



Land Suitability Analysis Report

**The Meadows Filing 20
380 Acre Mixed Use Development
December 12, 2003**

Prepared for:

**Castle Rock Development Company
3303 E. First Avenue Suite 410
Denver, CO 80206**

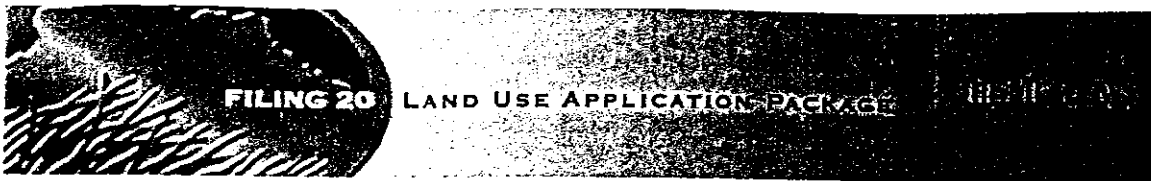


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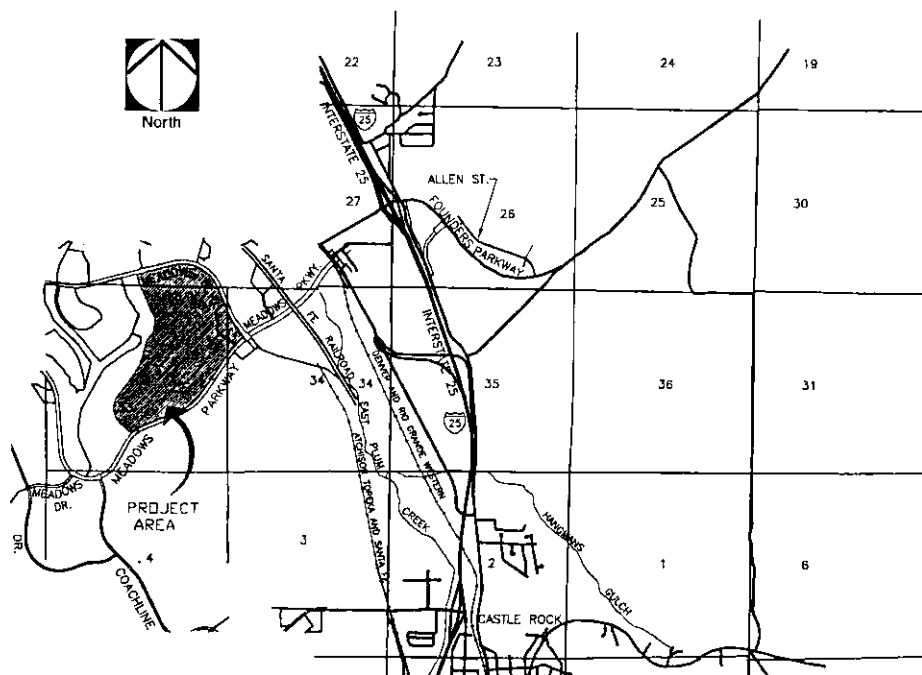
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Introduction

This Land Suitability Analysis Report (LSAR) has been prepared for Filing 20 of The Meadows, part of the Meadows Preliminary PD Site Plan – The Meadows Fourth Amendment. The property comprises 298 acres of the approximately 4,200 acres of The Meadows property and is planned for 2,822 residential units. The site is located within the Town's Primary Urban Service Area within The Meadows Preliminary PD Site Plan (Source: Town of Castle Rock; 2010 Comprehensive Master Plan). This analysis explores the property's opportunities and constraints for development by analyzing the slope of the topography, existing vegetation, wildlife, existing man-made improvements, and other unique natural features found on the site.

Vicinity Map



Location

This site is located in the Southeastern Quarter of Section 28, a part of Section 33, and the Northwestern Quarter of Section 34 of Township 7 South, Range 67 West of the 6th Principal Meridian, Town of Castle Rock, Douglas County, Colorado. The property is generally located west of Interstate 25, South of Meadows Boulevard, North of Meadows Parkway and East of Meadows Filing 16.



Methodology

This LSAR has been compiled utilizing a number of existing reports and maps, supplemented by on-site review of existing conditions. Based on this information, Composite Analysis Maps were created to illustrate the site's opportunities and constraints. The Composite Analysis Maps are included in Appendix A of this document.

Sources of information researched in the development of this LSAR include:

- AG Wassenaar, Inc; Preliminary Geotechnical Study, October 7, 2003.
- Town of Castle Rock; 2010 Comprehensive Master Plan, January 1991.
- Town of Castle Rock; Parks, Recreation, Trails and Open Space Master Plan Update, December 2002.
- Town of Castle Rock, 2020 Comprehensive Master Plan – Adopted November 25, 2002.
- U.S. Department of Agriculture, Soil Conservation Service; Soil Survey of Castle Rock Area, Colorado, November 1974.
- ACI Consulting, The Meadows Town Center Vegetation Assessment / Wildlife Corridor and Habitat Issues, October 13, 2003.

Natural Features and Cultural Resources.

The Composite Analysis Maps identify a number of natural features and cultural resources including views, drainages, and trail linkages. Natural features have been preserved to the greatest extent possible as amenities to the proposed development.

Views abound on the site, the most dramatic of which are to the west, providing vistas of the mountains and sweeping plains of Front Range. The proposed development will address the preservation of ridgelines and views in accordance with the Town of Castle Rock Ridgeline Ordinance. The ordinance identifies red, yellow, and blue zones, which define allowable development patterns along affected ridgelines. Only the blue zone (minor skyline area) exists within the Filing 20 area. Any development occurring in this zone will be responsive to height and aesthetic requirements imposed by the Ridgeline Ordinance.

Slope Analysis

The site consists of rangeland, which generally drains from the south west to the north east eventually arriving at the East Plum Creek. A ridgeline defines the western boundary of the property and the majority of this area will be dedicated as open space. Two drainages cross the site from south to north. The eastern most drainage is located within the 100-year floodplain and will not be preserved in its existing condition. The western most drainage area will be preserved generally in its existing location and will be dedicated as open space.

The slope analysis was prepared using 2' contour intervals with categories of 0-8%, 8-12%, 12-15%, 15-25% and 25% and greater. Elevations range from a low point of 6,080' at the eastern portion of the site to 6,200' at the western portion of the site.



Vegetation / Wildlife

Vegetation

Filing 20 is located entirely in open grassland with the exception of a few trees located along Meadows Boulevard. The site has historically been used for cattle grazing.

Wildlife

There is no connectivity of Filing 20 to viable wildlife habitat and/or viable wildlife movement corridors. Given this lack of connectivity to wildlife habitat and / or wildlife corridors and the designation of open space (a drainage corridor that bisects the site from south to north), the proposed development in of Filing 20 will not result in a significant impact to the integrity of wildlife habitat or wildlife movement corridors within the Meadows Property. (Source: "The Meadows Town Center Vegetation Assessment / Wildlife Corridor and Habitat Issues" by ACI Consulting)

Geology / Soils

Geology

According to the Preliminary Geotechnical Report Study (Appendix B), the sub-surface materials encountered in the test borings consisted of slightly sandy to very sandy clays, interlayered very sandy clay and very clayey sand, and silty to clayey sands overlying sedimentary bedrock. Claystone or sandstone bedrock was encountered at depths of 3 to 19 feet in 36 of the 38 borings. Slightly sandy to very sandy clay was found in 35 of the 38 borings. These soils exhibited low to very high swell when tested and was assessed to possess a moderate to very high expansion material. Interlayered very sandy clay and very clayey sand was encountered in three of the test borings across the site. These soils exhibited low to high swell when tested and is considered to possess low to moderate expansion potential. Silty to clayey sand was encountered in 13 of the 38 test borings. These soils exhibited low consolidation when tested and are considered to possess no to low expansion potential. Claystone bedrock was encountered in 29 of the 38 borings. The claystone exhibited low to very high swell when tested and is considered to possess a moderate to high expansion potential. All of these conditions are considered common at the Meadows and for this region of Colorado and can be mitigated as prescribed in the included report. (Source: "Preliminary Geotechnical Study / the Meadows Town Center / Meadows Boulevard and Meadows Parkway" by AG Wassenaar, Inc.)

Soils

In general, the soils found in locations of proposed development are suitable to support the type of use proposed in the given locations. The soil or subsurface properties encountered during test borings of the site consisted of slightly sandy to very sandy clays, interlayered very sandy clay and very clayey sand, and silty to clayey sands overlying sedimentary bedrock. Because of expansive clays and claystone bedrock, encountered across the site; drainage, future irrigation controls, proper fill placement, foundation design and



construction techniques common to the area can prohibit this being a problem. (Source: "Preliminary Geotechnical Study / The Meadows Town Center, Meadows Boulevard, and Meadows Parkway" Filing 20 by A.G. Wassenaar, Inc.).

Opportunities and Constraints / Conclusion

The development of this property, as designed, will not significantly impact wildlife, vegetation and natural features. Constraints to development identified by this report are minor, and can be mitigated through appropriate techniques as discussed above.

This Land Suitability Analysis Report determines that this site is suitable for development as proposed by Filing 20 Preliminary Plat.



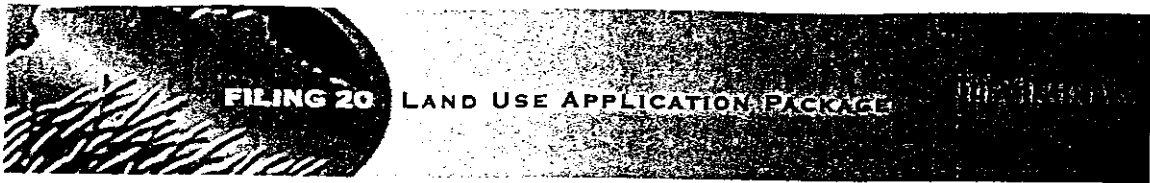


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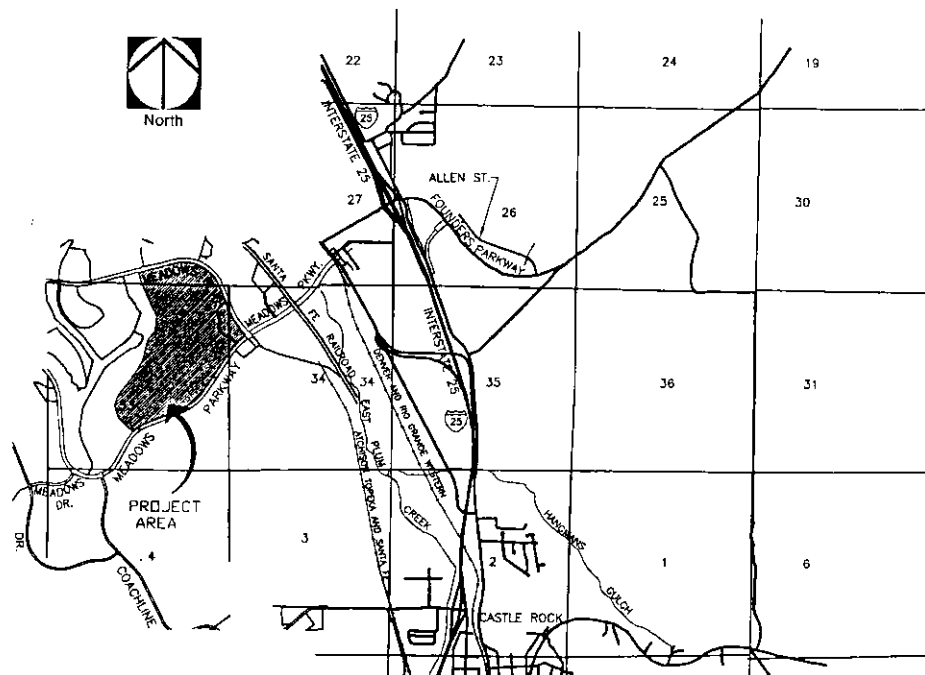
Appendices

Appendix A
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Appendix D

Composite Analysis Maps
Preliminary Geotechnical Report
Wildlife Report
Approved Jurisdictional Determination
for Meadows Wetlands

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Appendix A

Composite Analysis Maps

Appendix A

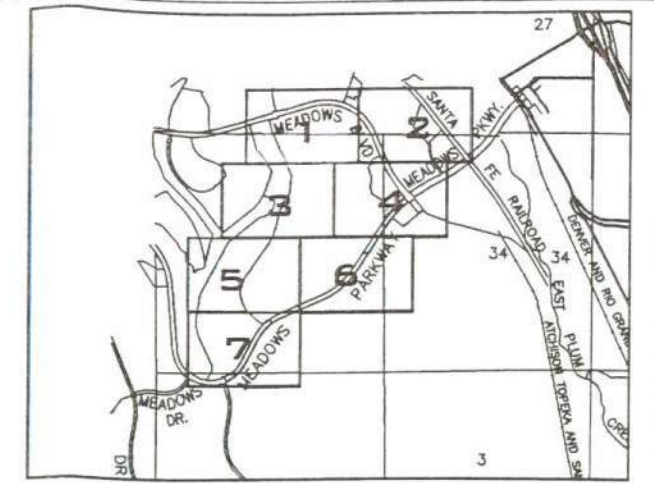
Composite Analysis Maps

THE MEADOWS FILING NO. 20

LOCATED IN THE SE 1/4 OF SECTION 28, A PART OF SECTION 33, AND THE
NW 1/4 OF SECTION 34 ALL IN TOWNSHIP 7 SOUTH, RANGE 67 WEST OF
THE 6TH. P.M. TOWN OF CASTLE ROCK, DOUGLAS COUNTY, COLORADO

PRELIMINARY PLAT/FINAL PD SITE PLAN

SHEET 1 OF 7



VICINITY MAP
SCALE: 1" = 4,000'-0"

EXISTING MAN-MADE FEATURES

- TRAILS
- FENCE
- DRAINAGE STRUCTURE

NATURAL FEATURE & HYDROLOGY

- EXISTING DRAINAGE AREA
- ○ ○ EXISTING RIDGE
- SIGNIFICANT VIEWS

RIDGE PROTECTION AREA

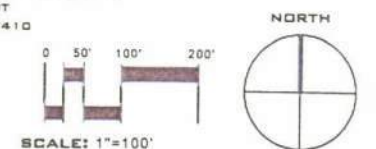
- MINOR RIDGE LINE AREAS
- VEGETATION

SLOPE ANALYSIS

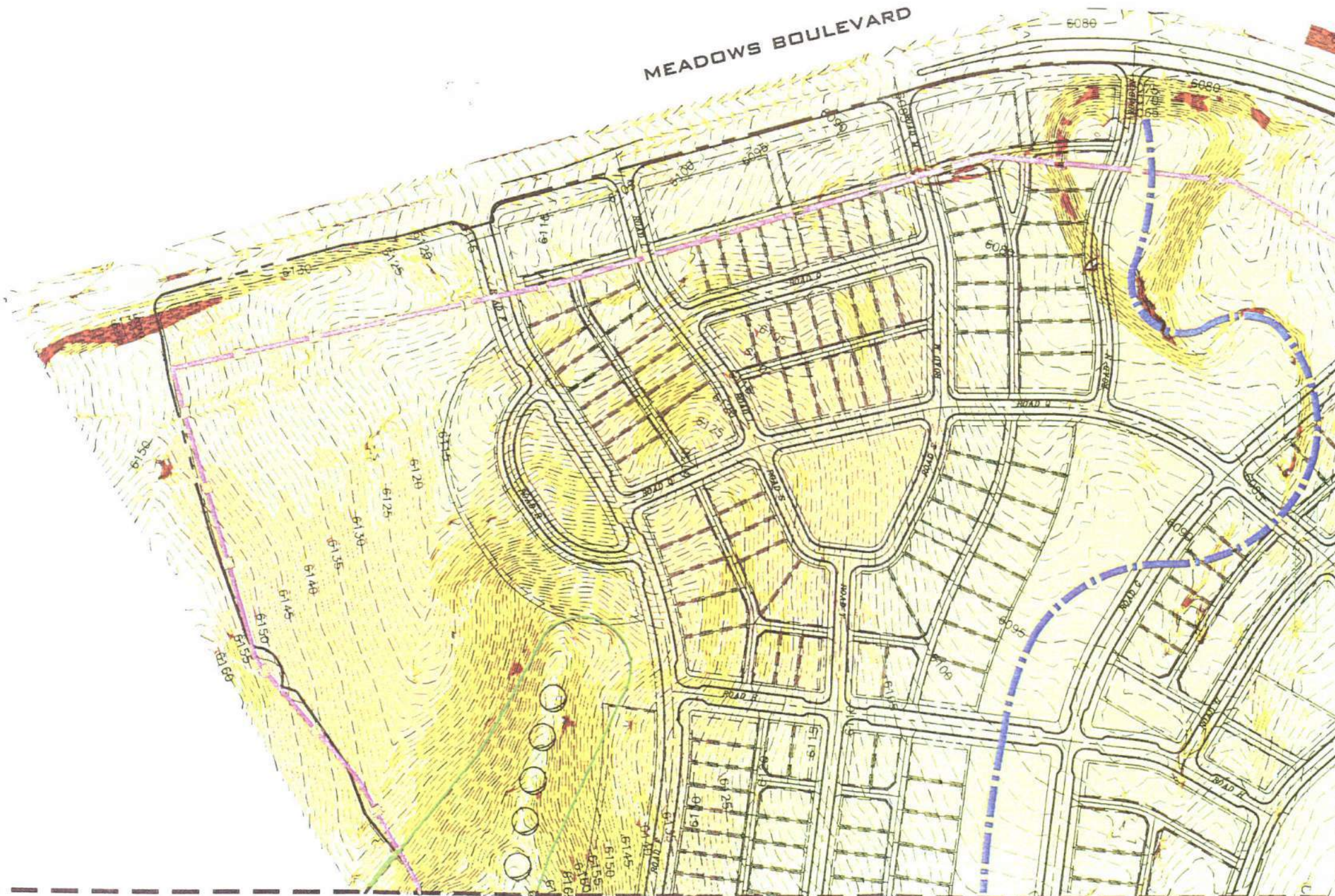
- 0%-8% SLOPE
- 8%-12% SLOPE
- 12%-15% SLOPE
- 15%-25% SLOPE
- 25%+ SLOPE

LAND SUITABILITY ANALYSIS REPORT THE MEADOWS FILING 20 COMPOSITE ANALYSIS MAP

OWNER
CASTLE ROCK DEVELOPMENT
3033 EAST FIRST AVENUE #410
DENVER, CO. 80206
303.394.5500



THE MEADOWS FILING NO. 20
PRELIMINARY PLAT/FINAL PD SITE PLAN



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FAX (303) 337-7079

NO.	REVISIONS	DATE	BY

DATE: DEC. 2003
DESIGNED BY: MEB
DRAWN BY: MEB
CHECKED BY: MEB

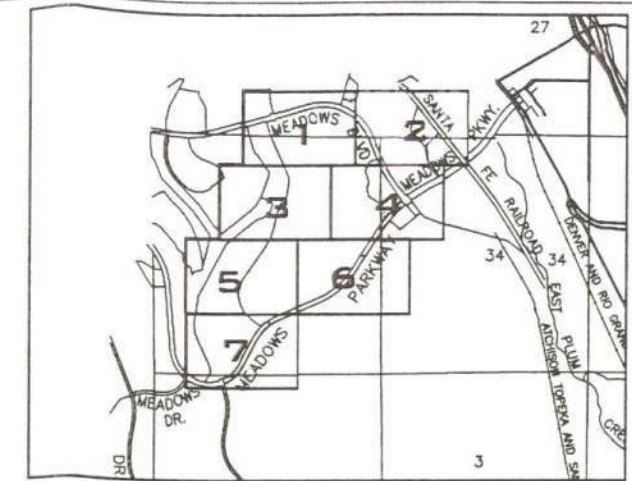
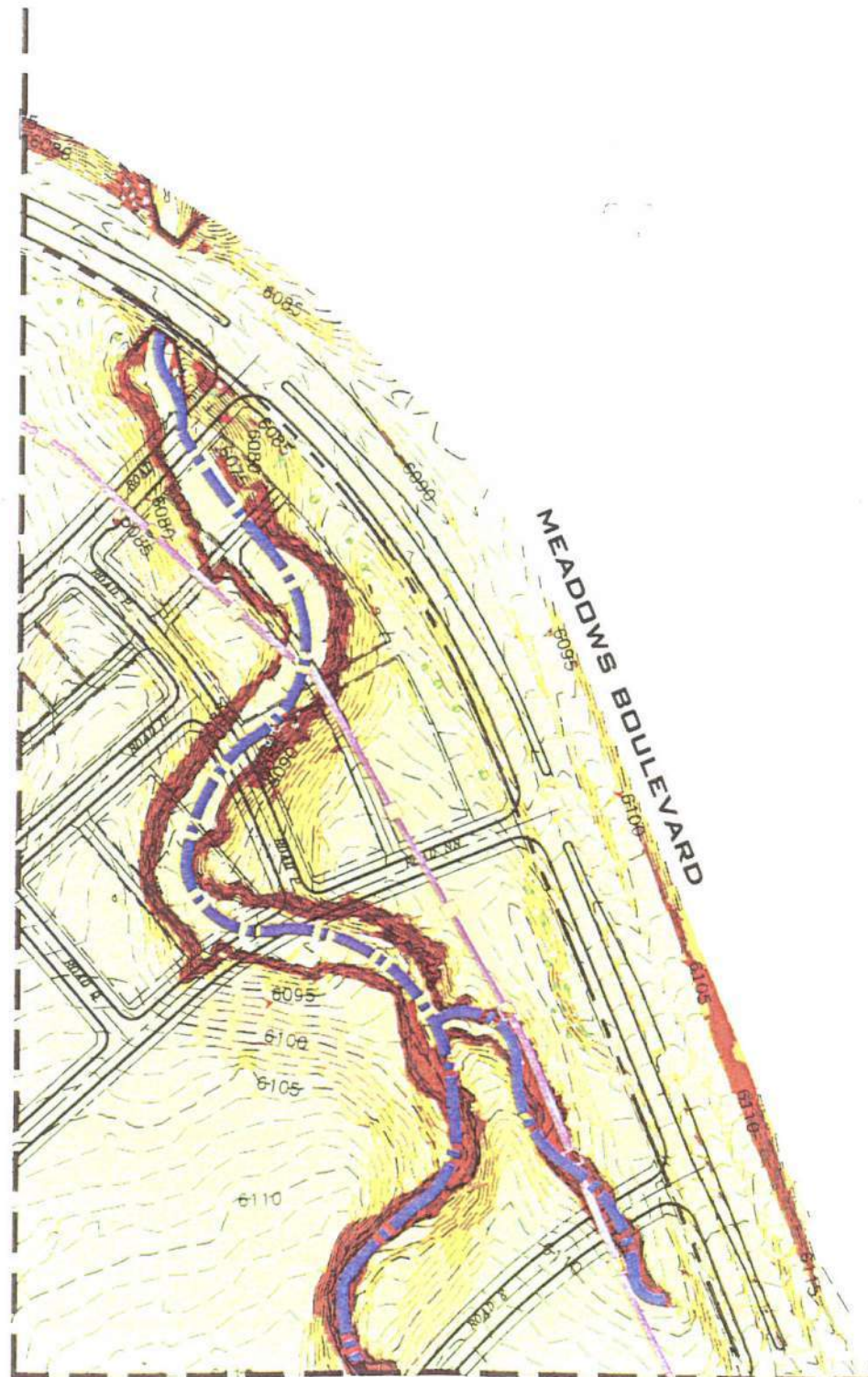
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THE MEADOWS FILING NO. 20

LOCATED IN THE SE 1/4 OF SECTION 28, A PART OF SECTION 33, AND THE NW 1/4 OF SECTION 34 ALL IN TOWNSHIP 7 SOUTH, RANGE 67 WEST OF THE 6TH. P.M. TOWN OF CASTLE ROCK, DOUGLAS COUNTY, COLORADO

PRELIMINARY PLAT/FINAL PD SITE PLAN

SHEET 2 OF 7



VICINITY MAP
SCALE: 1" = 4,000'-0"

EXISTING MAN-MADE FEATURES

- TRAILS
- FENCE
- DRAINAGE STRUCTURE

NATURAL FEATURE & HYDROLOGY

- EXISTING DRAINAGE AREA

- EXISTING RIDGE
- SIGNIFICANT VIEWS

RIDGE PROTECTION AREA

- MINOR RIDGE LINE AREAS
- VEGETATION

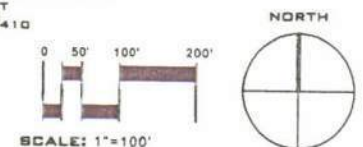
SLOPE ANALYSIS

- 0%-8% SLOPE
- 8%-12% SLOPE
- 12%-15% SLOPE
- 15%-25% SLOPE
- 25%+ SLOPE

LAND SUITABILITY ANALYSIS REPORT THE MEADOWS FILING 20 COMPOSITE ANALYSIS MAP

OWNER

CASTLE ROCK DEVELOPMENT
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THE MEADOWS FILING NO. 20
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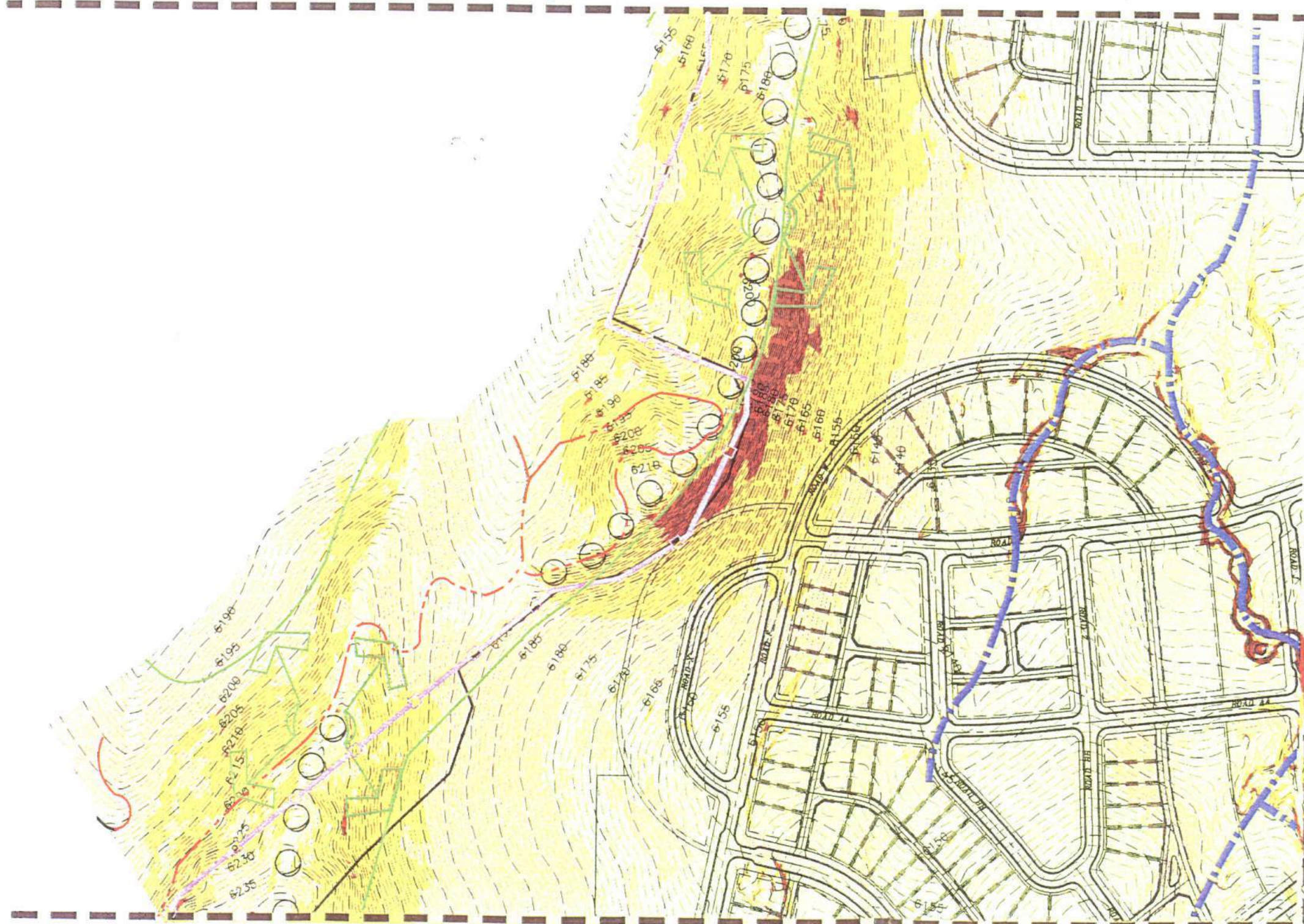
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PRELIMINARY PLAT/FINAL PD SITE PLAN

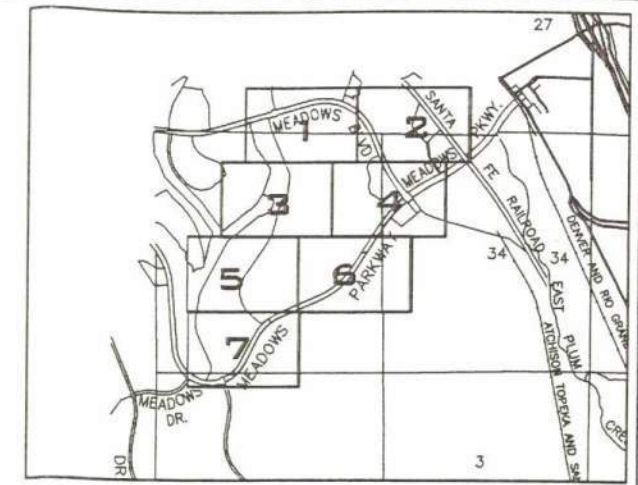
SHEET 3 OF 7

MATCHLINE SHEET 1



MATCHLINE SHEET 5

MATCHLINE SHEET 4



VICINITY MAP
SCALE: 1" = 4,000'-0"

EXISTING MAN-MADE FEATURES

- TRAILS
- - - FENCE
- - - DRAINAGE STRUCTURE

NATURAL FEATURE & HYDROLOGY

- EXISTING DRAINAGE AREA
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- ○ ○ SIGNIFICANT VIEWS
- RIDGE PROTECTION AREA

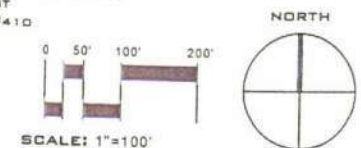
- MINOR RIDGE LINE AREAS
- VEGETATION

SLOPE ANALYSIS

- 0%-8% SLOPE
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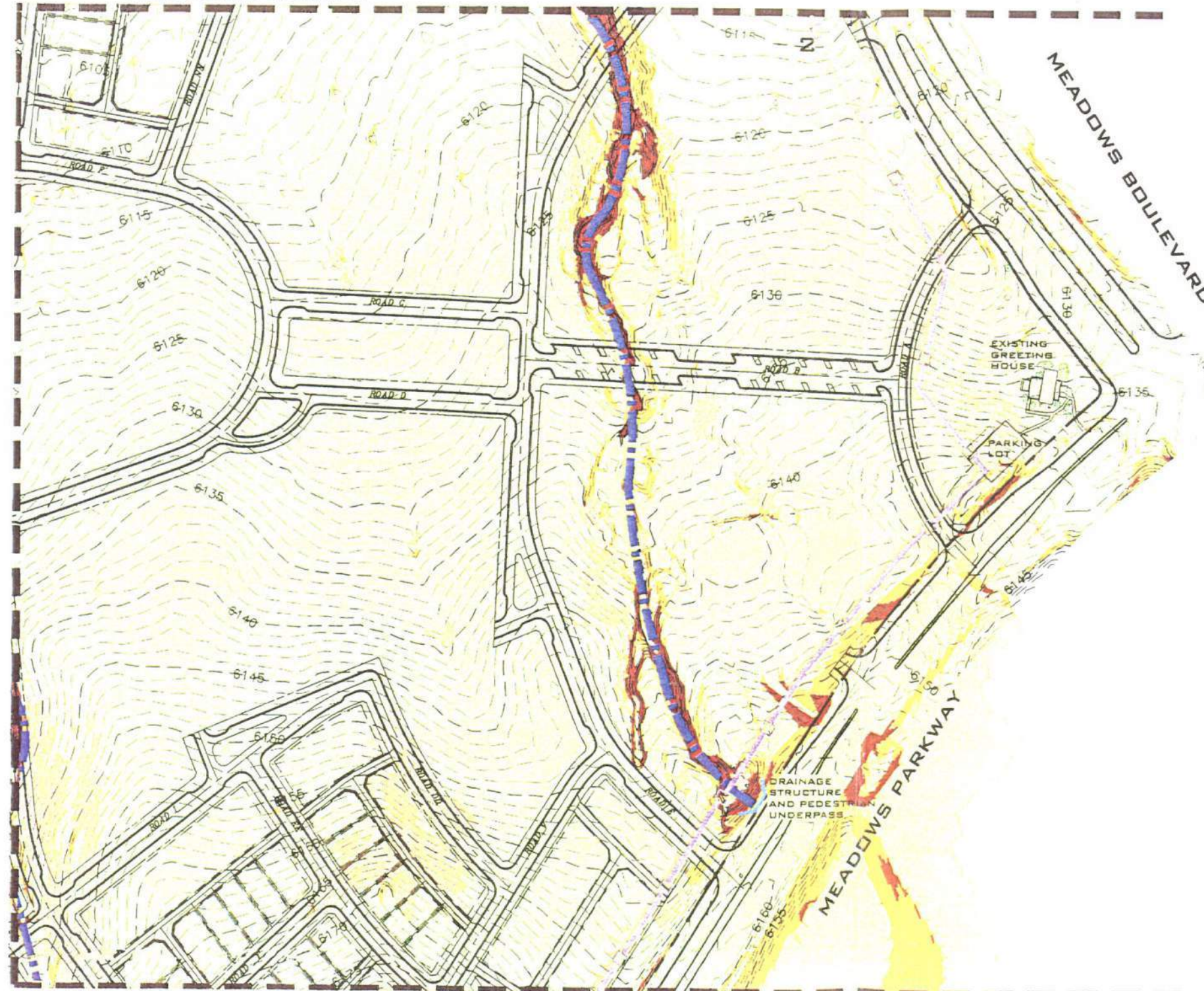
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SHEET 4 OF 7

MATCHLINE SHEET 2



MATCHLINE SHEET 6

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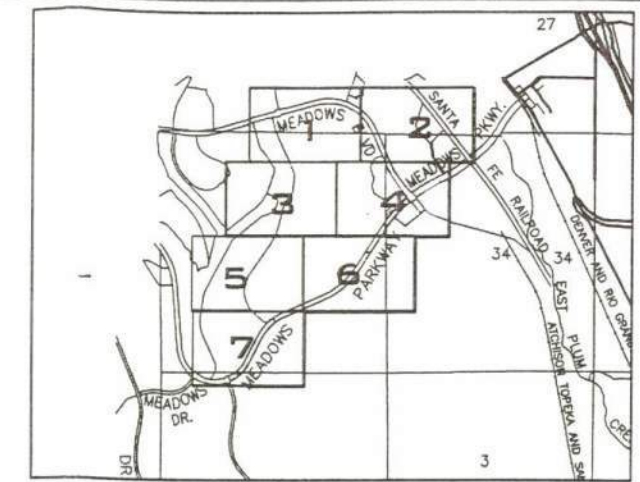


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VICINITY MAP

SCALE: 1" = 4,000'-0"

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- EXISTING DRAINAGE AREA

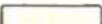
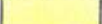
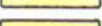
- EXISTING RIDGE

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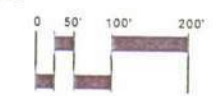
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LAND SUITABILITY ANALYSIS REPORT
THE MEADOWS FILING 20
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NORTH



SCALE: 1"=100'

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PRELIMINARY PLAT/FINAL PD SITE PLAN

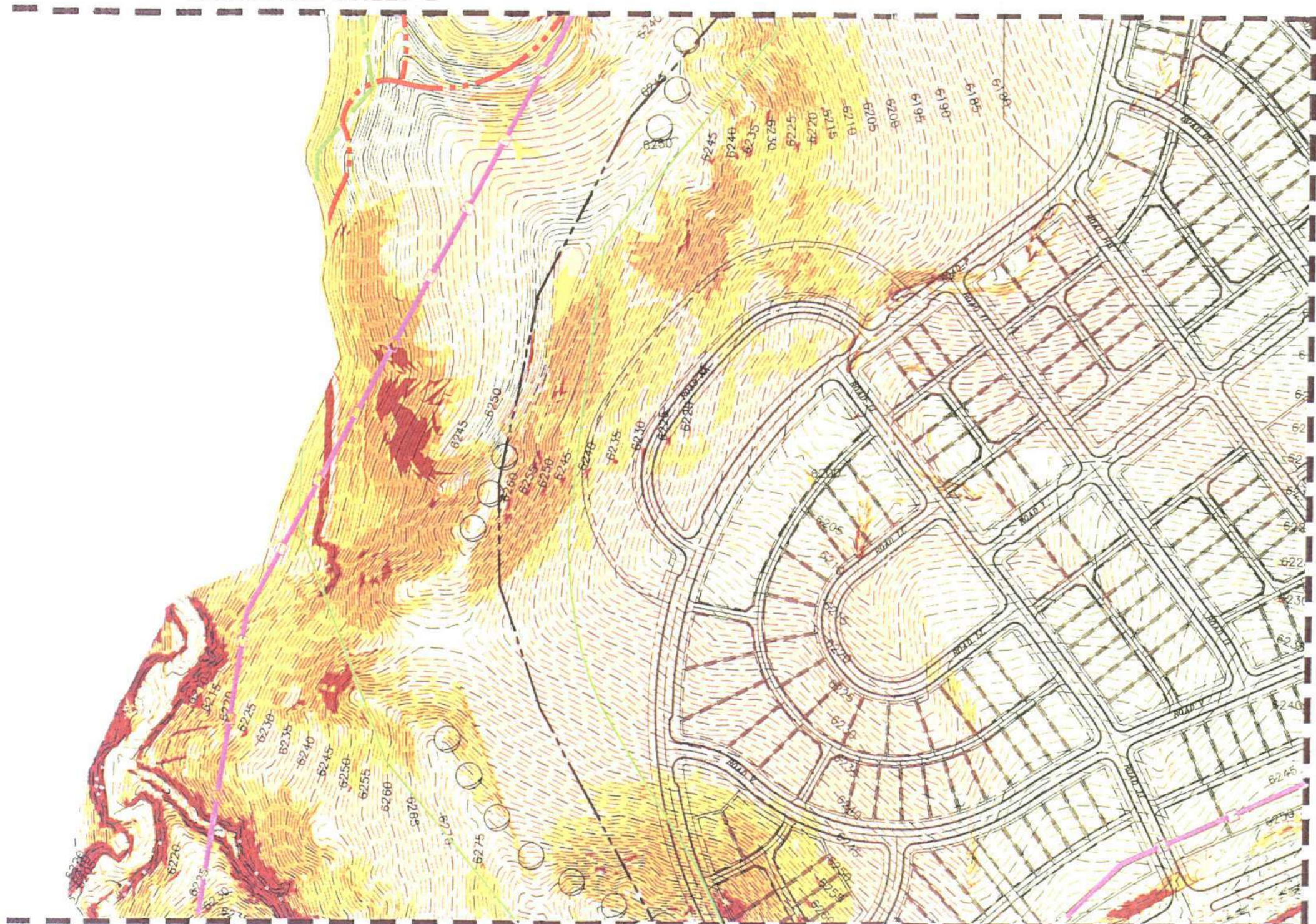
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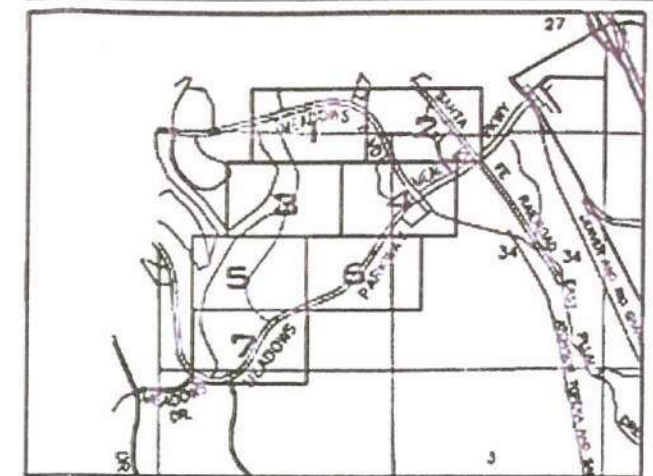
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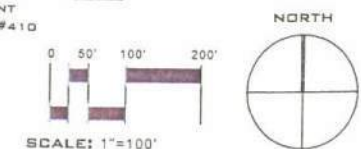
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DATE: DEC. 2003
DESIGNED BY: MSB
DRAWN BY: MSB
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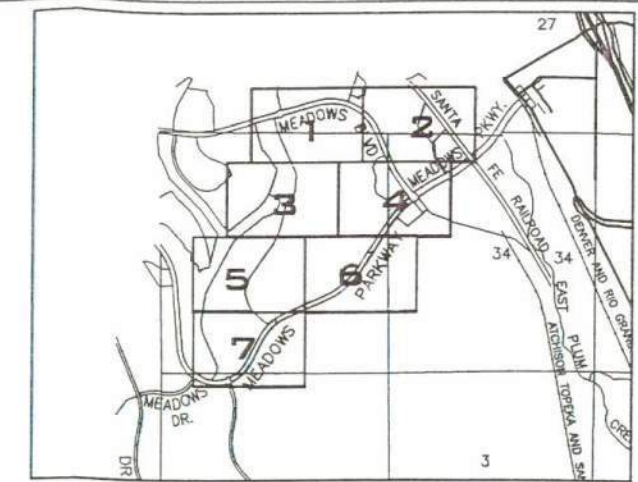
JOB NO.
10-03102.00

THE MEADOWS FILING NO. 20

LOCATED IN THE SE 1/4 OF SECTION 28, A PART OF SECTION 33, AND THE NW 1/4 OF SECTION 34 ALL IN TOWNSHIP 7 SOUTH, RANGE 67 WEST OF THE 6TH. P.M. TOWN OF CASTLE ROCK, DOUGLAS COUNTY, COLORADO

PRELIMINARY PLAT/FINAL PD SITE PLAN

SHEET 6 OF 7



VICINITY MAP
SCALE: 1" = 4,000'-0"

EXISTING MAN-MADE FEATURES

- TRAILS
- FENCE
- DRAINAGE STRUCTURE

NATURAL FEATURE & HYDROLOGY

- EXISTING DRAINAGE AREA

- ○ ○ EXISTING RIDGE
- SIGNIFICANT VIEWS

RIDGE PROTECTION AREA

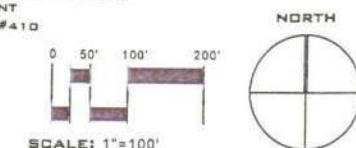
- MINOR RIDGE LINE AREAS
- VEGETATION

SLOPE ANALYSIS

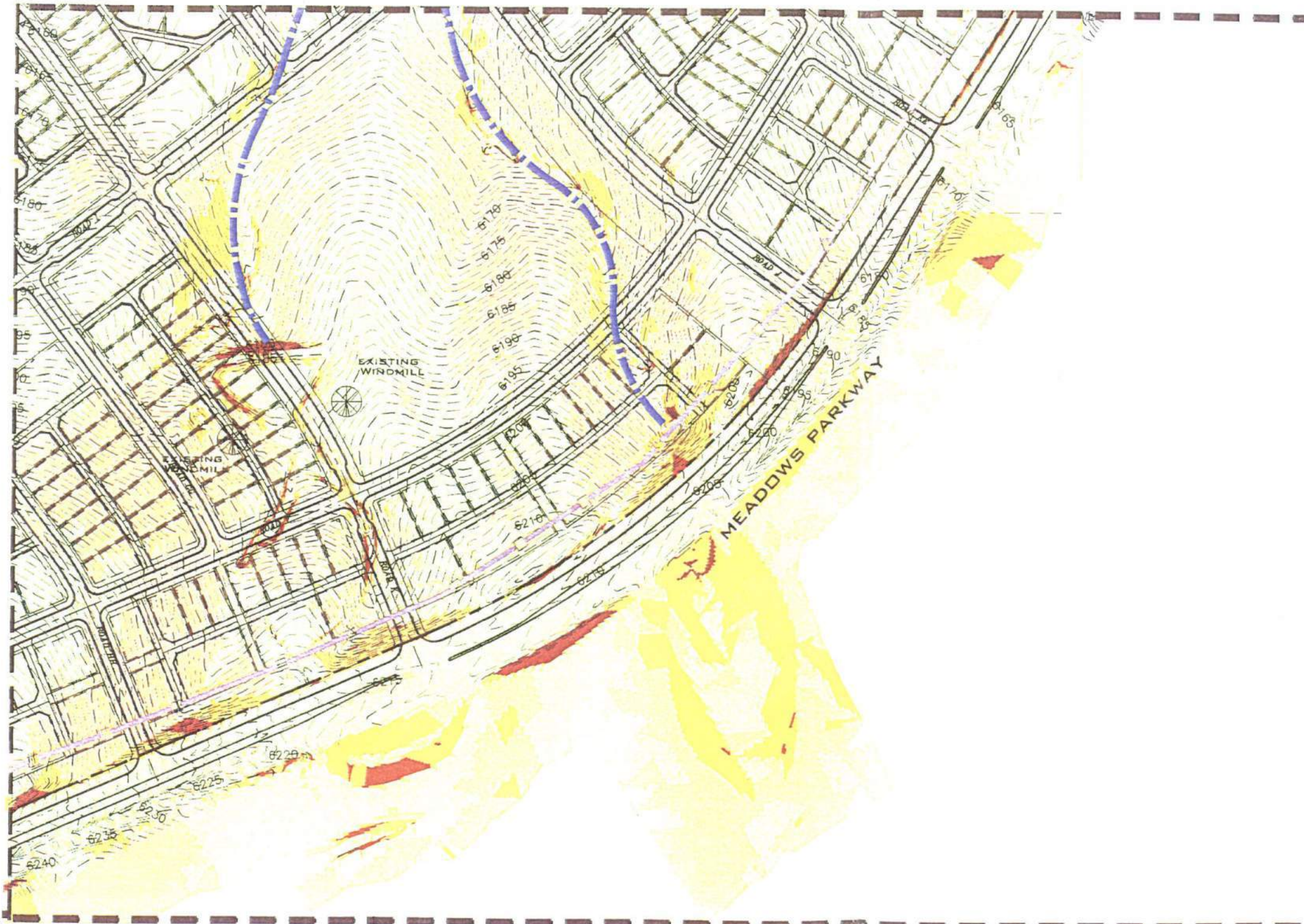
- 0%-8% SLOPE
- 8%-12% SLOPE
- 12%-15% SLOPE
- 15%-25% SLOPE
- 25%+ SLOPE

LAND SUITABILITY ANALYSIS REPORT THE MEADOWS FILING NO. 20 COMPOSITE ANALYSIS MAP

OWNER
CASTLE ROCK DEVELOPMENT
3033 EAST FIRST AVENUE #410
DENVER, CO. 80206
303.394.5500



THE MEADOWS FILING NO. 20
PRELIMINARY PLAT/FINAL PD SITE PLAN



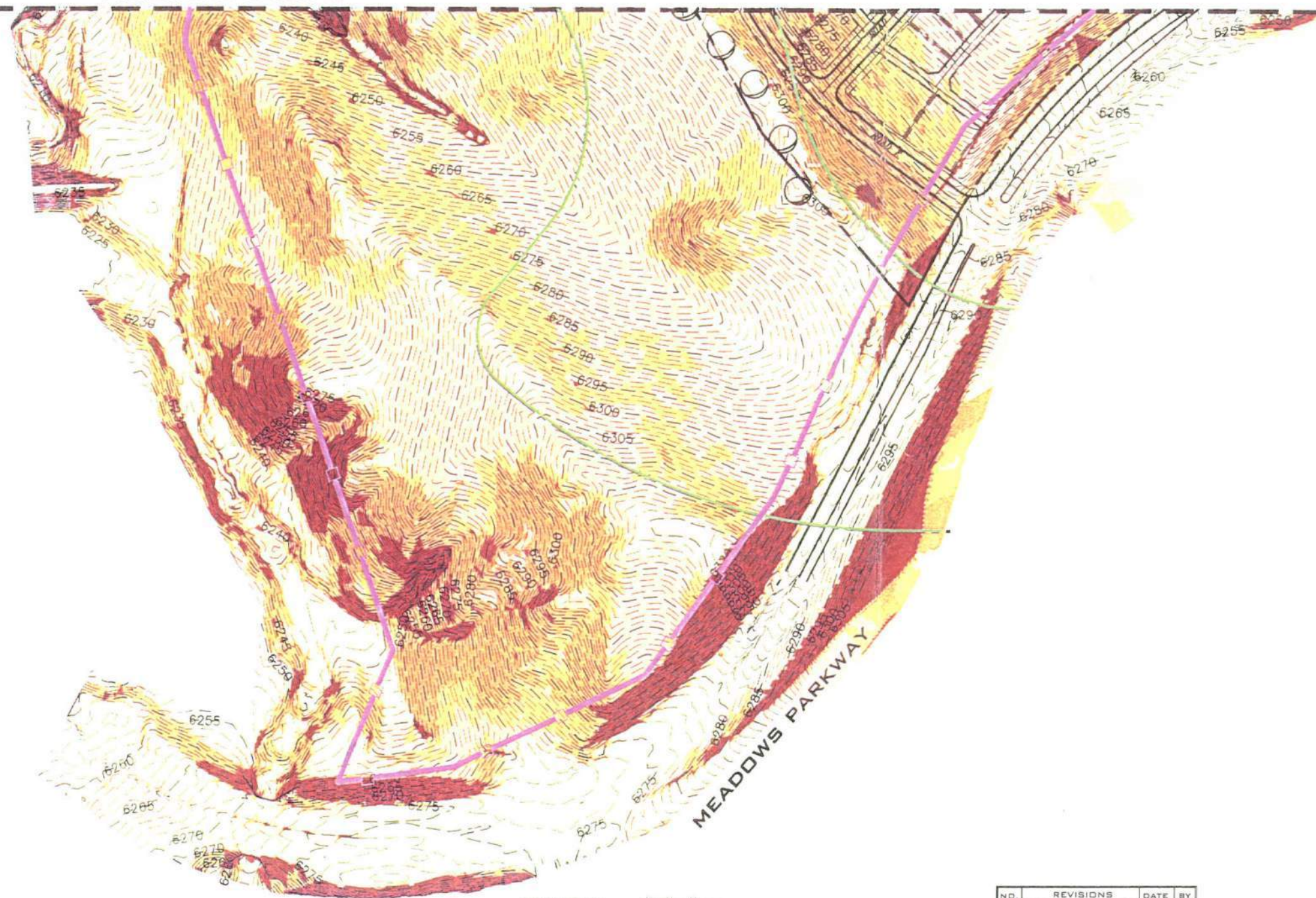
THE MEADOWS FILING NO. 20

LOCATED IN THE SE 1/4 OF SECTION 28, A PART OF SECTION 33, AND THE
NW 1/4 OF SECTION 34 ALL IN TOWNSHIP 7 SOUTH, RANGE 67 WEST OF
THE 6TH. P.M. TOWN OF CASTLE ROCK, DOUGLAS COUNTY, COLORADO

PRELIMINARY PLAT/FINAL PD SITE PLAN

SHEET 7 OF 7

MATCHLINE SHEET 5



Appendix B

Preliminary Geotechnical Report



A. G. WASSENAAR, INC.

GEOTECHNICAL CONSULTANTS

PHONE: 303/759-8100

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2180 S. IVANHOE, SUITE 5

DENVER, COLORADO 80222

PRELIMINARY GEOTECHNICAL STUDY
THE MEADOWS TOWN CENTER
MEADOWS BOULEVARD
AND MEADOWS PARKWAY
CASTLE ROCK, COLORADO

PREPARED FOR

CASTLE ROCK DEVELOPMENT COMPANY
3033 EAST FIRST AVENUE, SUITE 410
DENVER, COLORADO 80206

OCTOBER 7, 2003
PROJECT NUMBER 72607



October 7, 2003

Castle Rock Development Company
3033 East First Avenue, Suite 410
Denver, Colorado 80206

Attention: Mr. Tim Amberry

Subject: Preliminary Geotechnical Study
The Meadows Town Center
Meadows Boulevard and Meadows Parkway
Castle Rock, Colorado
Project Number 72607

Gentlemen:

We have conducted a preliminary geotechnical study for the proposed commercial/residential development at the subject site. Our summary of the data collected during our field and laboratory work and our analysis, opinions, and conclusions are presented in the attached report. The purpose of our study is to provide geotechnical design criteria for planning and site development, and preliminary design concepts for foundation systems, interior floor support, and drainage for the proposed development. Preliminary pavement thickness recommendations are also included.

