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ENGINEERING OPINION
INSPECTION OF FOUNDATION LEVELING
RESIDENCE AT 14041 UTOPIA DRIVE, SUGAR LAND, TEXAS, 77498
Date of Inspection: April 15, 2024
Date of Report: April 20, 2024

An inspection and certification of the foundation leveling performed to the subject house was requested. This is not a warranty for the future performance of the foundation.

INSPECTION

There was visual evidence of recent foundation leveling. The floors were walked and sensed to be level. The doors and windows were square or near-square.

An elevation survey throughout the house was performed using a Technidea Zipllevel. The foundation surface elevations fall within the generally accepted standard for foundation repair performance. See attached survey.

CONCLUSIONS

The foundation has been sufficiently leveled. The foundation leveling meets generally accepted standards of performance. No further work is needed at this time. The foundation appears to be structurally sound.

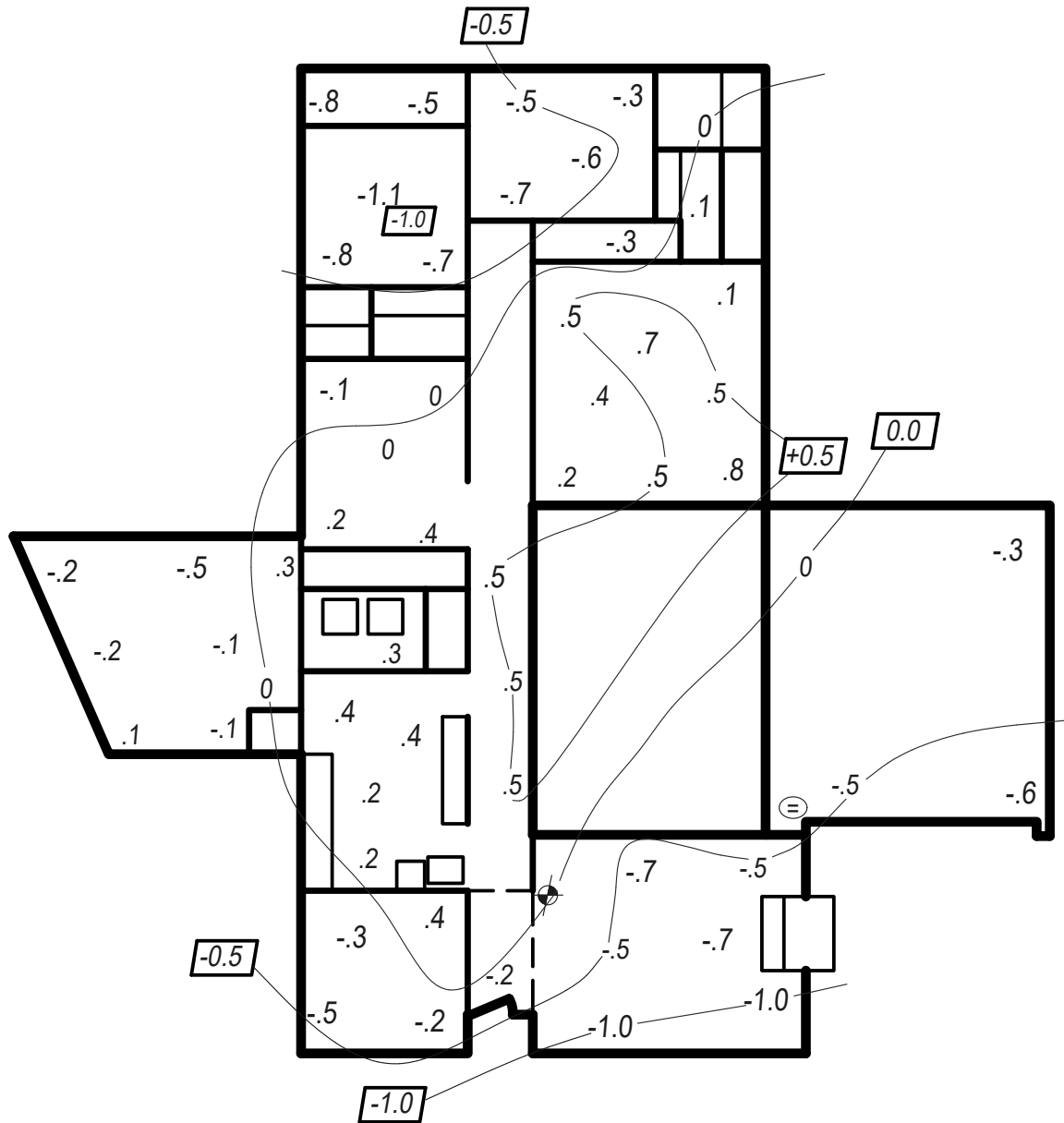
Attachments: Elevation survey
Criteria



POST-LEVELING SLAB SURFACE ELEVATIONS

14041 Utopia Drive, Sugar Land, Texas, 77498

April 15, 2024



- ELEVATIONS IN INCHES
 - CORRECTED FOR FLOORING
 - ISO-ELEVATION (CONTOUR) LINES AT .5 INCH INTERVALS
- x $\frac{3/4''}{10'}$ x

