

Maple Grove Residence 4909 E. Mercer Way Mercer Island, WA 98040 Wall Drain



DESIGNER:	
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APPROVED BY:	
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DATE:	
April 8, 2021	
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### 1. CODE REQUIREMENTS:

ALL MATERIALS, WORKMANSHIP, DESIGN, AND CONSTRUCTION SHALL CONFORM TO THE DRAWINGS, SPECIFICATIONS, THE 2015 IBC, AND THE LATEST EDITION OF THE PTI DOCUMENT, "RECOMMENDATIONS FOR PRE-STRESSED ROCK AND SOIL ANCHORS".

## 2. REFERENCE DOCUMENTS:

TOPOGRAPHIC AND BOUNDARY SURVEY INFORMATION BY SCJ STUDIO. REPORT ON GEOTECHNICAL INVESTIGATION BY EARTH SOLUTIONS NW, ES-6510 DATED 10-3-19.

## 3. GENERAL REQUIREMENTS:

CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS AND THE METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES REQUIRED TO PERFORM THE CONTRACTOR'S WORK. THE STRUCTURAL ENGINEER HAS NO OVERALL OR ACTUAL SUPERVISORY AUTHORITY AND/OR DIRECT RESPONSIBILITY FOR THE SPECIFIC WORKING CONDITIONS AT THE SITE AND/OR FOR ANY HAZARDS RESULTING FROM THE ACTIONS OF ANY TRADE CONTRACTOR. THE STRUCTURAL ENGINEER HAS NO DUTY TO INSPECT, SUPERVISE, NOTE, CORRECT, OR REPORT ANY HEALTH OR SAFETY DEFICIENCIES TO THE OWNER, CONTRACTORS, OR OTHER ENTITIES AT THE PROJECT SITE.

UTILITY LOCATION: THE SHORING CONTRACTOR SHALL DETERMINE THE HORIZONTAL AND VERTICAL LOCATION OF ALL ADJACENT UNDERGROUND UTILITIES PRIOR TO DRIVING PILES OR TIEBACK ANCHORS. THE UTILITIES INFORMATION SHOWN ON THE PLANS MAY NOT BE COMPLETE. THIS INCLUDES CALLING UTILITY LOCATE AT 1-800-424-5555 AND THEN POTHOLING ALL UTILITIES PRIOR TO CONSTRUCTION TO CONFIRM DEPTHS AND LOCATIONS AND TO VERIFY THAT THERE ARE NO CONFLICTS WITH THE PILE AND TIEBACK CROSSING ELEVATIONS. PILES AND TIEBACKS SHALL MAINTAIN A MINIMUM OF 12" CLEARANCE TO ANY EXISTING UTILITIES TO REMAIN. CONTRACTOR SHALL RESOLVE ANY PROBLEMS PRIOR TO PROCEEDING WITH CONSTRUCTION.

CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF EXISTING STRUCTURES IN THE FIELD AND SHALL NOTIFY THE ENGINEER OF ALL FIELD CHANGES PRIOR TO FABRICATION AND INSTALLATION OF ANY STRUCTURAL MEMBER.

ANY DISCREPANCIES FOUND AMONG THE DRAWINGS, THE SPECIFICATIONS, THESE GENERAL NOTES AND THE SITE CONDITIONS SHALL BE REPORTED TO THE ENGINEER AND ARCHITECT, WHO SHALL CORRECT SUCH DISCREPANCY IN WRITING. SHOULD ANY DISCREPANCIES BE FOUND IN THE PROJECT DOCUMENTS, THE CONTRACTOR WILL BE DEEMED TO HAVE INCLUDED IN THE PRICE THE MOST EXPENSIVE WAY OF COMPLETING THE WORK, UNLESS PRIOR TO SUBMISSION OF THE PRICE THE CONTRACTOR ASKS FOR A DECISION FROM THE ENGINEER AND ARCHITECT AS TO WHICH SHALL GOVERN. ANY WORK DONE BY THE GENERAL CONTRACTOR AFTER DISCOVERY OF SUCH DISCREPANCY SHALL BE DONE AT THE GENERAL CONTRACTOR'S RISK.

