**Jones Gillam Renz Architects**

**Address**
730 N 9th St.
Salina, KS 67401

1881 Main St., Suite 301
Kansas City, MO 64108

**Contact**
jgr@jgrarchitects.com
(785) 827-0386

**Web**
jgrarchitects.com

# NOTICE TO ALL CONTRACTORS AND SUB-CONTRACTORS

## December 31, 2025

## First Covenant Church Lobby & Fellowship Addition – JGR Proj #25-3518

### ADDENDUM NO. 1

YOU ARE INSTRUCTED TO READ AND TO NOTE THE FOLLOWING DESCRIBED CHANGES, CORRECTIONS, CLARIFICATIONS, OMISSIONS, DELETIONS, ADDITIONS, APPROVALS, AND STATEMENTS PERTINENT TO THE CONTRACT AND CONSTRUCTION DOCUMENTS. THIS ADDENDUM IS A PART OF THE CONTRACT AND CONSTRUCTION DOCUMENTS AND SHALL GOVERN IN THE PERFORMANCE OF THE WORK.

***Bid Date:*** *Thursday, January 8, 2026 to JGR Architects by 3:00 p.m.*

### GENERAL

1. The Pre-Bid Sign In sheets are attached.
2. The Geotech Investigation is attached. Note, the Geotechnical investigation is also located on the JGR Plan Room for download. www.jgrarchitects.com

### ARCHITECTURAL –Specifications

1. Section 02281 Termite Control – This section has been added and is attached with this addendum.
2. Section 08410 Aluminum Entrances and Storefronts – Clarification – All storefront material and trim/flashing is to be Champagne finish to match existing.
3. Section 09306 Floor and Wall Tile 3.06.1 – 3" x 12" size tile is acceptable in lieu of 3" x 6".

### ARCHITECTURAL – Drawings

1. Sheet A1.1 and A2.0 – Site clarification – At all site areas affected by construction, the contractor shall grade and level the site, install 4" inches of top soil, and place Kansas Blend Fescue seed at a rate of 10 pounds per 1,000 s.f. At landscape beds, install 4" topsoil, all plant materials, trees, fabric, etc. shall be by the owner per separate contract.
2. Sheet A2.1 Detail A Floor Plan - The Ceramic tile strip between the existing Lobby and the Gathering Area 106 shall be the following tile:
   Crossville, Color Blox 2.0, 12x12. Color to be selected from full line to match existing.
3. Sheet A2.1 Detail C – Clarification, the steel column at Grid B3 is moved east and does not extend outside the building sheathing. The column location as shown on the architectural and structural plans is correct.
4. Sheet A2.3 Interior Finish Schedule - The Interior Finish Scheduled is modified as follows:
   Prayer Room 103 – New Carpet C1 installed throughout; Paint all existing walls; New wood base at new sections of wall added by relocation of door at north wall.
   Hallway 104 – New Carpet C1 installed throughout; Paint all existing walls; New wood base at new sections of wall.
   Gathering Area 106 – Delete reference to note 2. All drywall finish to be level 5, no orange peel finish.
5. Sheet A2.3 – B Window Type A – The window units at the West exterior wall may be storefront. Delete the note stating "No Storefront".
6. Sheet A2.3 – A Door & Frame Type – 2 Storefront, existing storefront may remain, except where modified to infill for new door, or at area removing and infilling existing doors. Provide new framing, terminations, closures, flashing, trim, etc. as require for a complete and finished installation.
7. Sheet 3.1 - For the mechanical pad screen wall, reference detail 3/S4.3 shows the screen wall bearing on a 3' wide footing. Note that the footing steps down to accommodate the changing grade. CMU and brick shall extend down to the top of footing to accommodate the changing grade. There is to be no exposed condrete stem wall at the screen wall/retaining wall. Max step in footing is 2'.
8. Sheet A3.2 – Details A and B – Delete reference to plywood substrate at fascia. EIFS to be installed over dens-glass and rigid insulation. Note, no substitutions on from the specified Dryvit system.
9. Sheet A4.1 Detail B – Clarification. The existing overhang at the existing storefront hallway is to be removed as indicated at this section. There was discussion at the pre-bid meeting about whether this could remain. Remove overhang, gutter, etc. Ensure that the area remains weathertight during construction.

**STRUCTURAL – Drawings**

1. Sheet S4.0 Detail 7 Deck Attachment – Screw attachment shall be acceptable for the deck attachment in lieu of puddle welds. Note, there shall be no visible screws through the deck. Attachment shall meet all code requirements for attachment anchors, quantity, etc.
2. Sheet S4.0 General – Where structural engineer has addressed specific moment connections, additional delegated design is not required.

Receipt of this Addendum shall be noted on the Bid Form.

END OF ADDENDUM NO. 1

Attachments

- Pre-Bid Sign In sheets
- Geotech Report
- Section 02281Termite Control

JGR Jones Gillam Renz
730 N. 9th St., Salina KS 67401
1881 Main St, Ste 301,Kansas City, MO 64108
Ph: 785-827-0386 www.jgrarchitects.com

**First Covenant Church, Lobby & Fellowship Addition**
**Salina, Kansas**
**Pre-Bid Conference – Thursday, December 18, 2025**
**JGR Project No. 25-3518**

| Name | Company | General Contractor (X) | Sub-Contractor Trade | Phone Number | Email Address | Email Address where Bid Information is to be sent |
|---|---|---|---|---|---|---|
| Charles Renz | JGR Architects | | | 785-827-0386 | crenz@jgrarchitects.com | |
| Kelly Hall | Hall Contracting Inc | X | | 785-404-1830 | Kelly@hcisalina.com | 〃 〃 |
| Sean + Hunter Kindlesparger | Kindlesparger Const LLC | X | | 785-643-1831 | ~~Kindlesparger@~~ HunterKcllc@gmail.com | |
| ERIC HOLMGREN | PRECISION | | ELECTRICAL | 785-820-7977 | erich@pecsalina.com | |
| Archie Ponton | Ponton Construction | X | | 785-819-2001 | archie@pontonconstruction.com | |
| Chris Young | Hutton Construction | X | | 785-643-2447 | CYoung@huttonbuilds.com | 〃 〃 |
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|---|---|---|---|---|---|---|
| Charles Renz | JGR Architects | | | 785-827-0386 | crenz@jgrarchitects.com | |
| CHRIS EDWARDS | Kaw Valley Eng. | | Testing | 785-802-8442 | christophere@kveng.com | |
| Jackson Reilly | Harbin Construction | X | | 785-825-1651 | admin@harbinconstruction.com | |
| Alan Barker | Jaes Electric | | Electrical | 785-404-6533 | abarker@jaeselectric.com | |
| JASON GILLIG | HUTTONS | ✓ | | 785-825-4664 | jgillig@huttonbuilds.com | |
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SECTION 02281

TERMITE CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Soil treatment for termite control below grade, to interior and exterior foundation perimeter.

B. Kansas Department of Agriculture has issued the attached Fact Sheet regarding Termite Pretreatment Applications. All contractors shall follow the recommendations addressed in the article.

1.2 QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this Section with minimum 5 years documented experience approved by manufacturer, licensed, and approved regulations.

1.3 REGULATORY REQUIREMENTS

A. Conform to requirements for application, application licensing, and authority to use toxicant chemicals and in accordance with EPA.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of toxicants.

1.4 SEQUENCING

A. Apply toxicant 12 hours prior to installation of vapor barrier under slabs-on-grade and finish grading work outside foundations.

B. Notify Architect 24 hours prior to application.

1.5 WARRANTY

A. Provide five year warranty under provisions of the General Requirements.

B. Warranty: Include coverage for damage and repairs to building and building contents caused by termites. Repair damage. Re-treat where required.

C. Inspect and report annually to Owner in writing. Owner reserves the right to renew warranty for an additional five years.

PART 2 PRODUCTS

2.1 MATERIALS

A. Kansas Department of Agriculture has issued the attached Fact Sheet regarding Termite Pretreatment Applications. All contractors shall follow the recommendations addressed in this article.

B. Toxicant Chemical: EPA and Local authority approved; synthetically color dyed to permit visual identification of treated soil.

C. Diluent: Recommended by toxicant manufacturer.

D. Mix toxicant to manufacturer's instructions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify all the site conditions and become familiar with project scope.

B. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.

C. Verify final grading is complete.

3.2 APPLICATION

A. Spray apply or Inject toxicant in accordance with manufacturer's instructions.
B. Apply toxicant at locations indicated in Schedule at end of Section.
C. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.
D. Re-treat disturbed treated soil with same toxicant as original treatment. Retreat around building perimeter after top soil has been placed, directly adjacent to foundation wall.
E. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

3.3 PROTECTION OF FINISHED WORK

A. Protect finished Work, post signage to warn workers that soil poisoning has been applied.
B. Do not permit soil grading over treated work.

3.4 SCHEDULES

A. Locations:
   1. Under Slabs-on-Grade including basement floors, porches and stoops.
   2. Both Sides of Foundation Surfaces.
   3. Soil Within 10 feet of Building Perimeter.

END OF SECTION 02281

KANSAS DEPARTMENT OF AGRICULTURE

# FACT SHEET

Kansas Department of Agriculture • 109 SW 9th Street • Topeka, KS 66612 • (785) 296-3556 • www.ksda.gov

June 2010

# Termite Pretreatment Applications

The Kansas Pesticide Law and the Federal Insecticide Fungicide and Rodenticide Act require that pesticide products be applied according to label directions.

Pesticide product labels and the Kansas Pesticide Law state that it is unlawful for any person to use pesticides in a manner that is inconsistent with the pesticide's label instructions.

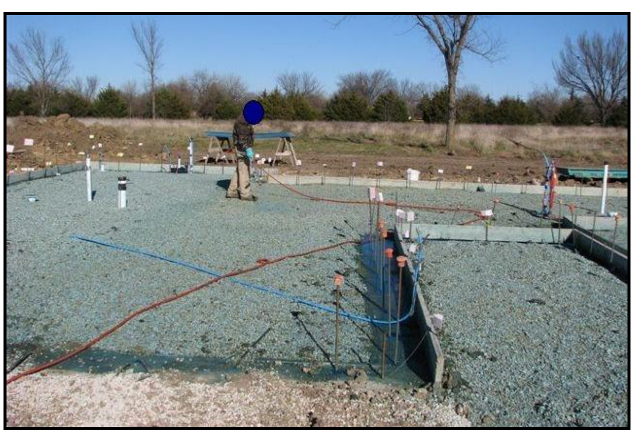
The Kansas Pesticide Law has additional requirements for termite pretreatment applications. They are outlined in K.A.R. 4-13-26, and state that in addition to label requirements, each preconstruction termite application must include both horizontal and vertical chemical barriers.

**What does this mean?**

Plainly stated, termite pretreatment applications must include both horizontal and vertical applications at the proper rates to be in compliance with state law.

**What is a horizontal chemical barrier?**

It is a continuous chemical barrier of termiticide that is applied to the soil beneath slab floors and porches, footing trenches for monolithic slabs and beneath stairs.



*Above: After the interior final grade is established, the applicator applies termiticide to the flat surface over which cement will be poured.*

**What is a vertical chemical barrier?**

Vertical chemical barriers must be established in the soil around the base of foundations, plumbing fixtures, foundation walls, support piers and voids in masonry, and any other critical area where structural components extend below grade.

