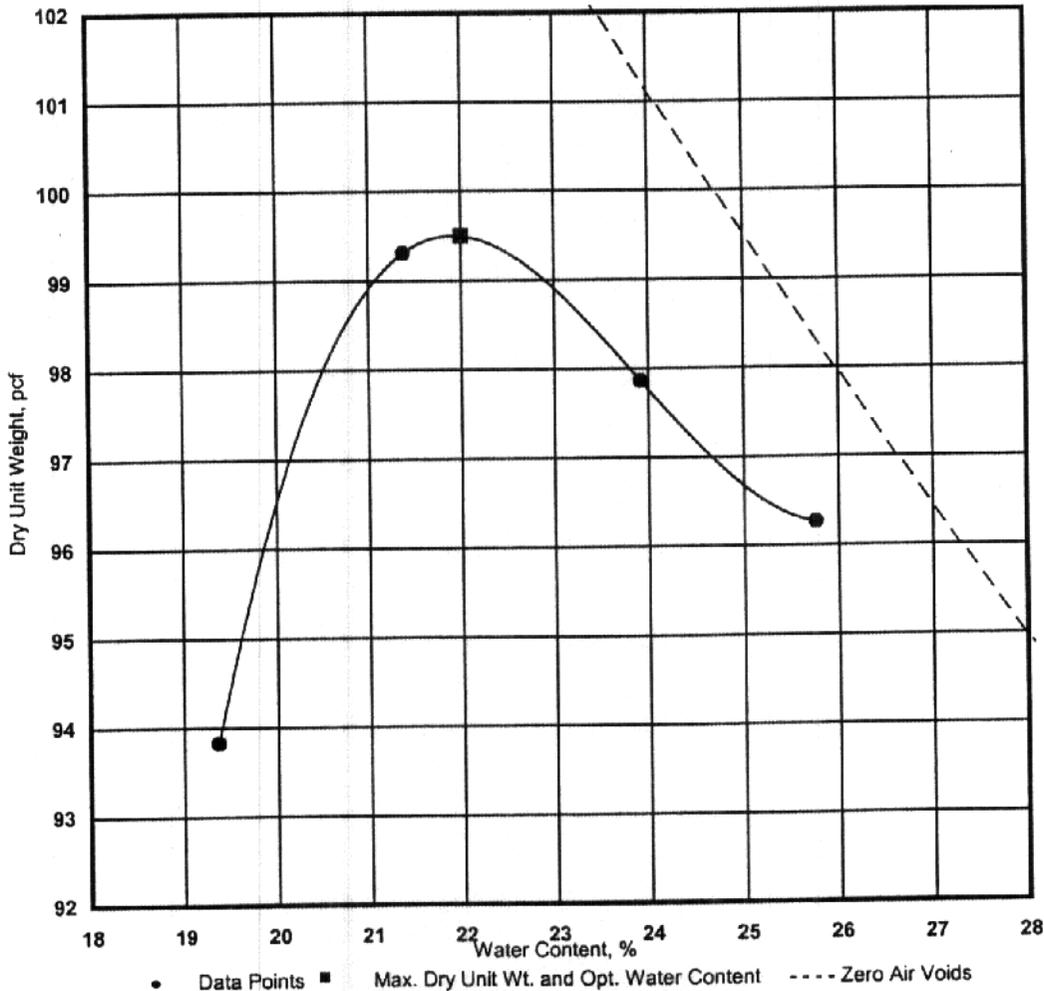
Liquid Limit: 67 Plastic Limit: 22

Plasticity Index: 44

% Passing #200 Sieve: 68

Reviewed by: \_\_\_\_\_  
 Doug Waldeier, E.I.T.

