

Lessons Learned from Litigation Caused by Expansive Clays

Steve Wendland, PE, PG, DGE

913.475.5851

Geo-Omaha

February 5, 2021



\$23,000,000



Assisted Living Center

Constructed in 2007 and 2008
Litigation settled in 2018



**CASE
HISTORY** | NUMBER
108

This GBA Case History will be
provided to you with the
conference proceedings.

www.geoprofessional.org



\$23,000,000



Photograph 7.3

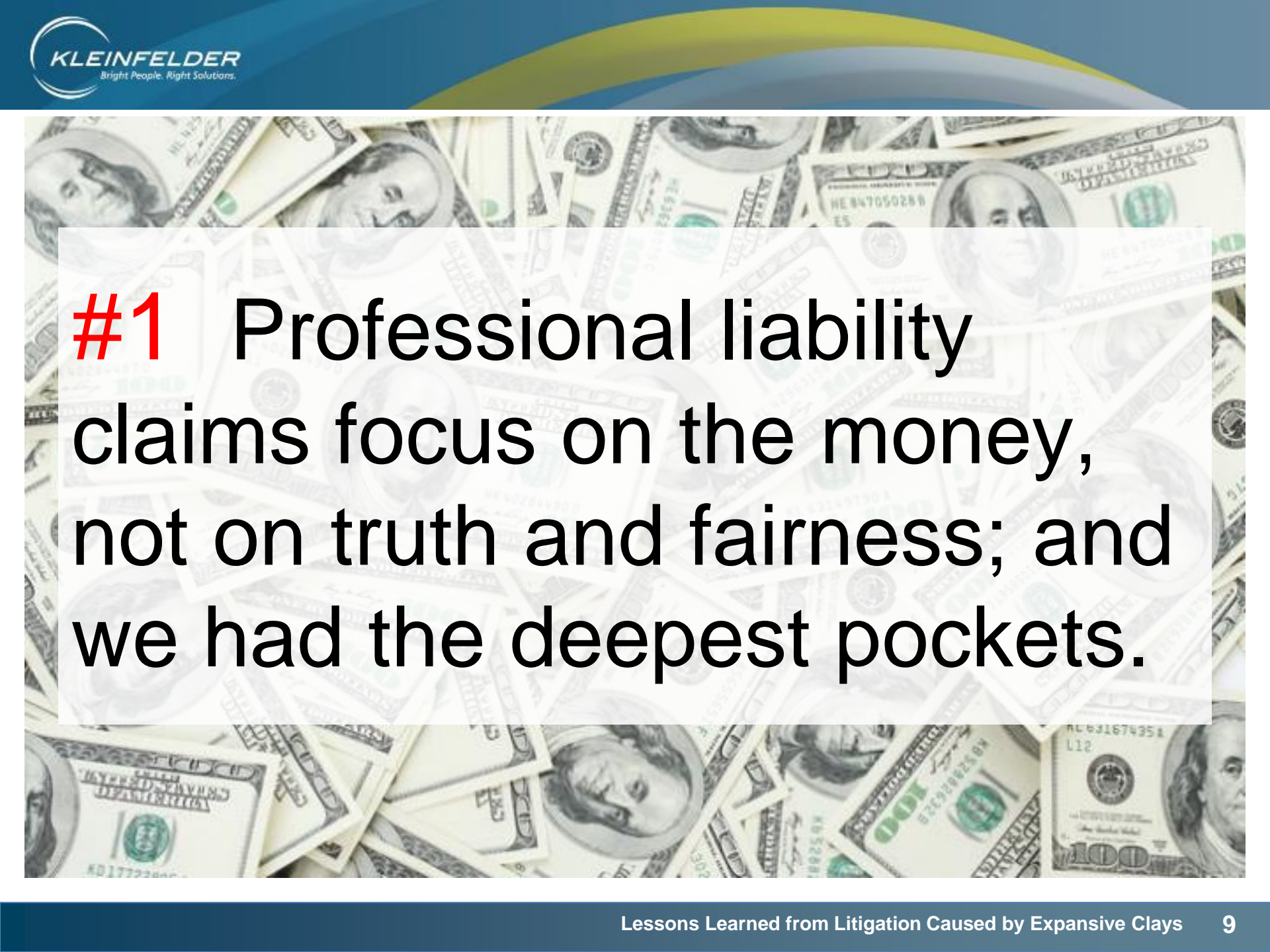


Photograph 7.1

Why was the claim focused on us?