In general, the subsurface materials encountered consist of slightly sandy to very sandy clay, interlayered very sandy clay and very clayey sand, and silty to clayey sand overlying sedimentary bedrock. Claystone and/or sandstone bedrock was encountered at depths of three (3) to 19 feet below the ground surface in 36 of the 38 test borings. Ground water was encountered in five (5) of the 38 test borings at depths ranging from 15 to 29 feet during this study.

Site development considerations should include provisions related to the presence of expansive clays and bedrock.

Based upon the results of this preliminary study, we expect that the structures at the site will be founded on straight shaft piers drilled into either competent bedrock or into clay soils; footings or footing pads placed upon non to low expansive soils, properly constructed fills or sandstone bedrock; or post-tensioned slab foundations constructed upon fills. Preliminary foundation design concepts are given in the report.

Slabs-on-grade will require some special consideration because of the swelling potential of the clay. Where the structures are founded upon straight shaft piers, structurally supported floors or slabs constructed upon thick buffer zones of non-expansive soils can be anticipated. Where footings are constructed, slabs-on-grade may be appropriate.

Perimeter subdrains will be necessary for all below grade areas.

Sulfate test results indicate that concrete placed across the site may be designed for negligible sulfate conditions.

Preliminary pavement sections are given in the following report. Overexcavation and placement of moisture treated fill in the streets during site grading may be advantageous in some areas prior to pavement construction.

Additional recommendations are presented in the following report.

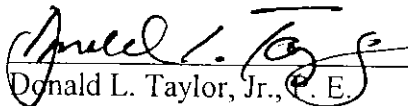
Castle Rock Development Company
Project Number 72607
October 7, 2003
Page 3

If you have any questions regarding the contents of this report or our analyses of the subsurface conditions which will influence the proposed development, please call us. We have appreciated the opportunity to provide this service for you.

Sincerely,

A. G. WASSENAAR, INC.


Keith D. Seaton, P. E. 10/8/03
Project Engineer


Donald L. Taylor, Jr., P. E.
Vice President

KDS/DLT/lia

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Preliminary Geotechnical Study
The Meadows Town Center
Meadows Boulevard and Meadows Parkway
Castle Rock, Colorado
October 7, 2003

PURPOSE

This report presents results of a geotechnical study for a proposed development located in the eastern portion of The Meadows development in Castle Rock, Colorado. This study was conducted for the purpose of generating geotechnical data to assist in determining geotechnical design criteria for planning, site evaluation, and development considerations. Preliminary geotechnical design concepts are also presented for foundations, interior floor support, drainage, and street construction. Factual data gathered during the field and laboratory work is summarized on Figures 1 through 44 and Table I attached. Our opinions and recommendations presented in this report are based on the data generated during this field exploration, associated laboratory testing, our experience with similar type projects, and our understanding of the proposed project.

This report was not intended to provide design criteria for individual structure foundations or street construction. Additional geotechnical studies will be required to develop these types of final design criteria and construction recommendations.

PROPOSED CONSTRUCTION

We understand the proposed development will consist of a mixture of multi-family residential and commercial structures. No specific details of construction are available at this time. Grading plans

are in the preliminary stages of development. Discussion with the site Civil Engineer indicates that the existing topography will be significantly changed by the development. Grading cuts and fills of 20 to 25 feet were noted on a preliminary grading plan. Additionally, it is our understanding that a significant amount of fill is to be imported to the site from adjacent parcels. One of the drainages crossing the site is to be channelized. The other drainage will be filled.

SITE CONDITIONS

The site consists of portions of Sections 28, 33, and 34, Township 7 South, Range 67 West, located to the west of the intersection of Meadows Boulevard and Meadows Parkway in Castle Rock, Colorado (see Figure 1). The site consists of range land which drains generally towards the north to East Plum Creek. The site is mainly rolling hills to the west with more level areas to the east. The site is covered by brush and rangeland grasses with some pine and scrub oak. Two major ephemeral drainages cross the site from south to north. A total elevation difference of approximately 210 feet was noted across the site based upon the USGS Topographic Map of the area. The site is bounded on the north, east, and south by Meadows Boulevard, and on the west by undeveloped land.

FIELD EXPLORATIONS

Subsurface conditions were explored by drilling thirty eight (38) test borings at the approximate locations indicated on Figure 2. The boring locations were staked in the field by others at locations chosen by this firm. The locations were surveyed for elevation. The borings were then drilled to depths ranging from 20 to 30 feet. The borings were advanced using a 4-inch diameter, continuous flight auger powered by a truck-mounted, CME 45 or 55 drilling rig. At frequent intervals, samples

of the subsurface materials were taken using a Modified California sampler which is driven into the soil by dropping a 140-pound hammer through a free fall of 30 inches. The Modified California sampler is a 2.5-inch outside diameter by 2-inch inside diameter device. The number of blows required for the sampler to penetrate 12 inches gives an indication of the consistency or relative density of the soils encountered. Results of the penetration tests and location of sampling are presented on the "Logs of Exploratory Borings," Figures 3 through 9. In addition to sampling and logging each boring for material types, ground water measurements were made at the time of drilling and again 14 to 19 days after drilling.

LABORATORY TESTING

Samples were returned to the laboratory where they were visually classified by a geotechnical engineer. Testing was then assigned to specific samples to evaluate their engineering properties. The laboratory tests included fifty (50) settlement-swell tests to evaluate the effect of wetting and loading on the selected soils samples. The results of the settlement-swell tests are presented on Figures 10 through 34. Nineteen (19) gradation analysis tests and Atterberg limits tests were conducted to evaluate grain size distribution and plasticity. These results are presented on Figures 35 through 44. In addition, representative samples were tested for water soluble sulfates, pH, resistivity, and chlorides. These results are discussed under the heading "Site Concrete and Corrosivity". The test results are summarized on Figures 3 through 9 and Table I.

SUBSURFACE CONDITIONS

The subsurface materials encountered in our test borings consisted of slightly sandy to very sandy clays, interlayered very sandy clay and very clayey sand, and silty to clayey sands overlying

sedimentary bedrock. Claystone or sandstone bedrock was encountered at depths of three (3) to 19 feet in 36 of the 38 borings. Ground water was encountered in only Test Boring 4 at a depth of 29 feet at the time of drilling. When checked 14 to 19 days after drilling, ground water was found in five (5) of the borings at depths ranging from 15 to 27½ feet. A graphical depiction of the subsurface materials and ground water encountered is shown on Figures 3 through 9. Plans showing our estimation of the depth and elevation of the bedrock surface are shown on Figures 45 and 46.

Slightly sandy to very sandy clay was found in 35 of the 38 borings. This material was medium stiff to very stiff, silty with sand lenses, calcareous, slightly moist to moist and brown in color. It exhibited in-situ dry densities ranging from 86 to 118 pounds per cubic foot at in-situ moistures ranging from 7 to 26 percent. The samples tested were of moderate to high plasticity. These soils exhibited low to very high swell (+0.4% to +11.5%) upon wetting and under a load of 1,000 pounds per square foot. This soil is assessed to possess a moderate to very high expansion potential.

Interlayered very sandy clay and very clayey sand was encountered in three of the test borings. These materials were silty with scattered small gravel, stiff to very stiff, slightly moist to moist, and brown in color. The samples tested exhibited low to moderate plasticity. The samples tested exhibited low to high swell (+1.2% to +4.2%) when wetted under a 1,000 psf surcharge load. The material is considered to possess low to moderate expansion potential depending upon sand content and plasticity.

- Silty to clayey sand was encountered in 13 of the 38 test borings. It was loose to dense, slightly moist and light brown to gray in color. The material contained some clay lenses and/or gravel. The samples tested were either non-plastic or of low plasticity. The sample tested exhibited low consolidation (-2.0%) when wetted under a 1,000 psf surcharge load. The sands are considered to possess no to low expansion potential.

Claystone bedrock was encountered in 29 of the 38 borings. It was silty and sandy in part, with some sandstone lenses. It was weathered to very hard, moist, iron stained and olive to brown to gray in color. The material tested exhibited moderate to high plasticity. The claystone exhibited low to very high swell (+0.8% to +6.8%) upon wetting and under a loading of 1,000 pounds per square foot. One sample which was determined to be disturbed consolidated 3.5% when wetted under a 1,000 psf surcharge load. The claystone is considered to possess a moderate to high expansion potential.

Sandstone bedrock was encountered in 17 of the 38 borings across the site. The sandstone encountered was silty or clean to clayey, with occasional claystone lenses. It was weakly cemented, weathered to very hard, moist, and gray to brown in color. The clean to silty sandstone was of no to low plasticity; however, the clayey sandstone was of moderate to high plasticity. The samples of the sandstone tested exhibited low swell (+0.4%) when wetted under a 1,000 psf surcharge load. The sandstone is largely considered to possess no to low expansion potential.

GEOTECHNICAL CONCERNS

Expansive clays and claystone bedrock were encountered across the site. The clays exhibited low to very high swell when tested and exhibited an average swell of 4.7% across the site. The claystone exhibited low to high swell when tested and exhibited an average swell of 2.6% across the site. However the claystone is assessed as possessing a moderate to high expansion potential. In our opinion, the expansive properties of the soil and bedrock may be reduced across some portions of the site with proper fill placement, drainage, future irrigation controls, and with the use of proper foundation design and construction techniques common to the area. Consideration should be made to perform mitigation of soil/bedrock expansion in the form of overexcavation and placement of moisture treated fill across the residential portion of the site during site grading. For the commercial portions of the site, it may be more appropriate to perform this type of operation on a structure by structure basis. However, mitigation of these materials should be considered beneath the roadways across the site. We are available to discuss this with you.

SITE DEVELOPMENT

Overlot Grading

The fill materials to be used at the site will be from on-site cut areas and from off-site sources. In general, suitable inorganic on-site or off-site soils may be used for structural fill. Any topsoil, or soil containing vegetation or other deleterious material, should also be removed prior to placement of structural fill. Any materials that have been chemically contaminated should be removed from the site for proper disposal. Off-site material considered for structural fill should be evaluated by our office prior to hauling to the site.

Construction of the fill embankments throughout the site will consist of proper foundation preparation, constructing embankment benching where necessary, disposition of strippings, proper fill placement and compaction, and designing and vegetating slopes in accordance with the analysis performed and the applicable governing regulations. Following are general site grading recommendations:

1. It is recommended that we be called to observe and test the fill placement so that a uniform, compacted fill will be placed.
2. Based upon the subsurface information contained in this report, and our assumption that the near surface soils will be used as fill, we have provided general specifications for the project in the Appendix.
3. All vegetation, topsoil, or soft surface soils beneath planned fill areas should be thoroughly stripped and removed prior to fill placement. These soils should be removed from the site or stockpiled for future use in revegetating exposed slopes. In no case should these materials be used in the structural areas or where the stability of slopes will be affected by their low shear strength. If these materials are used in non-structural areas, they should only be placed in fills where the embankment section does not exceed five feet in height.
4. The drainages should be specifically observed by a geotechnical engineer prior to fill placement. Areas of potential slope instability should be identified. Any areas identified should be laid back or removed to the underlying undisturbed natural soils. This is more fully discussed in the following section entitled "Slopes".
5. If soft, rutting soils become a problem in the drainages, stabilization with rockfill may be necessary. Stabilization prior to fill placement may be accomplished by placing

6-inch minus pit-run, crushed rock or equivalent material, which should be evaluated by our office prior to use. The material should be placed in approximately eight-inch loose lifts and rolled into the underlying soft or loose soils with a rubber-tired, fully loaded front-end loader or similar equipment. This procedure should be observed by a representative of our firm and should continue until a front-end loader with loaded bucket or similar equipment can be supported on the rock fill with no significant deformation. In some instances, a geogrid or geotextile fabric may be economical for use in conjunction with rock stabilization.

6. Where natural slopes exceed an existing slope of 5:1 (horizontal to vertical), benching of the slope before fill placement will be required for structural integrity. Prior to placing fill sections in these areas, the natural slopes should be benched as shown on Figure 47. This would not be required in the incised drainages where the fill would abut an opposing drainage sidewall which is within about 50 feet of the sidewall being filled. More information concerning the filling of slopes is included in the section of this report entitled, "Slopes".
7. The existing drainages will tend to collect subsurface water after fill has been placed. This may cause an increase in pore water pressure in the fill that may make the fill either unstable or prone to settlement. In order to help prevent this situation, we recommend that the existing drainages which are filled with more than 15 feet of fill be drained. A blanket or "burrito" drain should be constructed along the flow line of the drainages to a daylight. A typical drain figure is shown on Figure 48.

8. After the foundation has been properly prepared, the natural foundation soils should be scarified to a minimum depth of 6 inches, brought to the proper moisture content and then compacted according to the Appendix.
9. The compaction and moisture control of the soils will be dependent upon material types. The specifications outlined in the Appendix are based upon providing a fill with sufficient shear strength to support structures and controlling residual swell of expansive soil used in fill sections. It will be necessary to provide additional compactive effort in order to reduce settlement of the deeper fills. This is necessary for fill more than 20 feet below the ground surface. These specifications are also provided in the Appendix.
10. Particular attention should be paid to compaction of the exterior faces of slopes (i.e., slopes should be compacted to the minimum specification to the surface of the fill embankment).
11. Other specifications outlined in the Appendix of this report should be followed.

Overexcavation and Placement of Moisture Treated Fill

An option to reduce the amount of swell of the expansive clays and claystone would be to remove them from beneath the foundation and pavement areas and then to replace them as a moisture treated fill. This procedure generally results in a fill that is either able to support footing type foundations or reduces the swell of the materials sufficiently to allow the construction of minimum pier lengths. This procedure involves excavating to a depth below the foundations and pavements as determined by the amount of potential swell. The excavated soil is then wetted to above the optimum moisture content and then compacted into the excavations.

The following recommendations should be followed during grading operations in order to enable the placement of a moisture treated fill that could be used for foundation support. This may also be required in the street subgrade and would be most efficiently performed during site grading. These recommendations may be modified during construction if soil conditions differing from those anticipated are encountered.

1. The existing soils should be excavated to a depth of at least ten feet below the bottom of the lowest foundation level on each site (approximately 13 to 14 feet below overlot final grade for crawl space or post-tensioned slab type structures; 17 to 18 feet for the basement structures), or to a level where the soils become soft or unstable under wheeled excavation loads or to a significant layer of sand or sandstone. For street right-of-way, overexcavation should be accomplished to a depth of at least three feet below the pavement subgrade elevation. Overexcavation is most effectively accomplished by mass excavation rather than by excavating individual foundations. The base of the excavation should extend to a width of at least five feet beyond the foundation footprint (including any counterforts). The excavation should be sloped following current OSHA regulations. A licensed surveyor must verify the depth and width of the excavation prior to any fill placement.
2. Once the excavation width and depth has been verified, fill placement may begin. The bottom of the excavation should be scarified and moistened prior to fill placement. The fill, consisting of the overexcavated materials, should be placed in maximum eight-inch, loose lifts. The fill should be moistened and thoroughly mixed to obtain a relatively uniform moisture content between 0 and +4% of optimum moisture content. Mixing should be performed using a construction disc. The fill

should then be compacted to a minimum of 95% of maximum dry density. Optimum moisture content and maximum dry density should be obtained from a Standard Proctor test (ASTM D698) for cohesive soils. If granular soils are used as fill in overexcavations, they should be compacted as outlined for traditional overlot grading. This procedure for fill placement should also be accomplished for fill placed beneath the structures in areas where excavation is not necessary.

3. Observation and testing of fill placement must be performed by this firm on an essentially full-time basis. Testing should include in-place moisture content and dry density as well as periodic swell-consolidation and unconfined compressive strength testing performed at the discretion of the engineer.
4. Placement and compaction of fill should continue to final overlot grade. We do not recommend that placement of fill stop at foundation elevation as drying of the near surface fill prior to foundation construction may allow sufficient heave after construction to distress the structure. If the structures are not to be constructed within one year of completion of the fill, additional effort will need to be taken to help maintain the moisture within the fill. This may include the addition of more soil to blanket the compacted fill, the placement of mechanical or chemical barriers, or applying water periodically to the fill surface. We are available to discuss this with you.

It must be understood that while this method is used to reduce the likelihood of future heave, it is not free of risk of foundation movement. While future heave is less likely, the possibility of

settlement induced by excess moisture is increased. Therefore, the control and removal of surface water at the site will continue to be very important.

Slopes

A slope stability analysis was not conducted as part of this study. Based upon preliminary site specific observation, most of the existing slopes appear stable. Potential instabilities noted were the result of erosion of banks along the various gullies and intermittent stream channels on the site. Where these areas will be included in fill areas, they should be removed prior to fill placement. In cut areas they should be entirely removed by the grading. It will be necessary for a geotechnical engineer to field identify these areas as grading begins. Where natural slopes exceed 5 to 1, horizontal to vertical, benching to maintain structural integrity will be required. Construction of conventional fill slopes should be limited to 2 to 1 or flatter. Cut slopes steeper than 2 to 1 should be evaluated for stability.

Construction Excavations

In our opinion, the foundation and utility excavations may be constructed using conventional earth-moving equipment for the Front Range area. The excavations in areas where bedrock is present at or near the surface may require some additional effort, especially where cemented sandstone is encountered. Excavations deeper than three feet should be properly sloped or braced to prevent collapse because of caving soils. Local, city, county, state, and federal (OSHA) regulations should be followed.

Site Drainage

We recommend that provision be made to divert surface runoff away from foundation areas. This may reduce potential problems associated with excess water in the foundation bearing soils. The site should be designed such that a 10% slope can be established at the residential structures after foundation construction. Slopes of at least 2% should then be planned in landscaped areas once the water is away from the foundation. The commercial areas should be designed to shed water away from the structural areas.

Subsurface Drainage

The ground water encountered is not anticipated to cause significant problems during development. Blanket drains should be constructed in the existing drainages where they are to be filled more than about 15 feet in depth as discussed previously. We should be retained to review the final site grading plans to make this determination and to provide drain specifications.

The types of materials encountered have a relatively low permeability, and are, therefore, susceptible to the creation of a perched water condition. Perched water, in conditions such as these, forms after construction has taken place, when extensive irrigation is introduced to the property. For this reason, we recommend an overall area drain be considered during site development, particularly in the area of the residential structures. In addition, the overall area drain can also provide for a discharge and collection point for individual foundation drains. Because the sanitary sewer trench excavation is typically the deepest excavated trench area, area drains can be designed and constructed with installation of the sanitary sewer system, if allowed by the governing sanitation district. The civil engineering company contracted to design the infrastructure should be

able to provide this design. We are available to assist in drain design. For the system to work, the area drain must be graded to a positive discharge point. Given the topography of the site, it should be possible to lead the area drain to a gravity "daylight" outfall on the lower topographic portions of the site. **If a permanent outfall for an area drain cannot be determined, the area drain should not be constructed.** If an area drain is not constructed, it would be advantageous to provide a gravity outfall for the sewer bedding material, where feasible.

Utility Construction

Utility excavations will encounter sands, clays and bedrock. The overburden clay above the ground water level may be considered a "Type B" soil, and the sands and any soil influenced by ground water should be considered as a "Type C" soil. Final determination of the soil types must be made by the contractor's "competent person" at the time of construction. All excavations should be sloped or shored in the interest of safety, following local and federal (OSHA) regulations.

The bedrock, when encountered, may stand vertically unsupported, except where fractured or inundated with water. In the interest of safety, bedrock excavations should be sloped as outlined above. In our opinion, the utility excavations may be constructed using conventional earth-moving equipment for the Front Range area. Difficulty may be experienced if cemented sandstone is found.

Trench backfill should be well compacted to prevent future settlement. Trenches, as a minimum, should be compacted to the same specifications as required for overlot grading. Trenches in streets should be compacted to City of Castle Rock specifications. Density-compaction testing must be performed during trench backfilling.

SITE CONCRETE AND CORROSIVITY

Testing performed on selected soil samples indicates a water soluble sulfate content ranging from less than 50 to 200 ppm. This is considered to be a negligible concentration relative to potential corrosive attack on concrete. Therefore, all concrete in contact with the soils on the site should be designed for negligible sulfate exposure in accordance with the American Concrete Institute (ACI) Design Manual, Section 318, Chapter 4.3, 1999 Edition.

The pH testing exhibited levels of 7.0 to 8.3. Resistivity testing at in-situ moistures resulted in levels from 454.5 to 1,548.0 Ohms/cm. Chloride test results indicated 0.0001% to 0.0017%. These results are summarized on Table I. The results of this testing should be used as an aid in choosing the construction materials in contact with these soils and will be resistant to the various corrosive forces. Manufacturer's representatives should be contacted regarding the specific corrosivity resistance to the stated levels of pH, resistivity, and chlorides for their particular product. In addition, local district specifications should be consulted when selecting pipe materials.

PRELIMINARY FOUNDATION DESIGN CONCEPTS

The foundation recommendations for each structure are dependent upon the subsurface profile and engineering properties of the materials encountered at and near to the depth of the proposed foundation. These are dependent upon the final configuration and construction methods used during overlot grading at the site and the type of structure to be constructed. Therefore, foundation design recommendations for each structure cannot be presented until site grading is complete. **The information presented in the following sections presents preliminary foundation concepts which must be finalized for each building site upon completion of the overlot grading**

operations. We should be retained to provide an additional soil and foundation exploration after completion of site grading to provide specific foundation design recommendations for each site.

Piers

A suitable foundation system for structures founded where claystone bedrock or moderate to highly expansive clay soils are at or near to the bottom of the final excavations would be straight shaft piers drilled into bedrock, or into natural clays or well compacted clay fills (friction piers). The piers drilled into bedrock will likely be designed for an end bearing pressure in the range of 15,000 to 30,000 pounds per square foot (psf), a minimum dead load pressure in the range of 15,000 to 20,000 psf, and a side shear in the range of 1,500 to 3,000 psf. The side shear would be applied for that portion of the pier in undisturbed bedrock with the exception of the upper ten feet of each pier beneath the grade beam or foundation wall. Pier lengths on the order of 20 to 30 feet with bedrock penetration from 8 to 15 feet can be anticipated.

Friction piers may be necessary where the clays are expansive and the bedrock is deep below the ground surface. Friction piers would likely be designed for allowable end bearing pressures of 8,000 to 12,000 psf, side shear on the order of 8% to 10% of the end bearing pressure. Construction of friction piers would be very difficult where caving soils (sands) are encountered. This situation would likely require casing of the piers to complete construction.

Footings

It is likely that most of the structures across the site could be supported by spread footings or pad-type footings bearing on the natural sands, clays, and on deep, non- to low expansion potential fills.

In areas where expansive materials are overexcavated and replaced as moisture treated fill, most of the structures would likely be supported by footings. The footings must be founded below frost depth. Some densification may be required for footing support in areas where loose sand is encountered at foundation level. The footings will likely be designed for a maximum soil pressure ranging from 1,000 to 3,000 pounds per square foot (psf). A minimum dead load pressure may be required where clays are present.

Post-Tensioned Slab Foundation

Post-tensioned slab type foundations would be feasible across the site, if the supporting soils are modified as moisture treated fill. These foundations are most often used for apartment buildings in this area; however, multi-family residential structures on these foundations have proven feasible where basements are not planned. Our experience in the Denver area indicates that the design parameters should fall within the following ranges:

Edge Lift	e_m	=	2.0 - 3.0 feet
	y_m	=	0.5 - 1.4 inches

Center Lift	e_m	=	5.0 - 6.0 feet
	y_m	=	2.0 - 6.8 inches

Allowable Bearing Capacity 2,000 psf - 3,000 psf

Specific design recommendations are dependent upon the soil types found beneath each structure.

Lateral Earth Pressures

Foundation walls with fill on only one side will need to be designed for lateral earth pressures. For this site, lateral equivalent fluid pressures on the order of 45 to 60 pounds per cubic foot should be anticipated dependent upon the type of soil used to backfill the walls.

Interior Floor Construction

Where straight shaft piers are used for foundation support, the sites will be assessed with a moderate to very high slab risk performance evaluation. Where footing type foundations are constructed, it is likely that the sites will be assessed with a low or moderate slab risk performance evaluation. For structures constructed on piers, it is likely that it will be necessary to either construct a structural basement floor where moderate or higher risk is present or to place the interior slab upon a 'buffer' zone of low to non-expansive fill. Where footings are constructed, we expect that most of the interior floors could be supported by concrete slabs-on-grade if the risk of floor movement is deemed acceptable. If the risk tolerance for slab movement is zero, structural floors should be considered in all areas.

Drain Systems

Due to the relatively impermeable nature of the soils encountered on the site, drain systems will be required where below grade spaces are planned. Either interior or exterior drains may be used in dry areas. The drains must be led to a positive gravity outfall or sump.

Backfill and Surface Drainage

Backfill should be moistened and compacted to reduce future settlement. The site grading should consider a slope of 10% away from the foundations at the completion of construction. All other drainage swales in landscaped areas should slope at a minimum of 2%.

PRELIMINARY STREET PAVEMENT DESIGN

Pavement design procedures are based on strength properties of the subgrade and pavement materials, along with the assumed design traffic conditions. Subgrade materials, such as the clay and claystone materials encountered on this site, are potentially expansive and require additional precautions be taken to provide for adequate pavement performance. The pavement design procedures outlined address expansive subgrade materials primarily by modifying the subgrade materials in such a manner as to reduce the swell potential and then by attempting to minimize subgrade wetting after construction.

Based upon our preliminary analysis, it appears the proposed pavement subgrade materials will be the slightly sandy to very sandy clays, silty to clayey sands, and/or bedrock. These soils are summarized below according to their AASHTO Soil Classification System and Group Index Method.

<u>Soil</u>	<u>AASHTO Classification</u>	<u>AASHTO Group Index</u>
Silty or Clayey Sand; Silty or Clayey Sandstone	A-1-b, A-2-4, A-2-6, A-2-7	0-3
Very Clayey Sand; Slightly Sandy to Very Sandy Clay; Sandstone, very silty	A-4, A-6	0-14
Very Clayey Sand, Sandy Clay; Claystone	A-7-6	7-42

From these soil classifications, we have estimated strength values in order to determine the preliminary pavement thicknesses. Based on this information and utilizing thickness as determined from the City of Castle Rock Design Nomograph, the alternatives presented below were calculated.

Pavement Alternatives for Interior Streets

A-1-b, A-2-4, A-2-6 (0), A-2-7 (3) Soils		
Traffic Category	HBP	HBP/ABC
Local Residential	5.0"*	3.0" / 6.0"*
Entry Residential	5.0"*	3.0" / 6.0"*
Minor Collector-Residential	5.5" - 6.5"	3.5" - 4.0" / 7.0" - 8.5"

*Indicates City minimum

A-4, A-6 (0-14) Soils		
Traffic Category	HBP	HBP/ABC
Local Residential	5.5" - 6.5"	3.5" - 4.0" / 7.0" - 8.5"
Entry Residential	6.0" - 7.0"	3.5" - 4.0" / 8.5" - 10.0"
Minor Collector-Residential	7.5" - 8.5"	4.5" - 5.0" / 10.0" - 12.0"

A-7-6 (7-42) Soils		
Traffic Category	HBP	HBP/ABC
Local Residential	6.5" - 7.5"	4.0" - 4.5" / 8.5" - 10.0"
Entry Residential	7.0" - 8.0"	4.0" - 4.5" / 10.0" - 11.5"
Minor Collector - Residential	8.5" - 9.5"	5.0" - 5.5" / 12.0" - 13.5"

A-1-b, A-2-4, A-2-6 (0), A-2-7 (3) Soils		
Traffic Category	HBP	HBP/ABC
Local - Commercial	6.0" - 6.5"	3.5" / 8.5" - 4.0" / 8.5"
Minor Collector - Commercial	6.5" - 7.0"	4.0" / 8.5" - 4.0" / 10.0"
Major Collector - Commercial	7.5" - 8.0"	4.5" / 10.0" - 5.0" / 10.0"

A-4, A-6 (0-14) Soils		
Traffic Category	HBP	HBP/ABC
Local - Commercial	8.0" - 8.5"	5.0" / 10.0" - 5.0" / 12.0"
Minor Collector - Commercial	8.5" - 9.0"	5.0" / 12.0" - 5.5" / 12.0"
Major Collector - Commercial	9.5" - 10.0"	5.5" / 13.5" - 6.0" / 13.5"

A-7-6 (7-42) Soils		
Traffic Category	HBP	HBP/ABC
Local - Commercial	9.0" - 9.5"	5.5" / 12.0" - 5.5" / 13.0"
Minor Collector - Commercial	9.5" - 10.0"	5.5" / 13.0" - 6.0" / 13.5"
Major Collector - Commercial	10.5" - 11.0"	6.5" / 13.5" - 6.5" / 15.0"

HBP = Hot Bituminous Pavement ABC = Aggregate Base Course

Traffic on the roadways was assumed to be Local Residential traffic (EDLA = 5), Entry Residential traffic (EDLA = 10), Minor Collector-Residential traffic (EDLA = 30), Local Commercial (EDLA = 30), Minor Collector Commercial (EDLA = 50) or Major Collector - Commercial (EDLA = 100). A design life of 20 years is assumed. It should be emphasized that the design alternatives provided above are preliminary. The final design thickness could be more or less than indicated.

The City of Castle Rock requires mitigation of swell for subgrade materials which swell more than 2% under a 150 psf surcharge load when remolded to 95% of the appropriate maximum dry density. Our experience indicates that the natural clays and claystone bedrock may swell more than this amount. Therefore, overexcavation and replacement with non- to low expansive materials (sands, sandstone) or chemical stabilization should be anticipated across portions of the site where the natural clays or claystone is exposed at the street subgrade. Overexcavation and moisture treatment of the top three (3) feet of the natural clays or claystone at the street subgrade should be considered in order to mitigate the potential for pavement heave.

Proper surface and subsurface drainage is essential for adequate performance of pavements constructed on these types of subgrade materials. It has been our experience that water from landscape areas will infiltrate pavement subgrade soils and result in loss of subgrade integrity

followed by pavement damage. Therefore, provisions should be made to maintain adequate drainage and/or contain runoff from such areas. This is especially important since composite pavement sections, which include base course, tend to promote further subgrade moisture infiltration and damage. In addition, water and irrigation lines should be thoroughly pressure tested for leaks prior to placement of pavement materials.

It must be reiterated that the information contained in this section is preliminary in nature. More detailed information will be required by the City of Castle Rock prior to issuance of a paving permit. Therefore, when overlot grading is complete at the site, a final pavement evaluation must be performed.

FINAL DESIGN CONSULTATION AND CONSTRUCTION OBSERVATION

This report has been prepared for the exclusive use of Castle Rock Development Company for the purpose of providing geotechnical criteria for the proposed project. The data gathered and the conclusions and recommendations presented herein are based upon the consideration of many factors including, but not limited to, the type of structures proposed, the configuration of the structures, the proposed usage of the site, the configuration of surrounding structures, the geologic setting, the materials encountered, and our understanding of the level of risk acceptable to the client. Therefore, the conclusions and recommendations contained in this report shall not be considered valid for use by others unless accompanied by written authorization from A. G. Wassenaar, Inc.

It is recommended that A. G. Wassenaar, Inc. be retained to provide general review of the final design and specifications in order that the recommendations presented may be properly interpreted

and implemented. Our firm should also be retained to provide geotechnical engineering and material testing services during construction of the site grading, utilities, and drainage features. The purpose of these services is to observe the construction with respect to the geotechnical design concepts, specifications or recommendations, and to facilitate design changes in the event that subsurface conditions differ from those anticipated prior to start of construction. It is also recommended that our firm be retained to perform a final pavement design for the streets in the development and to perform a final foundation design report for each structure in the development after site grading is complete.

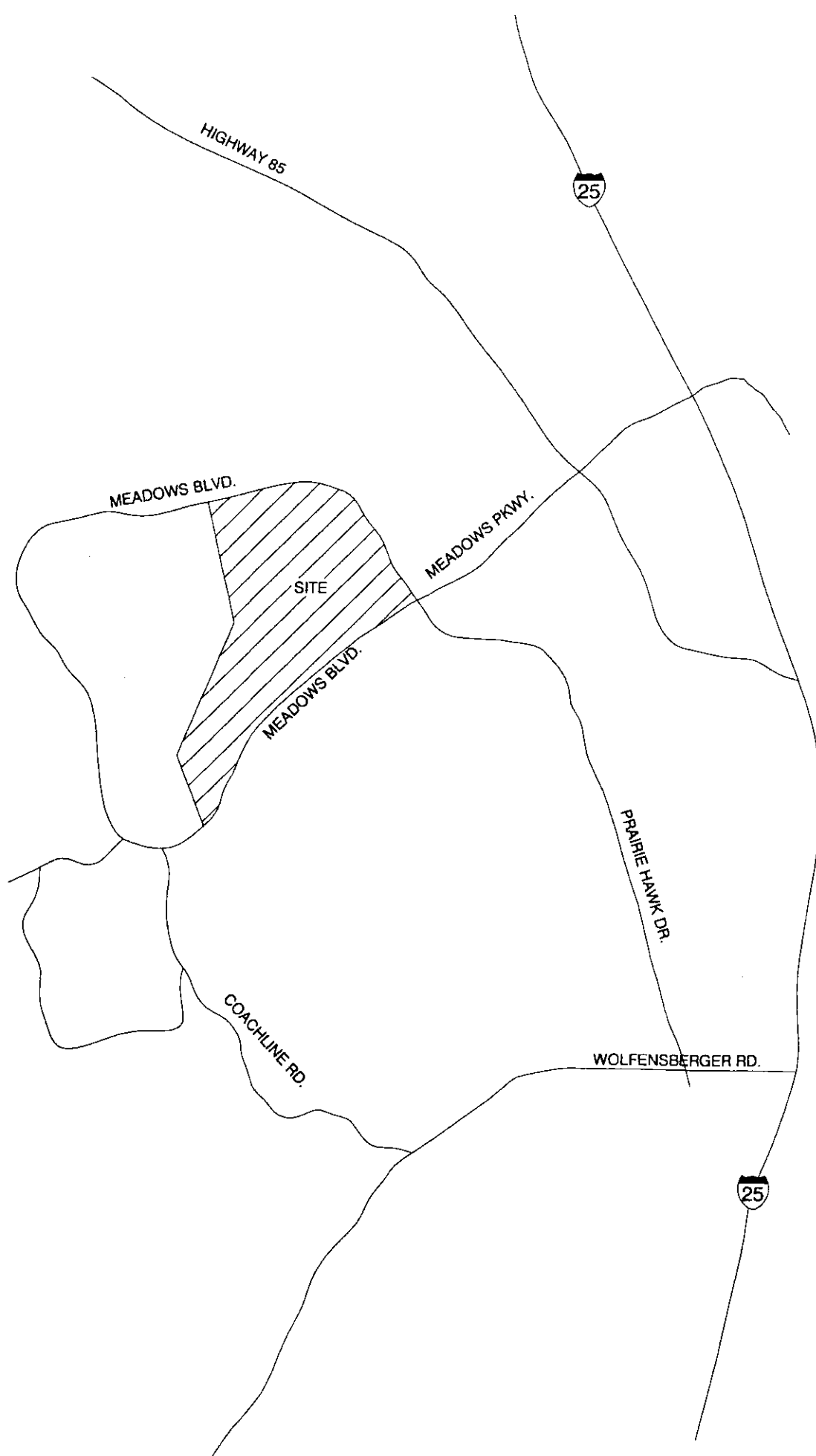
GEOTECHNICAL RISK

The concept of risk is an important aspect of any geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be tempered by engineering judgment and experience. Therefore, the solutions or recommendations presented in any geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as desired or intended. What the engineering recommendations presented in the preceding sections do constitute is our best estimate, based on the information generated during this and previous evaluations and our experience in working with these conditions, of those measures that are necessary to help the development perform in a satisfactory manner. The Developer, Builder, and future Owners must understand this concept of risk, as it is they who must decide what is an acceptable level of risk for the proposed development of the site.

LIMITATIONS

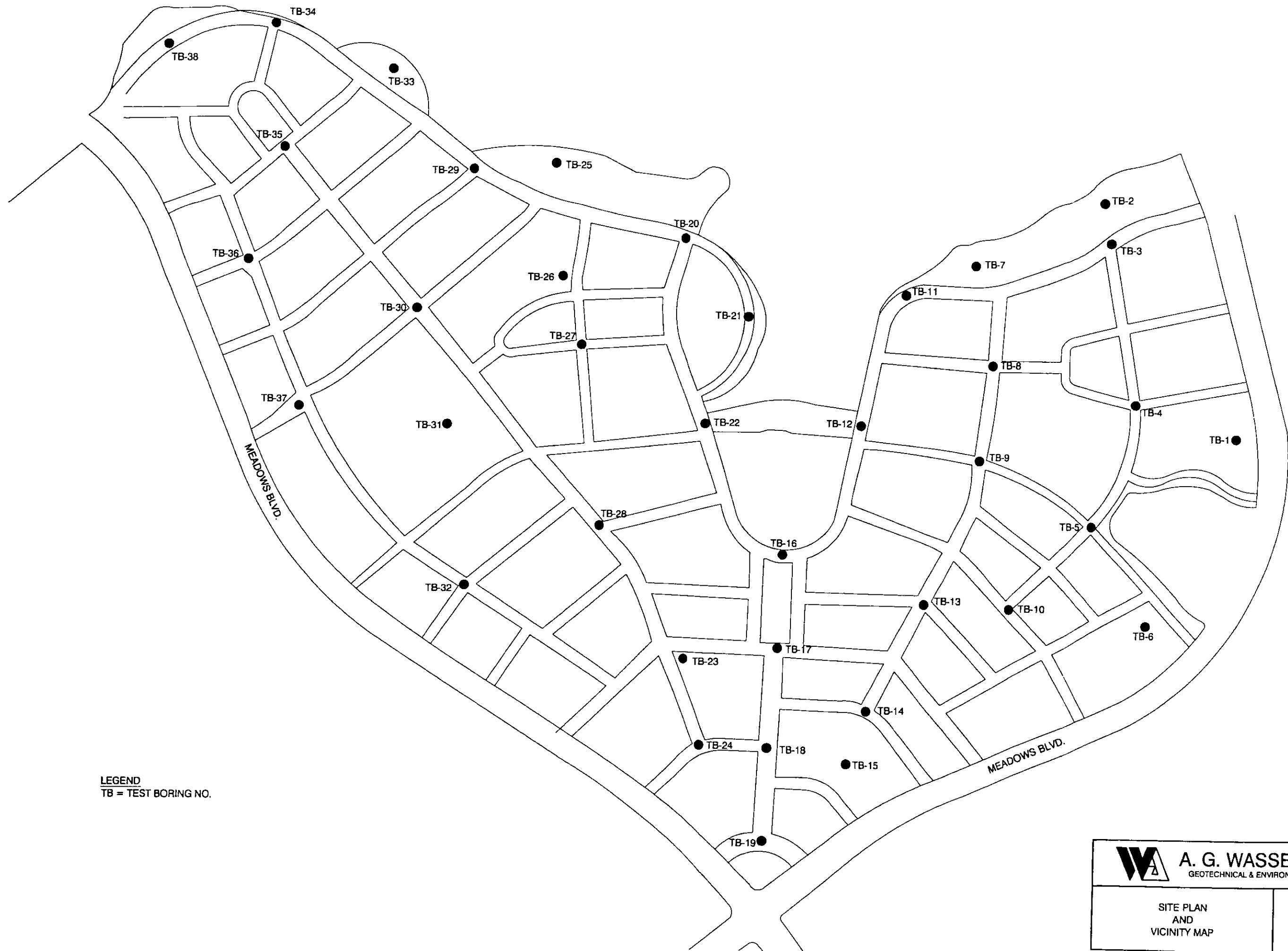
The professional judgments expressed in this report meet the standard care of our profession in this area at this time. The test borings drilled for this study were spaced to obtain a reasonably accurate picture of underground conditions for design purposes. Variations frequently occur from these conditions which are not indicated by the test borings. These variations are sometimes sufficient to necessitate modifications in the designs. For this reason, we should be retained to observe the site during construction.

Our scope of services for this project did not include any research, testing, or assessment relative to past or present contamination of the site by any source. If such contamination were present, it is likely that the exploration and testing conducted for this report would not reveal its existence. If the Client is concerned about the potential for such contamination, additional studies should be undertaken. We are available to discuss the scope of such studies with you.



VICINITY MAP

FIGURE 1



LEGEND
TB = TEST BORING NO.

 A. G. WASSENAAR, INC. GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS	
SITE PLAN AND VICINITY MAP	PROJECT NO. 72607 FIGURE 2

