

Isolation of Plumbing Under Isolated Slabs

Structural Engineers Association of Texas (SEAoT)

Dallas Chapter Meeting

November 15, 2022

Dallas, Texas

INTRODUCTION

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INTRODUCTION

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INTRODUCTION

The 2024 International Plumbing Code (IPC) will have new language explicitly requiring isolation of plumbing from expansive soil under isolated slabs (over a crawlspace or voidwork). It will not permit buried plumbing. It will also not permit non-isolated void systems that provide various forms of “voids” but do not actually isolate plumbing, hangers and supports under the slab, even though the manufacturers may claim they “isolate” plumbing. Furthermore, as a consequence of many lawsuits and the clarifying language in the 2024 IPC, **Mechanical Engineering firms today are increasingly interpreting long-standing IPC requirements for protection of plumbing to require isolation of plumbing from expansive soil under isolated slabs.** Below isolated slabs, these firms are not allowing buried plumbing and not allowing non-isolated void systems.

INTRODUCTION

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For Example

BHB's current office policy is to consider the new 2024 IPC language to have **already taken effect as a clarification of current plumbing codes** by the International Plumbing Code Committee (the "IPC Committee").

BHB will no longer allow buried plumbing under crawlspaces or voidwork.

BHB will no longer allow "non-isolated void systems" under crawlspaces or voidwork.

INTRODUCTION

Mechanical Engineers cannot isolate plumbing without Structural Engineers doing their part. **Responding to recent changes in Mechanical Engineering practices that define the Mechanical Engineering standard of care, this presentation will identify tasks for Structural Engineers.**

INTRODUCTION

TASK #1: KNOW WHAT ISOLATED PLUMBING IS

TASK #2: UNDERSTAND THE PROBLEM

TASK #3: LET THE GEO ENG BE THE GEO ENG

TASK #4: LET THE MECH ENG BE THE MECH ENG

TASK #5: DO THE STRUCTURAL ENGINEERING

INTRODUCTION

Intellectual Property Notice

Some of the methods and devices which are discussed in this presentation are inventions by various parties and have been **PATENTED** or are **PATENT-PENDING**. These methods and devices are referenced in this presentation without naming the manufacturers. A primary purpose of referencing these methods and devices is to discuss the relative technical advantages and disadvantages of various approaches used in the industry today. This presentation is not an inducement to patent infringement. Therefore, this slide is hereby providing **NOTICE** to all attendees that attendees should assume all methods and devices discussed in this presentation are **PATENTED** or are **PATENT-PENDING** unless they verify otherwise. Attendees are welcome to contact the Presenters and request more information related to intellectual property for any specific methods and devices referenced, if desired.

INTRODUCTION

RP

Existing IPC and UPC provisions require that Mechanical Engineers design plumbing so that it is protected from being overstressed or overstrained. However, other types of Engineers specify work around plumbing which can contribute to it being overstressed or overstrained. There have been numerous lawsuits in Texas against various types of design professionals, including but not limited to structural engineers and geotechnical engineers. In response to the invention of a method that makes isolation of pre-installed plumbing under slabs-on-voidwork possible, **SEAoT assembled a multi-disciplinary group of approximately a dozen design professionals across Texas (mechanical engineers, structural engineers and geotechnical engineers) to review the state of the practice** related to the protection of plumbing from expansive soil under foundations and consider proposing changes to construction codes.

All three presenters today were a part of that group and all three presenters have experience in specifying isolation of plumbing from expansive soil under isolated slabs.



THE STRUCTURAL ENGINEERS
ASSOCIATION OF TEXAS



AIA



INTRODUCTION

PB-21
IPC: 305.8 (New), 305.8.1 (New), 305.8.2 (New)
Proponent: Robert Nicholas, representing Structural Engineers Association of Texas (RNTS@CEngineers)

2021 International Plumbing Code

Add new text as follows:

305.8 Expansive Soil:
Where expansive soil is identified under buildings in accordance with Section 1905.3.3 of the International Building Code, the provisions of Section 305.8.1 and Section 305.8.2 of the International Building Code shall apply.

305.8.1 Non-Isolated Foundations:
Under foundations with a slab or footing that straddles two or more soil strata, the provisions of Section 305.8.1 of the International Building Code shall apply.

305.8.2 Isolated Foundations:
Under foundations with a slab or footing that straddles two or more soil strata, the provisions of Section 305.8.2 of the International Building Code shall apply.

Exception: It shall be permitted for a building to be located on a portion of expansive soil, provided that the building is designed in accordance with Section 1905.3.3 of the International Building Code, and the building is designed to resist the effects of expansive soil.

Exception: It shall be permitted for a building to be located on a portion of expansive soil, provided that the building is designed in accordance with Section 1905.3.3 of the International Building Code, and the building is designed to resist the effects of expansive soil.

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PB-21

Committee Action:

Committee Modification:

305.8 Expansive Soil:

As Modified

201

GROUP A 2021 REPORT OF THE COMMITTEE ACTION HEARING

201

Where expansive soil is identified under buildings in accordance with Section 1905.3.3 of the International Building Code, but not covered under

Section 1905.3.3 of the International Building Code, the provisions of Section 305.8.1 and Section 305.8.2 of the International Building Code shall apply.

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Based on the unanimous recommendations of the group SEAoT assembled to study this issue, **the Board of SEAoT proposed new language be added to the International Plumbing Code (IPC) if the IPC Committee interprets current IPC provisions to require protection from expansive soil.** This proposed language was supported at code action hearings by the American Institute of Architects (AIA), Geoprofessional Business Association (GBA), American Council of Engineering Companies of Texas (ACEC Texas), and many engineers that have been sued about this issue. This new language was approved at the ICC code action hearings by the International Plumbing Code (IPC) Committee. There was no public comment in opposition. And, the IPC Committee action was approved by online voting of building officials across the country. **The new language will be published in the 2024 IPC next year.**

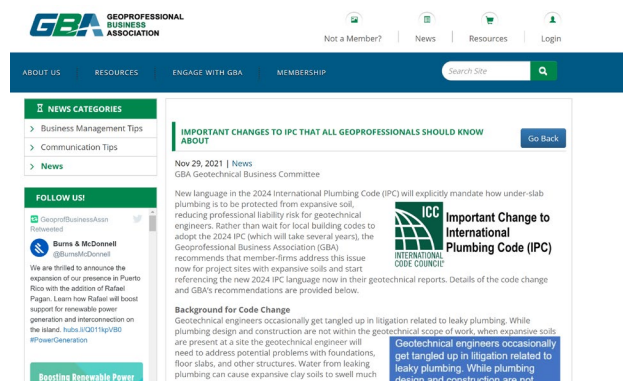


INTERNATIONAL
CODE
COUNCIL®

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After the 2024 IPC language was finalized, GBA issued a recommendation, to thousands of Geotechnical Engineers across the country, that Geotechnical Engineers explicitly recommend isolation of plumbing under Slab-on-Voidwork in their soil reports.

INTRODUCTION



GBA Recommends Isolation of Plumbing under Isolated Slabs

“For geotechnical reports on projects with expansive soils where the floor slab will be above a crawlspace or void forms, GBA recommends that the reports include recommendations that are consistent with this new section of the 2024 IPC, regardless of whether the IPC or the UPC is locally adopted.”

<https://www.geoprofessional.org/news/important-changes-to-ipc-that-all-geoprosessionals-should-know-about/>



INTRODUCTION

For Example

For many years, Alpha Testing has recommended a voidspace under plumbing under isolated slabs where expansive soil is present. However, non-isolated void systems circumvent the intent of Alpha's previous recommendations by providing a void but not isolating the plumbing. Given this concern and the clarification in the industry provided by the IPC Committee, **Alpha has revised its template recommendations to be consistent with the new, clarifying language in the 2024 IPC** and the recommendations of other organizations such as the Geoprofessional Business Association.

INTRODUCTION

Building Professional Institute (BPI)

The new 2024 IPC language was presented at the North Texas BPI in a 3 hour presentation in July 2022. Furthermore, because all previously published editions of the IPC and UPC require protection of plumbing to avoid overstressing and overstraining pipe material, the BPI presenters recommended Mechanical Engineers “**immediately cease and desist the practice of permitting Non-Isolated Plumbing (Buried Plumbing or Non-Isolated Void Systems) under Slab-On-Voidwork foundations...**”. The slides and the video are available for download from BPI.



Building Professional Institute (BPI) Presenters



John Focht, P.E. – Braun Intertec Inc.
Geotechnical Engineer



Don Penn, P.E. – Image Engineering Group, Ltd.
Mechanical Engineer



Michael Lee, P.E. – Wiss, Janney, Elstner Associates, Inc.
Structural Engineer

INTRODUCTION

All 3 presenters of this SEAoT Dallas presentation today agree with the content and recommendations presented at the North Texas BPI Presentation by those 3 engineers.

Their 3 hour presentation is the most comprehensive review of this issue in the industry today. We encourage you to download that content from the BPI website and evaluate your office policies in consideration of that content. The slides and the video are available for download through BPI online at www.bpi-tx.com

TASK #1
KNOW WHAT
ISOLATED
PLUMBING IS

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TASK #1
KNOW WHAT
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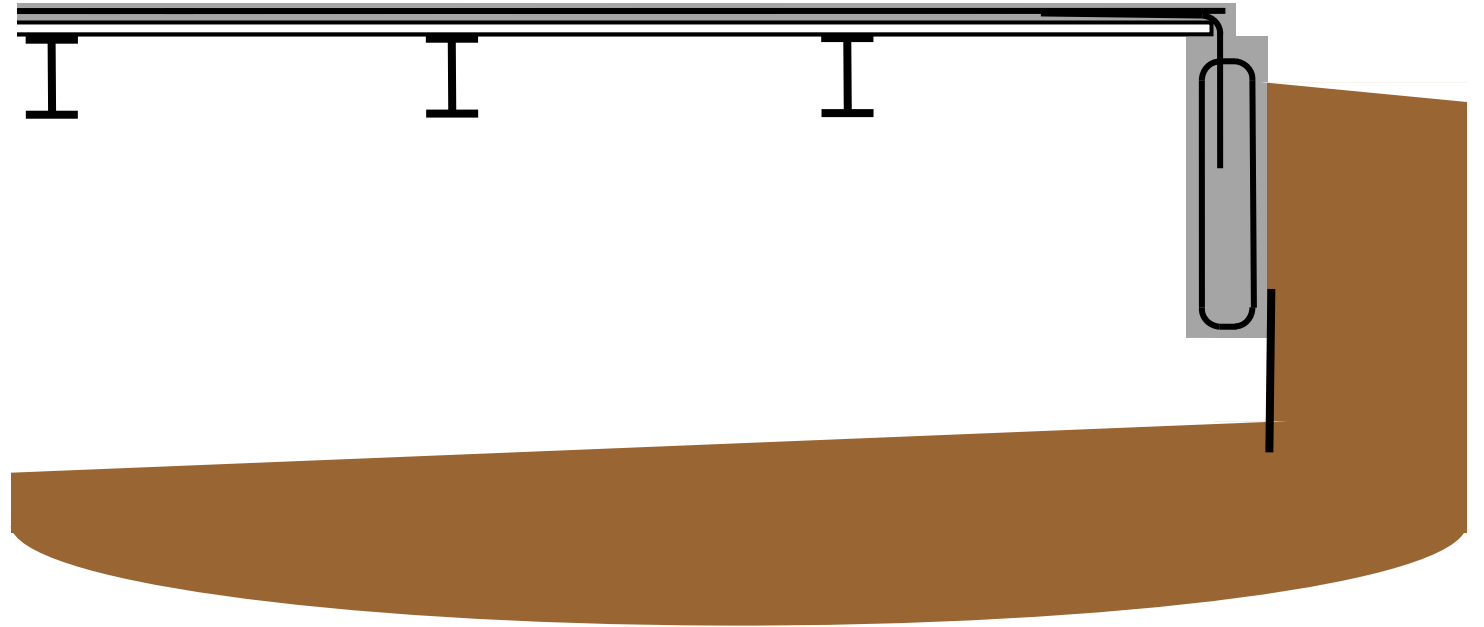
First, know what we mean when we say ISOLATED SLABS.

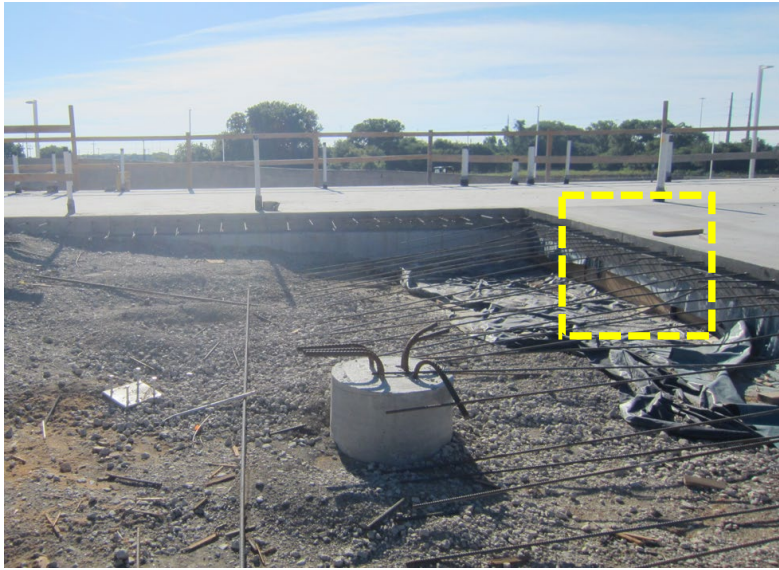


TASK #1



Isolated Slabs: Slab-on-Crawlspace





TASK #1



Isolated Slabs: Slab-on-Voidwork



TASK #1

KNOW WHAT ISOLATED PLUMBING IS

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Second, know the difference between what we mean when we say ISOLATED plumbing versus NON-ISOLATED plumbing.

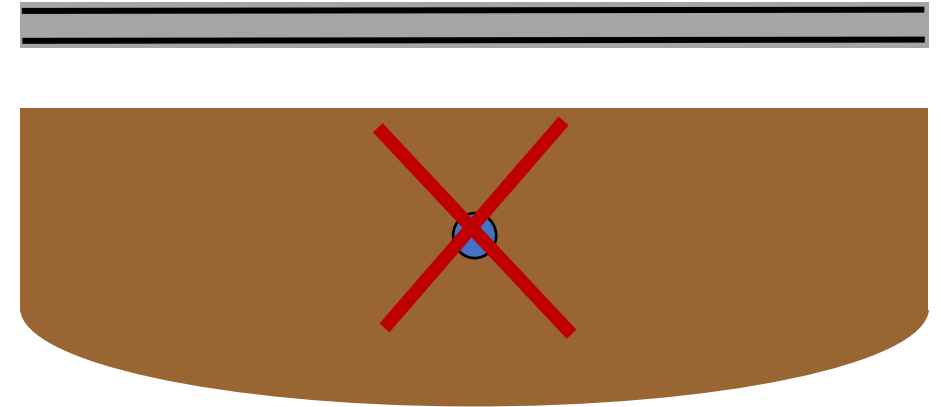
Many Mechanical Engineers and Manufacturers are claiming that various approaches or products “isolate” plumbing when they actually do not.

