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Project No. 18553

April 21, 2020

Re: Foundation Evaluation



Dear



As requested, personnel of GreenWorks Engineering and Consulting have completed an observation of the foundation at the address referenced above on April 11, 2020. The purpose of the observation was to collect information necessary to assess the performance of the existing foundation. This evaluation was a Level B evaluation as described in the "Guidelines for the Evaluation and Repair of Residential Foundations" by the Texas Section of the American Society of Civil Engineers (ASCE). For the purpose of this report the house faces south.

Introduction:

The house is a single-story wood framed structure built in 1981. The foundation system of the house is a concrete slab on grade. All the information gathered was from the visual evaluation and no destructive or invasive testing was performed.

Observations:

The interior and exterior of the house showed typical signs of distress for a house that has incurred differential foundation movement.

The interior distress included:

- Cracks in the walls and ceiling drywall
- Separation of the drywall at interior corners
- Compressed drywall joints
- Interior doors do not operate properly and are out of square
- Hairline cracks in the garage slab

Note, the walls within the living room were covered by wood paneling, which limited our ability to visually evaluate the interior of the room.

The exterior distress included:

- Cracks in the brick veneer
- Separation of the brick and the mortar
- Separation of the veneer from the window frame and trim
- Separation of the frieze board from the veneer
- Separation of the frieze board joints
- Cracked and broken foundation corners

The ground slopes toward the house on the east side of the house. Note, the exposed areas of the foundation were covered with a parge which limited our ability to visually evaluate the foundation.

Interior Elevation Survey:

An interior floor elevation survey was performed on the living area of the house, with the elevations recorded to the nearest 10th of an inch (0.1"). Adjustments were made to account for the thickness of the floor coverings. A benchmark elevation of 0.0 inches was established near the northwest corner of the living room as shown in Figure 1 of this report.

Drainage:

The drainage of water is an important issue that affects the shrink/swell properties of the expansive soil the house is built upon. The purpose of proper drainage is to remove excess water from around the house to keep the soil around and under the perimeter foundation at a stable moisture content and the soil under the slab dry. Gutters and down spouts are an effective method of draining rainwater away from the house but must be used correctly. Downspouts should discharge rainwater a minimum of 5 feet away from the foundation. In addition, the soil around the house should have a positive 5% slope, 3 inches in 5 feet, away from the house.

Foundation History:

The existing foundation has had foundation underpinning in the past. Per the copy of the repair plan by [REDACTED] (10) perimeter foundation piers were installed approximately 19 years ago, according to the current homeowner. Refer to Figure 1 of this report for approximate locations of the [REDACTED] piers. The exact location of the existing piers, the depth and type used is not known.

Conclusions:

Based on our observations of the interior and exterior cosmetic distress, the floor elevations and calculations, it is our opinion that the house has undergone an excessive amount of movement. The maximum differential deflection is 0.5 inches and occurred over an approximate distance of 10.5 feet. This amount of deflection exceeds the standard allowable deflection of 0.3 inches for a distance of 10.5 feet. The standard allowable differential deflection is based on 1.0 inch of vertical movement, up or down, over a horizontal distance of 30 feet; expressed as Length (in inches)/ 360.

Furthermore, it is our opinion that remedial measures are required to bring the foundation to a more level condition. There are also a few foundation maintenance recommendations that could be beneficial to the future performance of the foundation.

Recommendations:

- 1) Adjust (8) existing perimeter piers as required to stabilize and lift the perimeter foundation wall. Refer to Figure 1 of this report for the approximate location of the piers to be adjusted. Note, any foundation movement, even corrective movement, can cause additional cosmetic distress.
- 2) To achieve an approximate level condition of the interior floor, install (4) interior piles or drilled piers as shown on Figure 1 of this report. The piles can be concrete cylinders, steel pipe, or helical screws. Refer to Figures 2, 3, 4, and 5 of this report. Space the piles or drilled piers within the interior at a maximum of 5 feet on-center.
- 3) With the completion of the foundation repair, the interior cracks can be repaired, and the exterior separations can be sealed. Exterior cracks around doors and windows should be caulked with an elastic silicone caulk and brick cracks can be filled with mortar. Note, the broken foundation corners will not affect the overall performance of the foundation but could cause minor cracking in the bricks above that corner.
- 4) Have the doors that remain poorly functioning adjusted or rehung.
- 5) A leak detection test by a licensed plumber is recommended after the foundation has been repaired to verify the condition of the plumbing. If any discrepancies are determined they should be repaired immediately to preserve the foundation repair.
- 6) With the completion of the foundation underpinning, a final elevation survey must be performed to provide a final elevation baseline. It is recommended to review the performance of the foundation every 6 to 12 months. Compare all future foundation evaluations to this baseline.