TEST
BORING
NO. 1
ELEV. 6076

TEST
BORING
NO. 2
ELEV. 6117

TEST
BORING
NO. 3
ELEV. 6115

TEST
BORING
NO. 4
ELEV. 6092

TEST
BORING
NO. 5
ELEV. 6086

TEST
BORING
NO. 6
ELEV. 6080

LOOKING POINT
NO. 33

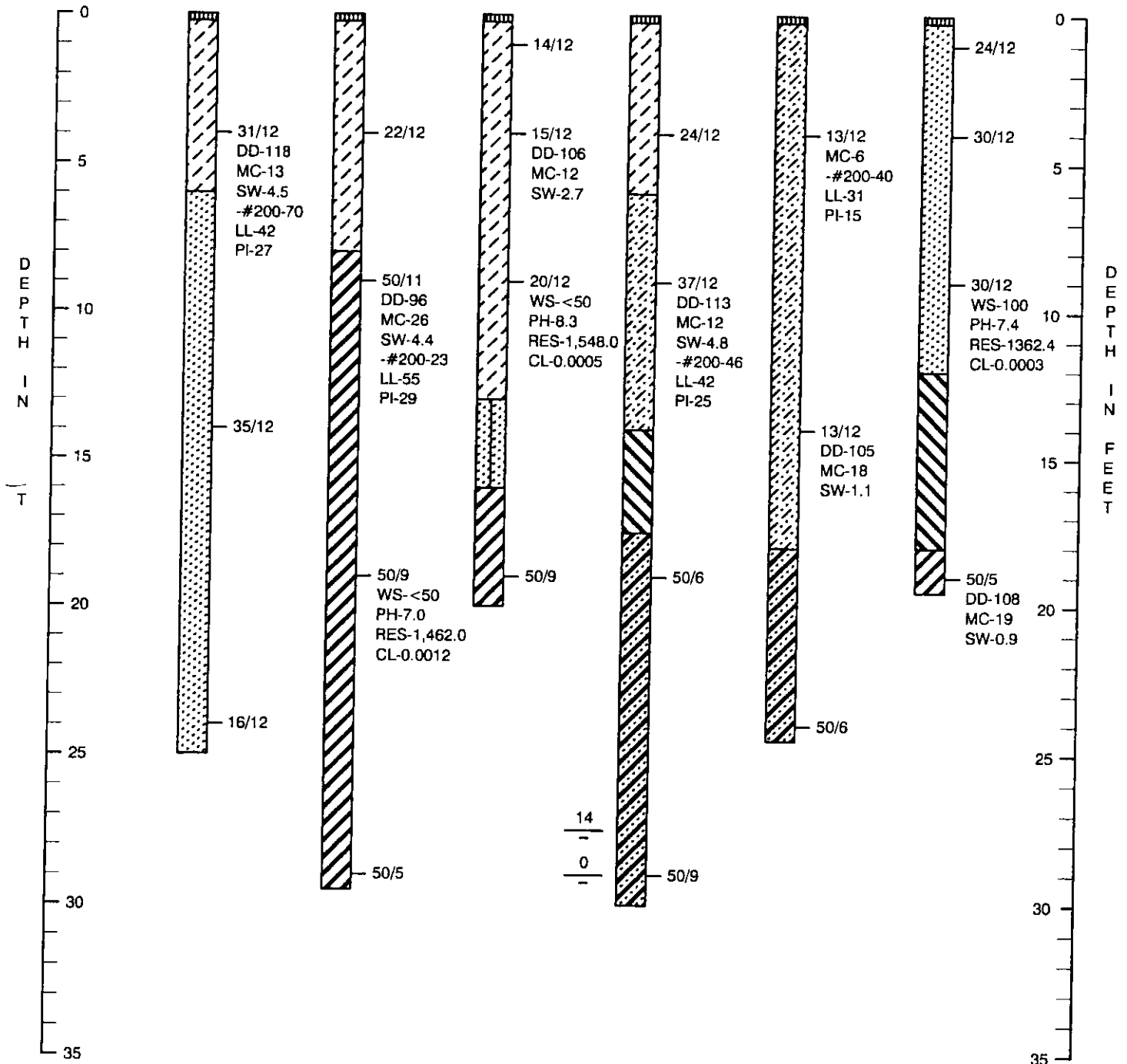
LOOKING POINT
NO. 32

LOOKING POINT
NO. 13

LOOKING POINT
NO. 30

LOOKING POINT
NO. 9

LOOKING POINT
NO. 34



SEE FIGURE 9 FOR LEGEND AND NOTES TO EXPLORATORY BORINGS

EXPLORATORY BORING LOG
FIGURE 3

TEST
BORING
NO. 7
ELEV. 6161

TEST
BORING
NO. 8
ELEV. 6111

TEST
BORING
NO. 9
ELEV. 6098

TEST
BORING
NO. 10
ELEV. 6102

TEST
BORING
NO. 11
ELEV. 6136

TEST
BORING
NO. 12
ELEV. 6109

LOOKING POINT
NO. 31

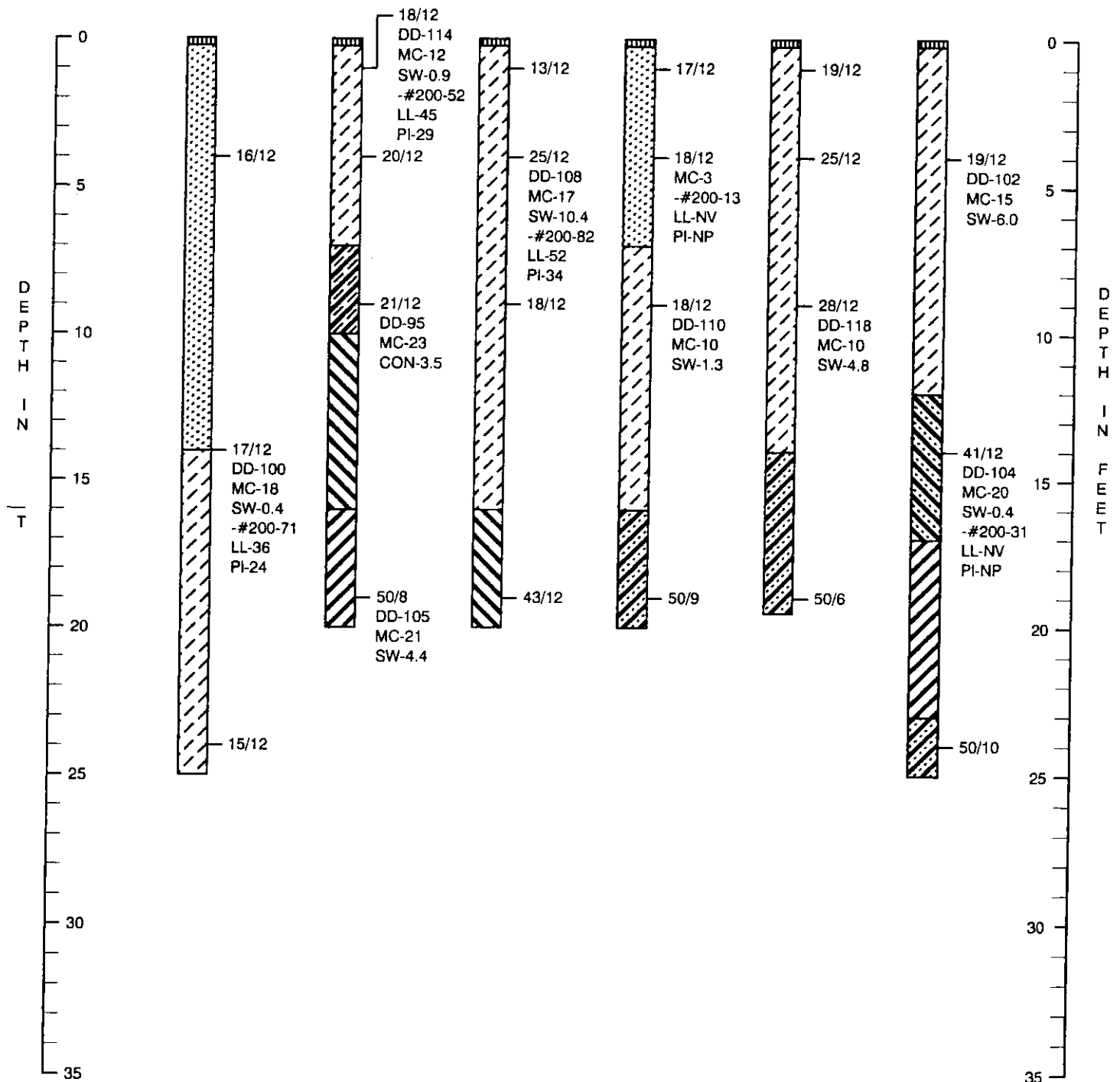
LOOKING POINT
NO. 26

LOOKING POINT
NO. 27

LOOKING POINT
NO. 5

LOOKING POINT
NO. 14

LOOKING POINT
NO. 10



SEE FIGURE 9 FOR LEGEND AND NOTES TO EXPLORATORY BORINGS

EXPLORATORY BORING LOG
FIGURE 4

TEST
BORING
NO. 13
ELEV. 6103

TEST
BORING
NO. 14
ELEV. 6120

TEST
BORING
NO. 15
ELEV. 6122

TEST
BORING
NO. 16
ELEV. 6121

TEST
BORING
NO. 17
ELEV. 6128

TEST
BORING
NO. 18
ELEV. 6134

LOOKING POINT
NO. 28

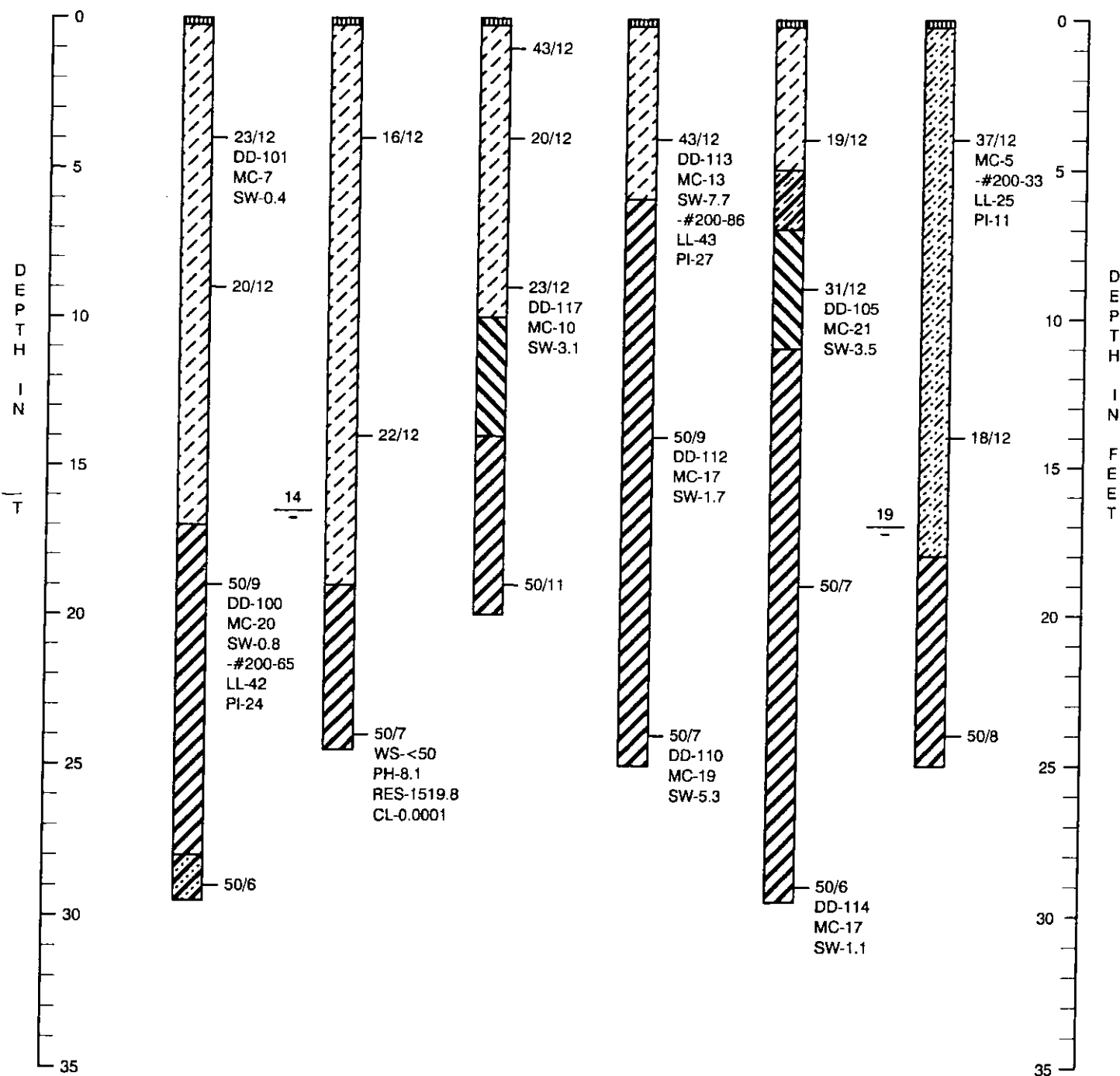
LOOKING POINT
NO. 2

LOOKING POINT
NO. 35

LOOKING POINT
NO. 6

LOOKING POINT
NO. 3

LOOKING POINT
NO. 29



SEE FIGURE 9 FOR LEGEND AND NOTES TO EXPLORATORY BORINGS

EXPLORATORY BORING LOG
FIGURE 5

TEST
BORING
NO. 19
ELEV. 6134

TEST
BORING
NO. 20
ELEV. 6150

TEST
BORING
NO. 21
ELEV. 6128

TEST
BORING
NO. 22
ELEV. 6127

TEST
BORING
NO. 23
ELEV. 6140

TEST
BORING
NO. 24
ELEV. 6139

LOOKING POINT
NO. 1

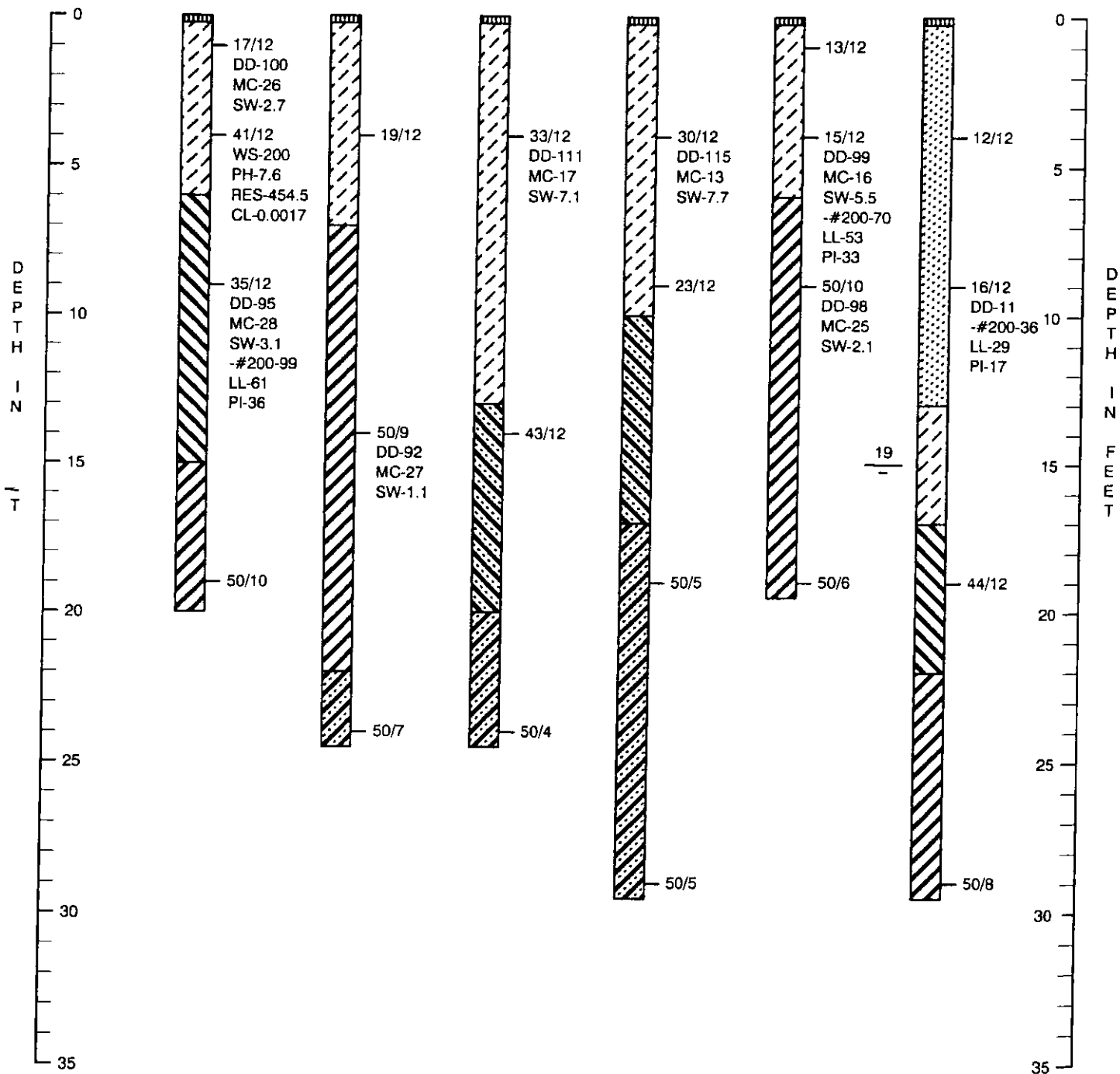
LOOKING POINT
NO. 16

LOOKING POINT
NO. 15

LOOKING POINT
NO. 11

LOOKING POINT
NO. 36

LOOKING POINT
NO. 4



SEE FIGURE 9 FOR LEGEND AND NOTES TO EXPLORATORY BORINGS

EXPLORATORY BORING LOG
FIGURE 6

TEST
BORING
NO. 25
ELEV. 6174

TEST
BORING
NO. 26
ELEV. 6154

TEST
BORING
NO. 27
ELEV. 6156

TEST
BORING
NO. 28
ELEV. 6154

TEST
BORING
NO. 29
ELEV. 6173

TEST
BORING
NO. 30
ELEV. 6174

LOOKING POINT
NO. 24

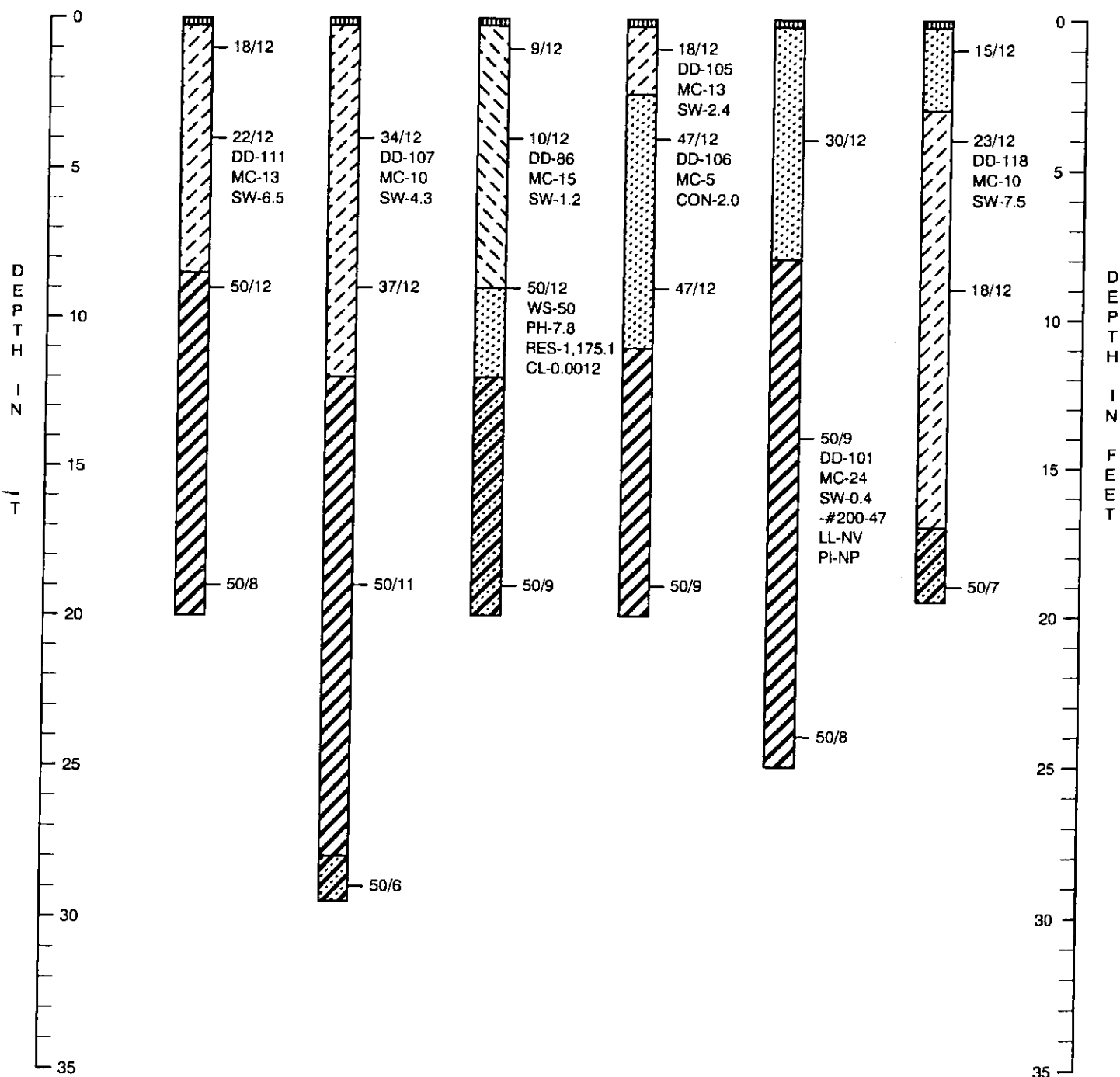
LOOKING POINT
NO. 38

LOOKING POINT
NO. 25

LOOKING POINT
NO. 7

LOOKING POINT
NO. 18

LOOKING POINT
NO. 17



SEE FIGURE 9 FOR LEGEND AND NOTES TO EXPLORATORY BORINGS

EXPLORATORY BORING LOG
FIGURE 7

TEST
BORING
NO. 31
ELEV. 6174

TEST
BORING
NO. 32
ELEV. 6189

TEST
BORING
NO. 33
ELEV. 6202

TEST
BORING
NO. 34
ELEV. 6226

TEST
BORING
NO. 35
ELEV. 6221

TEST
BORING
NO. 36
ELEV. 6239

LOOKING POINT
NO. 37

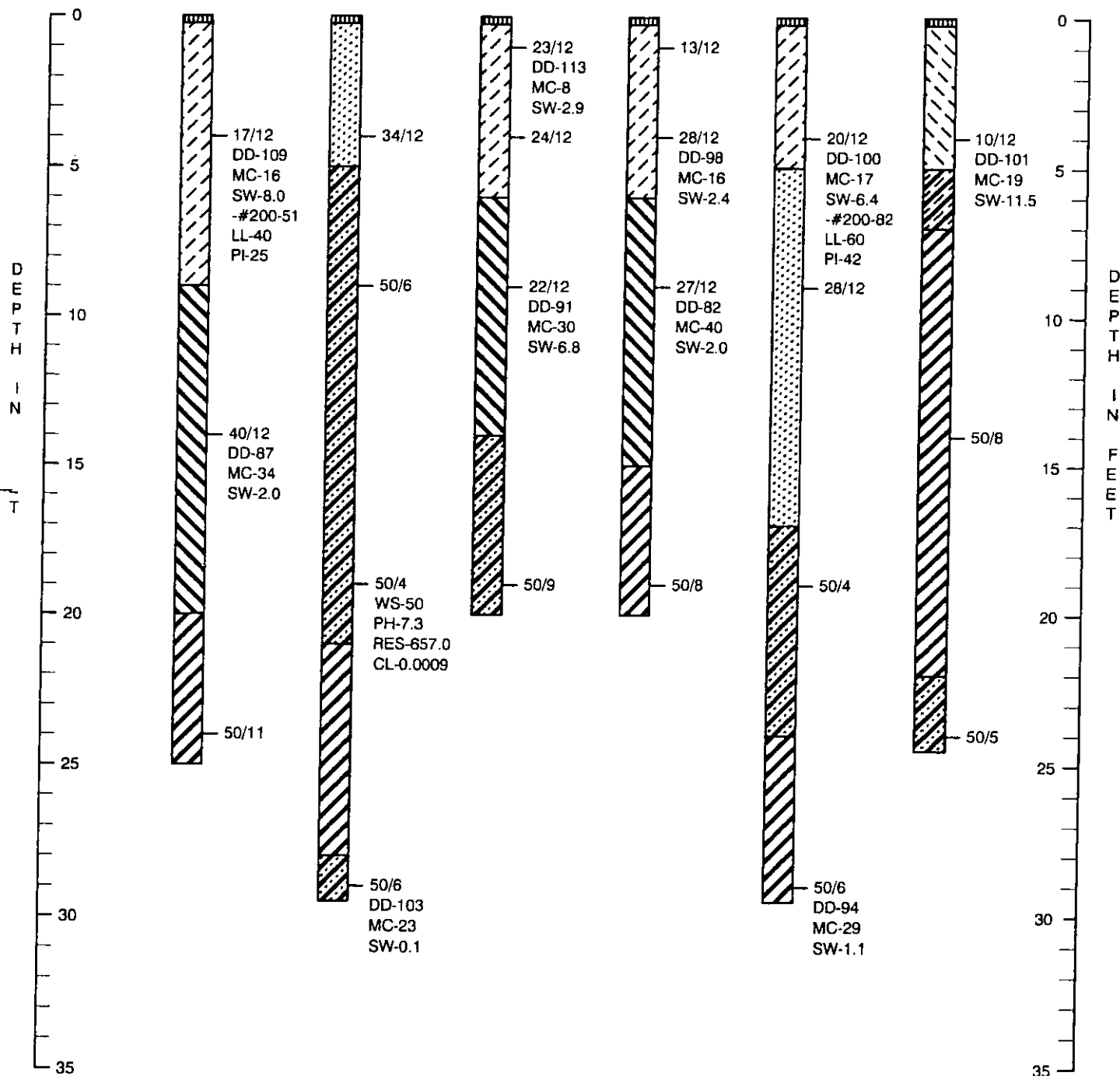
LOOKING POINT
NO. 8

LOOKING POINT
NO. 23

LOOKING POINT
NO. 21

LOOKING POINT
NO. 20

LOOKING POINT
NO. 19

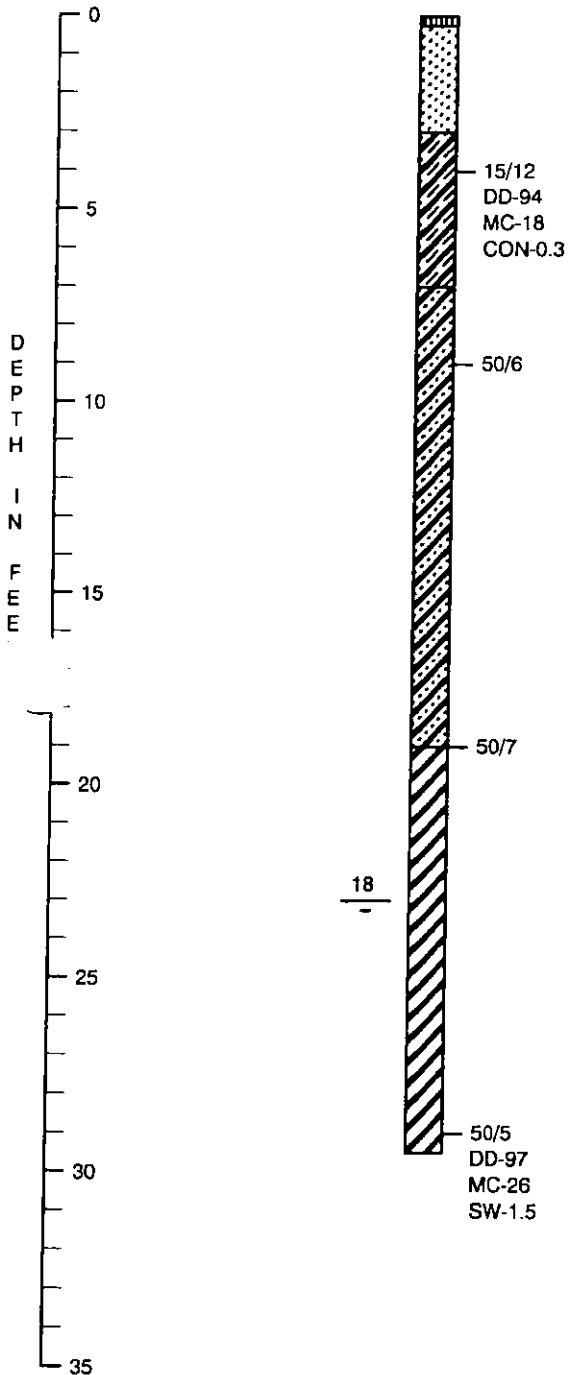


SEE FIGURE 9 FOR LEGEND AND NOTES TO EXPLORATORY BORINGS

EXPLORATORY BORING LOG
FIGURE 8

TEST
BORING
NO. 37
ELEV. 6200

LOOKING POINT
NO. 12



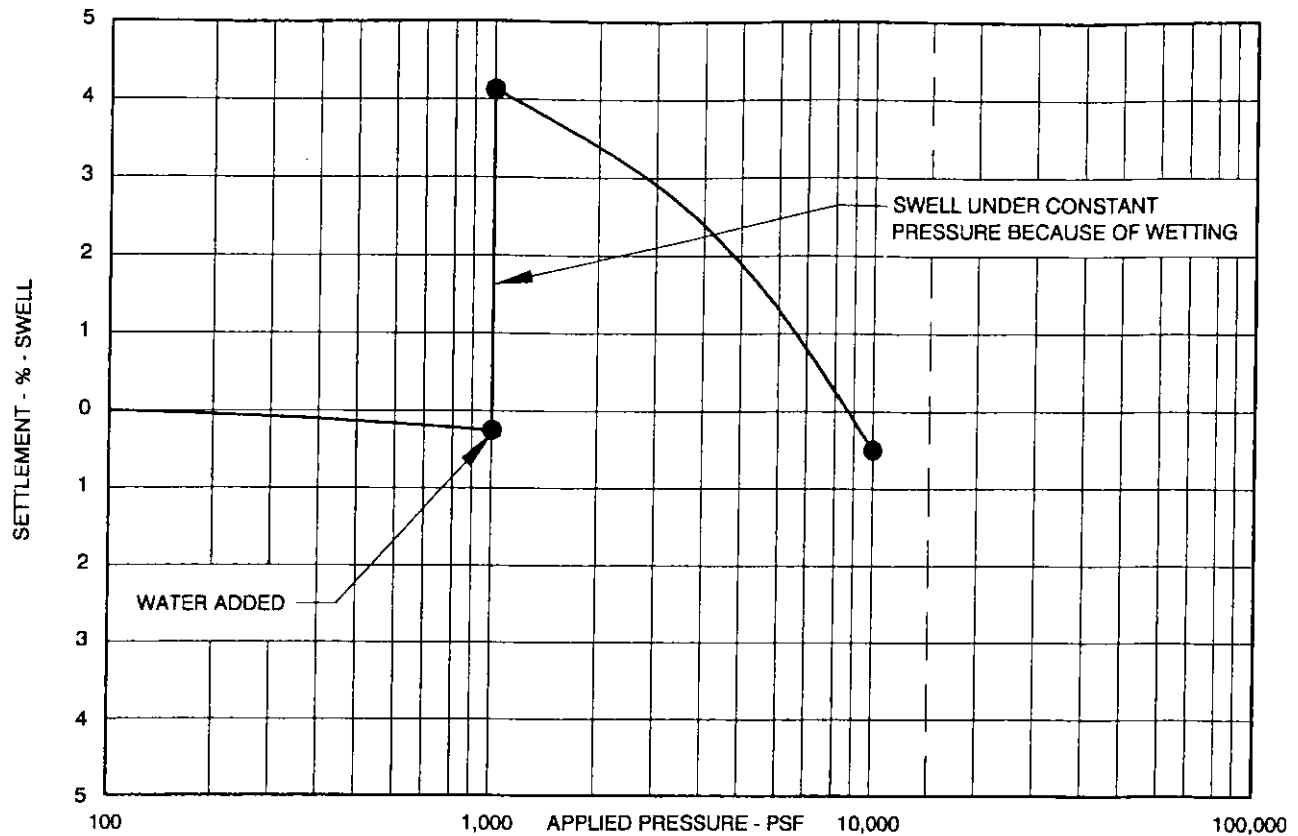
LIGHTLY MOIST TO MOIST, BROWN (CL)
LENSES, SOME CALCAREOUS, SLIGHTLY MOIST TO MOIST,
TO VERY STIFF, SILTY WITH SCATTERED SMALL GRAVEL, SLIGHTLY
LENSES, SCATTERED GRAVEL, SLIGHTLY MOIST, BROWN
SOME CLAYEY, SCATTERED GRAVEL, SLIGHTLY MOIST TO
SILTY, MOIST, BROWN TO GRAY
SANDSTONE LENSES, MOIST, IRON STAINED, GRAY TO BROWN
D, SILTY OR CLEAN TO CLAYEY, WITH CLAYSTONE LENSES, MOIST,
ANDSTONE LENSES, MOIST, IRON STAINING, OLIVE TO BROWN TO GRAY
SILTY OR CLEAN, WITH SOME CLAYSTONE LENSES,
CHES WERE REQUIRED TO DRIVE A 2.5-INCH OUTSIDE DIAMETER
OF DAYS AFTER DRILLING WHEN THE MEASUREMENT WAS TAKEN.

OF SOIL
ON WETTING.
PSF UPON WETTING

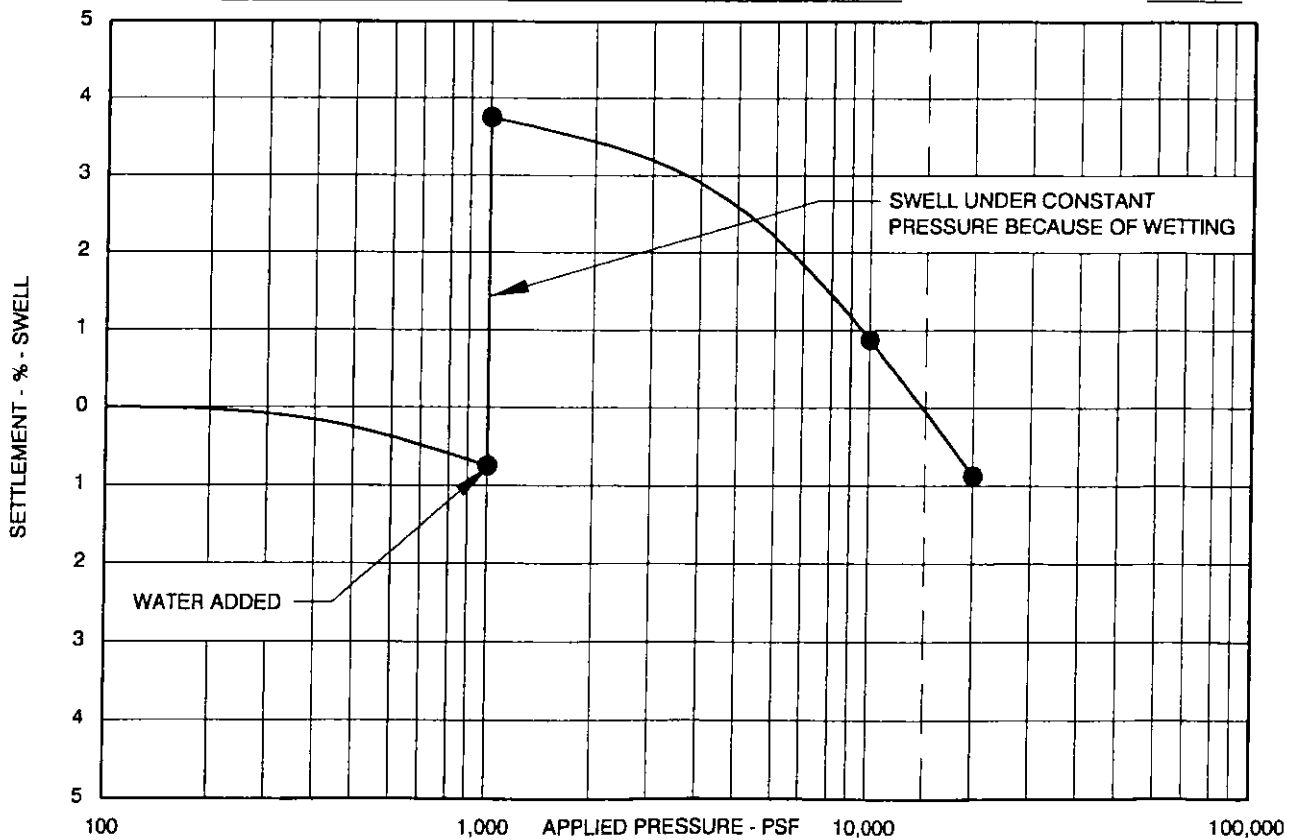
DIAMETER, CONTINUOUS FLIGHT POWER

WERE ROUNDED TO THE NEAREST FOOT.
TERIALS AND REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN
XPLANATIONS, AND CONCLUSIONS OF THIS REPORT.

 A. G. WASSenaar, INC. GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS	
LOGS OF EXPLORATORY BORINGS	PROJECT NO. 72607 FIGURE 9

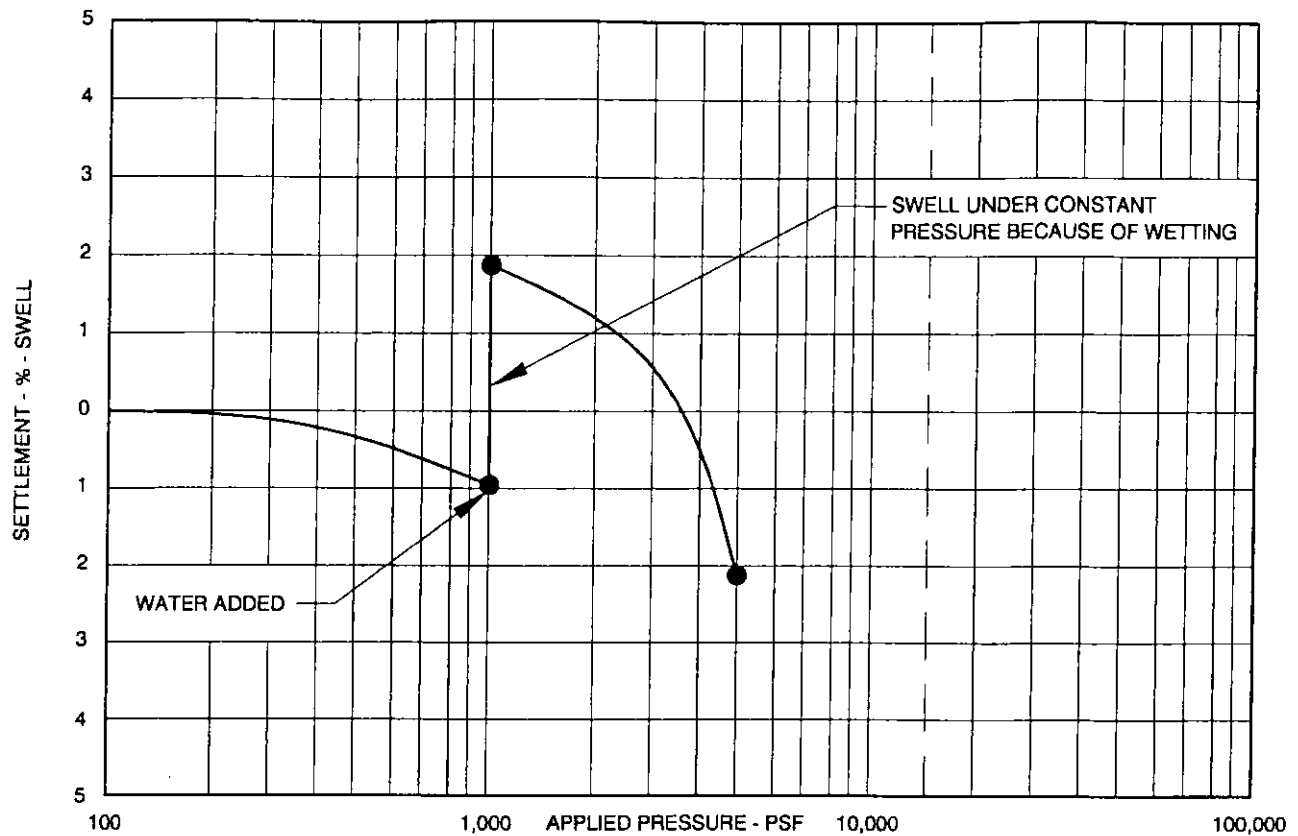


SAMPLE DESCRIPTION CLAY, SANDY DRY UNIT WT. 118 PCF
LOCATION TEST BORING NO. 1 @ DEPTH OF 4.0' MOISTURE CONTENT 13 %



SAMPLE DESCRIPTION CLAYSTONE DRY UNIT WT. 96 PCF
LOCATION TEST BORING NO. 2 @ DEPTH OF 9.0' MOISTURE CONTENT 26 %

SETTLEMENT - SWELL TEST RESULTS

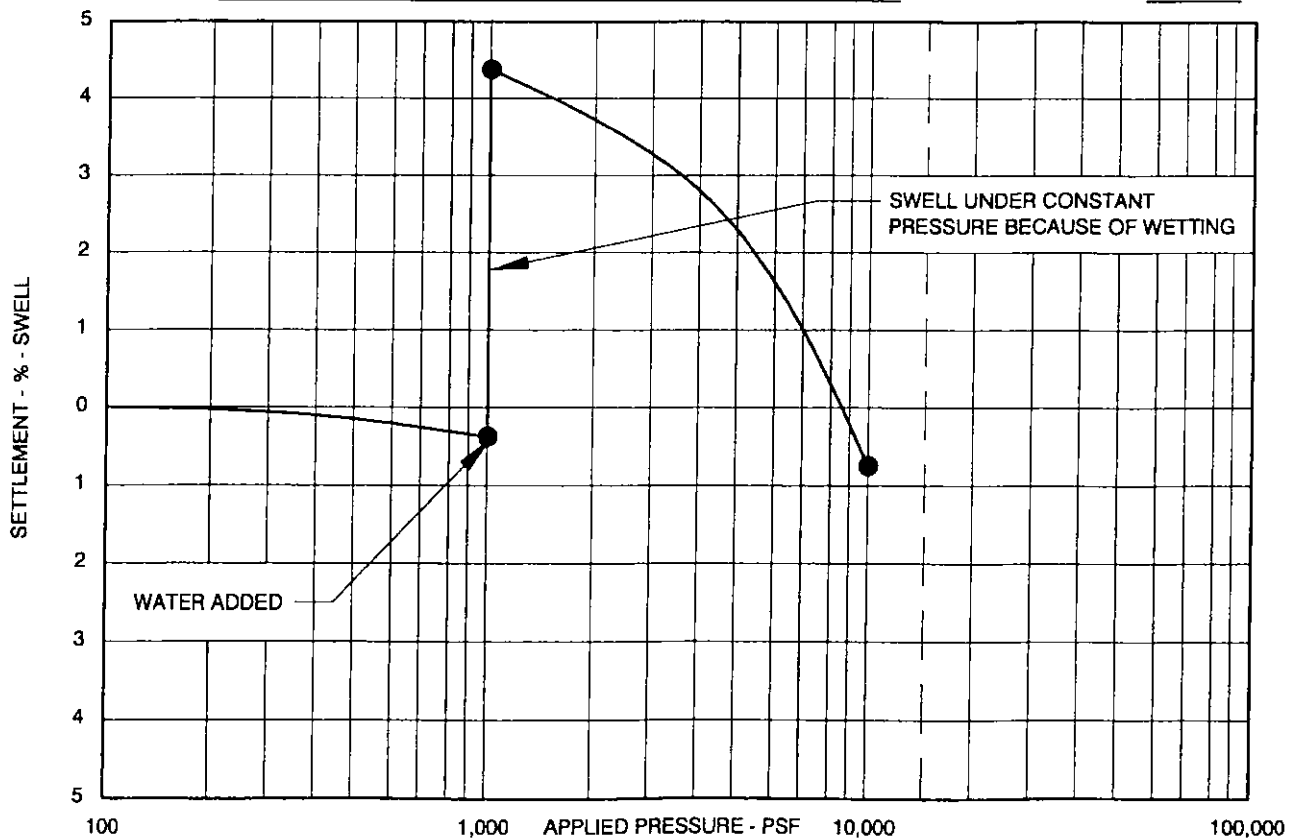


SAMPLE DESCRIPTION CLAY, SANDY

DRY UNIT WT. 106 PCF

LOCATION TEST BORING NO. 3 @ DEPTH OF 4.0'

MOISTURE CONTENT 12 %



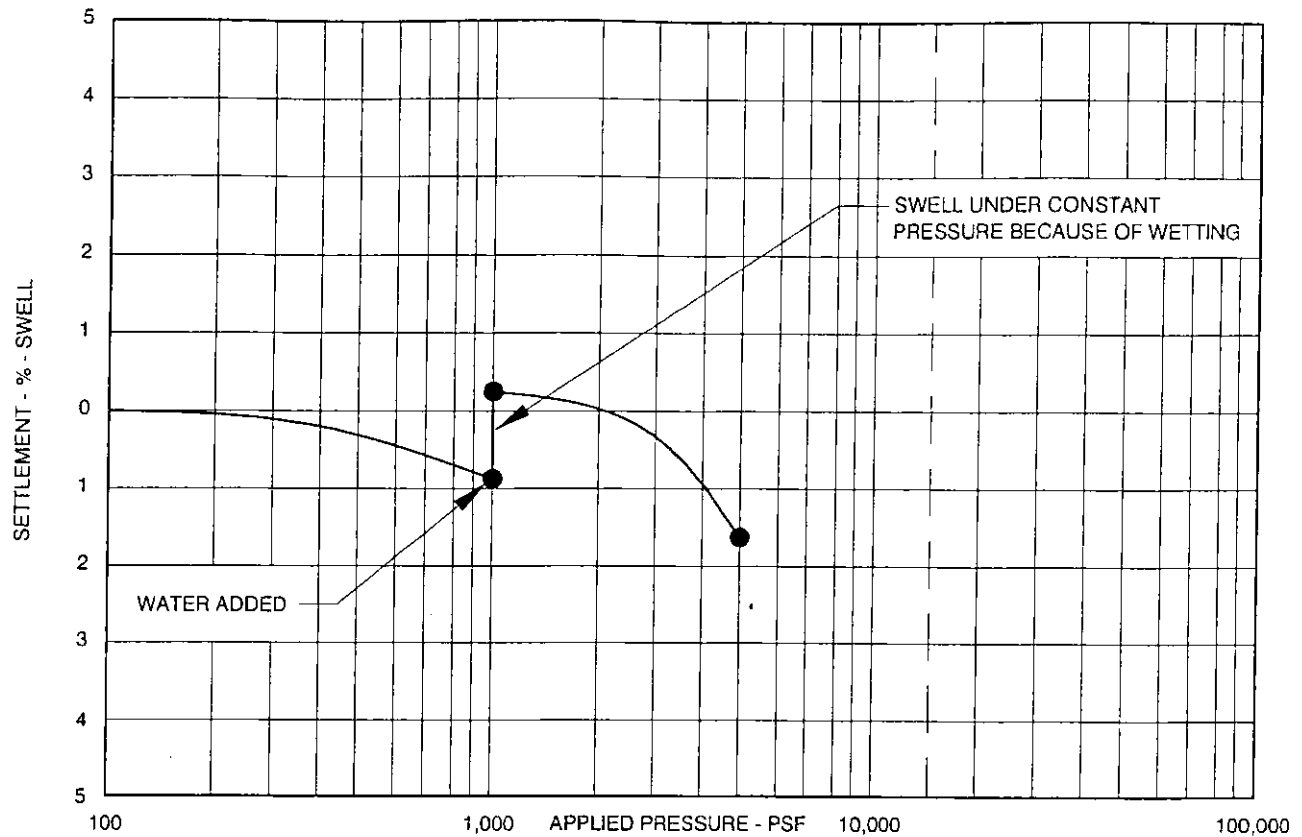
SAMPLE DESCRIPTION CLAY, VERY SANDY, SLIGHTLY GRAVELLY

DRY UNIT WT. 113 PCF

LOCATION TEST BORING NO. 4 @ DEPTH OF 9.0'

MOISTURE CONTENT 12 %

SETTLEMENT - SWELL TEST RESULTS

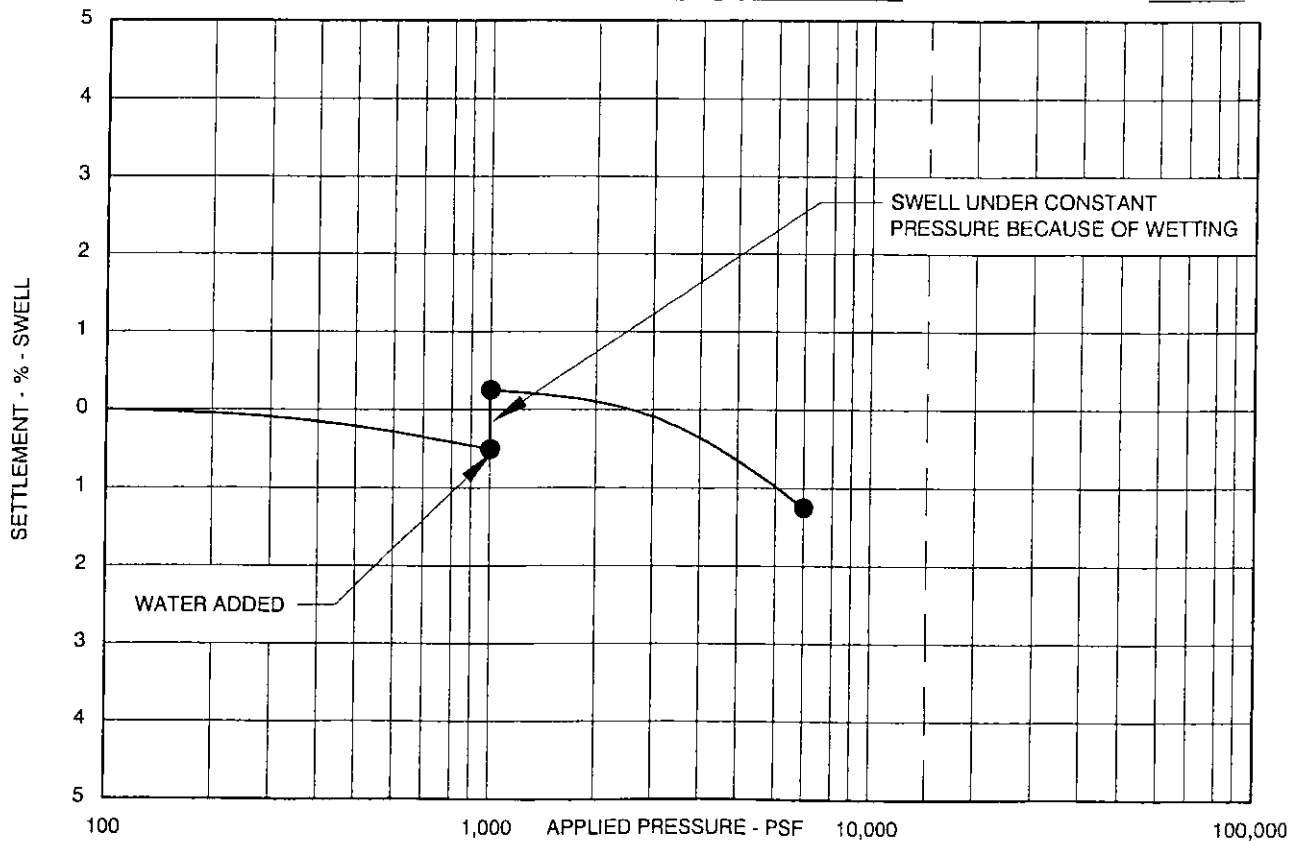


SAMPLE DESCRIPTION SAND, VERY CLAYEY

DRY UNIT WT. 105 PCF

LOCATION TEST BORING NO. 5 @ DEPTH OF 14.0'

MOISTURE CONTENT 18 %



SAMPLE DESCRIPTION CLAYSTONE

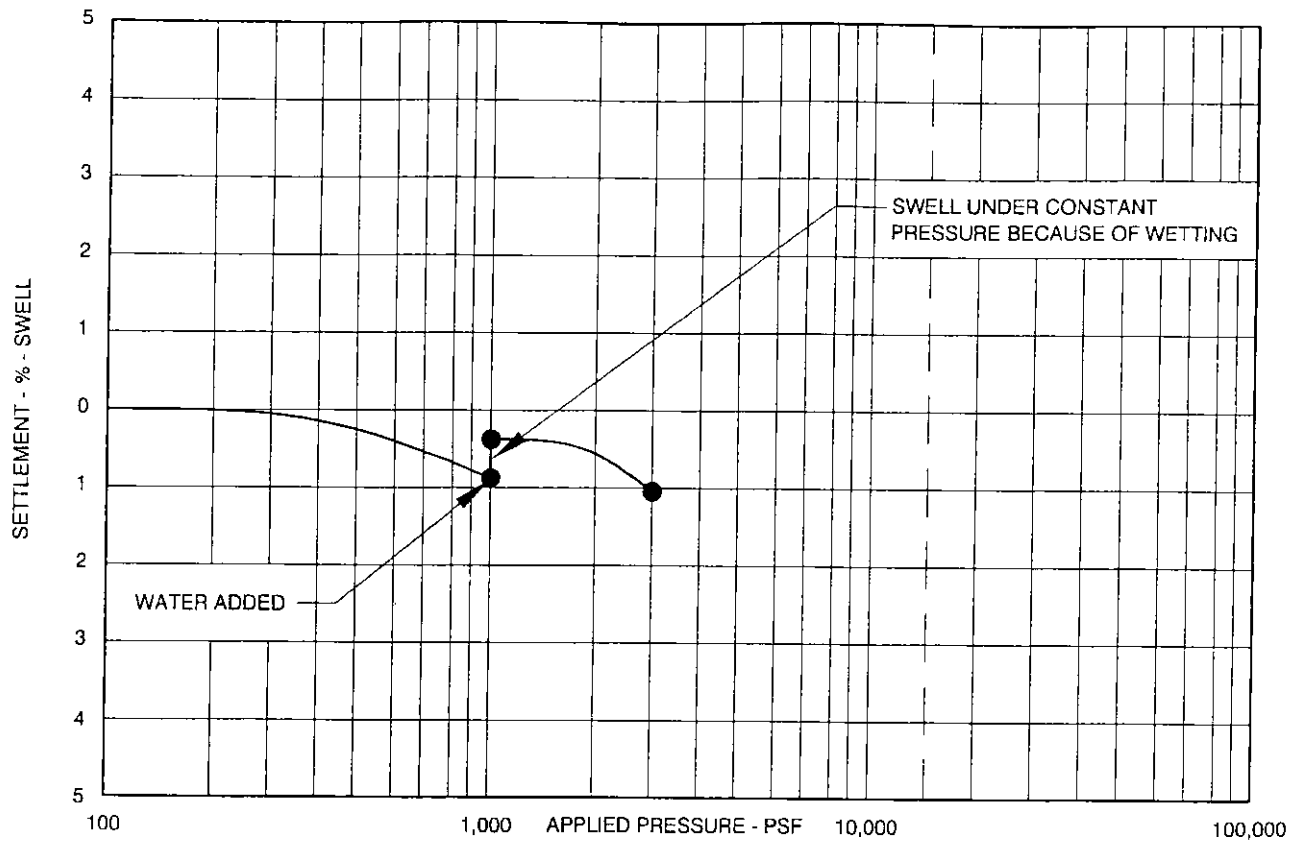
DRY UNIT WT. 108 PCF

LOCATION TEST BORING NO. 6 @ DEPTH OF 19.0'

MOISTURE CONTENT 75 %

SETTLEMENT - SWELL TEST RESULTS

FIGURE 12

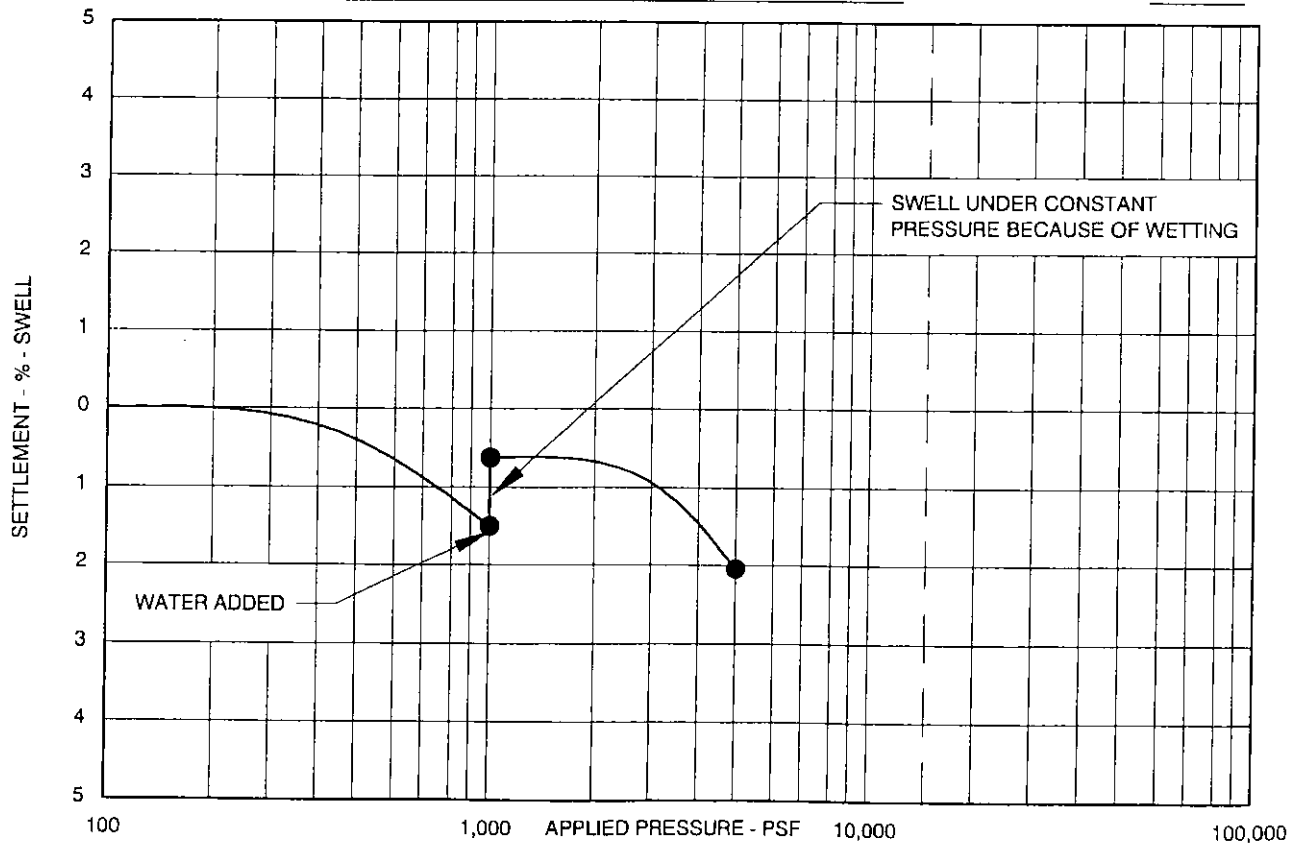


SAMPLE DESCRIPTION CLAY, SANDY

DRY UNIT WT. 100 PCF

LOCATION TEST BORING NO. 7 @ DEPTH OF 14.0'

MOISTURE CONTENT 18 %



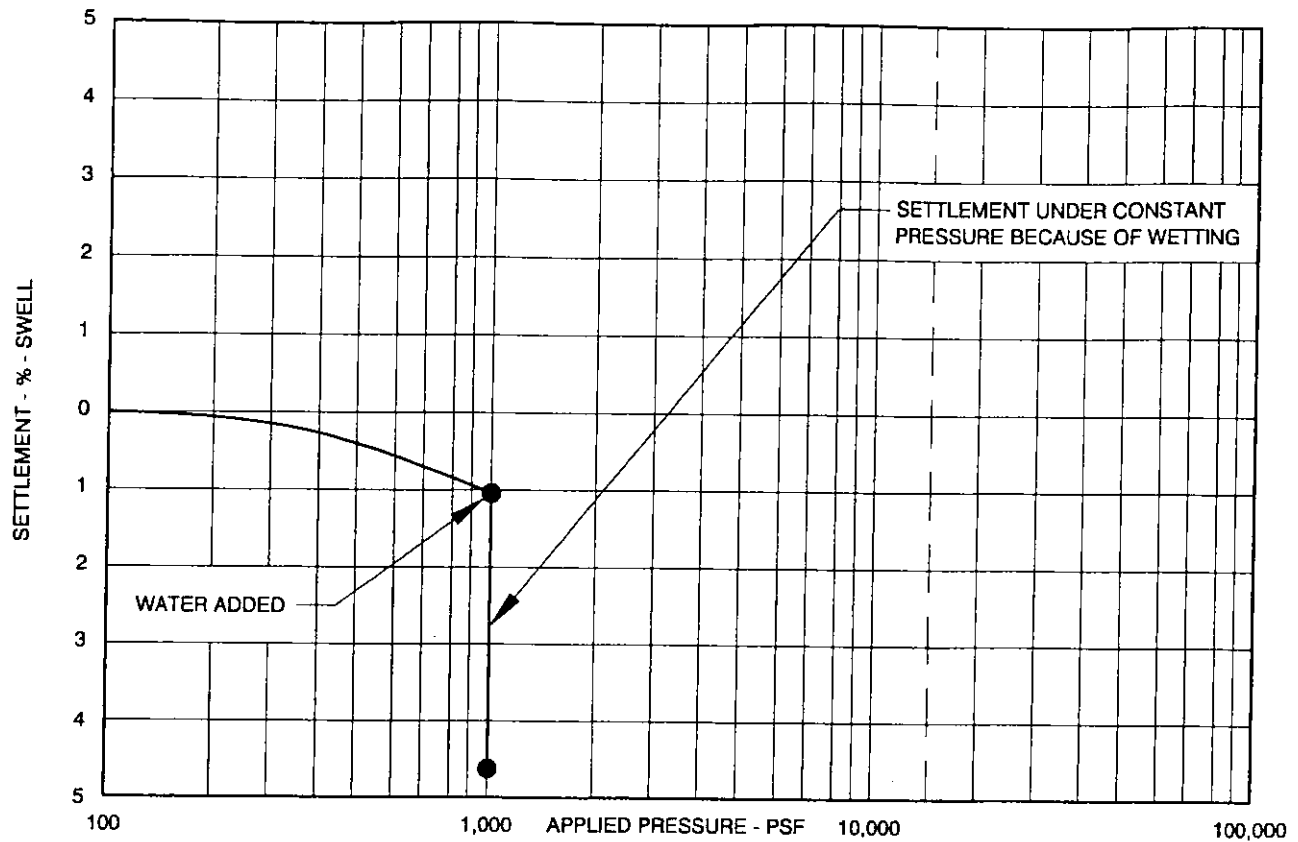
SAMPLE DESCRIPTION CLAY, VERY SANDY

DRY UNIT WT. 114 PCF

LOCATION TEST BORING NO. 8 @ DEPTH OF 4.0'