TASK #1
KNOW WHAT
ISOLATED
PLUMBING IS

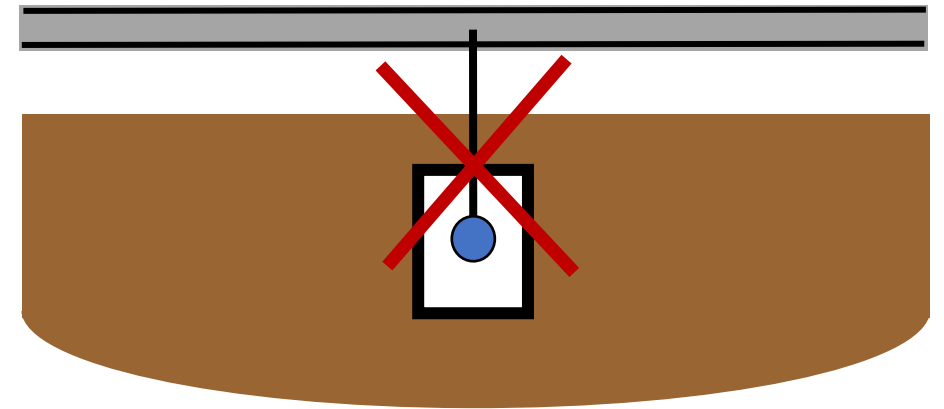
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Isolated Slabs with **Non-Isolated Plumbing**

Buried Plumbing



Non-Isolated
Void Systems



Regardless of how manufacturers may claim that their connections will flex or slip if soil movement occurs, these systems do not completely “isolate” plumbing, hangers and supports below the slab from all soil-induced loads.

TASK #1
KNOW WHAT
ISOLATED
PLUMBING IS

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Examples of Non-Isolated Plumbing

Buried Pipe



Non-Isolated
Void Systems



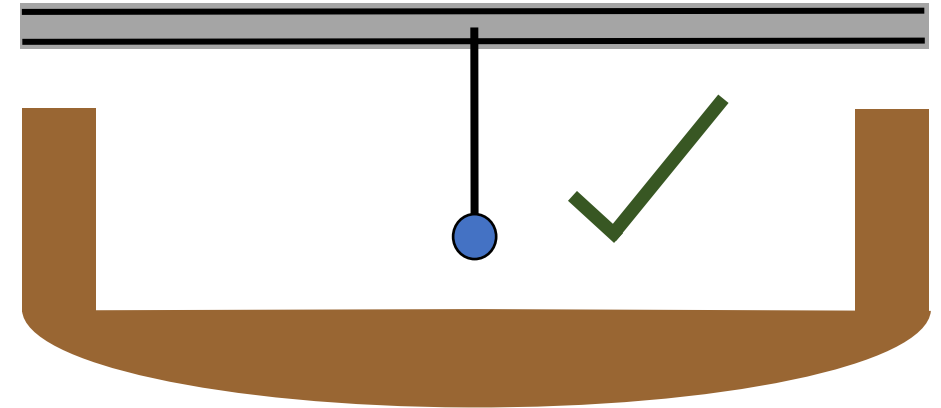
Note: These are examples of PATENTED methods and systems.

TASK #1
KNOW WHAT
ISOLATED
PLUMBING IS

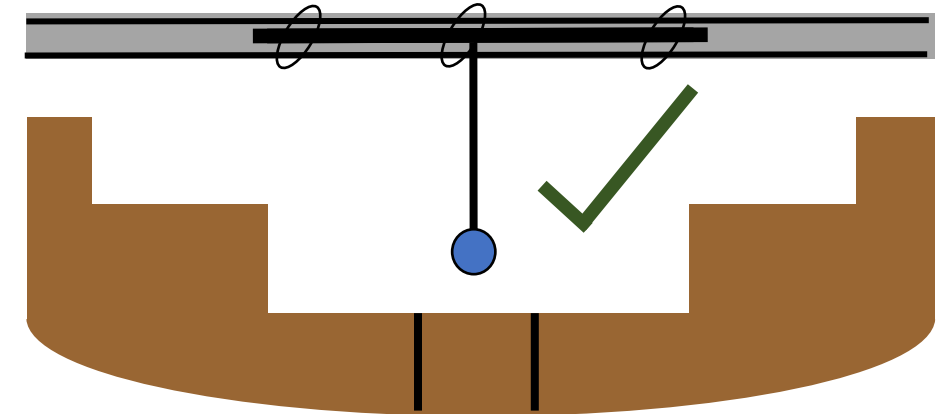
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Isolated Slabs with **Isolated Plumbing**

Post-Installed



Pre-Installed



TASK #1

KNOW WHAT

ISOLATED

PLUMBING IS

AG

Examples of Isolated Plumbing

Post-Installed

Note: This is an example of prior art that is not patented.



Pre-Installed

Note: This is an example of a PATENTED method.





TASK #1

KNOW WHAT ISOLATED PLUMBING IS

AG

International Plumbing Code New Language in the 2024 Edition

Explicitly requires protection of plumbing from expansive soil and defines when expansive soil is present.

Allows buried plumbing under Slabs-on-Ground.

Requires complete isolation of plumbing under Slab-on-Crawlspace and Slab-on-Voidwork: ***“It shall not be permitted for the plumbing, hangers and supports below the slab or below the framing to be in contact with soil or any assemblage of materials that is in contact with soil within the active zone.”***

Exception 1 allows buried pipe for drainage of crawl spaces

Exception 2 allows attachment to piers if the plumbing, hangers and supports are otherwise isolated.

305.8 Expansive Soil. Where expansive soil is identified under buildings in accordance with Section 1803.5.3 of the International Building Code, but not removed in accordance with Section 1808.6.3 of the International Building Code, plumbing shall be protected in accordance with Section 305.8.1 or 305.8.2.

305.8.1 Non-Isolated Foundations. Under foundations with slabs that are structurally supported by a subgrade, it shall be permitted for plumbing to be buried.

305.8.2 Isolated Foundations. Under foundations with a slab or framing that structurally spans over an under-floor space which isolates the slab or framing from the effects of expansive soil swelling and shrinking in accordance with Section 1808.6.1 of the International Building Code, the plumbing shall be suspended so that plumbing, hangers and supports are isolated, by a voidspace, from the effects of expansive soil swelling and shrinking.

Exception: It shall be permitted for plumbing to be buried if the plumbing provides drainage of an under-floor space.

To protect the voidspace, soil shall be sloped, benched or retained in accordance with an approved design methodology.

It shall not be permitted for the plumbing, hangers and supports below the slab or below the framing to be in contact with soil or any assemblage of materials that is in contact with soil within the active zone. It shall not be permitted for a slab and plumbing to be lifted as an assembly to create the voidspace unless the under-floor space is a crawlspace with access to allow inspection of plumbing after lifting.

Exception: It shall be permitted for the piping, fittings, hangers, and supports below the slab or below the framing to be in contact with structural elements of the foundation that are designed to resist the effects of expansive soil swelling and shrinking in accordance with Section 1808.6.1 of the International Building Code.

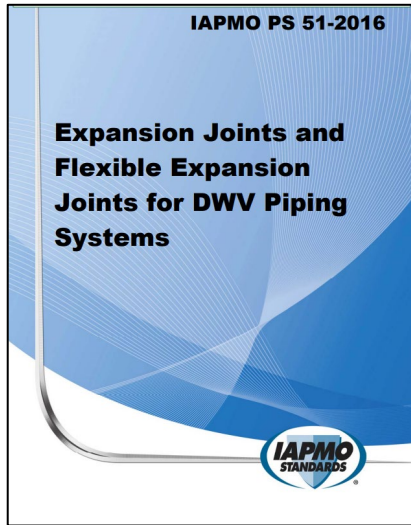
Organic materials subject to decay shall not be used for hangers, supports and soil retention systems. Materials subject to corrosion shall not be used for hangers, supports and soil retention systems unless protected in an approved manner.

Where plumbing transitions to a buried condition beyond the perimeter of the foundation, an adequately flexible expansion joint shall be provided in the plumbing system to accommodate the effects of expansive soil swelling and shrinking.

TASK #1

KNOW WHAT ISOLATED PLUMBING IS

Third, know that isolated plumbing is not protected if the transitions to non-isolated plumbing at the perimeter are not protected.



TASK #1

KNOW WHAT

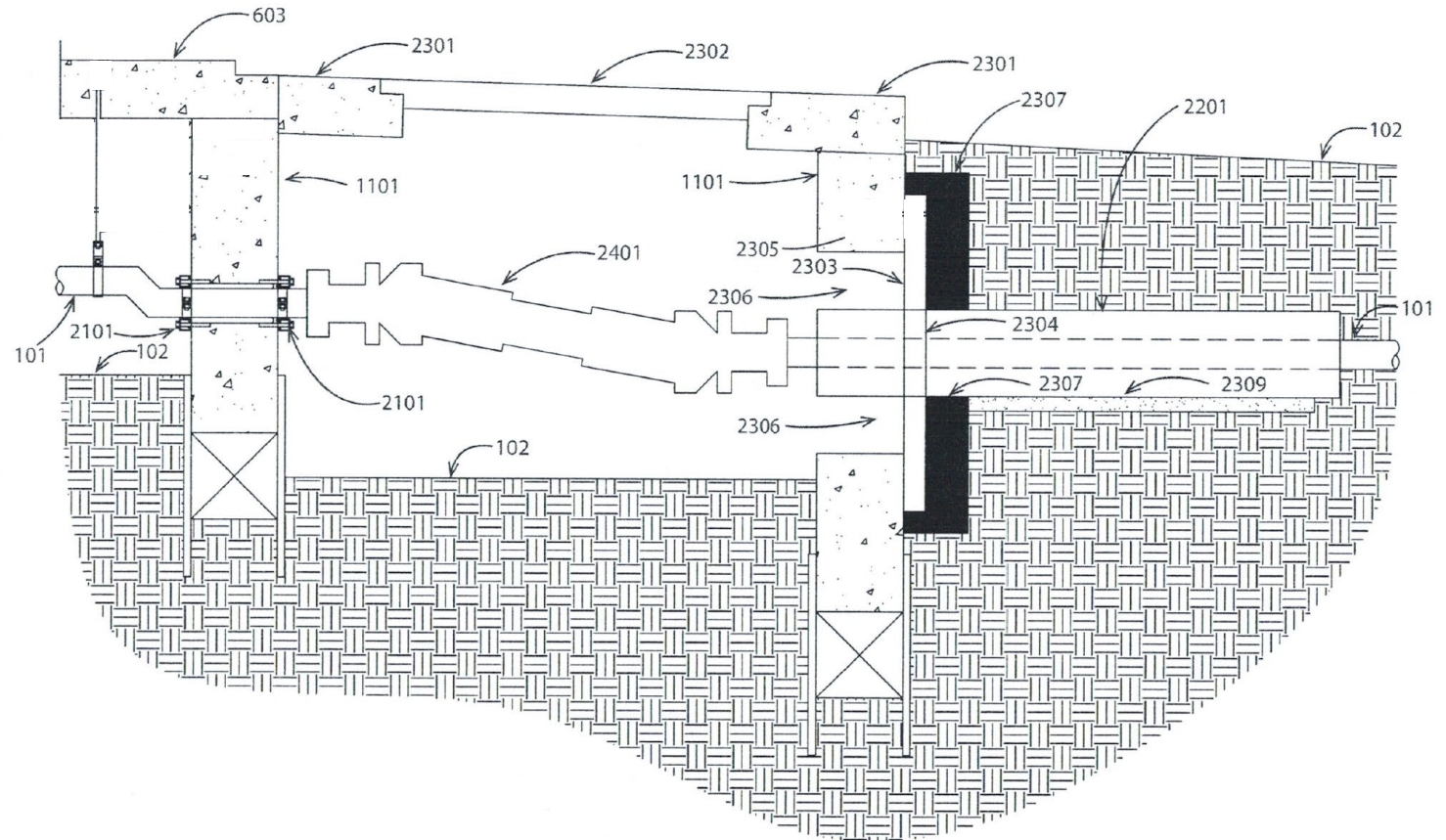
ISOLATED

PLUMBING IS



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Isolated Slab with Isolated Plumbing and a Protected Perimeter Transition



Note: This is an example of a PATENT PENDING method.

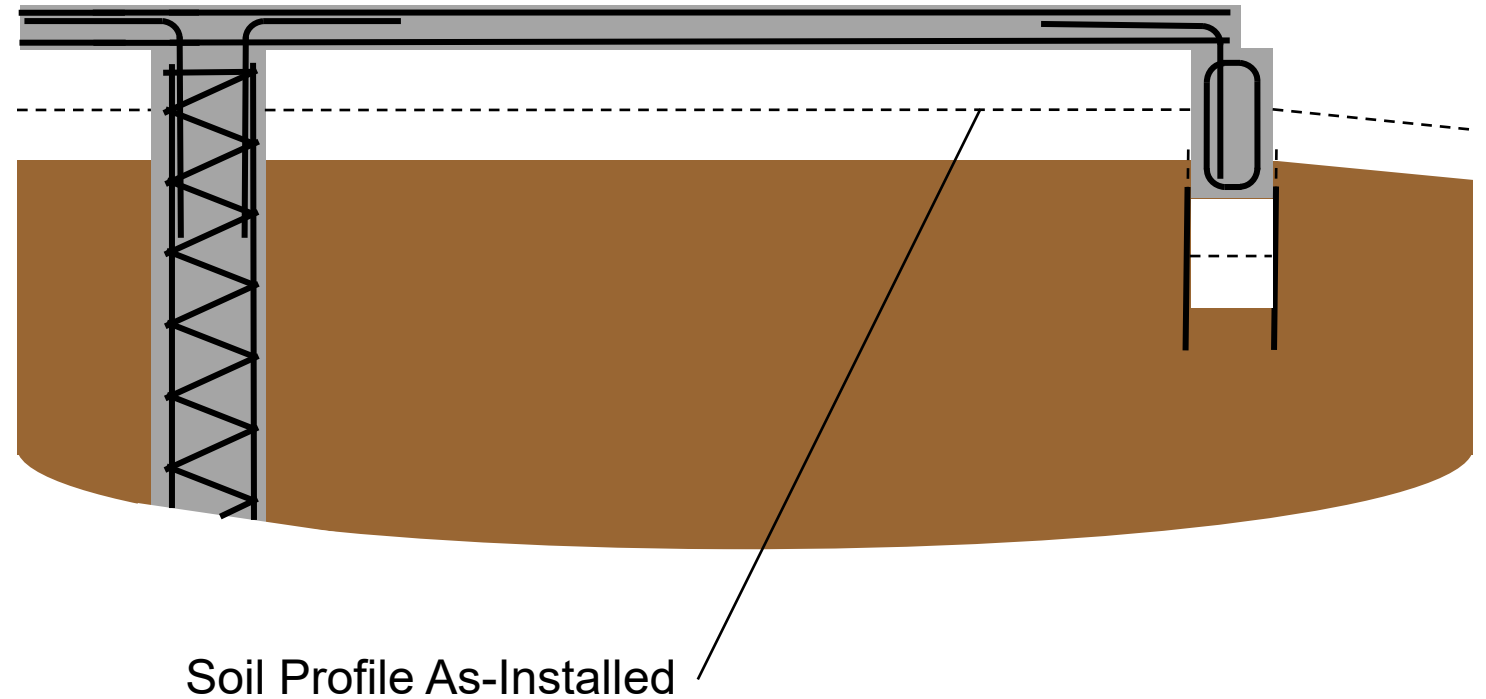
TASK #2
UNDERSTAND
THE PROBLEM

TASK #2
UNDERSTAND
THE PROBLEM

The following slides illustrate examples of
Expansive Soil Behavior under **Isolated Slabs**