*Far left: The applicator completes the interior vertical application before the flat concrete surface is poured.*

*Left: The exterior vertical application is made after final grading is complete and sometimes after the turf and ornamentals are installed.*

Vertical applications may be performed two ways. The applicator may dig a trench according to label directions and apply the termiticide in the trench. Alternatively, the applicator may dig a trench according to label directions and apply termiticide by rodding in the trench to the top of the footing or to a minimum depth of four feet.

**What are the types and costs of termiticides?**

There are two basic types of soil treatment termiticides offered on the market: repellent and nonrepellent. Repellent termiticides are generally less expensive than nonrepellent termiticides.

When estimating the cost of termiticides for your project, you should consider the cost of the termiticide and how much will need to be applied to follow label directions and state regulations.

Termiticide prices can be divided into three groups. The lowest priced group is repellent termiticides. The middle priced group includes the higher cost repellents and lower cost nonrepellent termiticides.

The highest priced group is nonrepellent termiticides.

An easy way to figure the cost of termiticide products in a job estimate is by the cost of a finished gallon of solution to be applied.

Low-cost termiticides are about 40 cents to 60 cents per finished gallon, mid-cost are about $1 per finished gallon and high-cost are about $1.65 per finished gallon.

**How much should be applied?**

You can estimate the amount of horizontal area to be treated for a flat slab building by first determining the size of the slab. For instance, a building that is 60 feet by 100 feet has a 6,000 square feet area to be treated. Most termiticide labels require a minimum of one gallon of finished solution per 10 square feet, so the horizontal application would require 600 gallons of finished solution.

Next, estimate the amount of vertical application volume to be applied. Assume the same 60 foot by 100 foot building has four-foot foundation footings. The vertical application has to be made to the inside and outside of the foundation wall, so the estimated linear feet to be treated are 640.

Using the formula four gallons for every 10 linear feet per foot of depth would give the following amount of termiticide to apply: 4 x (640/10) x 4 foot of depth = 1,024 gallons of finished solution for the vertical application.

Combining the gallons of finished solution needed for the horizontal application (600) with the gallons needed for the vertical application (1,024) results in a total 1,624 gallons of finished solution to treat the building according to the label directions and state regulations. The cost of termiticide to treat this building would then be:

- Low-cost termiticide: $650 to $974
- Mid-cost termiticide: $1,624
- High-cost termiticide: $2,680

These estimates do not include the pest control company's labor, equipment and other operating costs.

**What should I look for in a pretreatment bid?**

Occasionally a bid is less than the cost of the termiticide needed to properly treat the structure. A reputable company cannot perform the treatment for less than the cost of the pesticide. Seek bids from several firms and make sure all bids are received in writing. You should also:

- get a label for the termiticide to be applied and read it carefully.
- check to make sure that bids received are in compliance with the pesticide label and the Kansas Pesticide Law.
- ask for a written contract that specifies what is to be done, who will do it, the termiticide to be used, the amounts to be used, and how the application will be performed.
- require a warranty and understand what it means to the property owner.

Most termite preconstruction treatments will require several applications at different times during the construction process. To keep your project on schedule and to be sure the termiticide is properly applied:

- notify the pest control company several days ahead of when an application can be made so that it is scheduled with ample time to complete it.
- be present when the termiticide is applied and record the amount of finished termiticide solution used.
- notify the pest control company when the structure and exterior final grade are completed, so the final exterior vertical application is made. This is the first line of defense against termites.

Contact the Kansas Department of Agriculture Pesticide and Fertilizer program at (785) 296-3786 any time you have questions about termite treatment bids or applications.

*This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement BG99732308 to the Kansas Department of Agriculture. The contents do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.*

Pesticide and Fertilizer Program
Kansas Department of Agriculture
109 SW 9th Street, 3rd Floor
Topeka, KS 66612
(785) 296-3786

# GEOTECHNICAL ENGINEERING REPORT

## PROPOSED FIRST COVENANT CHURCH
## MAGNOLIA ROAD SOUTH OF OHIO STREET
## SALINA, KANSAS

H-04

PROJECT NO. 01015110
June 13, 2001

Prepared for:

FIRST COVENANT CHURCH

Prepared by:

Terracon

Wichita, Kansas

TABLE OF CONTENTS



APPENDIX

June 13, 2001

First Covenant Church
801 East Cloud
Salina, KS 67401

Attention: Mr. Joe Kejr

Re: Geotechnical Engineering Report
Proposed First Covenant Church
Magnolia Road South of Ohio Street
Salina, Kansas
Terracon Project No. 01015110

Dear Mr. Kejr:

Terracon has completed a subsurface exploration program for the referenced project. The native soils that we encountered in our borings generally consisted of lean or fat clay that mantles weathered shale.

Support of the structure on footing foundations is feasible. Recommendations regarding foundations and other geotechnical aspects of the proposed construction are presented in this report. Our recommendations should be followed to avoid excessive foundation settlement and heave of floor slabs supported on-grade.

We appreciate the opportunity to be of service to you on this project. If you have any questions regarding this report, or if we may be of further service in other ways, please let us know.

Sincerely,
**TERRACON**

Jason D. Hoy, I.E.

Kent J. Schwieger, P.E.
Kansas No. 6606

N:Geo/Dtr/2000/01015110

# GEOTECHNICAL ENGINEERING REPORT
# PROPOSED FIRST COVENANT CHURCH
# MAGNOLIA ROAD SOUTH OF OHIO STREET
# SALINA, KANSAS

**Terracon Project No. 01015110**
**June 13, 2001**

## INTRODUCTION

A subsurface exploration and geotechnical engineering analysis for the proposed First Covenant Church to be located on Magnolia Road south of Ohio Street, in Salina, Kansas have been completed. Sixteen borings were drilled at the site to obtain information on subsurface conditions. Subsurface conditions suitable to support the proposed structure on footing foundations were encountered in these borings. The results of these borings and a diagram showing their approximate locations are included with this report.

We understand the proposed project will involve the construction of a one story, slab-on-grade (non-basement) south wing, with a footprint of 12,700 square feet and a maximum column load of 60 kips. The project will also involve the construction of a two-story north wing having a footprint of 13,500 square feet per floor, maximum column load of 150 kips, and a walkout basement. Wall loads were not provided to us, but we anticipate continuous wall loads of less than 6 kips per lineal foot. Floor loads are anticipated to be light. Paved parking and drives also are planned for construction at this time.

In this report, we describe the subsurface conditions encountered in the borings, present the laboratory data obtained, and provide geotechnical recommendations for the design and construction of foundations and for the development of subgrades suitable for supporting floor slabs and pavements. We are also including recommendations regarding minimum pavement thickness.

## SUBSURFACE EXPLORATION PROCEDURES

The boring locations were established in the field by Terracon's drill crew using a calibrated measuring wheel or pacing methods. Right angles for the boring location measurements were estimated. The approximate ground surface elevations that are shown on the boring logs were obtained by interpolation of the site plan provided to us. The locations and elevations of the borings should be considered accurate only to the degree implied by the methods used to make these measurements.

The borings were drilled with a truck-mounted, drill rig using continuous-flight augers to advance the boreholes. Representative samples were obtained by both the thin-walled tube and split-barrel sampling procedures in general accordance with the appropriate ASTM standard.

In the thin-walled tube sampling procedure, a seamless steel tube with a sharpened cutting edge is pushed hydraulically into the boring to obtain a relatively undisturbed sample of cohesive or moderately cohesive soil. In the split-barrel sampling procedure, a standard, 2-inch O.D., split-barrel sampler is driven into the bottom of the boring with a 140-pound hammer falling 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of an 18-inch sampling interval is recorded as the standard penetration resistance (N) value.

A CME automatic SPT hammer was used to advance the split-barrel sampler. A significantly greater efficiency is achieved with the automatic hammer compared to the conventional safety hammer operated with a cathead and rope. This higher efficiency has an appreciable effect on the standard penetration resistance blow count (N) values. The effect of the automatic hammer's efficiency has been considered in our interpretation and analysis.

The sampling depths, penetration distances, and the standard penetration resistance values are reported on the boring logs. The borings were backfilled with auger cuttings. The samples were sealed and returned to the laboratory for testing and classification.

The drill crew, as part of the drilling operations, prepared field boring logs. These boring logs include visual classifications of the materials encountered during drilling and the driller's interpretation of the subsurface conditions between samples. The final boring logs included with this report represent the engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in the laboratory.

## LABORATORY TESTING PROGRAM

The thin-walled tube samples were tested to determine their moisture contents and dry densities. The unconfined compressive strengths of the tube samples were estimated with a calibrated hand penetrometer. The split-barrel samples were tested to determine their moisture contents and, their unconfined compressive strengths also were estimated with a calibrated hand penetrometer.

As part of the testing program, an engineer examined the soil samples in the laboratory and, based on the material's texture and plasticity, described the samples according to the attached *General Notes* and classified the samples in accordance with the attached *Unified Soil Classification System*. The estimated group symbols for the *Unified Soil Classification System* are shown in the appropriate column on the boring logs. A brief description of the Unified System is included in the appendix. Rock classification is according to the *General Notes for*

*Sedimentary Rock* and has been estimated from disturbed samples. Observation of core samples and petrographic analysis may reveal other rock types.

## SITE AND SUBSURFACE CONDITIONS

The proposed site is a mostly grass-covered field that slopes downward to the north. Below a thin layer of organic topsoil, at the site, we found deposits of native lean or fat clays that mantle weathered shale. The subsurface conditions encountered at the borings are described in greater detail below.

At our boring locations, below a thin layer of organic topsoil we encountered lean or fat clay that extended to the bottom of our shallow borings, a depth of 5 feet, and to depths of 5 to 11 feet in our deeper borings. Below the lean or fat clay we logged weathered shale that extended to the bottom of the borings, a maximum depth of 20 feet.

The subsurface conditions at each boring location are indicated on the boring logs. The stratification boundaries shown on the boring logs represent the approximate locations of changes in soil/rock types; in situ, the transition between material types may be gradual.

## WATER LEVEL INFORMATION

The borings were monitored for water while drilling and after completing the drilling operations. Water was encountered at either of these times only in borings B-2 and B-4, where water level depths were 13 and 18.5 feet while drilling and at depths of about 13 and 18 feet after completion of drilling operations.

Based on this water level information and conditions encountered at the borings, it is our opinion that the groundwater table was located at an elevation of approximately 1301 to 1303 feet at the time the borings were performed. This conclusion is based, in part, on short-term observations in materials that are primarily low permeability clayey soils or weathered shale, which can be misleading, since these materials typically require a long period of time for groundwater levels to develop and stabilize in a borehole.

To obtain more accurate groundwater level information, long-term observations in deep wells or piezometers, which are sealed from the influence of surface water, would be needed. Fluctuations in groundwater table conditions should be expected to occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the borings were drilled. Also, after periods of heavy rain, temporary, shallow, perched water levels could develop.