- We were the geotechnical engineer.
- We had deep pockets.
- We had trouble with our contract documents.
- We didn't clearly and consistently communicate risk.
- We practiced outside of our area of expertise and outside of our scope of work.
- It wasn't 100% clear that we had met the local standard of care.
- Some of our work appeared to be low quality.

What did we (re)learn?



#1 Professional liability claims focus on the money, not on truth and fairness; and we had the deepest pockets.

Joint and Several Liability

#2 Control and Understand Your Contract Documents.



The Geotechnical Contract

We appreciate the opportunity to submit this proposal and look forward to working with you on this project. If you have any questions or comments, or if the scope of services we have developed differs from that which you intended, please contact the [redacted] Sunrise's Client Service Manager, at [redacted]

Respectfully submitted,

KLEINFELDER, INC.

Geotechnical Division Manager

Enclosure: General Conditions 2006

Cc: [redacted]

Client agrees to the Scope of Work described in this Proposal and Cost Estimate and the General Conditions attached and incorporated herein.

By: Wayne [redacted]
Title: SR VP
Date: 3/2/06

Reviewed by:

Area Manager



KLEINFELDER, INC. GENERAL CONDITIONS (PROFESSIONAL SERVICES)

- Services.** This Agreement is entered into between Client and Kleinfelder, Inc. ("Consultant") wherein Client engages Consultant to provide professional services ("Services") in connection with the project described in the proposal ("Project") to which these General Conditions are attached. Client agrees that services not specifically described in the Scope of Services identified in Consultant's proposal are not included in the Scope of Services described by Consultant. This Agreement, including the proposal, these General Conditions, Consultant's Addenda and Fee Schedule, represents the entire Agreement between the parties and supercedes any and all agreements between the parties, either oral or in writing, including any purchase or work order issued by Client.
- Payment.** Client shall pay invoices upon receipt. Invoices not paid within thirty (30) days of the invoice date shall be subject to a late payment fee of 1% per month from the date of invoice. Additionally, Consultant may, upon five (5) calendar days' notice to Client, suspend all Services until paid in full and may terminate the Agreement.
- Prevailing Wages.** It is Client's legal responsibility to determine whether the Project is covered under prevailing wage regulations. Unless Client specifically informs Consultant in writing that the Project is a prevailing wage project and is identified as such in Consultant's Scope of Services, Consultant agrees to reimburse Consultant and to defend, indemnify and hold harmless Consultant from and against any liability, including costs, fines and attorneys' fees, resulting from a subsequent determination that the Project was covered under prevailing wage regulations.
- Work Product.** Services provided under this Agreement, including all reports, information, recommendations, or opinions ("Reports") prepared or issued by Consultant, are for the exclusive use and benefit of Client or its agents in connection with the Project, are not intended to inform, guide or otherwise influence any other entities or persons with respect to any particular business transactions, and should not be relied upon by any entities or persons other than Client or its agents for any purpose other than the Project. Client will not distribute or convey such Reports to any other persons or entities without Consultant's prior written consent which shall include a release of Consultant from liability and indemnification by the third party. Consultant's Reports, boring logs, maps, field data, drawings, test results and other work products are part of Consultant's professional services, do not constitute goods or products and are copyrighted works of Consultant. However, such copyright is not intended to limit the Client's use of its work product in connection with the Project.
- Standard of Care.** Consultant will strive to perform the Services in a manner consistent with that level of care and skill ordinarily exercised by members of the Consultant's profession practicing in the same locality under similar circumstances at the time the services are performed. This Agreement creates no other representation, warranty or guarantee, express or implied.
- Limitation of Liability.** Consultant's potential liability to Client and others is grossly disproportionate to Consultant's fee due to the size, scope, and value of the Project. Therefore, unless Client and Consultant otherwise agree in writing in consideration for an increase in Consultant's fee, Client, including its directors, officers, partners, employees, agents, contractors and their respective assigns, agree to limit Consultant's liability (whether arising from contract, statutory violation or tort) to the greater of \$25,000 or the amount of Consultant's fee. This limitation of liability shall apply to all phases of Services performed in connection with this Project, whether subsequent to or prior to the execution of this Agreement. In no event shall Consultant be liable for consequential, incidental or special damages.