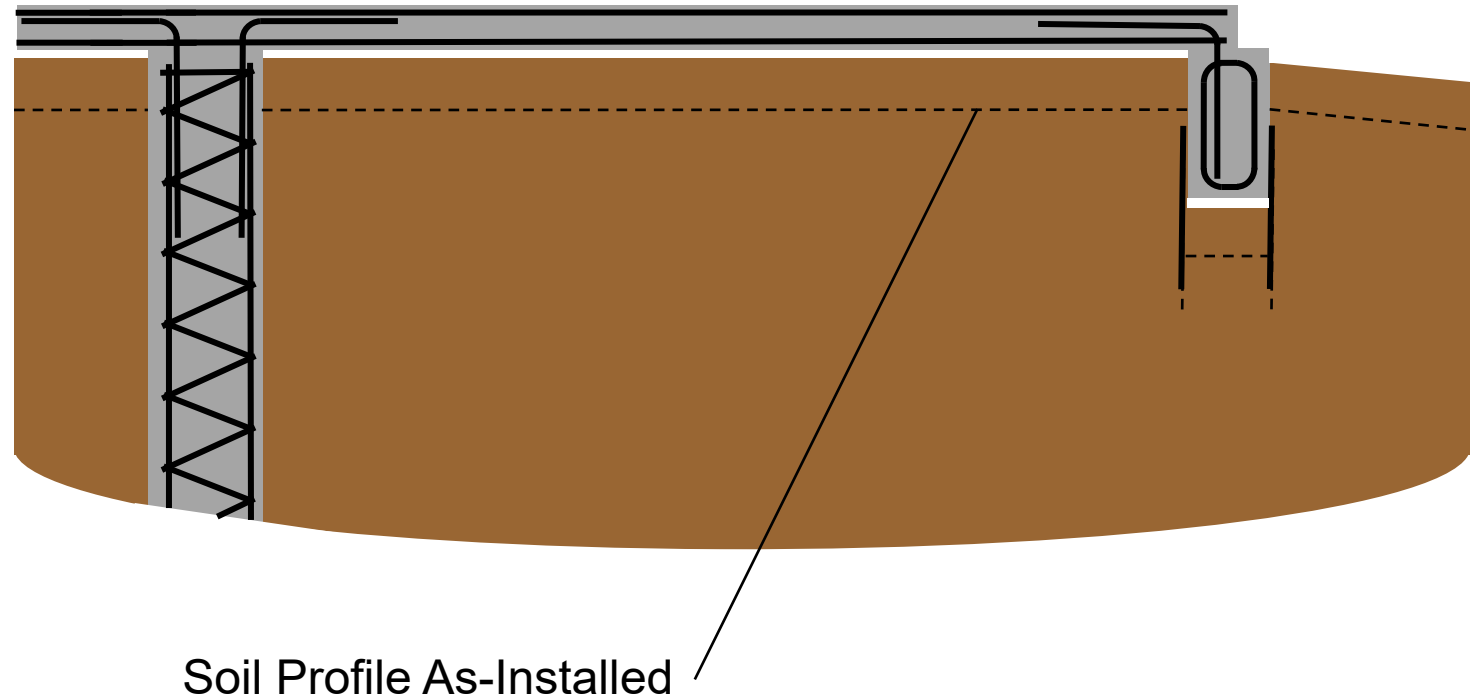
TASK #2
UNDERSTAND
THE PROBLEM

General Under-Slab Settlement



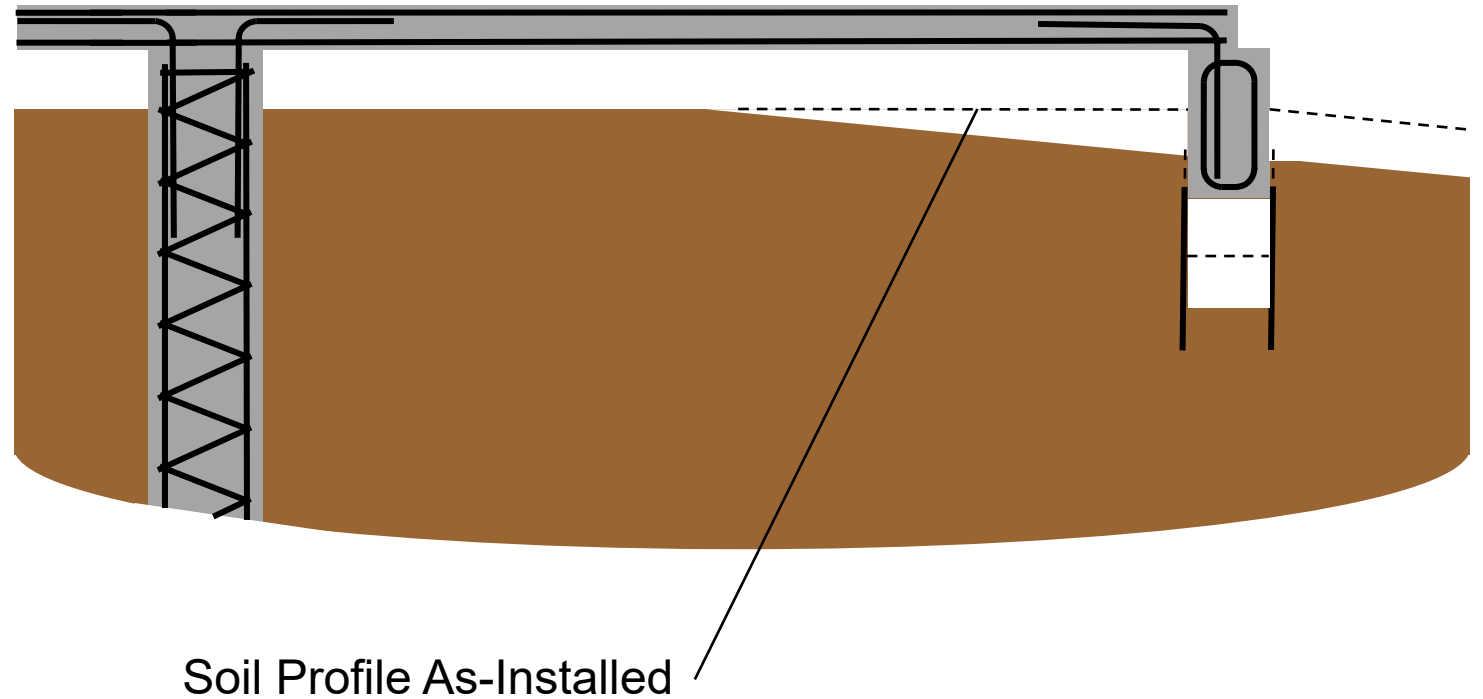
TASK #2
UNDERSTAND
THE PROBLEM

General Under-Slab Swelling



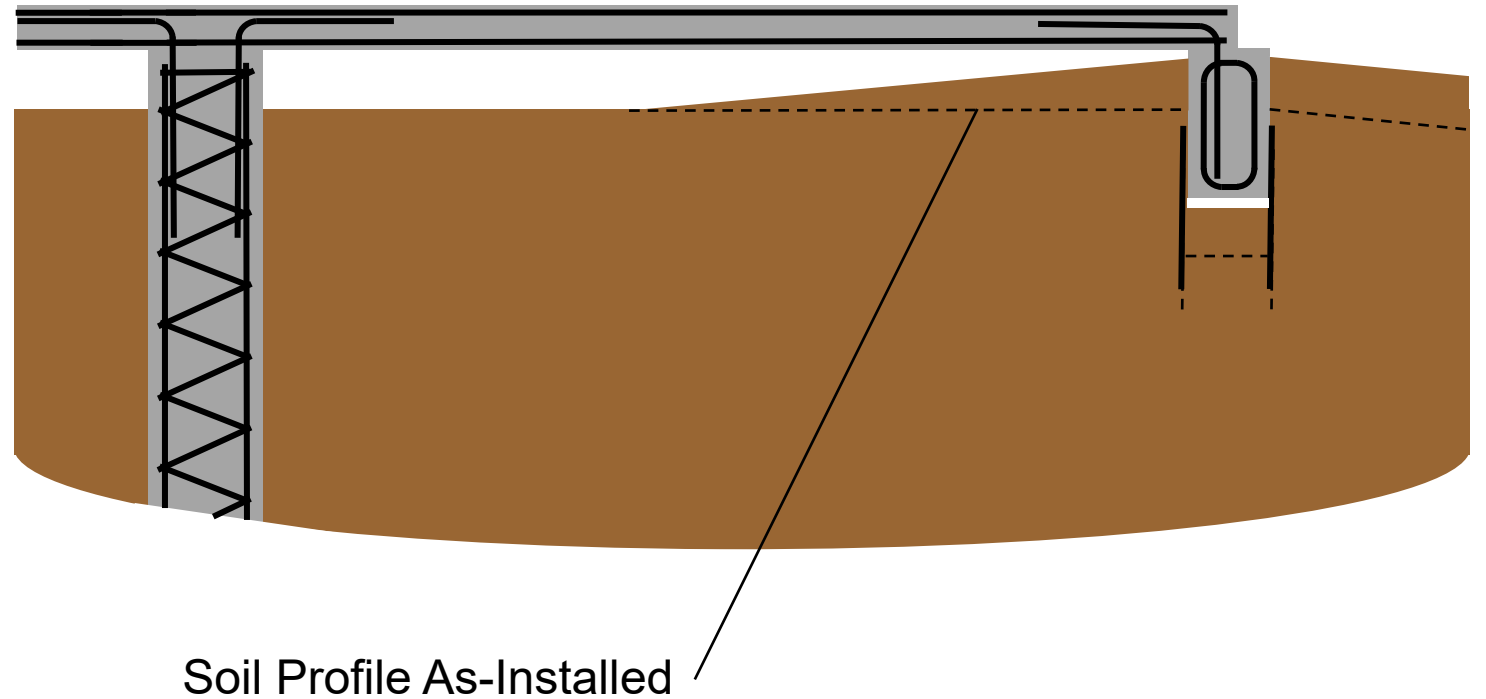
TASK #2
UNDERSTAND
THE PROBLEM

Perimeter Under-Slab Shrinkage



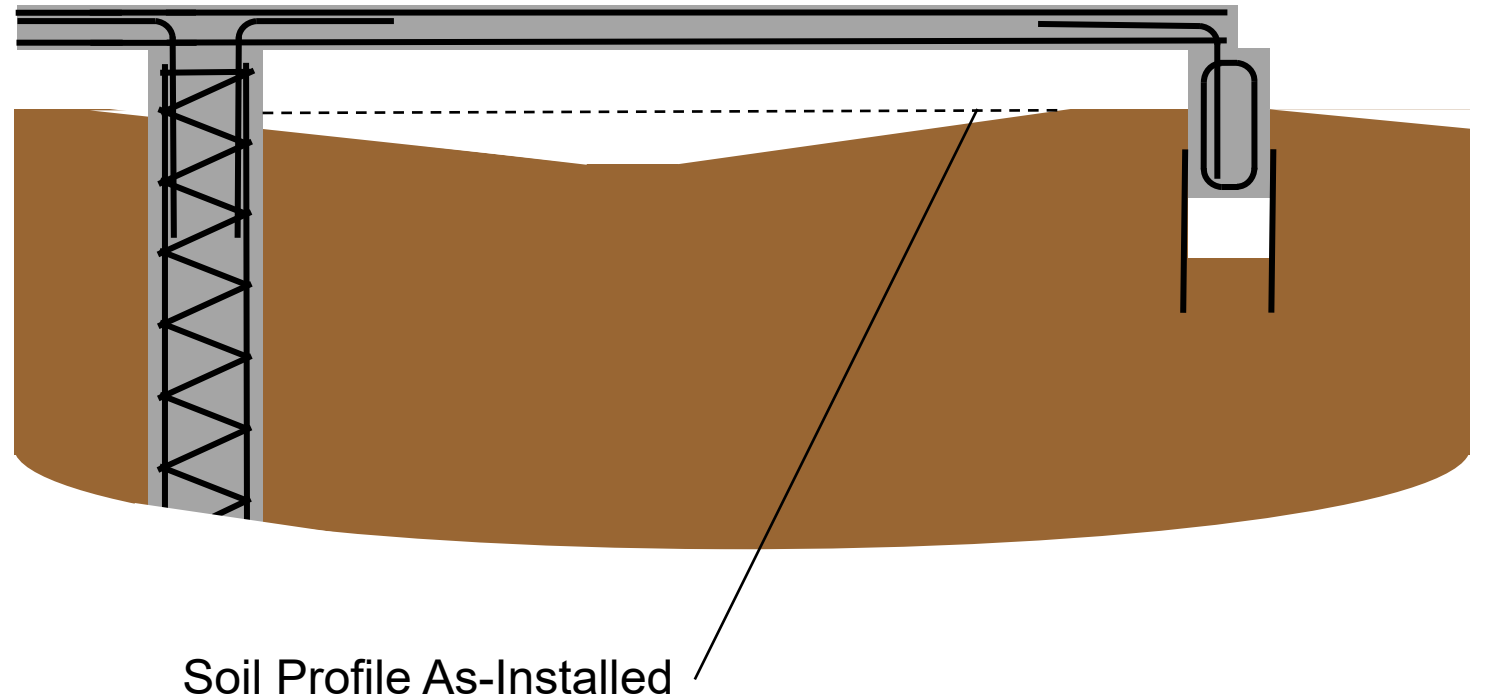
TASK #2
UNDERSTAND
THE PROBLEM

Perimeter Under-Slab Swelling



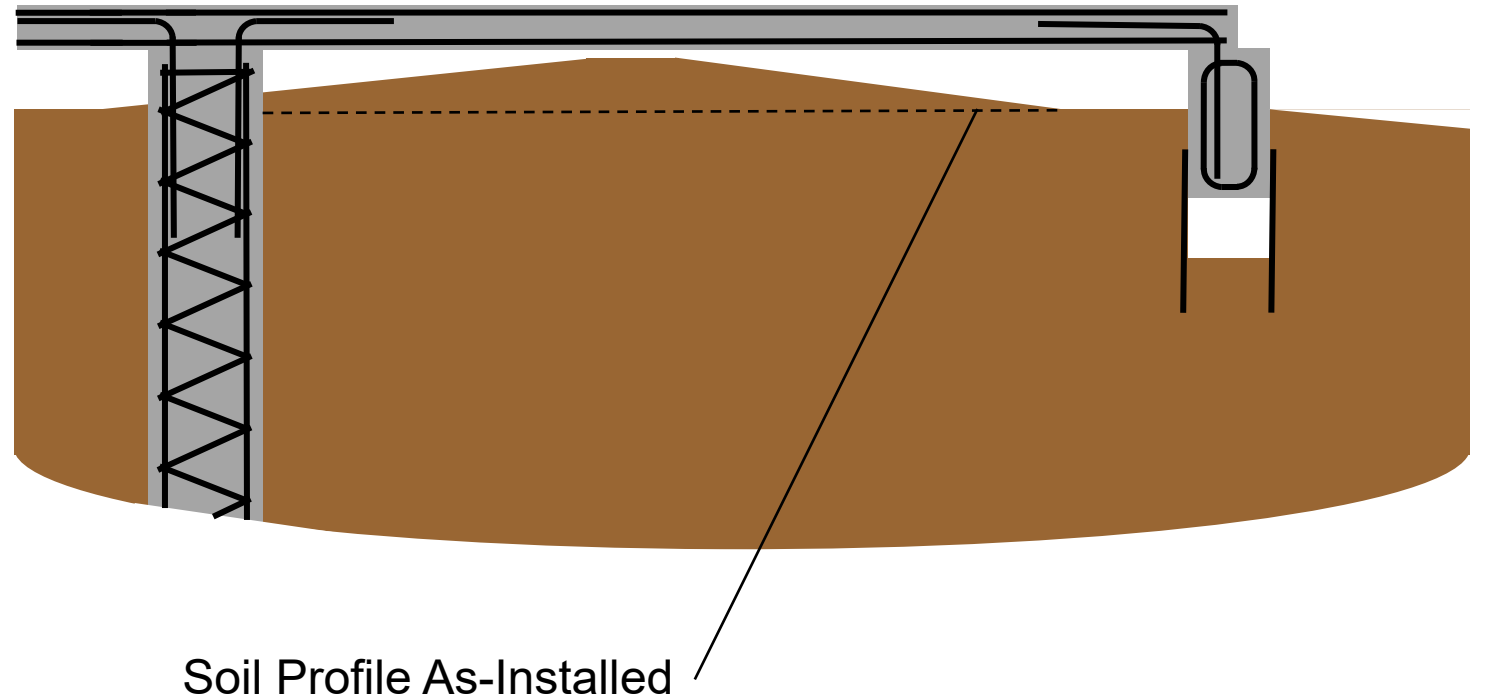
TASK #2
UNDERSTAND
THE PROBLEM

Localized Under-Slab Settlement



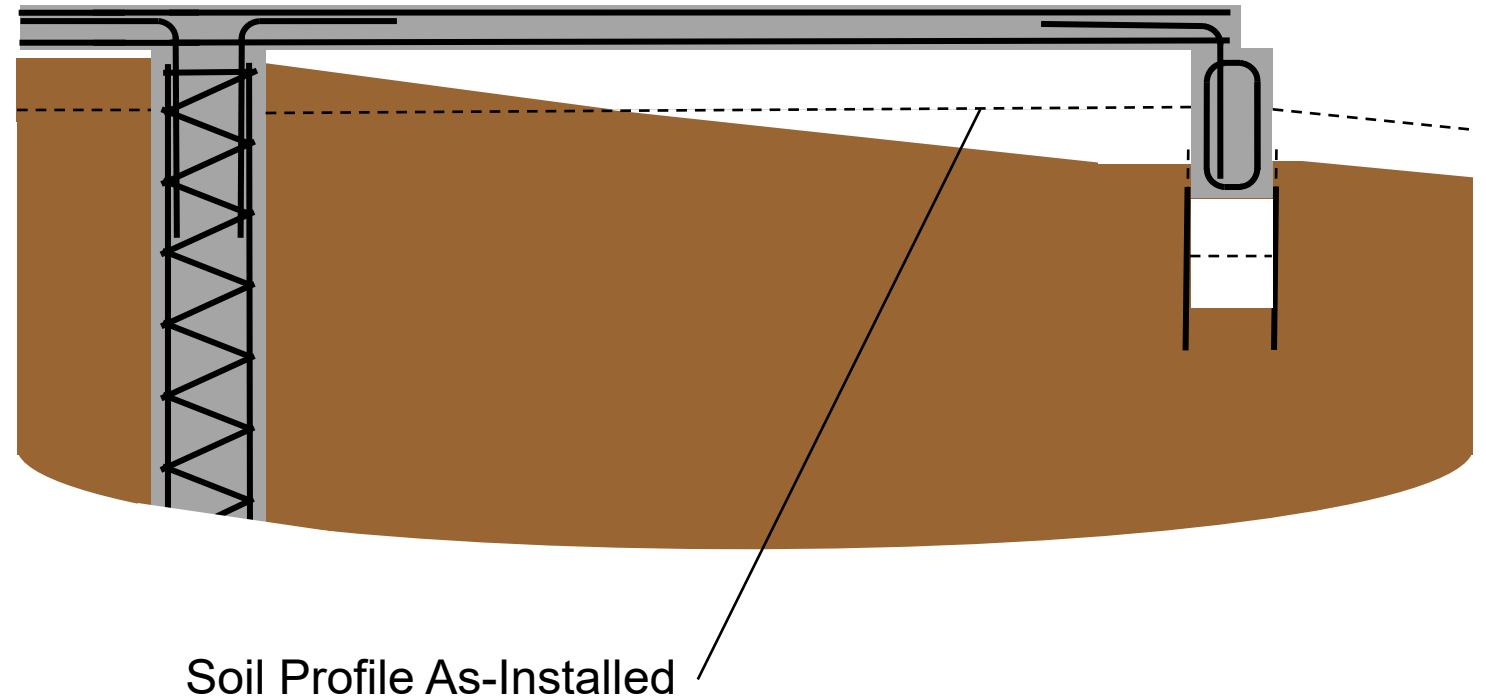
TASK #2
UNDERSTAND
THE PROBLEM

Localized Under-Slab Swelling



Complex Swelling & Shrinking

TASK #2 UNDERSTAND THE PROBLEM



TASK #2

UNDERSTAND THE PROBLEM

Non-Isolated Slabs

Non-Isolated Plumbing

Isolated Slabs

Slab-on-Crawlspace

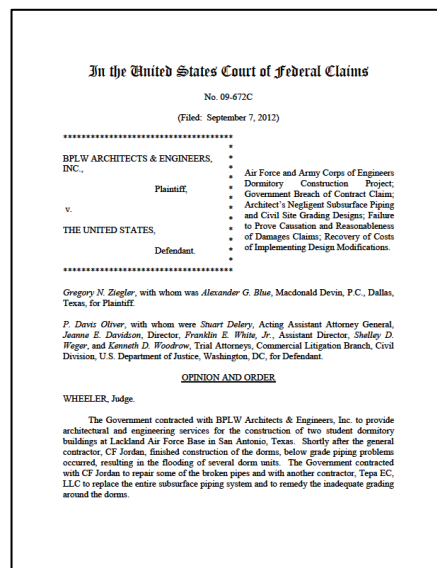
Non-Isolated Plumbing ← MAJOR LITIGATION

Isolated Plumbing

Slab-on-Voidwork

Non-Isolated Plumbing ← MAJOR LITIGATION

Isolated Plumbing



TASK #2

UNDERSTAND THE PROBLEM

Federal Court Ruling re Isolated Slabs and Non-Isolated Plumbing

“The Government claims that BPLW provided a negligent underfloor piping design, as the design failed to accommodate the “highly expansive” soils in the San Antonio area.” “The Government contends that these negligent designs caused the piping problems at the dorms and led it to incur substantial expense to repair broken pipes, replace the underfloor piping system, and remedy the site grading.”

“As set forth below, the Court finds that BPLW did indeed provide negligent underfloor piping and civil site grading designs, as both failed to comply with the contract requirements and the applicable standard of care.”

BPLW ARCHITECTS & ENGINEERS, INC. V. THE UNITED STATES
IN THE UNITED STATES COURT OF FEDERAL CLAIMS
NO. 09-672C (FILED: SEPTEMBER 7, 2012)

“The Member Firm agreed to a settlement two weeks before the trial; seven years after the client initiated the claim; and eleven years after the Member Firm initiated the project.”

TASK #2

UNDERSTAND THE PROBLEM

Examples of Litigation reported in the News re Isolated Slabs and Non-Isolated Plumbing

ISD Petitions to Further Investigate Architects, Inc

By Christine Lee • Published June 25, 2014 • Updated on June 26, 2014 at 1:10 pm



The Independent School District wants to know if Architects, Inc., who designed the now closed football stadium, is also responsible for causing millions of dollars in damages at its properties.

A North Texas school district wants to know if the same company that designed the now closed football stadium is behind problems with their buildings.

The nearly \$60 million football stadium closed two years after opening. Engineering experts said the stadium's cracks were caused by problems in the structural design.

- **\$60M** High School Stadium Closed by Cracks

That structural design was made by Architects, Inc., the same company that designed two of Independent School District's campuses — Elementary School and Middle School.

Both schools sit on top of a type of soil that could be difficult to build on. In documents filed for a deposition, the ISD stated they shared that information with Architects. In the filing, the school district also stated that shifting soil caused foundation problems to leading leaks in both schools, costing the district about \$4 million to fix.

