

CASCADE SUBDIVISION ROCKFALL MITIGATION SITE PLAN

SCALE 1"=20'

REVISIONS	
DATE	BY

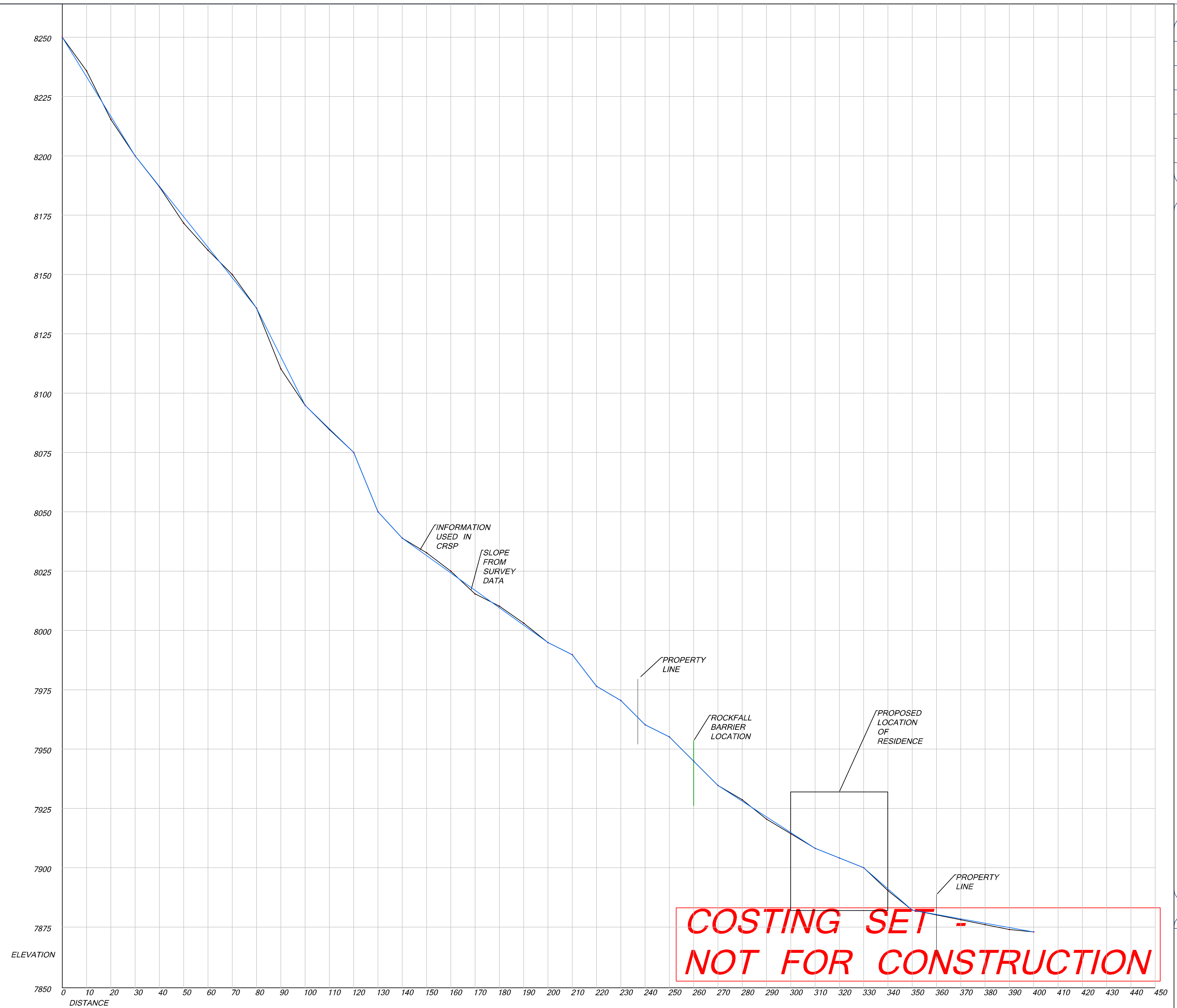
ALPINE EDGE ENGINEERING LLC  
MATTHEW D. HEPP, P.E.  
605 RIVER PARK DR  
RIDGWAY, CO 81432  
970-318-1469