### 4. GEOTECHNICAL INFORMATION AND CRITERIA:

INSTALLATION OF PILES AND TIEBACKS, SUBGRADE PREPARATION INCLUDING DRAINAGE, EXCAVATION, COMPACTION AND FILLING REQUIREMENTS SHALL CONFORM WITH THE RECOMMENDATIONS CONTAINED IN THE SOILS REPORT AND/OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER. THE SUBSURFACE CHARACTERIZATIONS USED TO DESIGN THE SHORING ARE CONTAINED IN THE SOILS REPORT AS REFERENCED ABOVE.

EXCAVATIONS FOR FOUNDATIONS SHALL BE PER PLAN DOWN PER THE GEOTECHNICAL ENGINEERING RECOMMENDATIONS. OVER EXCAVATED AREAS SHALL BE BACKFILLED WITH LEAN CONCRETE OR PER GEOTECHNICAL RECOMMENDATIONS AT THE CONTRACTOR'S EXPENSE. EXCAVATION SLOPES SHALL BE SAFE AND SHALL NOT BE GREATER THAN THE LIMITS SPECIFIED BY LOCAL, STATE, AND NATIONAL SAFETY REGULATIONS. CONTRACTOR SHALL PROTECT CUT SLOPES AS NECESSARY IF CONSTRUCTION OCCURS DURING WET WEATHER, AND SHALL CONTROL AND MANAGE RUNOFF TO MINIMIZE EFFECTS ON CONSTRUCTION.

DESIGN LOADS ARE DETERMINED BY THE GEOTECHNICAL ENGINEER. THE SOIL PRESSURES INDICATED ON THE SOIL PRESSURE DIAGRAM WERE USED FOR DESIGN, IN ADDITION TO THE DEAD AND LIVE LOADS. SEE REPORT OF GEOTECHNICAL INVESTIGATION FOR MORE COMPLETE INFORMATION, INCLUDING RECOMMENDATIONS FOR PILES AND TIEBACKS IN GENERAL, MONITORING, EXCAVATION, AND DRAINAGE.

DESIGN PARAMETERS AS APPROVED BY THE GEOTECHNICAL ENGINEER ARE AS FOLLOWS:

ATERAL EARTH PRESSURES (EQUIVALENT FLUID PRESSURE) FFP ACTIVE EARTH PRESSURE (YIELDING) ACTIVE EARTH PRESSURE WITH 3' WIDTH OF GEOFOAM 15 PCF SEISMIC SURCHARGE PRESSURE (UNIFORM LOAD) 6H PSF 250 PCF/100 PCF PASSIVE EARTH PRESSURE (4:1SLOPE/2:1SLOPE) HELICAL ANCHORS: REFER SECTION ON HELICAL ANCHORS

PILE AND TIEBACK DURATION: THE PILES AND TIEBACKS ARE PERMANENT.

PILES SHALL BE GALVANIZED

## 5. SHOP DRAWINGS:

SHOP DRAWINGS ARE REQUIRED FOR THE FOLLOWING ITEMS:

PILE CAPACITY: 2IN DIAMETER SCHEDULE 80 PIPE

STRUCTURAL STEEL MISCELLANEOUS METALS HELICAL ANCHORS

CONTRACTOR SHALL ALSO COORDINATE APPROVED SHORING SUBMITTALS WITH BUILDING DEPARTMENT REQUIREMENTS.

SHOP DRAWING REVIEW: DIMENSIONS AND QUANTITIES ARE NOT REVIEWED BY THE ENGINEER OF RECORD, THEREFORE MUST BE VERIFIED BY THE CONTRACTOR. CONTRACTOR SHALL REVIEW AND STAMP DRAWINGS PRIOR TO REVIEW BY ENGINEER OF RECORD. CONTRACTOR SHALL REVIEW DRAWINGS FOR CONFORMANCE WITH THE MEANS, METHODS, TECHNIQUES, SEQUENCES AND OPERATIONS OF CONSTRUCTION, AND ALL SAFETY PRECAUTIONS AND PROGRAMS INCIDENTAL THERETO. SUBMITTALS SHALL INCLUDE A REPRODUCIBLE AND ONE COPY; REPRODUCIBLE WILL BE MARKED AND RETURNED WITHIN TWO WEEKS OF RECEIPT WITH A NOTATION INDICATING THAT THE SUBMITTAL HAS BEEN FOUND TO BE IN GENERAL CONFORMANCE WITH THE STRUCTURAL DESIGN. THE SUBMITTED ITEMS SHALL NOT BE INSTALLED UNTIL THEY HAVE BEEN APPROVED BY THE DESIGN TEAM AND/OR THE OWNER'S REPRESENTATIVE. ELECTRONIC SUBMISSIONS MAY ALSO BE DEEMED TO MEET THE SUBMITTAL REQUIREMENTS NOTED ABOVE.