## ANALYSIS AND RECOMMENDATIONS

Our borings indicate that the site is overlain by lean or fat clay that typically changes to highly weathered shale at depths ranging from 5 feet to 11 feet. The basement floor slab of the structure, constructed below existing grade, will bear on either fat clay, lean clay, or weathered shale. Groundwater was present at the time of our drilling activities. Foundation support conditions were analyzed based on the data obtained from the field and laboratory testing programs. Based on this analysis, it is our opinion that it is feasible to support the proposed building on footing foundations. Recommendations regarding foundations and issues related to other geotechnical aspects of the proposed construction are presented below.

### Site Preparation

We recommend that all vegetation and organic topsoil be removed from the proposed building and areas to be paved. Following completion of these operations and cuts required to develop design grade, we recommend the exposed subgrade in non-basement areas be proofrolled (under the observation of Terracon personnel) with a loaded, tandem-axle dump truck or scraper or other heavy, rubber-tired construction vehicle weighing at least 25 tons, to locate any zones that are soft or unstable. If the subgrade ruts or pumps excessively during proofrolling, it should be removed and replaced with suitable fill, as described in subsequent sections of the report, if it cannot be compacted in-place. After completing these operations and prior to placing any fill or constructing pavements, we recommend the upper 9 inches of all exposed subgrade be scarified and recompacted to at least 95% of standard Proctor maximum density at moisture contents wet of optimum.

### Building Subgrade Preparation

Floor slab performance can be affected by the volume change potential of the supporting subgrade soils due to variations in moisture content. Typically, some increase in subgrade moisture content will occur as a result of the gradual accumulation of capillary moisture, which would otherwise evaporate if the floor slab had not been constructed. A soil's swell potential is dependent primarily on its plasticity, moisture content, and density. The confining pressure provided by the weight of the overlying existing materials, the new fill required to develop design grade, and the concrete floor slab aid in reducing the swell potential. The higher the plasticity and density, and the lower the moisture content and confining pressure, the greater the swell potential.

The borings indicate that the materials expected to be encountered at basement grade are fat clay, lean clay, or weathered shale, have moderate to high strength, and generally were relatively dry at the time of our exploration. Although the materials are moderately to highly plastic, their present relatively dry condition and moderate to high strength suggests to us that these materials have moderate to high swell potential in their present condition. To reduce swell potential, to less than about ¾ inch, we recommend constructing a zone of low volume change (LVC) material immediately below the floor slabs. This zone should be at least 12 inches thick (including the drainage layer described later in this report) in basement areas and 18 inches thick for slabs on grade (see *"Low Volume Change Zone"* section for details).

Constructing an low volume change zone may not be adequate to limit floor slab heave to less than about ¾ inch if drier moisture conditions exist at the proposed building location at the time of construction, than were encountered at our boring locations. Therefore, we recommend that following cuts needed to allow construction of the LVC zone, the moisture content of the 30 inches of the resulting subgrade be evaluated in areas where slabs will be constructed at grade as shown on the attached *Building Subgrade Preparation Diagrams*. If the existing materials within this depth range are drier than moisture contents described in the *Additional Fill* section of this report, we recommend procedures be implemented to either add water and rework the dried soils or replace the dried soils with low volume change material. If the reworking option is utilized, the dry soils should be uniformly increased in moisture content as described in the *Additional Fill* section of this report. The reworked on-site soils, any additional fill, and low volume change material should be placed in lifts not exceeding 9 inches in loose thickness and compacted to at least 95% but not more than 100% of standard Proctor maximum density. These materials should be placed at moisture contents as described in the *"Additional Fill"* section of this report.

We recommend that the exposed basement subgrade (below the 12-inch thick LVC/drainage layer zone) be scarified to a minimum depth of 8 inches, moisture conditioned to moisture contents described in the *Additional Fill* section of this report and recompacted to the requirements for compacted fill. Because desiccation can readily occur in the exposed basement subgrade during construction the exposed basement level subgrade should be wetted periodically to maintain the recommended moisture content until placement of the granular drainage layer and floor construction.

In addition to carefully controlling the moisture content of the soils within the building footprint, it is important that moisture fluctuations of the soils adjacent to the building be reduced. This can be accomplished by providing and maintaining grading that promotes positive drainage away from the building area.

Where utility lines enter beneath the structure, we recommend providing clay or concrete plugs with waterstops, to preclude the possibility of water saturating the subgrade below the floor slab. The clay plugs should extend at least 5 feet beyond the building perimeters.

Capillary moisture, if present directly below the floor slab, can cause delaminating and/or blistering of carpeted, tiles, or coated floors. If floor finishings are to be installed, we recommend providing a capillary moisture break or barrier to prevent these adverse effects. Also, flooring and slab coatings often specify a maximum moisture emission rate of the concrete slab prior to the placement of the floor covering or coating. Various factors have an effect on the moisture emission rate from the floor slabs. If authorized, Terracon could provide project specific recommendations related to reducing the moisture emission rate from the floor slabs. We could also provide the appropriate field testing on the new concrete floors prior to installation of floor finishings to determine if the moisture emission specifications are met.

## Additional Fill

Additional fill required below the LVC zone should consist of approved, on-site or off-site soils that are free of organic and deleterious materials. The soils should be constructed in maximum lifts not exceeding 9 inches in loose thickness and compacted to at least 95%, but not more than 100%, of their maximum dry density as determined by the standard Proctor procedure, ASTM D-698.

The moisture content at which the soils should be compacted is given below:

- Cohesive soils with a plasticity index (PI) greater than 35 should be placed at a moisture content of at least 3% above their optimum moisture content (ASTM D-698).

- Cohesive soils with a PI between 25 and 35 should be placed at a moisture content at least 2% above their optimum moisture content.

- Cohesive soils with a PI less than 25 should be placed at a moisture content above their optimum moisture content.

- Granular soils should be placed at workable moisture content.

The zone of fill compacted to meet these criteria should extend at least 5 feet or 1 foot horizontally beyond the building footprint for each foot of fill needed to develop design grade, whichever is greater.

## Low Volume Change Zone

We recommend the upper 12 inches of material directly below the basement floor slabs and the upper 18 inches of material directly below slabs-on-grade (including any granular drainage layer or capillary moisture break) be low volume change material. This is primarily to help protect the subgrade soils from moisture fluctuations during construction.

By our definition, low volume change soils would be granular soils with at least 15% fines (materials passing the #200 sieve), such as silty sand or limestone screenings. Cohesive materials having a liquid limit (LL) less than 40 and a plasticity index (PI) less than 18, also could be used to develop the low volume change zone, although the contractor should provide a "wetting maintenance" program after placement and compaction to maintain the moisture level in the clays until construction of floor slabs and pavements.

If cohesive material meeting the above criteria cannot be readily obtained, a low volume change soil can be developed with the clay overburden soils above the shale by modifying them with hydrated lime or Class C fly ash. Because of the potentially severe deleterious heave that could result if Class C fly ash or lime is used to modify shale that contains sulfates, such as gypsum zones or seams, we recommend that **shale not be modified** with lime of Class C fly ash unless extensive additional laboratory and field testing is performed. For clay materials, it has been our experience that lime contents of 4% to 6% or Class C fly ash contents of 14% to 16%, based on dry weight of the soil, would be required to appreciably reduce the shrink/swell characteristics of clayey soils not meeting the previously described plasticity requirements for low volume change materials. A more precise application rate could be developed based on additional laboratory testing. Recognized guidelines, such as those specified by KDOT, should be followed in the mixing of the hydrated lime or fly ash with the soil (including temperature restrictions while mixing).

The low volume change soils should be placed in lifts not exceeding 9 inches in loose thickness and compacted to at least 95% of standard Proctor maximum density. Cohesive soils should be placed at moisture contents wet of optimum. Granular soils should be placed at a workable moisture content. If lime- or fly ash-modified soils are used, they should be mixed, compacted, and maintained at moisture contents within 2% of optimum until paved.

Cohesive, low volume change materials can be swell susceptible if allowed to dry before constructing the floor slab; therefore, it is important that the recommended moisture content of the cohesive, low volume change material be maintained. As a check, we recommend the moisture content be evaluated about 3 to 4 days before placing concrete. If drying of the subgrade materials has occurred at this time, measures should be taken to increase the moisture content of the subgrade soils before placing concrete.

## Foundations

Based on the conditions encountered at the borings, we expect that fat clay, lean clay, or highly weathered shale will be present at the base of most of the footings. Footings bearing on these native materials could be designed for a maximum net allowable total load bearing pressure of 2,500 psf. The maximum net allowable bearing pressure described above refers to the stress that can be applied at the base of the footings in excess of the surrounding overburden pressure.

Because considerable amounts of fill may be required to develop design grade, footings may bear in engineered fill. For footings bearing in engineered fill compacted to at least 95% of standard Proctor maximum density, we recommend using a maximum, net allowable, total load bearing pressure of 2,000psf. This is the stress that can be applied at the base of the footings in excess of the minimum surrounding overburden pressure.

Continuous-formed footings should have a minimum width of at least 16 inches, and isolated column footings should have a minimum width of at least 30 inches. Earth-formed trench footings also could be used. Trench footings should have a minimum width of at least 12 inches. Non-load-bearing grade beams could have narrower widths.

To provide protection from frost heave and to reduce the magnitude of shrinking and swelling of the bearing materials that could occur due to seasonal variations in subgrade moisture content, we recommend that the base of perimeter footings be located at least 3.5 feet below final outside grade.

Regarding construction of footings, we generally anticipate that material suitable for support of the design bearing pressure will be present at the base of the footings. However, there may be some variation in the load-carrying capability of the on-site materials, and it is possible that materials not suitable for support of the design bearing pressure could be encountered at the base of the footing excavations. For example, at borings B-3 and B-7, zones of relatively compressible material were encountered below a depth of 3.5 feet. For this reason, we recommend the base of all footing excavations be observed and evaluated by the geotechnical engineer prior to placing concrete. Care should be taken to prevent wetting or drying of the bearing materials during construction. Any extremely wet or dry material, or any loose or disturbed material in the bottom of the footing excavations, should be removed prior to placing concrete.

Long-term settlement for footings bearing within new engineered fill or suitable native materials is expected to be minor, less than 1 inch. Differential settlements across the structure is not expected to exceed about one-half this value.

**Lateral Earth Pressure and Groundwater Considerations**

We understand that the lower level of the north wing of the church will be below-grade. The unbalanced, lateral earth forces transmitted to below-grade walls in these areas will depend primarily on the type of backfill material used, the influence of surface loads imposed adjacent to the walls, and the groundwater levels. For the conditions encountered at the borings we recommend the walls be designed to resist the pressure generated by a material with an equivalent fluid pressure as shown on the attached *At Rest Earth Pressure* diagram. No factor of safety is included in these load distributions.

Fluctuations in the groundwater level could occur and we expect perched water could develop during prolonged wet weather. To prevent hydrostatic loading on below-grade walls, we recommend a perforated, rigid plastic or metal drain pipe with a minimum diameter of 6 inches be installed outside and inside the below-grade walls at a level at least 1 foot below the bottom of the below-grade floor slabs. To prevent the intrusion of fines, the drain lines should be surrounded by a minimum of 6 inches of appropriately sized granular filter material. As an alternative, the drain could be surrounded with at least 6 inches of free-draining granular material, and the granular material encapsulated with suitable filter fabric. The drains should provide positive drainage to sumps equipped with pumps. Because it is possible that a power outage could occur, consideration should be given to providing a battery or auxiliary power source for the sump pumps. Also, if the pumps were to fail, hydrostatic forces could develop and/or the below-grade areas could flood. Therefore, consideration also should be given to backup pumps.