- **ISD Reveals Information From Stadium Engineering Study**

ISD issued a statement saying that the two problems were detected and resolved back in 2009 and 2012. They said the petition comes after a lengthy review in an effort to hold the responsible contractors accountable.



(Texas) district sues architect and builder over facility conditions at intermediate school

Oct. 3, 2017

The district contends that a faulty foundation at Intermediate School has led to structural defects.

Mike Kennedy

The (Texas) district has sued the firms that designed and built one of its intermediate schools 11 years ago over what it contends is a faulty foundation that has resulted in structural defects.

The reports that Intermediate School in which opened in 2006, is beset by deteriorating conditions such as cracks in walls and concrete, and

TASK #2

UNDERSTAND THE PROBLEM

AG

Examples of Damage with Slab-on-Voidwork and Non-Isolated Plumbing With only 1/2" Vertical Movement

>\$1M Damage
at a High School

1/2" movement like this can
occur in Buried Plumbing or
Non-Isolated Void Systems



Damage under Slab-on-Voidwork
to Non-Isolated Plumbing is likely
much more common than realized.

TASK #2

UNDERSTAND THE PROBLEM

RP

Examples of Repairing Non-Isolated Plumbing under an Slab-on-Voidwork after only 1/2" Vertical Movement (>\$1M)



This repair simply replaced cracked plumbing in a non-isolated condition, so damage is expected to occur again.

TASK #2
UNDERSTAND
THE PROBLEM

Examples of Plumbing Damage under
Slab-on-Crawlspace where Plumbing
Transitions to Non-Isolated Plumbing



Cracked Plumbing



Backdraining Plumbing



TASK #2

UNDERSTAND THE PROBLEM

RP

The 160 slides of the BPI Presentation go into great detail on Non-Isolated Plumbing approaches under Isolated Slabs:

- How Non-Expansive Trench In-Fill and/or Vertical Sleeving through an Isolated Slab does not solve the problem.
- How Mechanical Engineers are specifying Retaining Walls in Non-Isolated Void Systems without the Structural Engineering education and experience required by Texas Engineering Practice Act (TEPA).
- How Complex it would be to design a Hanger Rod (partially in expansive soil undergoing volumetric changes) for Expected Uplift.
- How Mechanical Engineers have a false sense of security because they normally specify labelled and listed products but they have been misled by Non-Isolated Void System Manufacturer's claims about these unlabelled and unlisted products, and a TEPA provision which allows unlicensed staff at manufacturing companies to call themselves "Engineers".
- How soil-retaining elements are required by the IBC to be designed for expansive soil swell pressures, which can be **100 times the structural limit states capacity of non-isolated void system components**.
- How non-isolated plumbing imparts **loads onto slabs that the Structural Engineer must account for in the design.**



TASK #2

UNDERSTAND THE PROBLEM

The following are some sketches from the BPI Presentation, to help illustrate the problem.