SHOP DRAWING SUBMITTALS PROCESSED BY THE ENGINEER ARE NOT CHANGE ORDERS. THE PURPOSE OF SHOP DRAWING SUBMITTALS BY THE CONTRACTOR IS TO DEMONSTRATE TO THE ENGINEER THAT THE CONTRACTOR UNDERSTANDS THE DESIGN CONCEPT, BY INDICATING WHICH MATERIAL IS INTENDED TO BE FURNISHED AND INSTALLED AND BY DETAILING THE INTENDED FABRICATION AND INSTALLATION METHODS.

### 6. INSPECTIONS:

THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE ALL INSPECTIONS REQUIRED BY THE LOCAL BUILDING DEPARTMENT. IN ADDITION TO INSPECTIONS REQUIRED BY THE LOCAL BUILDING DEPARTMENT, THE OWNER OR A REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE ACTING AS THE OWNER'S AGENT SHALL EMPLOY ONE OR MORE SPECIAL INSPECTORS TO PROVIDE INSPECTIONS FOR ITEMS NOTED IN THE SPECIFICATIONS AND IBC SECTIONS 108 AND 1704. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THE DISCREPANCIES ARE NOT CORRECTED, 15. PILE TESTING THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND THE STRUCTURAL ENGINEER IMMEDIATELY AND PRIOR TO COMPLETION OF THAT PHASE OF WORK.

SOILS INSPECTION: INSPECTION BY THE SOILS ENGINEER SHALL BE PERFORMED FOR PILE PLACEMENT, EXCAVATION, AND TIEBACK PLACING AND STRESSING. THE GEOTECHNICAL ENGINEER SHALL ALSO ADVISE ON WATER CONTROL AND SLAB ON GRADE CONSTRUCTION.

PILE AND ANCHOR INSTALLATION AS WELL AS REQUIRED TESTING SHALL BE PERFORMED UNDER DIRECT AND CONTINUOUS OBSERVATION OF THE GEOTECHNICAL SPECIAL INSPECTOR.

TESTING AND SPECIAL INSPECTION REPORTS ARE TO BE DISTRIBUTED TO THE ARCHITECT, OWNER, BUILDING DEPARTMENT AND STRUCTURAL ENGINEER WITHIN TWO WEEKS OF COMPLETION OF EACH PHASE OF WORK UNLESS DISCREPANCIES ARE NOT CORRECTED AS NOTED ABOVE.

THE FOLLOWING ITEMS REQUIRE SPECIAL INSPECTIONS:

TYPE OF INSPECTION CONSTRUCTION TYPE

PER TABLE 1704.4 CONCRETE CONSTRUCTION STRUCTURAL STEEL FABRICATION AND ERECTION PER TABLE 1704.3 DRIVEN PILE INSTALLATION CONTINUOUS

TIEBACK CONSTRUCTION **CONTINUOUS** EXCAVATION AND GRADING PERIODIC

PERIODIC INSPECTION ALLOWS INSPECTION AT INTERVALS NECESSARY TO CONFIRM THAT WORK REQUIRING SPECIAL INSPECTION IS IN COMPLIANCE WITH REQUIREMENTS. CONTINUOUS SPECIAL INSPECTION REQUIRES THAT THE INSPECTOR BE ONSITE AT ALL TIMES THAT WORK REQUIRING SPECIAL INSPECTION IS PERFORMED.

CONCRETE CONSTRUCTION SHALL CONFORM TO ALL REQUIREMENTS OF IBC CHAPTER 19 AND THE ACI STANDARD 318-02 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE".

CONCRETE SHALL BE MIXED, PROPORTIONED, CONVEYED AND PLACED IN ACCORDANCE WITH ACI 301, INCLUDING TESTING PROCEDURES. CONCRETE SHALL ATTAIN A 28-DAY STRENGTH OF fc = 3,000 PSI AND MIX SHALL CONTAIN NOT LESS THAN 5-1/2 SACKS OF CEMENT PER CUBIC YARD AND SHALL BE PROPORTIONED TO PRODUCE A SLUMP OF 5" OR LESS. REQUIRED CONCRETE STRENGTH IS BASED ON THE DURABILITY REQUIREMENTS OF IBC SECTION 1904. DESIGN STRENGTH IS fc = 2,500 PSI.

