

**GENERAL NOTES**  
**FOR PROJECT SPECIFICATIONS SEE REFERENCE NO. 10 MONTECITO DEBRIS FLOW MITIGATION PROJECT SPECIFICATIONS.**

1. DETAILS SHOWN ON THE DRAWINGS ARE TYPICAL AND SIMILAR. DIMENSIONS, SCHEDULES, SPECIFIC NOTES, AND DETAILS TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. DIMENSIONS SHOWN ON THE DRAWINGS ARE BASED ON BEST AVAILABLE INFORMATION PROVIDED TO AND MAY NOT BE PRECISELY INDICATIVE OF FIELD CONDITIONS.
2. THE CONTRACTOR SHALL VERIFY ALL UTILITY LINES, DIMENSIONS, AND ELEVATIONS, AS WELL AS ANCHOR LOCATIONS, INDICATED ON THE DRAWINGS PRIOR TO ANY CLEARING, EXCAVATION, FABRICATION, OR CONSTRUCTION. CALL BEFORE YOU DIG.
3. ALL DIMENSIONS AND DETAILS SHOWN ON THE DRAWINGS SHALL BE REVIEWED AND VERIFIED BY THE CONTRACTOR PRIOR TO THE START OF ANY CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY FOR CLARIFICATION.

**SITE LAYOUT NOTES**

1. PRIOR TO ORDERING MATERIALS FOR THE GEOBRUGG MITIGATION SYSTEMS, FIELD STAKE-OUT LIMITS, AND ANCHOR LOCATIONS SHALL BE ACCOMPLISHED USING THE DRAWINGS AS A GUIDE. NO MATERIALS SHALL BE ORDERED OR ANY CONSTRUCTION ACTIVITIES COMMENCED UNTIL THE GEOBRUGG MITIGATION SYSTEM STAKE-OUT HAVE BEEN REVIEWED AND APPROVED BY THE OWNER, CONTRACTOR, AND ENGINEER.

**SITE ACCESS**

1. SITE ACCESS TO REACH DEBRIS FLOW MITIGATION LOCATIONS SHALL BE AS DESCRIBED IN REFERENCE NO.1, SECTION 3.0 - DEBRIS FLOW MITIGATION TECHNICAL APPROACH.

**CONTRACTOR QUALIFICATIONS**

1. PRIOR TO PROJECT BIDDING, THE CONTRACTOR SHALL MEET THE REQUIRED QUALIFICATIONS NOTED IN THE REFERENCED PROJECT SPECIFICATIONS SECTION 1-2 "CONTRACTOR QUALIFICATIONS".

**SUBMITTALS**

1. THE CONTRACTOR SHALL DEVELOP AND SUBMIT A "PROJECT SUBMITTAL DOCUMENT PACKAGE" TO THE ENGINEER NO LESS THAN ONE WEEK PRIOR TO CONSTRUCTION COMMENCEMENT. THE SUBMITTAL PACKAGE DOCUMENT SHALL BE IN PORTABLE DOCUMENT FORMAT (PDF) FORM AND ALL INFORMATION CONTAINED SHALL BE LEGIBLE. THE SUBMITTAL PACKAGE SHALL INCLUDE:
  - 1.1. CONTRACTOR QUALIFICATIONS AS DESCRIBED IN THE REFERENCED PROJECT SPECIFICATIONS SECTION 1-2 "CONTRACTOR QUALIFICATIONS".
  - 1.2. PROJECT START DATE AND SCHEDULE THAT INCLUDES A DETAILED CONSTRUCTION SEQUENCE.
  - 1.3. DRILLING, GROUTING METHODS AND EQUIPMENT TO BE USED ON THE PROJECT.
  - 1.4. ALL APPROPRIATE MATERIAL AND INSTALLATION DOCUMENTATION TO BE USED ON THE PROJECT INCLUDING: MATERIAL SPECIFICATION SHEETS, MANUALS, PRODUCT TECHNICAL DATA, MANUFACTURER'S NAMES, ASTM CONFORMANCE, MATERIAL HANDLING SHEETS AND WARRANTIES.
  - 1.5. PROPOSED GROUT MIX DESIGN AND COMPRESSIVE STRENGTH DATA
    - 1.5.1. TO THE ENGINEER FOR APPROVAL A MINIMUM OF ONE WEEK PRIOR TO GROUTING COMMENCEMENT.
  - 1.6. ANCHOR TESTING EQUIPMENT, CALIBRATION CERTIFICATES, AND LOADING GRAPHS TO THE ENGINEER FOR APPROVAL A MINIMUM ONE WEEK PRIOR TO TESTING.
  - 1.7. ANCHOR TESTING CRIBBING (LOAD FRAME) INFORMATION FOR MATERIALS TO BE USED.
2. THE ENGINEER SHALL APPROVE OR REJECT THE CONTRACTORS SUBMITTAL WITHIN FIVE (5) WORKING DAYS AFTER RECEIPT. WORK SHALL NOT BE STARTED NOR MATERIALS ORDERED UNTIL THE CONTRACTOR'S SUBMITTAL HAS BEEN APPROVED BY THE ENGINEER. APPROVAL OF THE CONSTRUCTION PLAN DOES NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR THE SUCCESSFUL COMPLETION OF THE WORK.