- Construction Observation.** If included in the Services, Consultant's services during construction, shall be limited to observation and testing of construction operations. Consultant shall not be responsible for constant or exhaustive inspection of the work, the means and methods of construction or the safety procedures employed by Client's contractor. Performance of construction observation services does not constitute a warranty or guarantee of any type, since even with diligent observation, some construction defects, deficiencies or omissions in the Contractor's work may occur. Client shall hold its contractor solely responsible for the quality and completion of the Project, including construction in accordance with the construction documents. Any duty hereunder is for the sole benefit of the Client and not for any third party, including the contractor or any subcontractor. Client or its designees, shall notify Consultant at least twenty-four (24) hours in advance of any field tests and observations required by the construction documents.
- Certifications.** Consultant shall sign certifications only if (a) Consultant approves the form of such certification prior to the commencement of services, (b) such certification is included in Consultant's Services, (c) the certification is limited to a statement of professional opinion and does not constitute a warranty or guarantee, express or implied. Any certification shall not relieve any entity of its obligations.
- Samples.** All samples shall remain the property of the Client. Client shall promptly, at its cost, remove and lawfully dispose of samples, borings and hazardous materials. If appropriate, Consultant shall preserve samples obtained no longer than sixty (60) days after the issuance of any document that includes the data obtained from those samples. After that date, Consultant may dispose of the samples or return them to Client at Client's cost.
- Client Responsibilities.** Client shall bear sole responsibility for (a) jobsite safety; (b) notifying third parties including any governmental agency or prospective purchaser, of the existence of any hazardous or dangerous materials located in or around the Project site; and (c) providing and updating Consultant with accurate information regarding existing conditions, including the existence of hazardous or dangerous materials, proposed Project site uses, the correct location of Project property boundaries, any change in Project plans, and all subsurface installations, such as pipes, tanks, cables and utilities within the Project site. Client shall cooperate with all requests by Consultant, including obtaining permission for access to the Project site. Client releases Consultant from liability for any incorrect advice, judgment or decision based on inaccurate information furnished by Client or others. If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including hazardous materials, encountered on the site, Consultant shall immediately stop work in the affected area and report the condition to Client.
- Electronic Media.** Because data stored on electronic media can deteriorate undetected or be modified without Consultant's knowledge, the Client accepts responsibility for the completeness or readability of the electronic media after an acceptance period of 30 days from delivery of the electronic files.
- Indemnification.** To the fullest extent permitted by law, Client, including its directors, officers, partners, employees, agents, contractors and their respective assigns, agrees to defend, indemnify and hold Consultant, its directors, officers, employees and subcontractors from and against all claims, liability, damages, or expenses ("Claims") arising out of or resulting from the Project, whether or not caused in whole or in part by the negligence or other fault of Consultant, including out of Consultant's sole negligence or willful misconduct. Client shall indemnify Consultant even if Client is partially or wholly without fault for the Claims.

Client shall attempt resolution of any dispute arising under or related to this Agreement by mediation. Notwithstanding the foregoing, in the event of at its sole option, waive mediation. Either party may demand mediation by serving a written notice on the other party stating the essential nature of the dispute in accordance with the AAA Construction Industry Mediation Rules then in effect within forty-five (45) days from the service of notice. The mediation shall be held in the state or federal court of the county in which Consultant's office issuing the proposal is located. If mediation fails, either party may institute litigation in the state or federal court of the county in which Consultant's office issuing the proposal is located. The parties expressly waive the right to a jury trial and agree that any action shall be brought within one year from the date of Consultant's final invoice. The parties expressly waive any claim, proceeding or counterclaim brought by either of the parties against the other with respect to any matter relating to, arising out of or in any way connected with the Project.