The area above the perimeter drains extending at least 24 inches out from the wall should be backfilled with clean, free-draining sand. We recommend the upper 2 feet of backfill at the building perimeter be cohesive material, to reduce the infiltration of surface water into the perimeter drainage system

To prevent hydrostatic pressures on below-grade slabs, we recommend that under-slab drains (wrapped in filter cloth) be installed. The drains also should be perforated, rigid plastic or metal pipe with a minimum diameter of 4 inches. The under-slab drains should extend parallel to the long dimension of below-grade slab areas and be spaced on approximately 20-foot centers. We recommend the drains be placed in a drainage blanket at least 6 inches thick, constructed of free-draining granular material, such as UD-1 as specified by the KDOT.

As shown on the enclosed *At Rest Earth Pressure* diagram, a uniform surcharge load applied adjacent to the wall will induce additional lateral stresses on the below-grade walls. Continuous or isolated footings located adjacent to the below-grade walls also could impose lateral pressures on these walls; however, if these continuous or isolated loads are imposed beyond the zone that extends up from the bottom of the below-grade wall at an angle no steeper than 1H:1V, the effect of the vertical loads on the below-grade walls would be negligible.

### Pavement Subgrade Preparation

The recommendations related to stripping and proofrolling, as described in the *"Building Pad Preparation"* section, should be followed. Prior to placing new fill or constructing pavements, we recommend the upper 9 inches of exposed subgrade be scarified and compacted to at least 95% of standard Proctor maximum density at moisture contents not less than optimum.

Additional fill required to develop design grade should be an approved material that is free of organic matter and debris. The fill should be placed in lifts not exceeding 9 inches in loose thickness and, except for the upper 8 inches of materials directly below the pavement, the fill should be compacted to at least 95% of standard Proctor maximum density. The upper 8 inches of subgrade material below the pavement should be compacted to at least 98% of standard Proctor maximum density. Cohesive fill used below pavements should be placed at moisture contents not less than optimum.

Pavement support capacity can be enhanced and pavement thickness can be reduced by modifying the upper 8 inches of material directly below the pavement with lime or Class C fly ash. We recommend using the moisture criteria and application rates of lime or fly ash previously described in the *Low Volume Change Zone* section. The modified zone should extend at least 1 foot beyond the edge of the pavement. If hydrated lime is used to modify the subgrade soils; it would be necessary to allow at least 48 hours for the lime reactions to proceed prior to final compaction of the modified zone. Soils mixed with Class C fly ash should be compacted within 2 hours following blending operations. Recognized guidelines, such as those specified by K.D.O.T., should be followed in the mixing and/or blending of lime- or fly ash-modified material.

It is important that the moisture content of the subgrade soils be maintained prior to paving. We recommend the subgrade moisture be evaluated several days before paving. If drying or softening of the subgrade has occurred, measures should be taken to adjust the moisture and compaction of the subgrade materials before paving.

## Pavements

The following table represents the recommended minimum thickness of pavements constructed on properly prepared soil subgrades or subgrades treated with lime or fly ash, and assumes periodic maintenance will be performed throughout the life of the pavement.

| RECOMMENDED MINIMUM PAVEMENT SECTIONS (Inches) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CAR PARKING & DRIVE AREAS LIGHT DUTY | | | | TRUCK DRIVE AREAS HEAVY DUTY** | | | |
| SUBGRADE: | MODIFIED | | UNTREATED | | MODIFIED | | UNTREATED | |
| PORTLAND CEMENT CONCRETE:<br>Air Entrained<br>4,000 Psi Compressive<br>650 Psi Flexural | | 5.0* | | 5.0 | | 6.0 | | 6.5 |
| ASPHALTIC CONCRETE:<br>Surface Course (BM-2, KDOT Mix)<br>Base Course (BM-4, KDOT Mix) | <br>2.0<br>3.0 | | <br>2.0<br>4.0 | | <br>2.0<br>5.0 | | <br>2.0<br>6.0 | |
| MODIFIED SUBGRADE:<br>4% to 6% Hydrated Lime or<br>14% to 16% Class C Fly Ash*** or<br>Crushed Limestone (Silty Gravel) meeting KDOT specification AB-3 | 8.0 | 8.0 | | | 8.0 | 8.0 | | |
| Compacted to > 98% Dry Density (ASTM D-698,Standard Proctor) | | | | | | | | |

* Minimum Acceptable PCC Section.

** Subject to light truck traffic and up to the equivalent of two, semi-tractor-trailers per day, for a total of about 40,000 ESALS. Pavements subjected to greater traffic volumes would require thicker sections.

*** May need to be placed in two lifts to achieve 98% compaction

We recommend using an at least 7-inch thick, reinforced, concrete paving section in front of the trash dumpster. The concrete slab should be large enough to support the trash dumpster and the tipping axle of the pickup vehicle.

All pavement surfaces should be sloped to provide proper surface drainage. Water allowed to pond or adjacent to the pavement could saturate the subgrade and cause premature pavement deterioration.

### Fill Placement Monitoring

The exposed subgrade and each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the geotechnical engineer's representative prior to placement of additional lifts. We recommend that each lift of fill be tested for density and moisture content at minimum frequencies of one test for every 2,500 square feet of compacted fill in the building area and one density and moisture content test for every 50 linear feet of compacted utility trench backfill.

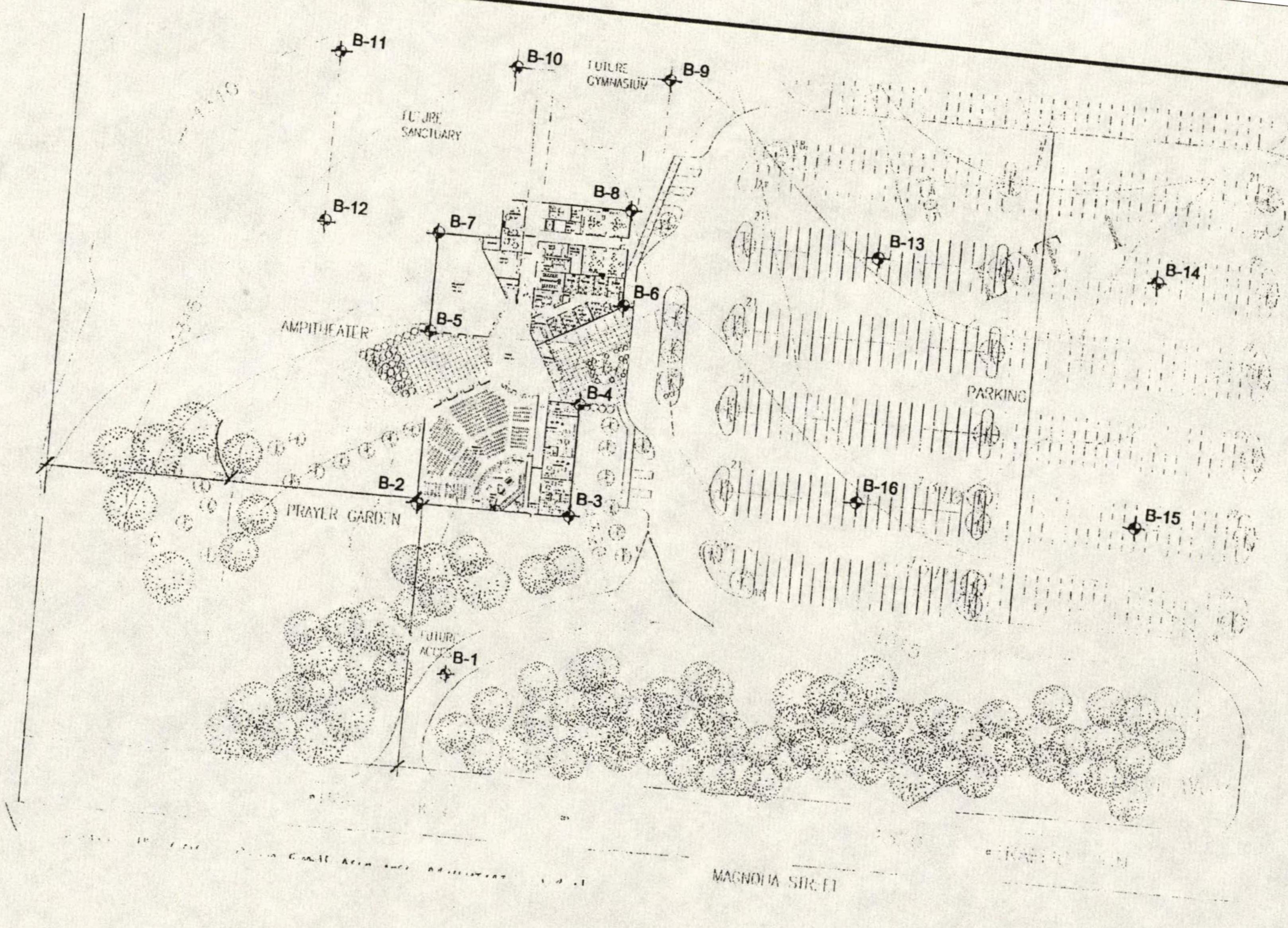
## GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide testing and observation during excavation, grading, foundation, and construction phases of the project.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings or across the site. The nature and extent of such variations may not become evident until construction. If variations appear, it will be necessary to reevaluate the recommendations of this report.

The scope of services for this project does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous material or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. In the event that changes in the nature, design, or location of the project, as outlined in this report, are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.




## LEGEND

⊕ BORING LOCATION

| | | | |
|---|---|---|---|
| **BORING LOCATION DIAGRAM**<br>**FIRST COVENANT CHURCH**<br>SALINA, KANSAS | | | |
| Project Mngr: JDH | **Terracon**<br>2111 West Harry Street<br>Wichita, Kansas 67213 | Project No. | 01015110 |
| Designed By: | | Scale: | NOT TO SCALE |
| Checked By: | | Date: | 6-5-01 |
| Approved By: | | Drawn By: | CWS |
| File Name: | 01015110.DWG | Figure No. | 1 |

# LOG OF BORING NO. B-1



CLIENT
**First Covenant Church**

SITE
**Salina, Kansas**

PROJECT
**First Covenant Church**

| GRAPHIC LOG | DESCRIPTION<br>Approx. Surface Elev.: 1325 ft | | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | TYPE | RECOVERY, in. | SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | DRY UNIT WT pcf | UNCONFINED STRENGTH, psf | ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organic Topsoil 3 - 4"<br>**LEAN CLAY**<br>Trace organics, red-brown, hard | | | | | PA | | | | | | |
| | | | | CL | 1 | SS | 14 | 13 | 16.1 | | 9000 | |
| | | | | | | PA | | | | | | |
| | Trace fine sand below 3.5' | | | CL | 2 | SS | 18 | 16 | 14.9 | | 9000 | |
| | 5 | 1320 | 5 | | | | | | | | | |
| | BOTTOM OF BORING | | | | | | | | | | | |

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | |
|---|---|---|---|
| WL | ∇ DRY | WS ▼ DRY | AB |
| WL | ∇ | ∇ | |
| WL | | | |