TASK #2

UNDERSTAND THE PROBLEM

BURIED PLUMBING



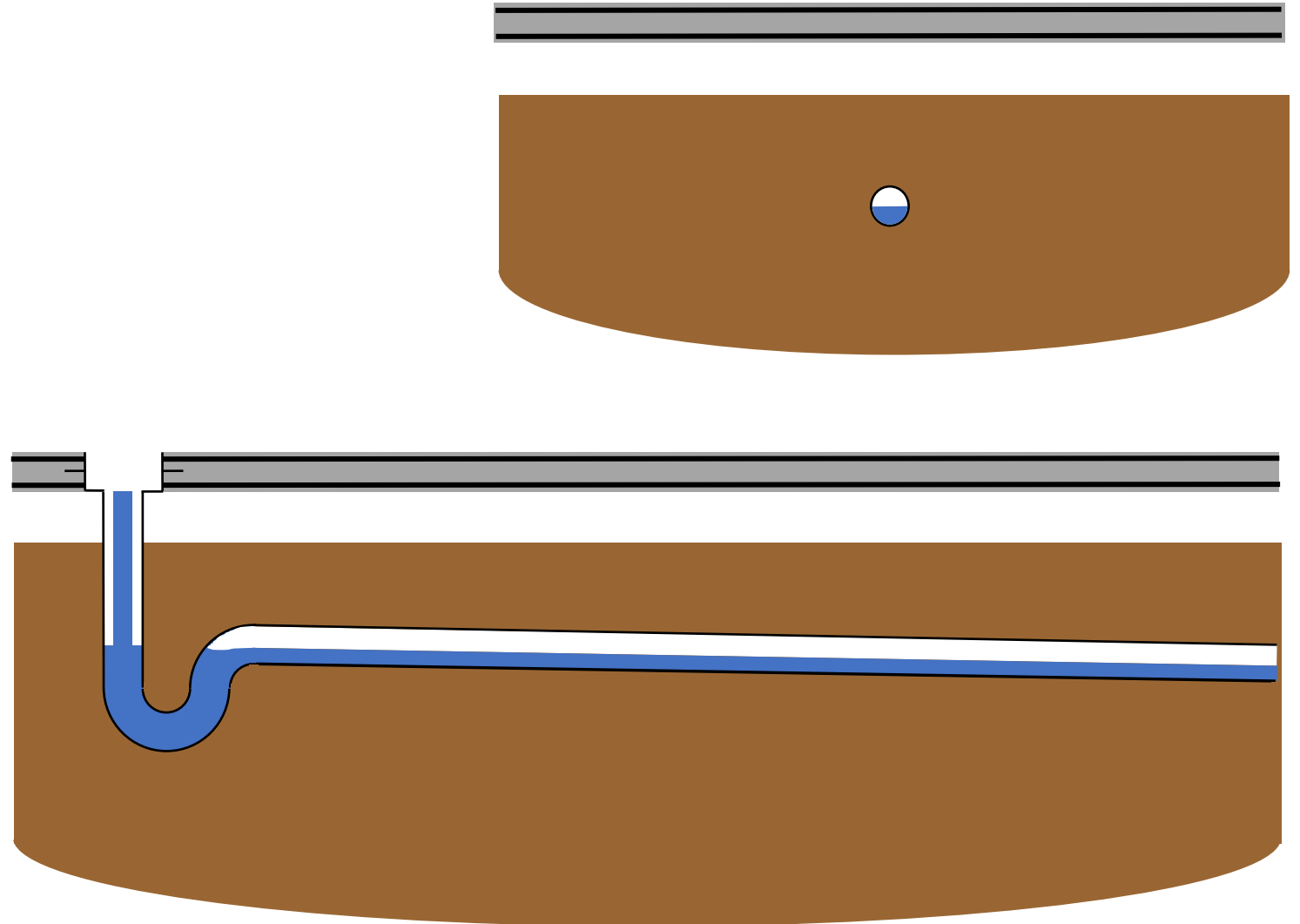
TASK #2

UNDERSTAND THE PROBLEM

RP

BURIED PLUMBING

Installed Conditions





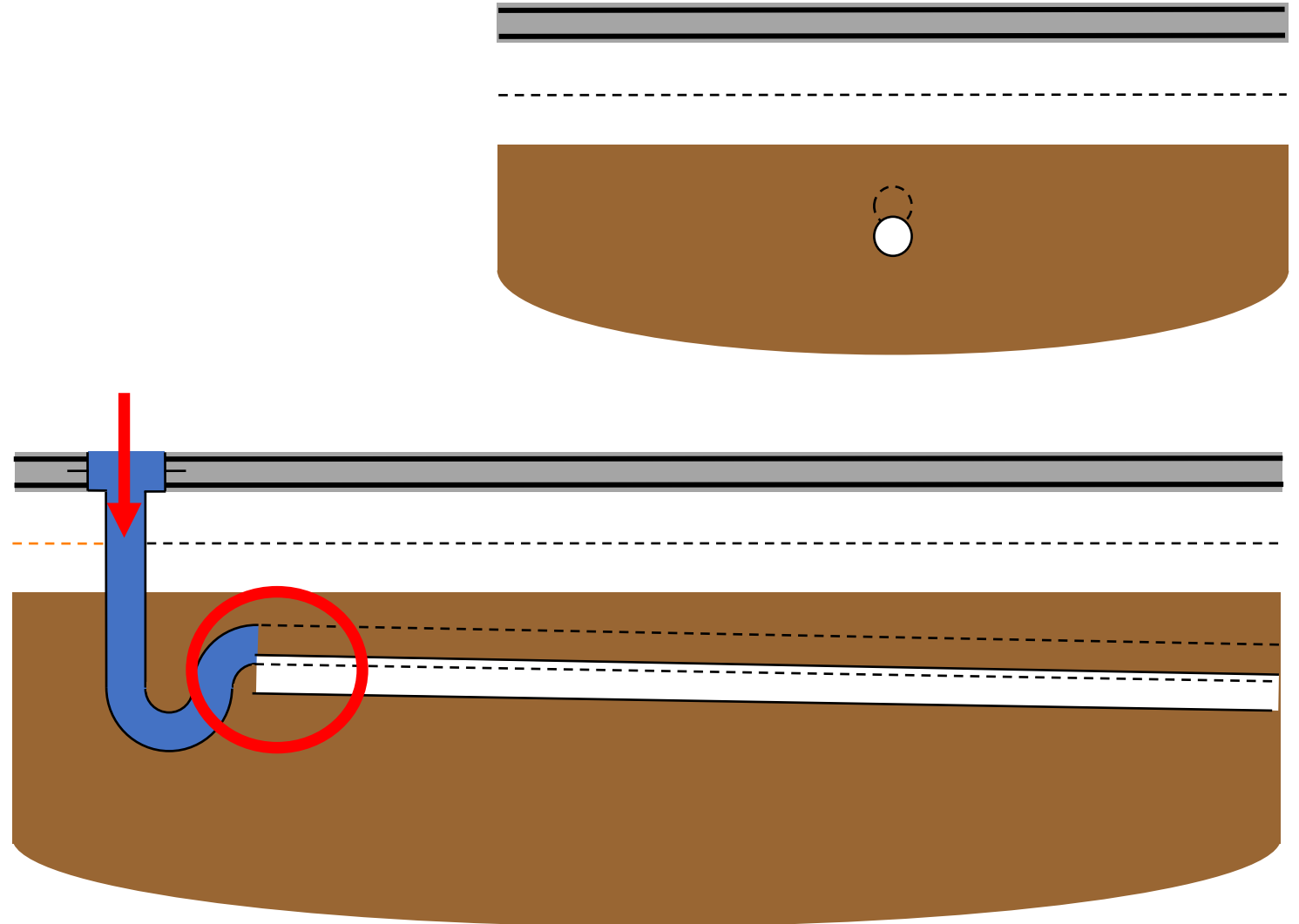
TASK #2

UNDERSTAND THE PROBLEM

RP

BURIED PLUMBING

General Under-Slab Settlement





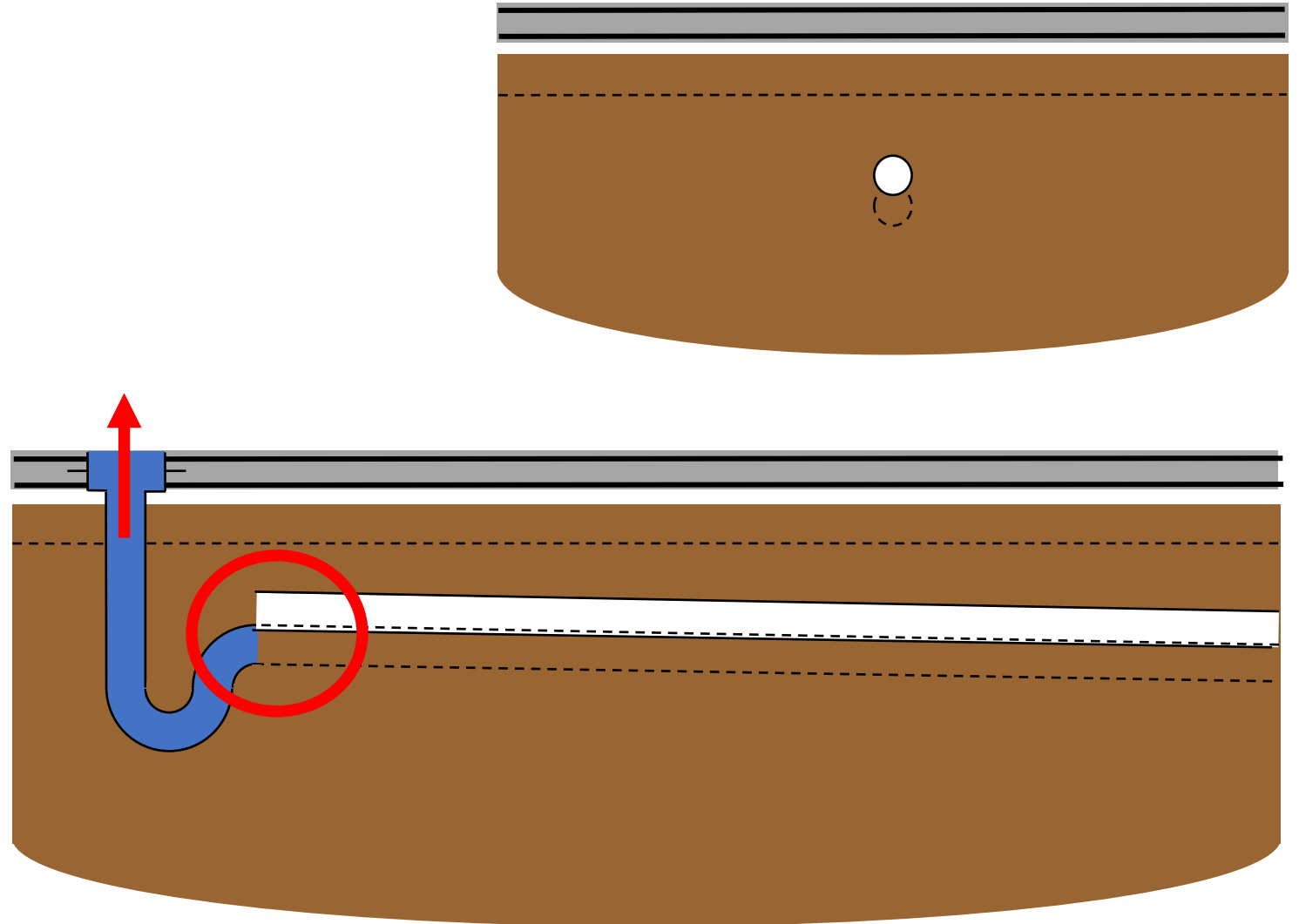
TASK #2

**UNDERSTAND
THE PROBLEM**

RP

BURIED PLUMBING

General Under-Slab Swelling



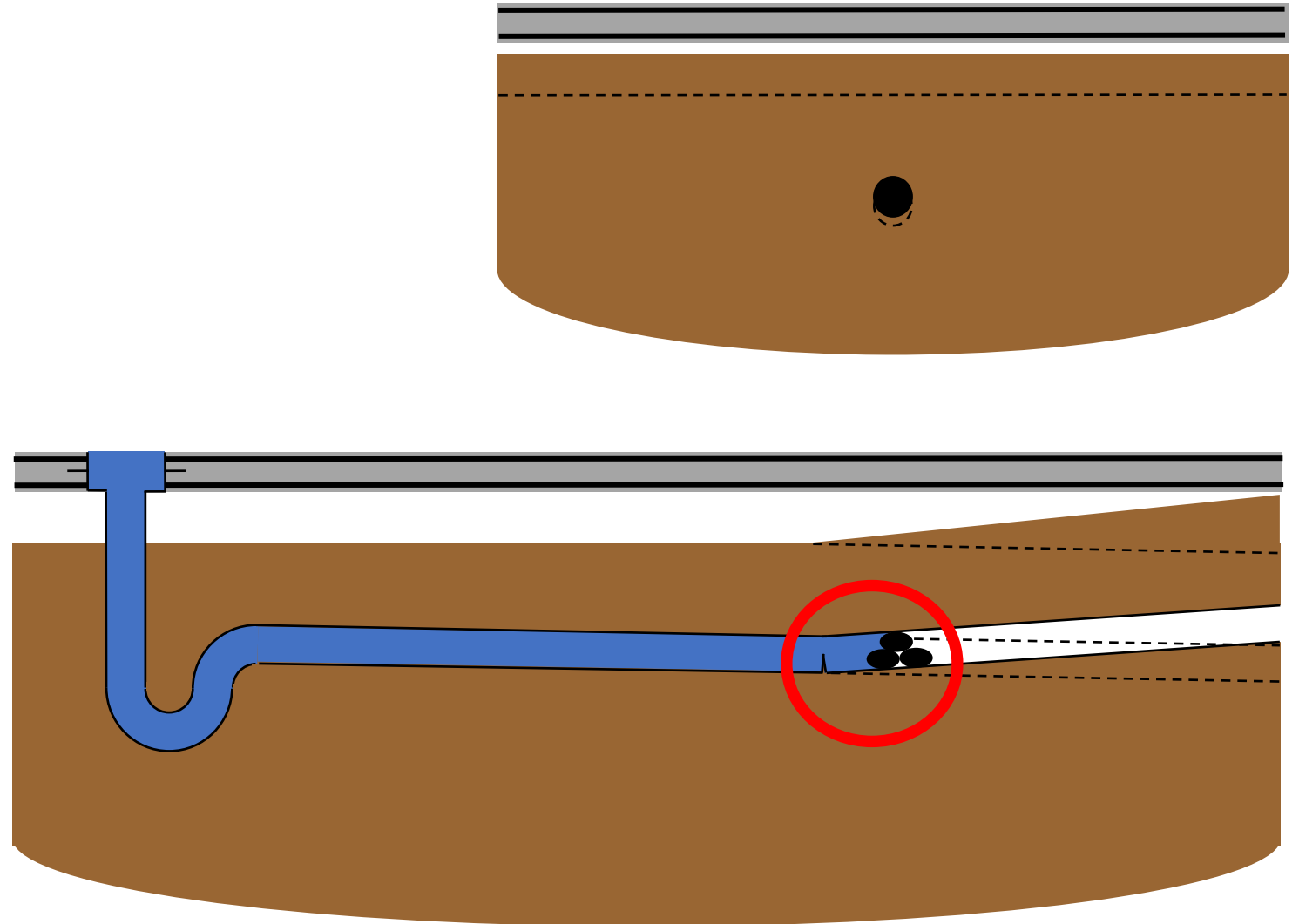


TASK #2

UNDERSTAND THE PROBLEM

RP

BURIED PLUMBING Perimeter Under-Slab Swelling





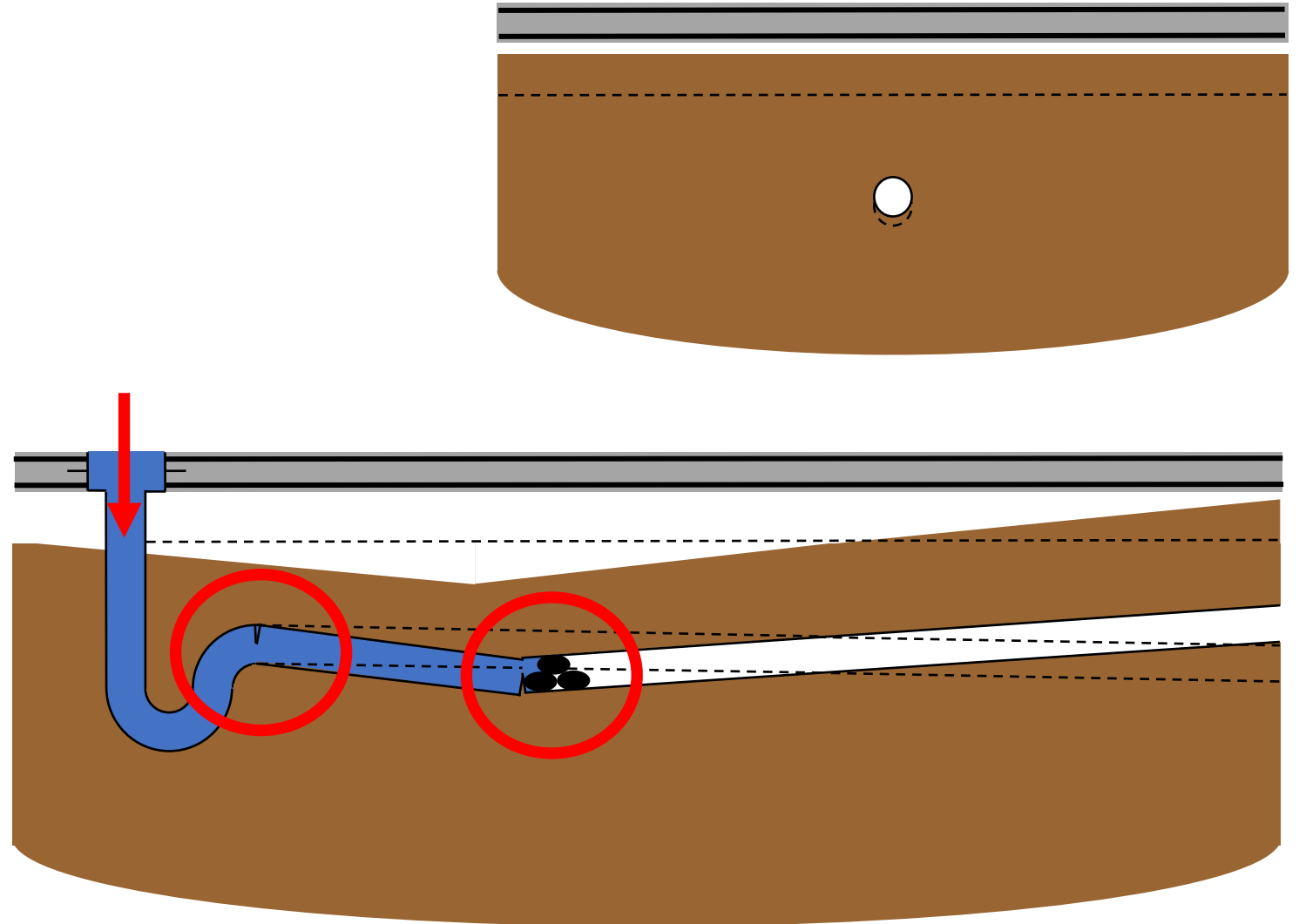
TASK #2

UNDERSTAND THE PROBLEM

RP

BURIED PLUMBING

Complex Under-Slab Swelling & Shrinkage





TASK #2

UNDERSTAND THE PROBLEM

MESH & PLYWOOD UNDER PLUMBING



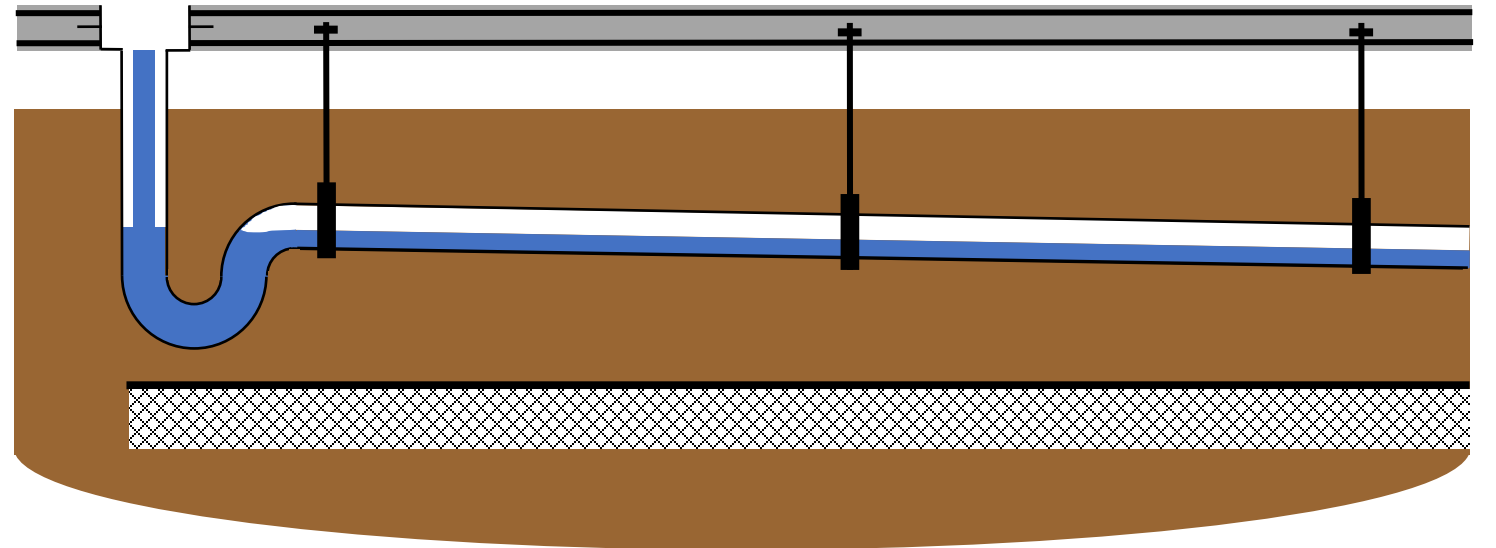
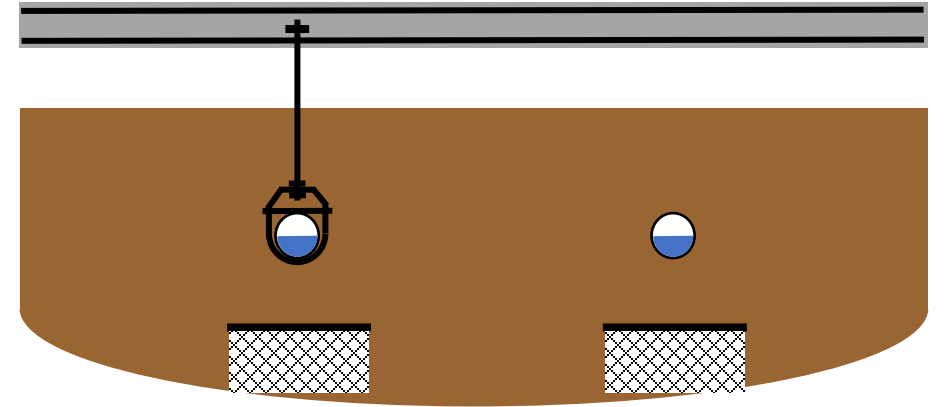
TASK #2