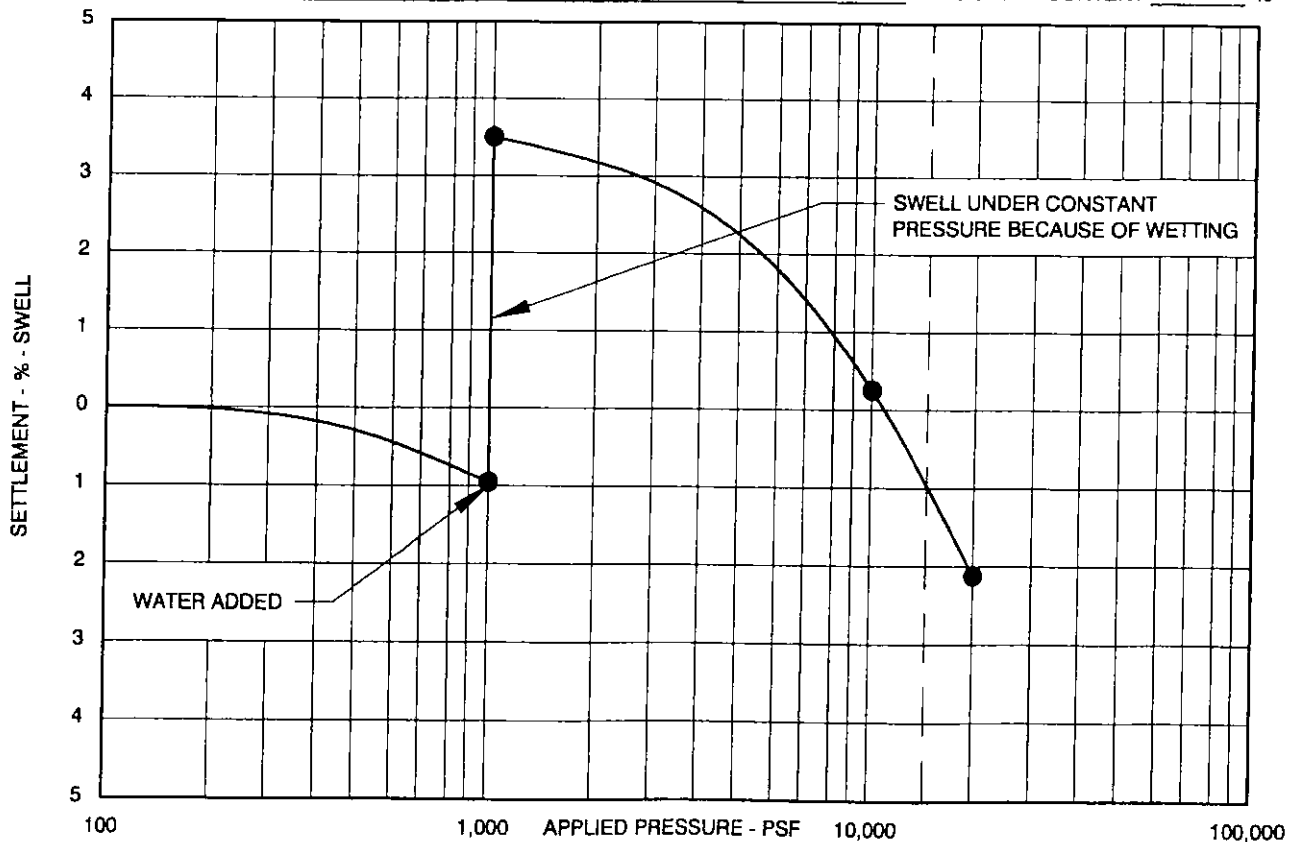
MOISTURE CONTENT 12 %

SETTLEMENT - SWELL TEST RESULTS



SAMPLE DESCRIPTION WEATHERED CLAYSTONE, VERY SANDY
LOCATION TEST BORING NO. 8 @ DEPTH OF 9.0'

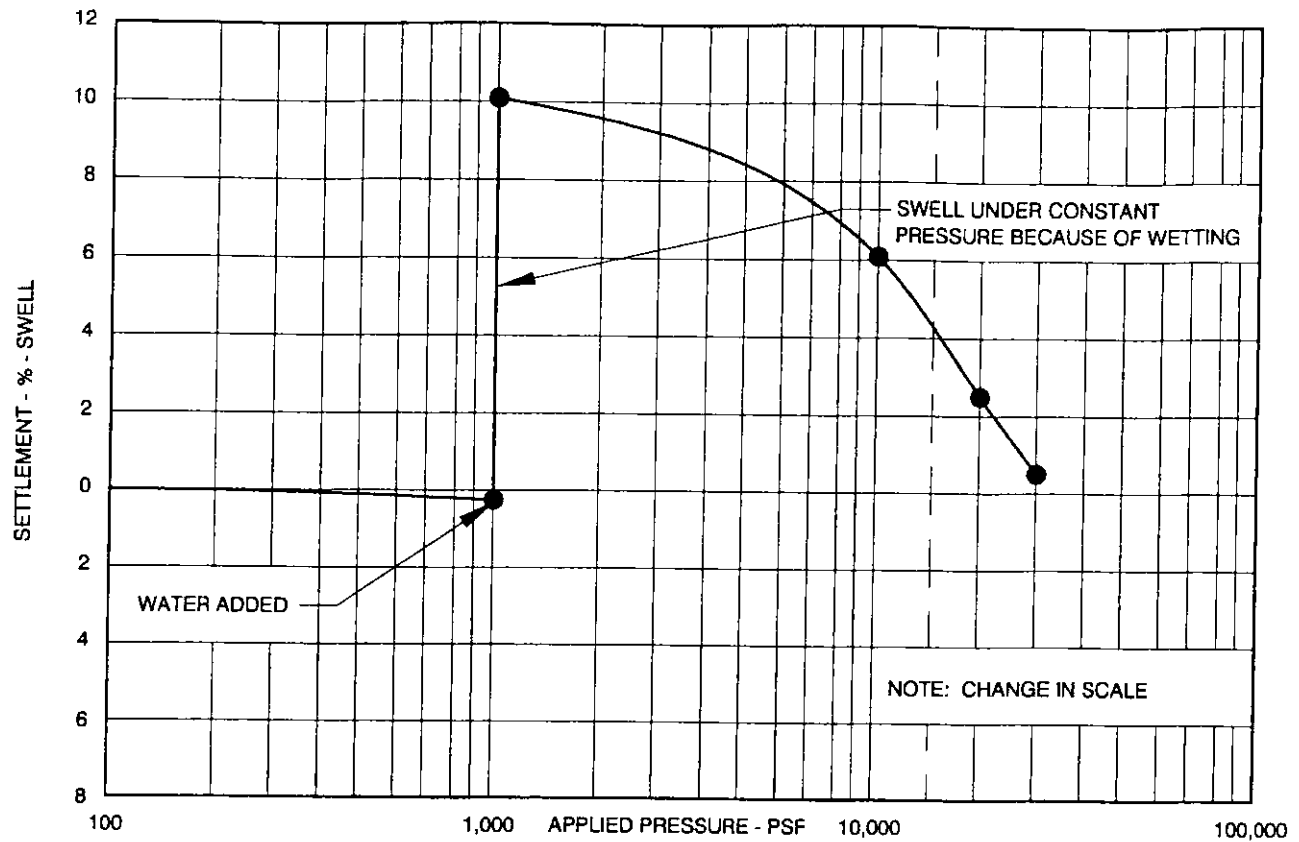
DRY UNIT WT. 95 PCF
MOISTURE CONTENT 23 %



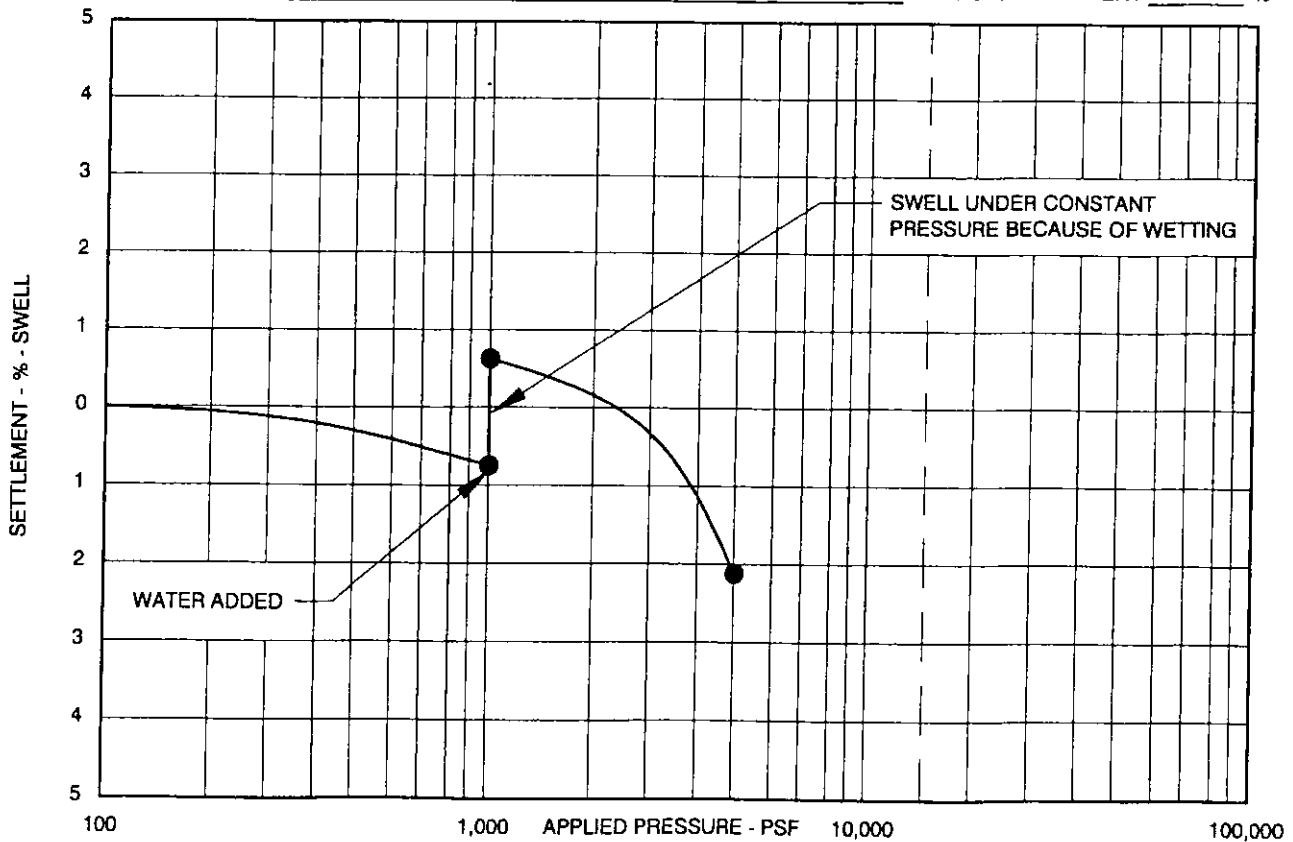
SAMPLE DESCRIPTION CLAYSTONE
LOCATION TEST BORING NO. 8 @ DEPTH OF 19.0'

DRY UNIT WT. 105 PCF
MOISTURE CONTENT 21 %

SETTLEMENT - SWELL TEST RESULTS

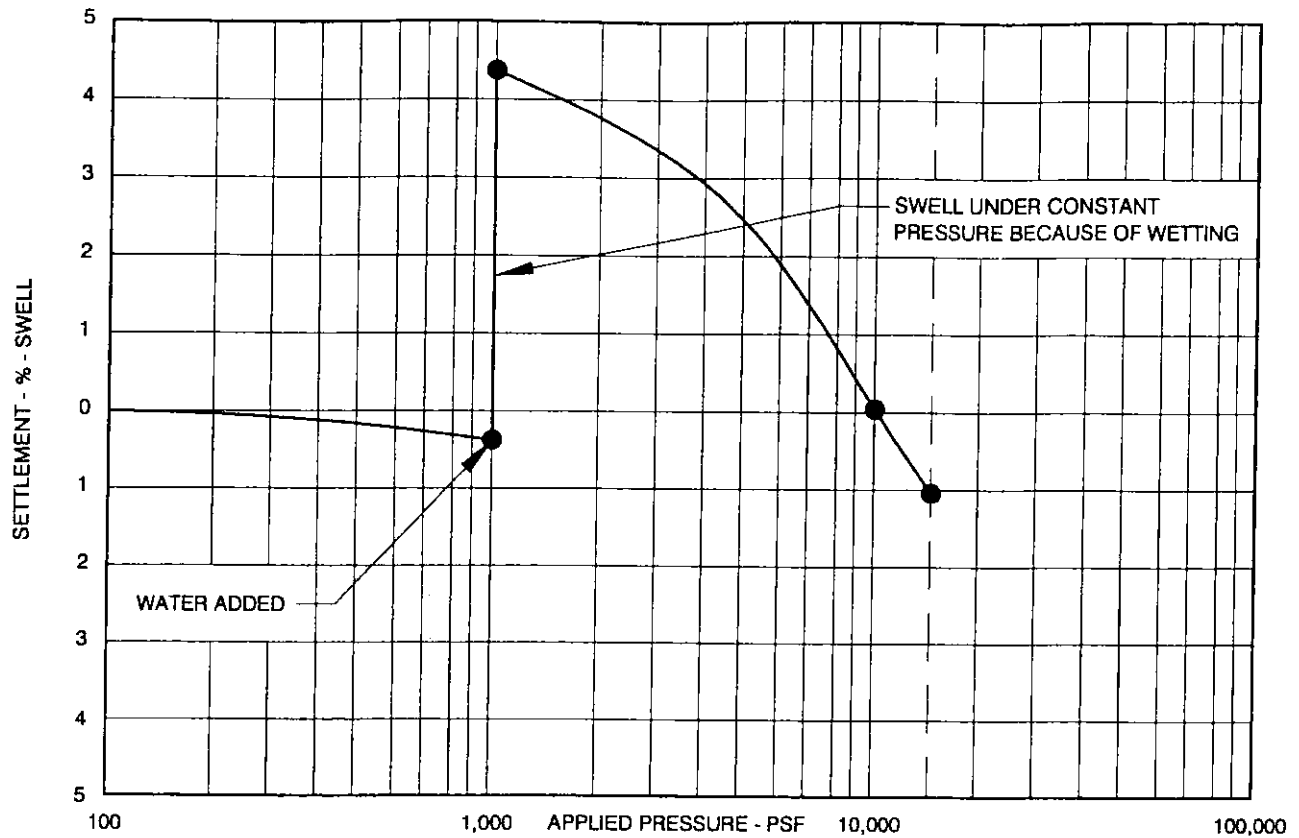


SAMPLE DESCRIPTION CLAY, SANDY DRY UNIT WT. 108 PCF
LOCATION TEST BORING NO. 9 @ DEPTH OF 4.0' MOISTURE CONTENT 17 %



SAMPLE DESCRIPTION CLAY, VERY SANDY DRY UNIT WT. 110 PCF
LOCATION TEST BORING NO. 10 @ DEPTH OF 9.0' MOISTURE CONTENT 10 %

SETTLEMENT - SWELL TEST RESULTS

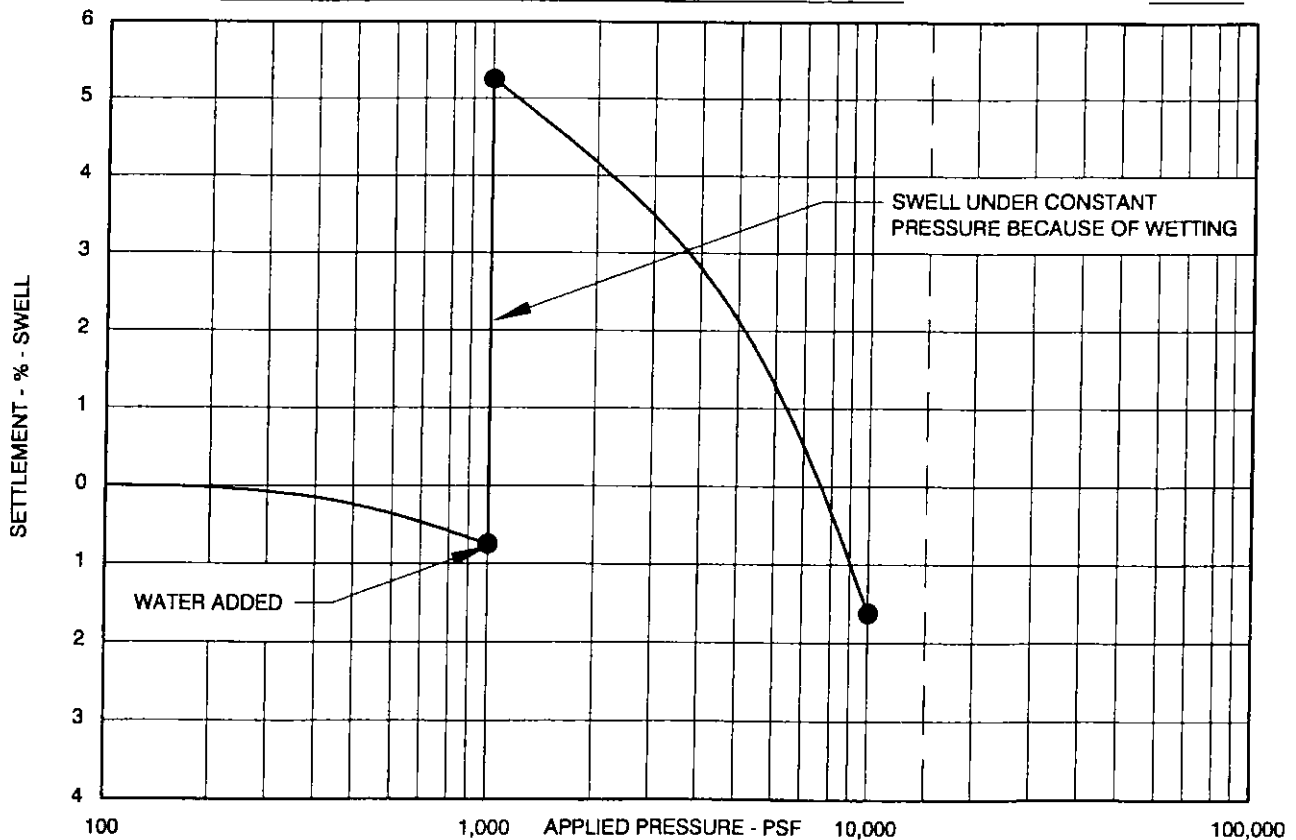


SAMPLE DESCRIPTION CLAY, SANDY

DRY UNIT WT. 118 PCF

LOCATION TEST BORING NO. 11 @ DEPTH OF 9.0'

MOISTURE CONTENT 10 %



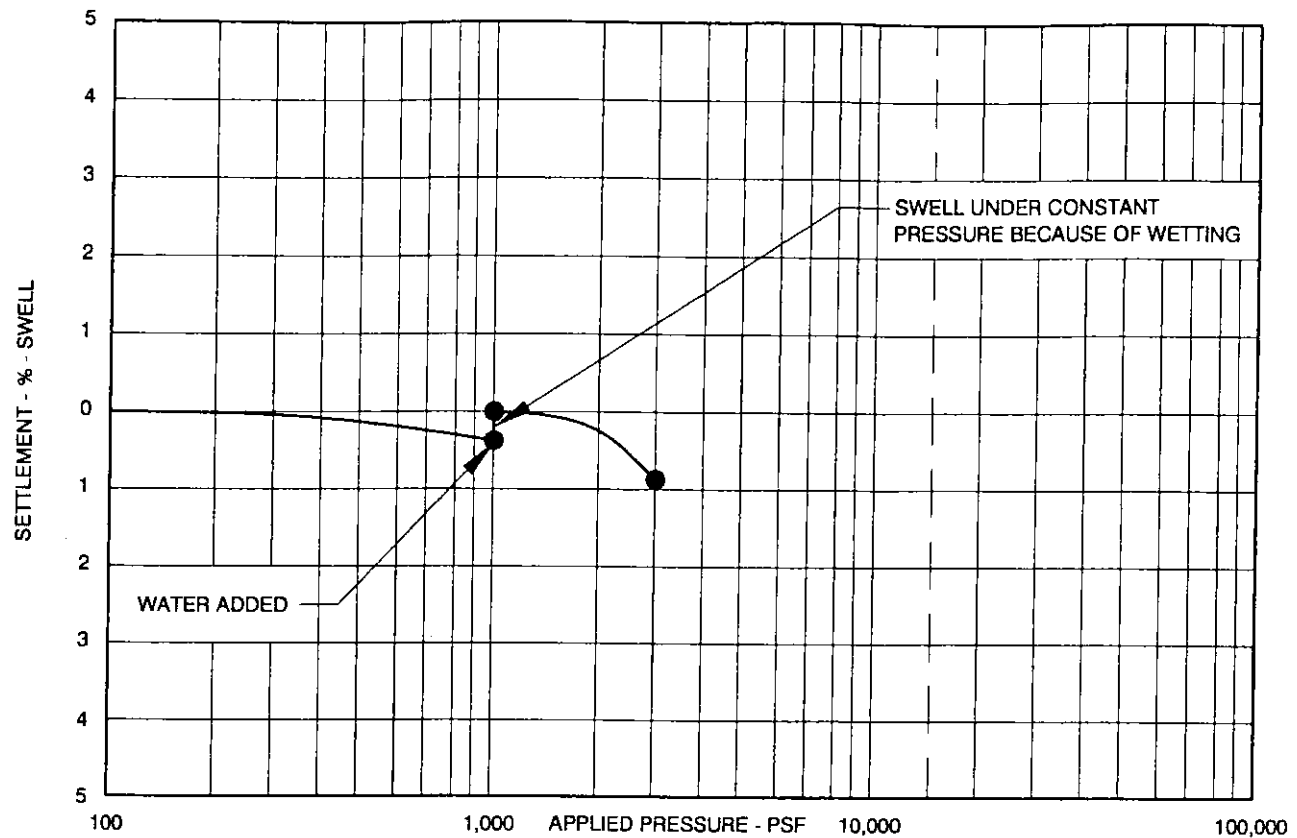
SAMPLE DESCRIPTION CLAY, SANDY

DRY UNIT WT. 108 PCF

LOCATION TEST BORING NO. 12 @ DEPTH OF 4.0'

MOISTURE CONTENT 15 %

SETTLEMENT - SWELL TEST RESULTS

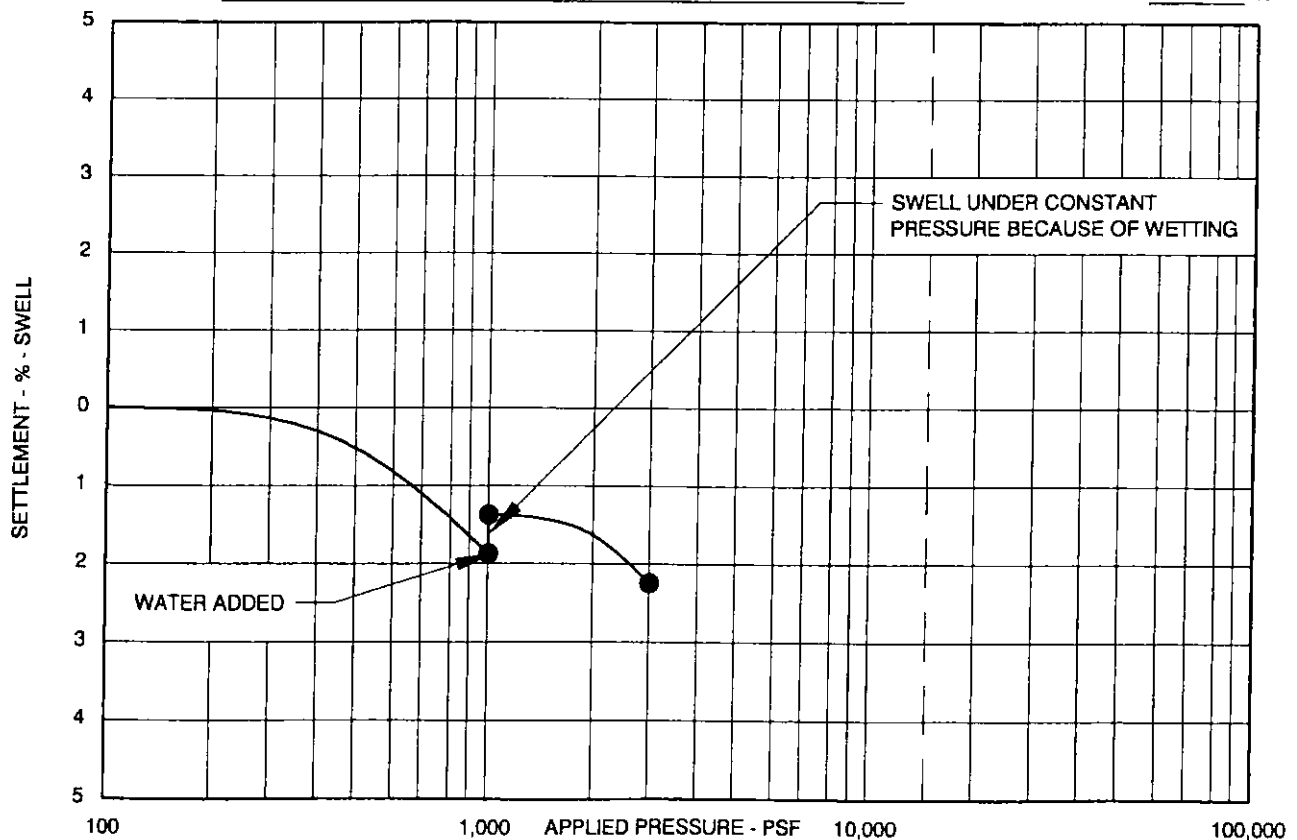


SAMPLE DESCRIPTION SANDSTONE, VERY SILTY

DRY UNIT WT. 104 PCF

LOCATION TEST BORING NO. 12 @ DEPTH OF 14.0'

MOISTURE CONTENT 20 %



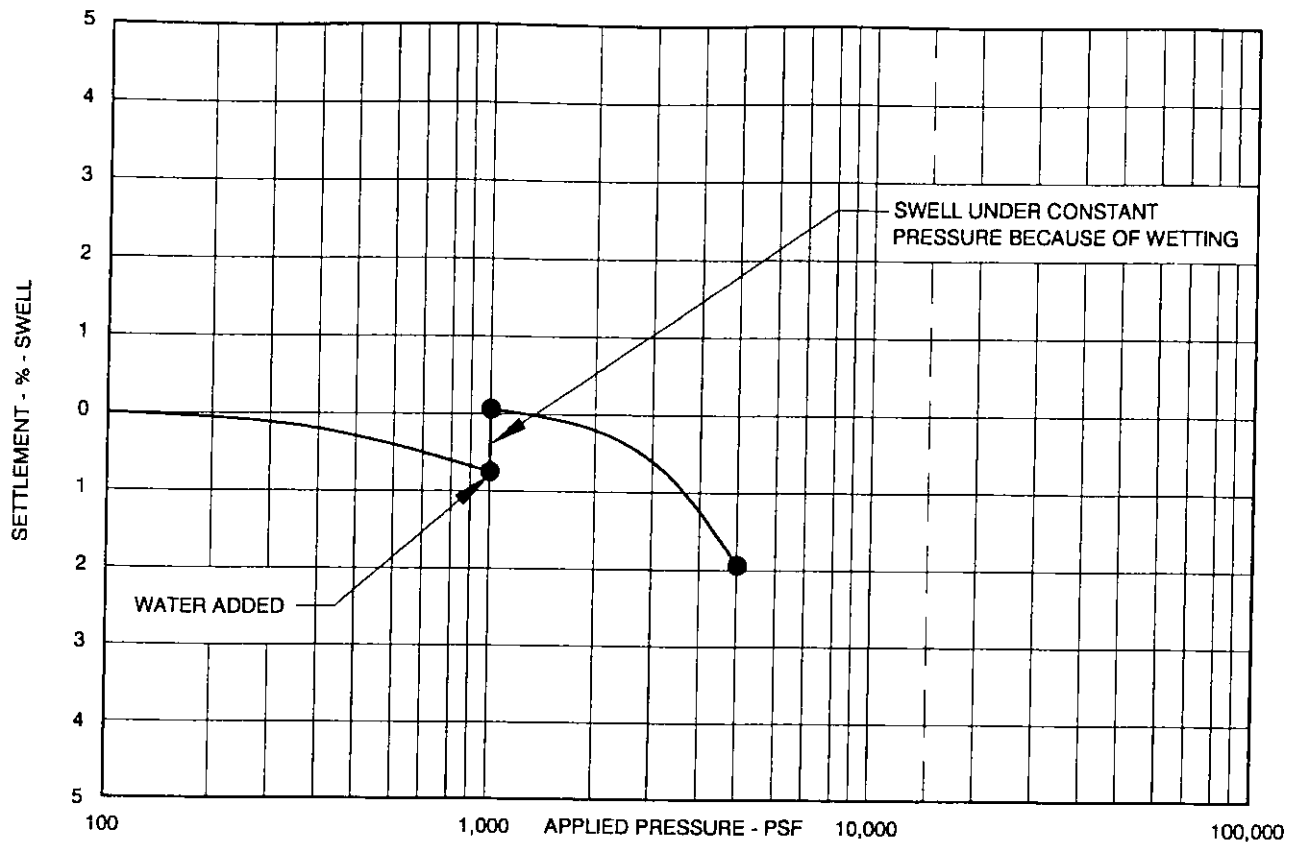
SAMPLE DESCRIPTION CLAY, SANDY

DRY UNIT WT. 101 PCF

LOCATION TEST BORING NO. 13 @ DEPTH OF 4.0'

MOISTURE CONTENT 7 %

SETTLEMENT - SWELL TEST RESULTS

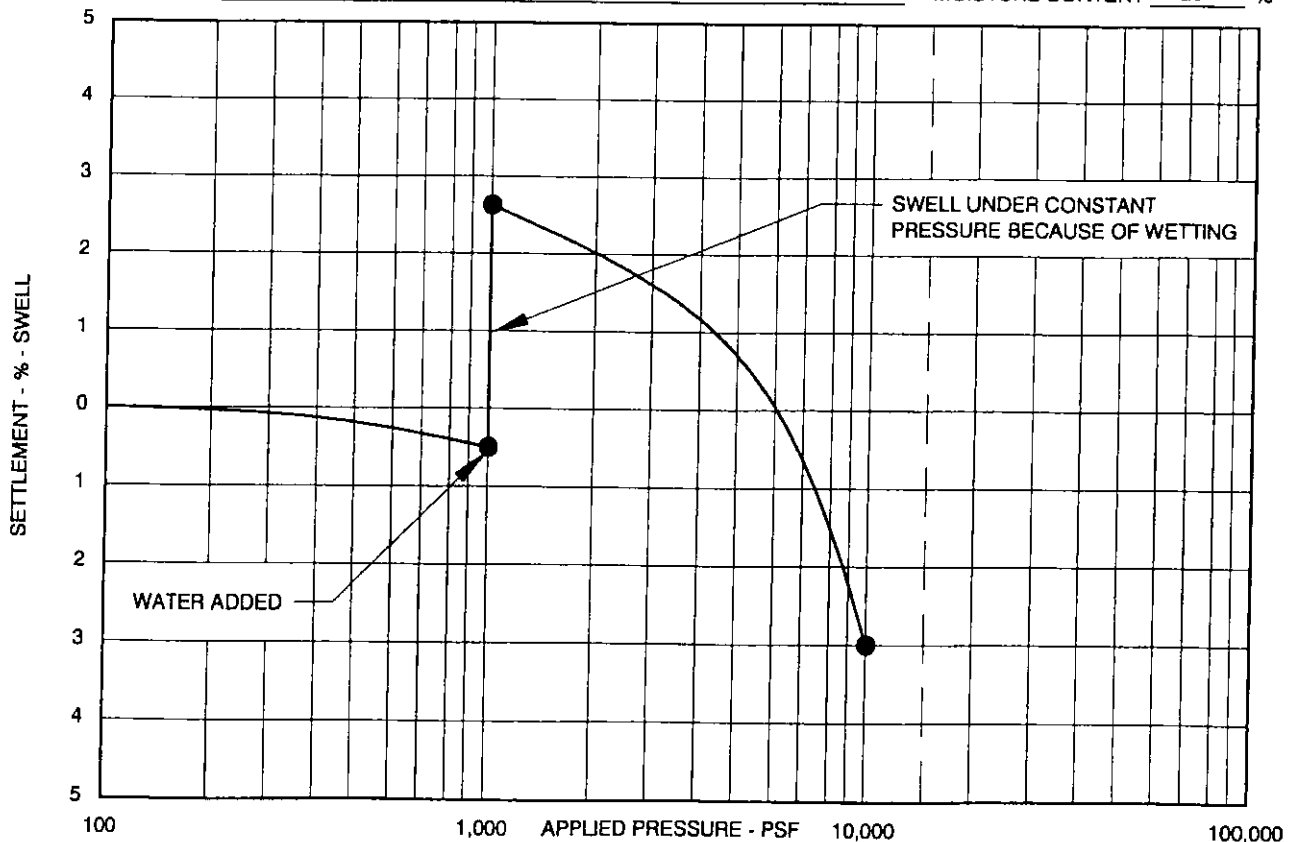


SAMPLE DESCRIPTION CLAYSTONE, VERY SANDY

DRY UNIT WT. 100 PCF

LOCATION TEST BORING NO. 13 @ DEPTH OF 19.0'

MOISTURE CONTENT 20 %



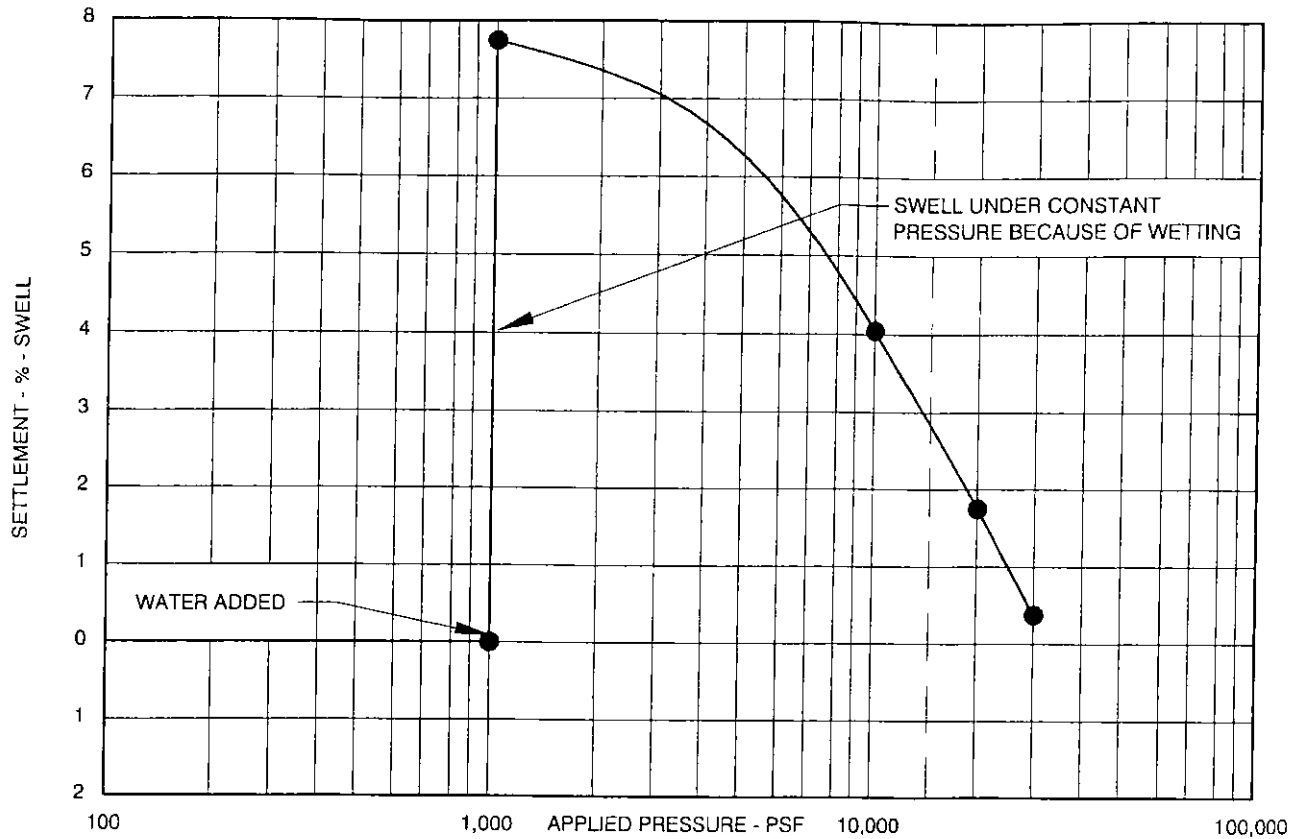
SAMPLE DESCRIPTION CLAY, SANDY

DRY UNIT WT. 117 PCF

LOCATION TEST BORING NO. 15 @ DEPTH OF 9.0'

MOISTURE CONTENT 10 %

SETTLEMENT - SWELL TEST RESULTS

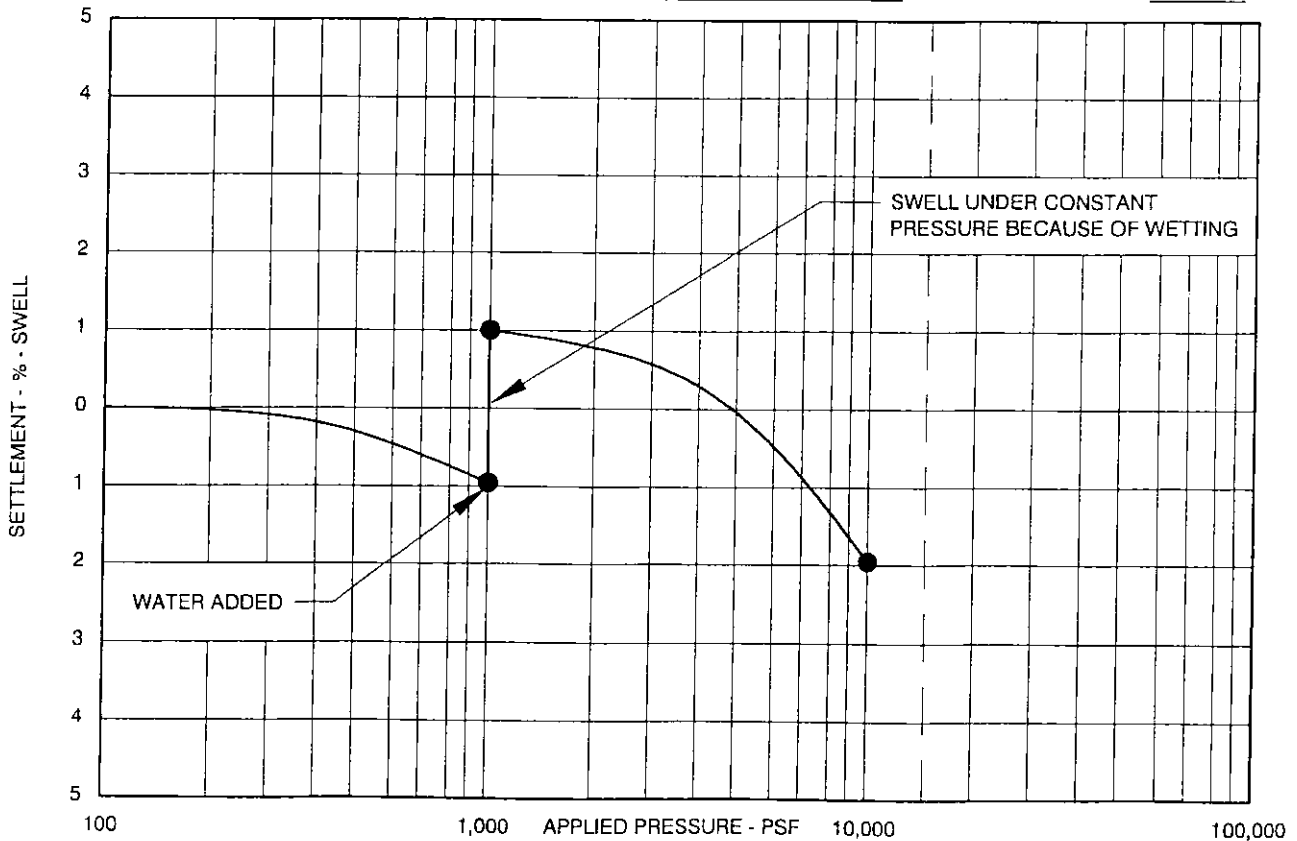


SAMPLE DESCRIPTION CLAY, SANDY

LOCATION TEST BORING NO. 16 @ DEPTH OF 4.0'

DRY UNIT WT. 113 PCF

MOISTURE CONTENT 13 %



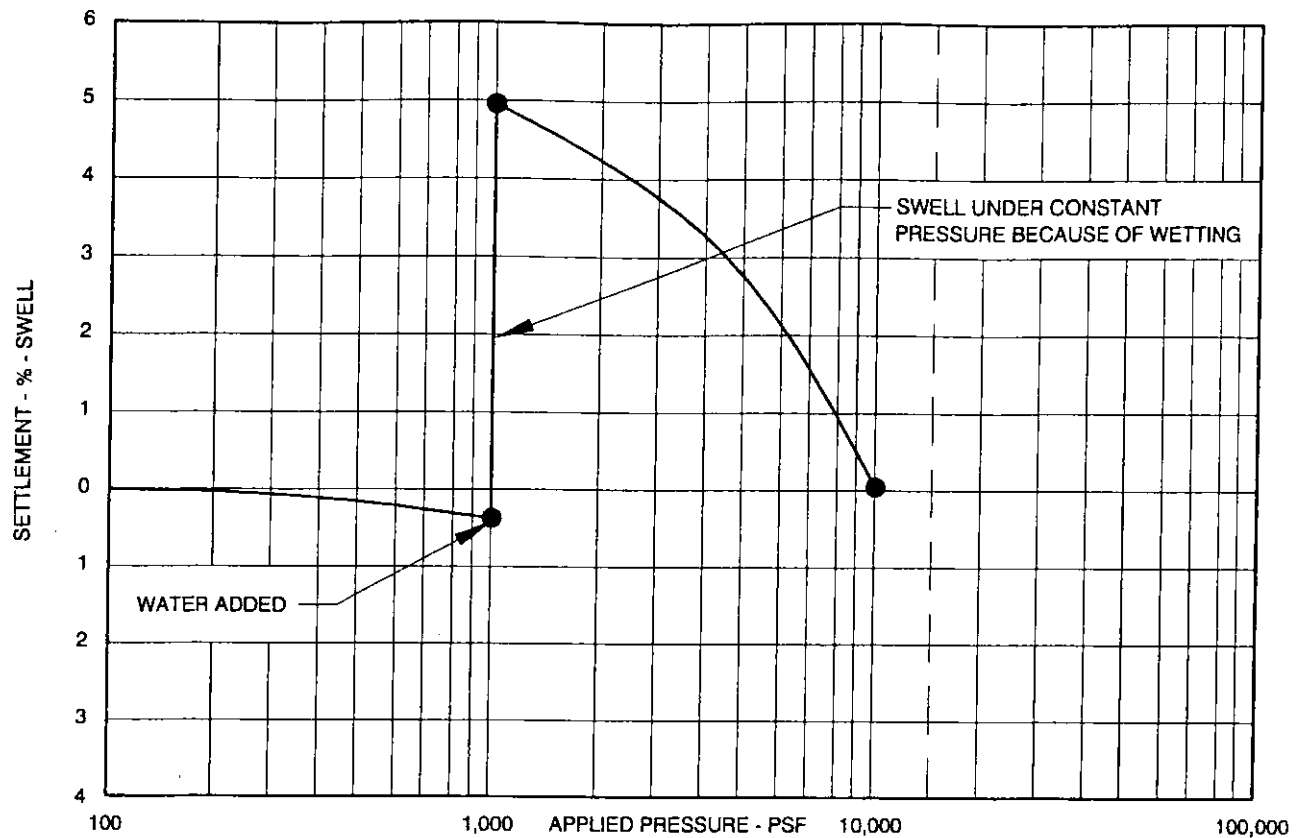
SAMPLE DESCRIPTION CLAYSTONE

LOCATION TEST BORING NO. 16 @ DEPTH OF 14.0'

DRY UNIT WT. 112 PCF

MOISTURE CONTENT 17 %

SETTLEMENT - SWELL TEST RESULTS

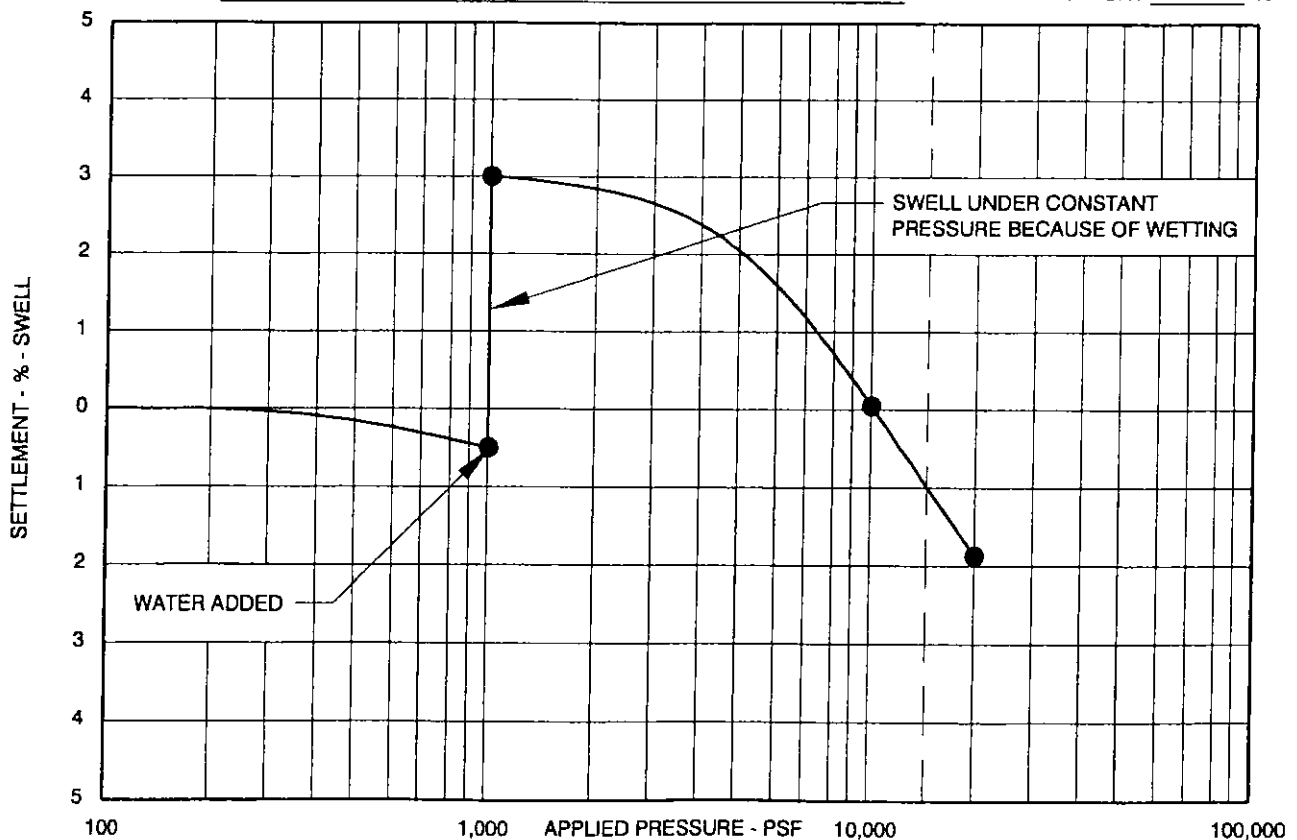


SAMPLE DESCRIPTION CLAYSTONE

DRY UNIT WT. 110 PCF

LOCATION TEST BORING NO. 16 @ DEPTH OF 24.0'

MOISTURE CONTENT 19 %



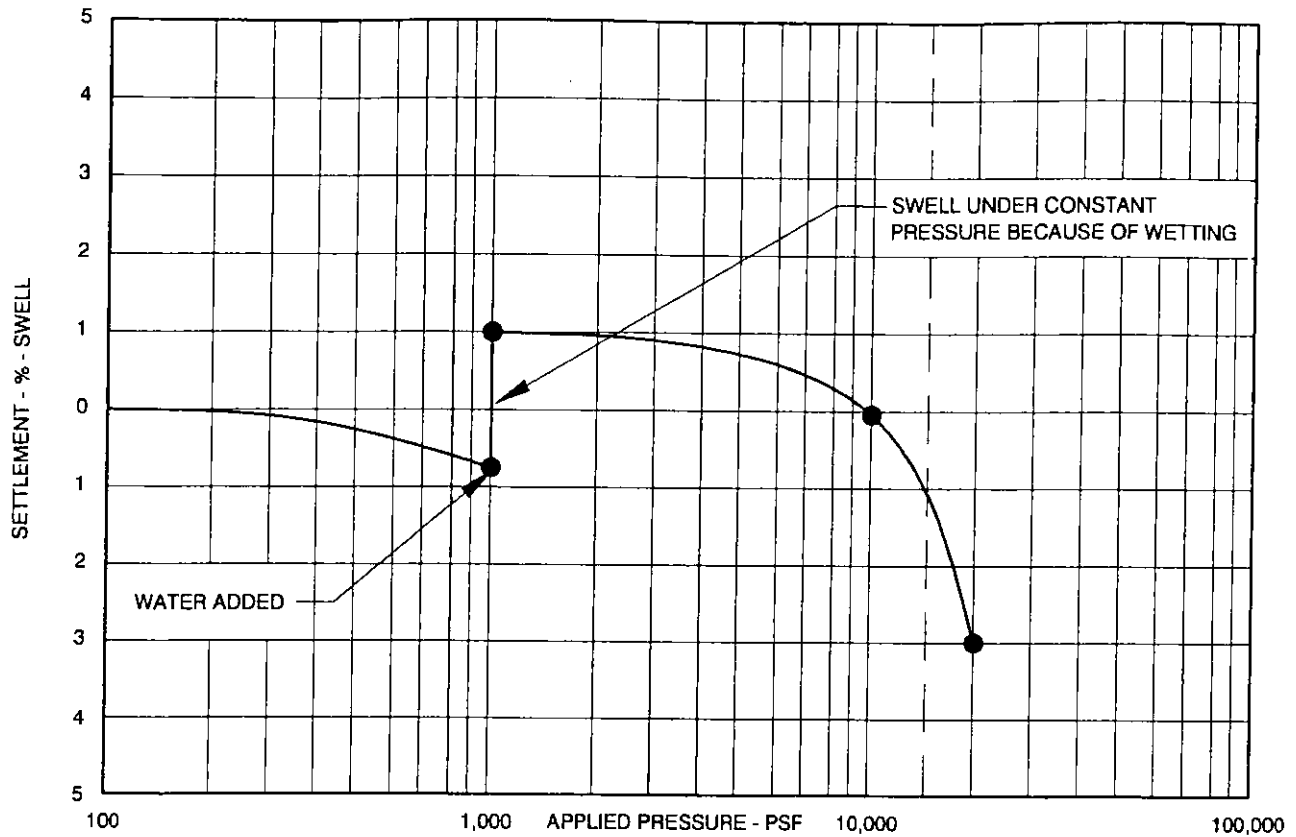
SAMPLE DESCRIPTION CLAYSTONE

DRY UNIT WT. 105 PCF

LOCATION TEST BORING NO. 17 @ DEPTH OF 9.0'