Foundation Maintenance Recommendations:

- 1) To better control the rainwater, add downspout extensions to all the downspouts that do not currently have them. In addition, repair the gutters that have deteriorated. The extensions should discharge the water a minimum of 5 feet from the foundation or into a drainage system.
- 2) To assist in the drainage of free water the soil around the house should be sloped away from the house. The slope should drop a minimum of 3 inches in 5 feet, a 5% slope. If this cannot be done a French Drain may be required.
- 3) Establish a watering program for the foundation soil to keep the soil moisture content constant during the dry months. The lawn should be kept healthy. This will help by

reducing evaporation. Water the lawn and other vegetation consistently and evenly. If the soil is cracking at the surface this is a sign that the soil is drying out.

Limitations:

The opinions and recommendations contained in this report are based on the visual observation of the then current conditions of the house and the knowledge and experience of the engineer. The evaluation was limited to visual observations and areas not visible, accessible or hidden behind furniture and appliances were not included in the evaluation. There has been no structural inspection of the existing framing of the house and no verification of the framing has been done. The evaluation did not include any soil sampling or testing.

The evaluation did not include any assessment of the existing framing, plumbing or soil and no implication is made on the compliance or non-compliance of the house with old or current building codes. The evaluation does not constitute a design of the foundation. No verification was made of the existing concrete strength, thickness, reinforcement nor capacity to support any load.

Foundation movement is a prevalent phenomenon in the Dallas/Fort Worth metroplex area. Future foundation movement is likely to varying degrees due to the shrink/swell characteristics of the soil. The foundation is prone to movement due to the moisture variation in the existing soil and total prevention of future movement is unlikely.

No guarantee or warranty as to the future performance or need for repair of the foundation is intended or implied. Limits of liability for any claims with respect to this report is limited to the fees paid for services and anyone relying on the content of this report agrees to indemnify GreenWorks Service Company for all costs exceeding this fee.

Prepared by,



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Professional Engineer



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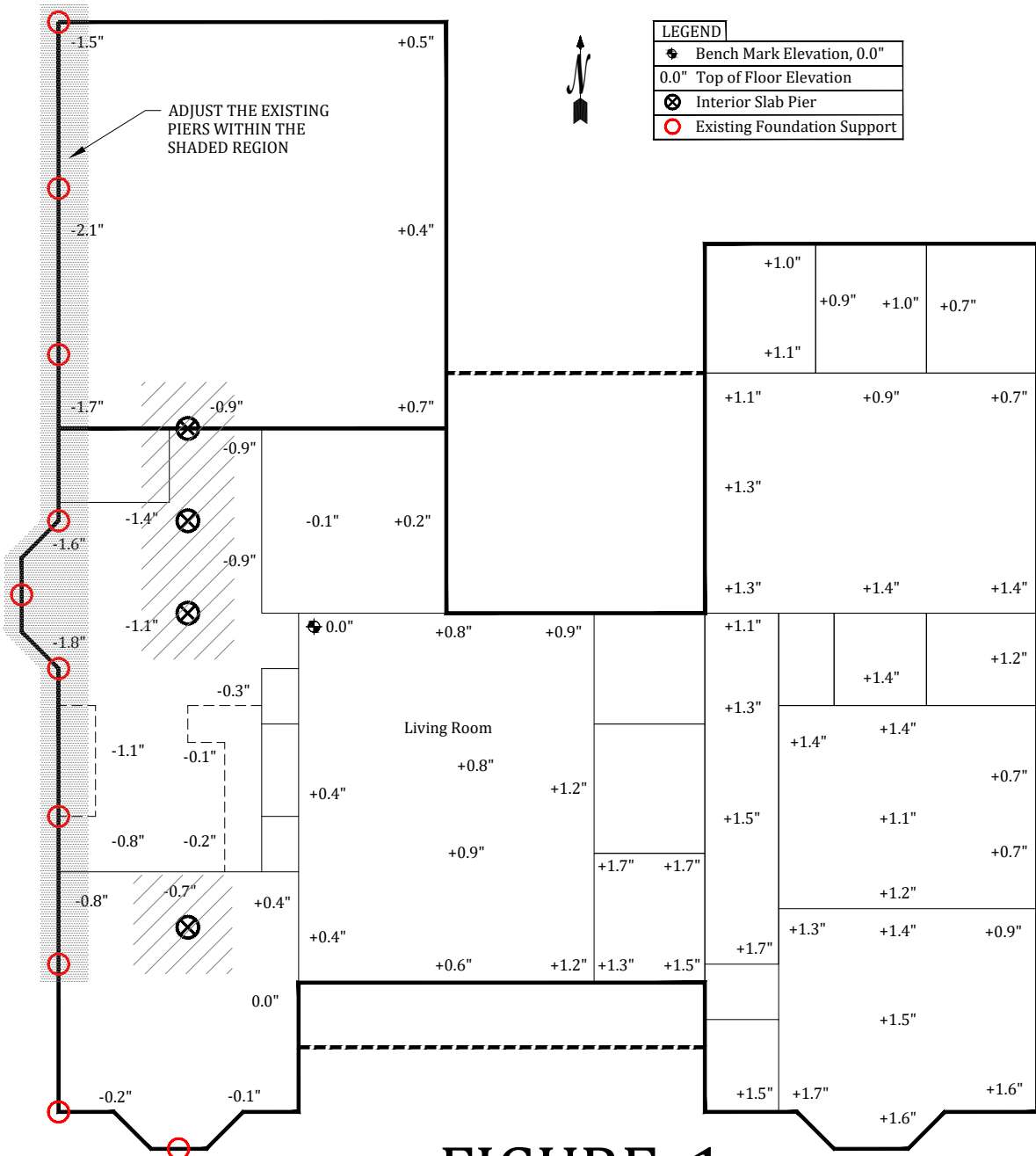