**REQUESTS FOR INFORMATION**

1. SUBSTITUTION REQUESTS OR REQUESTS FOR INFORMATION (RFI) SHALL BE SUBMITTED BY THE CONTRACTOR IN WRITING AND APPROVED BY THE ENGINEER PRIOR TO ANY CHANGE IMPLEMENTATION.

**PERMITTING**

1. THE CONTRACTOR SHALL MEET ALL STATE OF CALIFORNIA AND LOCAL PERMITTING REQUIREMENTS AND SHALL OBTAIN ALL NECESSARY PERMITS BEFORE CONSTRUCTION COMMENCES. CONTRACTOR SHALL OBTAIN SITE-SPECIFIC PERMITS INCLUDING, BUT NOT LIMITED TO, HOT WORK PERMITS (IF APPLICABLE) WHEN REQUIRED FOR ANY ACTIVITY THAT CAN BE A SOURCE OF IGNITION WHEN FLAMMABLE MATERIAL IS PRESENT OR CAN BE A POTENTIAL FIRE HAZARD.

**ON-SITE SPECIAL INSPECTIONS**

1. ON-SITE SPECIAL INSPECTIONS ARE RECOMMENDED TO BE PERFORMED FOR THE PROJECT TO ENSURE CONSTRUCTION IS IN CONFORMANCE WITH THE ENGINEERING DESIGN, SPECIFICATIONS, AND CONSTRUCTION DRAWINGS. SEE THE PROJECT SPECIFICATIONS SECTION 7 "SPECIAL INSPECTIONS" FOR ADDITIONAL INFORMATION. ON-SITE SPECIAL INSPECTIONS INCLUDE:
  - 1.1. SITE LAYOUT / FIELD STAKEOUT
  - 1.2. ANCHOR TESTING OBSERVATION
  - 1.3. FINAL INSPECTION

**CONSTRUCTION OVERSIGHT**

1. TO ENSURE THAT THE PROJECT DURING CONSTRUCTION IS IN CONFORMANCE WITH THE ENGINEERING DESIGN, SPECIFICATIONS, AND CONSTRUCTION DRAWINGS IT IS RECOMMENDED THAT KANE GEOTECH, INC. BE RETAINED TO OBSERVE CONSTRUCTION OVERSIGHT DURING THE PROJECT. KANE GEOTECH, INC. IS NOT RESPONSIBLE FOR CONSTRUCTION PERFORMED WITHOUT ITS OVERSIGHT.

**DISCLAIMER**

1. DEBRIS FLOW EVENTS CAN BE SPORADIC AND UNPREDICTABLE. CAUSES RANGE FROM HUMAN CONSTRUCTION TO ENVIRONMENTAL EFFECTS (WEATHER, EARTHQUAKES, ETC.). BECAUSE OF THE MULTIPLICITY OF FACTORS AFFECTING SUCH EVENTS IT IS NOT, AND CANNOT BE, AN EXACT SCIENCE THAT GUARANTEES THE SAFETY OF INDIVIDUALS AND PROPERTY. HOWEVER, BY THE APPLICATION OF SOUND ENGINEERING PRINCIPLES TO A PREDICTABLE RANGE OF PARAMETERS, THE RISK OF INJURY AND PROPERTY LOSS CAN BE SUBSTANTIALLY REDUCED USING PROPERLY DESIGNED PROTECTION MEASURES IN IDENTIFIED RISK AREAS.

2. INSPECTION AND MAINTENANCE OF SUCH SYSTEMS ARE NECESSARY TO ENSURE THE DESIRED PROTECTION LEVEL IS NOT DEGRADED BY IMPACT DAMAGE, CORROSION, OR OTHER FACTORS.