MOISTURE CONTENT 21 %

SETTLEMENT - SWELL TEST RESULTS

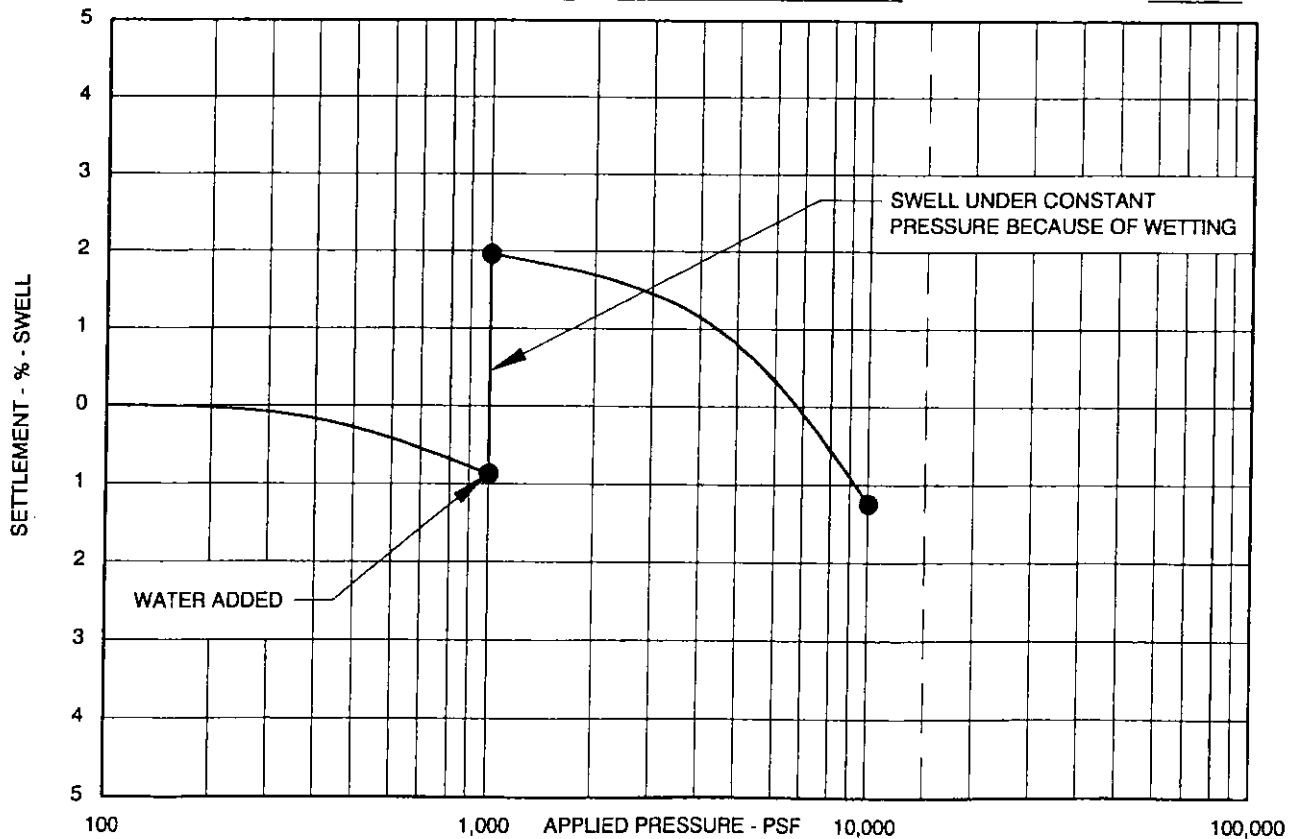


SAMPLE DESCRIPTION CLAYSTONE

DRY UNIT WT. 114 PCF

LOCATION TEST BORING NO. 17 @ DEPTH OF 29.0'

MOISTURE CONTENT 17 %



SAMPLE DESCRIPTION CLAY, SLIGHTLY SANDY

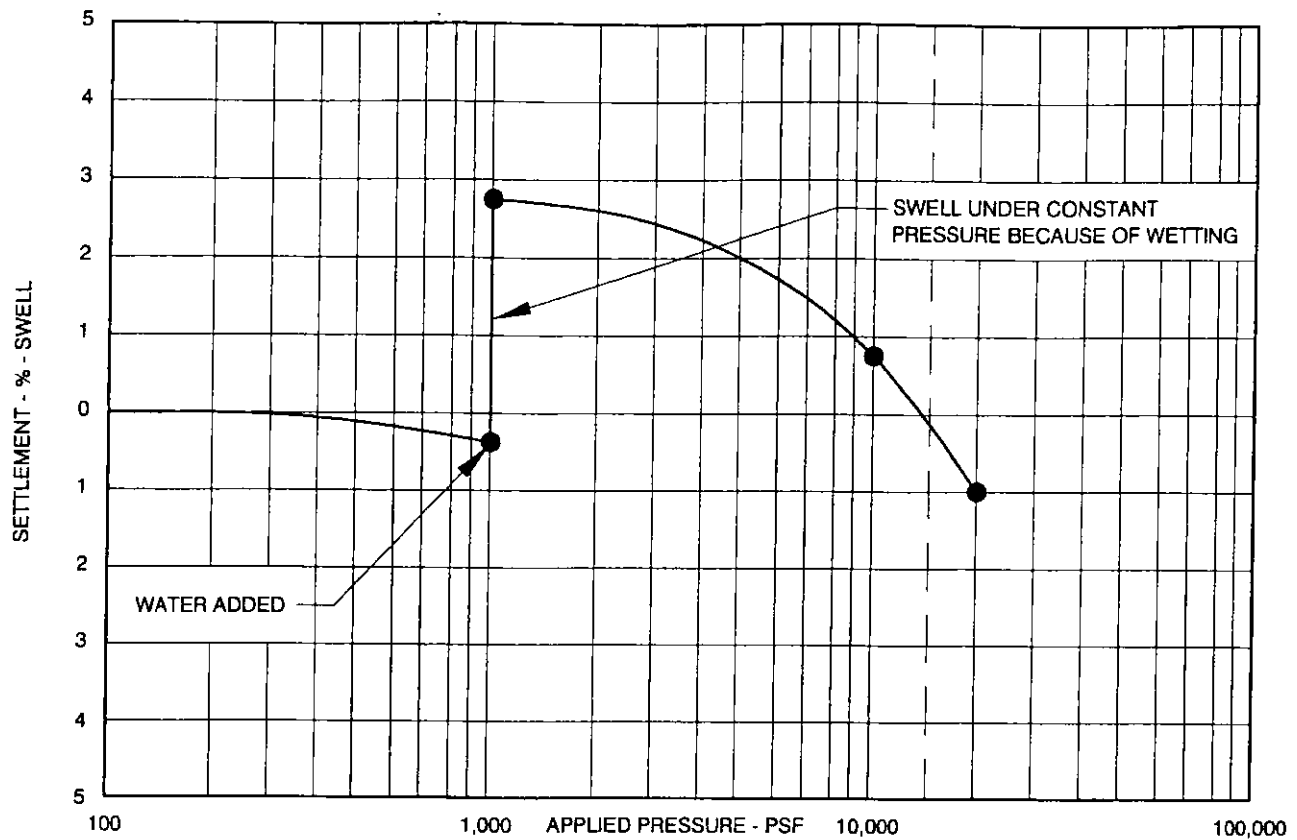
DRY UNIT WT. 100 PCF

LOCATION TEST BORING NO. 19 @ DEPTH OF 1.0'

MOISTURE CONTENT 26 %

SETTLEMENT - SWELL TEST RESULTS

FIGURE 21

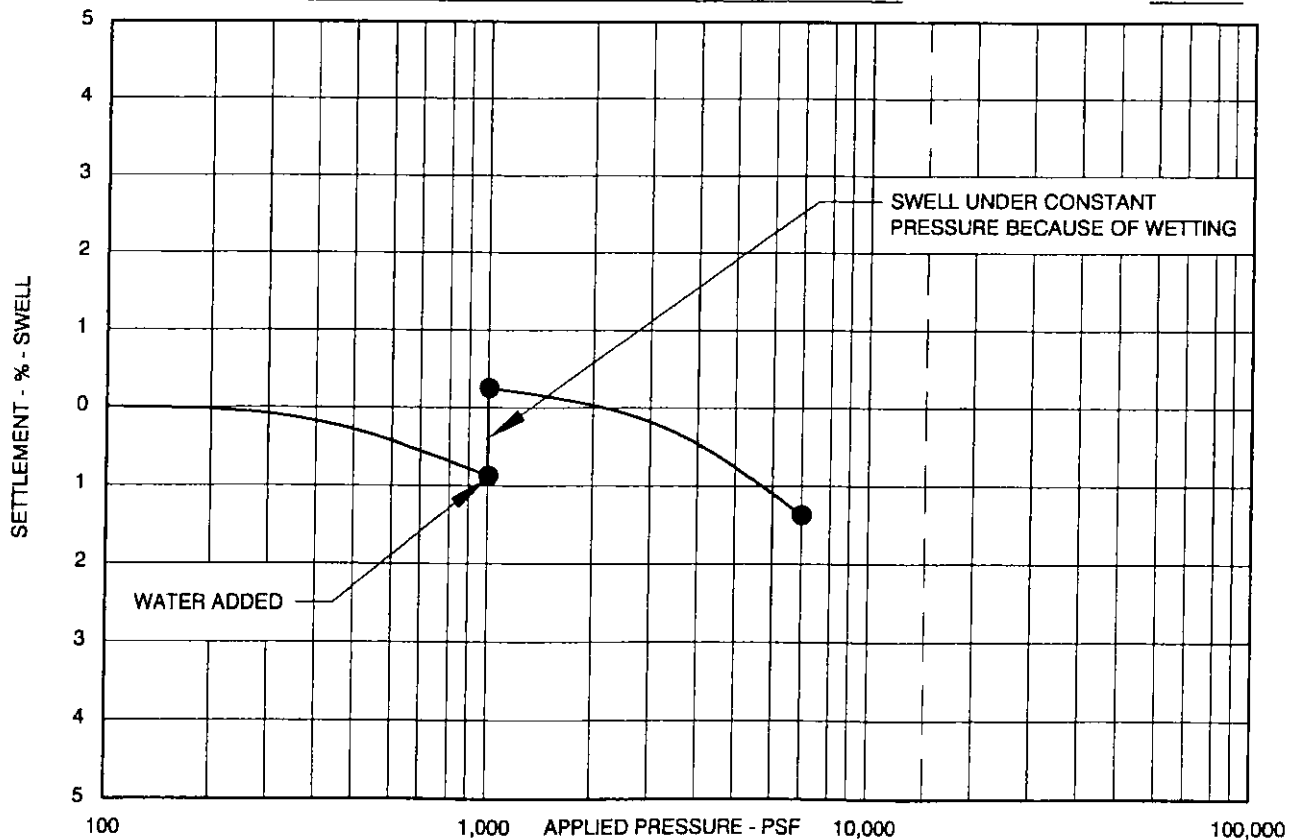


SAMPLE DESCRIPTION CLAYSTONE

DRY UNIT WT. 95 PCF

LOCATION TEST BORING NO. 19 @ DEPTH OF 9.0'

MOISTURE CONTENT 28 %



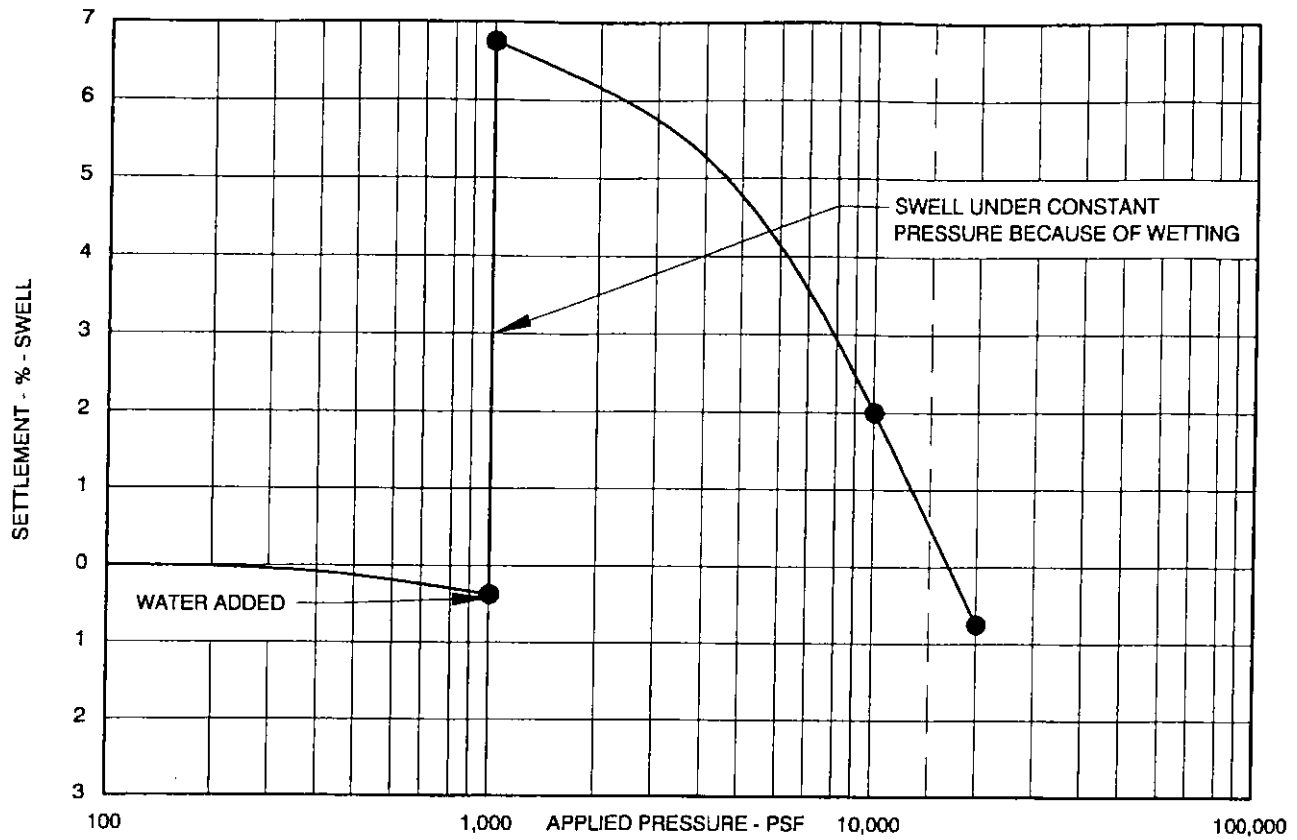
SAMPLE DESCRIPTION CLAYSTONE

DRY UNIT WT. 92 PCF

LOCATION TEST BORING NO. 20 @ DEPTH OF 14.0'

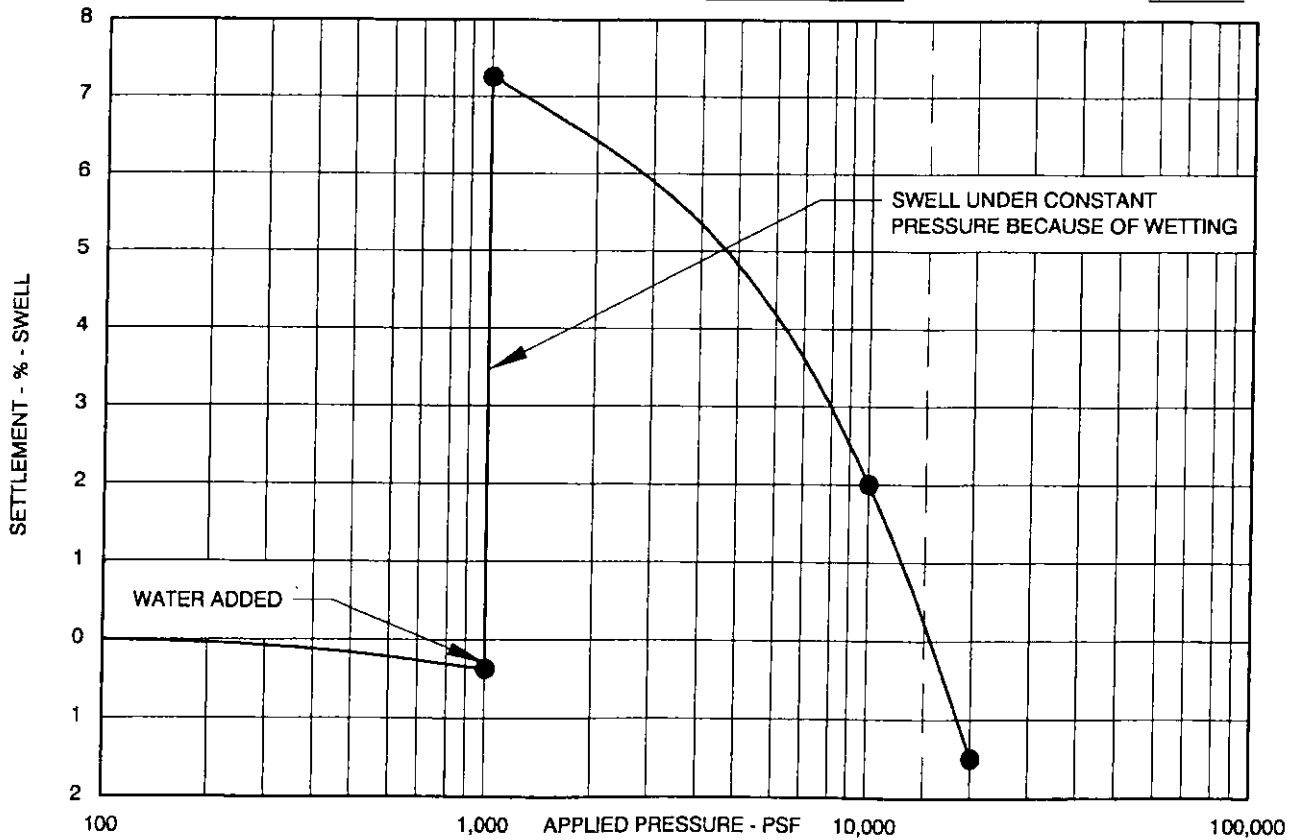
MOISTURE CONTENT 27 %

SETTLEMENT - SWELL TEST RESULTS



SAMPLE DESCRIPTION CLAY, SANDY
LOCATION TEST BORING NO. 15 @ DEPTH OF 4.0'

DRY UNIT WT. 111 PCF
MOISTURE CONTENT 17 %

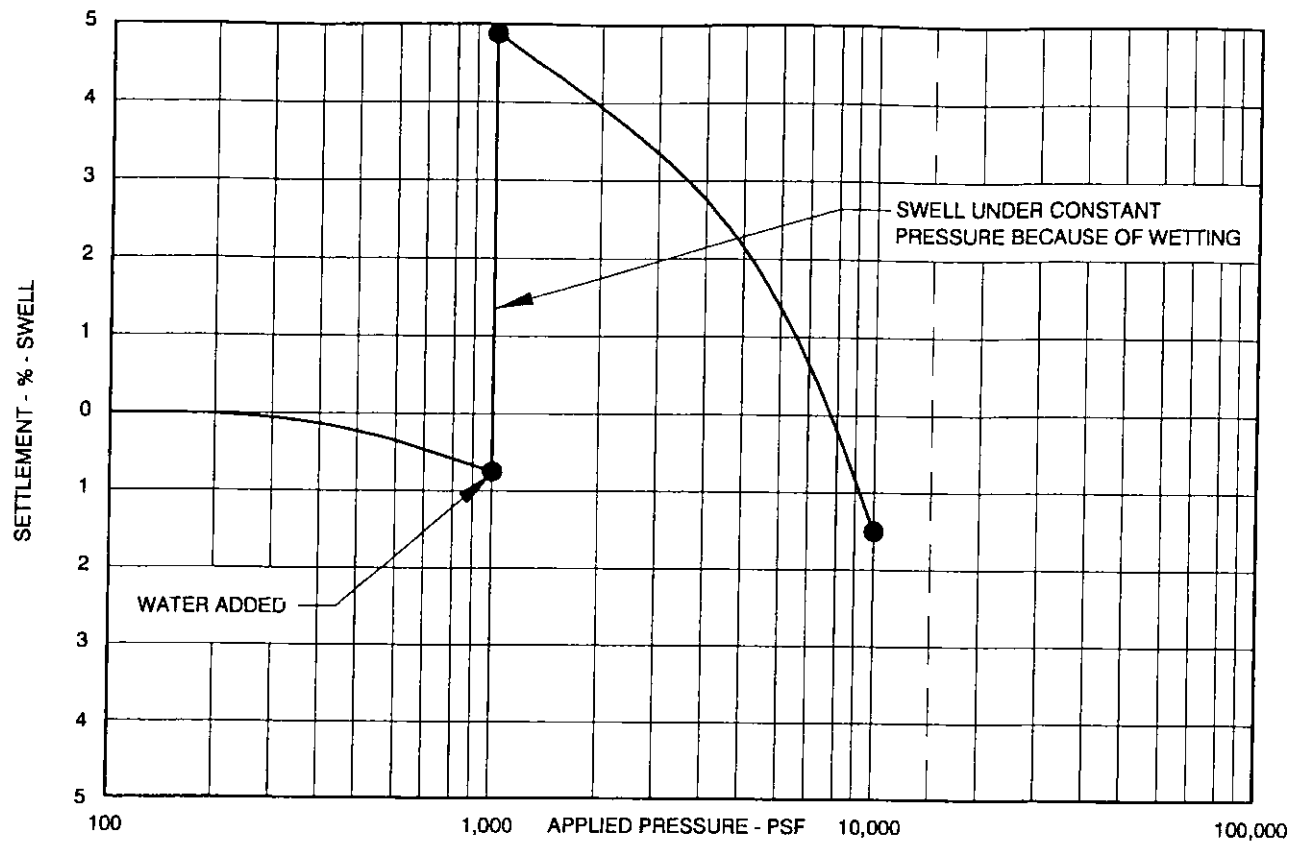


SAMPLE DESCRIPTION CLAY, SANDY
LOCATION TEST BORING NO. 22 @ DEPTH OF 4.0'

DRY UNIT WT. 115 PCF
MOISTURE CONTENT 13 %

SETTLEMENT - SWELL TEST RESULTS

FIGURE 23

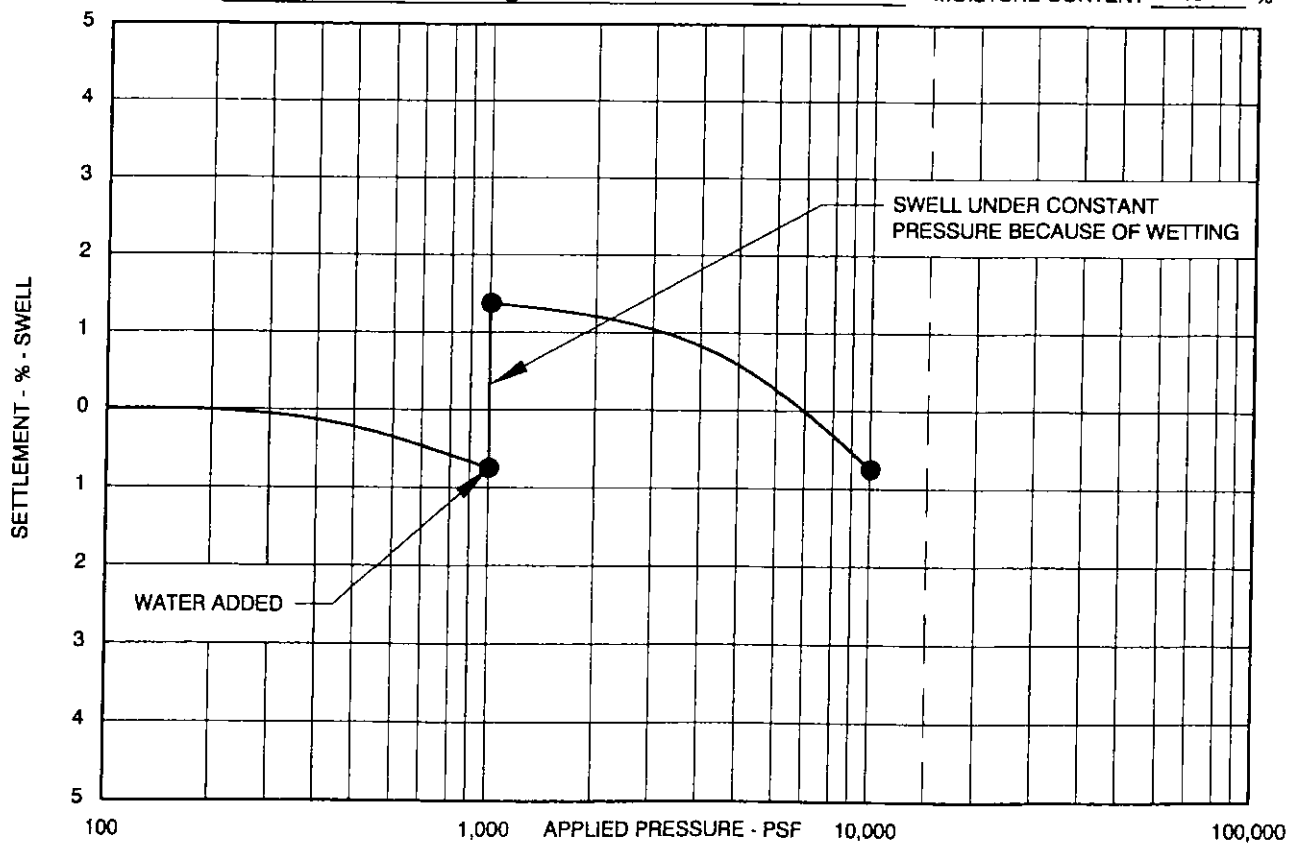


SAMPLE DESCRIPTION CLAY, SANDY

DRY UNIT WT. 99 PCF

LOCATION TEST BORING NO. 23 @ DEPTH OF 4.0'

MOISTURE CONTENT 16 %



SAMPLE DESCRIPTION CLAYSTONE

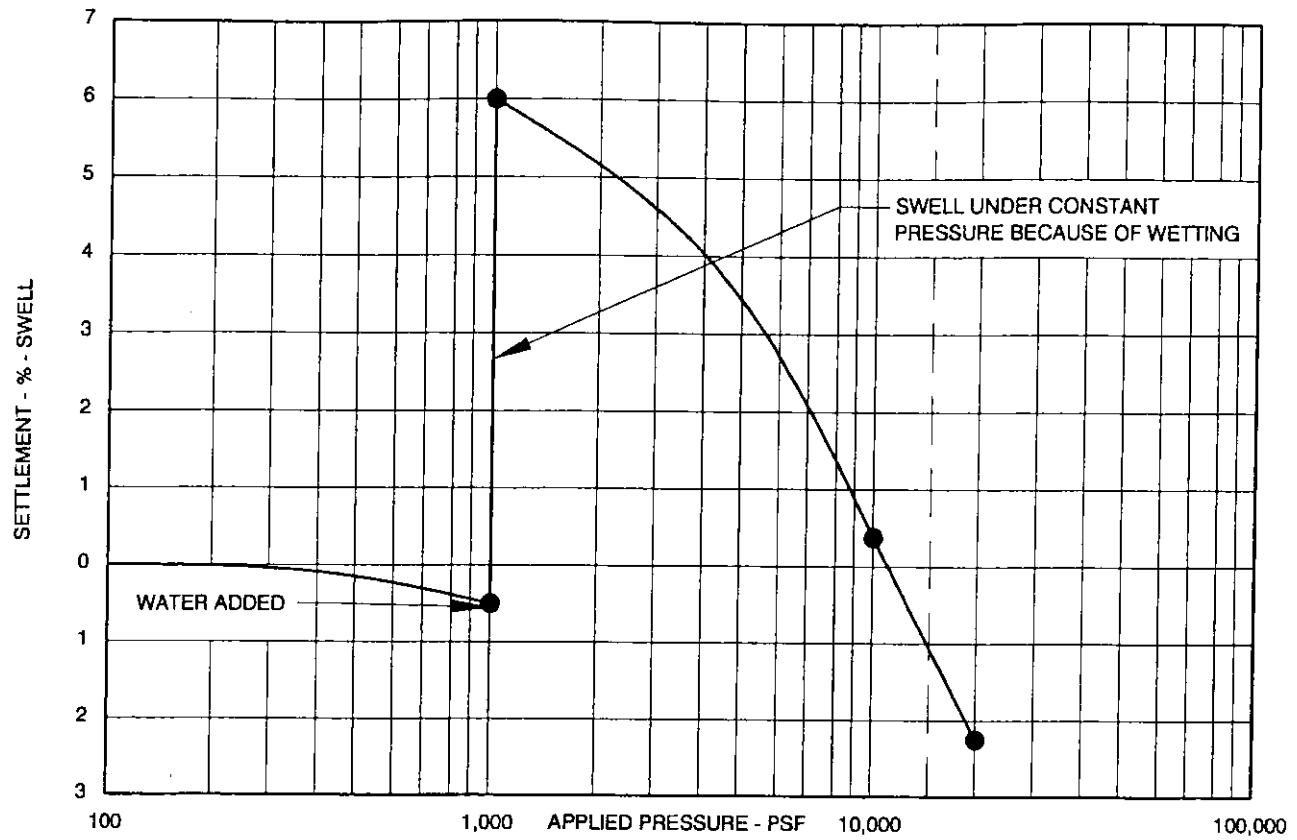
DRY UNIT WT. 98 PCF

LOCATION TEST BORING NO. 23 @ DEPTH OF 9.0'

MOISTURE CONTENT 25 %

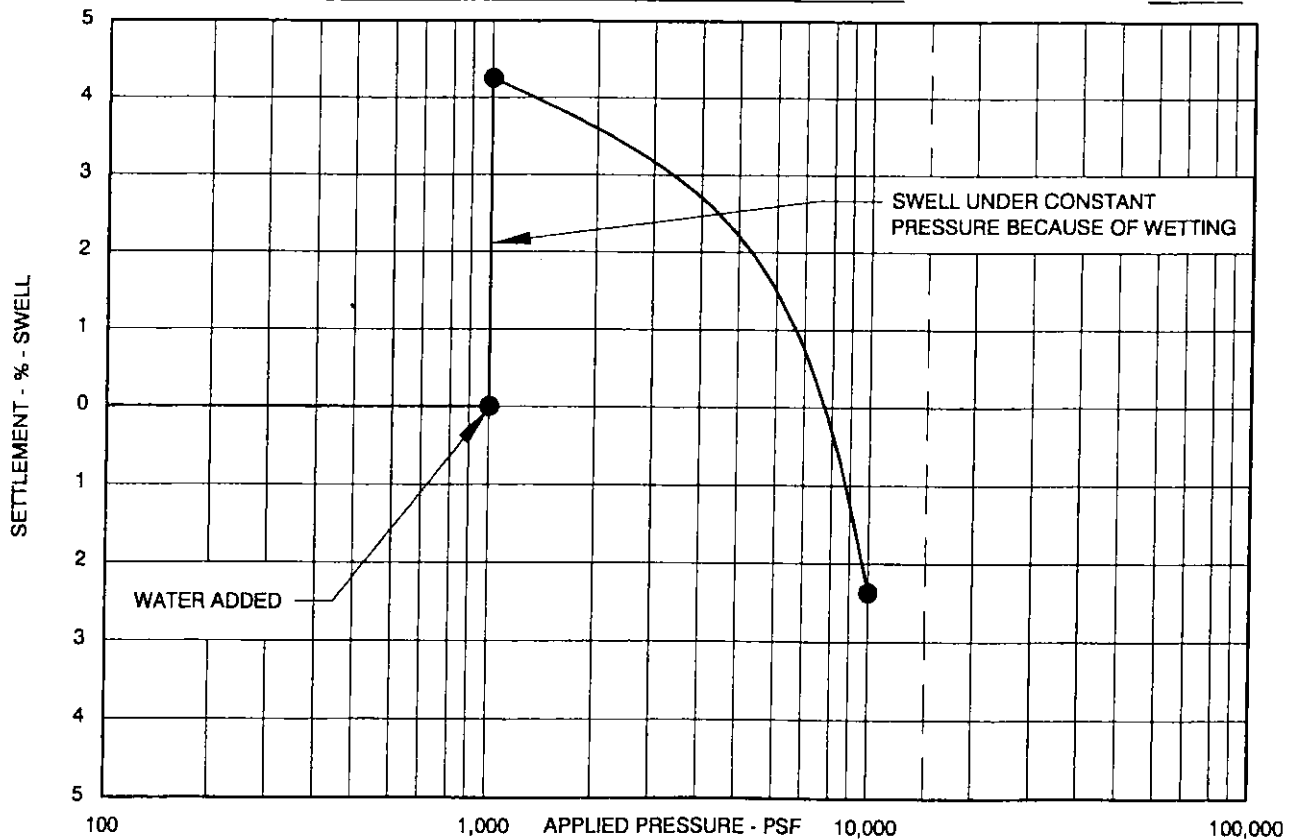
SETTLEMENT - SWELL TEST RESULTS

FIGURE 24



SAMPLE DESCRIPTION CLAY, SANDY
LOCATION TEST BORING NO. 25 @ DEPTH OF 4.0'

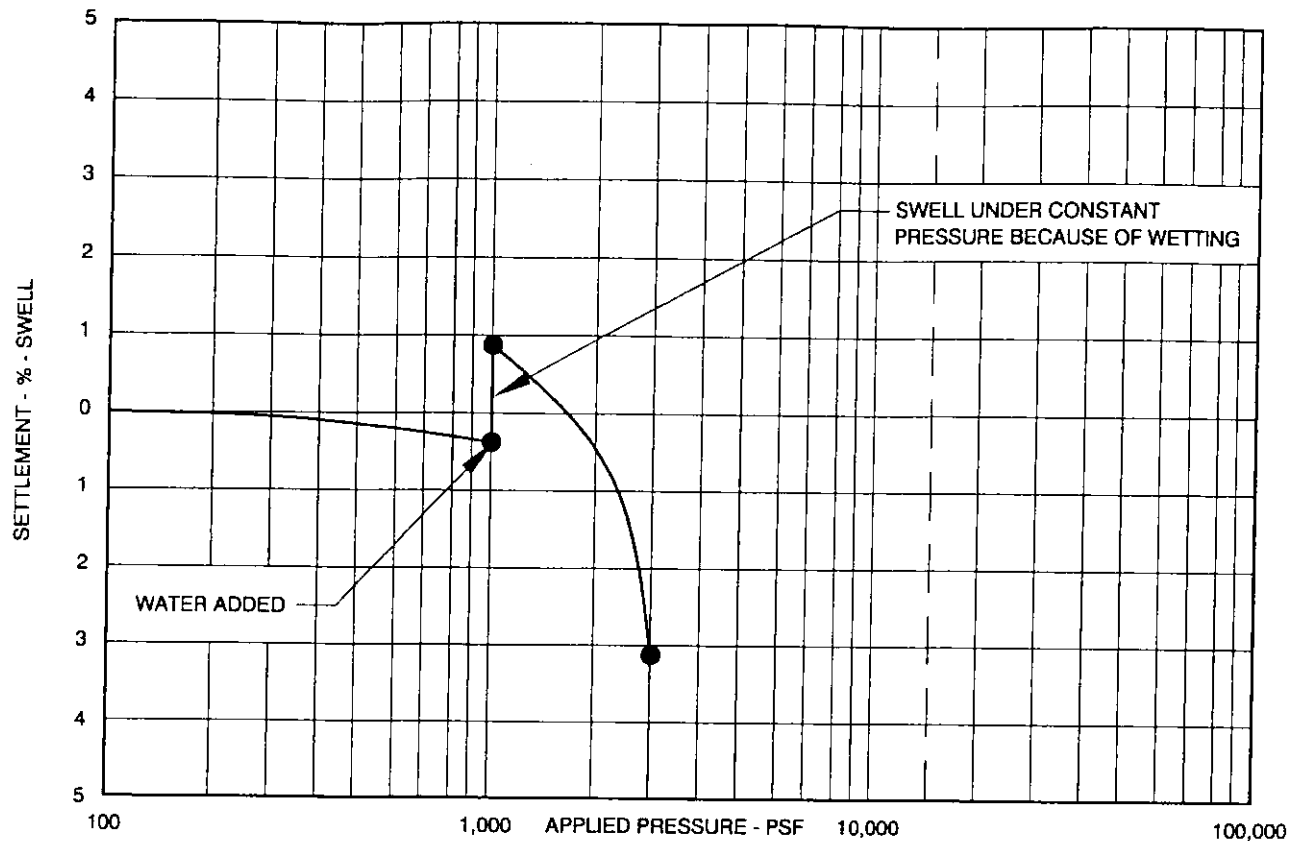
DRY UNIT WT. 111 PCF
MOISTURE CONTENT 13 %



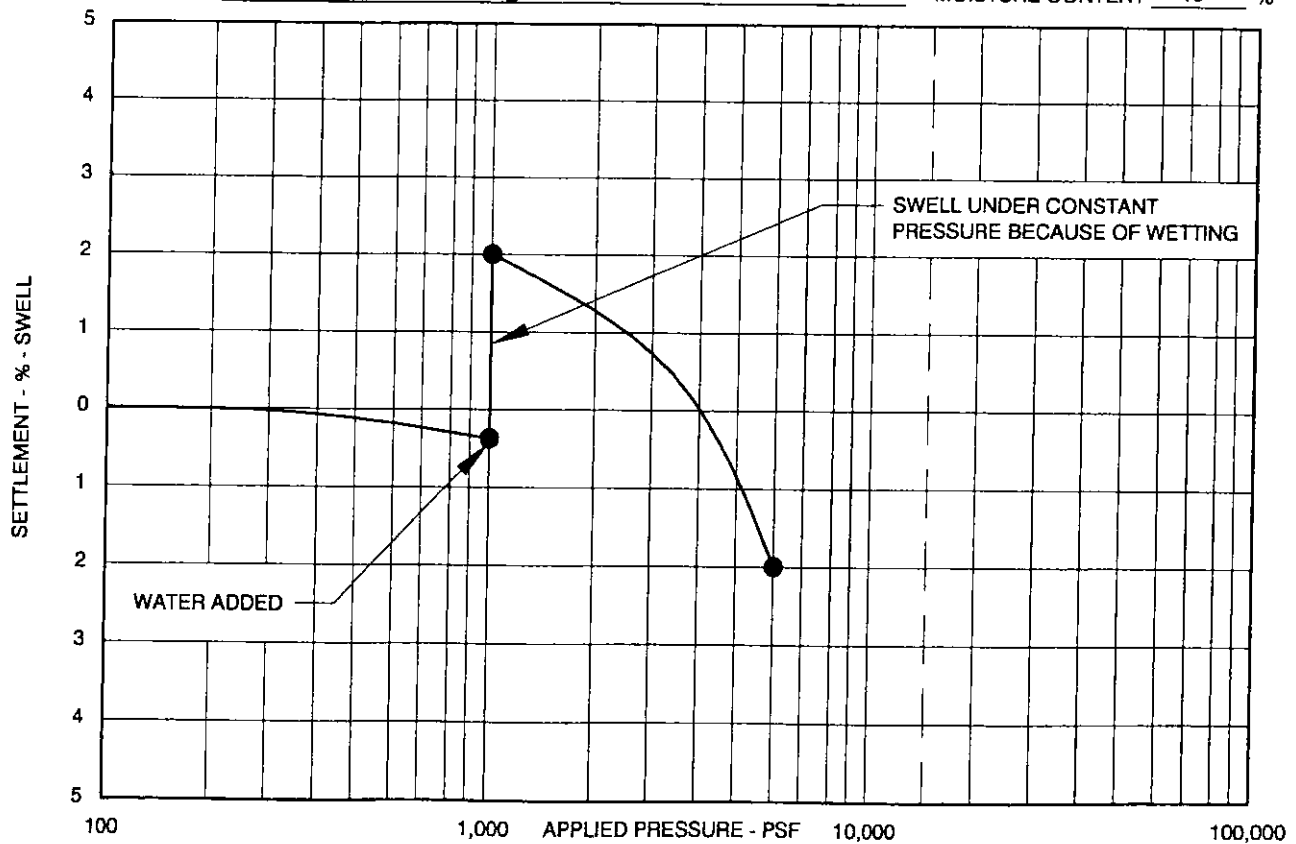
SAMPLE DESCRIPTION CLAY, SLIGHTLY SANDY
LOCATION TEST BORING NO. 26 @ DEPTH OF 4.0'

DRY UNIT WT. 107 PCF
MOISTURE CONTENT 10 %

SETTLEMENT - SWELL TEST RESULTS

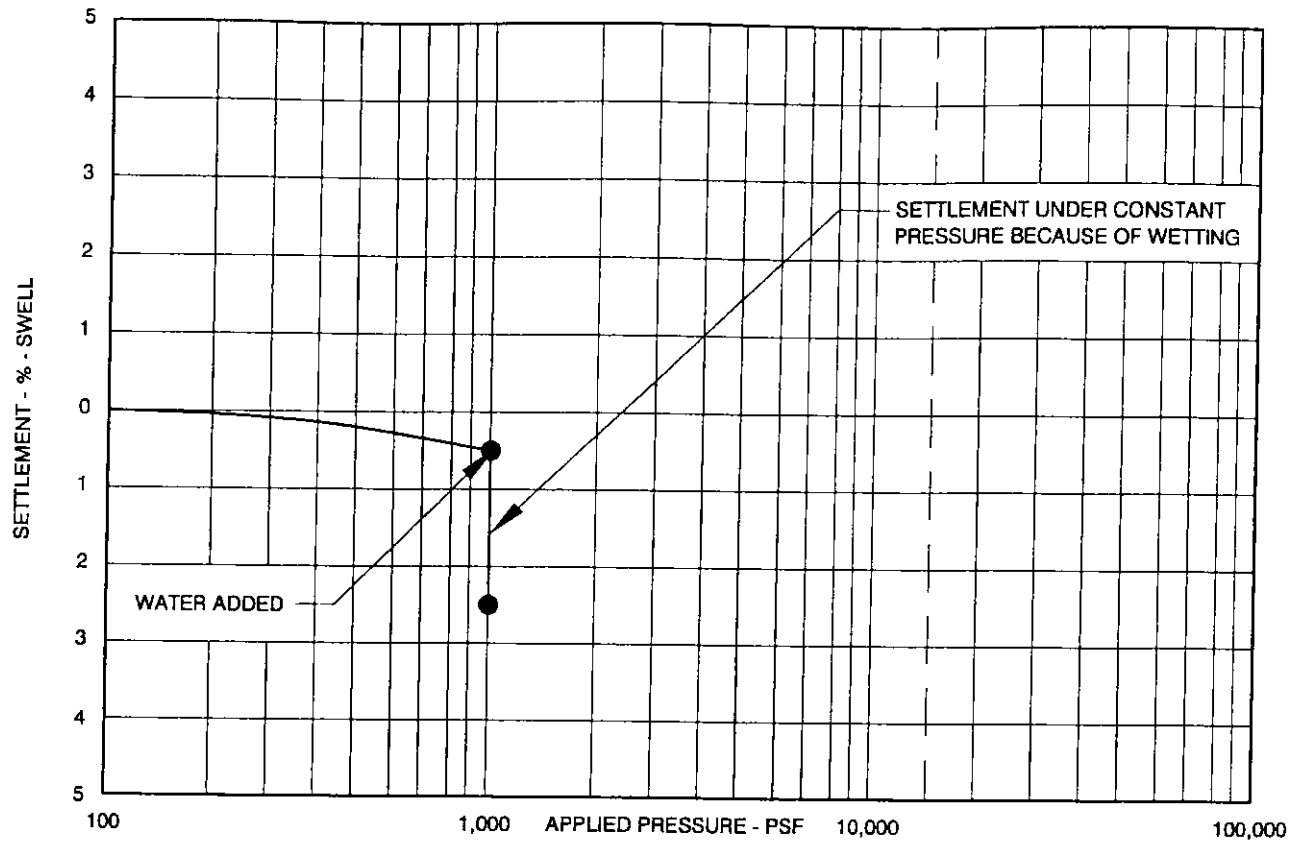


SAMPLE DESCRIPTION CLAY, SANDY DRY UNIT WT. 88 PCF
LOCATION TEST BORING NO. 27 @ DEPTH OF 4.0' MOISTURE CONTENT 15 %



SAMPLE DESCRIPTION CLAY, SANDY DRY UNIT WT. 105 PCF
LOCATION TEST BORING NO. 28 @ DEPTH OF 1.0' MOISTURE CONTENT 13 %

SETTLEMENT - SWELL TEST RESULTS

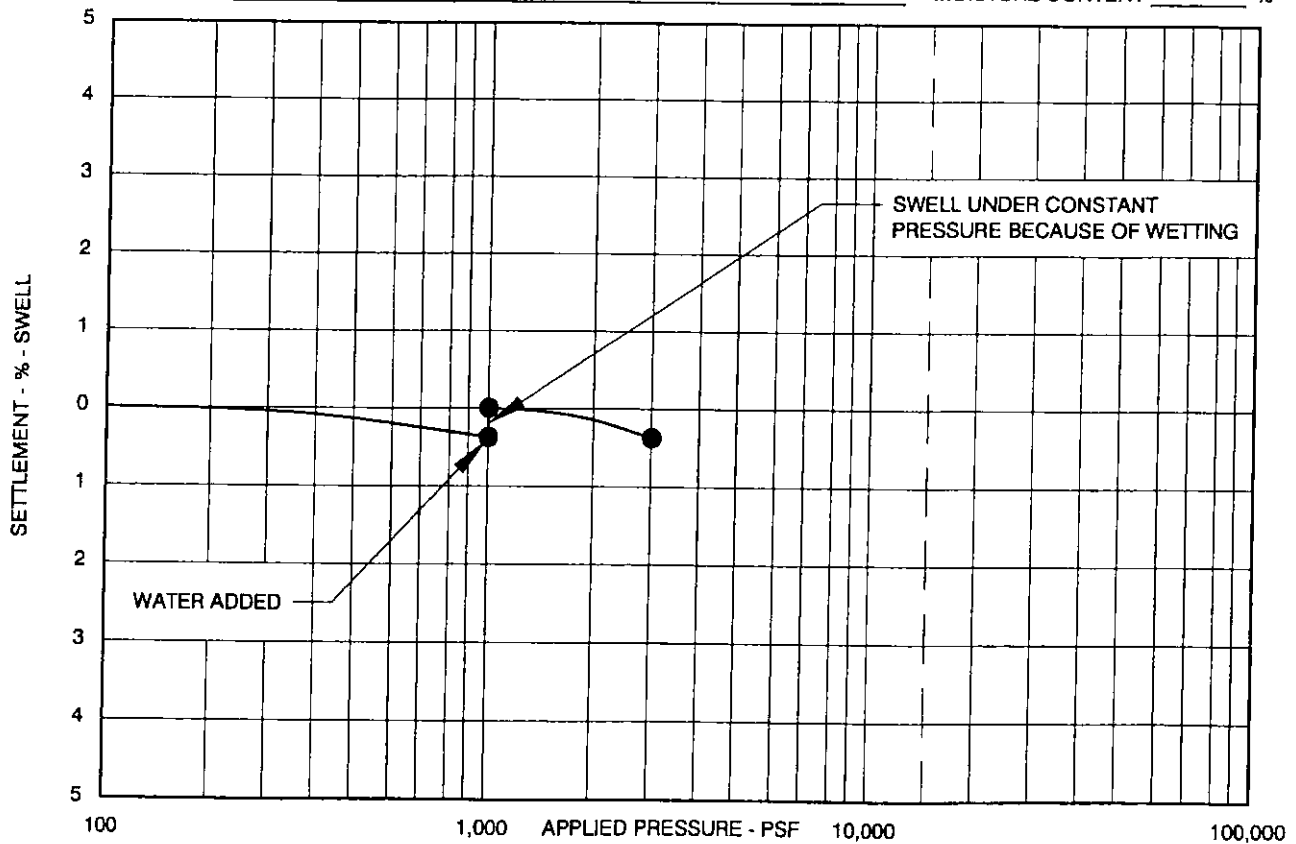


SAMPLE DESCRIPTION SAND, SILTY TO CLAYEY

DRY UNIT WT. 106 PCF

LOCATION TEST BORING NO. 28 @ DEPTH OF 4.0'

MOISTURE CONTENT 5 %



SAMPLE DESCRIPTION SANDSTONE, VERY SILTY

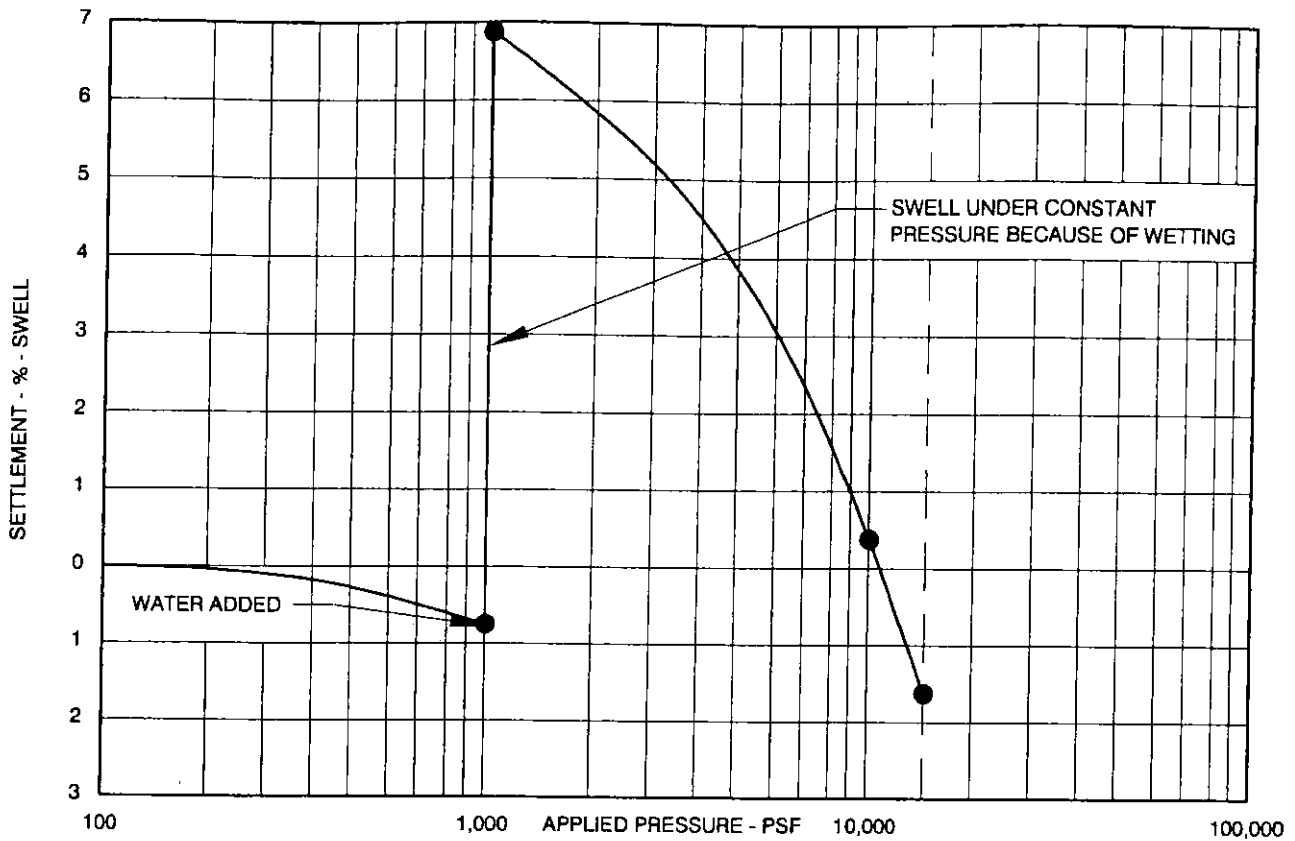
DRY UNIT WT. 101 PCF

LOCATION TEST BORING NO. 29 @ DEPTH OF 14.0'

MOISTURE CONTENT 24 %

SETTLEMENT - SWELL TEST RESULTS

FIGURE 27

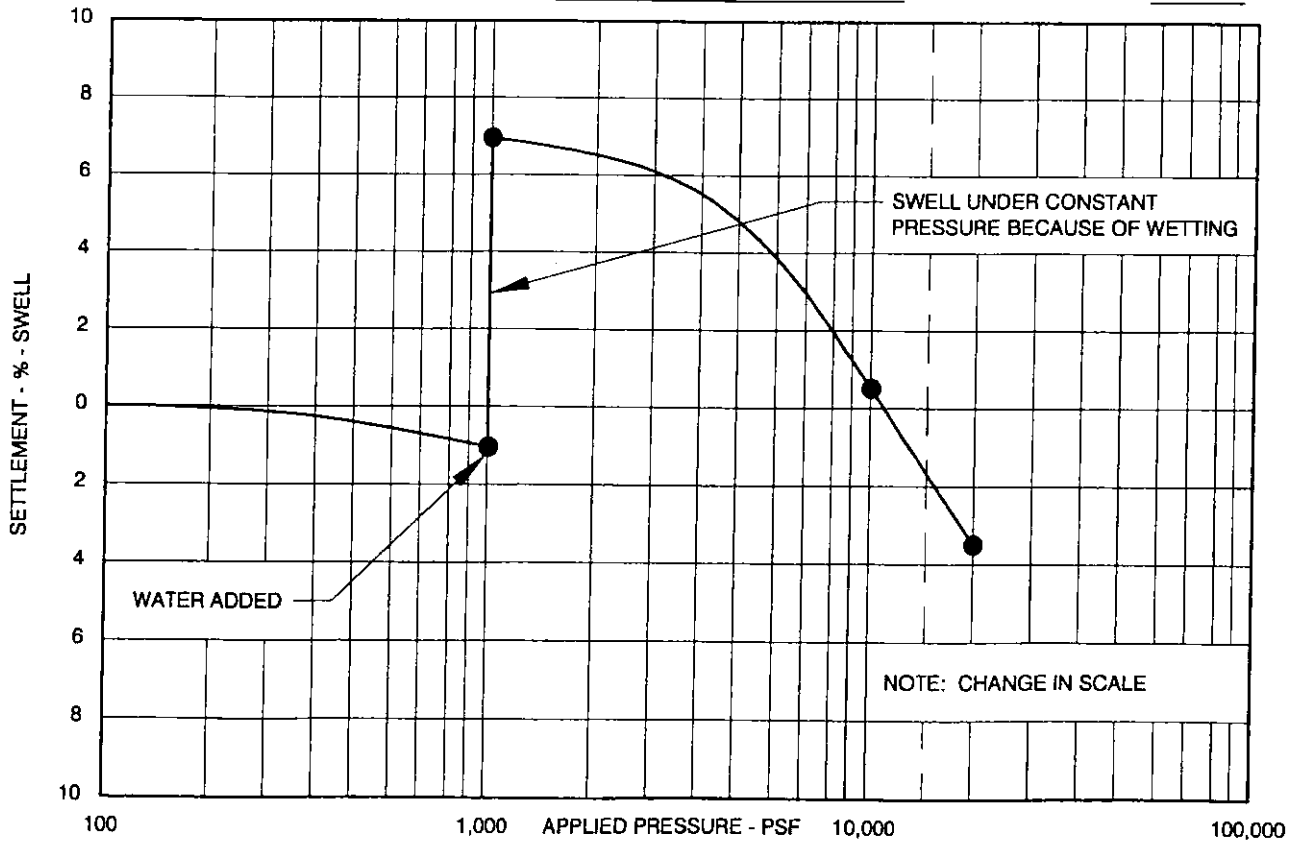


SAMPLE DESCRIPTION CLAY, SANDY

LOCATION TEST BORING NO. 30 @ DEPTH OF 4.0'