Zero air voids for specific gravity of 2.65



## Laboratory Compaction Characteristics of Soil

2220 Welsch Industrial Ct  
St. Louis, Missouri 63146  
(314) 692-8811

Client Name: OEI

Project No.: 15015084 Date: 10/18/01

Project Name: Westgate

Location: \_\_\_\_\_

Source Material: Bulk sample, Boring 94

Sample Description: FAT CLAY: Reddish brown, with gravel

Material Designation: P-3 Sample date: 8/30/01

Test Method: ASTM D698

Test Procedure: A

Sample Preparation: wet

Rammer:  Mechanical  Manual

**TEST RESULTS**

Maximum Dry Unit Wt.: 96.0 pcf  
Optimum Water Content: 24.5 %

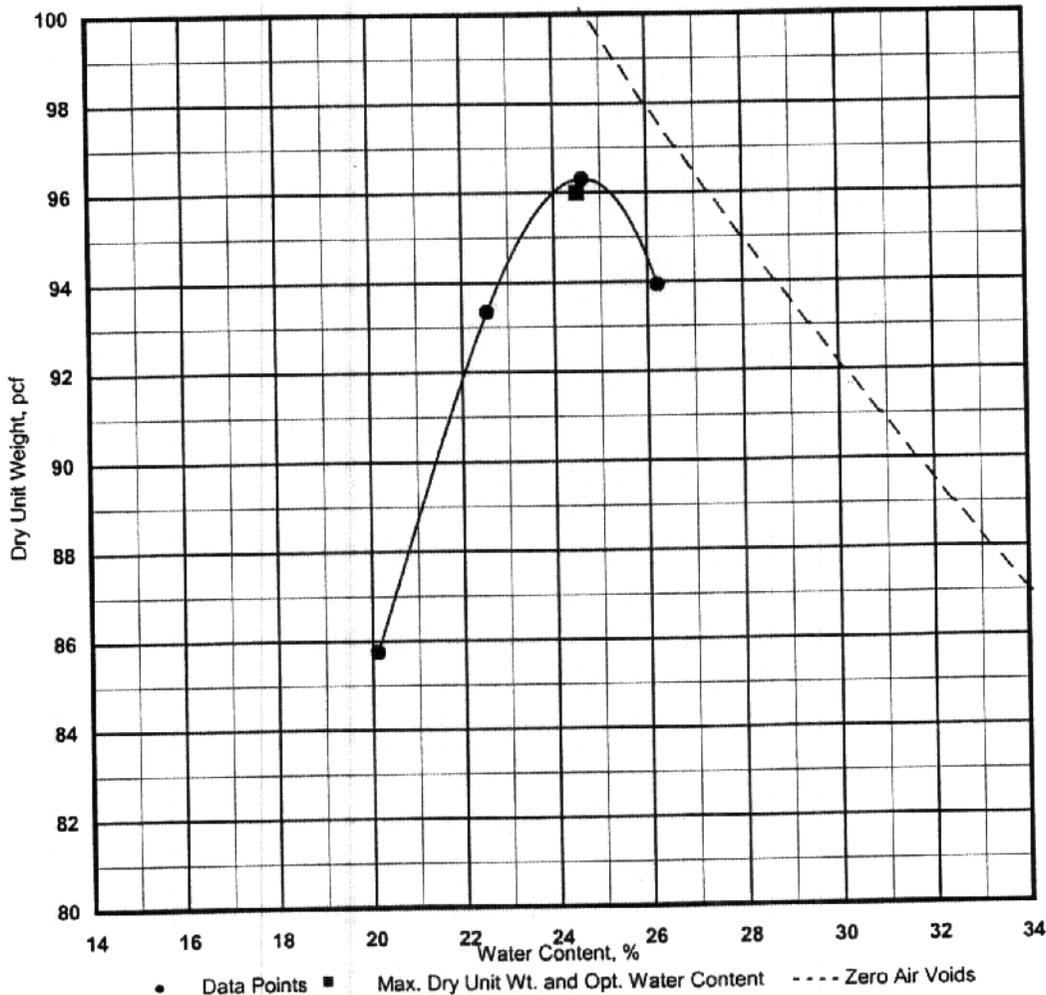
Liquid Limit: 67 Plastic Limit: 25

Plasticity Index: 42

% Passing #200 Sieve: 67

Reviewed by: \_\_\_\_\_  
Doug Waldeier, E.I.T.

Zero air voids for specific gravity of 2.65



## BEARING RATIO OF LABORATORY-COMPACTED SOILS ASTM D 1883

PROJECT: Westgate DATE: 10/23/01  
Ft. Leonard Wood, Missouri JOB NO. 15015084

SAMPLE NO.: P-1 B-202

LOCATION OF SAMPLE: P-1 B-202

DESCRIPTION OF SOIL: FAT CLAY: Reddish brown, with gravel

METHOD OF PREPARATION: METHOD: B ASTM D 698

SURCHARGE: 51 PSF 10 POUNDS

LENGTH OF SOAKING: 96 HOURS

DRY DENSITY BEFORE SOAKING: 95.0 PCF

MAX. LAB DENSITY: 100.0 PCF

OPTIMUM MOISTURE: 22.0 %

PERCENT COMPACTION: 95.0 % AT + 0.3 % OPT. MOISTURE

MOISTURE CONTENT OF SAMPLE:

BEFORE SOAKING: 21.7 %

TOP 1 INCH AFTER SOAKING: 31.1 %

AVERAGE AFTER SOAKING: 31.1 %

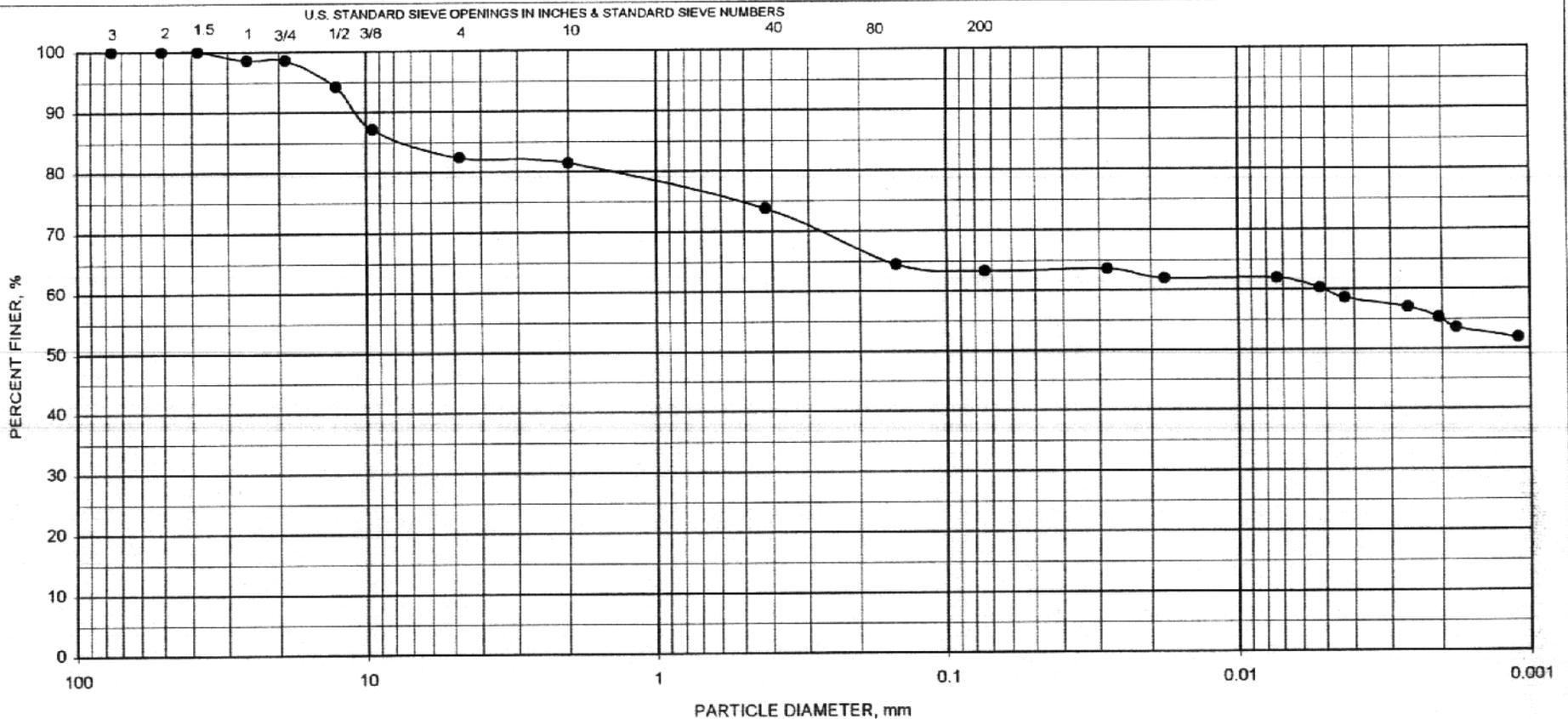
SWELL (% OF INITIAL HEIGHT): 4.5 %

BEARING RATIO:

0.1 INCH PENETRATION: 1.5

0.2 INCH PENETRATION: 1.4

# Terracon



GRAVEL		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

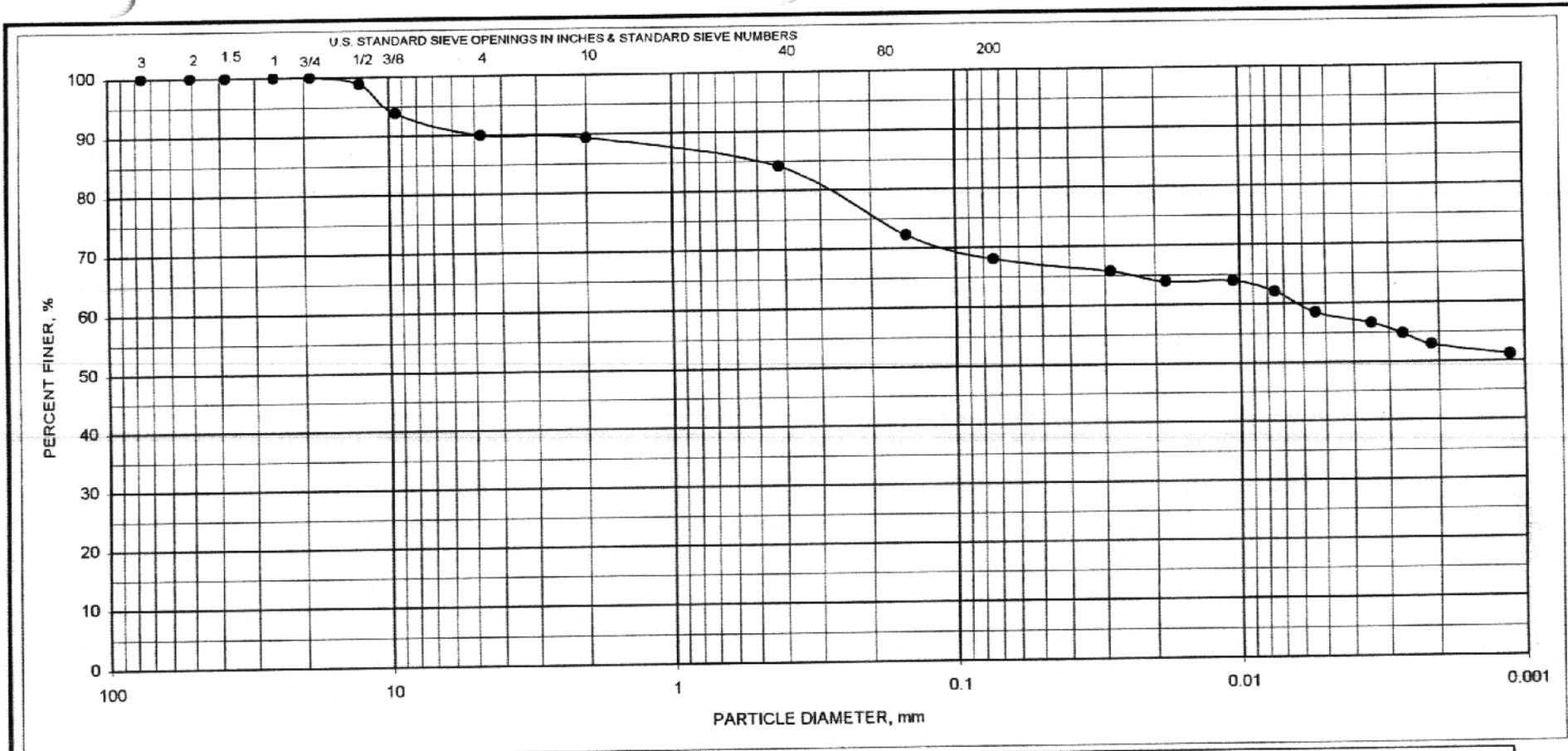
**GRAIN SIZE DISTRIBUTION CURVE**

BORING NO.	SAMPLE NO.	DEPTH, feet	ASTM DESCRIPTION	UNIFIED SYMBOL	% PASS #200	ATTERBERG LIMITS		
						LL	PL	PI
202	Bag		Sandy fat clay with gravel	CH	63	70	25	45