**REFERENCES**

1. ACCESS LIMITED CONSTRUCTION (2018). MONTECITO DEBRIS FLOW MITIGATION PROJECT - TECHNICAL PROPOSAL. OCTOBER 4, 2018.
2. CALIFORNIA BUILDING STANDARDS COMMISSION (CBCS) (2016). 2016 CALIFORNIA BUILDING CODE OF REGULATIONS TITLE 24. EFFECTIVE JANUARY 1, 2017.
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4. GEOBRUGG AG (2017). DEBFLOW® ONLINE TOOL. CH-8590 ROMANSHORN, SWITZERLAND. 2017 06-13.
5. GEOBRUGG AG (2016). PRODUCT MANUAL VX/UX DEBRIS FLOW NETS PRODUCT MANUAL. CH-8590 ROMANSHORN, SWITZERLAND. EDITION 164-N-FO/05, 07/11/2016.
6. GEOBRUGG AG (2017). DEBFLOW® DEBRIS FLOW PROTECTION SOFTWARE MANUAL. CH-8590 ROMANSHORN, SWITZERLAND. 2017 04-28.
7. GEOBRUGG AG (2017). DEBRIS FLOW PROTECTION SYSTEM VX TYPE: VX160-H6, DRAWING NO. GD-1004.1E. CH-8590 ROMANSHORN, SWITZERLAND. 2017 12-07.
8. HUNT, ROY E. (1984). GEOTECHNICAL ENGINEERING INVESTIGATION MANUAL. NEW YORK: MCGRAW-HILL, PRINT.
9. HOEK & J.W. BRAY (1981). ROCK SLOPE ENGINEERING. LONDON: THE INSTITUTION OF MINING AND METALLURGY, PRINT.
10. KANE GEOTECH INC. (2018). MONTECITO DEBRIS FLOW MITIGATION PROJECT SPECIFICATIONS. KGT18-18. OCTOBER 4, 2018.
11. KANE GEOTECH INC. (2018). MONTECITO DEBRIS FLOW MITIGATION DESIGN CALCULATION REPORT. KGT18-18. OCTOBER 4, 2018.
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15. U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION (FHWA) (1999). GEOTECHNICAL ENGINEERING CIRCULAR NO. 4 GROUND ANCHOR AND ANCHORED SYSTEMS. PUBLICATION NO. FHWA-IF-99-015.
16. STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION (2015). 2015 STATE OF CALIFORNIA STANDARD SPECIFICATIONS. SACRAMENTO, CALIFORNIA.

**REVISION SUMMARY**

1. 2018 10-23: BUENA VISTA CANYON SITE BV-1 LOCATION REMOVED.
  - 1.1. SHEETS REVISED
    - 1.1.1. SHEET 5, SHEET 13, SHEET 14, SHEET 15.