Terracon

| | | | |
|---|---|---|---|
| BORING STARTED | | | 5-22-01 |
| BORING COMPLETED | | | 5-22-01 |
| RIG | 313 | FOREMAN | JD |
| APPROVED | JDH | JOB # | 01015110 |

BOREHOLE_99 01015110.GPJ TERRACON.GDT 6/8/01

# LOG OF BORING NO. B-2



CLIENT: **First Covenant Church**

SITE: **Salina, Kansas**

PROJECT: **First Covenant Church**

| DESCRIPTION (Approx. Surface Elev.: 1325 ft) | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: RECOVERY, in. | SAMPLES: SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | TESTS: DRY UNIT WT pcf | TESTS: UNCONFINED STRENGTH, psf | TESTS: ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|
| Organic Topsoil 3 - 4" **LEAN CLAY** Trace organics, brown, hard | | | | PA | | | | | | |
| | | CL | 1 | SS | 18 | 12 | 12.1 | | 9000* | |
| 3 — 1322 **LEAN CLAY** Red-brown, very stiff | | | | PA | | | | | | |
| | | CL | 2 | SS | 18 | 21 | 19.1 | | 8000* | |
| | 5 | | | PA | | | | | | |
| 7 — 1318 **HIGHLY WEATHERED SHALE**** Light gray | | | | | | | | | | |
| | | | 3 | SS | 18 | 64 | 13.7 | | | |
| | 10 | | | PA | | | | | | |
| | | | 4 | SS | 18 | 18 | 22.9 | | | |
| 15 — 1310 **HIGHLY WEATHERED SHALE**** Gray-brown | 15 | | | PA | | | | | | |
| | | | 5 | SS | 18 | 60 | 20.1 | | | |
| 20 — 1305 BOTTOM OF BORING | 20 | | | | | | | | | |

**Classification estimated from disturbed samples. Core sample and petrographic analysis may reveal other rock types.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | |
|---|---|---|
| WL | ∇ 18.5 WS | ▼ 18.0 AB |
| WL | ∇ | ▼ |
| WL | | |

Terracon

| | |
|---|---|
| BORING STARTED | 5-22-01 |
| BORING COMPLETED | 5-22-01 |
| RIG 313 | FOREMAN JD |
| APPROVED JDH | JOB # 01015110 |

# LOG OF BORING NO. B-3



| | |
|---|---|
| CLIENT<br>**First Covenant Church** | |
| SITE<br>**Salina, Kansas** | PROJECT<br>**First Covenant Church** |

| GRAPHIC LOG | DESCRIPTION<br>Approx. Surface Elev.: 1321 ft | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: RECOVERY, in. | SAMPLES: SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | TESTS: DRY UNIT WT pcf | TESTS: UNCONFINED STRENGTH, psf | TESTS: ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organic Topsoil 3 - 4"<br>**LEAN CLAY**<br>Trace organics, dark brown, very stiff | | | | PA | | | | | | |
| | | | CL | 1 | ST | 18 | | 19.9 | 101 | 7000* | |
| | | | | | PA | | | | | | |
| | Red-brown and stiff below 3.5' | | CL | 2 | ST | 18 | | 19.8 | 100 | 3000* | |
| | 5 — 1316 | 5 | | | | | | | | | |
| | **HIGHLY WEATHERED SHALE****<br>Red-brown | | | | PA | | | | | | |
| | | | | 3 | SS | 18 | 23 | 16.3 | | | |
| | | 10 | | | PA | | | | | | |
| | | | | 4 | SS | 18 | 24 | 17.5 | | | |
| | 15 — 1306 | 15 | | | | | | | | | |
| | BOTTOM OF BORING<br>**Classification estimated from disturbed samples. Core sample and petrographic analysis may reveal other rock types. | | | | | | | | | | |

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | | |
|---|---|---|---|---|
| WL | ▽ DRY | WS | ▼ DRY | AB |
| WL | ▽ | | ▽ | |
| WL | | | | |

Terracon

| | | | |
|---|---|---|---|
| BORING STARTED | | | 5-22-01 |
| BORING COMPLETED | | | 5-22-01 |
| RIG | 313 | FOREMAN | JD |
| APPROVED | JDH | JOB # | 01015110 |

BOREHOLE_99 01015110.GPJ TERRACON.GDT 6/8/01

# LOG OF BORING NO. B-4



CLIENT: **First Covenant Church**

SITE: **Salina, Kansas**

PROJECT: **First Covenant Church**

| GRAPHIC LOG | DESCRIPTION<br>Approx. Surface Elev.: 1318.5 ft | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | TYPE | RECOVERY, in. | SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | DRY UNIT WT pcf | UNCONFINED STRENGTH, psf | ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organic Topsoil 3 - 4" | | | | PA | | | | | | |
| | **FAT CLAY**<br>Trace organics, dark brown, very stiff | | CH | 1 | SS | 15 | 11 | 23.8 | | 8000 | LL=56<br>PL=20<br>PI=36 |
| | | | | | PA | | | | | | |
| | Red-brown below 3.5' | | CH | 2 | SS | 18 | 10 | 21.5 | | 7000 | |
| | | 5 | | | PA | | | | | | |
| | Brown-gray below 8.5' | | CH | 3 | SS | 18 | 12 | 19.5 | | 8000 | |
| | 11 — 1307.5 | 10 | | | PA | | | | | | |
| | **HIGHLY WEATHERED SHALE****<br>Gray-brown ▼ | | | | | | | | | | |
| | | | | 4 | SS | 18 | 39 | 23.2 | | | |
| | 15 — 1303.5 | 15 | | | | | | | | | |
| | BOTTOM OF BORING<br>**Classification estimated from disturbed samples. Core sample and petrographic analysis may reveal other rock types. | | | | | | | | | | |

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | | |
|---|---|---|---|---|
| WL | ▽ 13.0 | WS | ▼ 13.0 | AB |
| WL | ▽ | | ▽ | |
| WL | | | | |

Terracon

| | | | |
|---|---|---|---|
| BORING STARTED | | | 5-22-01 |
| BORING COMPLETED | | | 5-22-01 |
| RIG | 313 | FOREMAN | JD |
| APPROVED | JDH | JOB # | 01015110 |

# LOG OF BORING NO. B-5



CLIENT
First Covenant Church

SITE
Salina, Kansas

PROJECT
First Covenant Church

Approx. Surface Elev.: 1322 ft

| DESCRIPTION | DEPTH, ft. | ELEV. | USCS SYMBOL | SAMPLES NUMBER | TYPE | RECOVERY, in. | SPT - N BLOWS / ft. | TESTS WATER CONTENT, % | DRY UNIT WT pcf | UNCONFINED STRENGTH, psf | ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Organic Topsoil 3 - 4" **LEAN CLAY** Brown, very stiff | | | | | PA | | | | | | |
| | | | CL | 1 | SS | 12 | 7 | 18.4 | | 8000* | |
| | 2.5 | 1319.5 | | | | | | | | | |
| **LEAN CLAY** Rusty gray, hard | | | | | PA | | | | | | |
| | | | CL | 2 | SS | 18 | 11 | 20.1 | | 9000* | LL=42 PL=26 PI=16 |
| | | | | | PA | | | | | | |
| | 8.5 | 1313.5 | | | | | | | | | |
| **HIGHLY WEATHERED SHALE**** Calcareous, light brown | | | | 3 | SS | 18 | 21 | 24.5 | | 9000* | |
| | | | | | PA | | | | | | |
| | | | | 4 | SS | 18 | 31 | 22.4 | | | |
| | 15 | 1307 | | | | | | | | | |
| BOTTOM OF BORING **Classification estimated from disturbed samples. Core sample and petrographic analysis may reveal other rock types. | | | | | | | | | | | |

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | |
|---|---|---|---|
| WL | ▽ DRY | WS | ▼ DRY AB |
| WL | ▽ | | ▽ |
| WL | | | |

Terracon

| | | | |
|---|---|---|---|
| BORING STARTED | 5-22-01 | | |
| BORING COMPLETED | 5-22-01 | | |
| RIG | 313 | FOREMAN | JD |
| APPROVED | JDH | JOB # | 01015110 |

# LOG OF BORING NO. B-6



CLIENT
**First Covenant Church**

SITE
**Salina, Kansas**

PROJECT
**First Covenant Church**

| GRAPHIC LOG | DESCRIPTION (Approx. Surface Elev.: 1316.5 ft) | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: RECOVERY, in. | SAMPLES: SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | TESTS: DRY UNIT WT pcf | TESTS: UNCONFINED STRENGTH, psf | TESTS: ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organic Topsoil 3 - 4" | | | | PA | | | | | | |
| | **LEAN CLAY** Trace organics, brown, very stiff | | CL | 1 | ST | 18 | | 23.5 | 90 | 6000* | |
| | | | | | PA | | | | | | |
| | | | CL | 2 | ST | 18 | | 21.1 | 89 | 5500* | |
| | | 5 | | | PA | | | | | | |
| | 6 — 1310.5 | | | | | | | | | | |
| | **HIGHLY WEATHERED SHALE**** Trace calcareous, olive brown | | | 3 | SS | 18 | 18 | 24.1 | | | |
| | | 10 | | | PA | | | | | | |
| | 13.5 — 1303 | | | | | | | | | | |
| | **MODERATELY WEATHERED SHALE**** Olive-gray, calcareous | | | 4 | SS | 18 | 55 | 16.0 | | | |
| | | 15 | | | PA | | | | | | |
| | | | | 5 | SS | 12 | 56 | 14.1 | | | |
| | 20 — 1296.5 | 20 | | | | | | | | | |
| | BOTTOM OF BORING<br>**Classification estimated from disturbed samples. Core sample and petrographic analysis may reveal other rock types. | | | | | | | | | | |

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | |
|---|---|---|---|
| WL | ∇ DRY | WS | ▼ DRY AB |
| WL | ∇ | | ∇ |
| WL | | | |

Terracon

| | | | |
|---|---|---|---|
| BORING STARTED | | | 5-22-01 |
| BORING COMPLETED | | | 5-22-01 |
| RIG | 313 | FOREMAN | JD |
| APPROVED | JDH | JOB # | 01015110 |

# LOG OF BORING NO. B-7



| CLIENT | |
|---|---|
| First Covenant Church | |
| SITE: Salina, Kansas | PROJECT: First Covenant Church |

| GRAPHIC LOG | DESCRIPTION (Approx. Surface Elev.: 1318 ft) | Depth / Elev. | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | TYPE | RECOVERY, in. | SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | DRY UNIT WT pcf | UNCONFINED STRENGTH, psf | ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organic Topsoil 3 - 4" | | | | | PA | | | | | | |
| | **LEAN CLAY** Trace organics, brown, hard | 2.5 / 1315.5 | | CL | 1 | SS | 18 | 11 | 19.5 | | 9000* | |
| | **LEAN CLAY** Brown, very stiff | | | | | PA | | | | | | |
| | | | | CH | 2 | SS | 18 | 3 | 20.3 | | 5000* | |
| | | 8.5 / 1309.5 | 5 | | | PA | | | | | | |
| | **HIGHLY WEATHERED SHALE**** Olive-gray | | | | 3 | SS | 18 | 23 | 19.5 | | | |
| | | 13.5 / 1304.5 | 10 | | | PA | | | | | | |
| | **MODERATELY WEATHERED SHALE**** Olive-gray | 15 / 1303 | | | 4 | SS | 18 | 73 | 16.7 | | | |
| | BOTTOM OF BORING | | 15 | | | | | | | | | |