BERG ROCKFALL MITIGATION  
LOT A CASCADE SUBDIVISION  
CITY OF OURAY, COLORADO

MARCH 14, 2024

S1





SITE PROFILE ALONG ANALYZED ROCK FALL LINE

SCALE 1"=20'

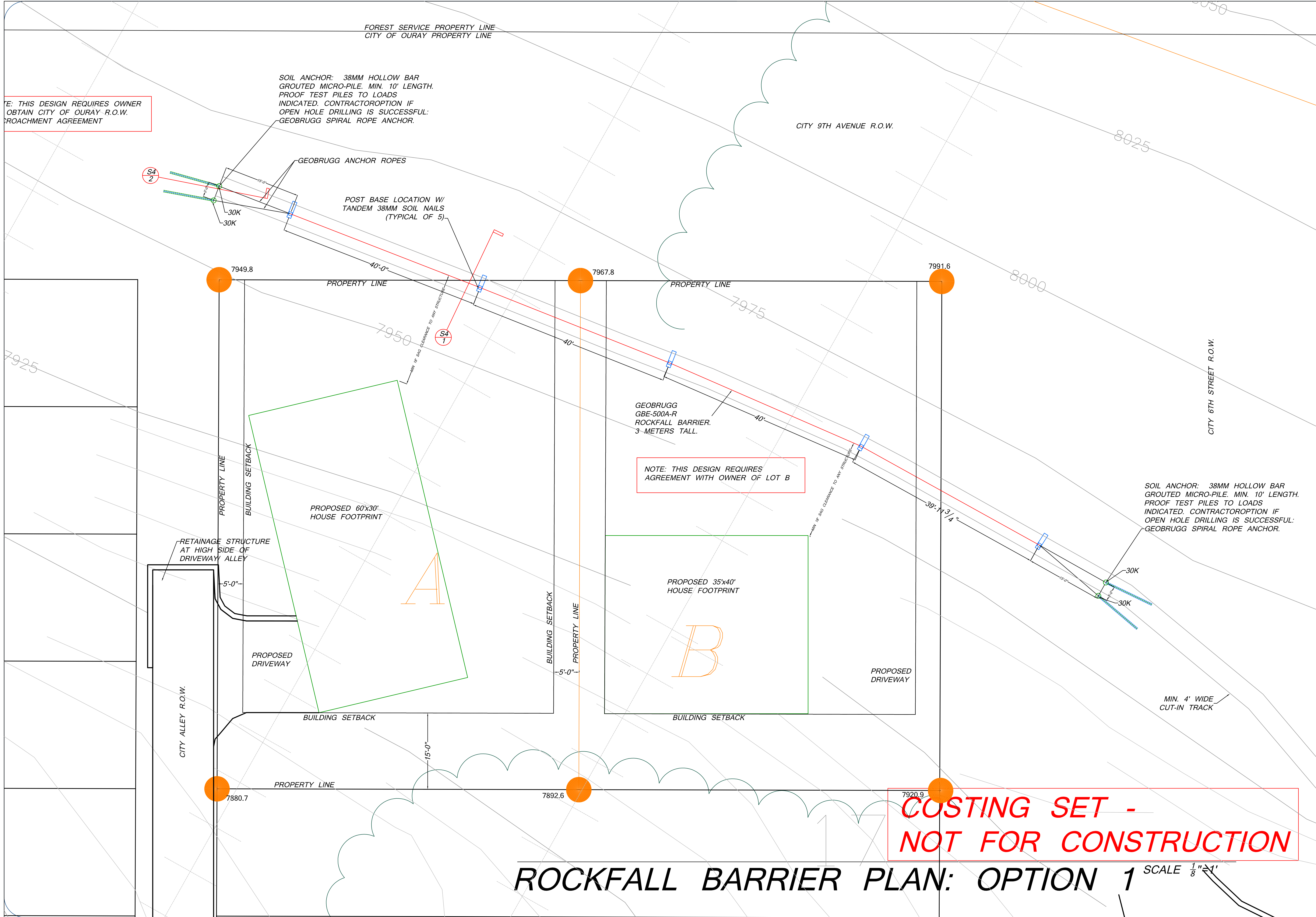
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NOTE: THIS DESIGN REQUIRES OWNER OBTAIN CITY OF OURAY R.O.W. ENCROACHMENT AGREEMENT