UNDERSTAND THE PROBLEM

RP

MESH & PLYWOOD UNDER PLUMBING

Installed Conditions





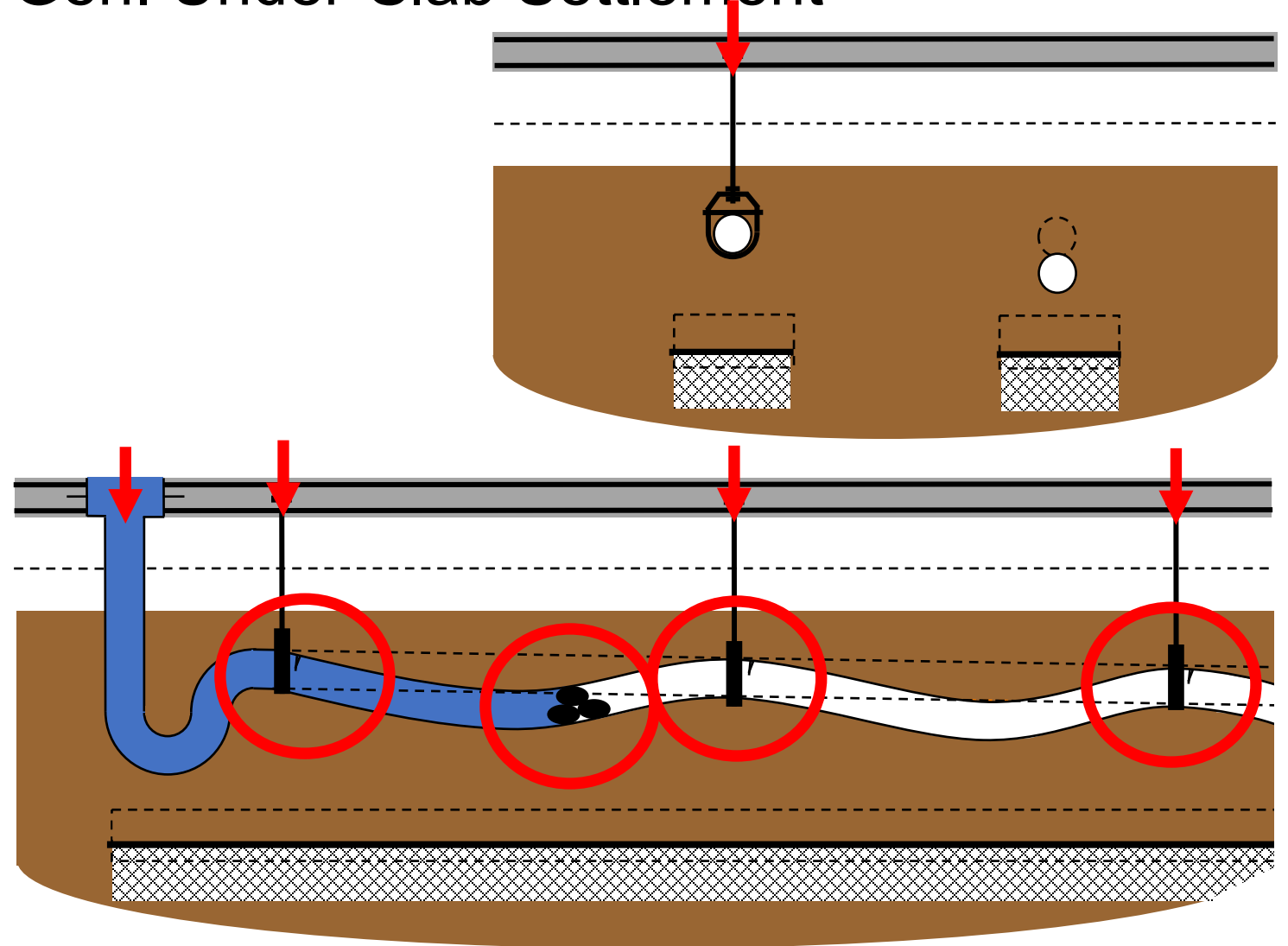
TASK #2

UNDERSTAND THE PROBLEM

RP

MESH & PLYWOOD UNDER PLUMBING

Gen. Under-Slab Settlement



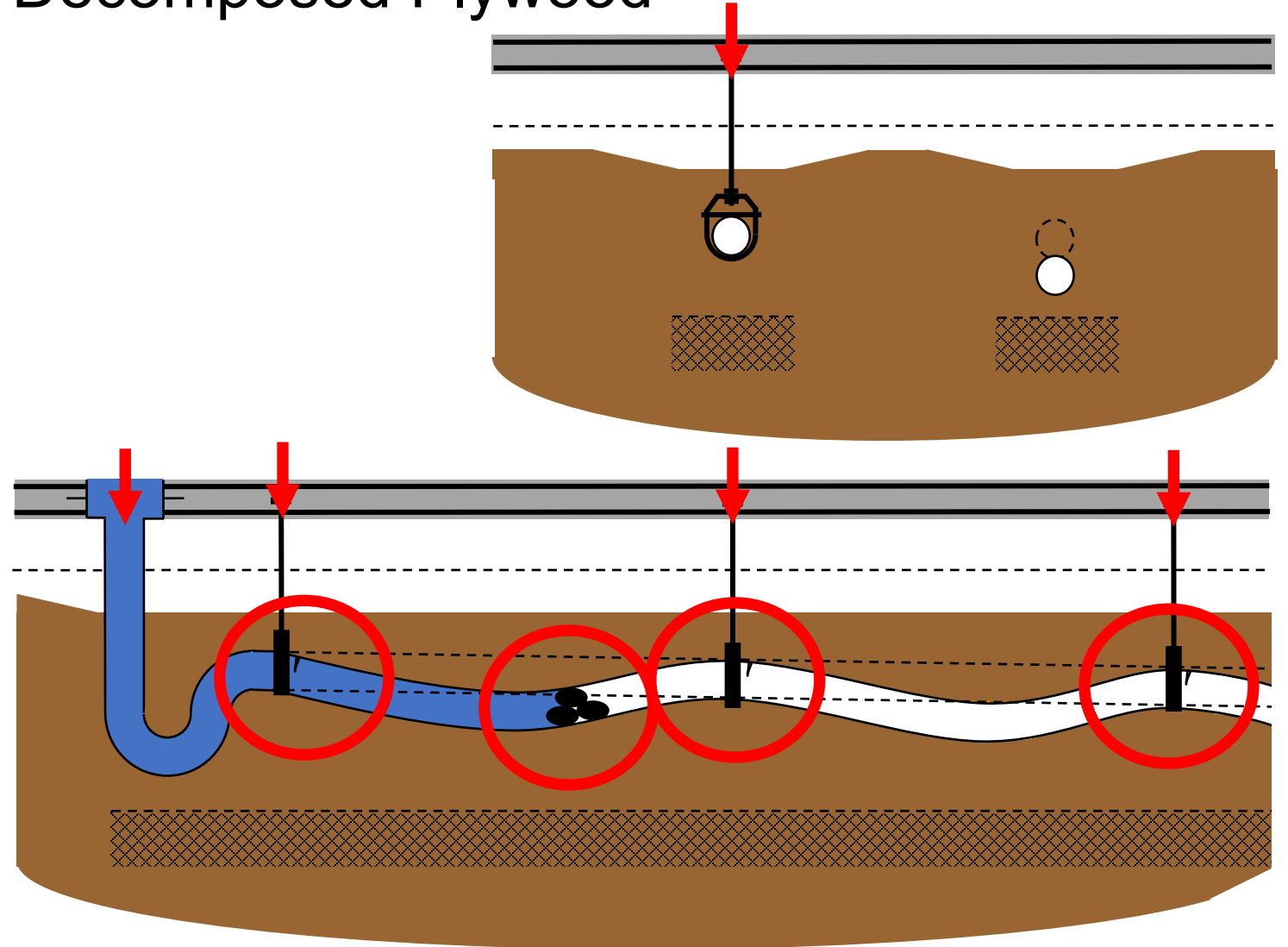


TASK #2

UNDERSTAND THE PROBLEM

RP

MESH & PLYWOOD UNDER PLUMBING Decomposed Plywood





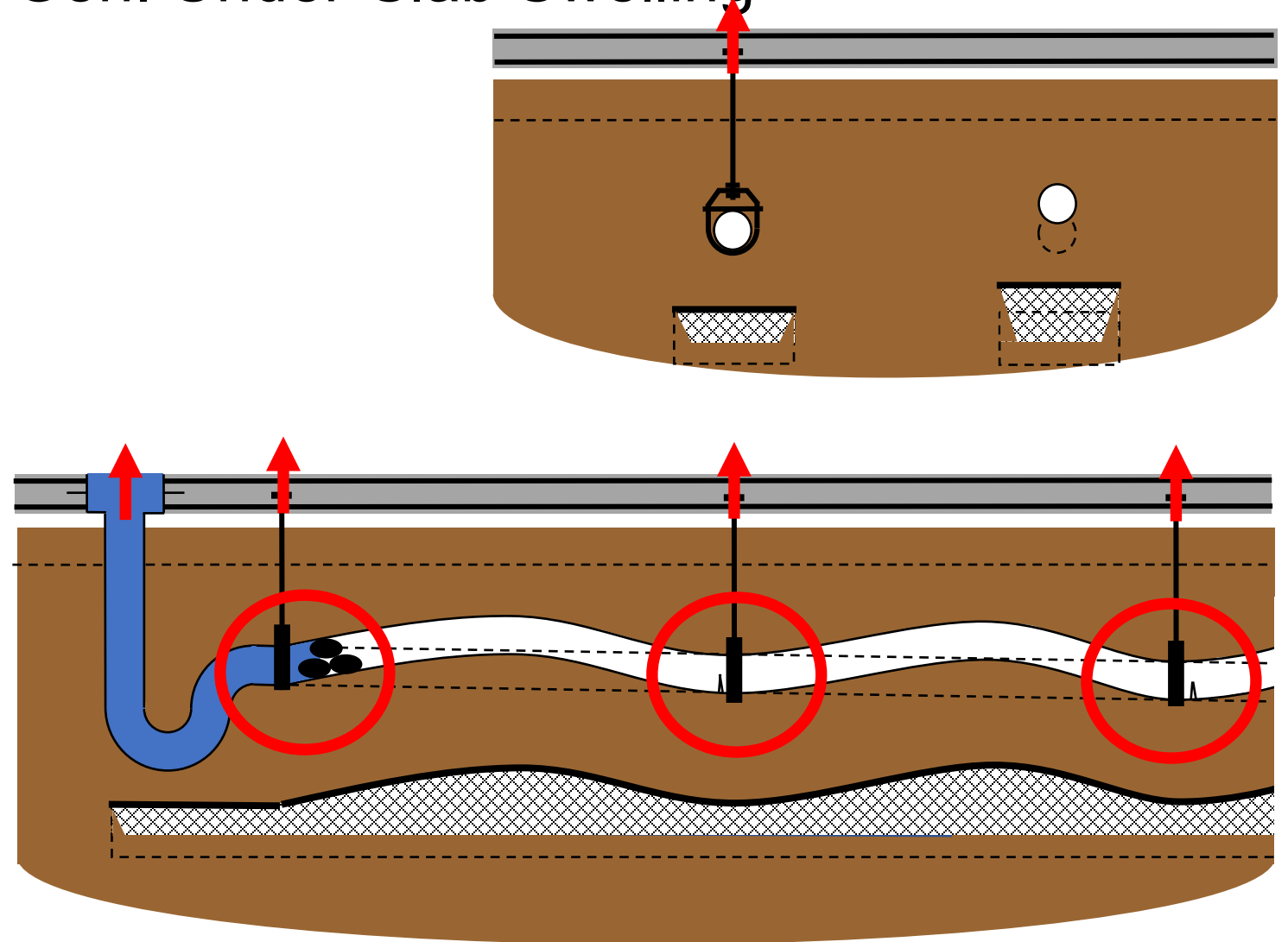
TASK #2

UNDERSTAND THE PROBLEM

RP

MESH & PLYWOOD UNDER PLUMBING

Gen. Under-Slab Swelling



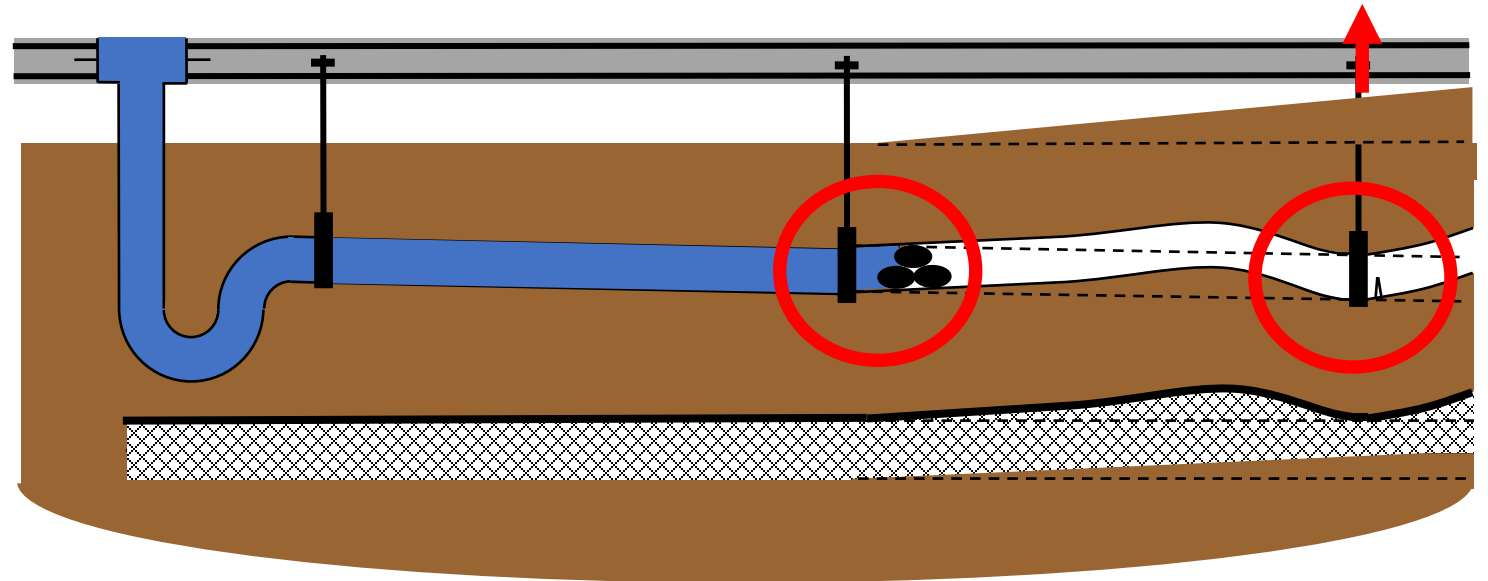
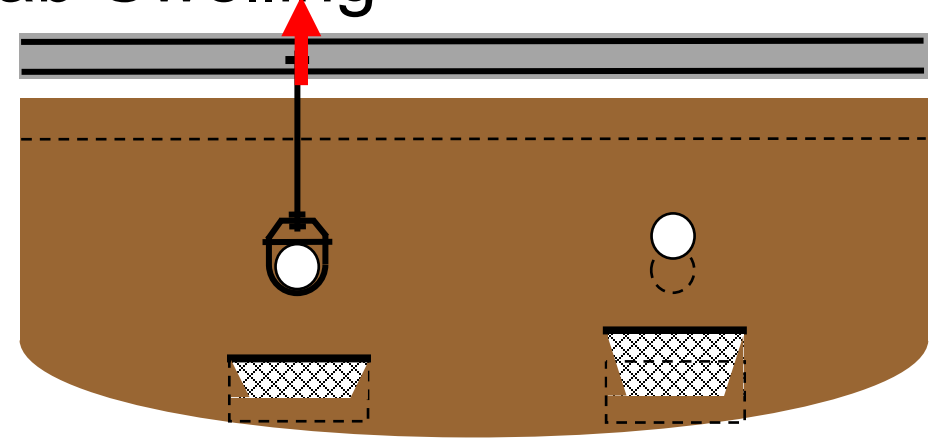


TASK #2

UNDERSTAND THE PROBLEM