DRY UNIT WT. 118 PCF

MOISTURE CONTENT 10 %



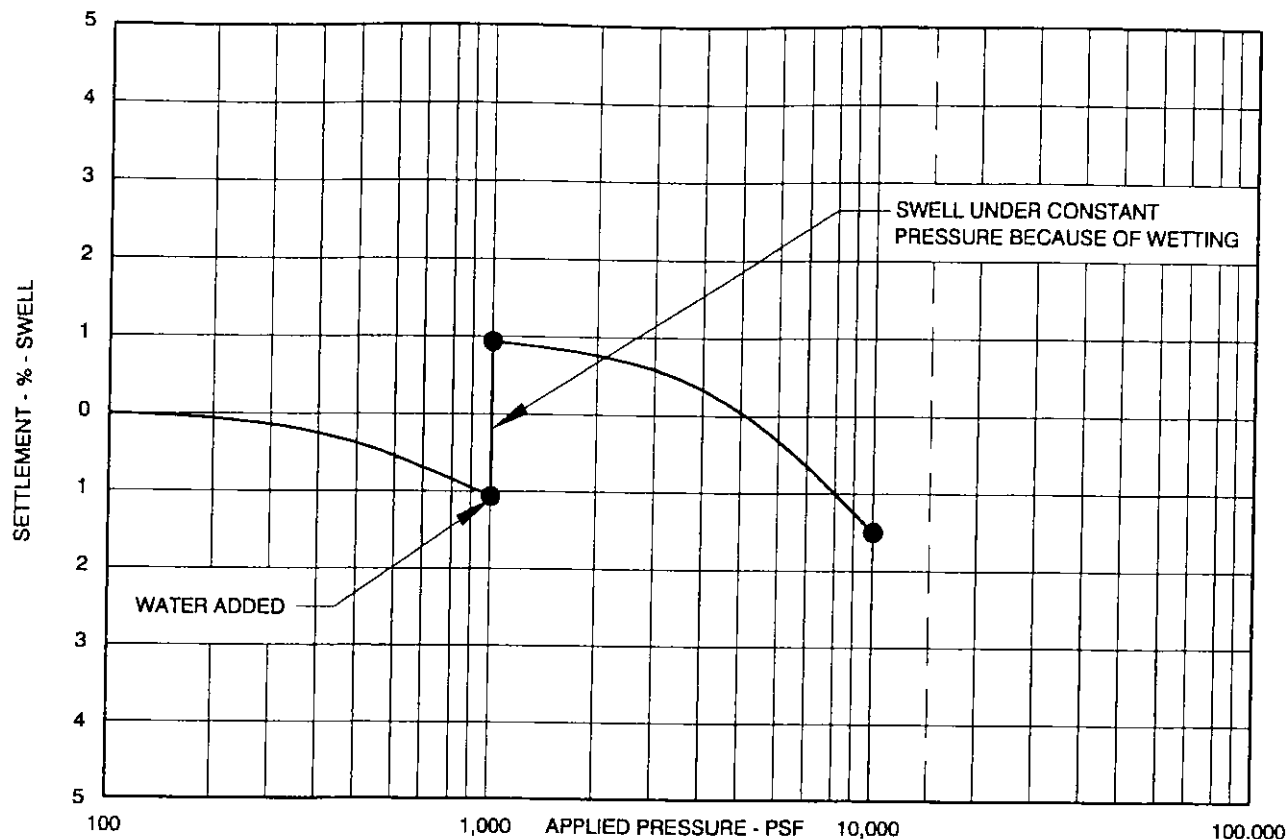
SAMPLE DESCRIPTION CLAY, VERY SANDY

LOCATION TEST BORING NO. 31 @ DEPTH OF 4.0'

DRY UNIT WT. 109 PCF

MOISTURE CONTENT 16 %

SETTLEMENT - SWELL TEST RESULTS

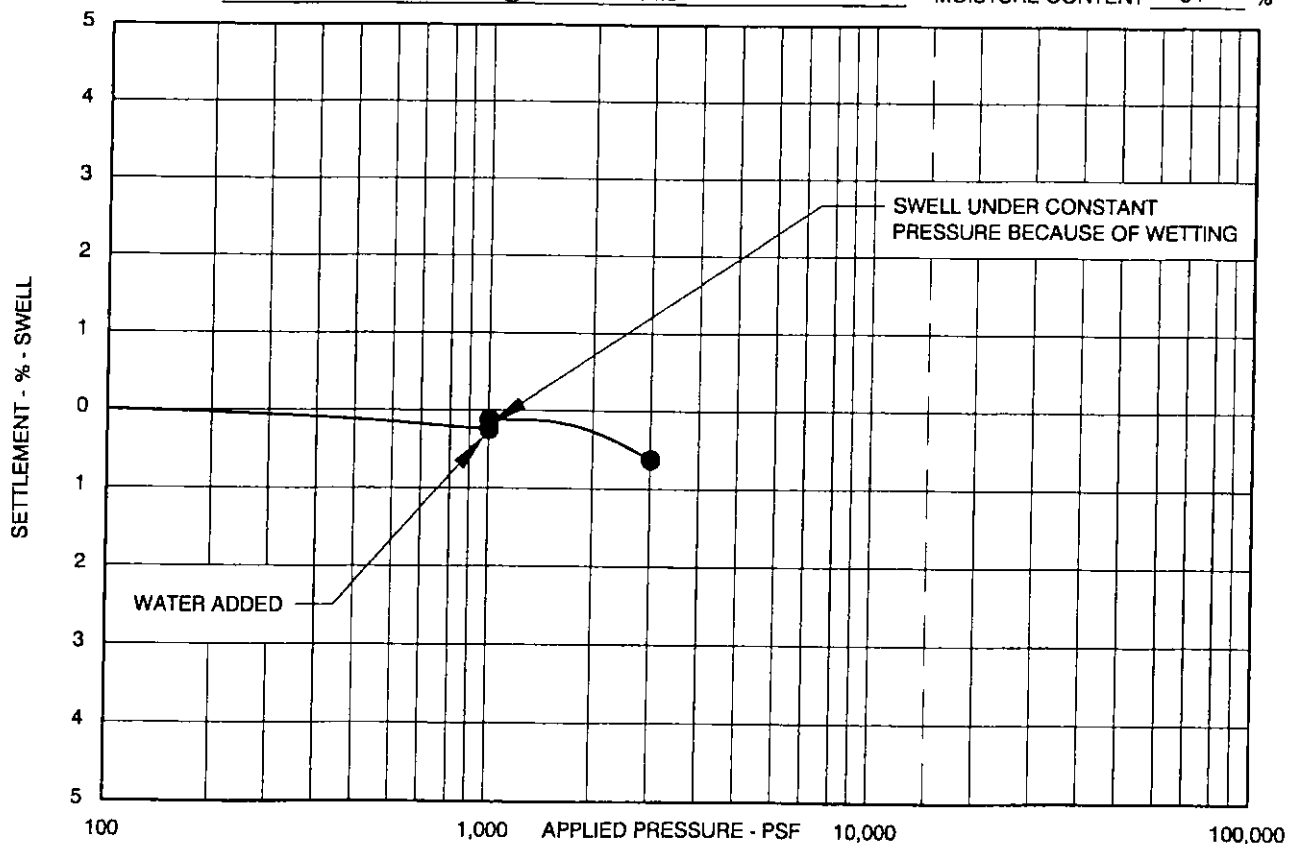


SAMPLE DESCRIPTION CLAYSTONE

LOCATION TEST BORING NO. 31 @ DEPTH OF 14.0'

DRY UNIT WT. 87 PCF

MOISTURE CONTENT 34 %



SAMPLE DESCRIPTION SANDSTONE

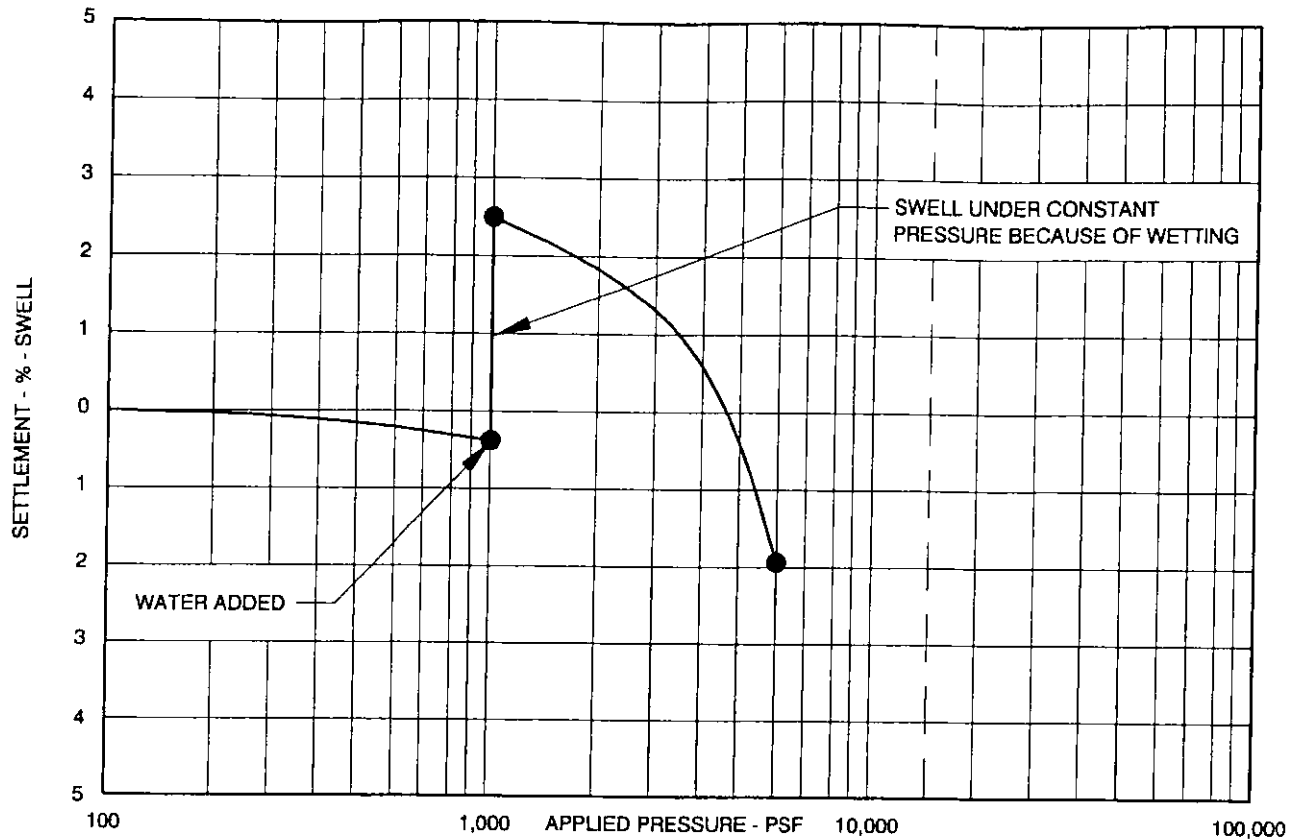
LOCATION TEST BORING NO. 32 @ DEPTH OF 29.0'

DRY UNIT WT. 103 PCF

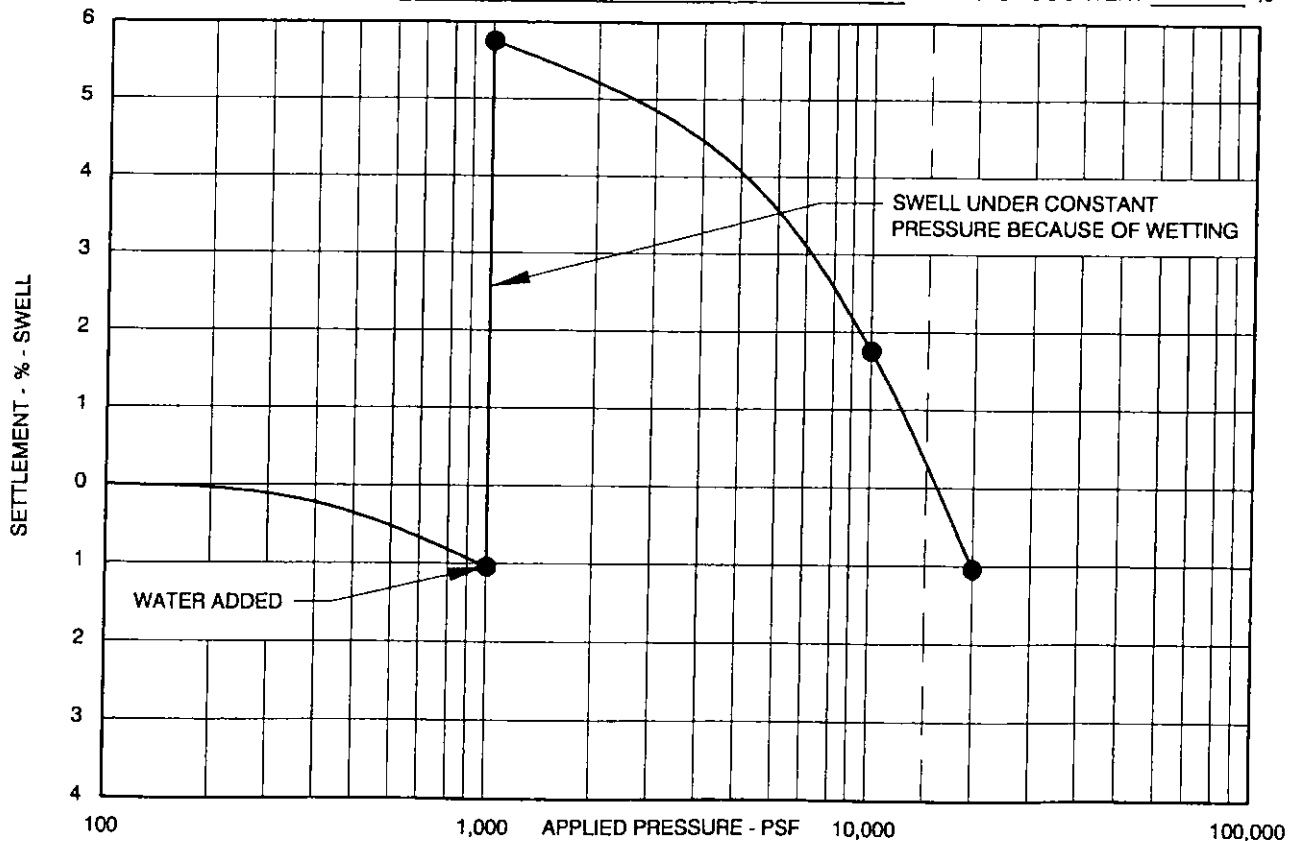
MOISTURE CONTENT 23 %

SETTLEMENT - SWELL TEST RESULTS

FIGURE 29



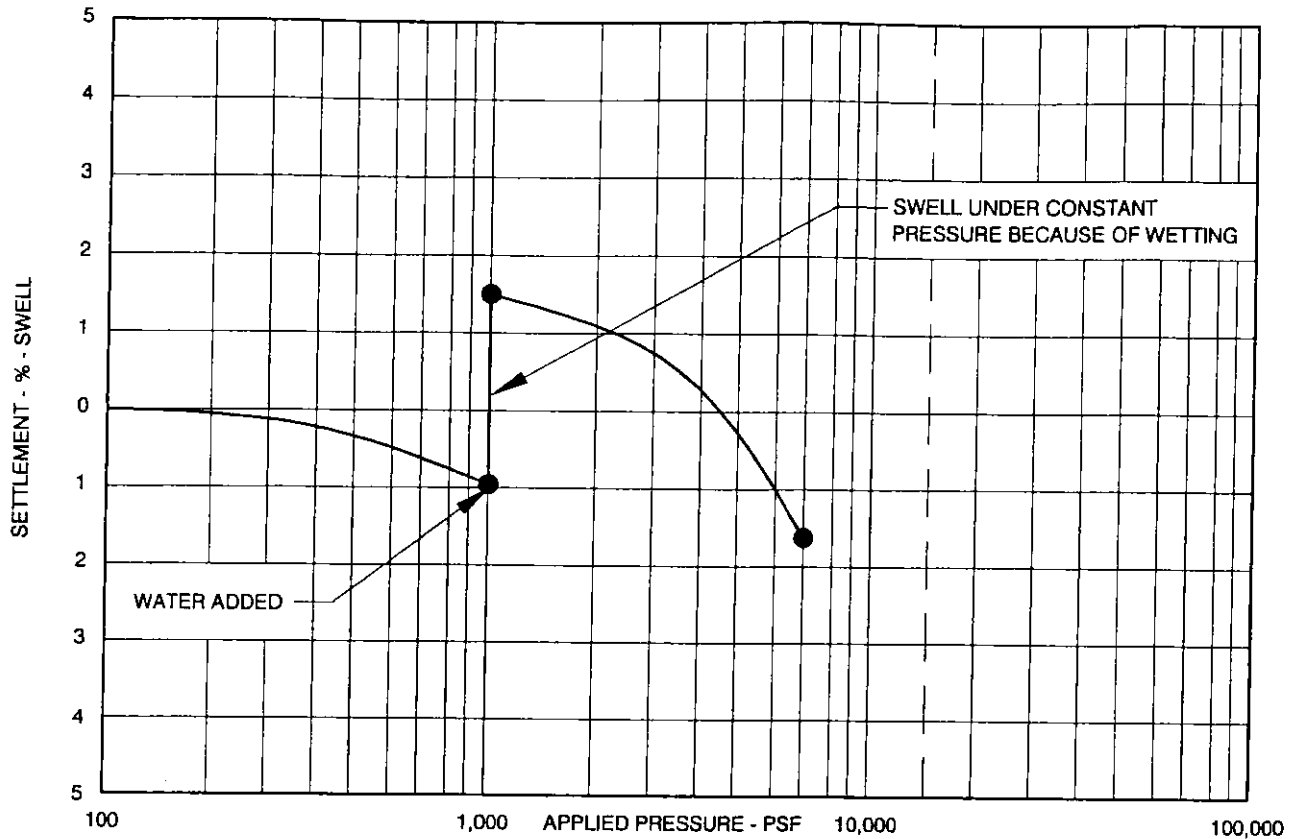
SAMPLE DESCRIPTION CLAY, SANDY DRY UNIT WT. 113 PCF
LOCATION TEST BORING NO. 33 @ DEPTH OF 1.0' MOISTURE CONTENT 8 %



SAMPLE DESCRIPTION CLAYSTONE DRY UNIT WT. 91 PCF
LOCATION TEST BORING NO. 33 @ DEPTH OF 9.0' MOISTURE CONTENT 30 %

SETTLEMENT - SWELL TEST RESULTS

FIGURE 30

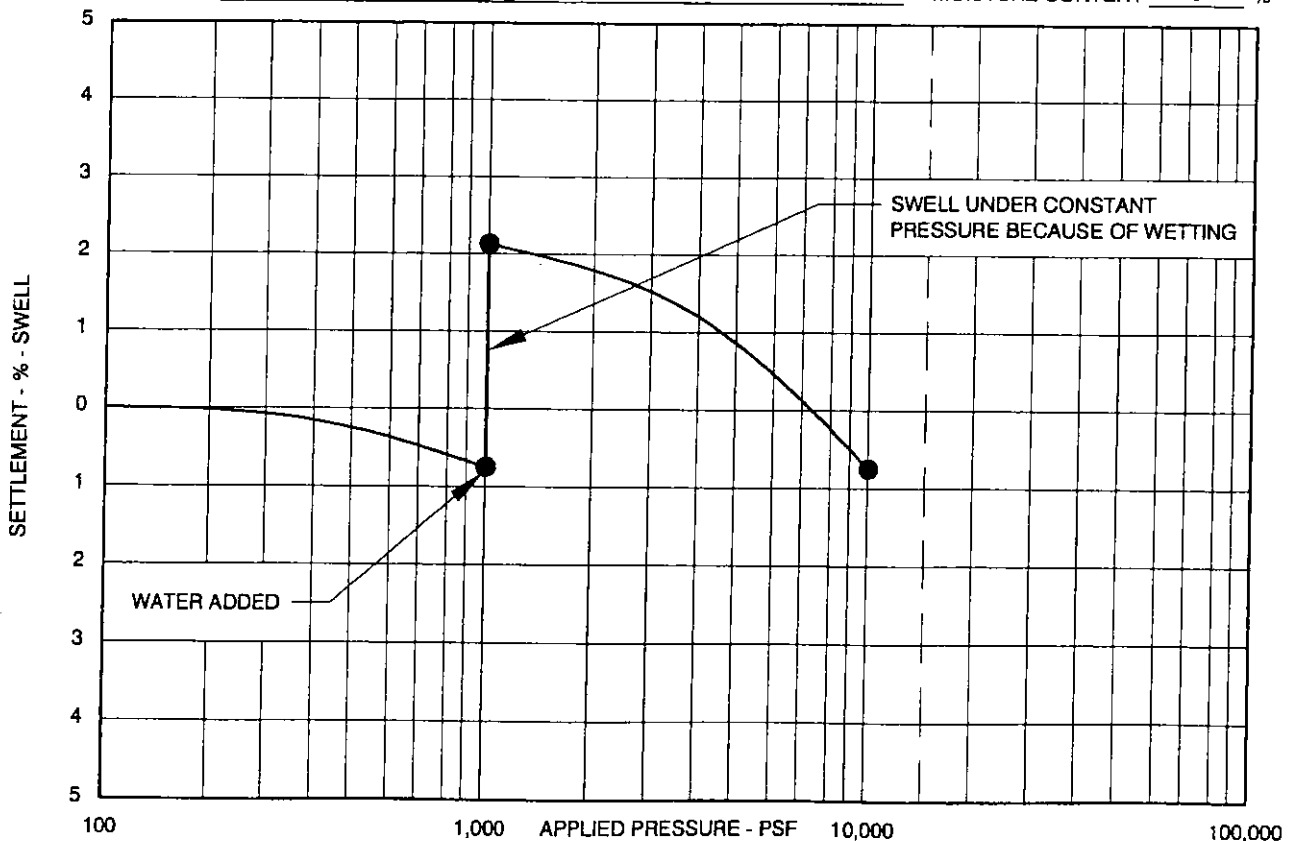


SAMPLE DESCRIPTION CLAY, SANDY

DRY UNIT WT. 98 PCF

LOCATION TEST BORING NO. 34 @ DEPTH OF 4.0'

MOISTURE CONTENT 16 %



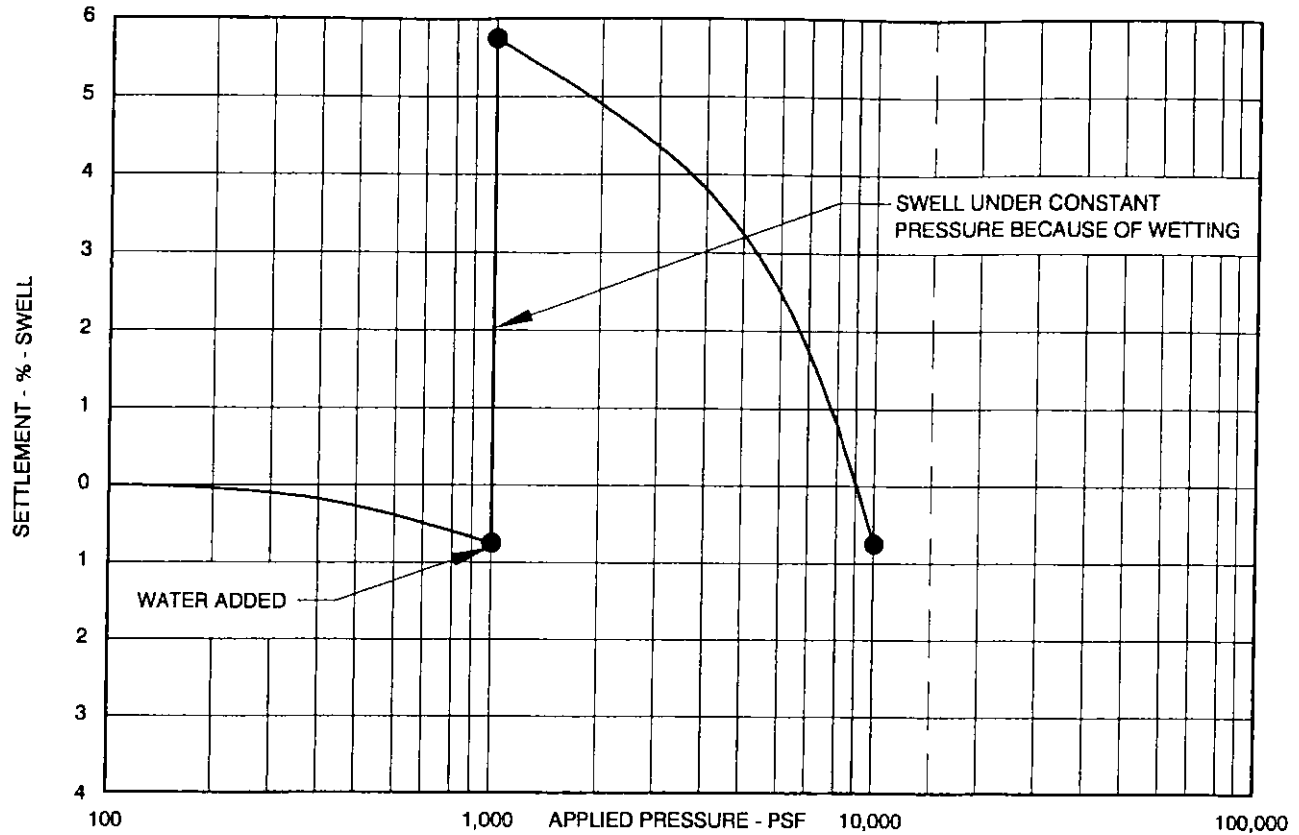
SAMPLE DESCRIPTION CLAYSTONE

DRY UNIT WT. 82 PCF

LOCATION TEST BORING NO. 34 @ DEPTH OF 9.0'

MOISTURE CONTENT 40 %

SETTLEMENT - SWELL TEST RESULTS

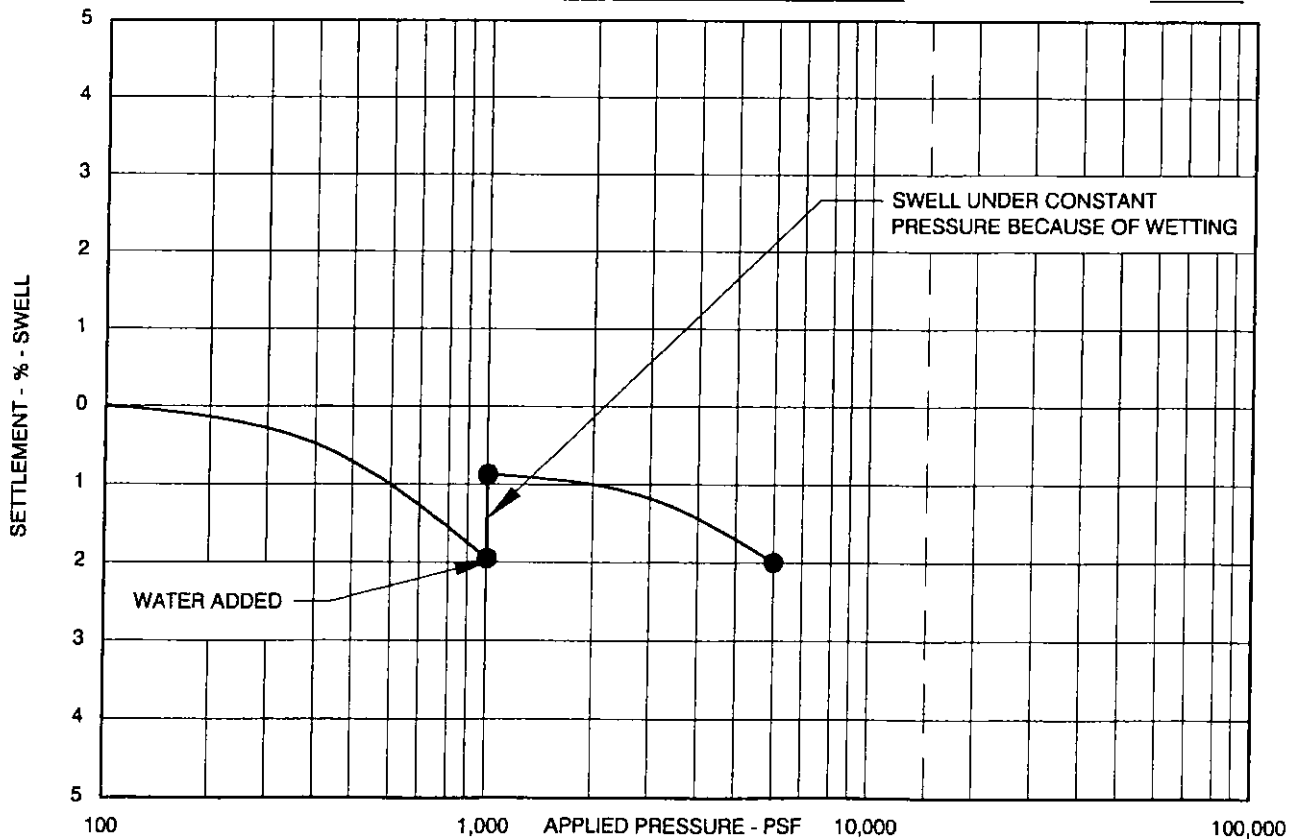


SAMPLE DESCRIPTION CLAY, SANDY

DRY UNIT WT. 100 PCF

LOCATION TEST BORING NO. 35 @ DEPTH OF 4.0'

MOISTURE CONTENT 17 %



SAMPLE DESCRIPTION CLAYSTONE

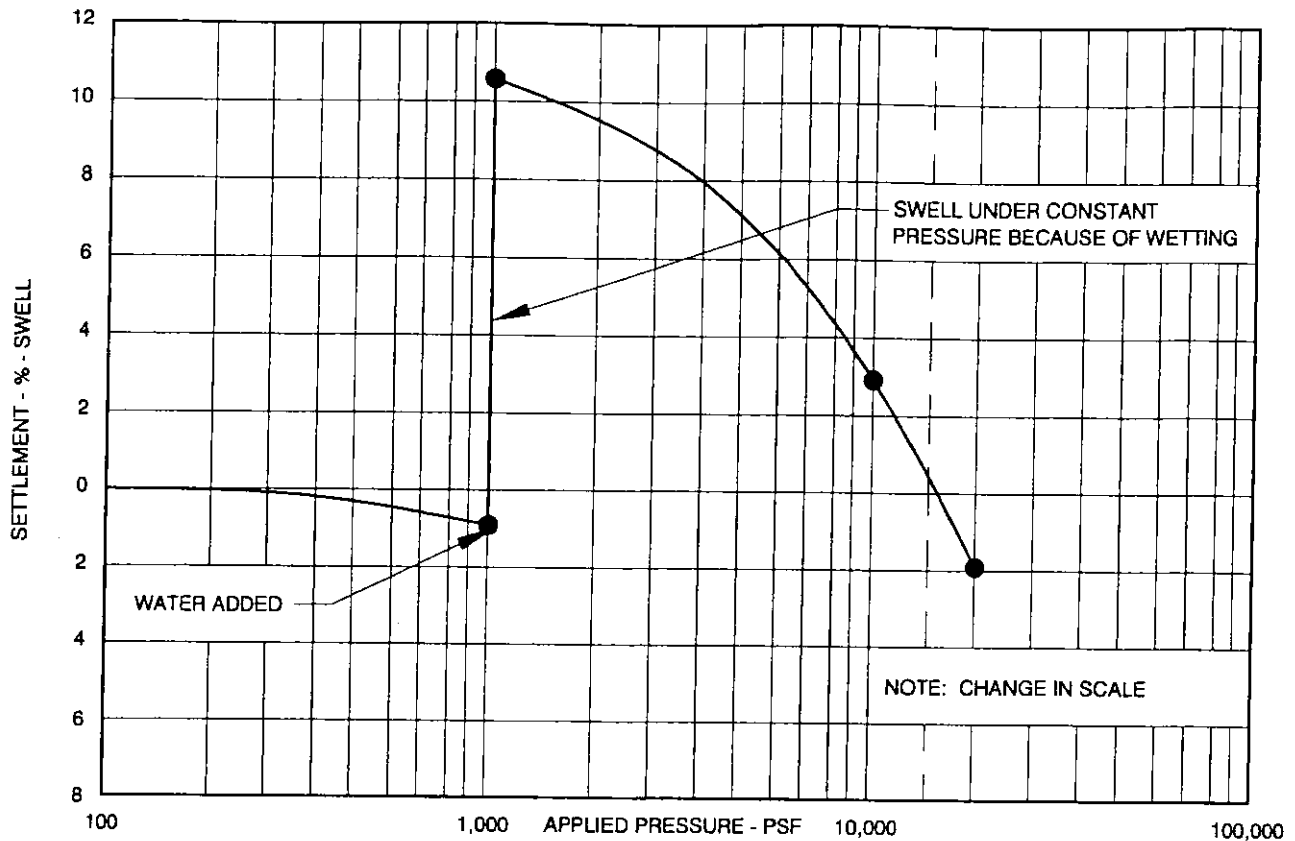
DRY UNIT WT. 94 PCF

LOCATION TEST BORING NO. 35 @ DEPTH OF 29.0'

MOISTURE CONTENT 29 %

SETTLEMENT - SWELL TEST RESULTS

FIGURE 32

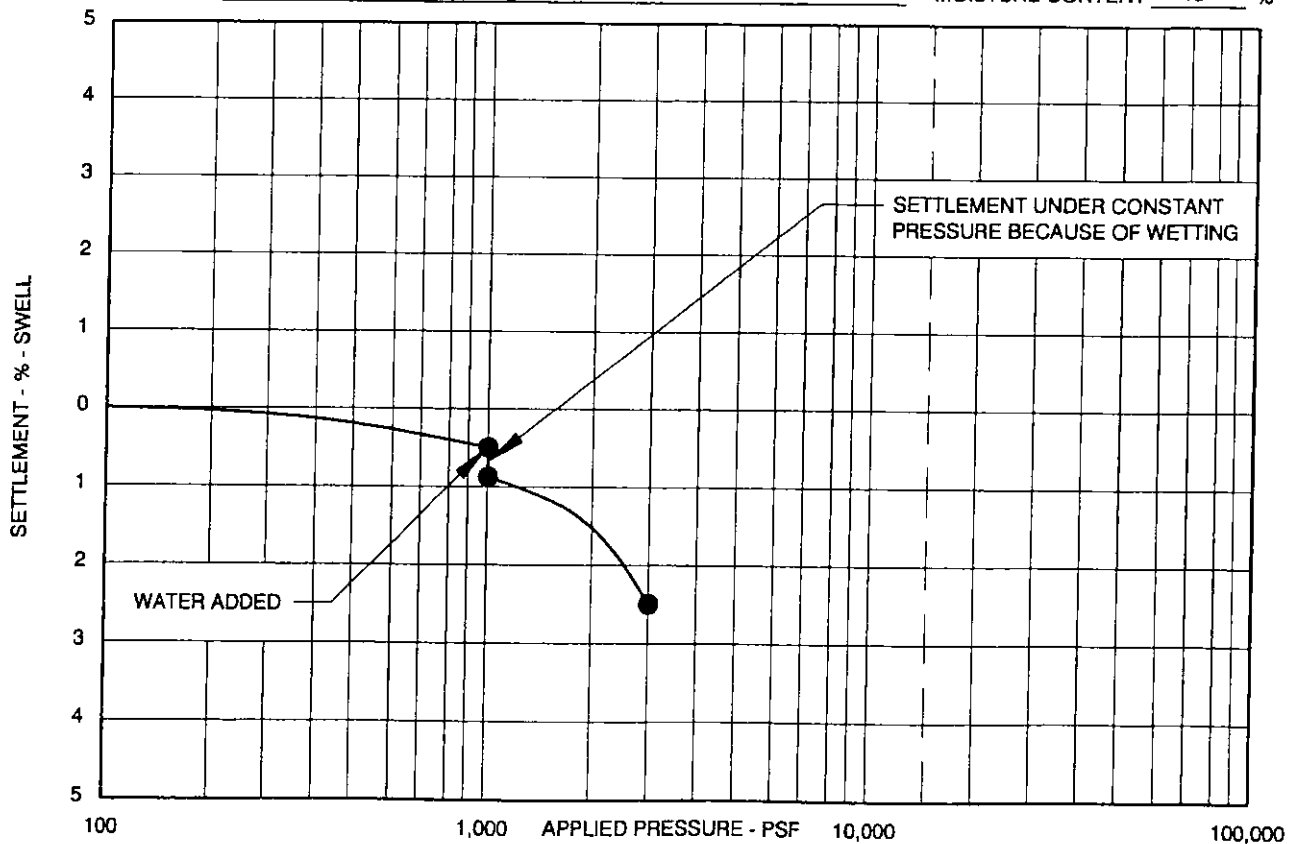


SAMPLE DESCRIPTION CLAY, SANDY

DRY UNIT WT. 101 PCF

LOCATION TEST BORING NO. 36 @ DEPTH OF 4.0'

MOISTURE CONTENT 19 %



SAMPLE DESCRIPTION WEATHERED CLAYSTONE

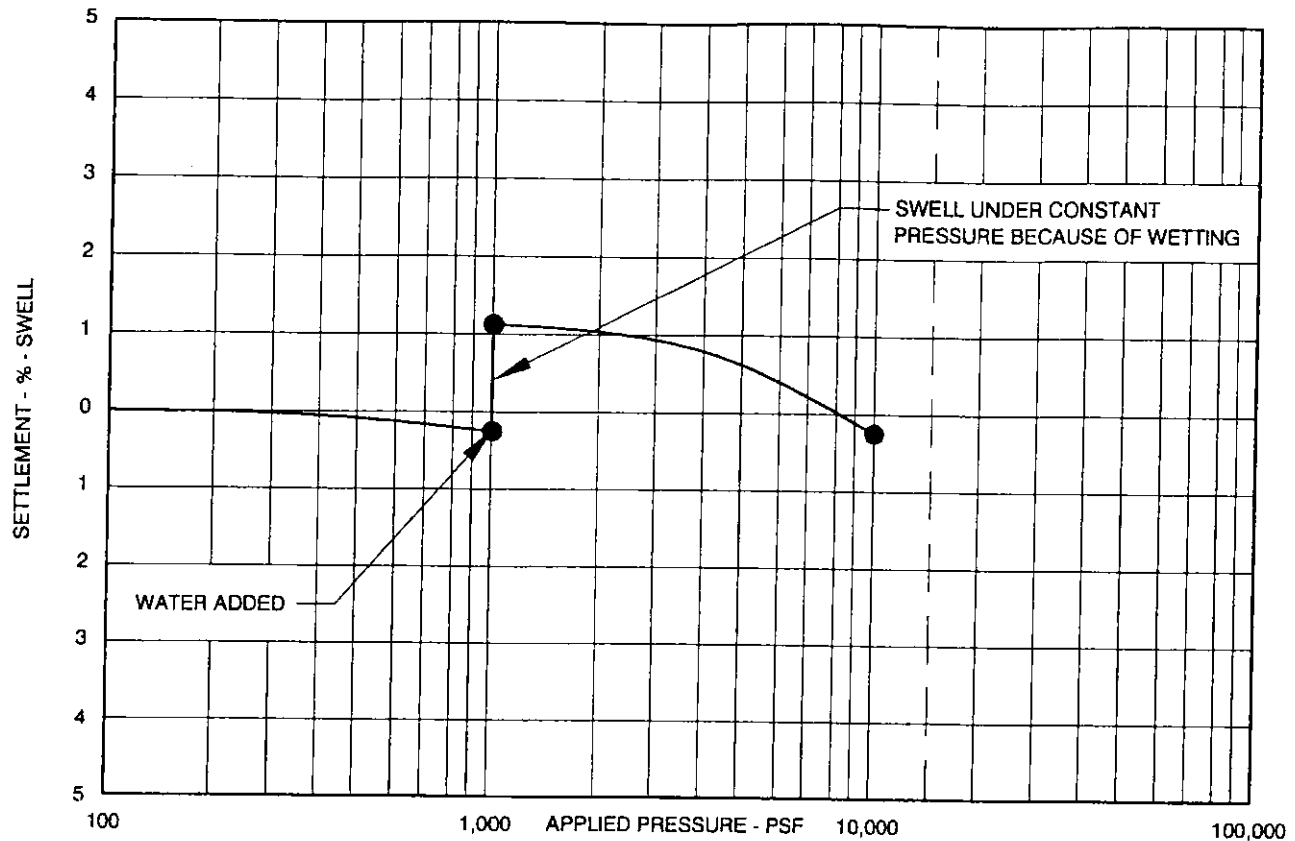
DRY UNIT WT. 94 PCF

LOCATION TEST BORING NO. 37 @ DEPTH OF 4.0'

MOISTURE CONTENT 18 %

SETTLEMENT - SWELL TEST RESULTS

FIGURE 33

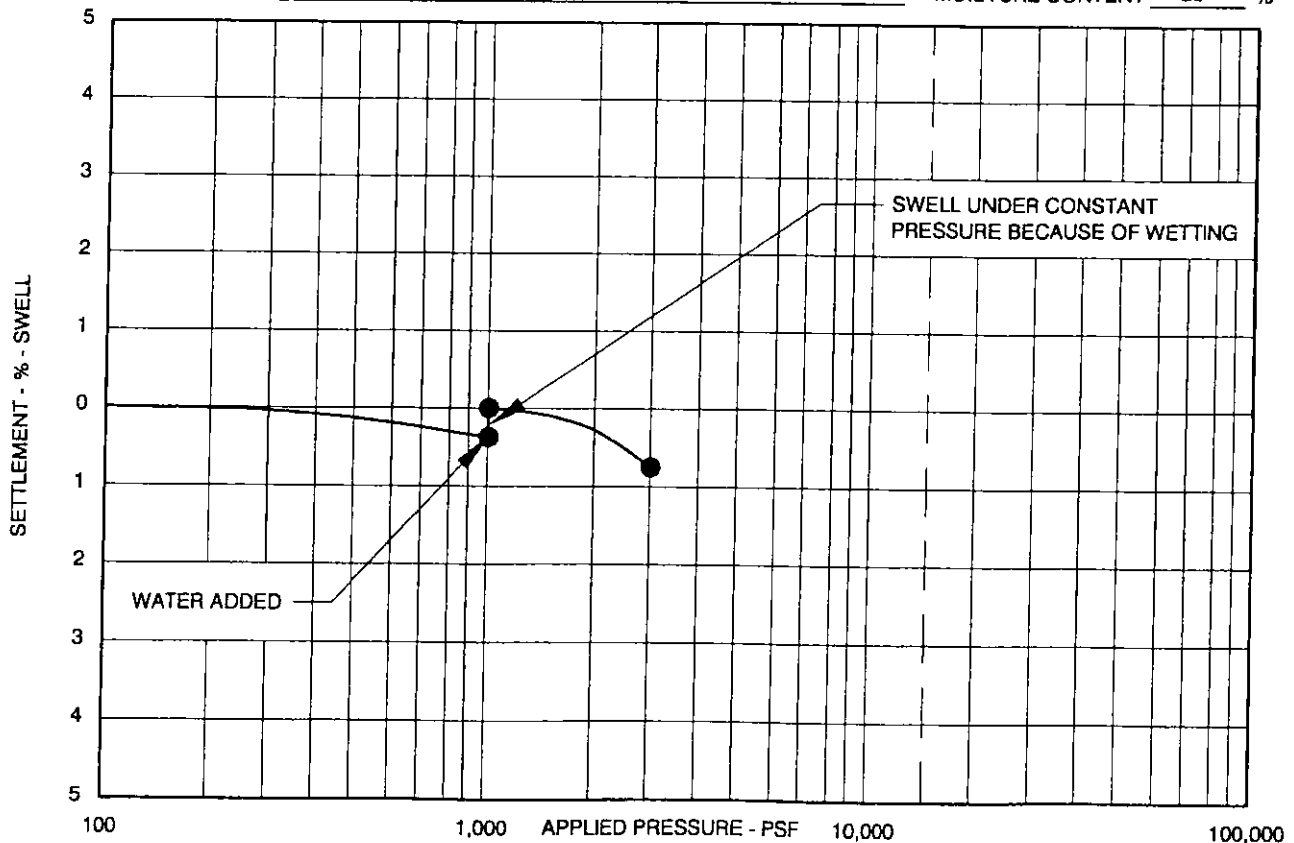


SAMPLE DESCRIPTION CLAYSTONE

LOCATION TEST BORING NO. 37 @ DEPTH OF 29.0'

DRY UNIT WT. 97 PCF

MOISTURE CONTENT 26 %



SAMPLE DESCRIPTION SANDSTONE, VERY CLAYEY

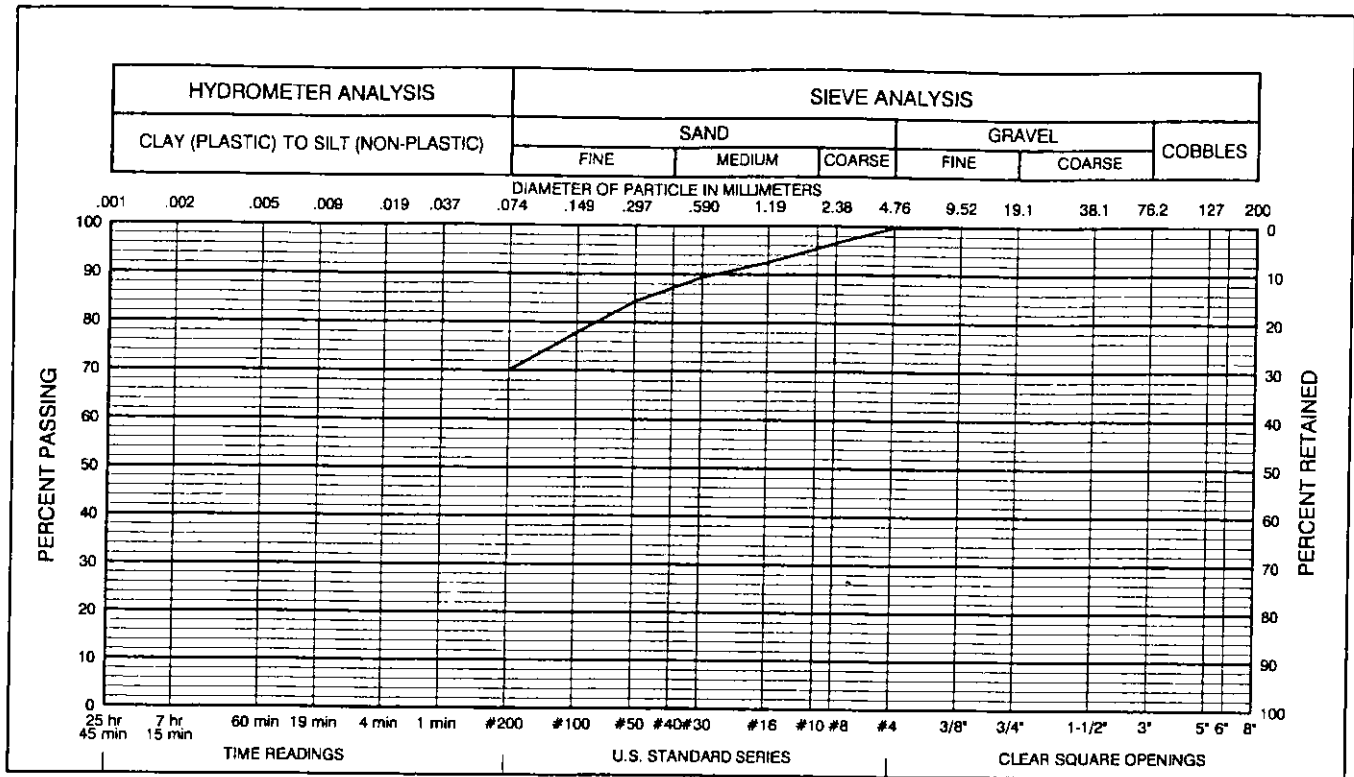
LOCATION TEST BORING NO. 38 @ DEPTH OF 14.0'

DRY UNIT WT. 108 PCF

MOISTURE CONTENT 18 %

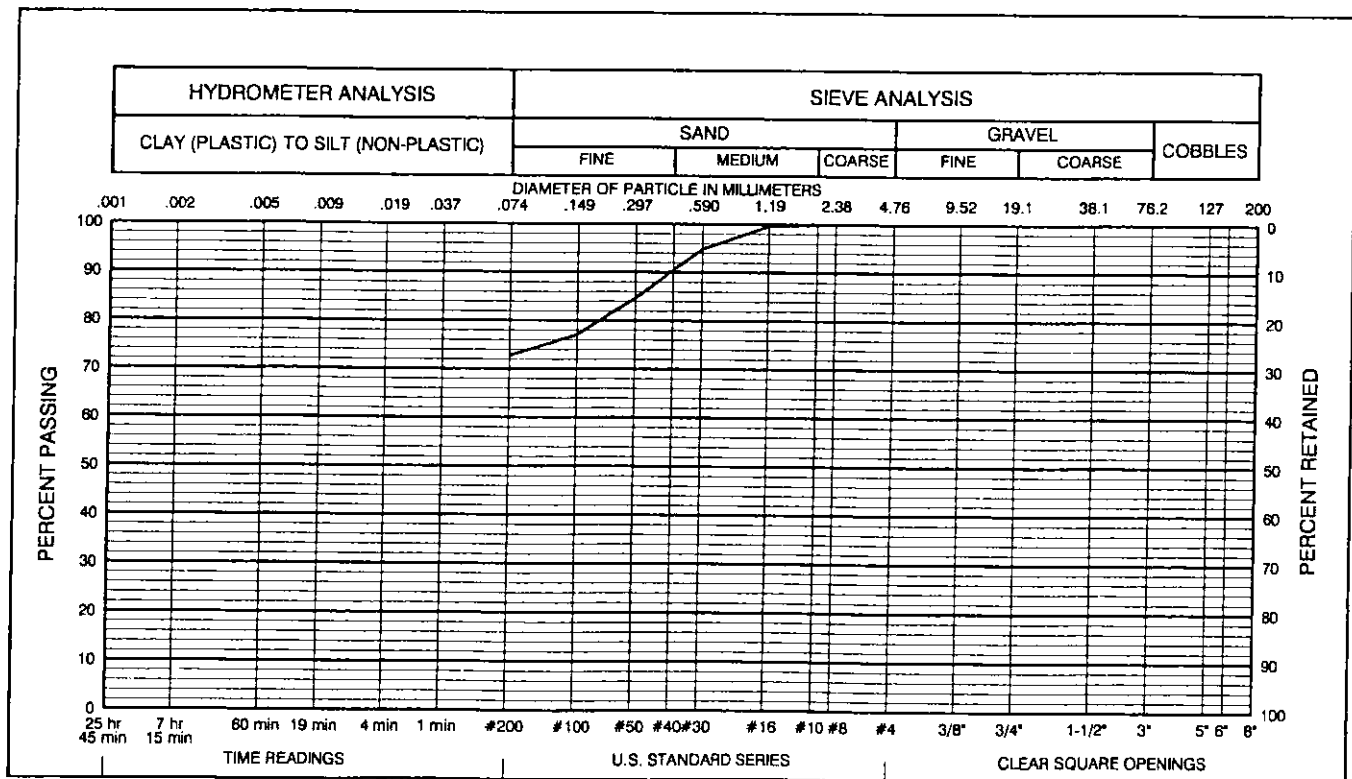
SETTLEMENT - SWELL TEST RESULTS

FIGURE 34



LOCATION TEST BORING NO. 1 @ DEPTH OF 4.0'
SAMPLE DESCRIPTION CLAY, SANDY (CL)
CLASSIFICATION AASHTO A-7-6 (16)