SOIL ANCHOR: 38MM HOLLOW BAR GROUTED MICRO-PILE, MIN. 10' LENGTH. PROOF TEST PILES TO LOADS INDICATED. CONTRACTOR OPTION IF OPEN HOLE DRILLING IS SUCCESSFUL: GEOBRUGG SPIRAL ROPE ANCHOR.

GEOBRUGG ANCHOR ROPES

POST BASE LOCATION W/ TANDEM 38MM SOIL NAILS (TYPICAL OF 5)

CITY 9TH AVENUE R.O.W.

8000

CITY 6TH STREET R.O.W.

GEOBRUGG GBE-500A-R ROCKFALL BARRIER. 3-METERS TALL.

NOTE: THIS DESIGN REQUIRES AGREEMENT WITH OWNER OF LOT B

PROPOSED 60'x30' HOUSE FOOTPRINT

PROPOSED 35'x40' HOUSE FOOTPRINT

SOIL ANCHOR: 38MM HOLLOW BAR GROUTED MICRO-PILE, MIN. 10' LENGTH. PROOF TEST PILES TO LOADS INDICATED. CONTRACTOR OPTION IF OPEN HOLE DRILLING IS SUCCESSFUL: GEOBRUGG SPIRAL ROPE ANCHOR.

MIN. 4' WIDE CUT-IN TRACK

COSTING SET - NOT FOR CONSTRUCTION

ROCKFALL BARRIER PLAN: OPTION 1 SCALE 1/8"=1'

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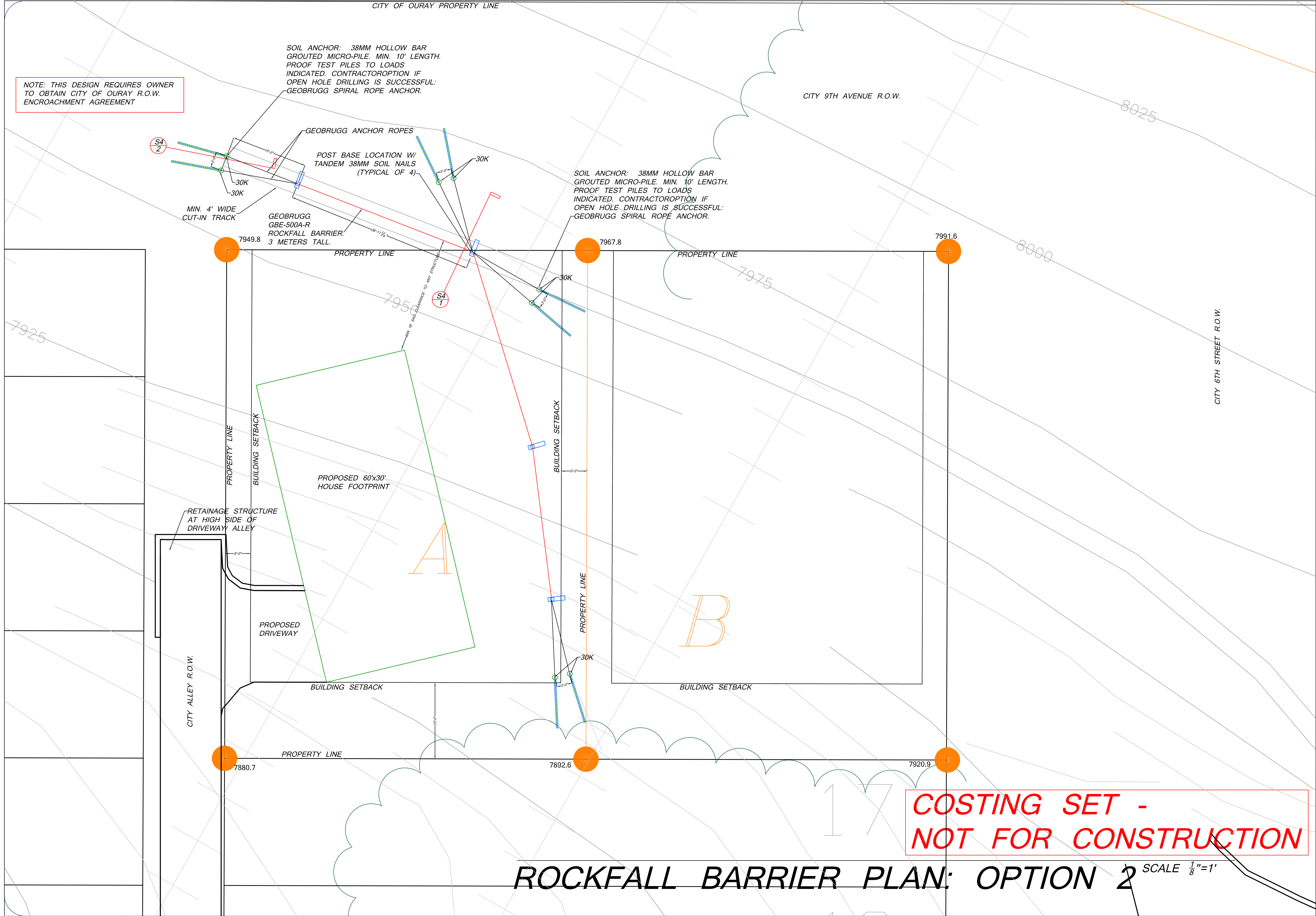
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S3