8. **REINFORCING STEEL** SHALL CONFORM TO ASTM A615, GRADE 60, FY = 60,000 PSI.

STEEL SPECIFICATIONS: DESIGN, FABRICATION AND ERECTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE AISC MANUAL, AISC 360 AND IBC SECTION 2205.

STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

ASTM SPECIFICATION Fy TYPE OF MEMBER

OTHER SHAPES, PLATES, AND RODS A36 PIPE COLUMNS A53 (E OR S, GR.B) 35 KSI **CONNECTION BOLTS** A307

ALL WELDING SHALL BE IN CONFORMANCE WITH A.I.S.C. AND A.W.S. STANDARDS AND SHALL BE PERFORMED BY W.A.B.O CERTIFIED WELDERS USING E70 XX ELECTRODES. ONLY PREQUALIFIED WELDS (AS DEFINED BY A.W.S.) SHALL BE USED. ALL COMPLETE JOINT PENETRATION GROOVE WELDS SHALL BE MADE WITH A FILLER MATERIAL THAT HAS A MINIMUM CVN TOUGHNESS OF 20 FT-LBS AT 20 DEGREES F AND 40 FT-LBS AT 70 DEGREES F, AS DETERMINED BY AWS CLASSIFICATION OR MANUFACTURER CERTIFICATION.

## 10. HELICAL ANCHORS:

HELICAL ANCHORS REMOVED FROM PLANS

## 11. PROOF TESTS:

ALL ANCHORS NOT PERFORMANCE TESTED SHALL BE INSTALLED TO 200 PERCENT OF THE DESIGN LOAD AS PERFORMED BY THE TORQUE METHOD WHEN APPROVED BY THE STRUCTURAL AND GEOTECHNICAL ENGINEERS.

# 12. TORQUE METHOD INSTALLATION:

ANCHORS INSTALLED BY THE TORQUE METHOD MUST FIRST MEET THE EMBEDMENT REQUIREMENTS NOTED ON THE STRUCTURAL DRAWINGS OR APPROVED BY BOTH THE STRUCTURAL AND GEOTECHNICAL ENGINEER IN WRITING. ONCE THE REQUIRED MINIMUM EMBEDMENT HAS BEEN MET, THE CONTRACTOR SHALL PROVIDE GAUGES OR SHEAR BOLTS TO DETERMINE THAT THE ANCHOR HAS BEEN TORQUED TO A MINIMUM OF 200 PERCENT OF THE DESIGN LOAD BASED ON THE EMPIRICAL RELATIONSHIP THAT THE 200 PERCENT LOAD MEASURED IN POUNDS IS APPROXIMATELY EQUAL TO 10 TIMES THE INSTALLATION TORQUE AS MEASURED IN FOOT POUNDS. THE CONTRACTOR SHALL BE PREPARED TO PROVIDE EXTENSIONS TO ADVANCE HELICALS DEEPER INTO THE SOILS UNTIL THE REQUIRED INSTALLATION TORQUE HAS BEEN MET. INSTALLATION SHALL BE CONDUCTED UNDER THE OBSERVATION OF THE GEOTECHNICAL SPECIAL INSPECTOR.

## 13. PIN PILES:

PIN PILES SHOWN ON THE PLAN SHALL BE 2" DIAMETER SCHEDULE 80 AND GALVANIZED. THE MAXIMUM CAPACITY OF 2" PILES SHALL BE 3 TONS. ALL PILES SHALL BE DRIVEN TO REFUSAL IN ACCORDANCE WITH THE GEOTECHNICAL REPORT. AS A MINIMUM, PILE REFUSAL SHALL BE DEFINED AS 1 INCH OF PENETRATION IN 60 SECONDS DURING CONTINUOUS DRIVING OF A 90 LB JACK HAMMER UNDER THE FULL WEIGHT AND EFFORT OF THE OPERATOR OR THE CONVENTIONAL DRIVING OF A RHINO PD-140. PILES SHALL HAVE THE ADDITIONAL REQUIREMENT OF BEING EMBEDDED A MINIMUM OF 10 FEET BELOW RETAINED GRADE. THE MAXIMUM PILE ECCENTRICITY SHALL BE 2 INCHES. GEOTECHNICAL SPECIAL INSPECTION IS REQUIRED. TRUE DEPTH OF REFUSAL IS UNKNOWN. IF SHALLOW, PILES TO BE DRILLED, NOT DRIVEN.