GRAVEL 0 % LIQUID LIMIT 42
SAND 30 % PLASTICITY INDEX 27
SILT & CLAY 70 %

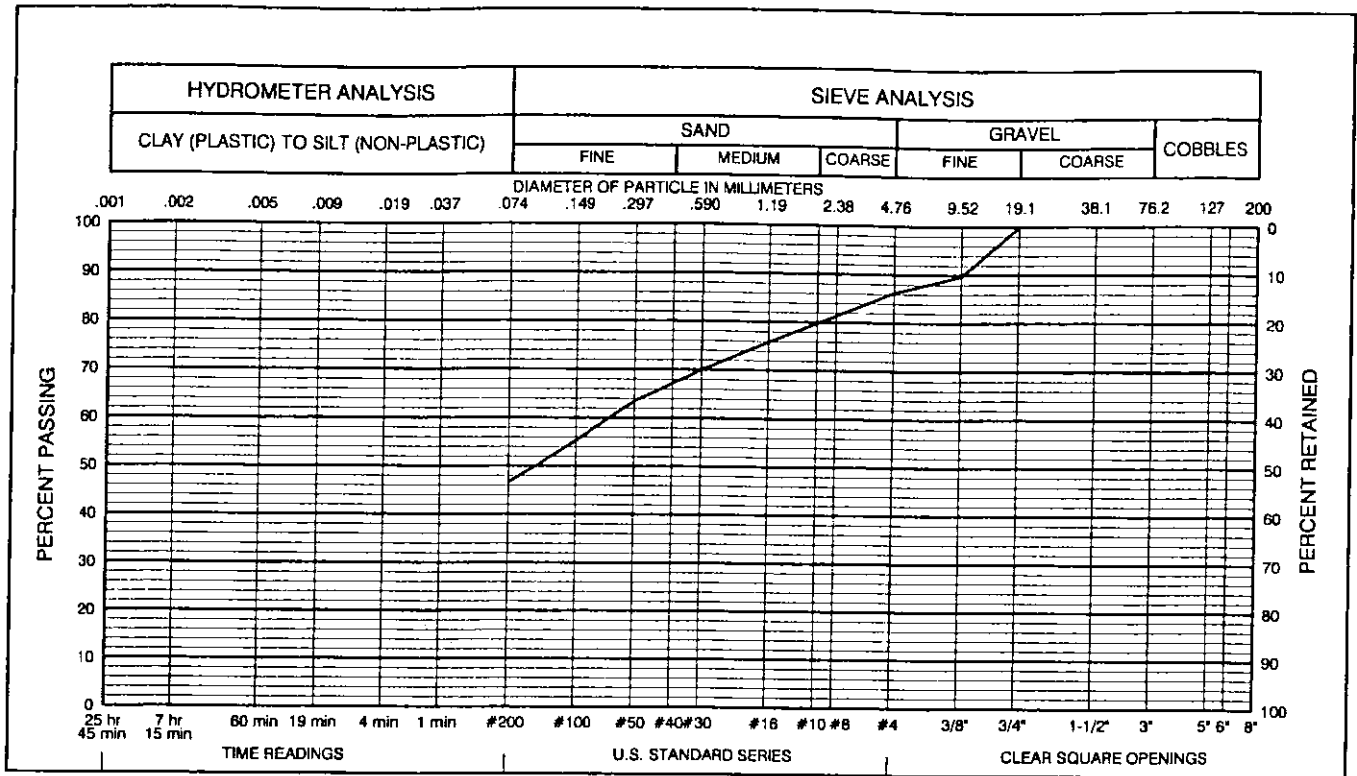


LOCATION TEST BORING NO. 2 @ DEPTH OF 9.0'
SAMPLE DESCRIPTION CLAYSTONE, SANDY (CH)
CLASSIFICATION AASHTO A-7-6 (22)

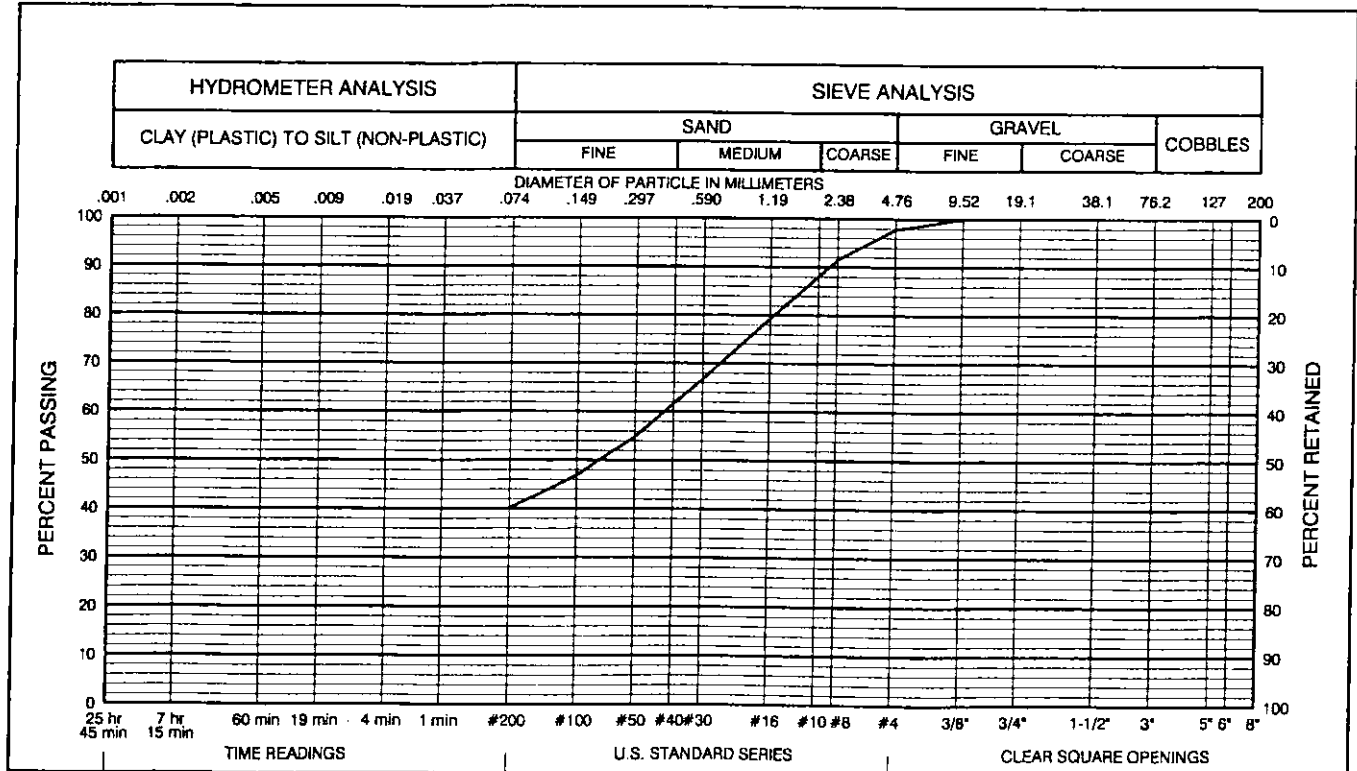
GRAVEL 0 % LIQUID LIMIT 55
SAND 27 % PLASTICITY INDEX 29
SILT & CLAY 73 %

GRADATION TEST RESULTS

FIGURE 35



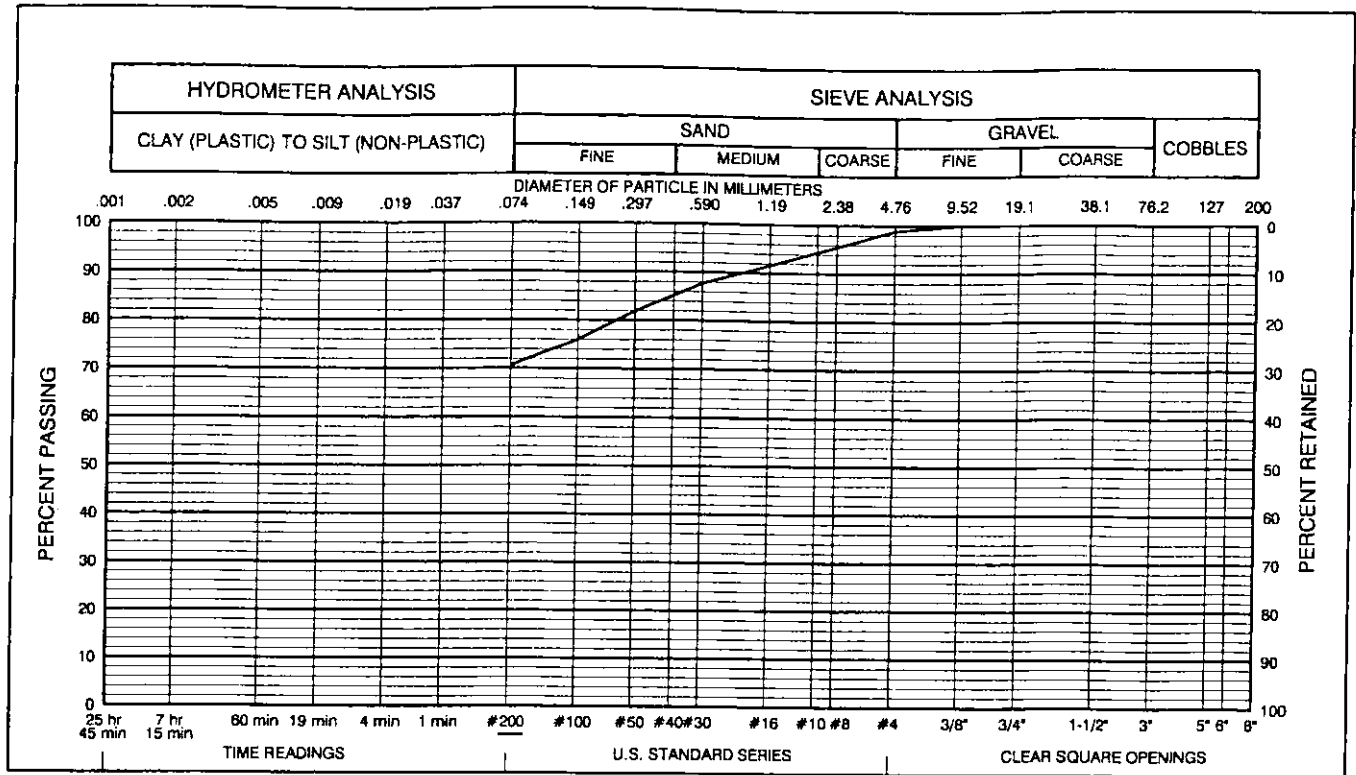
LOCATION TEST BORING NO. 4 @ DEPTH OF 9.0' GRAVEL 14 % LIQUID LIMIT 42
SAMPLE DESCRIPTION SAND, VERY CLAYEY, SLIGHTLY GRAVELLY (SC) SAND 40 % PLASTICITY INDEX 25
CLASSIFICATION AASHTO A-7-6 (7) SILT & CLAY 46 %



LOCATION TEST BORING NO. 5 @ DEPTH OF 4.0' GRAVEL 2 % LIQUID LIMIT 31
SAMPLE DESCRIPTION SAND, VERY CLAYEY (SC) SAND 58 % PLASTICITY INDEX 15
CLASSIFICATION AASHTO A-6 (2) SILT & CLAY 40 %

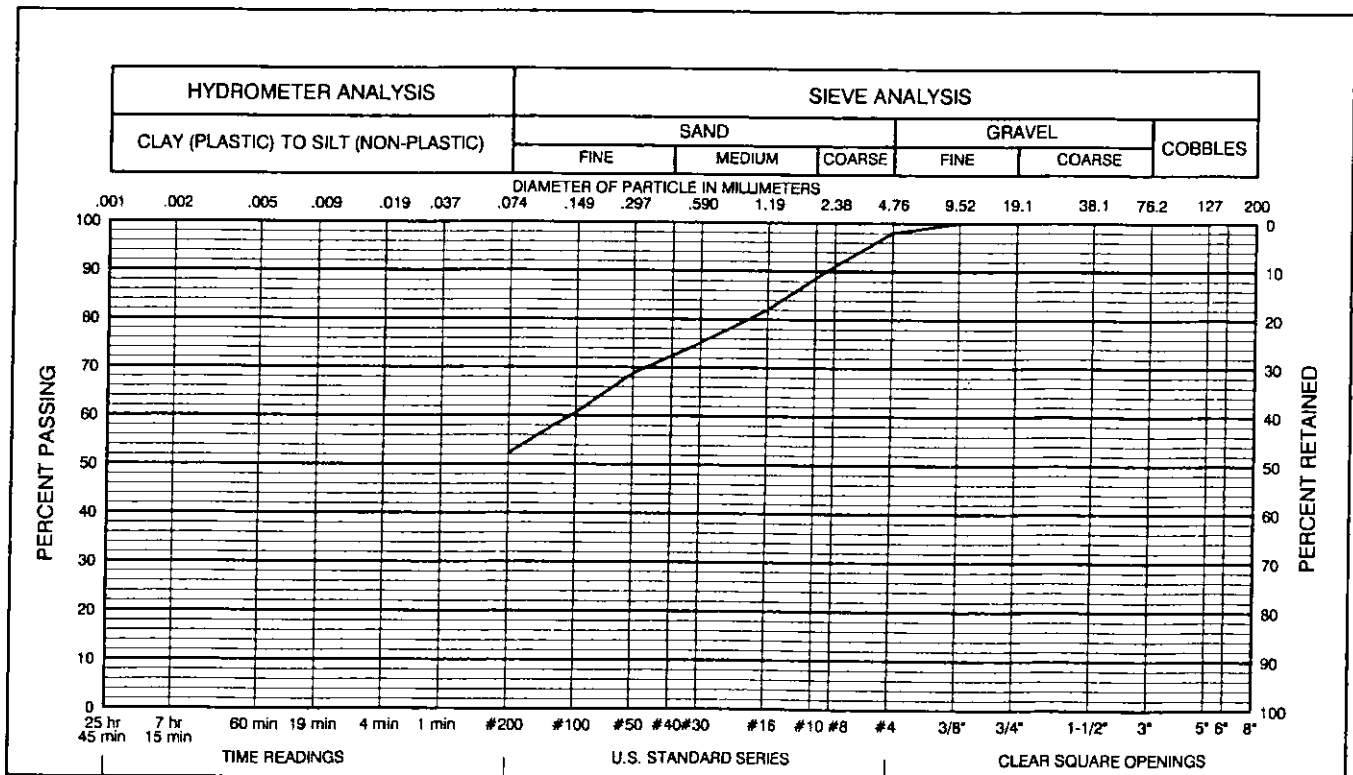
GRADATION TEST RESULTS

FIGURE 36



LOCATION TEST BORING NO. 7 @ DEPTH OF 14.0'
SAMPLE DESCRIPTION CLAY, SANDY (CL)
CLASSIFICATION AASHTO A-6 (14)

GRAVEL	<u>1</u>	%	LIQUID LIMIT	<u>36</u>
SAND	<u>28</u>	%	PLASTICITY INDEX	<u>24</u>
SILT & CLAY	<u>71</u>	%		

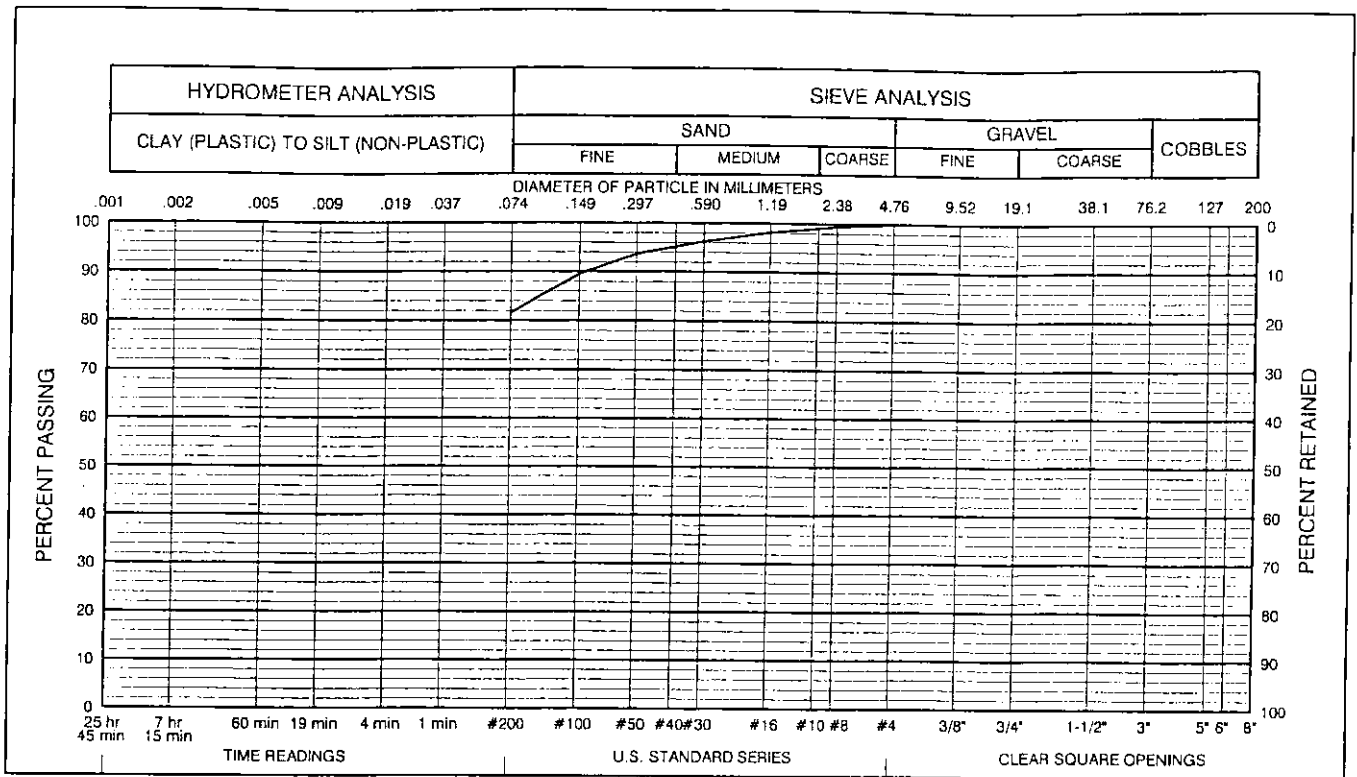


LOCATION TEST BORING NO. 8 @ DEPTH OF 4.0'
SAMPLE DESCRIPTION CLAY, VERY SANDY (SC)
CLASSIFICATION AASHTO A-7-6 (11)

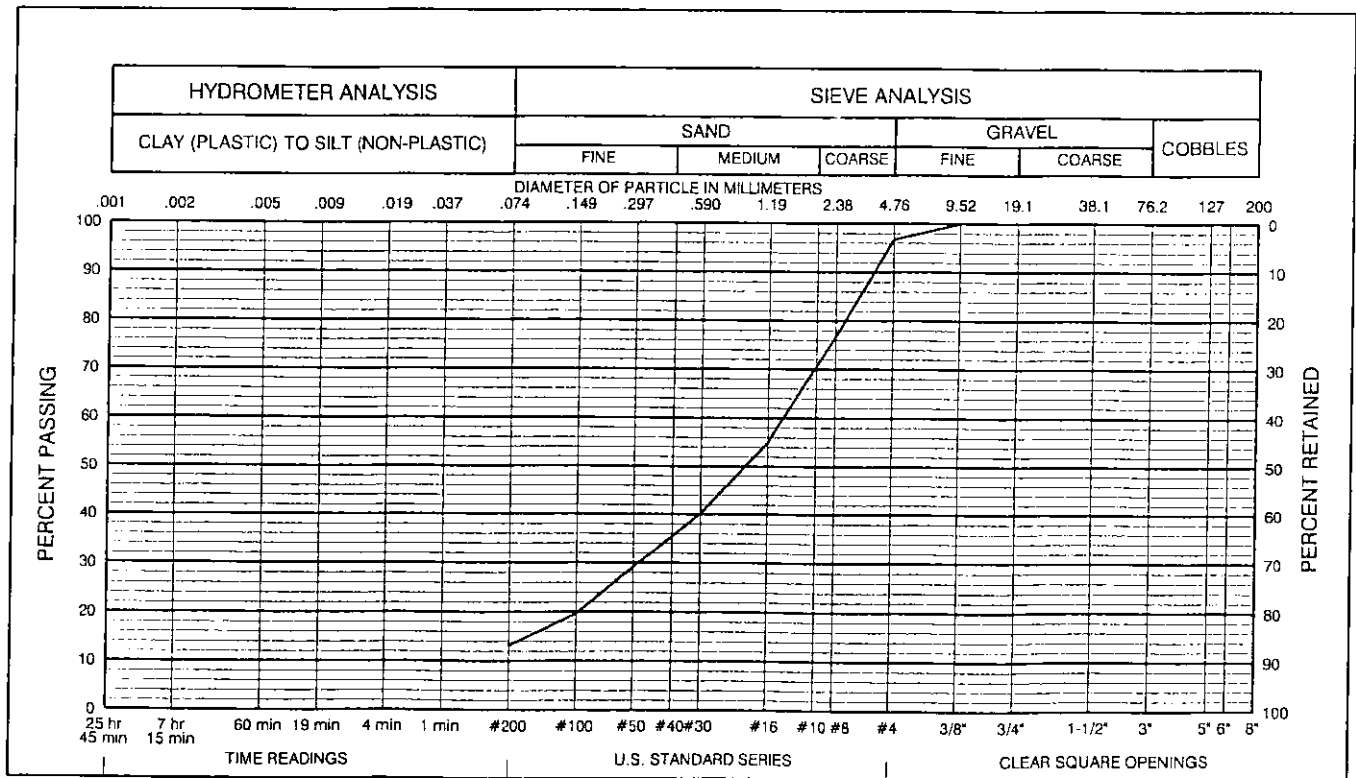
GRAVEL	<u>2</u>	%	LIQUID LIMIT	<u>45</u>
SAND	<u>46</u>	%	PLASTICITY INDEX	<u>29</u>
SILT & CLAY	<u>52</u>	%		

GRADATION TEST RESULTS

FIGURE 37



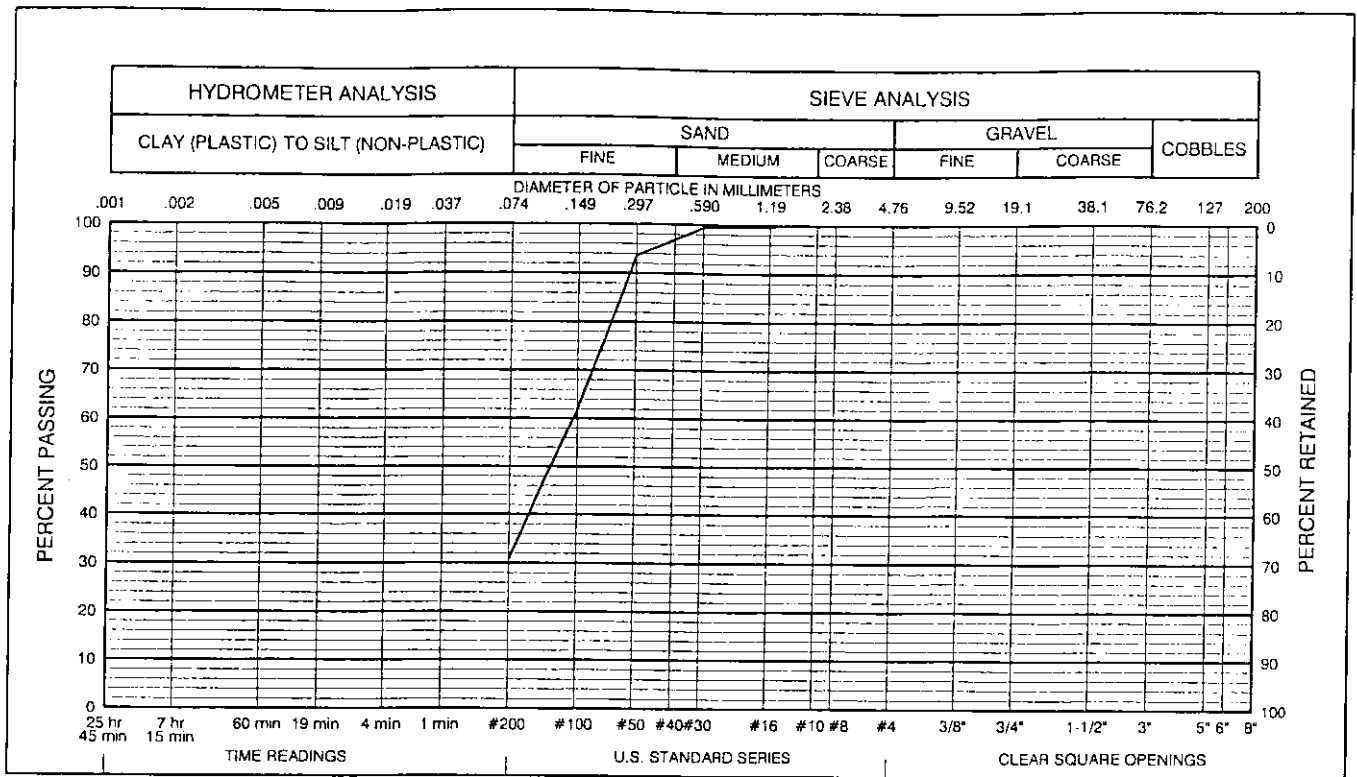
LOCATION TEST BORING NO. 9 @ DEPTH OF 4.0' GRAVEL 0 % LIQUID LIMIT 52
SAMPLE DESCRIPTION CLAY, SANDY (CH) SAND 18 % PLASTICITY INDEX 34
CLASSIFICATION AASHTO A-7-6 (28) SILT & CLAY 82 %



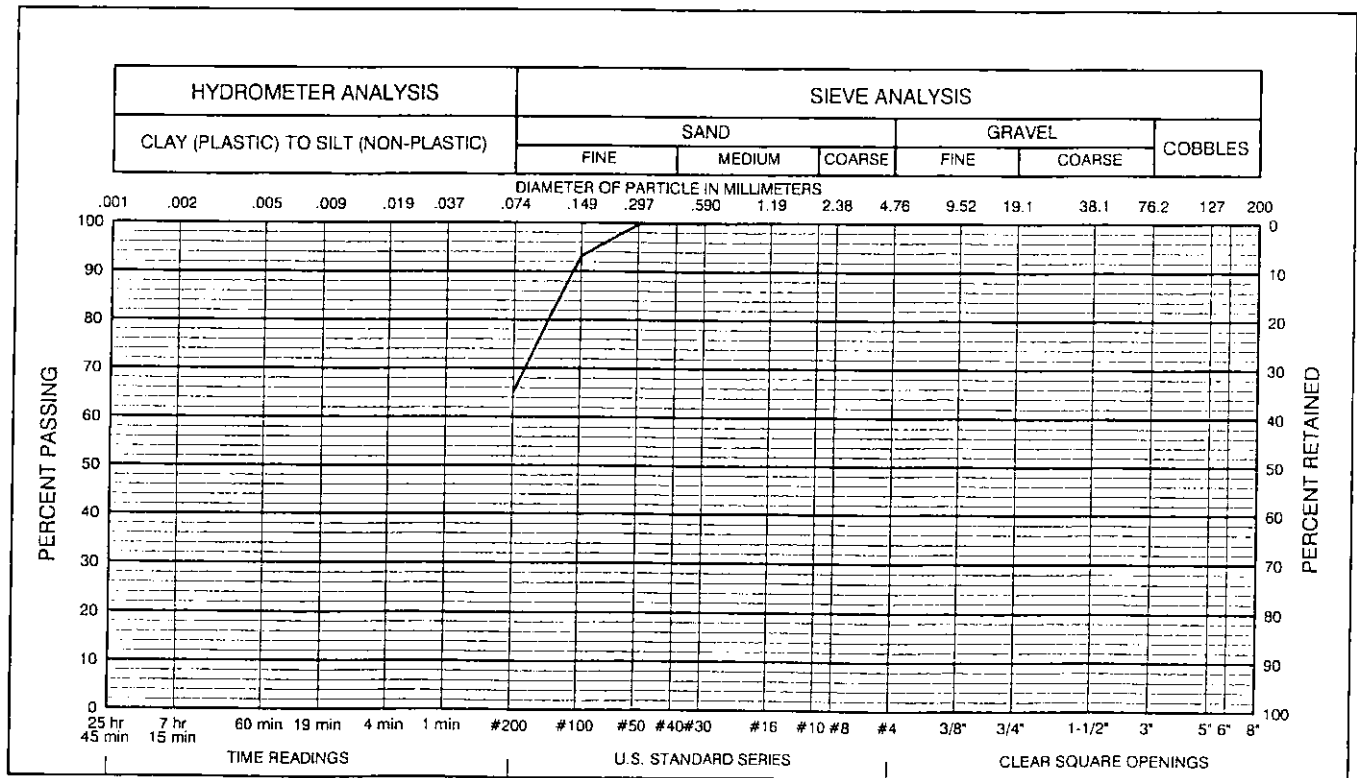
LOCATION TEST BORING NO. 10 @ DEPTH OF 4.0' GRAVEL 3 % LIQUID LIMIT NV
SAMPLE DESCRIPTION SAND, SILTY, TRACE GRAVEL SAND 84 % PLASTICITY INDEX NP
CLASSIFICATION AASHTO A-1-b SILT & CLAY 13 %

GRADATION TEST RESULTS

FIGURE 38



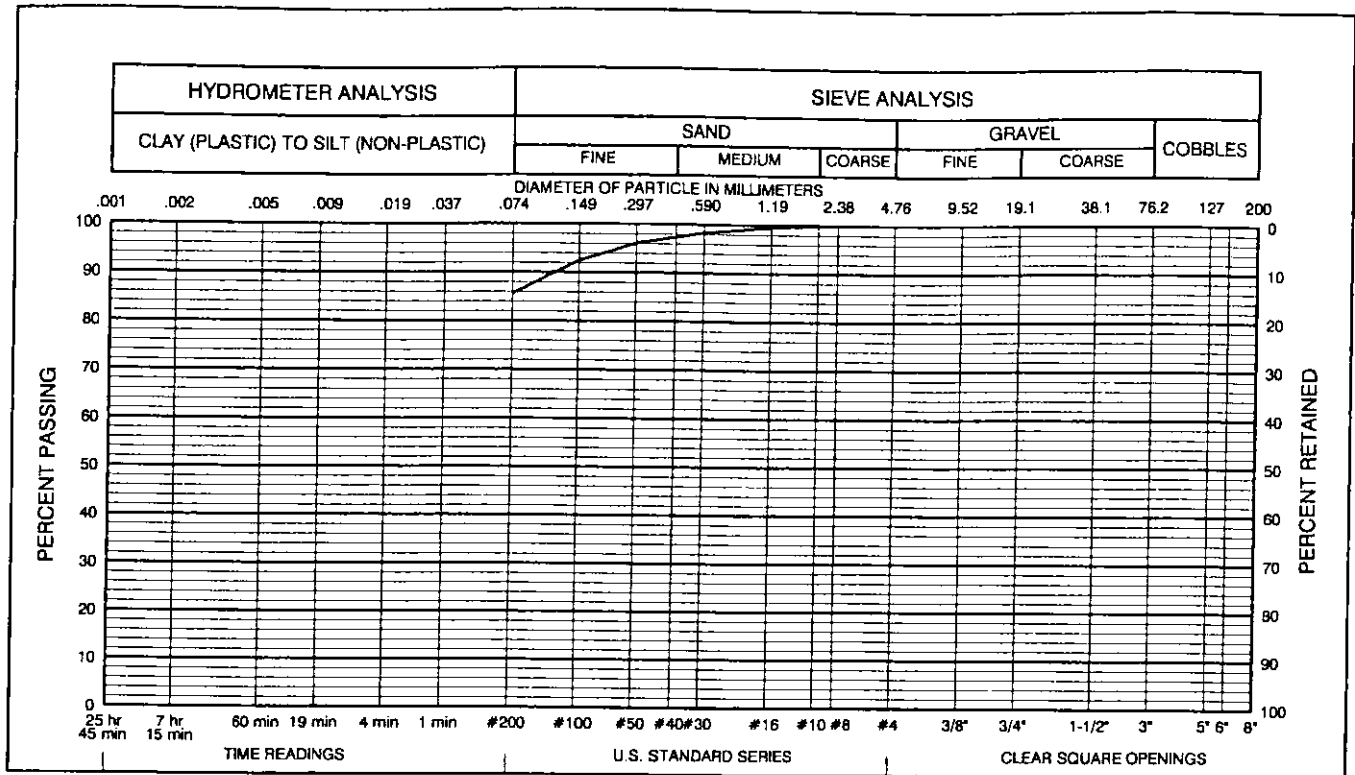
LOCATION TEST BORING NO. 12 @ DEPTH OF 14.0' GRAVEL 0 % LIQUID LIMIT NV
SAMPLE DESCRIPTION SANDSTONE, VERY SILTY (SM) SAND 69 % PLASTICITY INDEX NP
CLASSIFICATION AASHTO A-2-4 SILT & CLAY 31 %



LOCATION TEST BORING NO. 13 @ DEPTH OF 19.0' GRAVEL 0 % LIQUID LIMIT 42
SAMPLE DESCRIPTION CLAYSTONE, VERY SANDY SAND 35 % PLASTICITY INDEX 24
CLASSIFICATION AASHTO A-7-6 (13) SILT & CLAY 65 %

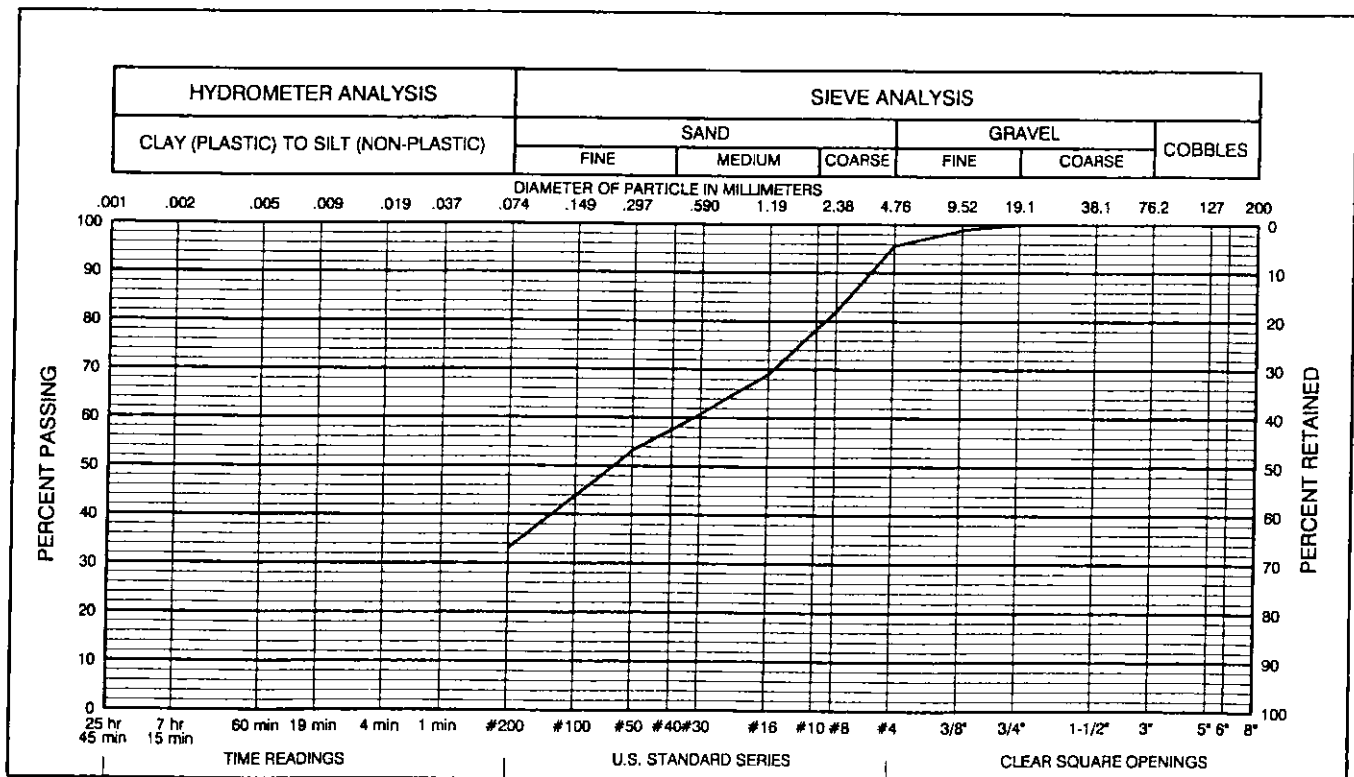
GRADATION TEST RESULTS

FIGURE 39



LOCATION TEST BORING NO. 16 @ DEPTH OF 4.0'
SAMPLE DESCRIPTION CLAY, SLIGHTLY SANDY (CL)
CLASSIFICATION AASHTO A-7-6 (23)

GRAVEL 0 % LIQUID LIMIT 43
SAND 14 % PLASTICITY INDEX 27
SILT & CLAY 86 %

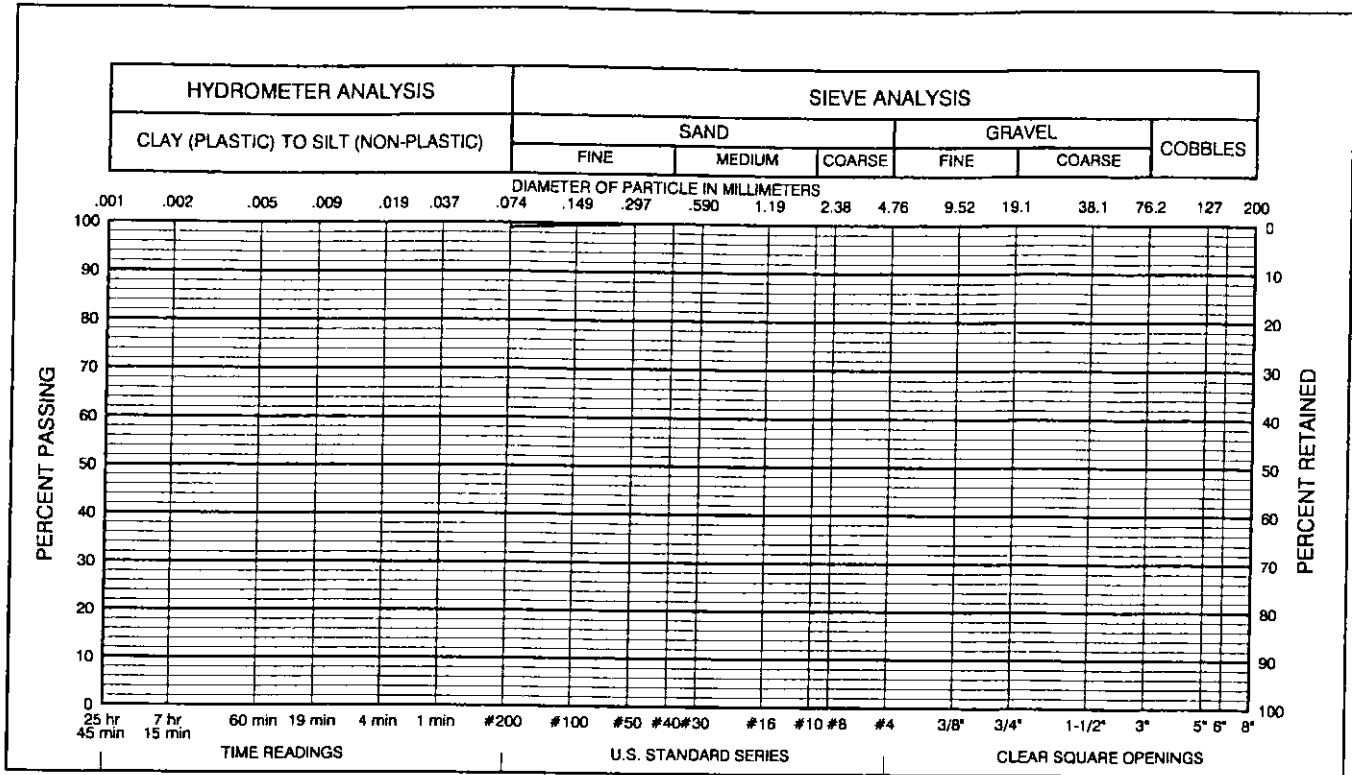


LOCATION TEST BORING NO. 18 @ DEPTH OF 4.0'
SAMPLE DESCRIPTION SAND, VERY CLAYEY, TRACE GRAVEL (SC)
CLASSIFICATION AASHTO A-2-6 (0)

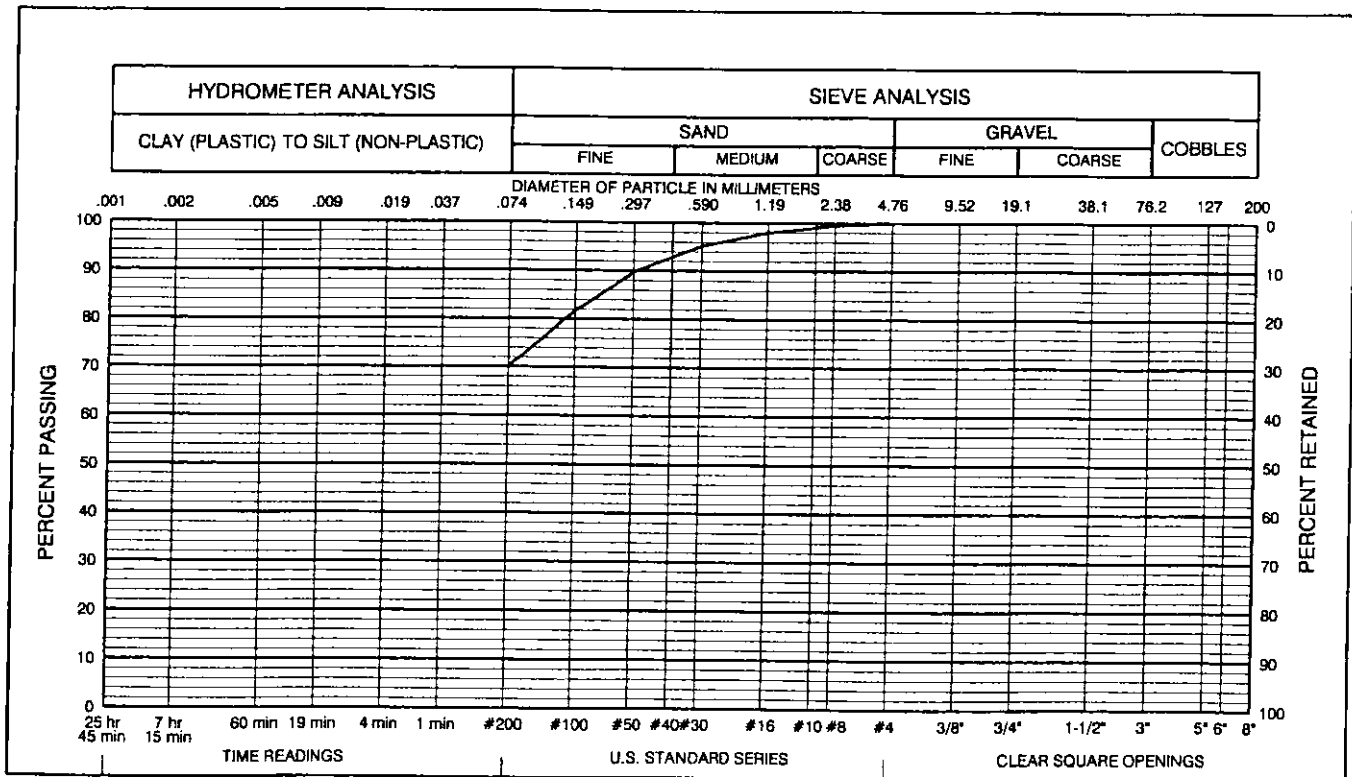
GRAVEL 4 % LIQUID LIMIT 25
SAND 63 % PLASTICITY INDEX 11
SILT & CLAY 33 %

GRADATION TEST RESULTS

FIGURE 40



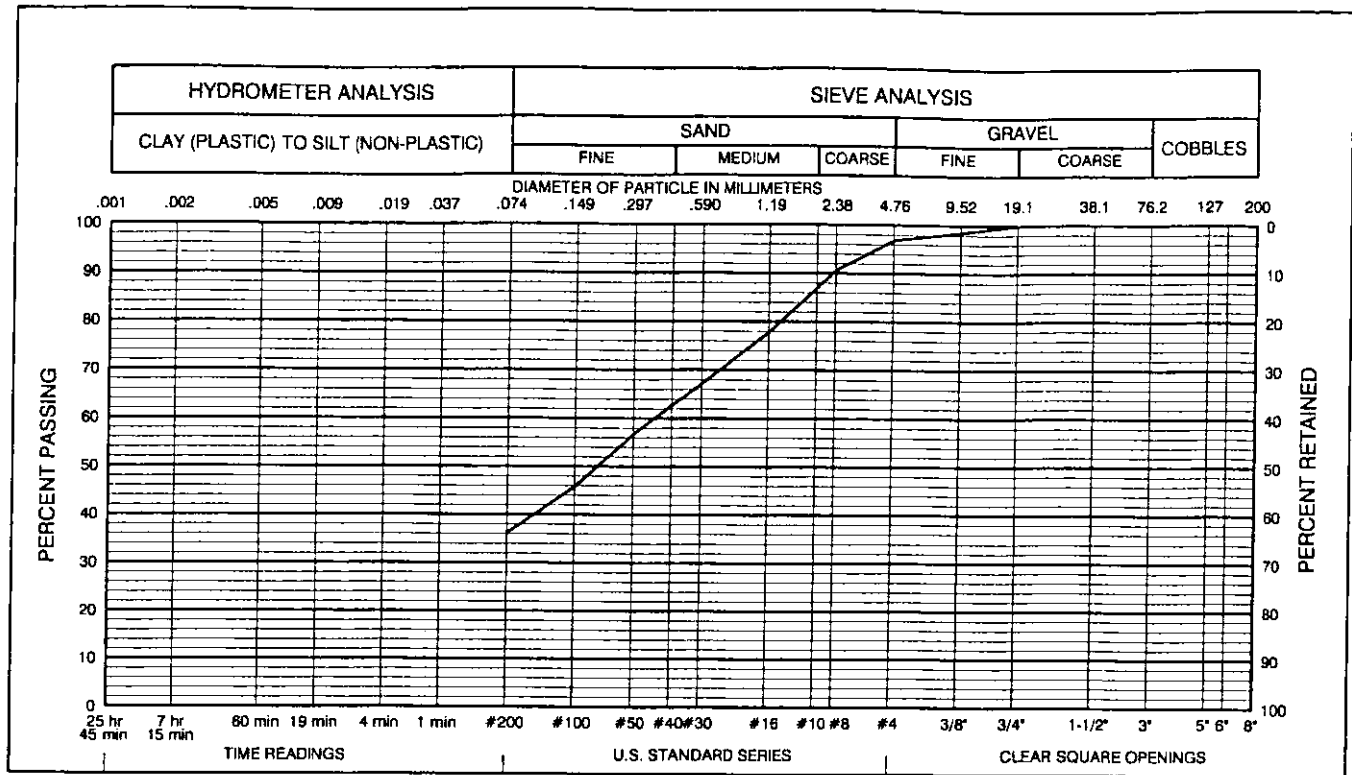
LOCATION TEST BORING NO. 19 @ DEPTH OF 9.0' GRAVEL 0 % LIQUID LIMIT 61
SAMPLE DESCRIPTION CLAYSTONE (CH) SAND 1 % PLASTICITY INDEX 36
CLASSIFICATION AASHTO A-7-6 (42) SILT & CLAY 99 %



LOCATION TEST BORING NO. 23 @ DEPTH OF 4.0' GRAVEL 0 % LIQUID LIMIT 53
SAMPLE DESCRIPTION CLAY, SANDY (CH) SAND 30 % PLASTICITY INDEX 33
CLASSIFICATION AASHTO A-7-6 (22) SILT & CLAY 70 %

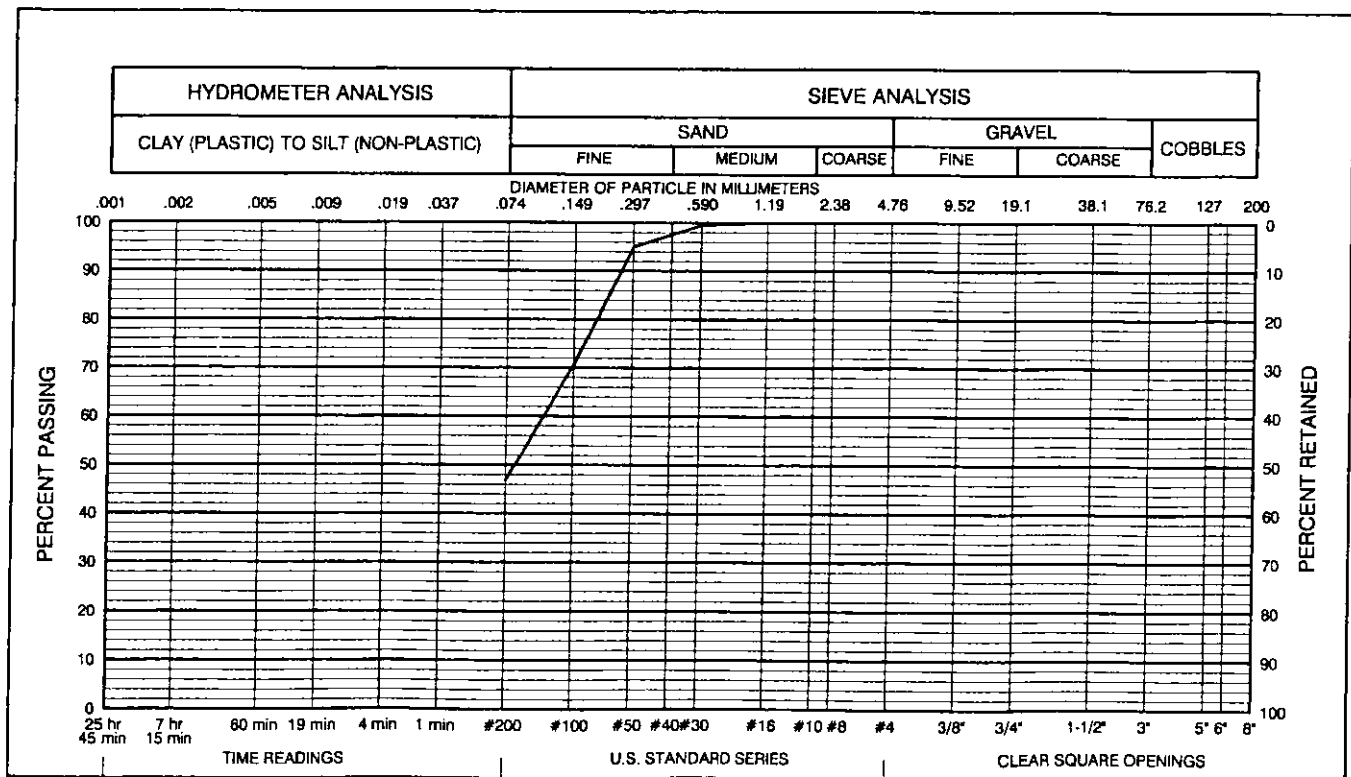
GRADATION TEST RESULTS

FIGURE 41



LOCATION TEST BORING NO. 24 @ DEPTH OF 9.0'
SAMPLE DESCRIPTION SAND, VERY CLAYEY
CLASSIFICATION AASHTO A-6 (1)