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Release and Indemnity Agreement

(owner) has engaged Alpine Edge Engineering, LLC, (engineer), to design a rock-fall mitigation plan to be used by owner in connection with owner's application with the City of Ouray, Colorado for permitting to construct a residence on real property located in the City of Ouray, and more specifically described on exhibit A hereto.

In designing the rock-fall mitigation plan engineer will use best engineering practices, with special consideration for human health and safety. Engineer agrees to design the plan based on his assumption that owner shall implement the plan with the most technologically advanced equipment available, and shall, in constructing improvements, using and maintaining the property, adhere strictly to all plan recommendations.

Owner has been specifically informed and understands that the property lies in an area which features special, hazardous geologic conditions. Owner is aware that natural rock fall has often occurred and will likely occur on the property in the future. Owner has been advised to obtain a geologic hazards assessment report evaluating and predicting the impact of hazardous geologic conditions, e.g., rock fall, on the property. Owner has either obtained such an assessment, or has knowingly elected to forego such assessment.

Owner understands that, given the natural geologic hazards existing on the property, even best engineering practices and design cannot completely eliminate the risk that rock fall on or near the property may at some future time cause both (a) property damage to structures, fixtures, landscape features and other improvements attached to the property and personal property located on or near the property, and (b) personal injury – possibly severe or fatal – to persons entering on or near the property. Owner has been advised that, to minimize impact from rock fall on the property, he should, in addition to following the recommendations of the rock fall mitigation, plan, have all homes, structures and other improvements installed on the property designed by a qualified engineer.

In light of special geologic hazards existing on the property, owner agrees that, to the fullest extent permitted by law, owner shall indemnify, hold harmless, and defend engineer, its shareholders, officers, directors, agents, and employees from and against any and all claims, demands, injuries, losses, expenses (including attorney fees), damages, and liability of every and any nature, to person or property, whether based on engineer's own active or passive negligence, gross negligence, strict liability, breach of warranty, or any other cause or theory of liability, whether arising from or in any way related to any rock fall, earth movement or similar geologic event occurring on the property, or the rock fall mitigation plan.