# MONTECITO DEBRIS FLOW MITIGATION

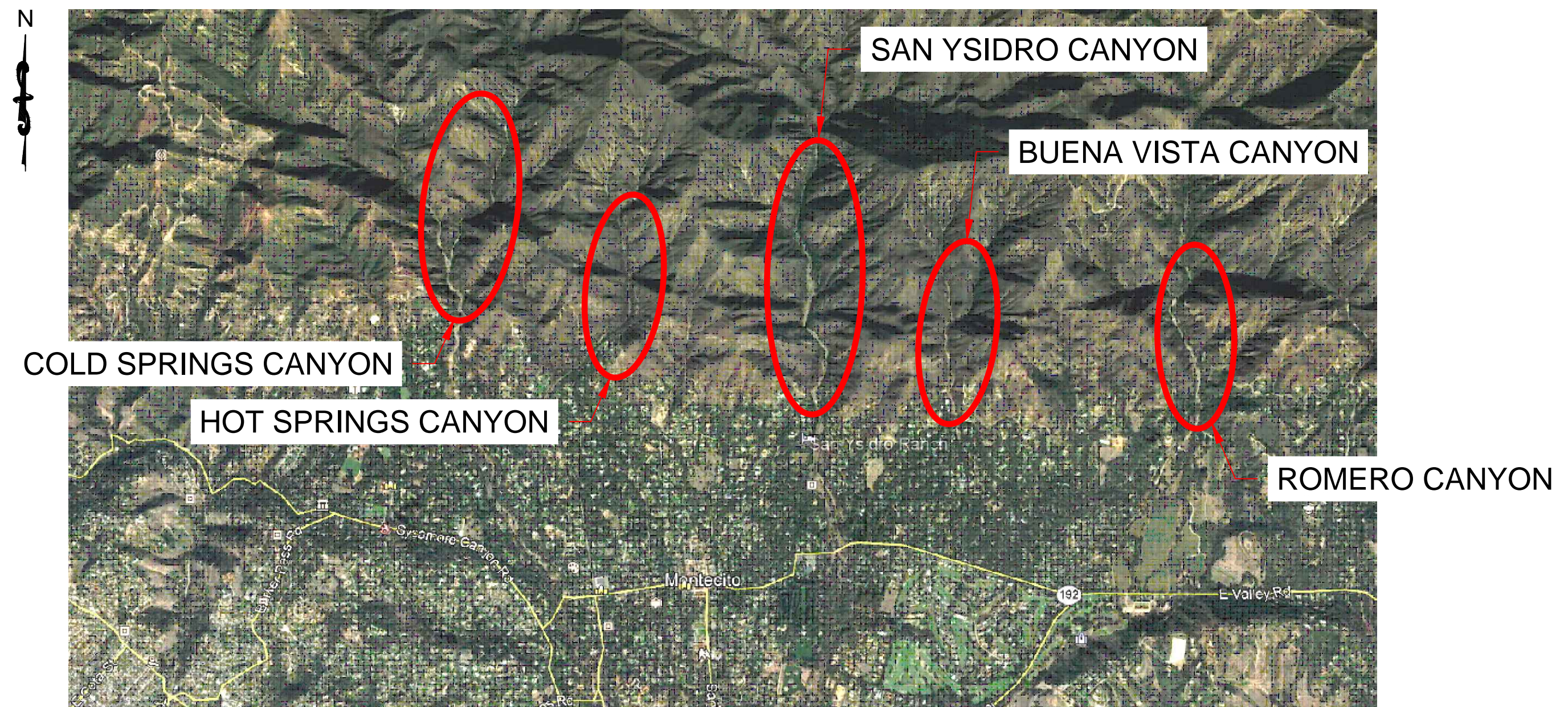
## GEOBRUGG SVX AND VX

### DEBRIS FLOW MITIGATION SYSTEMS

#### SANTA BARBARA COUNTY, CALIFORNIA

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DESCRIPTION	NUMBER
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P-1 PROJECT LOCATION  
 1 SCALE: N.T.S.

2018 10-23 REVISION

TITLE SHEET

2018 10-23: Added Revision Summary.

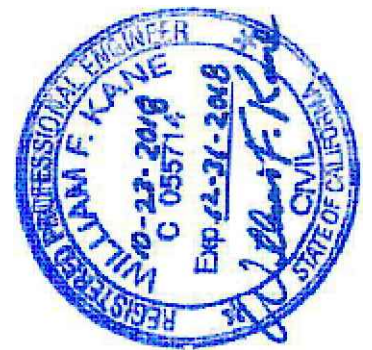
REVISED

Montecito Debris Flow Mitigation  
 Debris Flow Mitigation Systems  
 Santa Barbara County, California  
 PREPARED AT THE REQUEST OF  
 Partnership For Resilient Communities  
 Montecito, California