FIGURE 1

NOT TO SCALE

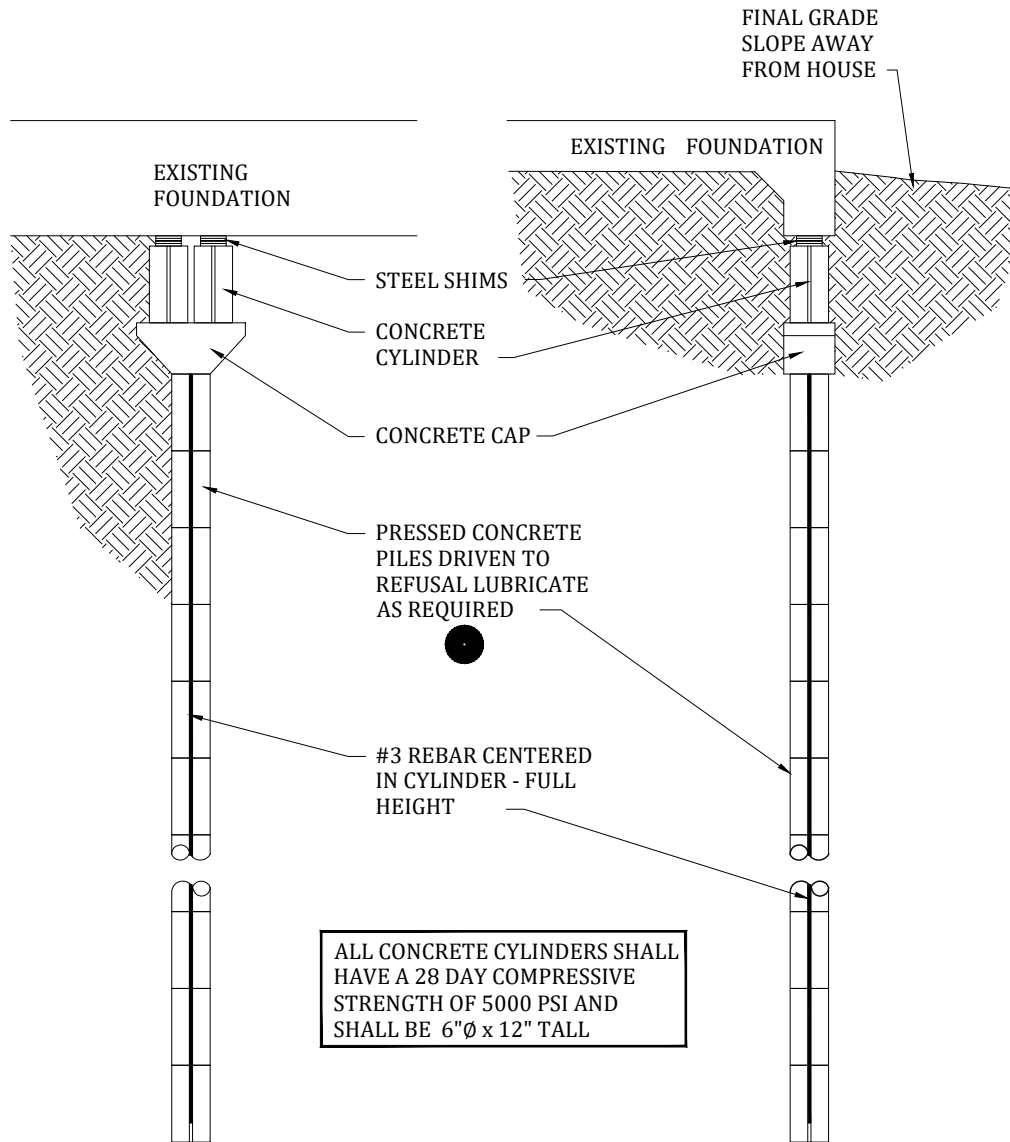


FIGURE 2