Owner has fully read and understands this Agreement and all of its terms. Owner understands that this agreement may affect his potential claims against engineer for damages in the event of personal injury or property damage arising from or relating to rock-fall and similar geologic events on the property. Owner nevertheless enters into this Agreement freely and voluntarily, and agrees that it shall bind owner, his heirs, assigns, and legal representatives. Owner further agrees that this agreement may be recorded in the public records for the County of Ouray, State of Colorado, and that any deed, plat map or other instrument evidencing, conveying or affecting title to the property shall contain a reference to this agreement.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

ALPINE EDGE ENGINEERING, LLC

By: Matt Hepp, P.E., Member/Manager

Owner

NOTES

DESIGN CRITERIA:

ROCKFALL MITIGATION DESIGN PER CDOT COLORADO ROCKFALL SIMULATION PROGRAM ASSUMED WORST CASE: 5' DIAMETER BOULDER STARTING ZONE AT 8250' ELEVATION.

GENERAL:

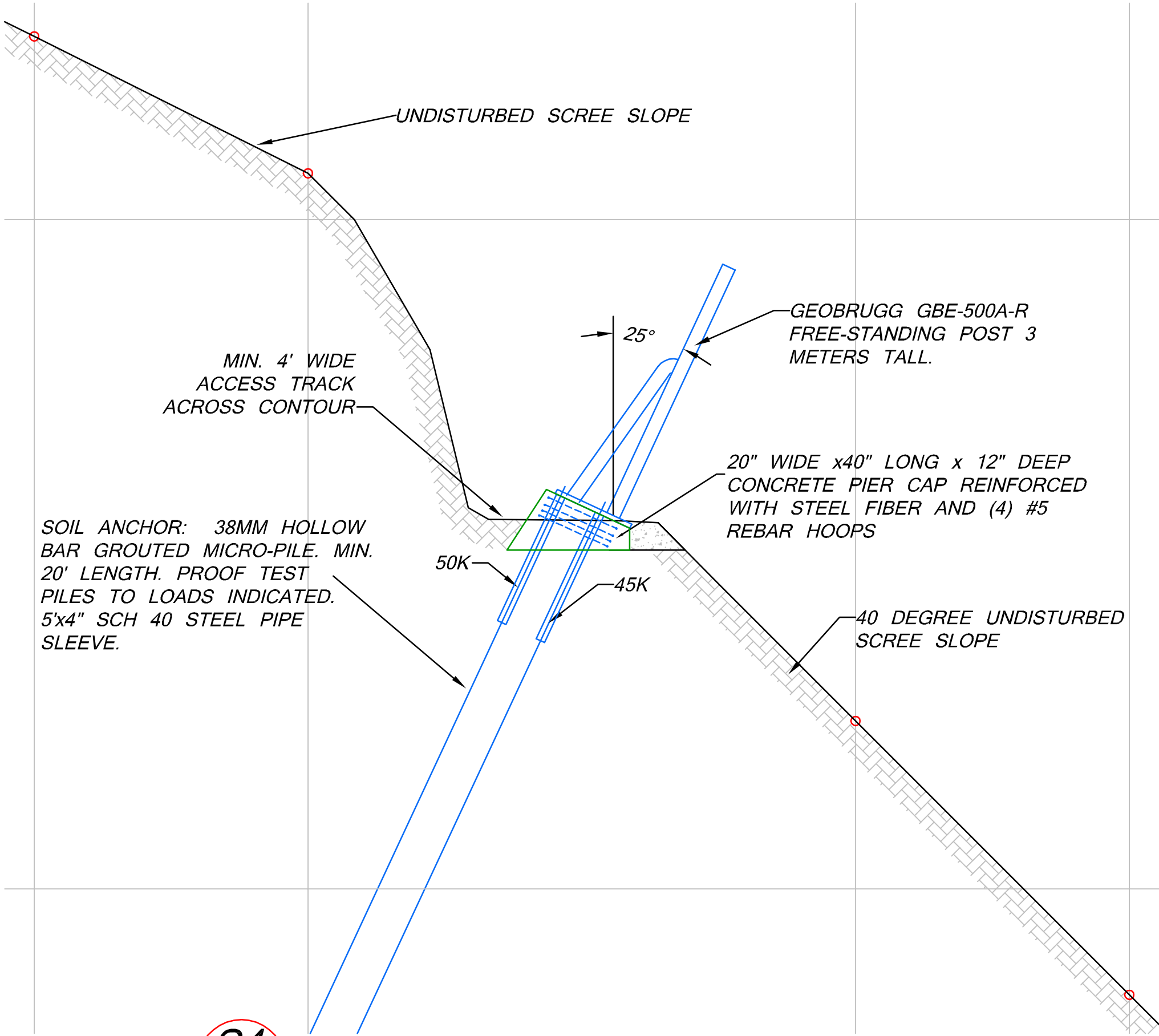
1. THIS ROCKFALL MITIGATION PLAN EXPLICITLY APPLIES TO ONLY LOT A CASCADE SUBDIVISION. THIS PLAN IS INTENED AS A FIRST LINE OF DEFENSE FOR ROCKFALL MITIGATION FOR THESE RESIDENTIAL LOTS ONLY. BY USE OF THIS PLAN THE OWNERS AGREE TO DESIGN THE PROPOSED RESIDENCES TO ABSORB A 2000KJ ROCKFALL IMPACT.
2. THIS PLAN IS NOT INTENDED TO PROVIDE COMPREHENSIVE PROTECTION TO ANY PORTION OF CITY RIGHT OF WAY, SPECIFICALLY FOR 6TH STREET ROW AND THE ALLEY ROW BETWEEN 6TH AND 5TH STREETS.
3. INSTALL GEOBRUGG GBE-500A-R ROCKFALL BARRIER ACCORDING TO MANUFACTURER SPECIFICATIONS AND RECOMMENDATIONS.