7400 Shoreline Drive, Suite 6  
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SHEET 1 OF 16

DRAWN BY:  
 B/JF

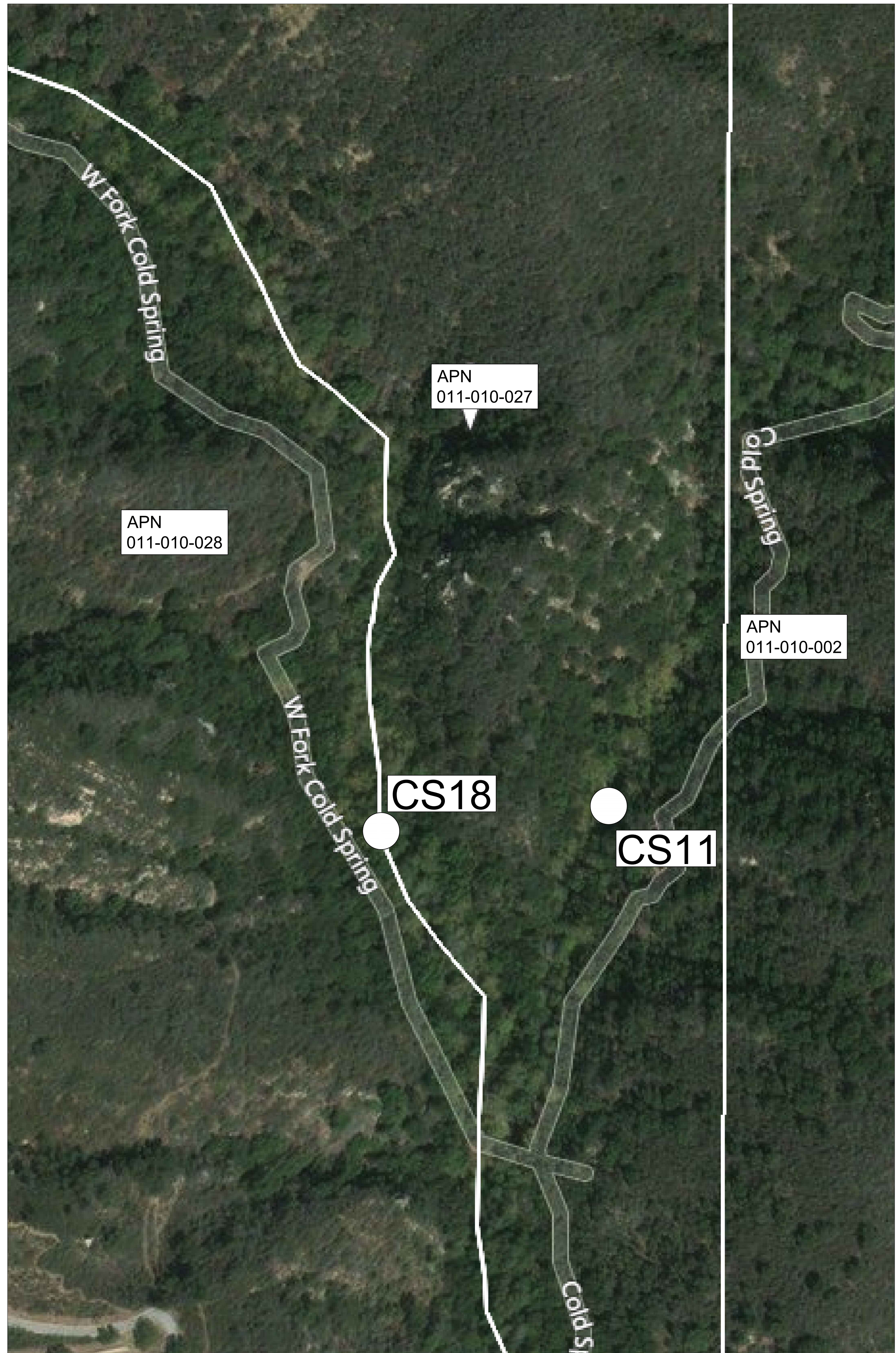
DESIGNED BY:  
 W/K

CHECKED BY:  
 W/K

SCALE: N.T.S.

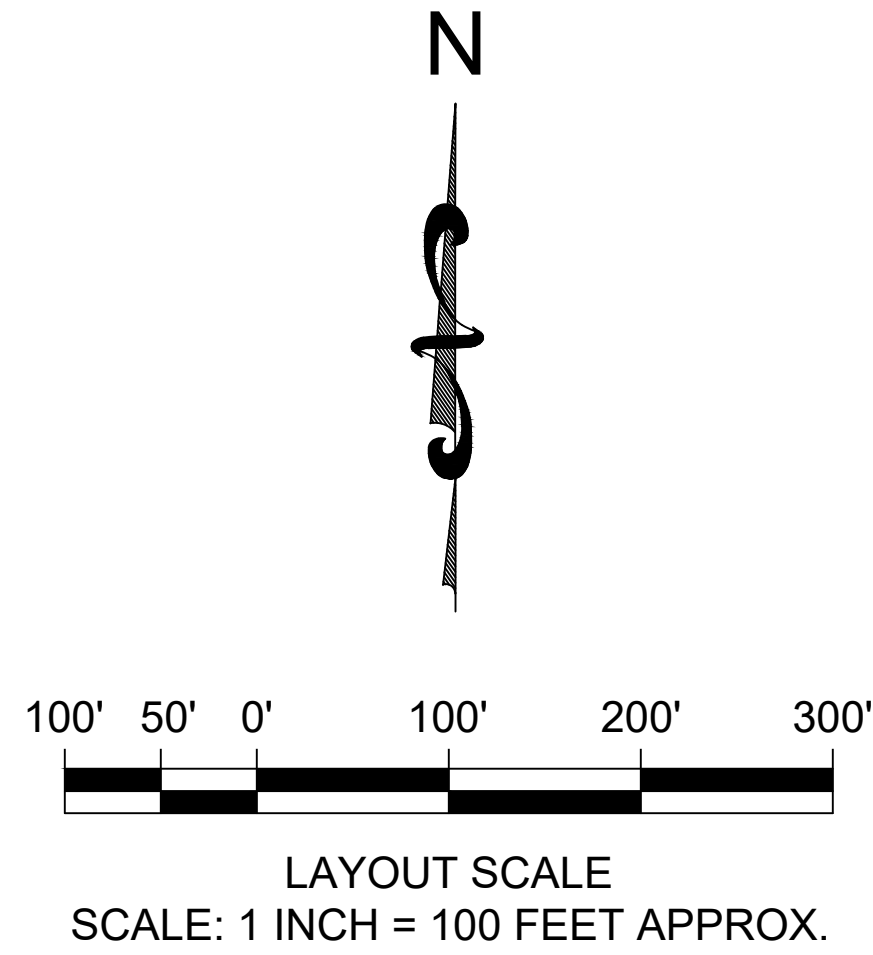
DATE: 2018 10-04

PROJECT NO:  
 KGT18-18



**IMAGERY LOCATION NOTE:**  
 1. LOCATIONS OF STREAMS AS DEPICTED ON THE AERIAL IMAGES ARE NOT PRECISE SHOULD BE CONSIDERED APPROXIMATE. DEBRIS NETS WERE LOCATED IN THE FIELD USING GPS EQUIPMENT AND SHOULD BE CONSIDERED ACCURATE.