In the course of performance of this Agreement conditions or circumstances are discovered which were not contemplated by Consultant at the time of the Agreement. The Consultant shall notify Client of the newly discovered conditions or circumstances, and Client and Consultant shall renegotiate, in good faith, the terms and conditions of the Agreement. If the parties cannot agree upon the revised terms and conditions within thirty (30) days after notice, Consultant may terminate this Agreement and Consultant shall be deemed to have terminated the Agreement.

The State where the Agreement was entered into shall govern interpretation of this Agreement. If any term is deemed unenforceable, the remainder of the Agreement shall survive.

Client may assign its interest in this Agreement without the prior written consent of the other. Any modification to this Agreement will be effective only if it is in writing and signed by both parties. If Consultant has performed services in reliance on Client's verbal approval to proceed, Client shall be bound by such of any term, condition or covenant by either party shall not be construed as a waiver of any other term, condition or covenant. This Agreement may be terminated by either party at any time.

Living

KLEINFELDER

2 Jan

KLEIN 002173

077/S

Copyright 2006 Kleinfelder, Inc.

Page 12 of 12

February 21, 2006

KLEINFELDER 611

fax

Our Second Contract (CoMET)

Stipulated Sum Contract Agreement [REDACTED] Senior Living

This Agreement is made this 9th day of August 2007, between [REDACTED] (“Owner”) and Kleinfelder (Contractor). The work described in Section 2 below shall be performed in accordance with all codes and ordinances, plans, specifications and other contract documents (collectively, the “Contract Documents”) relating to the project known as [REDACTED] Assisted Living of Broomfield Colorado (“Project”)

SECTION 1. CONTRACTOR’S

Contractor acknowledges and certifies that it enters into this Agreement based on the Contract Documents, the location of the work, and that it is not relying upon any opinions or representations of the Owner or any other party. The Contract Documents shall have the same force and effect as if the Contractor and its subcontractors, if any, were directly bound to the work covered by the Contract Documents.



Contractor acknowledges and certifies that it enters into this Agreement based on the terms, conditions, and obligations of the Contract Documents, the location of the work, and that it is not relying upon any opinions or representations of the Owner or any other party. The Contract Documents shall have the same force and effect as if the Contractor and its subcontractors, if any, were directly bound to the work covered by the Contract Documents.

SECTION 2. DESCRIPTION OF

Contractor agrees to furnish all labor, materials, equipment and other facilities required to complete the following work and/or services:

1. GEOTECHNICAL CONSTRUCTION SERVICES

- A. Material Testing and Inspection as required to confirm compliance with the requirements of the plans and specifications including, but not limited to:
 - I. Deputy Grading Inspection
 - II. Utility trench and structure backfill testing

The Supreme Court of the
State of Colorado says this a
“residential” structure!

#3 We must clearly
and consistently
communicate risk.



Original plan included a parking garage under the building.



It was changed to this void space.



Cardboard void forms below the floor slab



Is a basement better than a void space?



If we say nothing, does that mean we “approve” the change? Should we have explained the risks of using a void space and void forms?

KLEINFELDER

September 13, 2007
Project No. 66875

Subject: Structurally Supported Floor System
Sunrise Senior Living of Flatiron
400 Summit Boulevard
City and County of Broomfield, Colorado

Dear Ms. Chan:

Kleinfelder West, Inc. (Kleinfelder) performed geotechnical investigation for the proposed Sunrise Senior Living of Flatiron project in Broomfield, Colorado (report dated May 23, 2006). We understand it is desired to use a structurally supported floor system for the building. The floor will be concrete, cast on 12 inches of cardboard void form. We believe a structurally supported floor system provides the lowest risk of floor movement, and believe this design approach is appropriate for the geotechnical conditions at this site.