PROJECT Westgate

Fort Leonardwood, MO      JOB NO. 15015084      DATE 10/23/01





GRAVEL		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

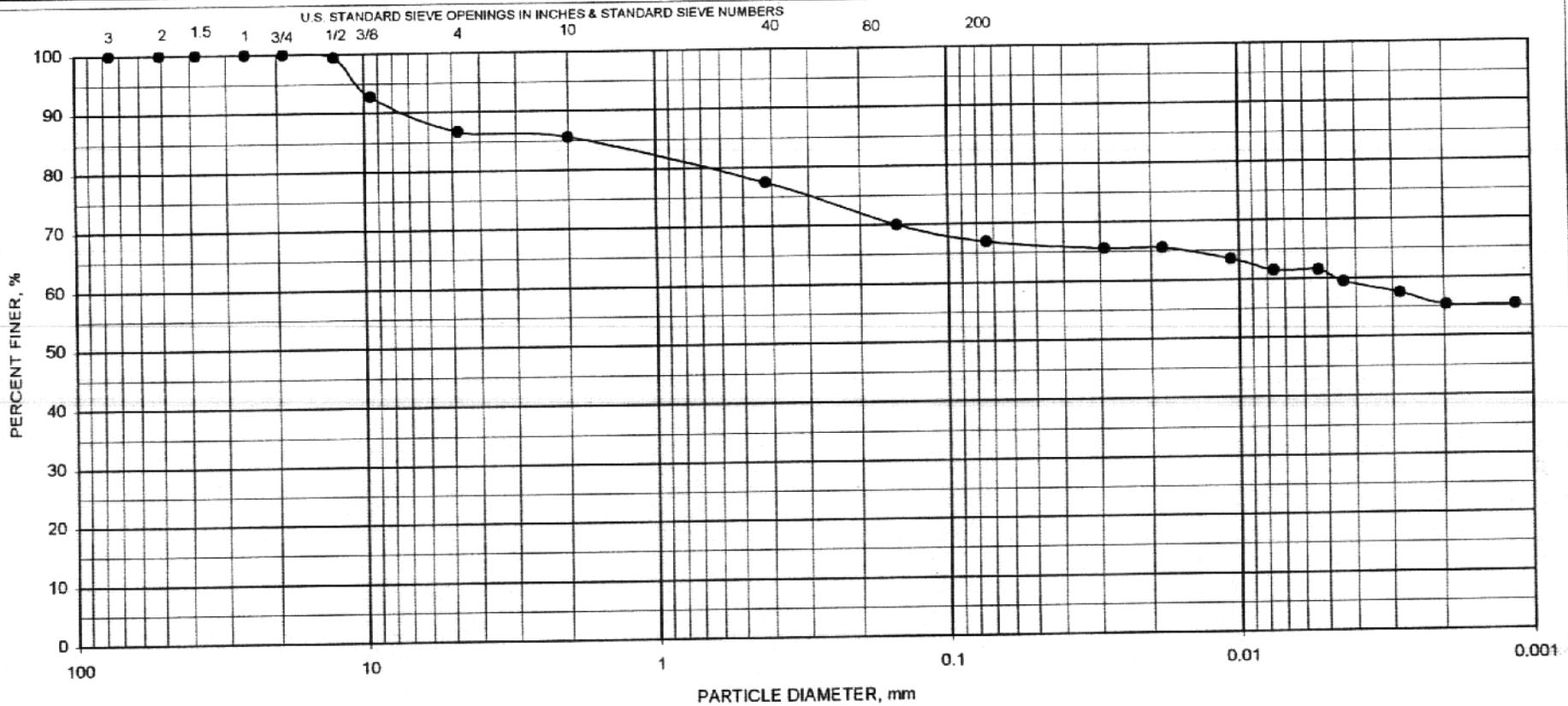
GRAIN SIZE DISTRIBUTION CURVE

BORING NO.	SAMPLE NO.	DEPTH, feet	ASTM DESCRIPTION	UNIFIED SYMBOL	% PASS #200	ATTERBERG LIMITS		
						LL	PL	PI
20	Bag		Sandy fat clay	CH	68	67	22	44