COLD SPRINGS CANYON DEBRIS FLOW MITIGATION SCHEDULE			
NET DESIGNATION	GEOBRUGG SYSTEM TYPE	GPS COORDINATES	EST. DEBRIS RETENTION VOLUME
CS-11	VX160-H6	N 34° 27.613'	3,850-YD <sup>3</sup>
		W 119° 39.245'	
CS-18	SVX180-H6	N 34° 27.615'	5,800-YD <sup>3</sup>
		W 119° 39.300'	
<b>TOTAL</b>			<b>9,650-YD<sup>3</sup></b>



2018 10-23 REVISION

**COLD SPRINGS CANYON DEBRIS FLOW MITIGATION LAYOUT**

SCALE: N.T.S.      DRAWN BY: BUJ      SHEET 2 OF 16      PROJECT NO: KGT18-18

DATE: 2018 10-04      DESIGNED BY: WFK      © 2018 KANE GeoTech, Inc.

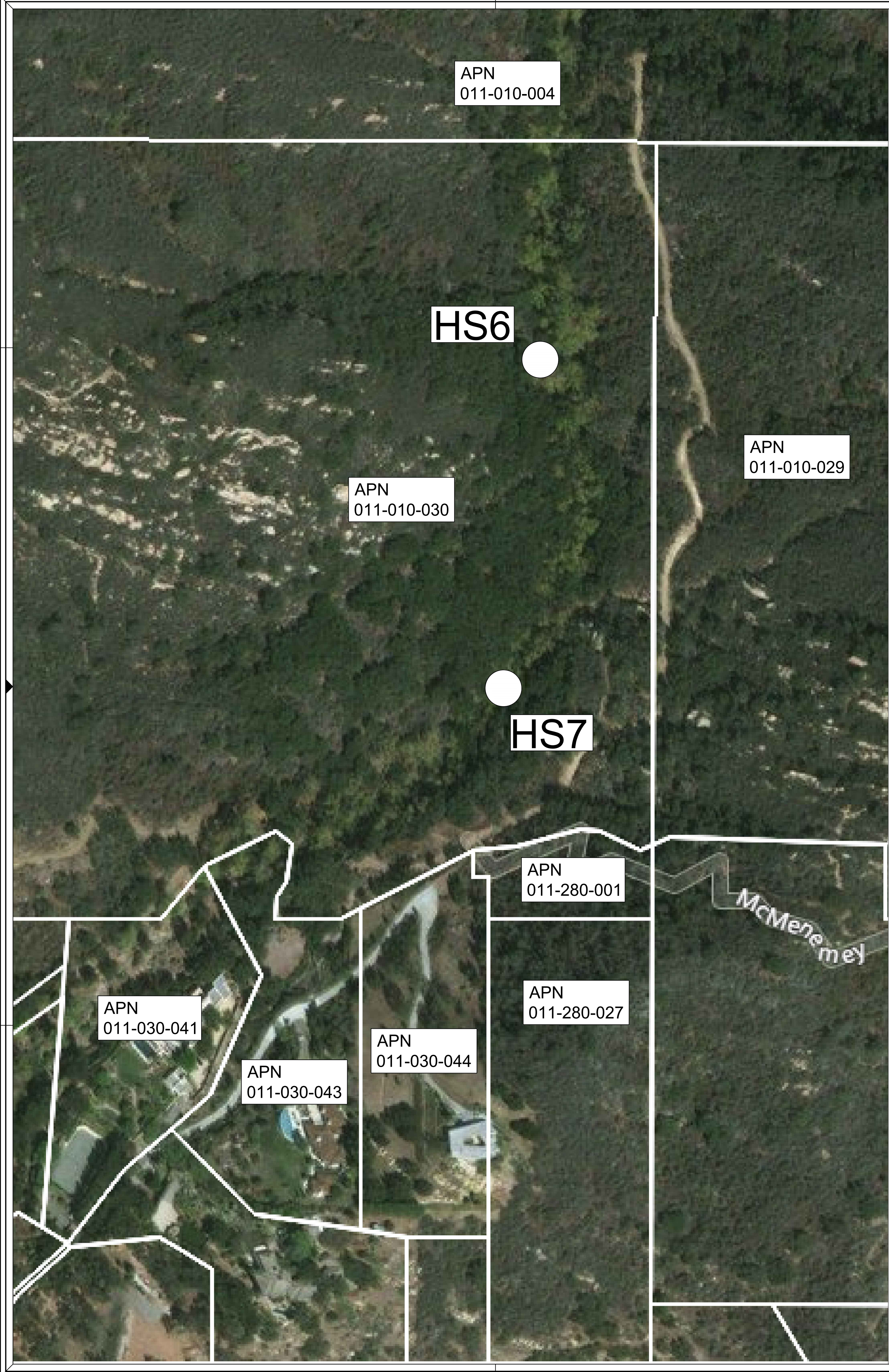
CHECKED BY: WFK