There have been occasional problems with these floor system designs when the cardboard void form has not degraded, which resulted in uplift of the floor when the underlying soils have swelled. The void form should be designed to have the minimum strength required to support the concrete until cure, and then break down quickly afterward. The void form should degrade with contact to water. We recommend against the use of plastic or wax-coated void forms that can delay moistening of the void form. The use of a gravel bed under the void form is also discouraged because the gravel can act as a capillary break, preventing moisture transmission from soil to the void form.

We appreciate this opportunity to be of service to you and look forward to future endeavors. If you have any questions regarding this letter or need additional information or services, please contact the undersigned in our office.

Respectfully submitted,

KLEINFELDER WEST, INC.

Reviewed by:

J
R

jr

66875/DEN/R104
Copyright 2007 Kleinfelder

Page 1 of 1

September 13, 2007





CAN'T YOU
COME UP
WITH A

CHEAPER ALTERNATIVE?

BY JOHN PHILIP BACHNER

#4 We must stay within our scope of work and within our area of expertise.





674-8

CORPORATION

TREEST
CO 80022
66

October 1, 2007

Mr. Taroni Lani



Re: Sanrise Assisted Living of Broomfield

Dear Larry,

Drawing P803, under slab pipe hanger detail shows a trench lined with visqueen with sides turned up between 4" - 7". The underground piping is shown supported with pipe hangers with all thread rod embedded in the floor slab. In addition the pipe is to be bedded and backfilled. The first 12" above the pipe is to be backfilled with dry sand.

The use of both bedding and hangers on underground plumbing systems is a highly unusual installation practice and in our professional opinion will be nearly impossible to maintain the integrity of the rod and hanger assembly during backfill, compaction and a concrete pour.

Drawing P803, structural slab pipe hanger. Note states: "Hanger shall be for cast iron pipe 2" through 6". Construction documents section 15410, part 2. 2.1 "Sanitary sewer piping, buried within 5' of building. B. PVC pipe. Only where permitted by code".

As you are aware, PVC piping will be used and is superior to cast iron in underground installations. Because of its corrosion resistance, Visqueen will not be necessary. When the pipe is properly bedded the risk of movement is eliminated and will eliminate the need for hangers. In addition, with the trench being backfilled up to finish grade with natural soils the use of bedding sand will not be needed to obtain proper soil compaction.

Our use of PVC pipe and fittings in lieu of cast iron will eliminate the risk of pipe movement and possible separation at the joints that can occur without cast iron (hub or SV) underground systems which we believe the detail was intended for. PVC underground piping systems are very common and a standard installation practice within the City of Broomfield and are preferred over cast iron systems.

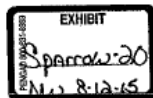
Please confirm that our assumption of the hanger details is strictly for use of cast iron piping and not valid for our use of PVC plastic piping.

If you have any questions, or if I may be of any further assistance, please do not hesitate to contact me at any time (303-289-9860).

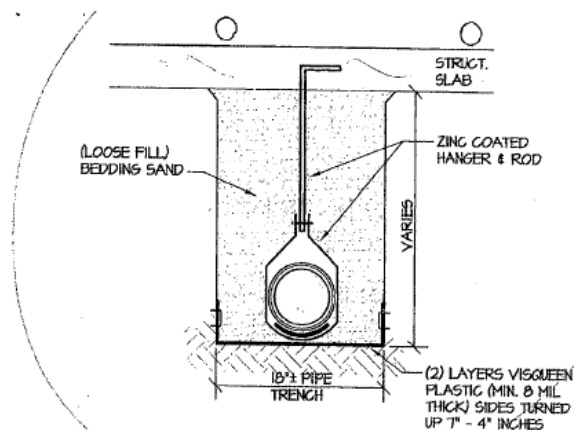
Sincerely,
Mal Mechanical Corporation

[Signature]

