



SFA Design Group, LLC

STRUCTURAL | GEOTECHNICAL | SPECIAL INSPECTIONS
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February 15, 2023

RE: Existing Condition Report
Hopfauf Residence
303 Quail Hollow
Sanford, NC 27332

Abstract

SFA Design Group conducted a visual observation of the Hopfauf Residence on January 31th, 2023. The subject property is located at 303 Quail Hollow, Sanford, NC 27332 (Figure-A). Originally built in 1989, the existing structure is a single-story, wood-framed, single family home of approximately 2,172 sq-ft. The foundation consists of traditional CMU stemwall with brick veneer, resting on a continuous concrete footing at the perimeter, with CMU pilaster and beam construction at the interior and a concrete slab on grade at the interior of the garage (Figure-C). The residence is located on a 0.39 acre lot. The results of the investigation and the corresponding repair recommendations are presented in the following pages.

Introduction

Differential settlement is a potential hazard which can compromise the structural integrity of your home, leading to costly repairs if not addressed in a timely manner. The causes of differential settlement at this location are out of the scope of this report, but literature¹ indicates drought, improper drainage and poorly compacted fill to be the common contributing factors. The effects of differential settlement include foundation cracks, cracks in drywall and sloping floors. A Zip Level was used to locate the differences in the floor elevations throughout the home. The Zip Level readings and corresponding topographic map will be discussed later in this report.

Scope

The purpose of this report is as follows:

- Gather data pertaining to differential settlement and foundation issues
- Evaluate the foundation of the subject property
- Evaluate the repair plan proposed by the contractor for its viability in supporting the areas of the structure indicated without adversely affecting the structures structural integrity
- Provide a comprehensive repair plan for consideration that addresses all areas observed to be outside of industry standards elevation deviation of ½" over a 10ft span.

All care was taken to provide the best available information to the client and the engineers, with the goal of recommending the best possible plan for support of the foundation.

Areas of the home that were not able to be observed due to obstructions or were otherwise made unavailable are not in the scope of this project and are not addressed.

¹ http://www.arnjournals.com/jeas/research_papers/rp_2010/jeas_0710_363.pdf

Data Collection

Data collection performed to evaluate the structural integrity of the subject property's foundation is collected in four stages:

1. A thorough inspection of the home is conducted. Items of interest during inspection include the following:
 - All visible cracks in the foundation, slabs, walls, etc.
 - Damaged or rotting wood members.
 - Identifying bowing, heaving or sloping floors and misaligned doors and windows.
2. Photographs are taken of the home's interior and exterior.
3. Measurements of the home are then taken in order to digitally produce foundation plans.
4. A Zip Level survey of the main level is performed to identify variances in the floor elevation.

The Zip Level survey data will be entered into a *3D Field*, mapping software, to create a topographical map of the floor, providing a contoured model of the areas experiencing the most settlement. From this information, the design engineer can properly analyze the issues concerning the foundation and make appropriate repair recommendations.

Results

Based on maps provided by the North Carolina Flood Risk Information System² the property is not in an area that is at risk of flooding; nor are there any geotechnical or ground water conditions which would indicate a potential for permanent ground displacement (Figure-B).

A visual inspection of the property found most of the CMU, brick and concrete foundation to be in average condition, with certain areas showing signs of differential settlement (Figure-C).

A Zip Level Survey was performed on the interior of the subject property, using the front door as the bench mark or starting point; designated as "0.0" on the floor plan (Figure-D). Measurements of the floor elevation were made in tenths of an inch. The high point was +0.1" and the low point was -1.0". The maximum difference in the floor readings was 1.1". As can be seen on the topographic map, the most significant settlement is indicated by dark brown contours surrounding the area (Figure-D & E).

A Bosch rebar scanner was used to identify if rebar was present in the concrete and/or CMU elements readily accessible for scanning. Rebar was not detected under this scanning method.

² <https://fris.nc.gov/fris/?ST=NC>

Recommendations

Based upon field observations, and evaluation of collected data, we find the property to be experiencing settlement, cracks, and general foundation stress in various areas. We have evaluated the repair plan (Figure G) proposed by the contractor for adverse affects on the performance of the structure relating to stabilization of the areas indicated, structural integrity, and life safety and find it to be viable. Based upon our findings, portions of the structure outside of the contractors recommended repair plan are experiencing differential settlements outside of the ½ in : 10 ft criteria. Figure F depicts a repair plan that includes all areas observed outside of this criteria for consideration only. We recommend the following:

- Install a push pier / helical pier system to stabilize and potentially lift the structure (Figure-F & G).
- Install a SmartJack system to stabilize and potentially lift the interior floor framing (Figure-F).
- Pier & SmartJack layout and quantities are based on bringing the structure up to a level condition per industry standards where industry standards are understood to be 0.5" of settlement over a 10' span.
- It is recommended to perform an elevation survey of the floor after installation of SmartJacks and/or piers to determine the necessity of installing add'l SmartJacks to support the floor framing.
- Inject PolyLevel to fill all voids potentially re-level any concrete slabs and walkways.
- Ensure that all drainage properly discharge away from structure.