### 14. ANCHORAGE

EXPANSION BOLTS INTO CONCRETE SHALL BE "STRONG-BOLT 2" WEDGE ANCHORS AS MANUFACTURED BY THE SIMPSON STRONG TIE COMPANY AND INSTALLED IN STRICT CONFORMANCE TO ICC-ES REPORT NUMBER ESR-3037. PERIODIC SPECIAL INSPECTION IS REQUIRED TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, ANCHOR LOCATION, TIGHTENING TORQUE, HOLE DIMENSIONS, ANCHOR EMBEDMENT, AND ADHERENCE TO THE INSTALLATION INSTRUCTIONS.

LOAD TESTS TO 200 PERCENT OF THE DESIGN CAPACITY ARE REQUIRED TO SUBSTANTIATE THE ALLOWABLE PILE LOAD. THE APPROPRIATE NUMBER OF LOAD TEST SHALL BE DETERMINED BY THE GEOTECHNICAL ENGINEER AT THE TIME THE CONTRACTOR AND INSTALLATION METHOD ARE CHOSEN. AS A MINIMUM, LOAD TESTS SHALL BE REQUIRED ON AT LEAST 3 PERCENT OF ALL PILES INSTALLED AT THE SITE, WITH A MINIMUM OF FIVE TESTS. ALL TESTS MUST CONFORM TO THE QUICKLOAD TEST METHOD ACCORDING TO THE AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) D-1143.

DETAILING OF REINFORCING STEEL (INCLUDING HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH ACI 315-99 AND 318-11. LAP ALL CONTINUOUS REINFORCEMENT 2'-0" MINIMUM. PROVIDE CORNER BARS AT ALL WALL AND FOOTING INTERSECTIONS AND LAP 2'-0" MINIMUM.

#### 16. DRIVEN PILE RECOMMENDATIONS

DUE TO THE PROXIMITY OF ADJACENT LOTS AND STRUCTURES, THE PILE INSTALLATION MONITORING PROGRAM SHOULD CONSIST OF OPTICAL SURVEYING DURING DRIVEN PILE INSTALLATION. A VIDEO SURVEY SHOULD BE PERFORMED PRIOR TO BEGINNING THE EXCAVATION TO DOCUMENT THE CURRENT CONDITIONS OF THE SURROUNDING FEATURES. INITIAL SURVEY POINTS SHOULD BE PLACED AT STRATEGIC LOCATIONS ALONG ADJACENT LOT ALIGNMENTS AND BUILDINGS THAT WILL ALLOW FOR PERIODIC MEASUREMENTS DURING AND AFTER DRIVEN PILE INSTALLATION. SUCH STRATEGIC PLACEMENT WILL ALLOW FOR EFFICIENT MONITORING OF THE SITE: EXCESSIVE DEFLECTIONS AND/OR EXCAVATION-RELATED MOVEMENTS CAN BE IDENTIFIED AND REMEDIATED, SHOULD THEY OCCUR.

VIBRATION MONITORING EQUIPMENT AND PLANS SHOULD ALSO BE ESTABLISHED PRIOR TO BEGINNING THE EXCAVATION AND DRIVEN PILE INSTALLATION, DUE TO THE PROXIMITY OF ADJACENT LOTS AND STRUCTURES. ESNW CAN FACILITATE COMPLETION OF A VIBRATION MONITORING PROGRAM, UPON REQUEST.

FOLLOWING INSTALLATION OF THE DRIVEN PILES, MONITORING POINTS SHOULD BE ESTABLISHED ON THE TOP OF EVERY THIRD PILE PRIOR TO PROCEEDING WITH THE EXCAVATION. INITIAL BASELINE READINGS OF THE SURVEY POINTS SHOULD BE ACQUIRED PRIOR TO PROCEEDING WITH THE EXCAVATION. READINGS SHOULD BE ACQUIRED TWICE WEEKLY DURING THE EXCAVATION PHASE OF CONSTRUCTION. READINGS MAY BE REDUCED TO ONCE WEEKLY AFTER THE EXCAVATION HAS BEEN COMPLETED AND IF THE MONITORING DATA INDICATES THE WALL SYSTEM IS STABLE. ESNW SHOULD REVIEW THE OPTICAL SURVEY DATA AS IT BECOMES AVAILABLE DURING CONSTRUCTION. THE MONITORING PROGRAM SHOULD BE SUPPLEMENTED WITH PERIODIC OBSERVATIONS BY ESNW REPRESENTATIVES DURING THE EXCAVATION PHASE OF CONSTRUCTION.