Dan Quine
Project Manager



BRINK_000075255



UNDER-SLAB PIPE HANGER DETAIL
NOT TO SCALE

STRUCTURAL SLAB PIPE HANGER NOTE:

ALL DRAINAGE PIPING BELOW STRUCTURAL SLAB ON GRADE SHALL BE SUPPORTED FROM FLOOR SLAB BY WAY OF PIPE HANGERS. HANGERS SHALL BE OF STEEL CONSTRUCTION EPOXY COATED ADJUSTABLE BAND HANGER TYPE WITH ZINC COATED HANGER ROD BENT AND IMBEDDED IN THE FLOOR SLAB. THE FIRST 12" OF BACKFILL ABOVE PIPE SHALL BE DRY SAND/HANGERS SHALL BE FOR CAST IRON PIPE 2" THRU 6" HANGER SPACING SHALL BE EVERY 5' OR AS DICTATED BY JURISDICTIONAL REQUIREMENTS OR MANUFACTURERS RECOMMENDATIONS FOR INTENDED APPLICATION.

EV. =

NOT TO FURNISH
STALL FLEXIBLE
ION JOINT BY
ION FLEX-TREND



BRINK_000075256

From: Jason Sparrow [jsparrow@ehlert-bryan.com]
Sent: Friday, November 02, 2007 2:13 PM
To: Mark Ottinger
Subject: F: [REDACTED]

From: [REDACTED] [kleinfelder.com]
Sent: [REDACTED] PM
To: Jason Sparrow
Cc: Travis Goracke
Subject: Sunrise Broomfield

Jason,

Per our telephone conversation, we do not believe the underdrain system is warranted in the AL wing since it is at grade. Any below grade areas should be protected with the drain. We believe the drain should remain as designed in the entire IL Wing. The purpose of the drain is to intercept any potential groundwater to keep the lower level floor dry.

Detail P803 indicates underslab plumbing lines are to be hung from the structural slab. Due to the plumbing gradients, the lines will have invert elevations in the underlying native soils and bedrock. This presents a risk to the structural slab should the soils heave. We suggest placing the plumbing lines on a minimum 12" of loosely placed bedding material, backfilling with same material (loosely placed) to subgrade, and omitting the hangers. Sleeves will be necessary at slab penetrations to allow free movement of plumbing lines.

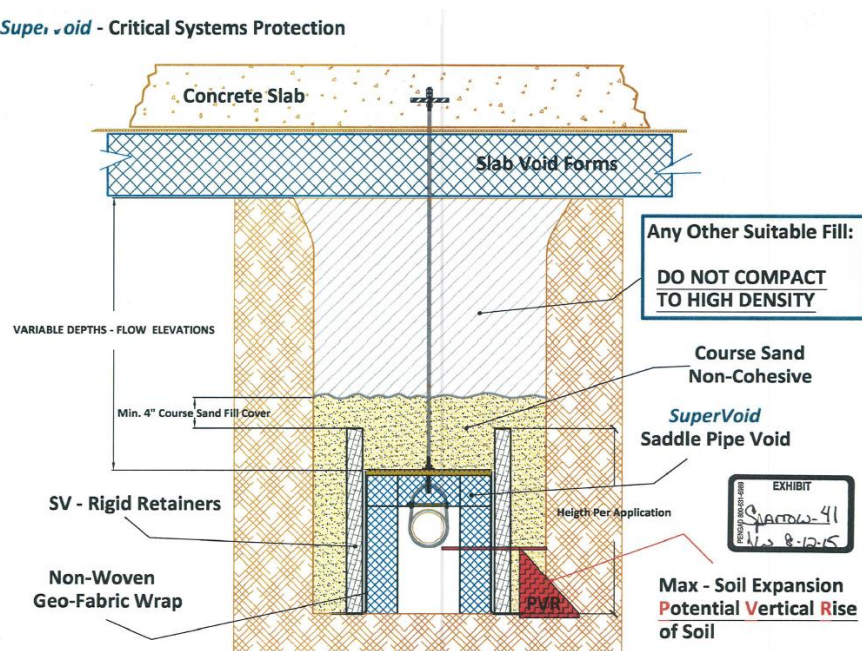
Regards,

KLEINFELDER
EXPECT MORE

1

BeeryRio0009536

SuperVoid - Critical Systems Protection





Photograph 7.3



Photograph 7.1

OWNER: “This is a soils problem, and you are the project soils engineer. Therefore, this is your problem.”