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- GARAGE ELEVATIONS TAKEN AT CEILING



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ENGINEERING OPINION

CRITERIA FOR JUDGING FOUNDATION LEVELING

As far as is known, there is no organization which has created a standard to judge whether the leveling of a foundation is adequate. The terms repair, leveling, and underpinning are synonymous in this opinion.

CONCERNING AN ENGINEERED REPAIR PLAN

If leveling of the foundation is being considered, a repair plan can be provided which, if properly installed, will improve the conditions related to the foundation. The engineered repair plan will typically be a partial plan which will, in the engineer's opinion, provide the maximum benefit/cost ratio. The repair plan will normally be provided with target elevations.

The target elevations provided on the repair plan are elevations that may be achieved, but they are not to be considered values that must be achieved. The contractor must use good judgement in determining the amount of leveling which will provide adequate results.

The pile locations shown on the engineered repair plan are approximate. The contractor will choose pile locations based on more information than is available to the engineer. The number of piles provided by the engineer should be close to the number proposed by the contractor.

CONCERNING CERTIFYING FOUNDATION LEVELING

The following are my main objective criteria for judgment of foundation leveling being adequate.

- Conditions, i.e. damages and elevations, improved in the area of repair.
- Deflection less than $L/360$ across 20+ feet of distance, in middle third of span.
- Floor slopes less than 1%.
- Doors and windows either functional or their jambs near square or the floor near level across the door or window.
- Brick mortar lines straight, expansion joints and cracks open at the top closed, frieze trim relationship to top of brick veneer wall reestablished.

The targets of foundation leveling, including more level measurements and better damage conditions, can be limited by several factors, including the following.

- As leveling is proceeding, new damages are occurring, especially to the foundation.
- As leveling is proceeding to close up cracks and separations, the cracks and separations are not closing.
- The area of underpinning of the foundation is limited.

If there are concerns by the engineer about not reaching apparently achievable targets of foundation leveling, the engineer should speak to the contractor about why these targets were not reached.

An engineering certification of leveling does not certify the locations, number, type or quality of underpinning installation, and does not warranty the future performance of the underpinning.

OTHER INFORMATION REGARDING FOUNDATION LEVELING

Brick veneer cracks open at the bottom are a special concern before and after leveling. If these exist before leveling, leveling will not close them, leveling will likely open the top. If these did not exist before leveling but exist after leveling, they indicate improper lifting to level or a final overlifted condition.

Another concern are brick veneer cracks (which have occurred due to the foundation movement to be addressed by the leveling) that have been filled, usually with mortar. If these cracks are filled, then leveling will likely cause this filled area to fracture or cause new cracks nearby. Filled brick veneer cracks greater than 1/8" in width should have the filling removed prior to leveling.

The target goals of the foundation leveling will affect the final result. If the target goal is to close up cracks and separations only then levels will not be as improved as much as if levelness was a goal. If the target goal of the work is to stabilize the foundation, with no leveling, then there will be no improvement in damages nor levels.

Stabilizing a foundation requires no skill and the ability of the underpinning to stabilize the foundation cannot be determined just after the underpinning. Underpinning to stabilize a foundation is an infrequent target goal and is subject to abuse by the contractor.

Partial underpinning of a foundation which is tilted excessively across the entire foundation will not do much to improve the situation. Full effect can only be achieved by a full exterior and interior underpinning repair.

Shallow underpinning is utilized by some contractors to lower their costs or the clients costs. Whether an underpinning is deep (piles sections (usually cylinders)

driven down with no delays to a depth capable of raising the tributary area of the foundation) or shallow (pile sections driven down and stopped prior to fully raising the foundation, or blocks driven down rather than pile sections) cannot be practically determined after the work. It can be determined by witnessing the operation. Shallow underpinning may be successful if the piles are in stable soils (no detrimental surface soil effects such as trees within influence, yard drainage resulting in water at the foundation perimeter, plumbing drainage leaks, and ground slopes exceeding 10%).



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