GRAVEL 3 % LIQUID LIMIT 29
SAND 61 % PLASTICITY INDEX 17
SILT & CLAY 36 %

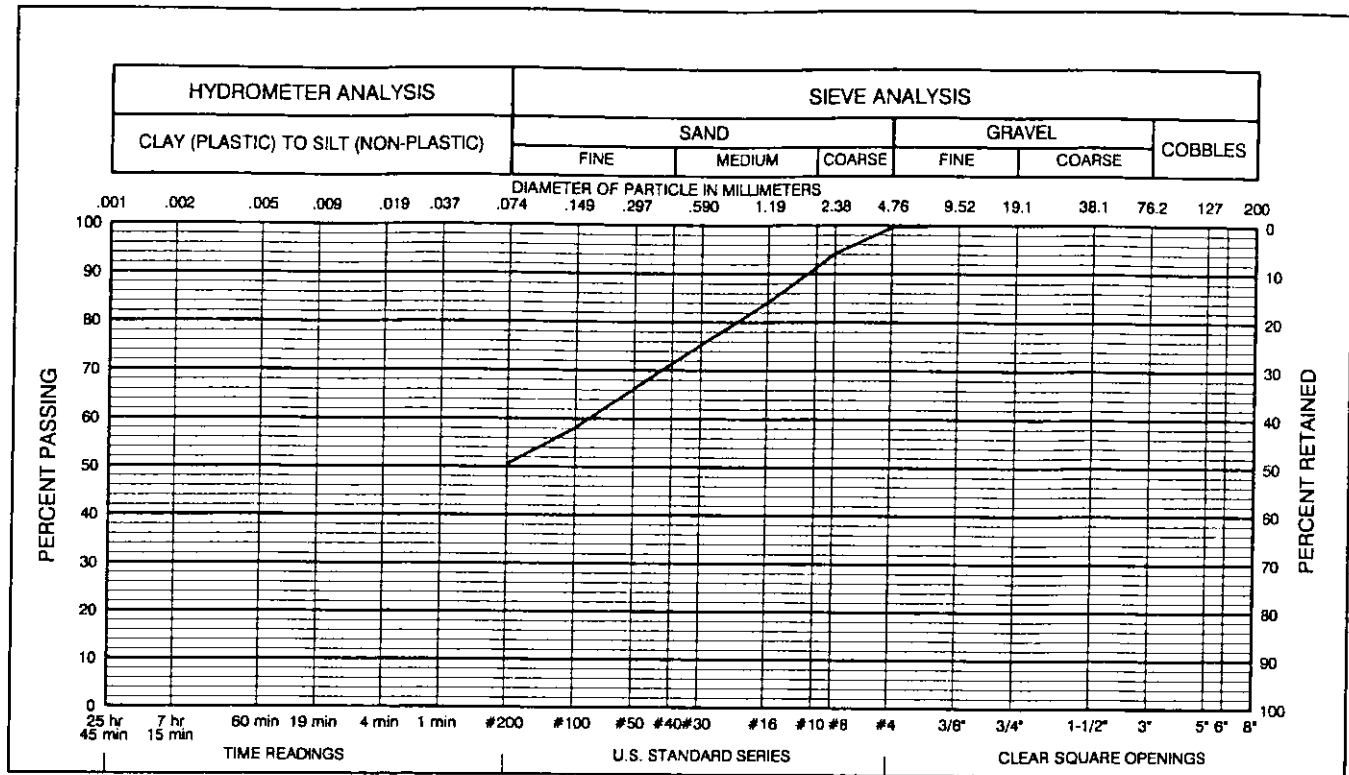


LOCATION TEST BORING NO. 29 @ DEPTH OF 14.0'
SAMPLE DESCRIPTION SANDSTONE, VERY SILTY (SM)
CLASSIFICATION AASHTO A-4

GRAVEL 0 % LIQUID LIMIT NV
SAND 53 % PLASTICITY INDEX NP
SILT & CLAY 47 %

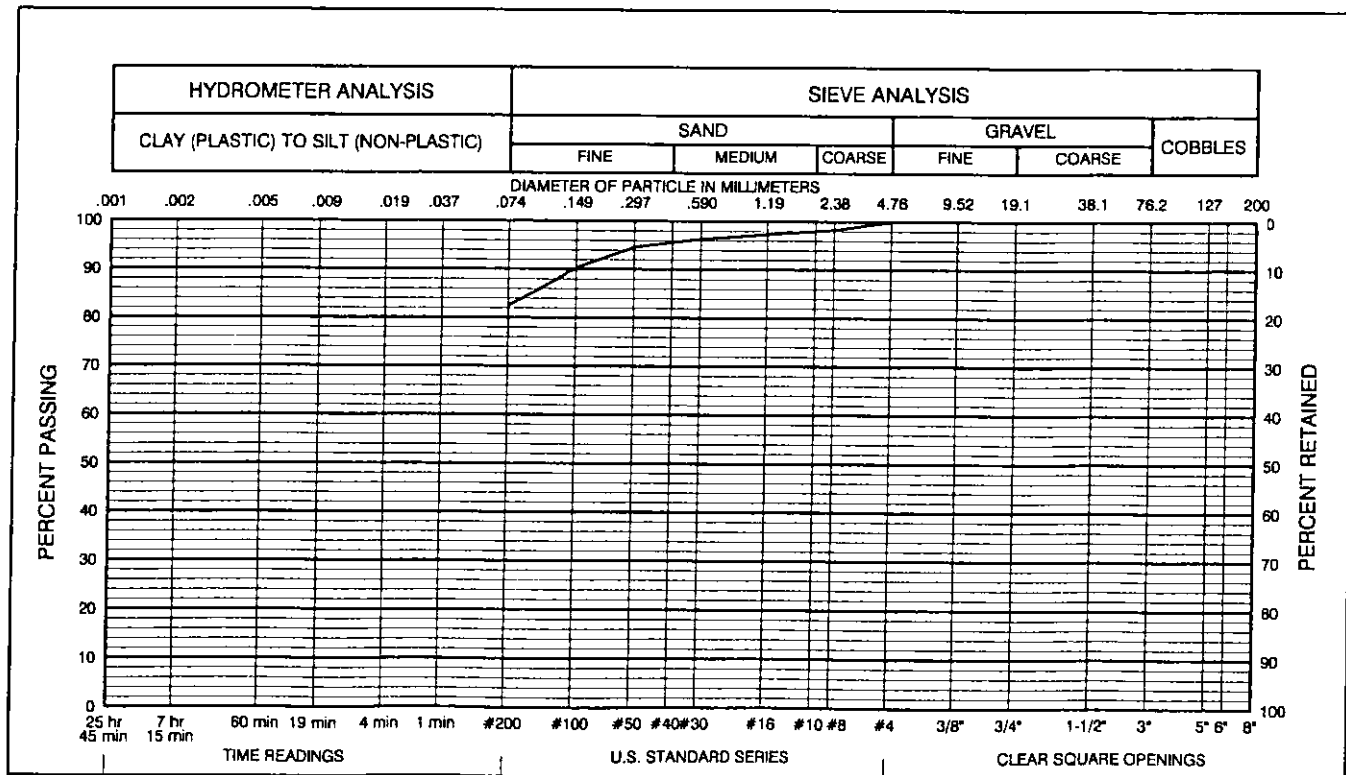
GRADATION TEST RESULTS

FIGURE 42



LOCATION TEST BORING NO. 33 @ DEPTH OF 1.0'
SAMPLE DESCRIPTION CLAY, VERY SANDY
CLASSIFICATION AASHTO A-6 (8)

GRAVEL 0 % LIQUID LIMIT 40
SAND 49 % PLASTICITY INDEX 25
SILT & CLAY 51 %



LOCATION TEST BORING NO. 35 @ DEPTH OF 4.0'
SAMPLE DESCRIPTION CLAY, SANDY (CH)
CLASSIFICATION AASHTO A-7-6 (36)

GRAVEL 0 % LIQUID LIMIT 60
SAND 18 % PLASTICITY INDEX 42
SILT & CLAY 82 %

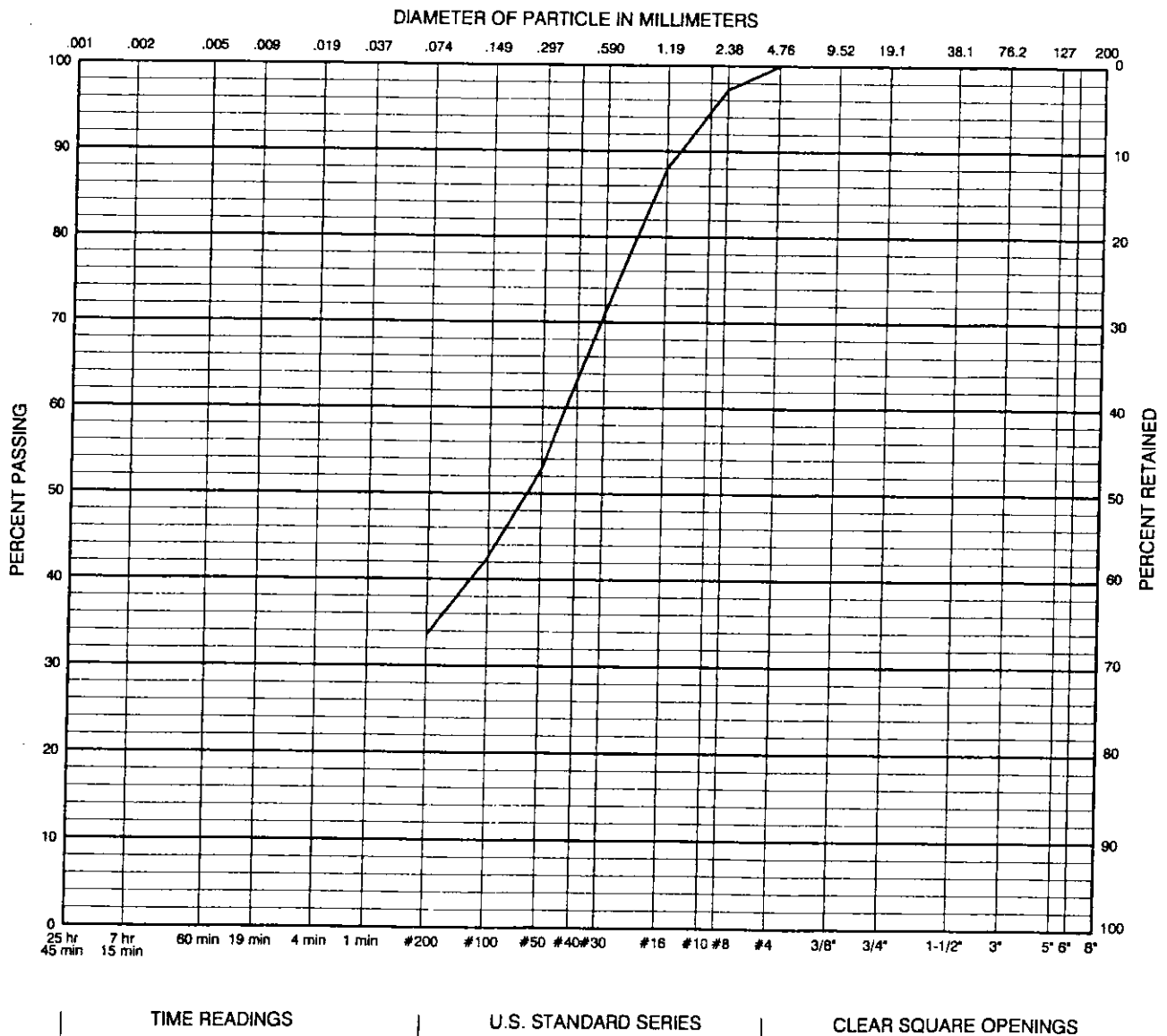
GRADATION TEST RESULTS

FIGURE 43



A. G. WASSENAAR, INC.
GEOTECHNICAL CONSULTANTS

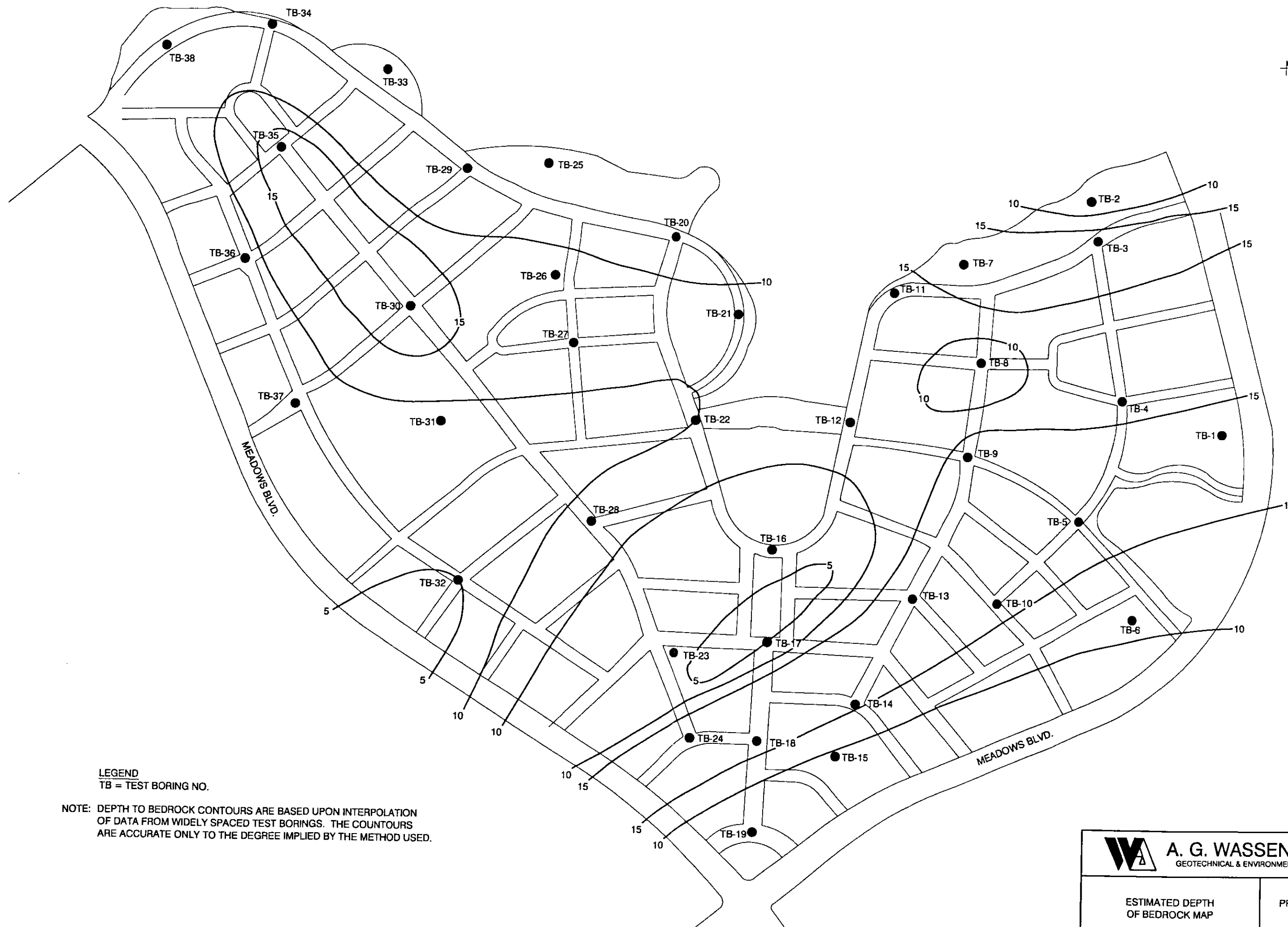
HYDROMETER ANALYSIS	SIEVE ANALYSIS				
CLAY (PLASTIC) TO SILT (NON-PLASTIC)	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE
					COBBLES



LOCATION TEST BORING NO. 38 @ DEPTH OF 14.0'
SAMPLE DESCRIPTION SANDSTONE, VERY CLAYEY (SC)
CLASSIFICATION AASHTO A-2-7 (3)

GRAVEL 0 % LIQUID LIMIT 50
SAND 66 % PLASTICITY INDEX 24
SILT & CLAY 34 %

GRADATION TEST RESULTS
FIGURE 44



LEGEND
TB = TEST BORING NO.

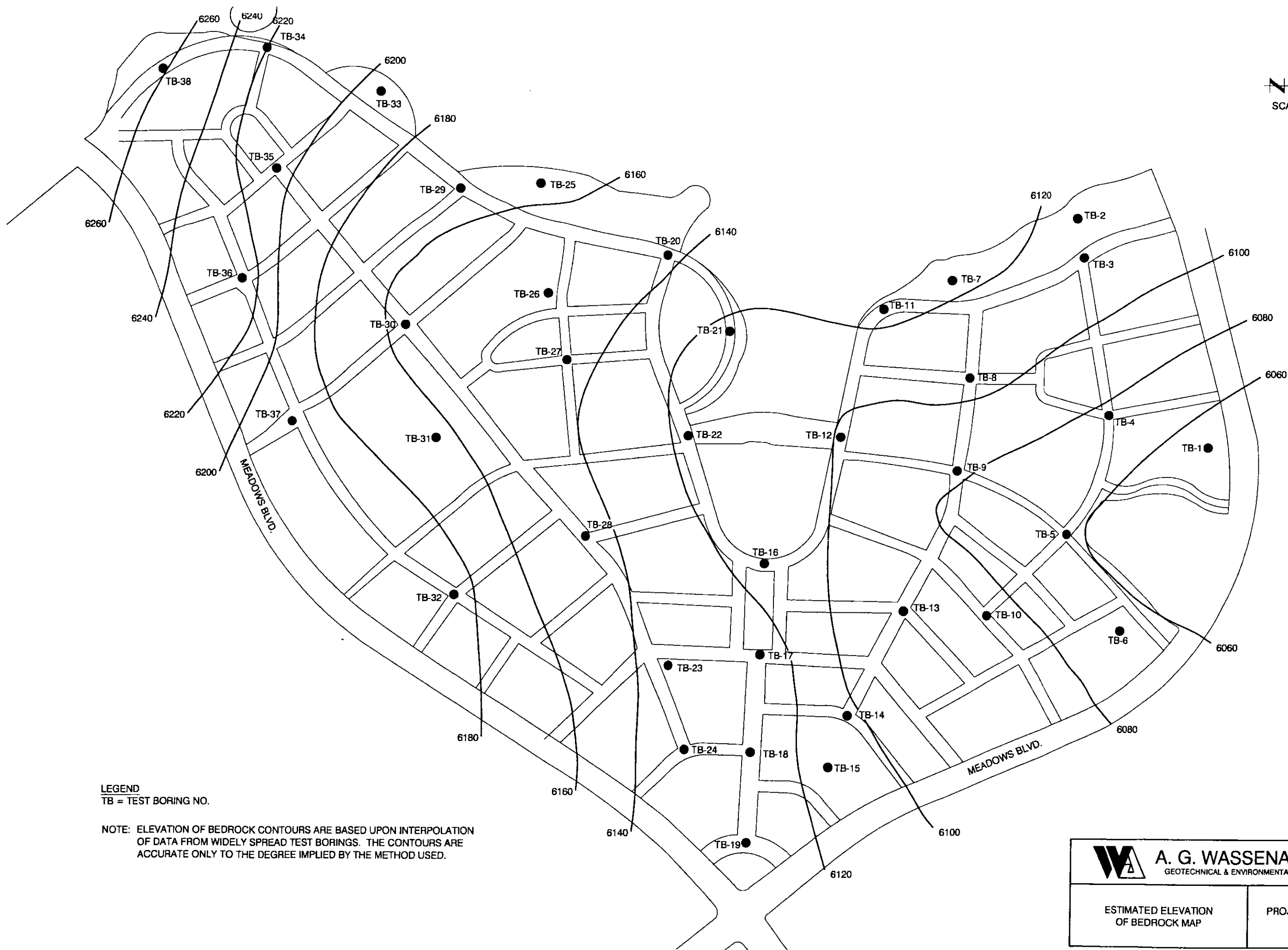
NOTE: DEPTH TO BEDROCK CONTOURS ARE BASED UPON INTERPOLATION
OF DATA FROM WIDELY SPACED TEST BORINGS. THE COUNTOURS
ARE ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

 **A. G. WASSENAAR, INC.**
GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS

ESTIMATED DEPTH
OF BEDROCK MAP

PROJECT NO. 72607
FIGURE 45

SCALE: 1" = 400'

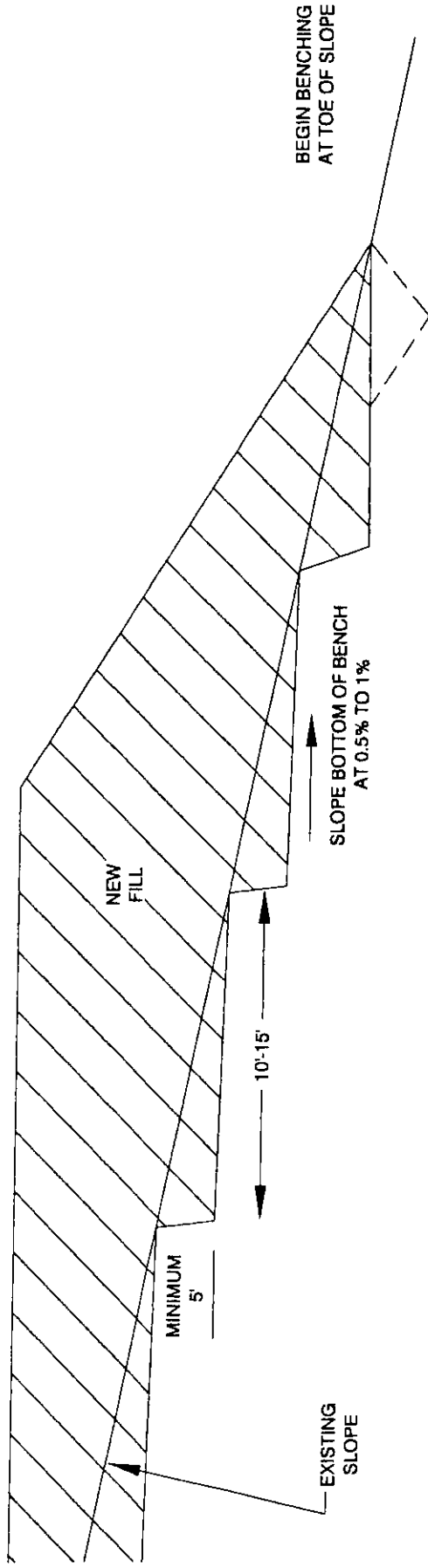


LEGEND
TB = TEST BORING NO.

NOTE: ELEVATION OF BEDROCK CONTOURS ARE BASED UPON INTERPOLATION OF DATA FROM WIDELY SPREAD TEST BORINGS. THE CONTOURS ARE ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

 A. G. WASSENAAR, INC. GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS	
ESTIMATED ELEVATION OF BEDROCK MAP	PROJECT NO. 72607 FIGURE 46

CONTINUE BENCHING UNTIL NATURAL SLOPE
FLATTENS OR SLOPE DAYLIGHTS



A KEYWAY MAY BE REQUIRED BY GEOTECHNICAL
ENGINEER DEPENDING UPON SLOPE CONFIGURATION.

BENCHING REQUIRED WHEN EXISTING
SLOPE IS 5 : 1 (HORIZONTAL : VERTICAL) OR GREATER

NOTES: DRAINS MAY BE REQUIRED IF GROUND
WATER IS ENCOUNTERED.

ADDITIONAL CUTTING BACK OF SOME SLOPES
MAY BE REQUIRED BY GEOTECHNICAL ENGINEER
IF SLOPE INSTABILITY IS NOTED.

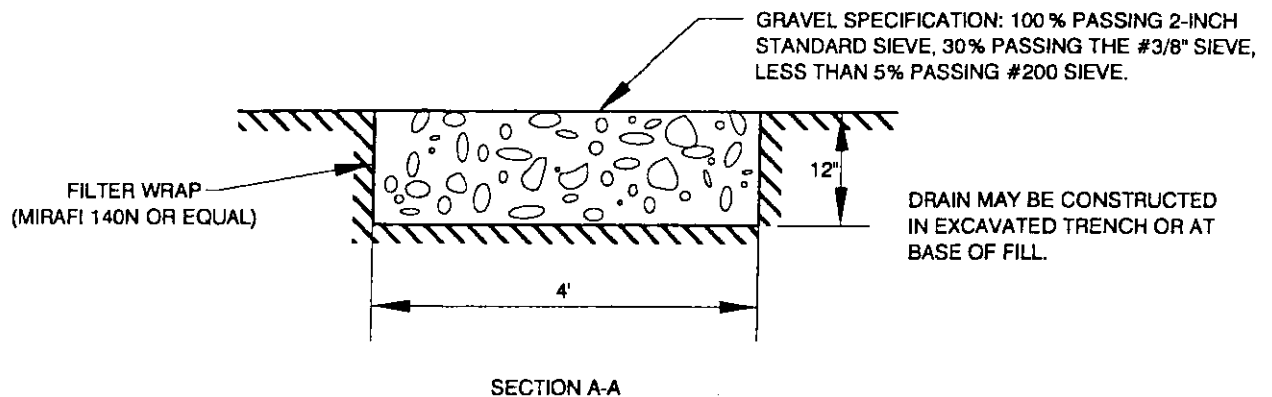
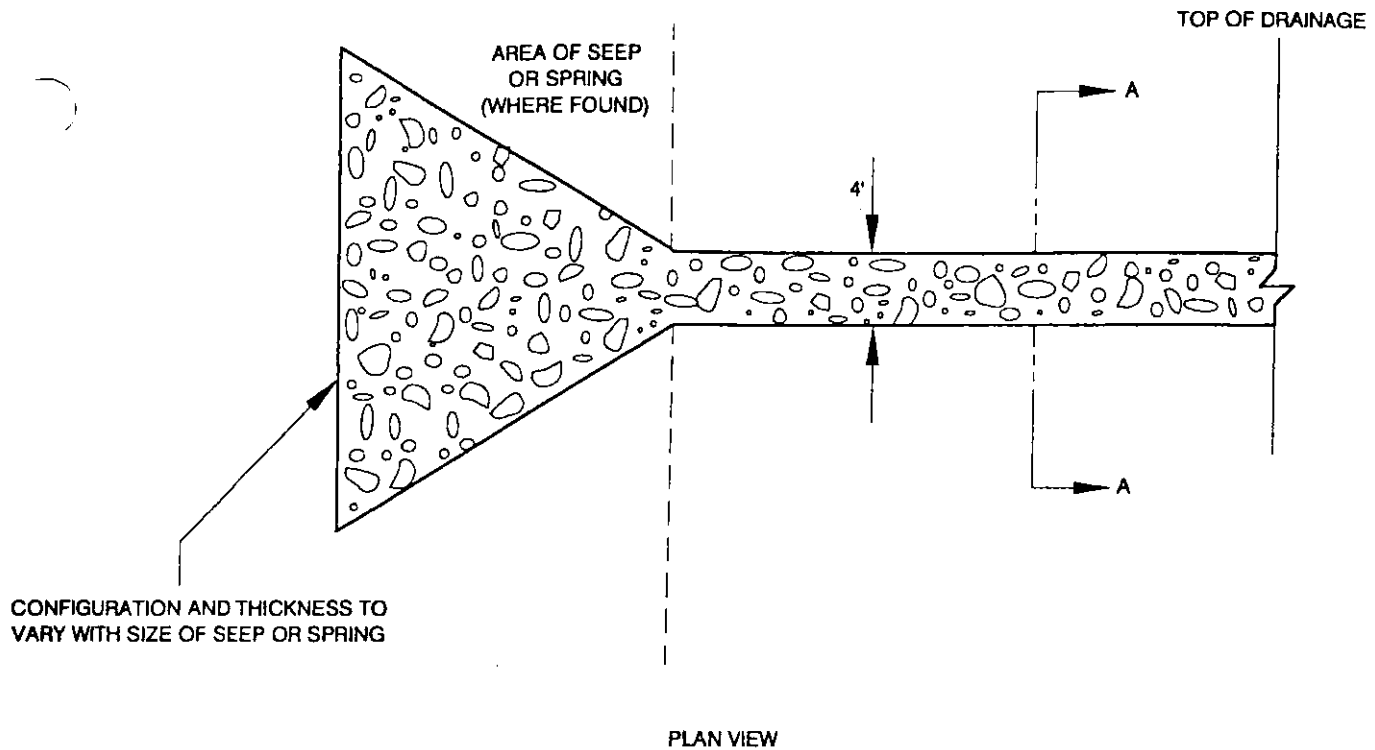
NOT TO SCALE



A. G. WASSEENAAR, INC.
GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS

GENERALIZED
BENCHING
DETAIL

PROJECT NO. 72607
FIGURE 47



NOTE:

1. DRAINS TO BE PLACE AT BASE OF NATURAL DRAINAGE.
2. FLAIR DRAIN ONLY TO COVER NATURAL SEEPS OR SPRINGS (IF FOUND).
3. GEOTECHNICAL ENGINEER TO FIELD LOCATE SEEPS AND SPRINGS AND VERIFY CONFIGURATION OF BLANKET AT SEEP OR SPRING.

 A. G. WASSENAAR, INC. GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS	
DRAIN DETAIL FOR NATURAL DRAINAGES	PROJECT NO. 72607 FIGURE 48



A. G. WASSENAAR, INC.

PHONE: 303/759-8100

FAX: 303/756-2920

2180 S. IVANHOE, SUITE 5

DENVER, COLORADO 80222

GEOTECHNICAL CONSULTANTS

SUMMARY OF LABORATORY TEST RESULTS

Test Boring No.	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell (+) / Consolidation (-) (%) *	Swell Pressure (ksf)	% Passing #200 Sieve	Atterberg Liquid Limits	Atterberg Plasticity Index	pH	Resistivity (ohm/cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
1	4	Clay, sandy	118	13	+4.5	9.5	70	42	27				
2	9	Claystone, sandy	96	26	+4.4	19	73	55	29				
	19	Sandstone, silty								7.0	1,462.0	< 50	0.0012
3	4	Clay, sandy	106	12	+2.7	4.3							
	9	Sand, very clayey								8.3	1,548.0	< 50	0.0005
4	9	Sand, very clayey, slightly gravelly	113	12	+4.8	9	46	42	25				
5	4	Sand, very clayey		6			40	31	15				
	14	Sand, very clayey	105	18	+1.1	4							
6	9	Clay, very sandy								7.4	1,362.4	100	0.0003
	19	Claystone	108	19	+0.8	4.5							
7	14	Clay, sandy	100	18	+0.4	2.8	71	36	24				
8	4	Clay, very sandy	114	12	+0.9	3.5	52	45	29				
	9	Weathered Claystone, very sandy	95	23	-3.5	—							
	19	Claystone	105	21	+4.4	15							
9	4	Clay, sandy	108	17	+10.4	33	82	52	34				
10	4	Sand, slightly silty, trace gravel		3			13	NV	NP				
	9	Clay, very sandy	110	10	+1.3	3.5							
11	9	Clay, sandy	118	10	+4.8	12							
12	4	Clay, sandy	102	15	+6.0	8.8							
	14	Sandstone, very silty	104	20	+0.4	2.3	31	NV	NP				
13	4	Clay, sandy	101	7	+0.4	2.5							
	19	Claystone, very sandy	100	20	+0.8	3.4	65	42	24				

* Swell or consolidation of a sample when wetted under a 1,000 psf surcharge load.



A. G. WASSENAAR, INC.

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DENVER, COLORADO 80222

GEOTECHNICAL CONSULTANTS

SUMMARY OF LABORATORY TEST RESULTS

Test Boring No.	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell (+) / Consolidation (-) (%) *	Swell Pressure (ksf)	% Passing #200 Sieve	Atterberg Liquid Limits	Atterberg Plasticity Index	pH	Resistivity (ohm/cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
14	24	Claystone, silty								8.1	1,519.8	< 50	0.0001
15	9	Clay, sandy	117	10	+3.1	7.1							
16	4	Clay, slightly sandy	113	13	+7.7	34	86	43	27				
	14	Claystone	112	17	+1.7	7.2							
	24	Claystone	110	19	+5.3	13							
17	9	Claystone	105	21	+3.5	13							
	29	Claystone	114	17	+1.1	14							
18	4	Sand, very clayey, trace gravel		5			33	25	11				
19	1	Clay, slightly sandy	100	26	+2.7	9							
	4	Clay, sandy								7.6	454.5	200	0.0017
	9	Claystone	95	28	+3.1	16	99	61	36				
20	14	Claystone	92	27	+1.1	8.4							
21	4	Clay, sandy	111	17	+7.1	18							
22	4	Clay, sandy	115	13	+7.7	17							
23	4	Clay, sandy	99	16	+5.5	9	70	53	33				
	9	Claystone	98	25	+2.1	10							
24	9	Sand, very clayey		11			36	29	17				
25	4	Clay, sandy	111	13	+6.5	13							
26	4	Clay, slightly sandy	107	10	+4.3	7.6							
27	4	Clay, sandy	86	15	+1.2	1.9							
	9	Sand, silty								7.8	1,175.1	50	0.0012

* Swell or consolidation of a sample when wetted under a 1,000 psf surcharge load.



A. G. WASSEENAAR, INC.

GEOTECHNICAL CONSULTANTS

PHONE: 303/759-8100

FAX: 303/756-2920

2180 S. IVANHOE, SUITE 5

DENVER, COLORADO 80222

SUMMARY OF LABORATORY TEST RESULTS

Test Boring No.	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell (+) / Consolidation (-) (%) *	Swell Pressure (ksf)	% Passing #200 Sieve	Atterberg Liquid Limits	Atterberg Plasticity Index	pH	Resistivity (ohm/cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
28	1	Clay, sandy	105	13	+2.4	4.3							
	4	Sand, silty to clayey	106	5	-2.0	—							
29	14	Sandstone, very silty	101	24	+0.4	3	47	NV	NP				
30	4	Clay, sandy	118	10	+7.5	13							
31	4	Clay, very sandy	109	16	+8.0	13	51	40	25				
	14	Claystone	87	34	+2.0	8.2							
32	19	Sandstone											
	29	Sandstone	103	23	+0.1	1.5				7.3	657.0	50	0.0009
33	1	Clay, sandy	113	8	+2.9	5							
	9	Claystone	91	30	+6.8	20							
34	4	Clay, sandy	98	16	+2.4	5.9							
	9	Claystone	82	40	+2.9	10							
35	4	Clay, sandy	100	17	+6.4	10	82	60	42				
	29	Claystone	94	29	+1.1	6							
36	4	Clay, sandy	101	19	+11.5	17							
37	4	Weathered Claystone	94	18	-0.3	—							
	29	Claystone	97	26	+1.5	10							
38	14	Sandstone, very clayey	108	18	+0.4	2.4	34	50	24				

* Swell or consolidation of a sample when wetted under a 1,000 psf surcharge load.



APPENDIX

SPECIFICATIONS FOR PLACEMENT OF OVERLOT GRADING FILL

GENERAL

The Soil Engineer, as the Owner's representative, shall conduct tests to determine if the material, method of placement, and compaction are in reasonable compliance with the specifications.

PREPARATION OF NATURAL GROUND

Vegetation, organic topsoil, any existing man-made fill and any other deleterious materials shall be removed from the fill area. The area to be filled shall then be scarified, moistened if necessary, and compacted in the manner specified below prior to placement of subsequent layers of fill.

PLACEMENT OF FILL MATERIAL

No organic, frozen, perishable, or other unsuitable material shall be placed in the fill. The materials shall be delivered to the fill in a manner which will permit a well and uniformly compacted fill. Before compacting, the fill material shall be properly mixed and spread in approximately horizontal layers not greater than 8 inches in loose thickness.

MOISTURE CONTROL

While being compacted, the material shall contain uniformly distributed optimum moisture for compaction. The Contractor shall be required to add moisture to the materials if, in the opinion of the Soil Engineer, proper and uniform moisture is not being obtained for compaction. If the fill materials are too wet for proper compaction, aerating and/or mixing with drier materials may be required.

Moisture content shall be controlled as a percentage deviation from optimum. Optimum moisture content is defined as the moisture content corresponding to the maximum density of a laboratory compacted sample performed according to ASTM D698 for cohesive soils or ASTM D1557 for granular soils. The moisture content specifications for the various areas are as follows:

APPENDIX
SPECIFICATIONS FOR PLACEMENT OF STRUCTURAL FILL
PAGE TWO

- | | | |
|----|------------------------------------|-------------------|
| 1. | Beneath Structural Areas: Cohesive | - 1 to +3 percent |
| | Granular | - 2 to +2 percent |
| 2. | Beneath Non-Structural Areas: | - 3 to +3 percent |
| 3. | Moisture Treated Fill: Cohesive | 0 to +4 percent |
| | Granular | - 2 to +2 percent |

COMPACTION

When the moisture content and conditions of each layer spread are satisfactory, it shall then be compacted by an approved method. Moisture-density tests shall be performed on typical fill materials to determine the maximum density. Field density tests must then be made to determine the adequacy of the fill compaction. The compaction standard to be utilized in determining the maximum density is ASTM D698 for cohesive soils or ASTM D1557 for granular soils. The following compaction specifications should be followed for each area:

- | | | |
|----|-------------------------------|----------------------------|
| 1. | Beneath Structural Areas: | 95% of Maximum Dry Density |
| 2. | Beneath Non-Structural Areas: | 90% of Maximum Dry Density |

Note: In areas where fill depths exceed 20 feet, additional compaction considerations will be required to minimize fill settlement. We recommend any fill placed within 20 feet of final subgrade elevation be compacted to a minimum of 95% of the appropriate maximum dry density, and deeper fills be compacted to 100% of the appropriate maximum dry density. The required moisture content for all fills more than 20 feet deep shall be -2 to +2 percent of optimum moisture content.

If the structural fill contains less than 10 percent passing the No. 200 sieve, it may be necessary to control compaction based on relative density (ASTM D 2049). If this is the case, then compaction around the structures and beneath slabs shall be to at least 60% relative density, and compaction beneath foundations and pavements shall be to at least 70% relative density.

Appendix C

Wildlife Report

October 13, 2003

Mr. Scott Chomiak
Castle Rock Development
3033 East First Street, Suite 410
Denver, Colorado 80206

RE: The Meadows Town Center Vegetation Assessment / Wildlife Corridor and Habitat Issues

Dear Scott:

The purpose of this letter is to provide an assessment of possible impacts to vegetation, potential wildlife habitat, and wildlife corridors resulting from the development of The Meadows Town Center Preliminary Plat and Final PD Site Plan (The Meadows Town Center). **aci consulting** biologists investigated the subject area on August 12, 2003; a vegetation assessment resulting from the investigation is attached as Appendix A. The Town Center subject area is bounded by Meadows Blvd. and Meadows Parkway. The Meadows Town Center comprises approximately 200 acres of the approximately 4,200 total acres of The Meadows Property. Of the 200 acres comprising the Town Center, approximately 65 acres are designated as open space.

The Town Center is entirely open grassland, historically used for cattle grazing. There is no connectivity of the Town Center to viable wildlife habitat and/or viable wildlife movement corridors. A drainage corridor is also being established as open space which bisects the site from north to south.

There is known Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*) (PMJM) habitat on a portion the Meadows property; however, the United States Fish and Wildlife Service (USFWS) issued concurrence that proposed construction of the remainder of the Meadows Property would not adversely affect the continued existence of the mouse. The Town Center is located outside of the area designated as PMJM habitat and within the area of concurrence. Concurrence was issued by USFWS with the no adverse-effect finding in a letter dated June 10, 1999 from LeRoy Carlson of USFWS to Mr. Steve Paulson (Appendix B).

In 1998, SWCA, Inc. and representatives of the Colorado Division of Wildlife (CDOW) conducted a site investigation of The Meadows Property, including the Town Center, to assess the potential for the regular occurrence of special status wildlife and regular utilization of travel corridors by elk and deer. SWCA determined that the closest known occurrence of Species of Special Significance near the Meadows Property was the Plains sharp tail grouse (*Tympanuchus phasianellus jamesi*). In 1997, a male Plains sharp tail

grouse was documented by CDOW west of the Meadows Property; however, no sightings have been made since. SWCA did not preclude the utilization of the Meadows Property by raptors (such as Ferruginous Hawk (*Buteo regalis*)) or burrowing owls (*Athene cunicularia hypugaea*) in search of small prey. SWCA also determined that deer and elk do utilize the area, including the Meadows Property. However, the closest known travel corridor for elk is located significantly north of the property.

The four federally-threatened or endangered terrestrial animal species listed by the Colorado Natural Heritage Program (CNHP) as potentially occurring in Douglas County are the bald eagle (*Haliaeetus leucocephalus*), Mexican spotted owl (*Strix occidentalis lucida*), Preble's meadow jumping mouse (*Zapus hudsonius preblei*), and the Pawnee montane skipper (*Hesperia leonardus Montana*). Currently, there is no known presence of bald eagles, Mexican spotted owls, or Preble's meadow jumping mice within the Town Center subject area. The Pawnee montane skipper butterfly occurs in Douglas County but only within South Platte Canyon, no further south than the town of Deckers, and not below 6,200 feet (CNHP, 2001). The black-tailed prairie dog (*Cynomys ludovicianus*) was petitioned to be listed as an endangered species in March 1999; however, no prairie dog towns were observed during the investigation of the Town Center subject area.

Given the lack of connectivity to viable wildlife habitat and/or wildlife corridors and the designated of open space, the proposed development of the Town Center will not result in a significant impact to the integrity of wildlife habitat or wildlife movement corridors within the Meadows Property. Additionally, USFWS has issued concurrence that proposed development of portions of the Meadows Property, the Town Center, would have no adverse effects on PMJM.

If you have any questions or concerns, please contact me at your earliest convenience.

Sincerely,



Stacy Nipper
aci consulting

APPENDIX A

INTRODUCTION

On August 12, 2003, **aci consulting** biologists investigated The Meadows Town Center project area.

PROPERTY DESCRIPTION

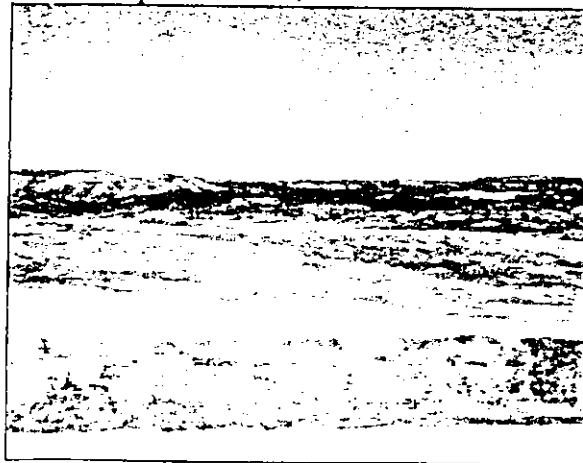
The Meadows Town Center is located in the foothills transition zone between the grasslands of the eastern Colorado plains and the ponderosa pine forests to the west.

The subject area is underlain by sedimentary units of the upper Tertiary age Castle Rock Conglomerate Member, of the Dawson Formation. This unit consists of claystones, siltstones, and light colored arkosic conglomerates, sandstones, and gravels. Additionally, limestones, lignites, and coals occur throughout the 300-1400 foot thickness of the unit (Chase/ McConaghy USGS Publication I-731, 1972). Alluvial material within drainages is of Pleistocene and Holocene age (post Piney Creek). The geologic formations are highly permeable and often contain low levels of organic material. These conditions result in highly erodible, poorly vegetated soil.

The Meadows site contains the Larkson, Newlan, and Sampson soil Series according to the U.S. Soil Conservation Service "Soil Survey of the Castle Rock Area, Colorado, 1977" publication.

FINDINGS

The subject area reviewed for this report consists of approximately 200 acres. The vegetative landscape of the subject is entirely open, rolling grassland without the presence of trees or shrubs (see photo below).



REFERENCES

Colorado Natural Heritage Program. 2001. Database of endangered and threatened species in Douglas County, Colorado.

Chase, G.H. and McConaghy, J.A. 1972. USGS Publication I-731.

U.S. Soil Conservation Service. 1977. Soil Survey of the Castle Rock Area, Colorado.

Appendix D

Approved Jurisdictional Determination
For Meadows Wetlands



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
DENVER REGULATORY OFFICE, 9307 SOUTH WADSWORTH BOULEVARD
LITTLETON, COLORADO 80128-6901

September 3, 2002

Mr. Jim Riley
Castle Rock Development Company
3033 E. First Avenue
Denver, CO 80206

RE: Approved Jurisdictional Determination, Meadows Development Project, Castle Rock,
Wetlands in Drainages to Plum Creek and Plum Creek
Corps File No. 200280574 (previous Corps File No. 199980868)

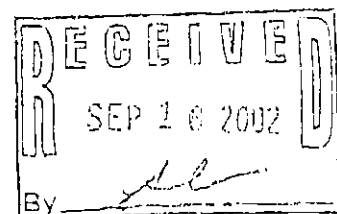
Dear Mr. Riley:

Reference is made to the above-mentioned project on behalf of the applicant, Castle Rock Development Company. This project is located in all of Section of 33, portions of Sections 23, 27, 28, 29, 32 and 34, Township 7 South, Range 67 West, and portions of Sections 3, 4, 5, 9 and 10, Township 8 South, Range 67 West, Douglas County, Colorado.

This project has been reviewed in accordance with Section 404 of the Clean Water Act under which the U.S. Army Corps of Engineers regulates the discharge of dredged and fill material, and any excavation activities associated with a dredged and fill project, into waters of the United States. Waters of the United States include ephemeral, intermittent and perennial streams, their surface connected wetlands and adjacent wetlands and certain lakes, ponds, drainage ditches and irrigation ditches that have a nexus to interstate commerce.

Based upon the ruling by the Supreme Court in the matter of Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, No. 99-1178 (January 9, 2001), the Department of the Army's regulatory jurisdiction over isolated, non-navigable, intrastate waters has been eliminated if the sole nexus to interstate commerce was use of the waters by migratory birds. Wetlands that are surface connected or adjacent to a river/tributary are waters of the United States. Streambed areas (Other Waters) that connect to a larger river system are also waters of the United States.

Plum Creek and wetland F are waters of the U.S. Drainage A (no wetland and no streambed), Drainage B wetland, Drainage C wetland, Drainage E wetland, Drainage G (no wetland and no streambed), Drainage H wetland and Drainage I (no wetland and no streambed) are not waters of the U.S. The drainage up gradient of wetland F is not a waters of the U.S. The attached Jurisdictional Determination form provides the basis for the jurisdiction of these waters. This letter is to inform you that our office considers the wetland delineation map and report by Environmental Resources Management for this project accurate and acceptable.



JURISDICTIONAL DETERMINATION
U.S. Army Corps of Engineers, Omaha District

APPLICANT: Castle Rock Development

PROJECT LOCATION/WATERWAY: Douglas Co / Drainage A (no wetland and no streambed), Drainage B wetland, Drainage C wetland, Drainage E wetland, Drainage up gradient of wetland F, Drainage G (no wetland and no streambed), Drainage H wetland and Drainage I (no wetland and no streambed)

FILE NUMBER: 200280574

PROJECT REVIEW COMPLETED: ☒ Office ☐ Field
Jurisdictional Determination (JD):

- ☐ Preliminary JD - Based on available information, there appear to be ☐ or there appear to be no ☐ waters of the United States on the project site. A preliminary JD is not appealable.
☒ Approved JD - There are ☐ or there are no ☒ waters of the United States in the above-mentioned drainages. An approved JD is an appealable action.

Basis of Jurisdictional Determination:

- ☒ There are no jurisdictional waters of the United States present in the above-mentioned drainages.
☐ The presence of waters which are currently used, or were used in the past, or may be susceptible for use to transport interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide (i.e., navigable waters of the U.S.)
☐ The presence of interstate waters (including interstate wetlands¹).
☐ The presence of a tributary to an interstate water or other water of the US.
☐ Impoundments of interstate or other waters of the US or their tributaries.
☐ The presence of territorial seas.
☐ The presence of wetlands adjacent² to interstate or other waters of the US, except for those wetlands adjacent to other wetlands.
☐ The presence of an isolated water (e.g., intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds).
☐ The site is used by interstate or foreign travelers for recreational purposes.
☐ The site has fish or shellfish that are taken and sold in interstate or foreign commerce.
☐ The site is used for industrial purposes by industries in interstate commerce.
☐ Other: _____

Rationale for Basis (applies to any boxes checked above): Since there are upland inclusions within the drainages of B, C, E and H between the wetlands and Plum Creek, these wetlands are neither adjacent to nor surface connected to an interstate waters. Therefore, these wetlands are isolated and non-jurisdictional. Drainages A, G and I have no characteristics of waters of the U.S. such as wetlands or streambeds. Drainage up gradient of wetland F. Therefore, these drainages are non-jurisdictional

Lateral Extent of Jurisdiction (33 CFR 328 and 329):

- ☐ Ordinary High Water Mark indicated by:
☐ clear, natural line impressed on the bank
☐ the presence of litter and debris
☐ changes in the character of soil
☐ destruction of terrestrial vegetation
☐ shelving
☐ other: _____
☐ High Tide Line indicated by:
☐ oil or seum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gages
☐ other: _____

- ☐ Mean High Water Mark indicated by
☐ survey to available datum; ☐ physical markings; ☐ vegetation lines/changes in veg. types
☐ In ocean or coastal area, site is in a zone three geographic (nautical) miles seaward of the baseline³

☒ Wetland, as shown on the attached wetland delineation map and/or in a jurisdictional report prepared by: Patricia Corbetta and Stephanie Larson of Environmental Resources Management

☐ Additional supporting information.

Prepared: Terry McKee Date: August 30, 2002

¹Wetlands are identified and delineated using the methods and criteria established in the Corps Wetland Delineation Manual (37 Manual) (i.e., occurrence of hydrophytic vegetation, hydric soils and wetland hydrology). Processes for determining wetlands on agricultural lands may vary from methods described in the Corps Wetland Delineation Manual.

²The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other waters of the U.S. by man-made dikes or barriers, natural river berms, beach dunes, and the like are also adjacent.

³Baseline is the line on the shore reached by the ordinary low tides from which the distance of three miles is measured.

BIBLIOGRAPHY

The Meadows

Document	Date	Author
Letter Re: Request for Section 9 Clearance on Area B of The Meadows Property, Douglas County, Colorado	6/10/1999	LeRoy W. Carlson, Colorado Field Supervisor
Letter Re: Formal Notification and Mitigation Plan for Activity Under Nationwide Permit 26	11/24/1999	Ken Waesche, Environmental Resources Management
Letter Re: Addendum to the Formal Notification and Mitigation Plan for Activity Under Nationwide Permit 26	11/29/1999	Ken Waesche, Environmental Resources Management
Meadows Development Project, Castle Rock, Colorado Nationwide Permit 26 Corps File No. 199980868	12/6/1999	US Army Corps of Engineers
Memorandum – Utility Crossing and Stock Ponds at The Meadows	5/15/2001	Patty Corbetta, Environmental Resources Management
Letter (Draft) Re: Evaluation of previous and proposed work at the Meadows Development in Castle Rock, Colorado in light of new rulings and revised permits	2/18/2002	Stephanie Larsen, Environmental Resources Management
Letter Re: Notification and Permitting Requirements for The Meadows Development Road Crossing in Section 33, T7S, R67W	3/28/2002	Patty Corbetta, Environmental Resources Management
Memorandum – Corps clarification regarding preliminary jurisdiction appeals and water of the US versus wetland permitting	4/9/2002	Stephanie Larsen, Environmental Resources Management
Memorandum – Meeting Notes: US Army Corps of Engineers, May 7, 2002	5/20/02	Patty Corbetta and Stephanie Larsen, Environmental Resources Management
Final Report, Wetlands Delineation - The Meadows, Castle Rock, Colorado	7/26/02	Patty Corbetta and Stephanie Larsen, Environmental Resources Management
Wetlands Delineation Within the Habitat Conservation Plan Area, The Meadows, Castle Rock, Colorado	7/31/02	Patty Corbetta and Stephanie Larsen, Environmental Resources Management
Letter Re: The Meadows Development, Castle Rock, Colorado. Sections 23, 27, 28, 29, 32, and 34 Township 7 South, Range 67 West, and Sections 3, 4, 5, 9, and 10, Township 8 South, Range 67 West	8/29/02	Patty Corbetta and Stephanie Larsen, Environmental Resources Management
Letter Re: Approved Jurisdictional Determination, Meadows Development Project, Castle Rock, Wetlands in Drainages to Plum Creek and Plum Creek, Corps File No. 200280574 (previous Corps File No. 199980868)	9/3/02	Terry McKee, US Army Corps of Engineers