Photograph 7.1

KLEINFELDER: “No, this is a sewer problem, and we are not the mechanical engineer.”







**Who
inspected
the void
forms?**



#5 Our technical work must meet the standard of care or we'll have an increased risk of professional liability. Defining the local standard of care can be difficult.

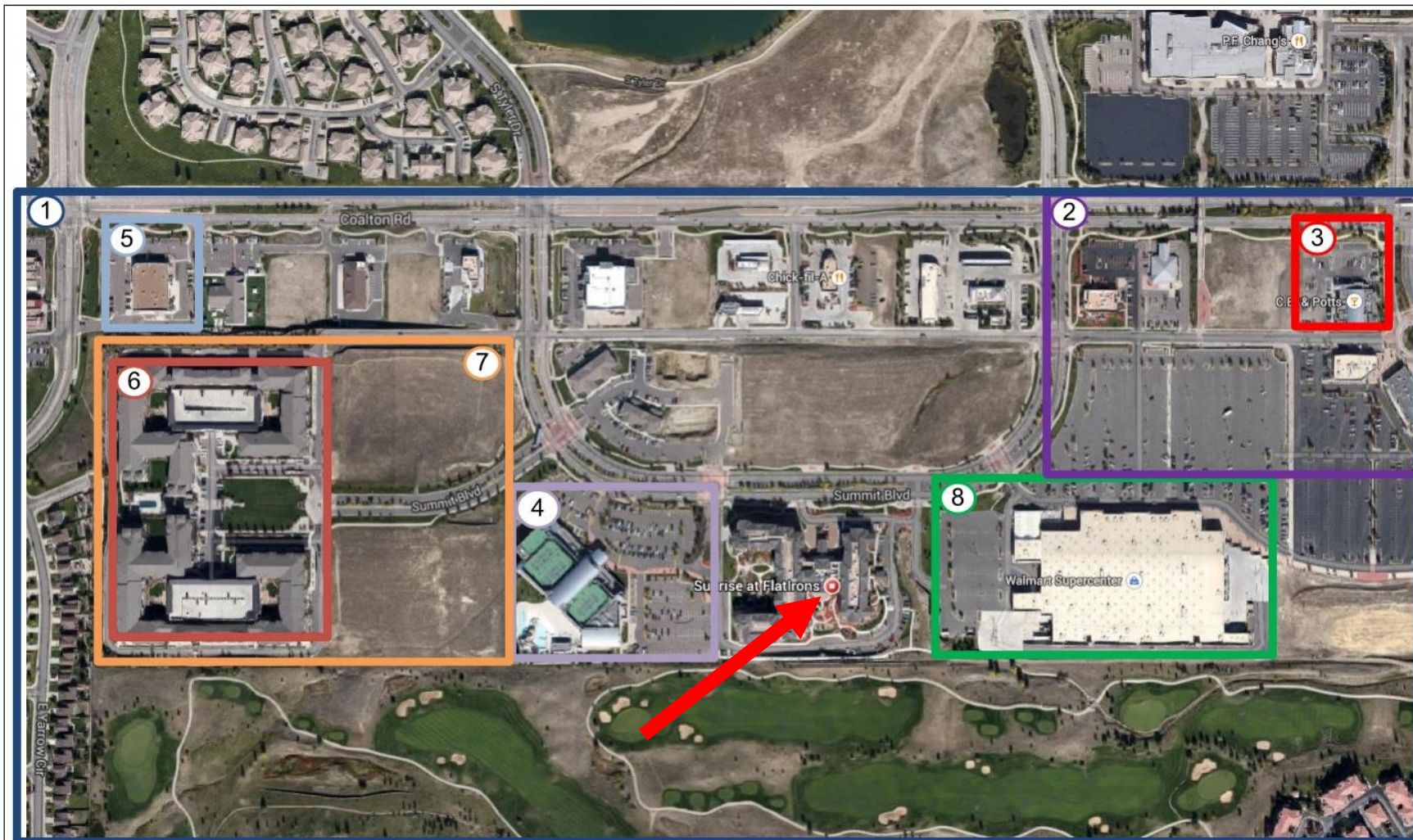


How should you evaluate swell potential?