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 Santa Barbara County, California  
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 Montecito, California

**KANE**  
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 Tel: 209-472-1822

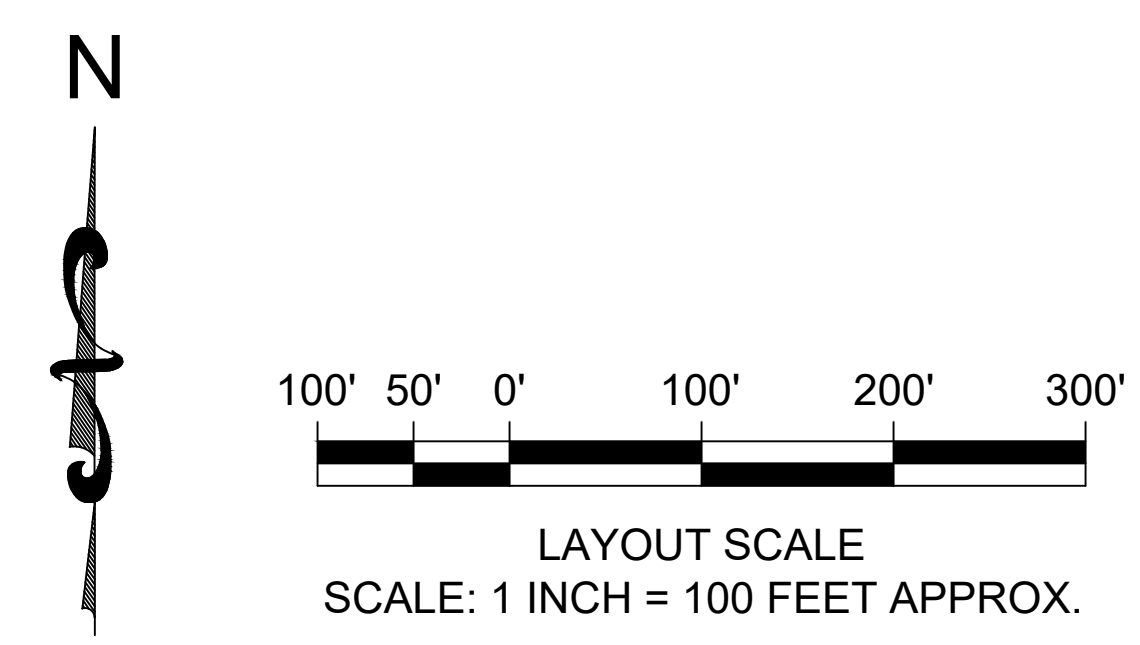
1441 Kapiolani Blvd., Suite 1115  
 Honolulu, Hawaii 96814  
 Tel: 808-536-2688

REGISTERED PROFESSIONAL ENGINEER  
 WILLIAM F. KANE, Inc.  
 C 055719  
 Exp. 12-31-2018



**IMAGERY LOCATION NOTE:**  
 1. LOCATIONS OF STREAMS AS DEPICTED ON THE AERIAL IMAGES ARE NOT PRECISE SHOULD BE CONSIDERED APPROXIMATE. DEBRIS NETS WERE LOCATED IN THE FIELD USING GPS EQUIPMENT AND SHOULD BE CONSIDERED ACCURATE.