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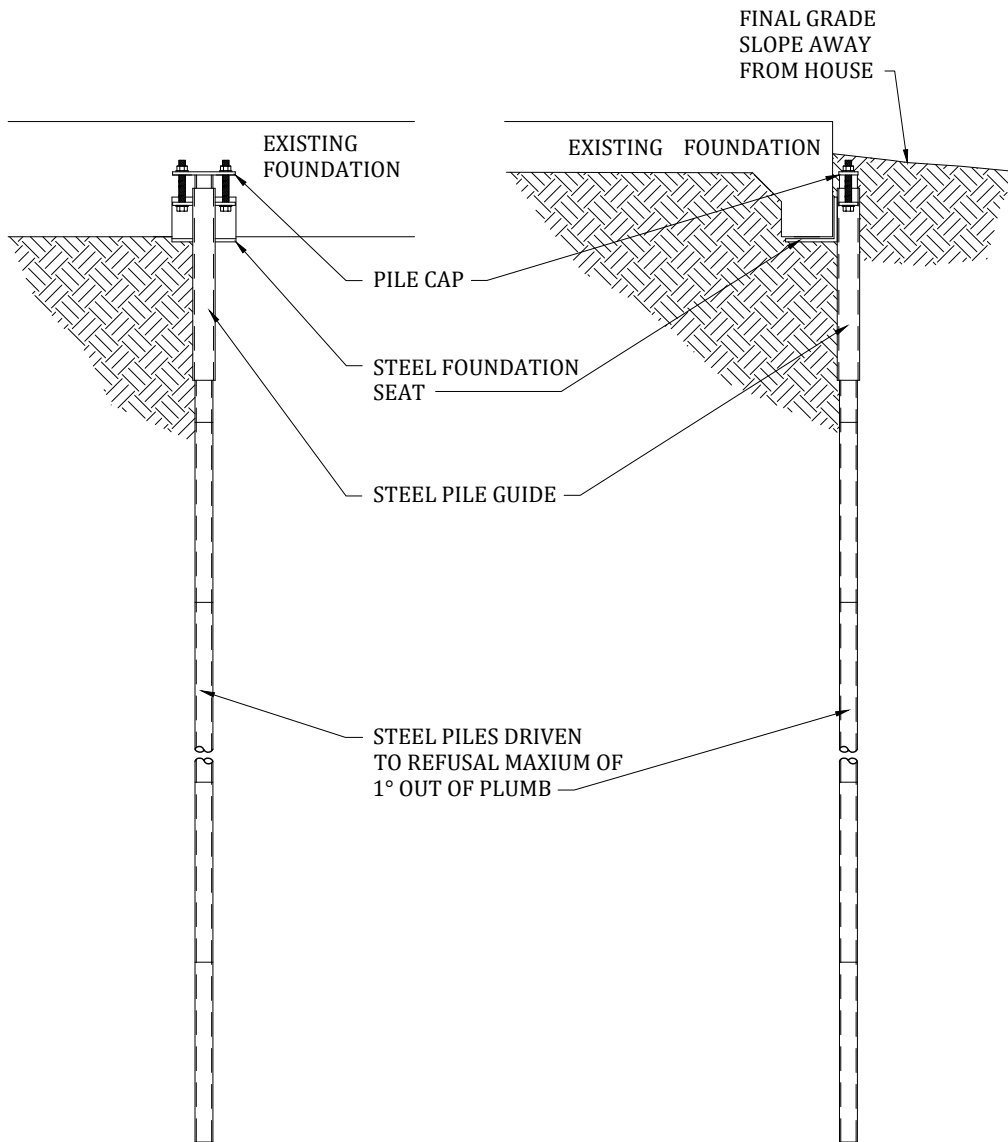