**Classification estimated from disturbed samples. Core sample and petrographic analysis may reveal other rock types.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | | |
|---|---|---|---|---|
| WL | ▽ DRY | WS | ▼ DRY | AB |
| WL | ▽ | | ▽ | |
| WL | | | | |

Terracon

| | | | |
|---|---|---|---|
| BORING STARTED | 5-22-01 | | |
| BORING COMPLETED | 5-22-01 | | |
| RIG | 313 | FOREMAN | JD |
| APPROVED | JDH | JOB # | 01015110 |

# LOG OF BORING NO. B-8



CLIENT
First Covenant Church

SITE
Salina, Kansas

PROJECT
First Covenant Church

| GRAPHIC LOG | DESCRIPTION (Approx. Surface Elev.: 1315 ft) | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | TYPE | RECOVERY, in. | SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | DRY UNIT WT pcf | UNCONFINED STRENGTH, psf | ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organic Topsoil 3 - 4" | | | | PA | | | | | | |
| | **FAT CLAY** Trace organics, dark brown, hard | | CH | 1 | SS | 18 | 14 | 19.9 | | 9000* | |
| | | | | | PA | | | | | | |
| | | | CH | 2 | SS | 14 | 12 | 17.7 | | 9000* | |
| | | 5 | | | PA | | | | | | |
| | 6 — 1309 | | | | | | | | | | |
| | **HIGHLY WEATHERED SHALE**** Brown | | | | | | | | | | |
| | | | | 3 | SS | 18 | 27 | 16.6 | | | LL=47 PL=22 PI=25 |
| | | 10 | | | PA | | | | | | |
| | 13.5 — 1301.5 | | | | | | | | | | |
| | **MODERATELY WEATHERED SHALE**** Brown | | | 4 | SS | 17 | 50/5 | 16.4 | | | |
| | 15 — 1300 | 15 | | | | | | | | | |

BOTTOM OF BORING
**Classification estimated from disturbed samples. Core sample and petrographic analysis may reveal other rock types.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | |
|---|---|---|---|
| WL | ▽ DRY | WS ▼ DRY | AB |
| WL | ▽ | ▽ | |
| WL | | | |

Terracon

| | | | |
|---|---|---|---|
| BORING STARTED | 5-22-01 | | |
| BORING COMPLETED | 5-22-01 | | |
| RIG | 313 | FOREMAN | JD |
| APPROVED | JDH | JOB # | 01015110 |

# LOG OF BORING NO. B-9



CLIENT: First Covenant Church

SITE: Salina, Kansas

PROJECT: First Covenant Church

| GRAPHIC LOG | DESCRIPTION (Approx. Surface Elev.: 1311 ft) | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: RECOVERY, in. | SAMPLES: SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | TESTS: DRY UNIT WT pcf | TESTS: UNCONFINED STRENGTH, psf | TESTS: ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organic Topsoil 3 - 4" | | | | PA | | | | | | |
| | **FAT CLAY** Trace organics, dark brown, hard | | CH | 1 | SS | 18.0 | 13 | 25.6 | | 9000* | |
| | | | | | PA | | | | | | |
| | Very stiff below 3.5' | | CH | 2 | SS | 18.1 | 11 | 20.6 | | 9000* | |
| | | 5 | | | PA | | | | | | |
| | 8.5 — 1302.5 | | | | | | | | | | |
| | **HIGHLY WEATHERED SHALE**** Olive | | | 3 | SS | 18.0 | 25 | 21.1 | | | |
| | | 10 | | | PA | | | | | | |
| | 13.5 — 1297.5 | | | | | | | | | | |
| | **MODERATELY WEATHERED SHALE**** Gray | | | 4 | SS | 5.0 | 50/5 | 10.9 | | | |
| | 15 — 1296 | 15 | | | | | | | | | |
| | BOTTOM OF BORING<br>**Classification estimated from disturbed samples. Core sample and petrographic analysis may reveal other rock types. | | | | | | | | | | |

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | |
|---|---|---|---|
| WL | ▽ DRY | WS | ▼ DRY AB |
| WL | ▽ | | ▽ |
| WL | | | |

Terracon

| | | | |
|---|---|---|---|
| BORING STARTED | 5-22-01 | | |
| BORING COMPLETED | 5-22-01 | | |
| RIG | 313 | FOREMAN | JD |
| APPROVED | JDH | JOB # | 01015110 |

# LOG OF BORING NO. B-10



CLIENT: First Covenant Church

SITE: Salina, Kansas

PROJECT: First Covenant Church

| GRAPHIC LOG | DESCRIPTION (Approx. Surface Elev.: 1314 ft) | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | TYPE | RECOVERY, in. | SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | DRY UNIT WT pcf | UNCONFINED STRENGTH, psf | ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organic Topsoil 3-4" **FAT CLAY** Brown, very stiff | | | | PA | | | | | | |
| | | | CH | 1 | ST | 18 | | 24.4 | 95 | 7000* | |
| | | | | | PA | | | | | | |
| | | | CH | 2 | ST | 18 | | 20.1 | | 4500* | |
| | 5 — 1309 | 5 | | | | | | | | | |
| | **HIGHLY WEATHERED SHALE**** Olive | | | | PA | | | | | | |
| | | | | 3 | SS | 18 | 33 | 17.2 | | | |
| | | 10 | | | PA | | | | | | |
| | 13.5 — 1300.5 | | | | | | | | | | |
| | **MODERATELY WEATHERED SHALE**** Olive-gray | | | 4 | SS | 18 | 68 | 16.2 | | | |
| | | 15 | | | PA | | | | | | |
| | | | | 5 | SS | 6 | 50/6 | 15.1 | | | |
| | 20 — 1294 | 20 | | | | | | | | | |
| | BOTTOM OF BORING **Classification estimated from disturbed samples. Core sample and petrographic analysis may reveal other rock types. | | | | | | | | | | |

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | | |
|---|---|---|---|---|
| WL | ∇ DRY | WS | ▼ DRY | AB |
| WL | ∇ | | ∇ | |
| WL | | | | |

Terracon

| | |
|---|---|
| BORING STARTED | 5-22-01 |
| BORING COMPLETED | 5-22-01 |
| RIG 313 | FOREMAN JD |
| APPROVED JDH | JOB # 01015110 |

# LOG OF BORING NO. B-11



CLIENT
First Covenant Church

SITE
Salina, Kansas

PROJECT
First Covenant Church

Approx. Surface Elev.: 1311 ft

| Description | Depth, ft. | USCS Symbol | Samples: Number | Samples: Type | Samples: Recovery, in. | Samples: SPT - N Blows / ft. | Tests: Water Content, % | Tests: Dry Unit Wt pcf | Tests: Unconfined Strength, psf | Tests: Atterberg Limits |
|---|---|---|---|---|---|---|---|---|---|---|
| Organic Topsoil 3-4" | | CL | | PA | | | | | | |
| **LEAN CLAY** Brown, hard | | CL | 1 | SS | 14 | 16 | 20.5 | | 8500* | LL=41 PL=19 PI=22 |
| | | | | PA | | | | | | |
| Very stiff below 3.5' | | CL | 2 | SS | 18 | 8 | 22.1 | | 7500* | |
| 5 — 1306 | 5 | | | | | | | | | |
| **HIGHLY WEATHERED SHALE**** Olive | | | | PA | | | | | | |
| | | | 3 | SS | 18 | 37 | 18.5 | | | |
| | 10 | | | PA | | | | | | |
| 13.5 — 1297.5 | | | | | | | | | | |
| **MODERATELY WEATHERED SHALE**** Olive-gray | | | 4 | SS | 6 | 50/6 | 14.6 | | | |
| 15 — 1296 | 15 | | | | | | | | | |

BOTTOM OF BORING
**Classification estimated from disturbed samples. Core sample and petrographic analysis may reveal other rock types.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | |
|---|---|---|---|
| WL | ▽ DRY | WS | ▼ DRY AB |
| WL | ▽ | | ▽ |
| WL | | | |

Terracon

| | | | |
|---|---|---|---|
| BORING STARTED | | | 5-22-01 |
| BORING COMPLETED | | | 5-22-01 |
| RIG | 313 | FOREMAN | JD |
| APPROVED | JDH | JOB # | 01015110 |

# LOG OF BORING NO. B-12



CLIENT
First Covenant Church

SITE
Salina, Kansas

PROJECT
First Covenant Church

| GRAPHIC LOG | DESCRIPTION (Approx. Surface Elev.: 1316 ft) | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | TYPE | RECOVERY, in. | SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | DRY UNIT WT pcf | UNCONFINED STRENGTH, psf | ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organic Topsoil 3-4" **LEAN CLAY** Red-brown, very stiff | | | | PA | | | | | | |
| | | | CL | 1 | ST | 20 | | 19.4 | | 7000* | |
| | | | | | PA | | | | | | |
| | mottled olive below 3.5' | | CL | 2 | ST | 18 | | 29.9 | | 4500* | |
| | | 5 | | | PA | | | | | | |
| | 8.5 — 1307.5 | | | | | | | | | | |
| | **HIGHLY WEATHERED SHALE**** Olive | | | 3 | SS | 18 | 29 | 20.5 | | | |
| | | 10 | | | PA | | | | | | |
| | 13.5 — 1302.5 | | | | | | | | | | |
| | **MODERATELY WEATHERED SHALE**** Olive | | | 4 | SS | 18 | 64 | 16.1 | | | |
| | 15 — 1301 | 15 | | | | | | | | | |
| | BOTTOM OF BORING **Classification estimated from disturbed samples. Core sample and petrographic analysis may reveal other rock types. | | | | | | | | | | |

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | |
|---|---|---|---|
| WL | ∇ DRY WS | ▼ DRY AB | |
| WL | ∇ | ∇ | |
| WL | | | |

Terracon

| | | | |
|---|---|---|---|
| BORING STARTED | | | 5-22-01 |
| BORING COMPLETED | | | 5-22-01 |
| RIG | 313 | FOREMAN | JD |
| APPROVED | JDH | JOB # | 01015110 |

BOREHOLE_99 01015110.GPJ TERRACON.GDT 6/8/01

# LOG OF BORING NO. B-13



CLIENT: **First Covenant Church**

SITE: **Salina, Kansas**

PROJECT: **First Covenant Church**

| GRAPHIC LOG | DESCRIPTION<br>Approx. Surface Elev.: 1309 ft | | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: RECOVERY, in. | SAMPLES: SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | TESTS: DRY UNIT WT pcf | TESTS: UNCONFINED STRENGTH, psf | TESTS: ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organic Topsoil 3 - 4"<br>**FAT CLAY**<br>Brown, very stiff | | | | | PA | | | | | | |
| | | | | CH | 1 | SS | 13 | 13 | 24.3 | | 7500* | |
| | | | | | | PA | | | | | | |
| | Hard below 3.5' | | | CH | 2 | SS | 18 | 11 | 19.1 | | 8500* | |
| | 5 | 1304 | 5 | | | | | | | | | |
| | BOTTOM OF BORING | | | | | | | | | | | |

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | | |
|---|---|---|---|---|
| WL | ▽ DRY | WS | ▼ DRY | AB |
| WL | ▽ | | ▽ | |
| WL | | | | |