RP

MESH & PLYWOOD UNDER PLUMBING Perim. Under-Slab Swelling





TASK #2

**UNDERSTAND
THE PROBLEM**

PLASTIC SIDE PANELS AND CROSSBARS



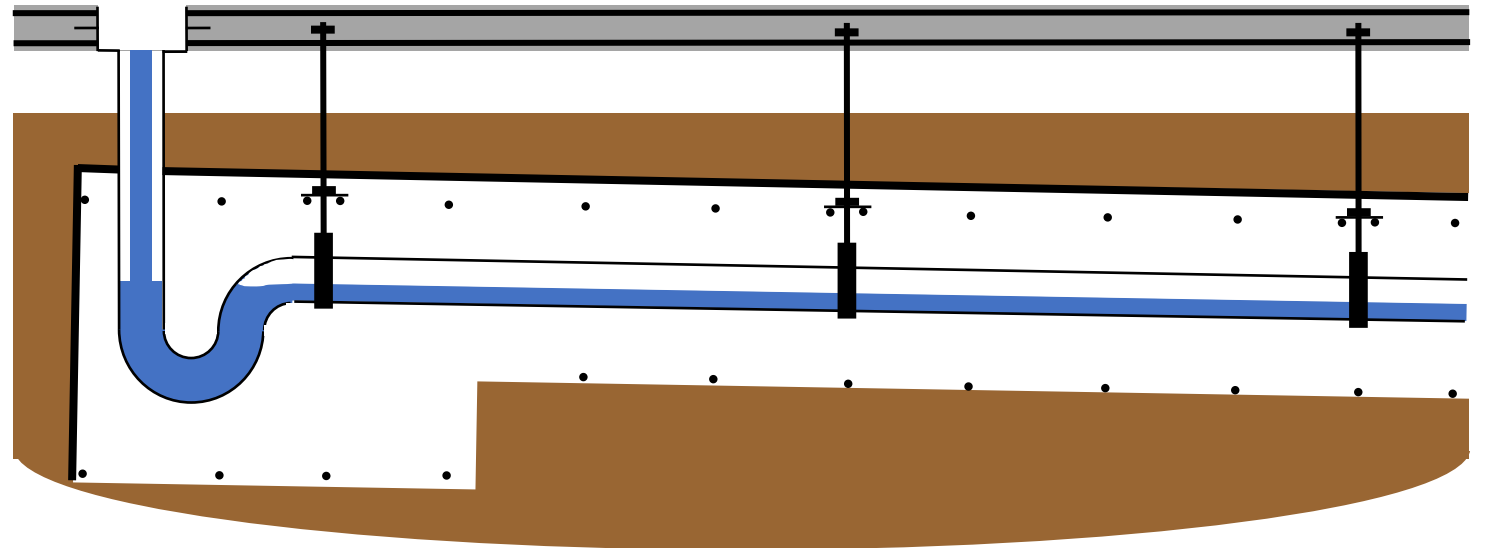
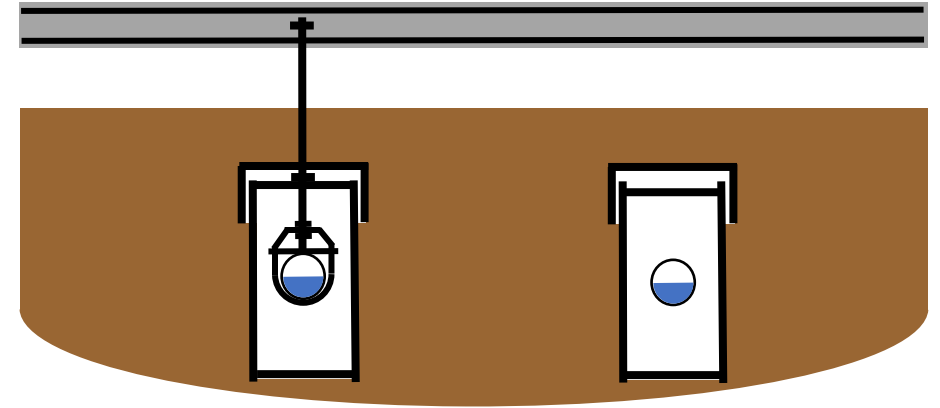
TASK #2

UNDERSTAND THE PROBLEM

RP

PLASTIC SIDE PANELS AND CROSSBARS

Installed Conditions



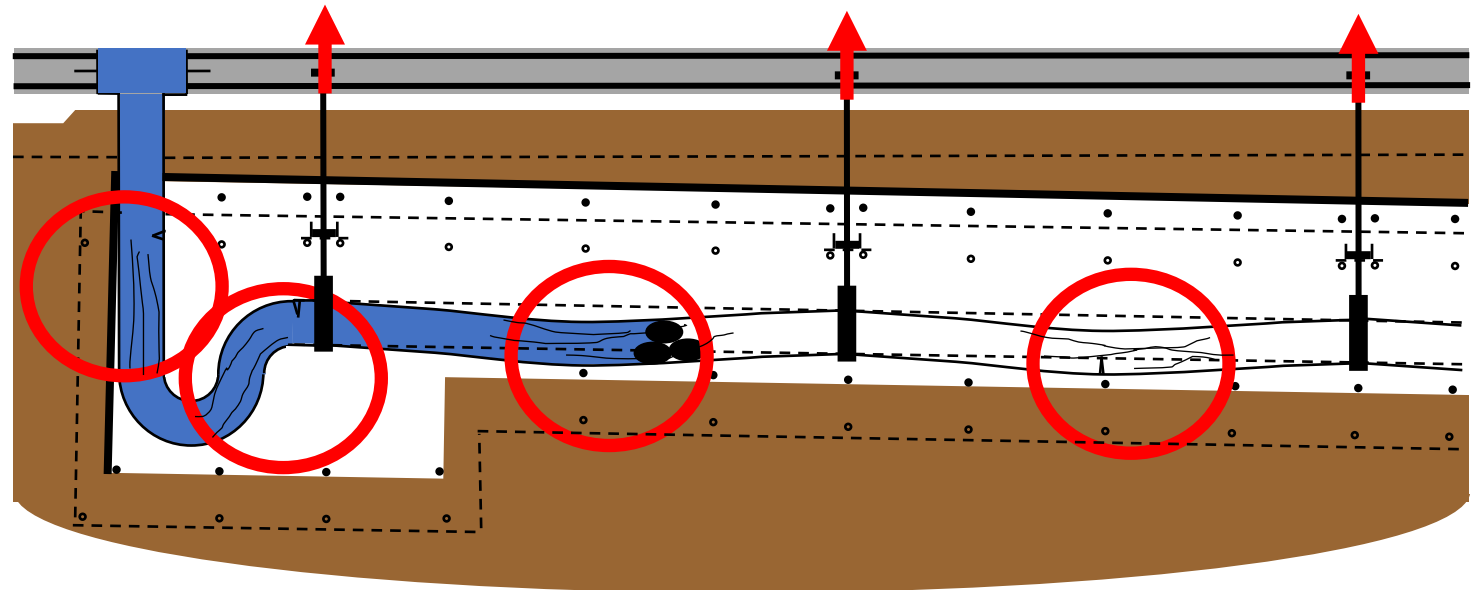
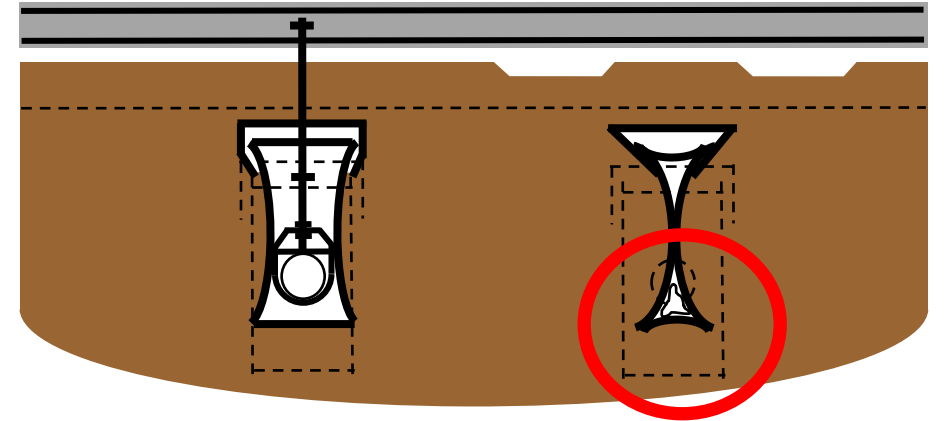


TASK #2

UNDERSTAND THE PROBLEM

PLASTIC SIDE PANELS AND CROSSBARS

Gen. Swelling, No Rod Buckling





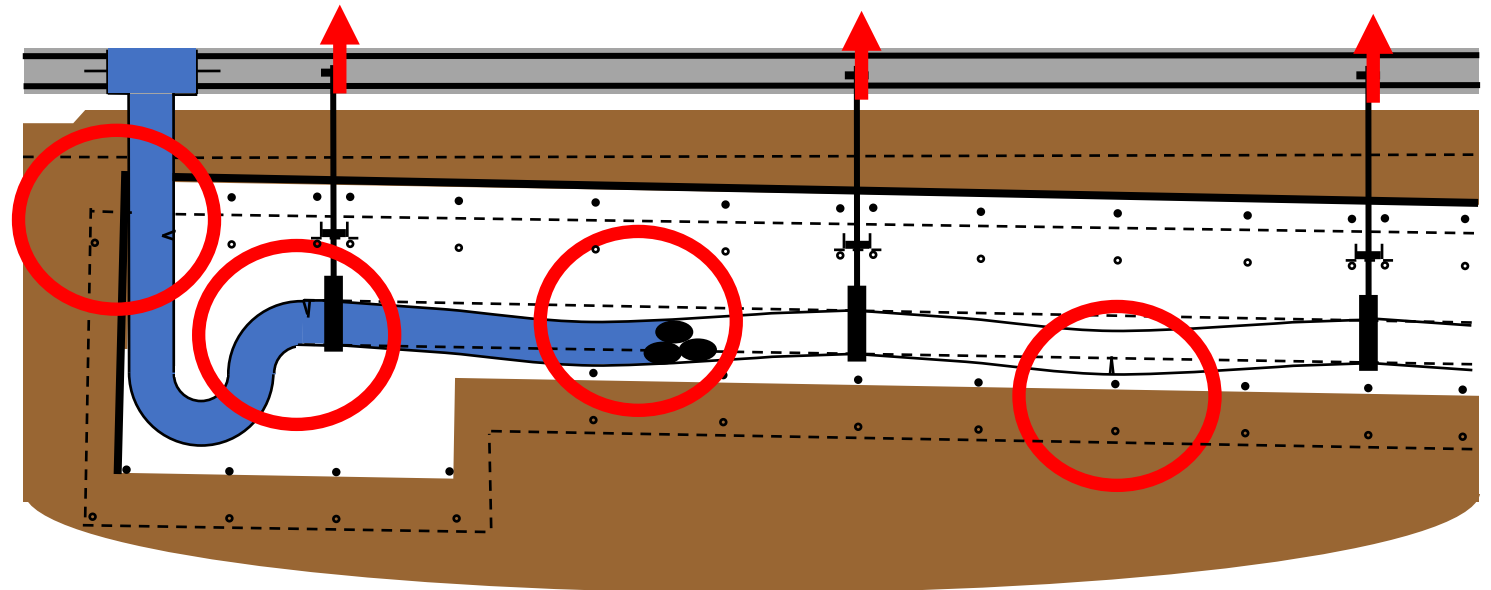
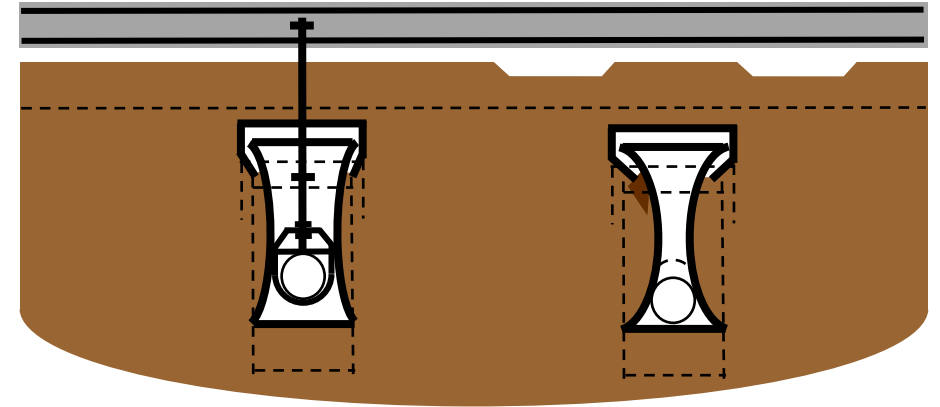
TASK #2