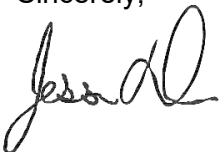
It is our understanding that the intent of this repair is to stabilize, and potentially lift the worst case portions of the structure. It should be noted that this project is voluntary and recommendations for repairs are not mandatory. The homeowner should, however, understand that the new foundation system will support the structure ONLY in the areas addressed. Structural concerns and additional settlement may continue in areas not supported and the home should be closely monitored for additional damage in these areas.

Limitations and Closure

This report does not contain all variables that may be causing the foundation issues. Comprehensive reports can be produced using geotechnical and structural engineering investigations by licensed professionals. These additional reports would require a soils analysis of the site, as well as a complete vertical and lateral analysis of the structure. This report only provides information procured via visual inspection, from online sources and data collected from the Zip Level measurements. All observed areas are indicated and problematic regions documented.

Thank you for the opportunity of providing our services to you on this project.

Sincerely,



Jesse Dean, PE
SFA Design Group, Inc.

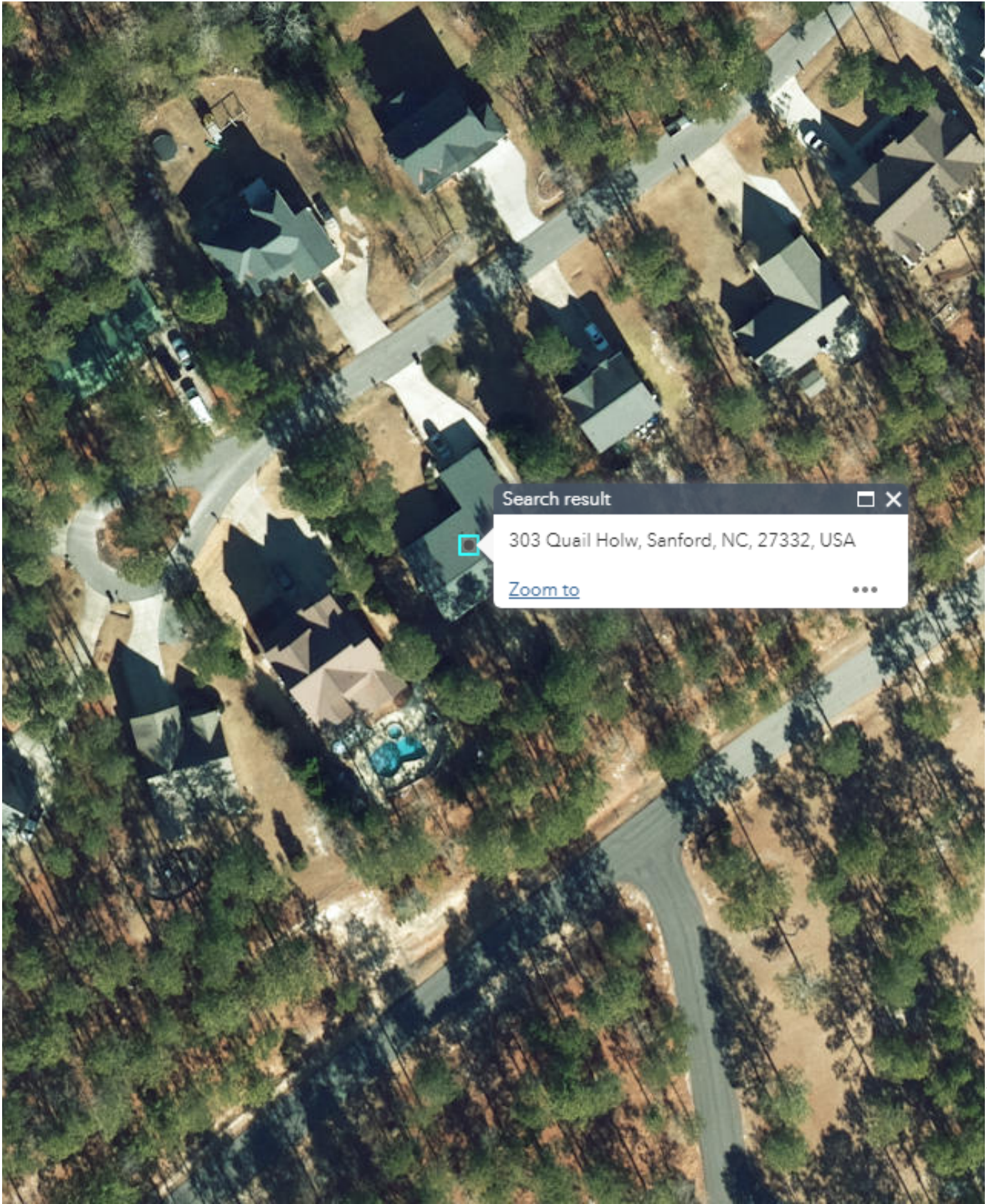
Attachments:

- Figure A – Site Map
- Figure B – Flood Hazard Map
- Figure C – Foundation Layout
- Figure D – Zip Level Measurements And 2D Topographic Map
- Figure E – 3D Topographic Map
- Figure F – SFA Comprehensive Recommended Repair Plan
- Figure G – Contractor Proposed Repair Plan
- Appendix 1 – Photographs

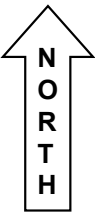


EXPIRES: 12/31/23


Date: 02/13/2023



Search result □ ×
303 Quail Holw, Sanford, NC, 27332, USA
[Zoom to](#) ⋮



<https://leecountync.maps.arcgis.com/apps/webappviewer/index.html>

	SITE MAP 303 Quail Hollow Sanford, NC 27332	Project Number: RBC23-023
		FIGURE-A

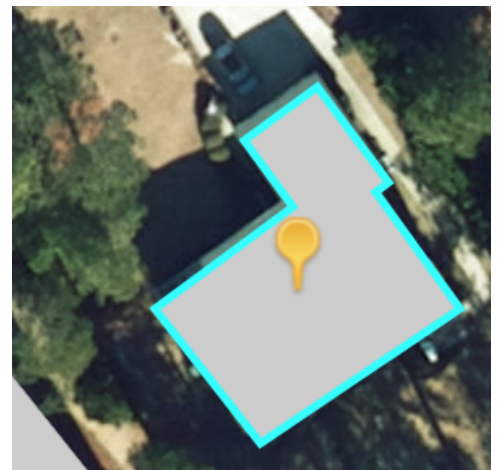


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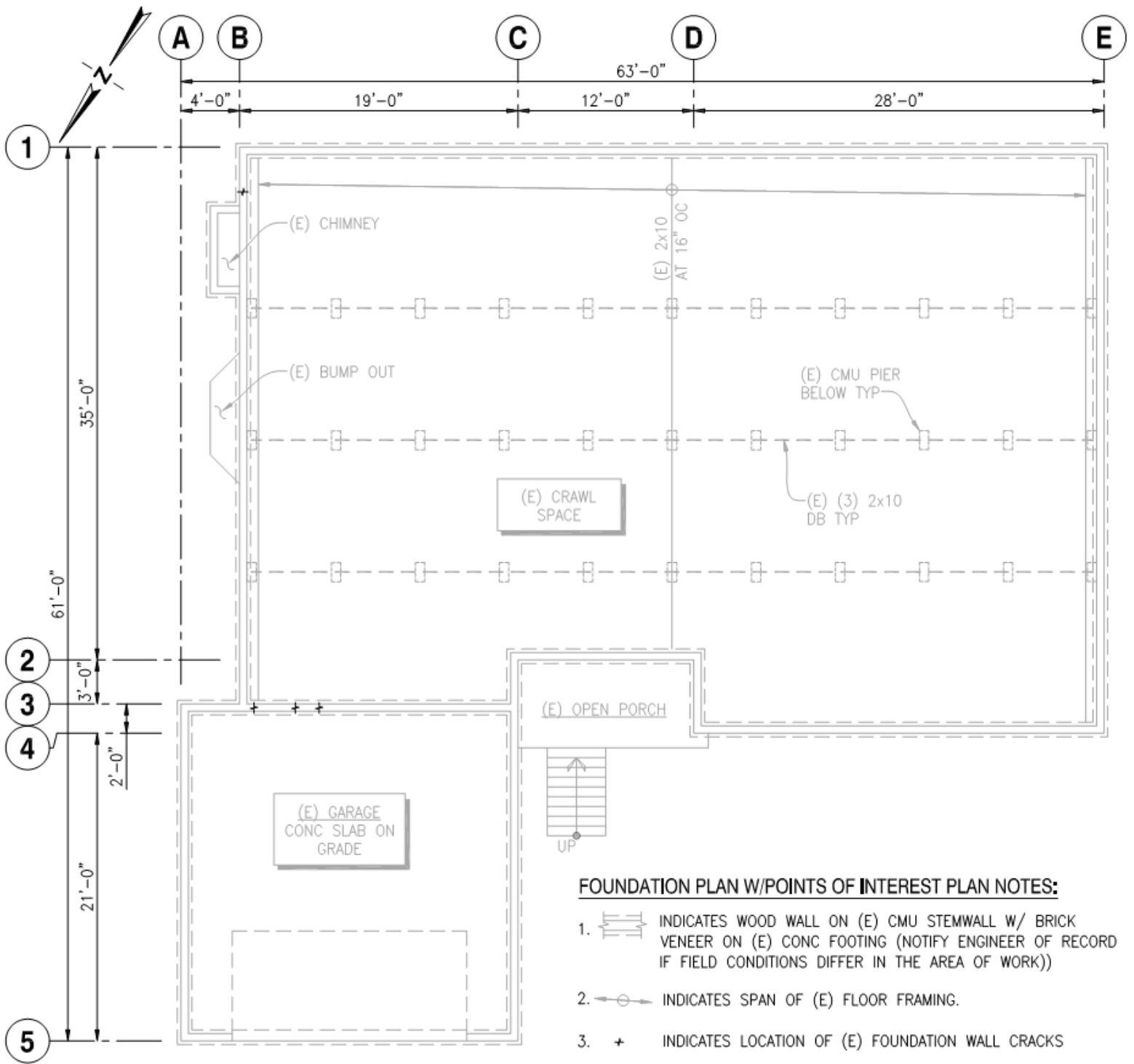
Flood Hazard Areas