PROJECT Westgate

Fort Leonardwood, MO JOB NO. 15015084 DATE 10/23/01





GRAVEL		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

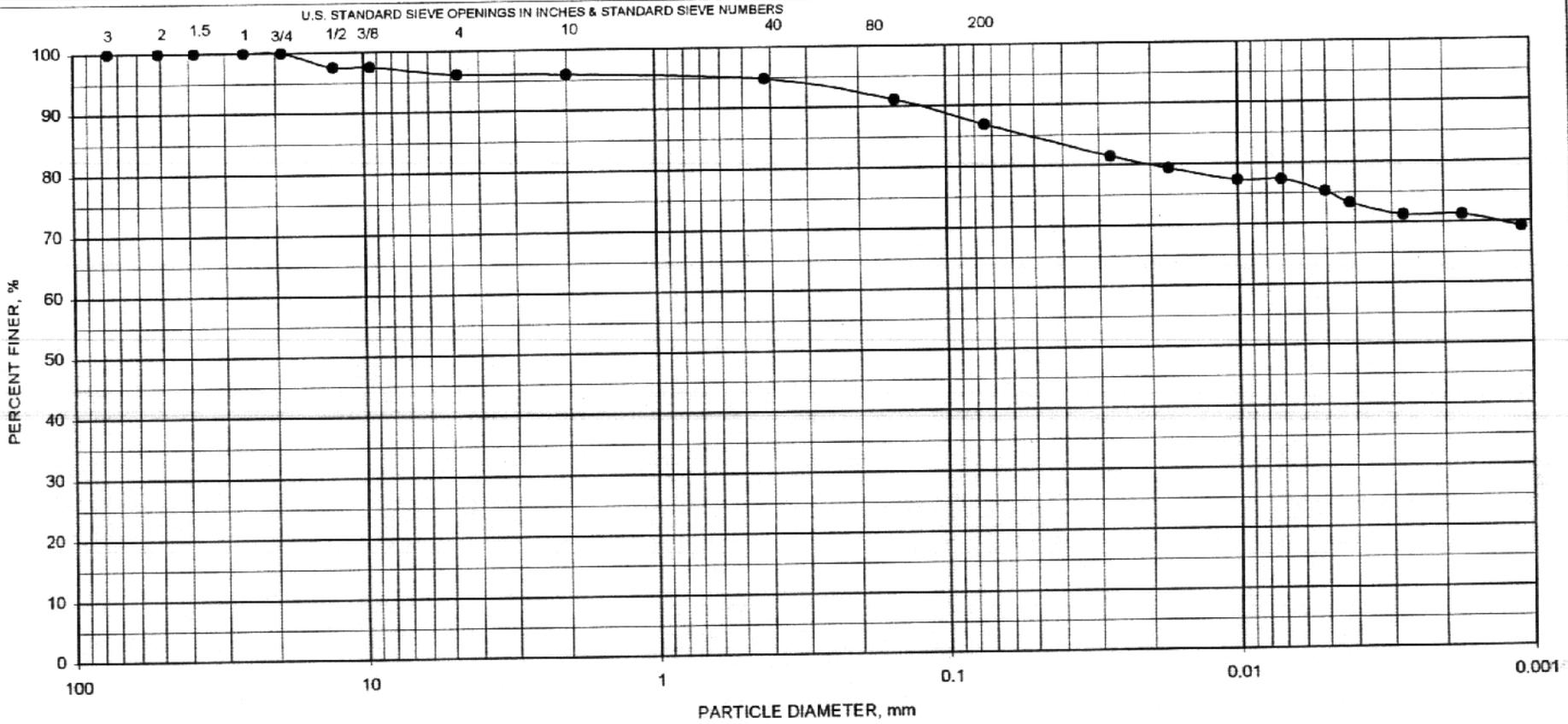
**GRAIN SIZE DISTRIBUTION CURVE**

BORING NO.	SAMPLE NO.	DEPTH, feet	ASTM DESCRIPTION	UNIFIED SYMBOL	% PASS #200	ATTERBERG LIMITS		
						LL	PL	PI
94	Bag		Sandy fat clay	CH	67	67	25	42

PROJECT Westgate

Fort Leonardwood, MO JOB NO. 15015084 DATE 10/24/01





GRAVEL		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

GRAIN SIZE DISTRIBUTION CURVE

BORING NO.	SAMPLE NO.	DEPTH, feet	ASTM DESCRIPTION	UNIFIED SYMBOL	% PASS #200	ATTERBERG LIMITS		
						LL	PL	PI
226	Bag	1-10'	Fat clay	CH	87	101	31	70

PROJECT Westgate

Fort Leonardwood, MO      JOB NO. 15015084      DATE 10/24/01



UNCONFINED COMPRESSIVE STRENGTH - ROCK CORES



Project Number: 15015084  
 Project Name: Westgate  
 Location: Ft. Loenardwood, MO

Date: 10/16/01  
 Technician: 3992

Boring Number:	BH4C-1	BH2-3	BH4C-1	BH3S-3	BH3C-1	BH4S-3	
Sample Number:	36-38'	40-42'	22-24'	24-26'	24-26'	19-20'	
Speciment Weight (gms):	367.00	488.00	389.00	507.00	445.00	440.00	
Tare Number:	232	259	265	278	234	215	
Wet Wt. + Tare:	104.85	64.07	440.42	147.23	115.05	194.59	
Dry Wt. + Tare:	104.63	63.99	440.09	147.05	114.95	193.98	
Wt. Tare:	24.55	23.89	24.26	23.69	24.75	25.03	
Diameter 1 (in.):	1.976	1.987	1.975	1.979	1.962	1.980	
Diameter 2 (in.):	1.977	1.990	1.969	1.979	1.982	1.975	
Diameter 3 (in.):	1.978	1.995	1.924	1.976	1.978	1.978	
Prepared Core Height 1 (in.):	3.159	3.553	3.613	3.768	3.268	3.448	
Height 2 (in.):	3.164	3.499	3.668	3.714	3.209	3.291	
Height 3 (in.):	3.137	3.559	3.56	3.694	3.238	3.461	
Capped Core Height 1 (in):	3.445	3.857	3.867	4.079	3.565	3.574	
Height 2 (in.):	3.441	3.876	3.818	4.085	3.546	3.584	
Height 3 (in.):	3.462	3.858	3.864	4.084	3.557	3.575	
L/D Ratio:	1.74	1.94	1.97	2.06	1.80	1.81	
Correction Factor:	0.979	1.000	1.000	1.000	1.000	1.000	
Maximum Load (pounds)	14,580	28,770	9,300	27,310	36,810	18,800	
Average Diameter (in.):	1.977	1.991	1.956	1.978	1.974	1.978	
Average Height (in.):	3.153	3.537	3.614	3.725	3.238	3.400	
Wet Density (pcf):	144.4	168.8	136.4	168.6	171.0	160.4	
Dry Density (pcf):	144.0	168.5	136.3	168.4	170.8	159.8	
Moisture Content (%):	0.3%	0.2%	0.1%	0.1%	0.1%	0.4%	
Stress (psi):	4,651	9,244	3,095	8,887	12,028	6,120	
Stress (psf):	669,712	1,331,114	445,675	1,279,799	1,731,985	881,301	
Stress (tsf):	335	666	223	640	866	441	