AN ESNW REPRESENTATIVE SHOULD OBSERVE TEMPORARY EXCAVATIONS TO VERIFY ADJACENT IMPROVEMENTS ARE NOT ADVERSELY AFFECTED. ESNW SHOULD ALSO OBSERVE INSTALLATION OF THE SHORING SYSTEM TO VERIFY ADEQUATE SOIL CONDITIONS, INSTALLATION METHODS, AND PIPE PILE REFUSAL.

IF MODIFIED INSTALLATION METHODS AND/OR EQUIPMENT ARE USED DURING CONSTRUCTION, ESNW SHOULD BE NOTIFIED TO REVIEW THESE RECOMMENDATIONS. TYPICALLY, PILES ARE ALTERNATIVELY DRIVEN WITH RESPECT TO OTHER PILES IN A ROW, SO THAT THE TEMPORARY LOSS OF SOIL STRENGTH DURING INSTALLATION, WHICH MAY AFFECT SUBSEQUENT PILE INSTALLATIONS, WILL BE MINIMAL. AN ESNW REPRESENTATIVE SHOULD OBSERVE THE PIPE PILE INSTALLATIONS TO VERIFY ACHIEVEMENT OF ADEQUATE REFUSAL CRITERIA.

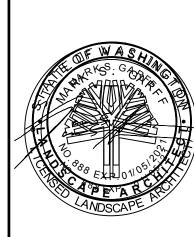
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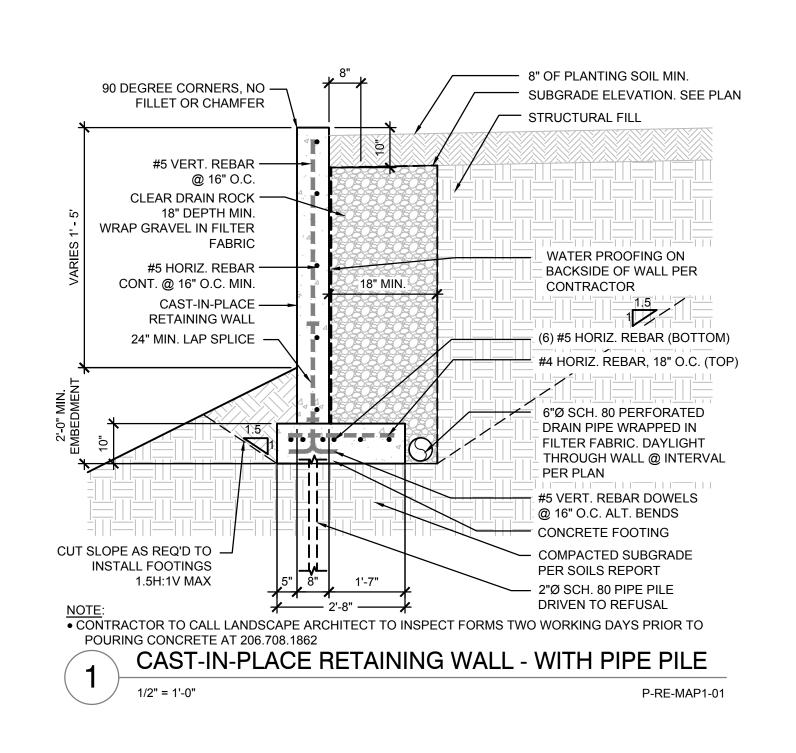