CONCRETE:

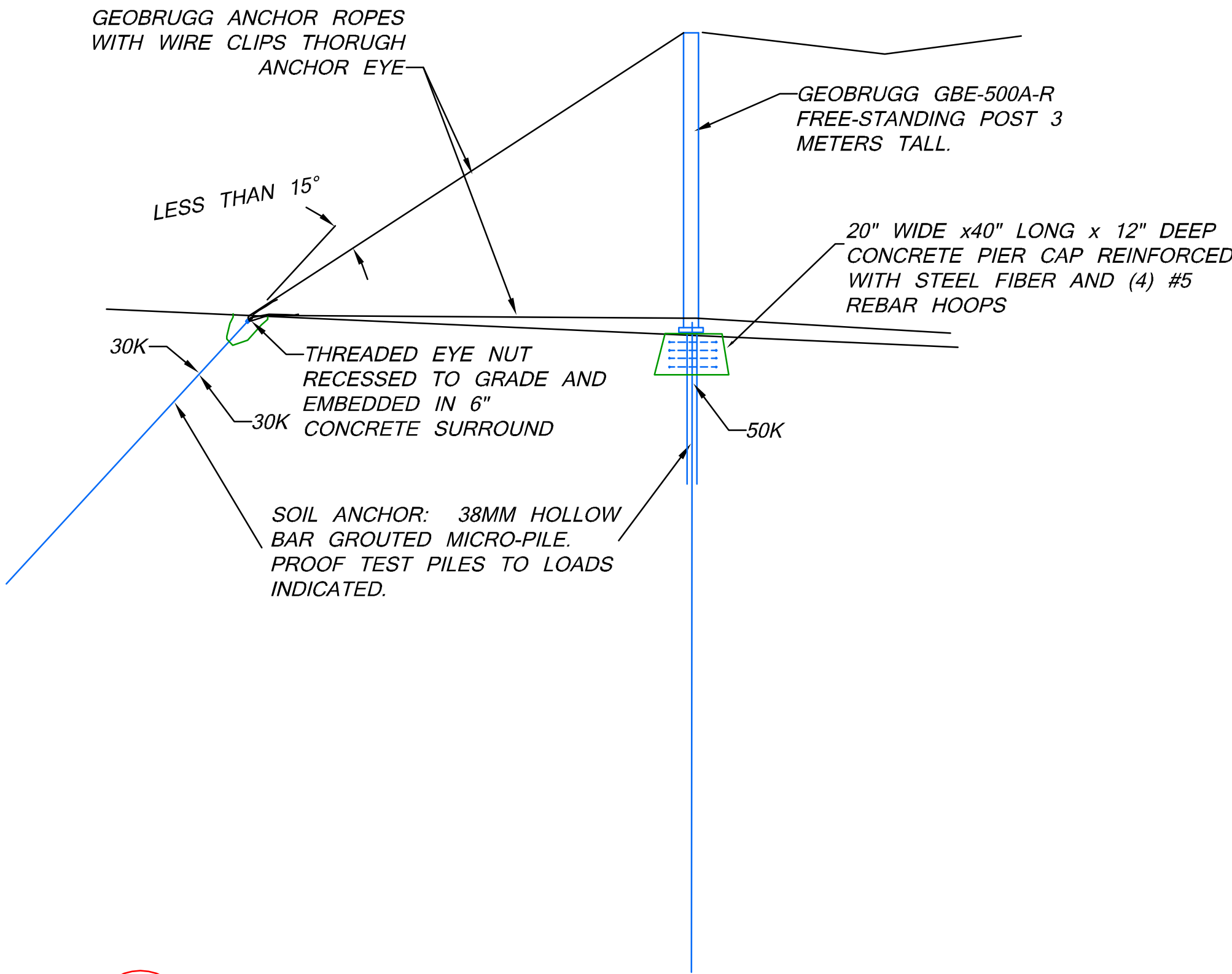
1. ALL CONCRETE SHALL DEVELOP 3500 PSI COMPRESSIVE STRENGTH AT 28 DAYS FROM POUR.
2. ALL CONCRETE SHALL USE TYPE II PORTLAND CEMENT. FLY ASH SUBSTITUTION IS PERMITTED PER APPROVAL OF ENGINEER.
3. ALL REINFORCING SHALL CONFORM TO ASTM A615, GRADE 60, EXCEPT COLUMN TIES, STIRRUPS, AND #3 BARS MAY BE GRADE 40. REINFORCING SHALL BE FREE OF DIRT, RUST, OR ANY OTHER MATERIAL WHICH MIGHT INHIBIT ITS BOND TO CONCRETE.
4. LAP SPLICES SHALL BE A MINIMUM OF 36 BAR DIAMETERS. MAKE ALL BARS CONTINUOUS AROUND CORNERS.
5. DETAIL BARS IN ACCORDANCE WITH A.C.I. BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE.
6. REINFORCEMENT PROTECTION SHALL BE AS FOLLOWS:  
FORMED CONCRETE EXPOSED TO EARTH-----3"
7. ALL CONSTRUCTION JOINTS SHALL BE APPROVED PER ENGINEER.
8. SAW CUT ALL SLABS AT MAXIMUM 10 FEET O.C. E.W.
9. ALL CONCRETE FOOTING AND WALL POURS SHALL BE MECHANICALLY VIBRATED.