Terracon

| | | | |
|---|---|---|---|
| BORING STARTED | | | 5-22-01 |
| BORING COMPLETED | | | 5-22-01 |
| RIG | 313 | FOREMAN | JD |
| APPROVED | JDH | JOB # | 01015110 |

BOREHOLE_99 01015110.GPJ TERRACON.GDT 6/8/01

# LOG OF BORING NO. B-14



CLIENT
First Covenant Church

SITE
Salina, Kansas

PROJECT
First Covenant Church

| GRAPHIC LOG | DESCRIPTION<br>Approx. Surface Elev.: 1307 ft | | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: RECOVERY, in. | SAMPLES: SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | TESTS: DRY UNIT WT pcf | TESTS: UNCONFINED STRENGTH, psf | TESTS: ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organic Topsoil 3 - 4"<br>**FAT CLAY**<br>Brown, very stiff | | | | | PA | | | | | | |
| | | | | CH | 1 | SS | 10 | 11 | 21.0 | | 7500* | |
| | | | | | | PA | | | | | | |
| | | | | CH | 2 | SS | 18 | 10 | 18.6 | | 8000* | |
| | 5 | 1302 | 5 | | | | | | | | | |
| | BOTTOM OF BORING | | | | | | | | | | | |

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | |
|---|---|---|---|
| WL | ∇ DRY WS | ▼ DRY AB | |
| WL | ∇ | ∇ | |
| WL | | | |

Terracon

| | | | |
|---|---|---|---|
| BORING STARTED | | | 5-22-01 |
| BORING COMPLETED | | | 5-22-01 |
| RIG | 313 | FOREMAN | JD |
| APPROVED | JDH | JOB # | 01015110 |

BOREHOLE_99 01015110.GPJ TERRACON.GDT 6/8/01

# LOG OF BORING NO. B-15



| CLIENT | |
|---|---|
| First Covenant Church | |
| SITE: Salina, Kansas | PROJECT: First Covenant Church |

| GRAPHIC LOG | DESCRIPTION | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | TYPE | RECOVERY, in. | SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | DRY UNIT WT pcf | UNCONFINED STRENGTH, psf | ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Approx. Surface Elev.: 1310 ft | | | | | | | | | | |
| | Organic Topsoil 3 - 4" | | | | PA | | | | | | |
| | **FAT CLAY** Brown, very stiff | | CH | 1 | SS | 12 | 7 | 22.3 | | 5500* | |
| | | | | | PA | | | | | | |
| | Olive below 3.5' | | CH | 2 | SS | 14 | 10 | 24.5 | | 6500* | |
| | 5 — 1305 | 5 | | | | | | | | | |
| | BOTTOM OF BORING | | | | | | | | | | |

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | | | BORING STARTED | 5-22-01 |
|---|---|---|---|---|---|---|
| WL | ∇ DRY | WS | ▼ DRY | AB | BORING COMPLETED | 5-22-01 |
| WL | ▼ | | ∇ | | RIG 313 | FOREMAN JD |
| WL | | | | | APPROVED JDH | JOB # 01015110 |

Terracon

BOREHOLE_99 01015110.GPJ TERRACON.GDT 6/8/01

# LOG OF BORING NO. B-16



CLIENT
First Covenant Church

SITE
Salina, Kansas

PROJECT
First Covenant Church

| GRAPHIC LOG | DESCRIPTION<br>Approx. Surface Elev.: 1310.5 ft | DEPTH, ft. | USCS SYMBOL | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: RECOVERY, in. | SAMPLES: SPT - N BLOWS / ft. | TESTS: WATER CONTENT, % | TESTS: DRY UNIT WT pcf | TESTS: UNCONFINED STRENGTH, psf | TESTS: ATTERBERG LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organic Topsoil 3 - 4" | | | | PA | | | | | | |
| | **FAT CLAY**<br>Brown, stiff | | CH | 1 | SS | 14 | 8 | 30.3 | | 4000* | |
| | | | | | PA | | | | | | |
| | very stiff below 3.5' | | CH | 2 | SS | 16 | 11 | 25.6 | | 6000* | |
| | 5 1305.5 | 5 | | | | | | | | | |
| | BOTTOM OF BORING | | | | | | | | | | |

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

*Calibrated Hand Penetrometer

| WATER LEVEL OBSERVATIONS, ft | | | |
|---|---|---|---|
| WL | ▽ DRY | WS | ▼ DRY AB |
| WL | ▽ | | ▽ |
| WL | | | |

Terracon

| | |
|---|---|
| BORING STARTED | 5-22-01 |
| BORING COMPLETED | 5-22-01 |
| RIG 313 | FOREMAN JD |
| APPROVED JDH | JOB # 01015110 |

# GENERAL NOTES

## DRILLING & SAMPLING SYMBOLS:

| | | | |
|---|---|---|---|
| SS | Split Spoon - 1⅜" I.D., 2" O.D., unless otherwise noted | PS | Piston Sample |
| ST | Thin-Walled Tube - 2" O.D., Unless otherwise noted | WS | Wash Sample |
| PA | Power Auger | FT | Fish Tail Bit |
| HA | Hand Auger | RB | Rock Bit |
| DB | Diamond Bit - 4", N, B | BS | Bulk Sample |
| AS | Auger Sample | PM | Pressuremeter |
| HS | Hollow Stem Auger | DC | Dutch Cone |
| | | WB | Wash Bore |

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch OD split spoon, except where noted.

## WATER LEVEL MEASUREMENT SYMBOLS:

| | | | |
|---|---|---|---|
| WL | Water Level | WS | While Sampling |
| WCI | Wet Cave In | WD | While Drilling |
| DCI | Dry Cave In | BCR | Before Casing Removal |
| AB | After Boring | ACR | After Casing Removal |

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of ground water levels is not possible with only short term observations.

## DESCRIPTIVE SOIL CLASSIFICATION:

Soil Classification is based on the Unified Soil Classification System and ASTM Designations D-2487 and D-2488. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are described as: clays, if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse grained soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their consistency. Example: Lean clay with sand, trace gravel, stiff (CL); silty sand, trace gravel, medium dense (SM).

### CONSISTENCY OF FINE-GRAINED SOILS:

| Unconfined Compressive Strength, Qu, psf | Consistency |
|---|---|
| < 500 | Very Soft |
| 500 - 1,000 | Soft |
| 1,001 - 2,000 | Medium |
| 2,001 - 4,000 | Stiff |
| 4,001 - 8,000 | Very Stiff |
| 8,001 -16,000 | Hard |
| > -16,000 | Very Hard |

### RELATIVE DENSITY OF COARSE-GRAINED SOILS:

| N-Blows/ft. | Relative Density |
|---|---|
| 0-3 | Very Loose |
| 4-9 | Loose |
| 10-29 | Medium Dense |
| 30-49 | Dense |
| 50-80 | Very Dense |
| 80+ | Extremely Dense |

### RELATIVE PROPORTIONS OF SAND AND GRAVEL

| Descriptive Term(s) (of Components Also Present in Sample) | Percent of Dry Weight |
|---|---|
| Trace | < 15 |
| With | 15 - 29 |
| Modifier | > 30 |

### GRAIN SIZE TERMINOLOGY

| Major Component Of Sample | Size Range |
|---|---|
| Boulders | Over 12 in. (300mm) |
| Cobbles | 12 in. to 3 in. (300mm to 75mm) |
| Gravel | 3 in. to #4 sieve (75mm to 4.75mm) |
| Sand | #4 to #200 sieve (4.75mm to 0.075mm) |
| Silt or Clay | Passing #200 sieve (0.075mm) |

### RELATIVE PROPORTIONS OF FINES

| Descriptive Term(s) (of Components Also Present in Sample) | Percent of Dry Weight |
|---|---|
| Trace | < 5 |
| With | 5 - 12 |
| Modifier | > 12 |

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# UNIFIED SOIL CLASSIFICATION SYSTEM

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

[A]Based on the material passing the 3-in. (75-mm) sieve.

[B]If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C]Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

[D]Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E]$Cu = D_{60}/D_{10}$ $\quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F]If soil contains ≥ 15% sand, add "with sand" to group name.

[G]If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H]If fines are organic, add "with organic fines" to group name.

[I]If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J]If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K]If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.

[L]If soil contains ≥ 30% plus. No. 200 predominantly sand, add "sandy" to group name.

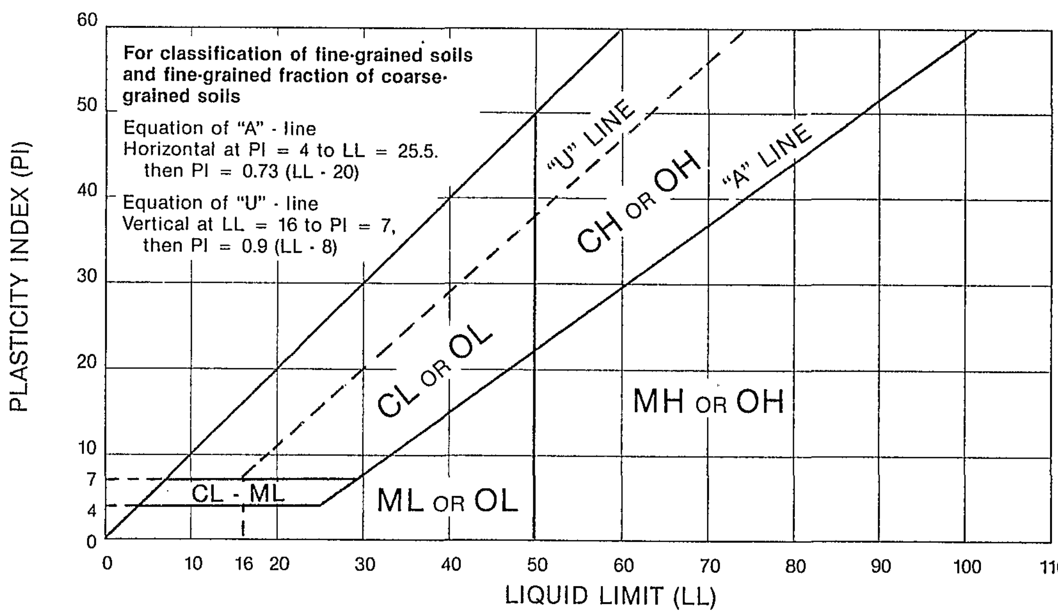
[M]If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N]PI ≥ 4 and plots on or above "A" line.

[O]PI < 4 or plots below "A" line.

[P]PI plots on or above "A" line.

[Q]PI plots below "A" line.