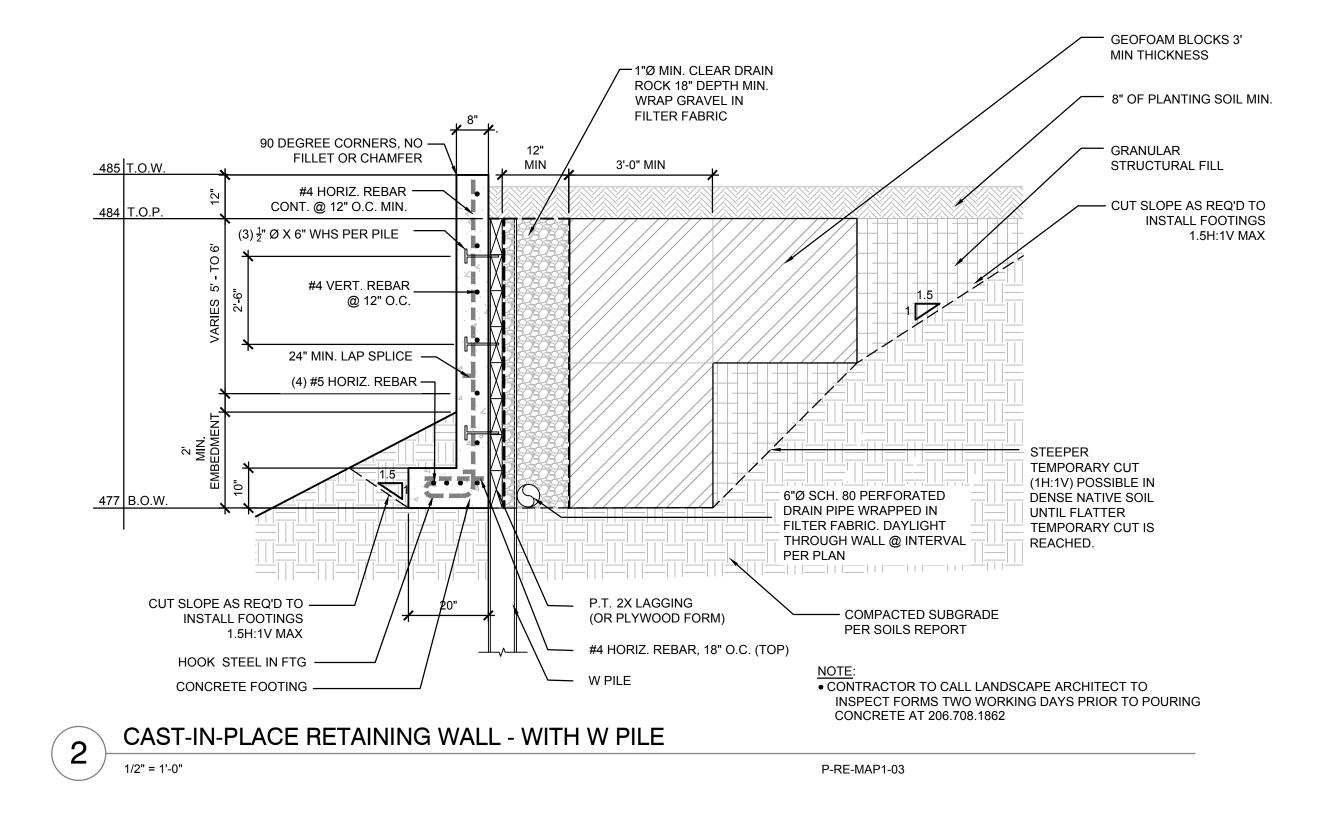
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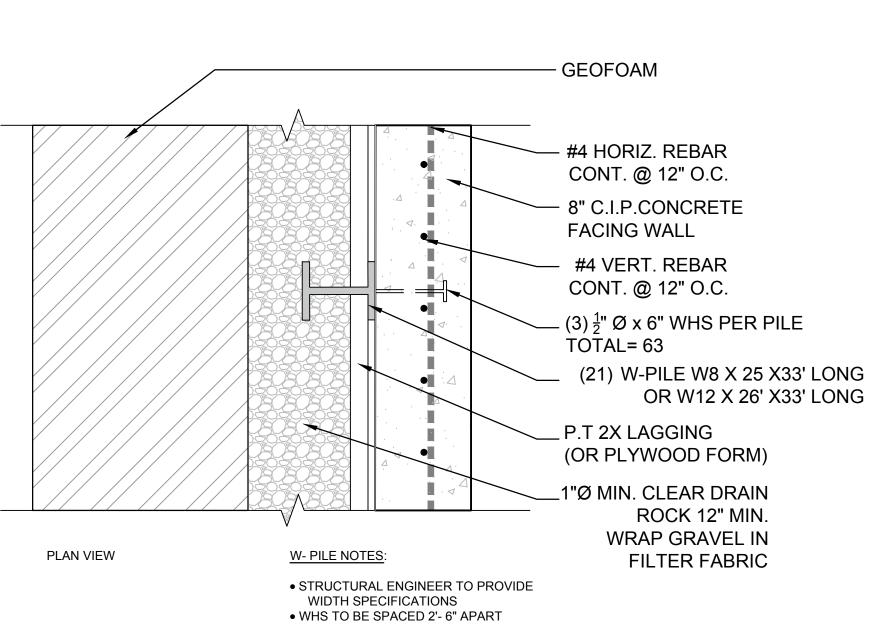
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