UNCONFINED COMPRESSIVE STRENGTH - ROCK CORES



Project Number: 15015084  
 Project Name: Westgate  
 Location: Ft. Loenardwood, MO

Date: 10/16/01  
 Technician: 3992

Boring Number:	BH2-3	BH4S-3	BH56C-2	BH3S-3	BH1-2	BH3C-1	
Sample Number:	23-25'	28-30'	24-26'	14-16'	23.3-25.3'	15-16'	
Speciment Weight (gms):	500.00	475.00	512.00	515.00	414.00	492.00	
Tare Number:	289	266	269	257	263	254	
Wet Wt. + Tare:	120.14	209.55	150.45	145.15	175.97	130.36	
Dry Wt. + Tare:	120.01	209.32	150.33	145.04	175.82	130.25	
Wt. Tare:	25.11	24.75	24.55	24.43	23.81	25.07	
Diameter 1 (in.):	1.986	1.971	1.978	1.981	1.974	1.972	
Diameter 2 (in.):	1.985	1.982	1.978	1.980	1.976	1.974	
Diameter 3 (in.):	1.985	1.978	1.975	1.975	1.975	1.967	
Prepared Core Height 1 (in.):	3.641	3.465	3.748	3.748	3.767	3.678	
Height 2 (in.):	3.635	3.422	3.733	3.760	3.752	3.651	
Height 3 (in.):	3.659	3.416	3.76	3.701	3.761	3.681	
Capped Core Height 1 (in):	4.086	3.757	4.123	3.968	4.075	4.03	
Height 2 (in.):	4.058	3.744	4.134	3.996	4.086	4.016	
Height 3 (in.):	4.072	3.749	4.137	3.984	4.096	4.014	
L/D Ratio:	2.05	1.90	2.09	2.01	2.07	2.04	
Correction Factor:	1.000	1.000	1.000	1.000	1.000	1.000	
Maximum Load (pounds)	20,140	26,310	38,790	45,870	21,180	22,680	
Average Diameter (in.):	1.985	1.977	1.977	1.979	1.975	1.971	
Average Height (in.):	3.645	3.434	3.747	3.736	3.760	3.670	
Wet Density (pcf):	168.7	171.6	169.5	170.7	136.9	167.3	
Dry Density (pcf):	168.5	171.4	169.3	170.5	136.7	167.1	
Moisture Content (%):	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	
Stress (psi):	6,506	8,571	12,636	14,917	6,914	7,433	
Stress (psf):	936,840	1,234,185	1,819,613	2,148,108	995,553	1,070,391	
Stress (tsf):	468	617	910	1,074	498	535	

UNCONFINED COMPRESSIVE STRENGTH - ROCK CORES



Project Number: 15015084

Date: 10/22/01

Project Name: Westgate

Technician: 3992

Location: Ft. Loenardwood, MO

Boring Number:	BH4S-3						
Sample Number:	16.5-17.5'						
Speciment Weight (gms):	517.17						
Tare Number:	125						
Wet Wt. + Tare:	157.73						
Dry Wt. + Tare:	157.6						
Wt. Tare:	54.06						
Diameter 1 (in.):	1.979						
Diameter 2 (in.):	1.976						
Diameter 3 (in.):	1.977						
Prepared Core Height 1 (in.):	3.840						
Height 2 (in.):	3.860						
Height 3 (in.):	3.85						
Capped Core Height 1 (in):	4.069						
Height 2 (in.):	4.064						
Height 3 (in.):	4.068						
L/D Ratio:	2.06						
Correction Factor:	1.000						
Maximum Load (pounds)	22,290						
Average Diameter (in.):	1.977						
Average Height (in.):	3.850						
Wet Density (pcf):	166.6						
Dry Density (pcf):	166.4						
Moisture Content (%):	0.1%						
Stress (psi):	7,259						
Stress (psf):	1,045,257						
Stress (tsf):	523						