Terracon

# GENERAL NOTES

## Sedimentary Rock Classification

**DESCRIPTIVE ROCK CLASSIFICATION:**

Sedimentary rocks are composed of cemented clay, silt and sand sized particles. The most common minerals are clay, quartz and calcite. Rock composed primarily of calcite is called limestone; rock of sand size grains is called sandstone, and rock of clay and silt size grains is called mudstone or claystone, siltstone, or shale. Modifiers such as shaly, sandy, dolomitic, calcareous, carbonaceous, etc. are used to describe various constituents. Examples: sandy shale; calcareous sandstone.

| | |
|---|---|
| LIMESTONE | Light to dark colored, crystalline to fine-grained texture, composed of $CaCo_3$, reacts readily with HCl. |
| DOLOMITE | Light to dark colored, crystalline to fine-grained texture, composed of $CaMg(CO_3)_2$, harder than limestone, reacts with HCl when powdered. |
| CHERT | Light to dark colored, very fine-grained texture, composed of micro-crystalline quartz ($Si0_2$), brittle, breaks into angular fragments, will scratch glass. |
| SHALE | Very fine-grained texture, composed of consolidated silt or clay, bedded in thin layers. The unlaminated equivalent is frequently referred to as siltstone, claystone or mudstone. |
| SANDSTONE | Usually light colored, coarse to fine texture, composed of cemented sand size grains of quartz, feldspar, etc. Cement usually is silica but may be such minerals as calcite, iron-oxide, or some other carbonate. |
| CONGLOMERATE | Rounded rock fragments of variable mineralogy varying in size from near sand to boulder size but usually pebble to cobble size (½ inch to 6 inches). Cemented together with various cementing agents. Breccia is similar but composed of angular, fractured rock particles cemented together. |

**DEGREE OF WEATHERING:**

| | |
|---|---|
| SLIGHT | Slight decomposition of parent material on joints. May be color change. |
| MODERATE | Some decomposition and color change throughout. |
| HIGH | Rock highly decomposed, may be extremely broken. |

**Classification of rock materials has been estimated from disturbed samples.**
**Core samples and petrographic analysis may reveal other rock types.**

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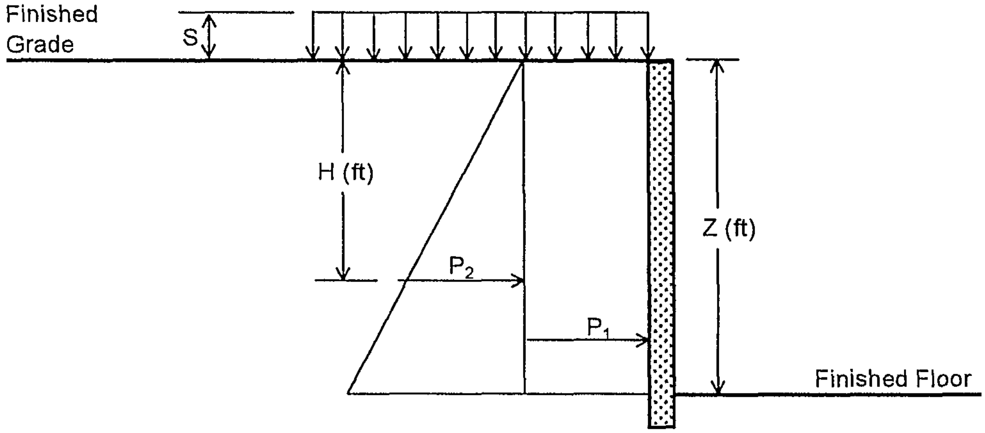
## AT-REST EARTH PRESSURE ON 1-FOOT WIDE VERTICAL STRIP

## (NO WALL ROTATION)

S = Uniform surcharge at grade, load in psf
Z = Wall height (ft)
$P_1$ = 0.68 x S = Effect of uniform surface surcharge
$P_2$ = 84 x H = Earth Pressure (drained)
$P_2$ = 105 x H = Earth Pressure (undrained)




### CONDITIONS

- Coefficient of at-rest earth pressure = 0.68
- Units of $P_1$, $P_2$ in psf
- Horizontal backfill
- Backfill is compacted to 95 percent of Standard Proctor maximum dry density
- In-situ soil weight = 124 pcf
- No safety factor included
- Uniform surcharge
- Negligible wall friction
- No ground water acting on wall
- Loading from heavy compaction equipment not included
- No wall rotation

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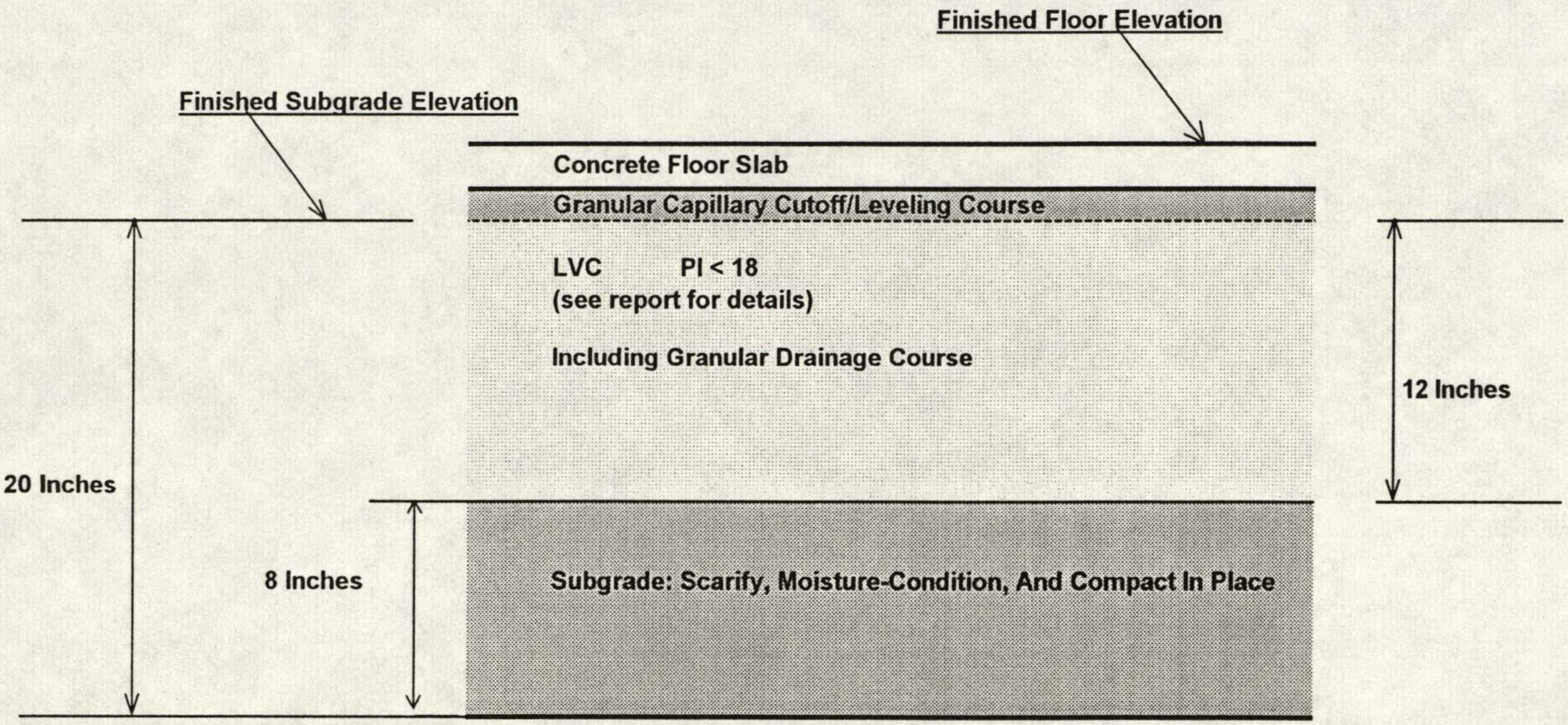
# BASEMENTSUBGRADE PREPARATION DIAGRAM

First Covenant Church

Salina, Kansas

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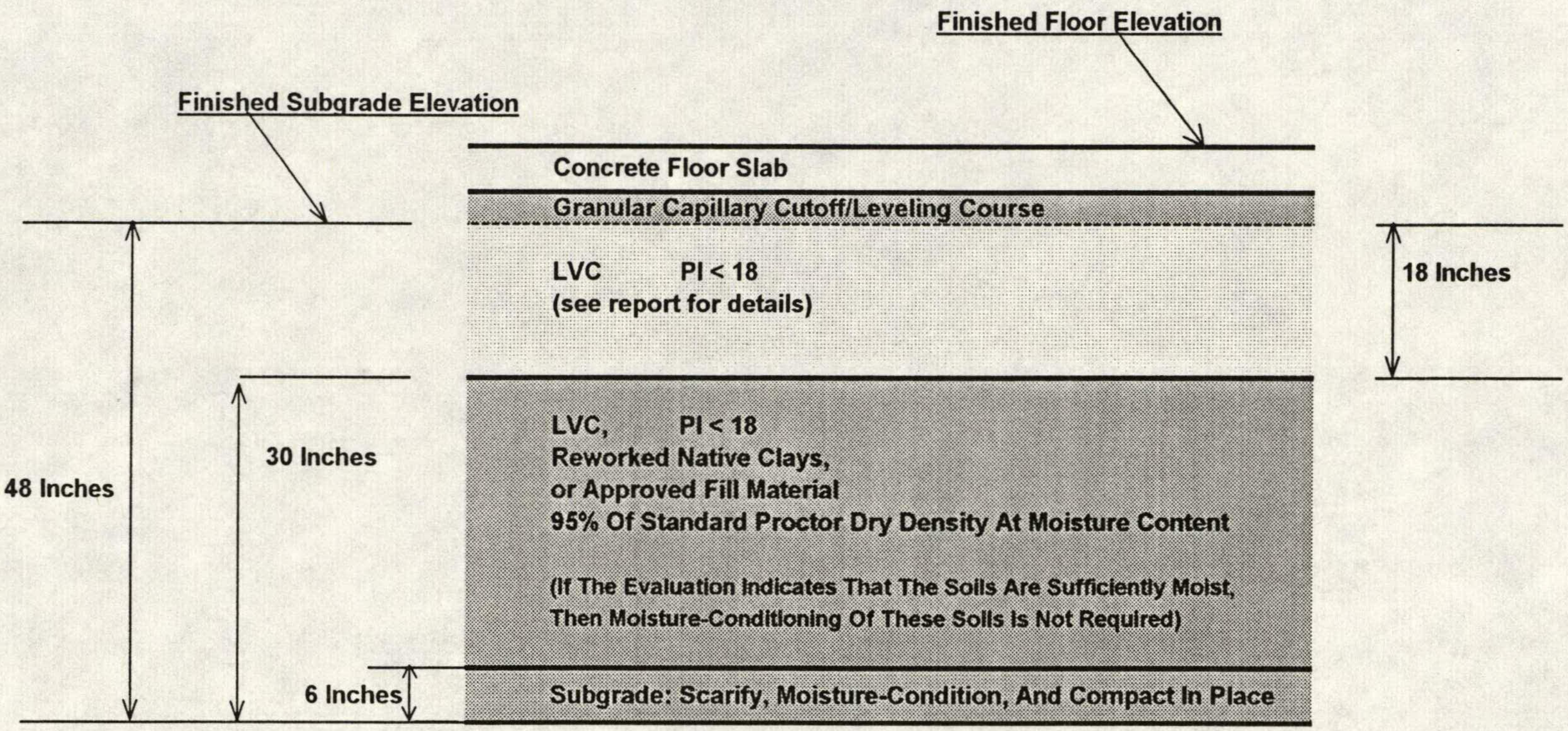
# SLAB-ON-GRADE SUBGRADE PREPARATION DIAGRAM

First Covenant Church

Salina, Kansas

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