Which laboratory tests?

- Moisture content
- Atterberg limits
- Swell pressure
- Amount of free swell
- Soil suction
- Expansion index

Did we do the right laboratory testing?



Was the 12" void space large enough?
Did other geotechs in the area usually
recommend 24"?



#6 Low quality work (or even the appearance of low quality) will be used against you in a claim, even if it doesn't apply to the problem.



Our geotechnical report provides good foundation recommendations :

garage depths of 1 foot, 4 feet, or 14 feet, piers shall be at least 38 feet, 35 feet, or 30 feet, respectively. To assure the desired competent bearing material and to verify recommendations, pier drilling operations shall be conducted to

3/31/06

Calculations for Drilled Shaft Uplift Resistance

$$U = \pi D L_w \alpha \sigma_s$$

Assume $L_w = 10'$ + $\sigma_s = 15 \text{ ksf}$

$$= \pi D (10 \text{ ft}) (0.15) (15,000 \text{ psf})$$

$$U = 70,686 \times D \text{ lbs.}$$

Notes, $L_w = 10'$ below garage level
∴ depth below ground surface $\approx 24'$

$\sigma_s = 15 \text{ ksf}$ is 2 to 3 times higher than σ_s measured in swell tests

Calculate min. embedment to resist U assuming $\alpha = 2'$

$$70,000 \times 2 = \pi (2) (L) (0.15) (15,000)$$

$$L_{\text{emb}} = 9.9', \text{ say } 10'$$

$$L_{\text{min}} = L_w + L_{\text{emb}} = 10' + 10' = 20'$$

$$L_{min} = L_w + L_{emb} = 10' + 10' = 20'$$

Calculations for Drilled Shaft Uplift Resistance

$$U = \pi D L_w \alpha \sigma_s$$

$$= \pi D (10 \text{ ft}) (0.15) (15,000 \text{ psf})$$

$$U = 70,686 \times D \text{ lbs.}$$

$$\text{Assume } L_w = 10' + \sigma_s = 15 \text{ ksf}$$

Notes, $L_w = 10'$ below garage level
depth below ground surface $\approx 24'$

$\sigma_s = 15 \text{ ksf}$ is 2 to 3 times higher than σ_s measured in
swell tests

Calculate min. embedment to resist U assuming $\alpha = 2'$

$$70,000 \times 2 = \pi (2') (L) (0.15) (15,000)$$

$$L_{\text{req}} = 9.9', \text{ say } 10'$$

$$L_{\text{min}} = L_w + L_{\text{req}} = 10' + 10' = 20'$$



1. Date is the same as the final report.
2. Calculations aren't checked.
3. No explanation for this input value.
4. Input number doesn't match our lab test results.
5. Input the wrong number in this equation.
6. Final answer doesn't match our actual recommendation.

#7 Good engineering judgement applied at the right time is exceptionally valuable.

The judgement of the senior reviewer overruled the bad calculations, and that saved the drilled piers from damage.



Seven years of litigation...
Three failed mediations...
Then we settle with
favorable terms!

What did you learn?

1. Stay within your area of expertise and scope of work.
2. Communicate risk.
3. Appreciate good engineering judgement.
4. Understand the standard of care.
5. Read GBA case history #108.

Questions?

Lessons Learned from Litigation Caused
by Expansive Clays

Steve Wendland, PE, PG, DGE

913.475.5851

**As of Feb. 22, 2021, I will be working for
Geoengineers, Inc.
swendland@geoengineers.com**