FIGURE 3

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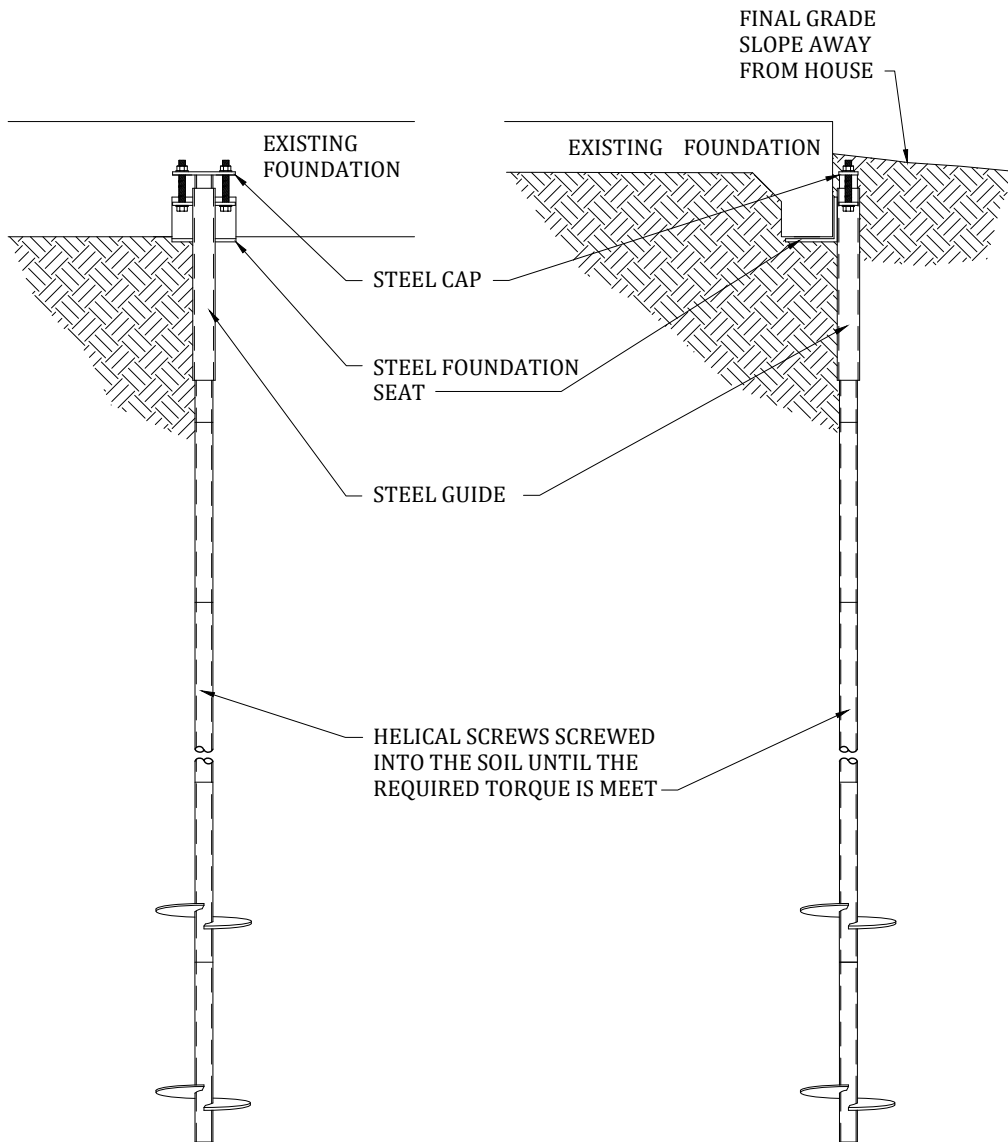
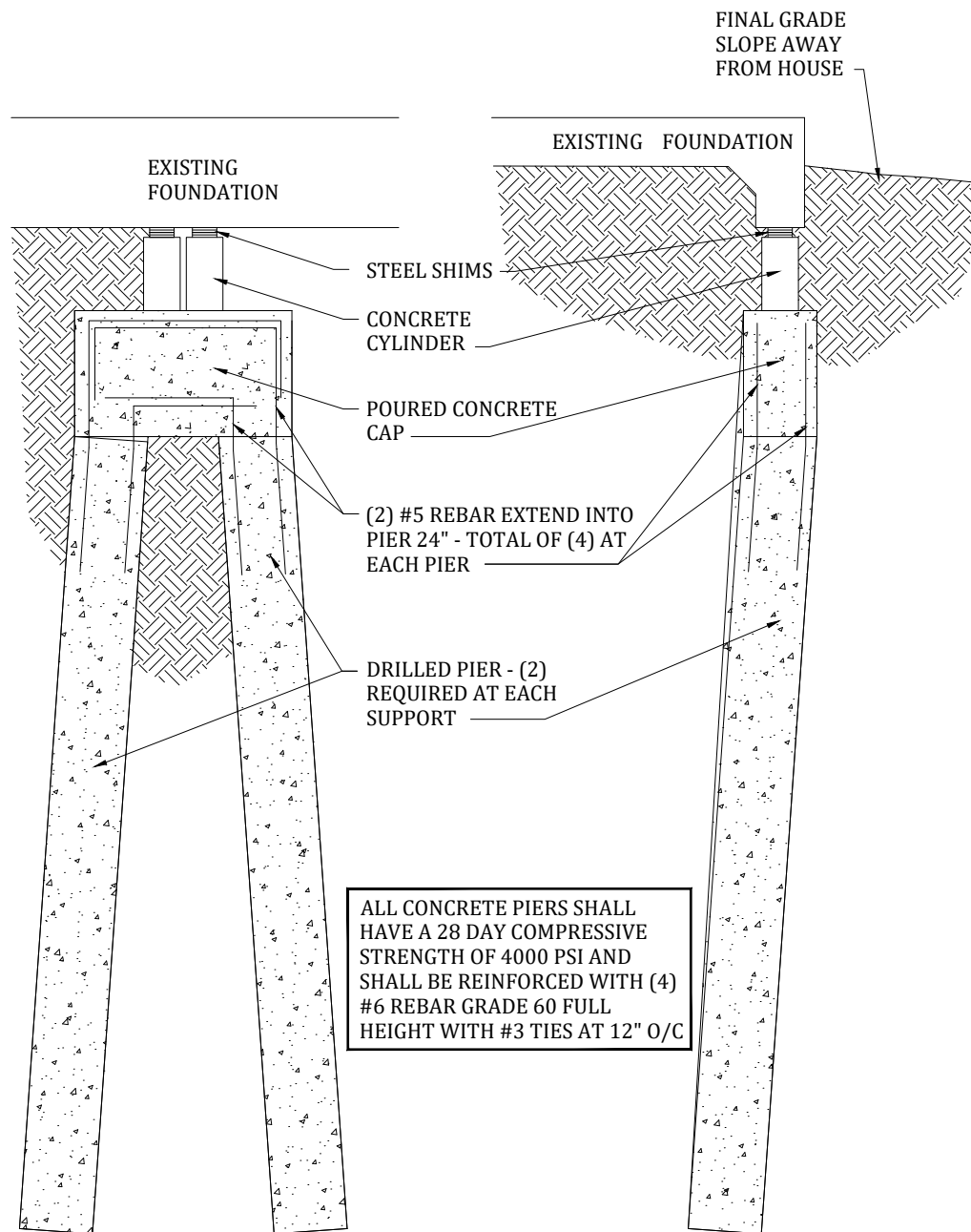


FIGURE 4

NTS

ALL CONCRETE CYLINDERS SHALL
HAVE A 28 DAY COMPRESSIVE
STRENGTH OF 5000 PSI AND
SHALL BE 6"Ø x 12" TALL



ALL CONCRETE PIERS SHALL
HAVE A 28 DAY COMPRESSIVE
STRENGTH OF 4000 PSI AND
SHALL BE REINFORCED WITH (4)
#6 REBAR GRADE 60 FULL
HEIGHT WITH #3 TIES AT 12" O/C

FIGURE 5

NTS