FOUNDATION:

1. SOIL ANCHORS SHALL BE MIN. 38MM HOLLOW BAR CONTINUOUSLY GROUTED MICRO PILES WITH 3.5" BIT. SEE PLAN FOR SPECIFIC WORKING LOADS. U.N.O. MINIMUM PILE LENGTH SHALL BE 10 FEET. PILE CONTRACTOR SHALL PROOF PULL MIN. 50% PILES AFTER INSTALLATION.
2. OWNER/CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO PLACEMENT OF PILES.
3. THE FOUNDATION SHALL BEAR ON NATIVE UNDISTURBED SOILS ONLY.
4. THE ENGINEER SHALL BE NOTIFIED A MINIMUM OF 48 HOURS IN ADVANCE FOR INSPECTION OF THE FOUNDATION WHEN ALL FORM WORK IS COMPLETE AND REBAR IS TIED IN PLACE. FURTHER INSPECTION PER THE LOCAL BUILDING JURISDICTION MAY BE REQUIRED.
5. THE ENGINEER SHALL BE NOTIFIED IF ADVERSE OR POOR SOIL CONDITIONS ARE ENCOUNTERED UPON EXCAVATION. FURTHER ENGINEERING MAY BE REQUIRED.
6. ALTERNATIVE SOIL ANCHORS MAY BE PERMITTED WITH ENGINEER APPROVAL.



S4  
1 ROCKFALL BARRIER SECTION 1/4" = 1'



S4  
2 LATERAL ANCHOR SECTION 1/4" = 1'

COSTING SET -  
NOT FOR CONSTRUCTION

REVISIONS

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