UNDERSTAND THE PROBLEM

RP

PLASTIC SIDE PANELS AND CROSSBARS

Gen. Swelling, No Rod/Crossbar Buckling



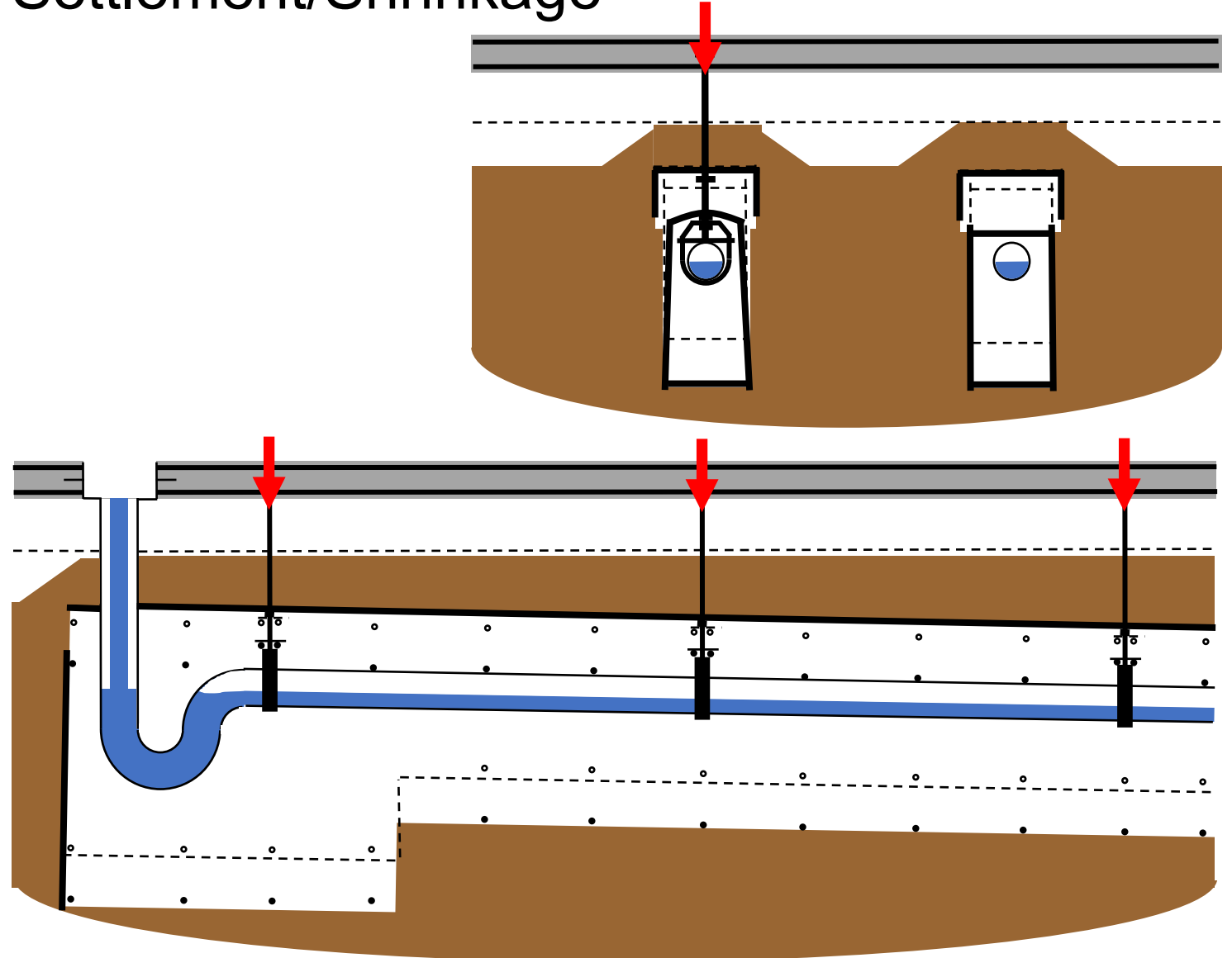


TASK #2

UNDERSTAND THE PROBLEM

RP

PLASTIC SIDE PANELS AND CROSSBARS Settlement/Shrinkage



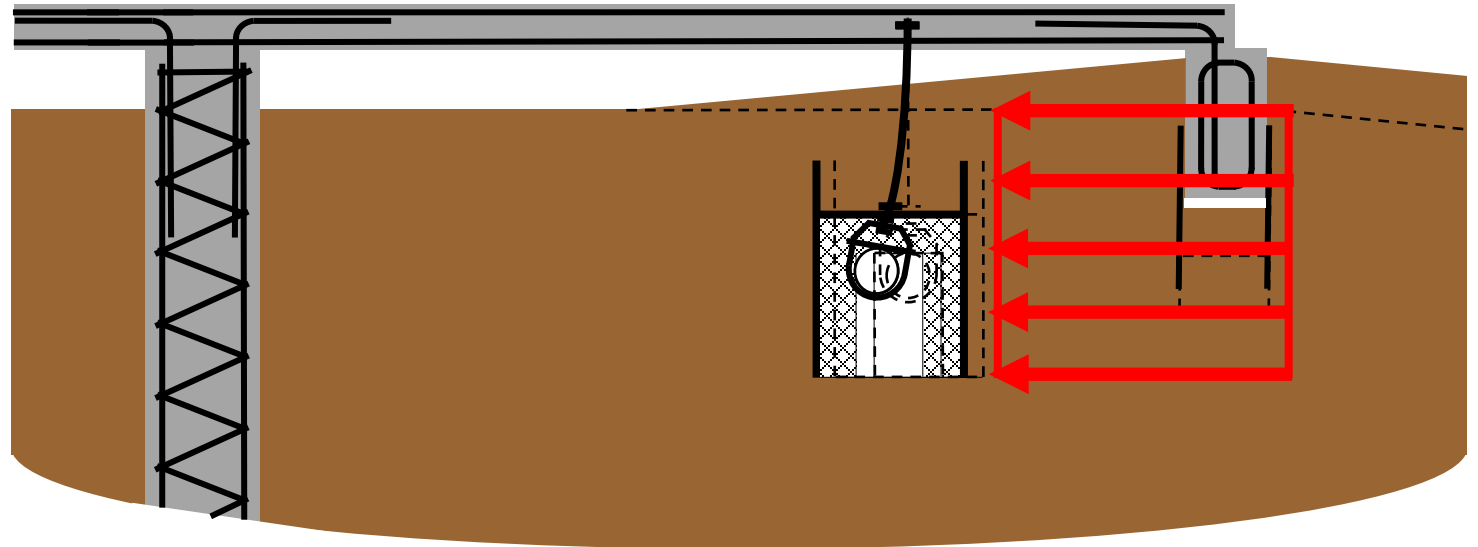


TASK #2

UNDERSTAND THE PROBLEM

NET HORIZONTAL FORCES

Soil swelling on one side of a Non-Isolated Void System can create net horizontal forces that push Non-Isolated Void Systems and damage plumbing.





TASK #2

UNDERSTAND THE PROBLEM

SWELL/SHRINK CYCLE DEFORMATIONS

Designers need to also carefully consider the effects of swell/shrink cycles on the deformed shape of non-isolated void systems.

TASK #2

UNDERSTAND THE PROBLEM

In summary, the problem is that **an unprecedented and possibly unobtainable level of inter-disciplinary testing and design coordination, plan review and plumbing inspection would be required** on each project between the Geotechnical, Mechanical and Structural Engineer to properly protect plumbing **using non-isolated plumbing approaches that have been used**. A Plumbing Inspector does not have the ability to verify this occurred.



TASK #3

**LET THE GEO ENG
BE THE GEO ENG**

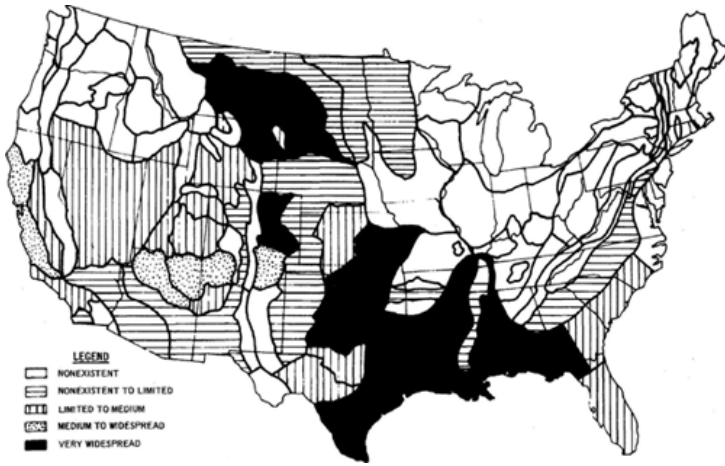


Image from the US Department of Transportation
Federal Highway Administration
Publication No. FHWA NHI-05-037 Chapter 7
May 2006

TASK #3

LET THE GEO ENG BE THE GEO ENG

Expansive Soil is Challenging to Predict

- Geology Matters
- Site History Matters
- Weather Conditions Matter
- Groundwater Matters
- Soils Are Anything But Uniform
- Estimating Soil Movement To The Nearest One Inch Is, At Best, Challenging (And Estimates To The Nearest Quarter Inch May Be A Fool's Errand.)
- Expansive Soil **Swell Pressures Can Exceed 20,000 psf.**
- **There is always the potential for volume change to occur under a slab if expansive soil is present.** The probability of movement occurring will never be zero.

TASK #3

LET THE GEO ENG BE THE GEO ENG

TJ

The Geotechnical Engineer on the project is the expert on:

- Geotechnical Engineering Standard of Care
- Estimating Potential Vertical Movements
- Estimating Potential Horizontal Movements
- Estimating Expansive Soil Swell Pressures
- Analyzing the Stability of Sloped and Benched Cuts
- Estimating the Probabilities of Soil Movement Occurring

The Geotechnical Engineer on the project is not the expert on:

- Mechanical Engineering Standard of Care
- IPC Requirements for Protection of Plumbing
- Structural Engineering Standard of Care
- IBC Structural Material Strength Provisions

TASK #3

LET THE GEO ENG BE THE GEO ENG

TJ

Compliance with Plumbing Codes is 100% the Mechanical Engineer's responsibility, not the Geotechnical Engineer

Structural Engineers should not mislead anyone into thinking otherwise (Owners, Building Officials, General Contractors, Attorneys).

A Mechanical Engineer should not consider any Geotechnical Engineering recommendations regarding plumbing design considerations as the Geotechnical Engineer taking responsibility for the plumbing design on a project.

TASK #4

**LET THE MECH ENG
BE THE MECH ENG**

TASK #4

LET THE MECH ENG BE THE MECH ENG

RP

Attorneys representing Owners who indicated during design that they accepted the risks associated with high maintenance costs to benefit from lower construction costs often claim that uninformed Owners were misled by negligent design professionals. To maximize the amount of insurance money available to their clients, these Attorneys will often strategically claim many different design professionals were negligent...because **the more firms accused means the more insurance money available.**

Make it clear in your words and your documentation that the Mechanical Engineer ALONE is responsible for defining the design requirements to protect plumbing from expansive soil. And, SUPPORT them in this role by taking their lead on however they interpret plumbing codes and performing whatever Structural Engineering they require for it be protected.

TASK #4

LET THE MECH ENG BE THE MECH ENG

AG

Some Owners have questioned Mechanical Engineering firms that have changed their policies to require isolated plumbing under isolated slabs. Most Owners are more familiar with non-isolated plumbing and they perceive that the change will cost them a lot more money (which is not necessarily true).

TASK #4

LET THE MECH ENG BE THE MECH ENG

AG

However, litigation history indicates **Owners routinely claim after the fact that they did not understand and accept the risk that the Mechanical Engineer thought the Owner was accepting.**

This is a public health, safety and welfare issue and it is in the best economic interests of Owners overall. When Mechanical Engineers have stood their ground on their office policies, Owners have ultimately respected the Mechanical Engineer's integrity. In other words, **Mechanical Engineers are being TESTED by Owners** to see if it's truly a requirement or not.

It is not helpful for the Structural Engineer or others to share anecdotal experiences about what the Structural Engineer perceives to be successful plumbing history with various approaches.

The evidence shows that these plumbing problems exist long before Owners become aware of them and Owners often mistake the cause of the problem to be something other than expansive soil movement until Attorneys become involved.

TASK #5
DO THE
STRUCTURAL
ENGINEERING

RP

TASK #5

DO THE STRUCTURAL ENGINEERING

RP

Some of the Structural Engineering items often required for Isolated Plumbing under Isolated Slabs:

- + Specifying benched cuts and/or retaining walls under Slabs-on-Voidwork where the voidwork bears on the subgrade of the utility trenches
- + Specifying that utility trenches be excavated by the Concrete Subcontractor where voidwork is placed on these trenches
- + Specifying voidwork be configured around isolated plumbing and installed by the Concrete Subcontractor with the main layer of voidwork
- + Specifying a structural element (e.g. gradebeam) that is connected to the isolated foundation for the Mechanical Engineer to specify attachment of the plumbing to the foundation at flexible expansion joints
- + Specifying concrete vaults, where required by the Mechanical Engineer to house flexible expansion joints, to be attached to and a part of the isolated foundation, with a vertical slotted opening at the elevations provided by the Mechanical Engineer for non-isolated plumbing

THANK YOU