- Zone VE
- Zones A, A99, V
- Zones AE, AH, AO, AE: 1% Annual Chance Flood Hazard Contained In Structure, 1% Annual Chance Flood Hazard Conditions
- Zone AE: Floodway, 1% Annual Chance Flood Hazard Conditions: Floodway, 1% Future Conditions Contained In Channel: Floodway
- Zone AE: Community Encroachment Area, 1% Annual Chance Flood Hazard Conditions: Community Encroachment Area
- 0.2% Annual Chance Flood Hazard Contained In Channel, 0.2% Annual Chance Flood Hazard
- Zone X: 1% Future Conditions, 1% Future Conditions Contained In Channel, X: 1% Future Conditions Contained in Structure
- 1% Future Conditions Contained In Channel: Community Encroachment Area
- Zone X: Protected By Levee
- Zone D
- Open Water
- Zone X

Stream Centerlines



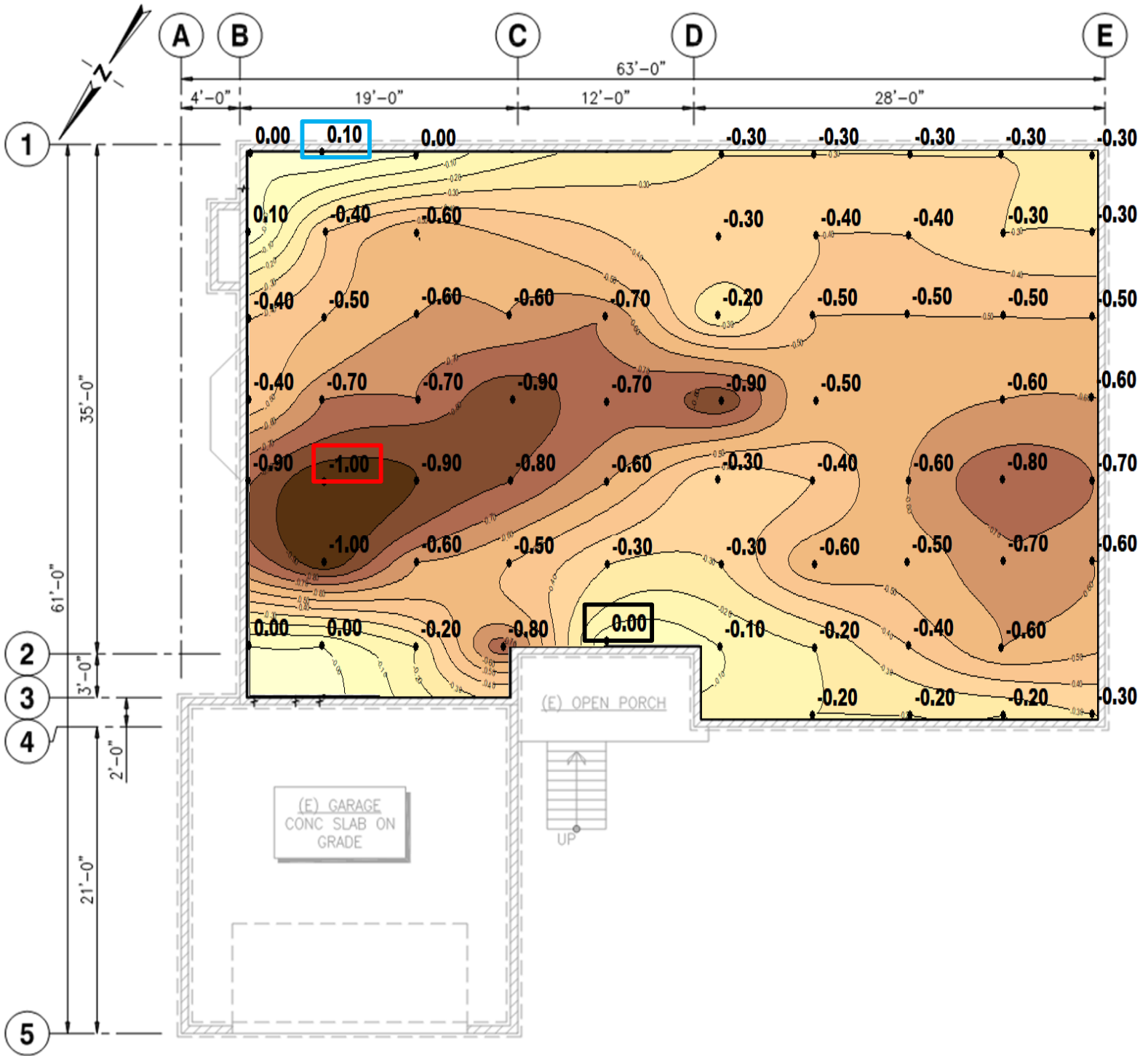
	FLOOD HAZARD MAP 303 Quail Hollow Sanford, NC 27332	Project Number: RBC23-023
		FIGURE-B