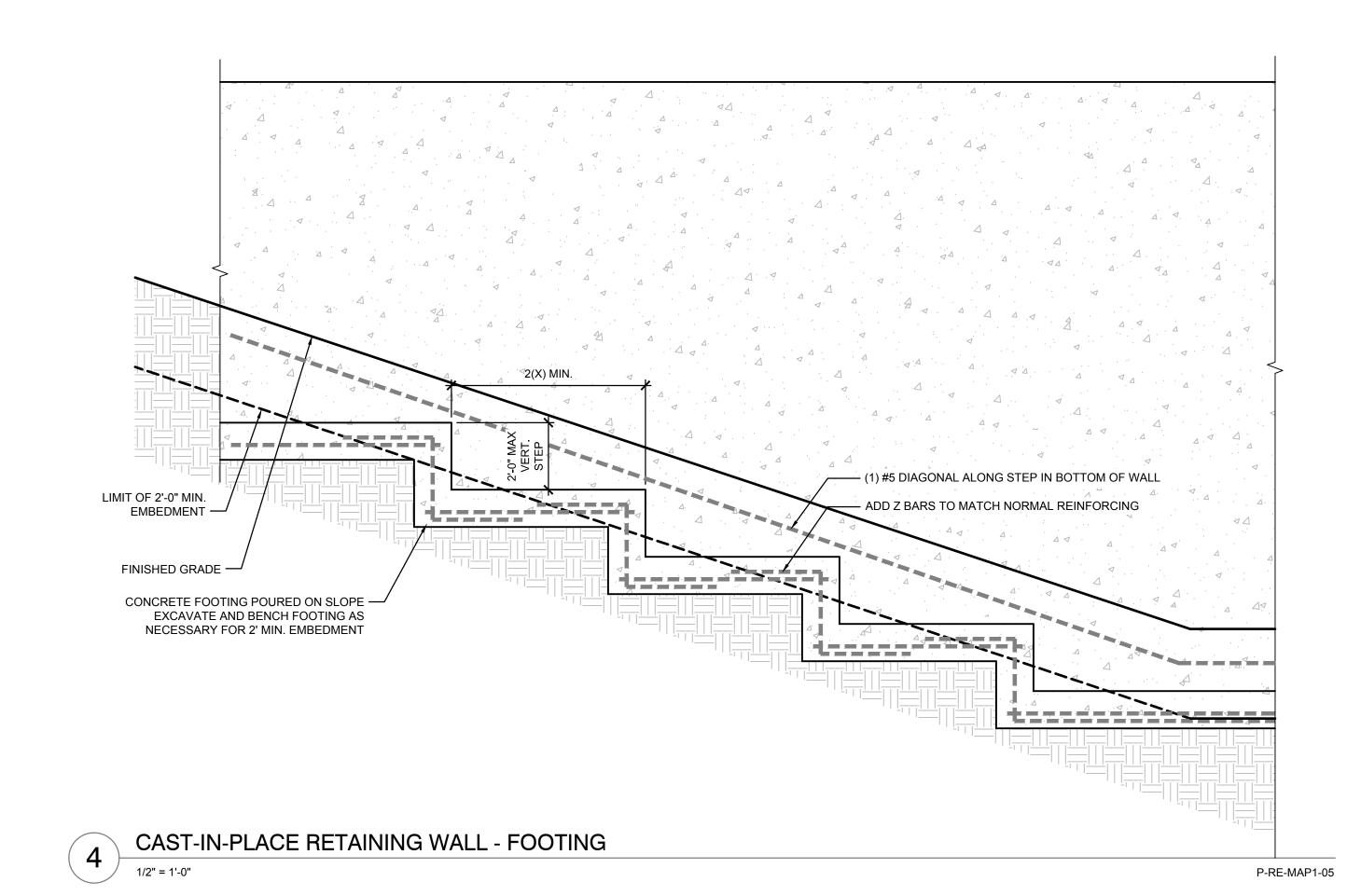
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W-PILE SHORING DETAIL

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