## 10.0 ROCK CORE PHOTOS



**Boring BH1-2, Box 1 of 2**



**Boring BH1-2, Box 2 of 2**



**Boring BH2-3, Box 1 of 4**



**Boring BH2-3, Box 2 of 4**



**Boring BH2-3, Box 3 of 4**



**Boring BH2-3, Box 4 of 4**



**Boring BH3C-1, Box 1 of 4**



**Boring BH3C-1, Box 2 of 4**



**Boring BH3C-1, Box 3 of 4**



**Boring BH3C-1, Box 4 of 4**



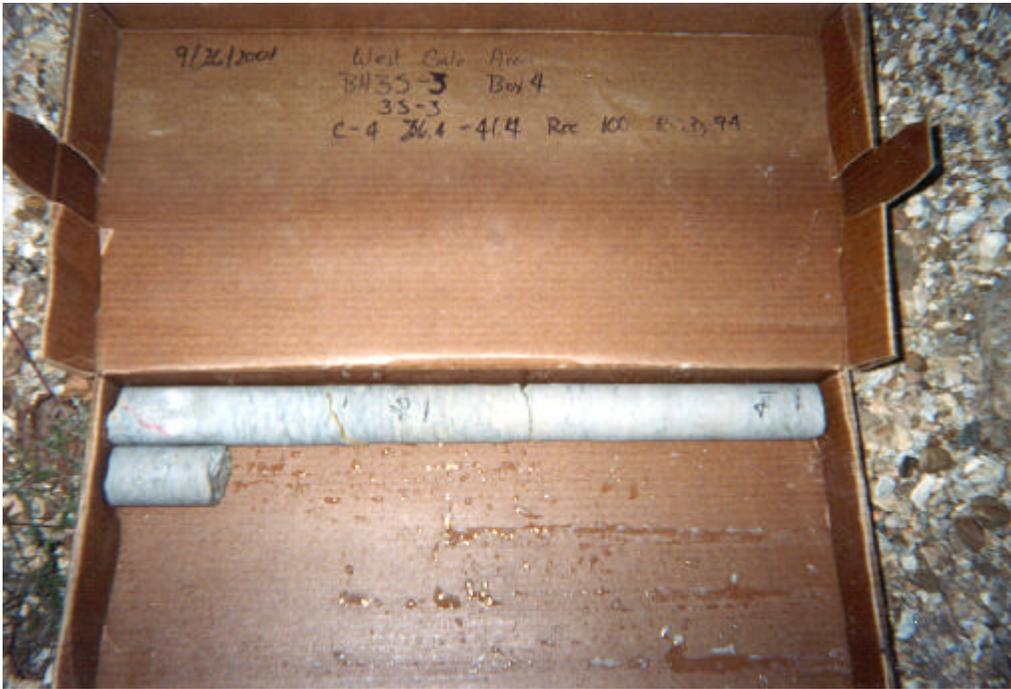
**Boring BH3S-3, Box 1 of 4**



**Boring BH3S-3, Box 2 of 4**



**Boring BH3S-3, Box 3 of 4**



**Boring BH3S-3, Box 4 of 4**



**Boring BH4C-1, Box 1 of 3**



**Boring BH4C-1, Box 2 of 3**



**Boring BH4C-1, Box 3 of 3**



**Boring BH4S-3, Box 1 of 4**



**Boring BH4S-3, Box 2 of 4**



**Boring BH4S-3, Box 3 of 4**



**Boring BH4S-3, Box 4 of 4**



**BH5S6C-2, Box 1 of 2**



**BH5S6C-2, Box 2 of 2**



**Boring B-113, Box 1 of 6**



**Boring B-113, Box 2 of 6**



**Boring B-113, Box 3 of 6**



**Boring B-113, Box 4 of 6**



**Boring B-113, Box 5 of 6**



**Boring B-113, Box 6 of 6**



**Boring B-156, Box 1 of 3**



**Boring B-156, Box 2 of 3**



**Boring B-156, Box 3 of 3**



**Boring B-181, Box 1 of 2**



**Boring B-181, Box 2 of 2**



**Boring B-208, Box 1 of 1**