FOUNDATION LAYOUT


Project Number: RBC23-023

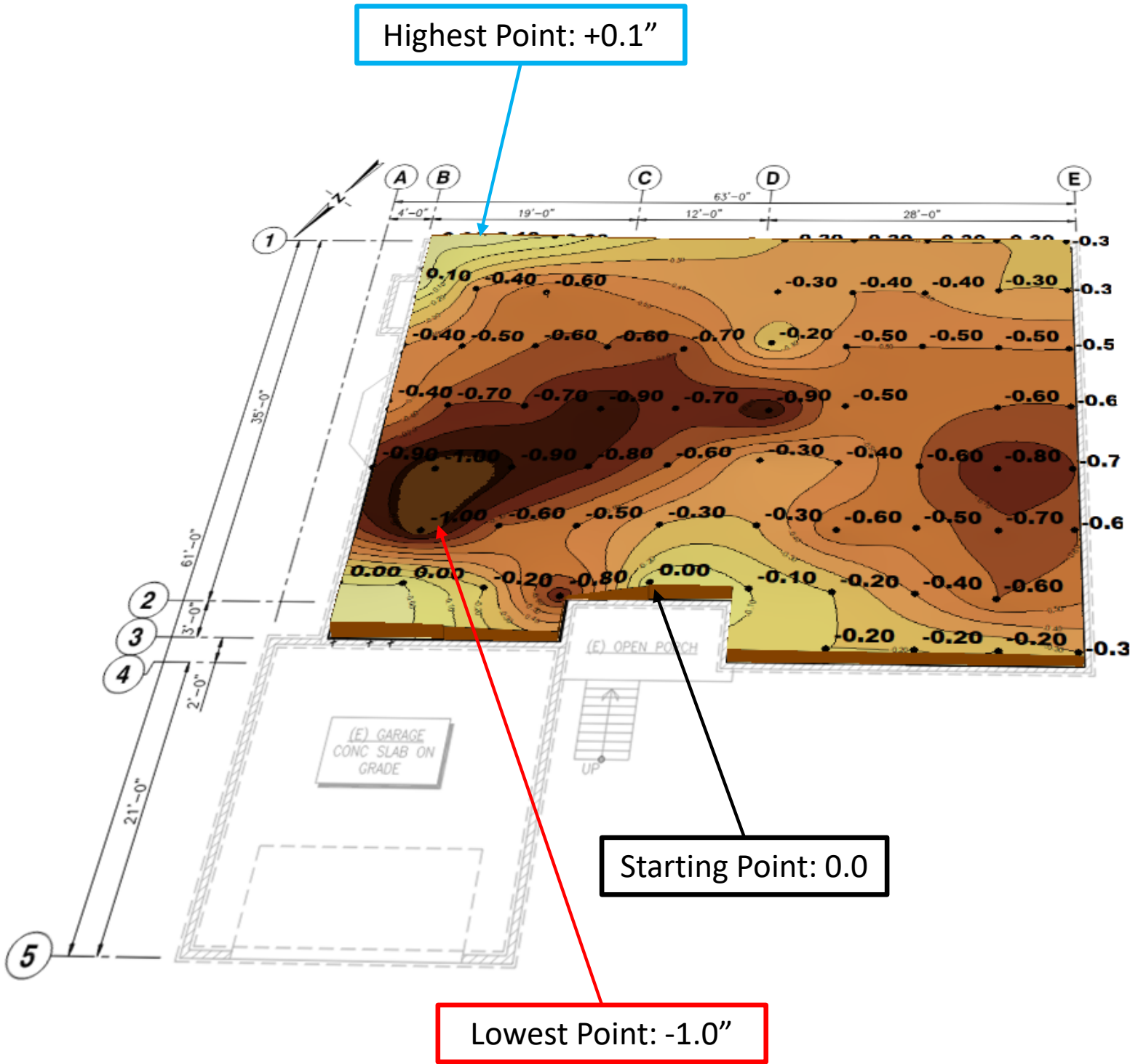
FIGURE-C



Starting Point: 0.0
 Highest Point: +0.1"
 Lowest Point: -1.0"

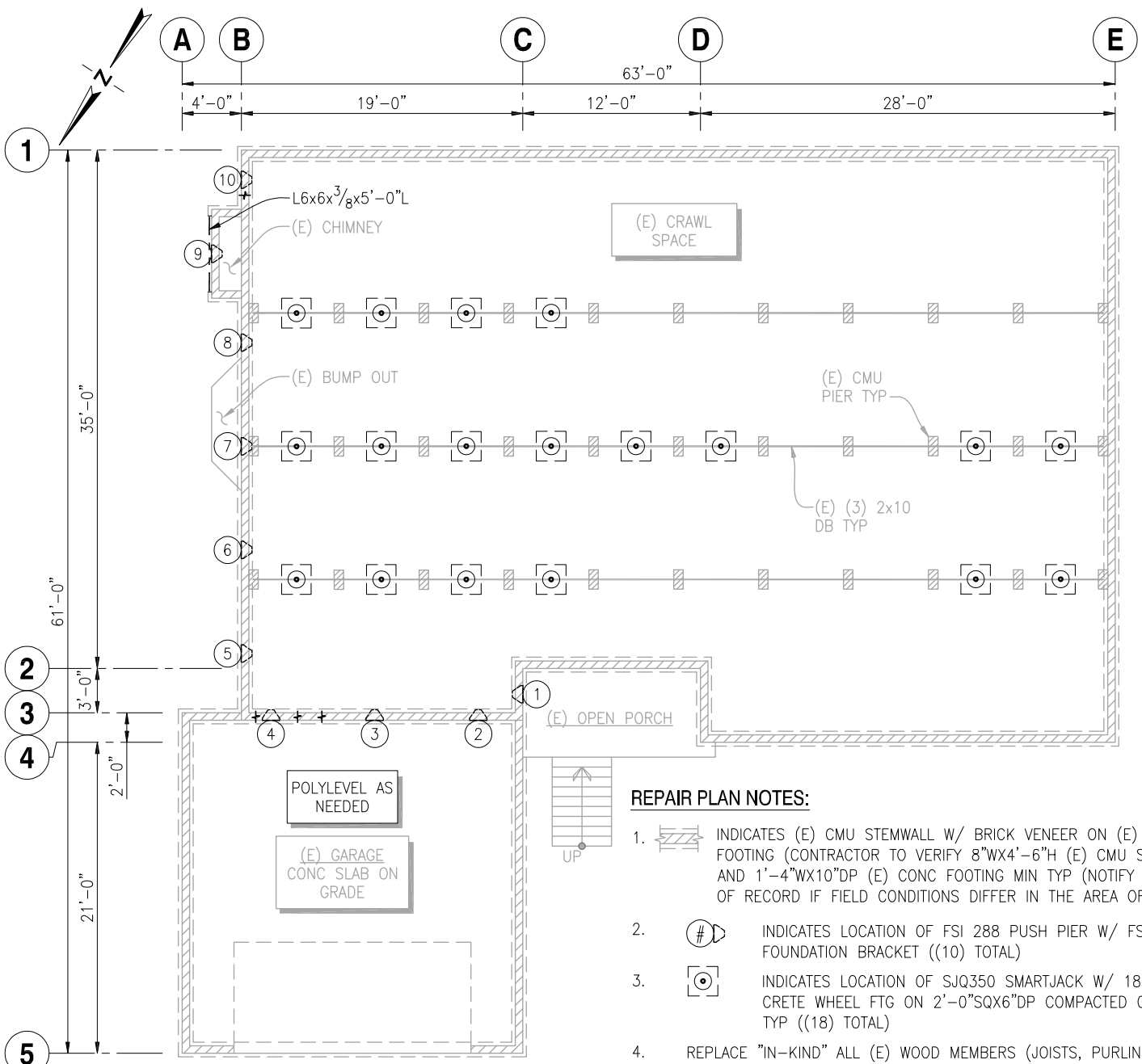
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	ZIP LEVEL MEASUREMENTS AND 2D TOPOGRAPHIC MAP	Project Number: RBC23-023
		FIGURE-D



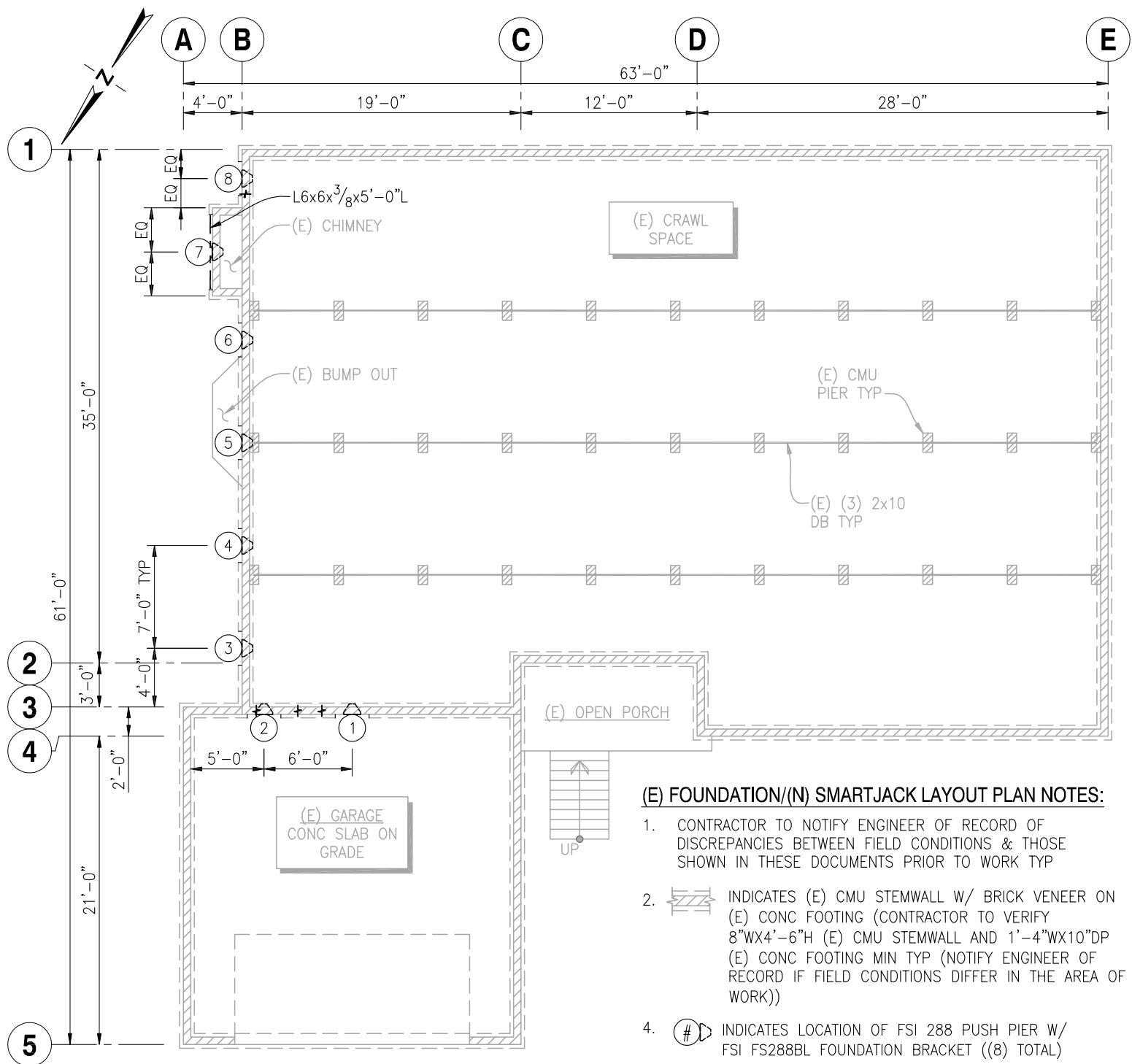
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	3D TOPOGRAPHIC MAP	Project Number: RBC23-023
		FIGURE-E





REPAIR PLAN NOTES:

1. INDICATES (E) CMU STEMWALL W/ BRICK VENEER ON (E) CONC FOOTING (CONTRACTOR TO VERIFY 8"Wx4'-6"H (E) CMU STEMWALL AND 1'-4"Wx10"DP (E) CONC FOOTING MIN TYP (NOTIFY ENGINEER OF RECORD IF FIELD CONDITIONS DIFFER IN THE AREA OF WORK))
2. INDICATES LOCATION OF FSI 288 PUSH PIER W/ FSI FS288BL FOUNDATION BRACKET ((10) TOTAL)
3. INDICATES LOCATION OF SJQ350 SMARTJACK W/ 18"SQx6"DP RBC EZ CRETE WHEEL FTG ON 2'-0"SQx6"DP COMPACTED CRUSHED STONE FILL TYP ((18) TOTAL)
4. REPLACE "IN-KIND" ALL (E) WOOD MEMBERS (JOISTS, PURLINS, SUBPURLINS, SHEATHING, STUDS, WALL PLATES) WHICH SHOW SIGNS OF DRY ROT OR STRUCTURAL DAMAGE
5. ENSURE THAT ALL STORMWATER DRAINAGE PROPERLY DISCHARGE AWAY FROM STRUCTURE
6. FILL ALL VISIBLE CRACKS IN THE FOUNDATION WALL WITH HYDRAULIC CEMENT OR EPOXY



(E) FOUNDATION/(N) SMARTJACK LAYOUT PLAN NOTES:

1. CONTRACTOR TO NOTIFY ENGINEER OF RECORD OF DISCREPANCIES BETWEEN FIELD CONDITIONS & THOSE SHOWN IN THESE DOCUMENTS PRIOR TO WORK TYP
2.  INDICATES (E) CMU STEMWALL W/ BRICK VENEER ON (E) CONC FOOTING (CONTRACTOR TO VERIFY 8"WX4'-6"H (E) CMU STEMWALL AND 1'-4"WX10"DP (E) CONC FOOTING MIN TYP (NOTIFY ENGINEER OF RECORD IF FIELD CONDITIONS DIFFER IN THE AREA OF WORK))
4.  INDICATES LOCATION OF FSI 288 PUSH PIER W/ FSI FS288BL FOUNDATION BRACKET ((8) TOTAL)

PUSH PIER INSTALLATION NOTES:

- DESIGN LOAD = 11,499 LBS
- 2.875"Ø PIPE PILE W/ 0.165" THICK WALL
- 3.5"Øx48" LONG PIPE SLEEVE W/ 0.216" WALL
- MINIMUM 10'-0" INSTALLATION DEPTH
- MINIMUM 2400 PSI INSTALLATION PRESSURE
- MINIMUM 1/4" FOUNDATION LIFT DURING INSTALLATION

5. PIERS SHALL SPACING SHALL BE AS INDICATED ON PLAN UNO
6. CONTRACTOR TO NOTIFY ENGINEER OF RECORD IF (E) FOUNDATION CRACK IS PRESENT IN THE SPAN BETWEEN FOUNDATION BRACKETS
7. ALL CONSTRUCTION MATERIALS ON PLAN ARE (N) UNO




**CONTRACTOR PROPOSED
REPAIR PLAN**


Project Number: RBC23-023

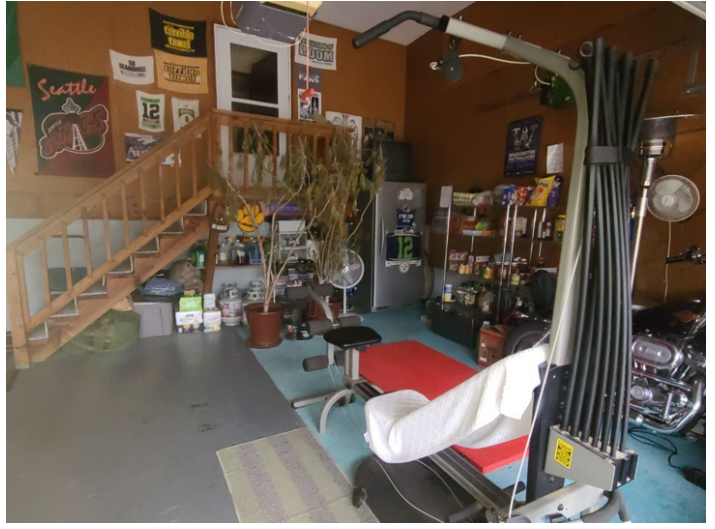
FIGURE-G




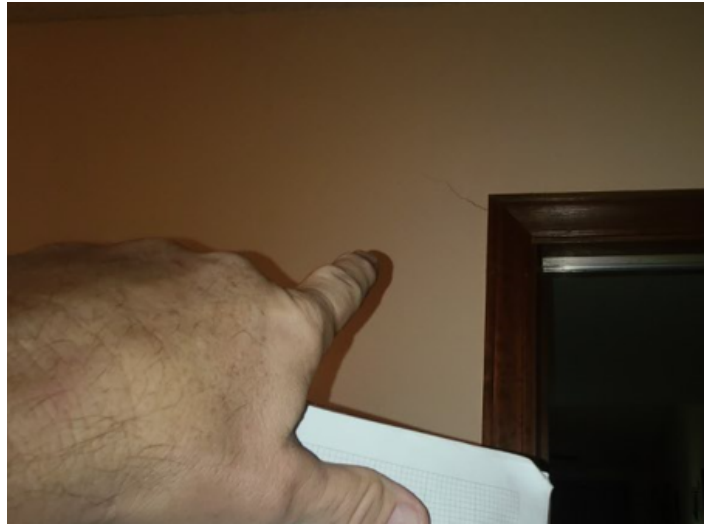
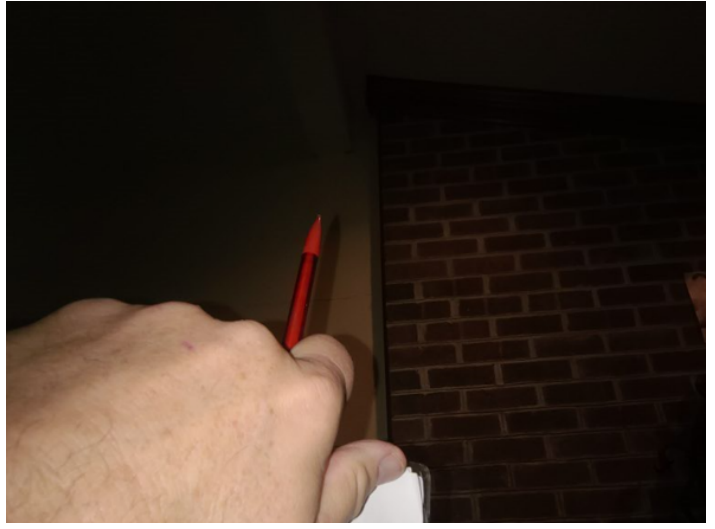
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		APPENDIX-1




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