HOT SPRINGS CANYON DEBRIS FLOW MITIGATION SCHEDULE			
NET DESIGNATION	GEOBRUGG NET TYPE	GPS COORDINATES	EST. DEBRIS RETENTION VOLUME
HS-6	SVX180-H6	N 34° 27.391'	12,900-YD <sup>3</sup>
		W 119° 38.329'	
HS-7	VX140-H4	N 34° 27.302'	1,700-YD <sup>3</sup>
		W 119° 38.351'	
<b>TOTAL</b>			<b>14,600-YD<sup>3</sup></b>



2018 10-23 REVISION

**HOT SPRINGS CANYON DEBRIS FLOW MITIGATION LAYOUT**

REVISIONS

Montecito Debris Flow Mitigation  
Debris Flow Mitigation Systems  
Santa Barbara County, California  
PREPARED AT THE REQUEST OF  
Partnership For Resilient Communities  
Montecito, California

**KANE**  
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Geoengineering Consultants  
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Honolulu, Hawaii 96814  
Tel: 808-336-2888

7400 Shoreline Drive, Suite 6  
Stockton, California 95219  
Tel: 209-472-1822

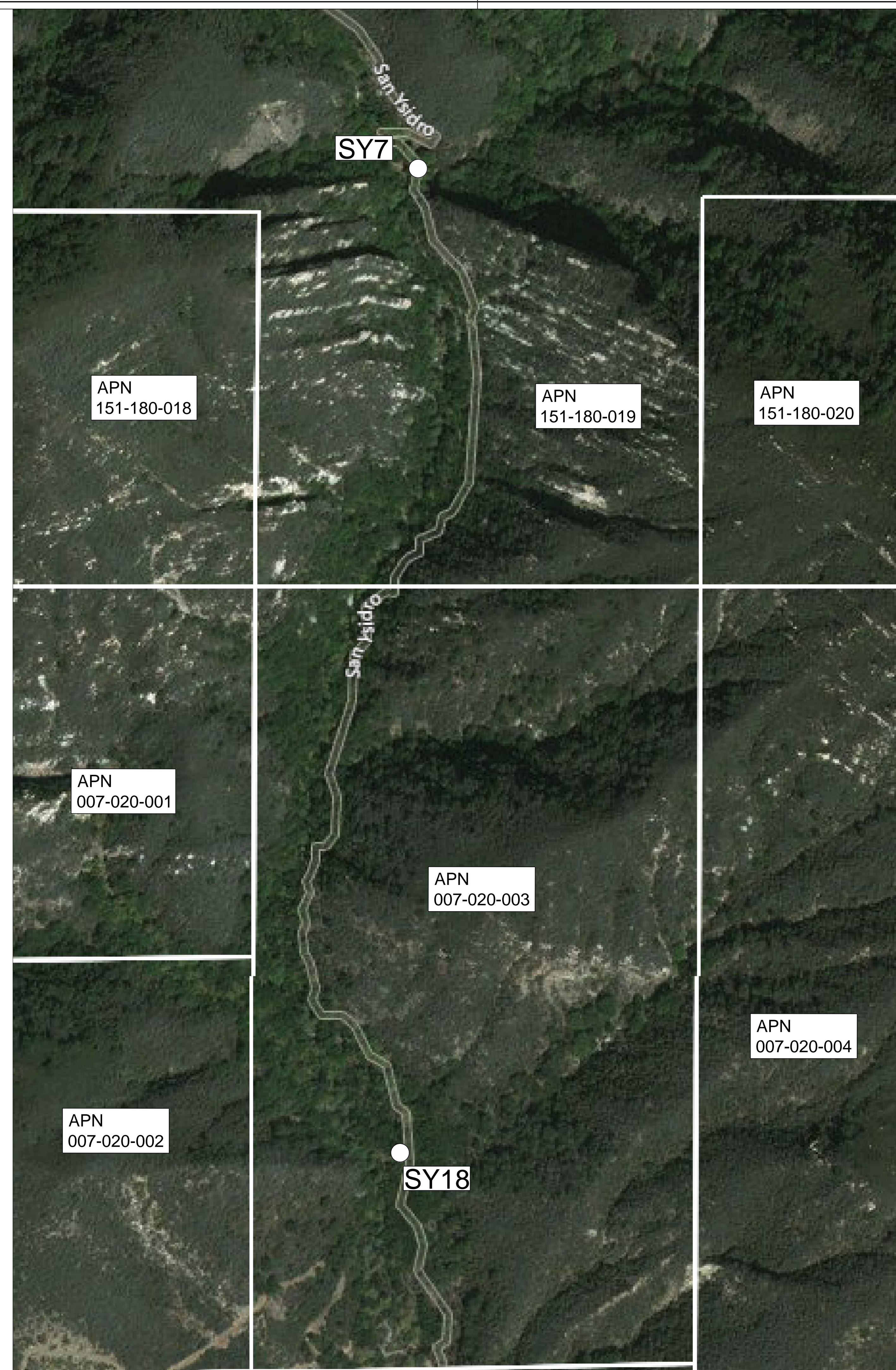
REGISTERED PROFESSIONAL ENGINEER  
WILLIAM F. KANE, INC.  
Exp. 12-31-2018  
C 055719

SHEET 3 OF 16

DRAWN BY: BJJ  
DESIGNED BY: WFK  
CHECKED BY: WFK

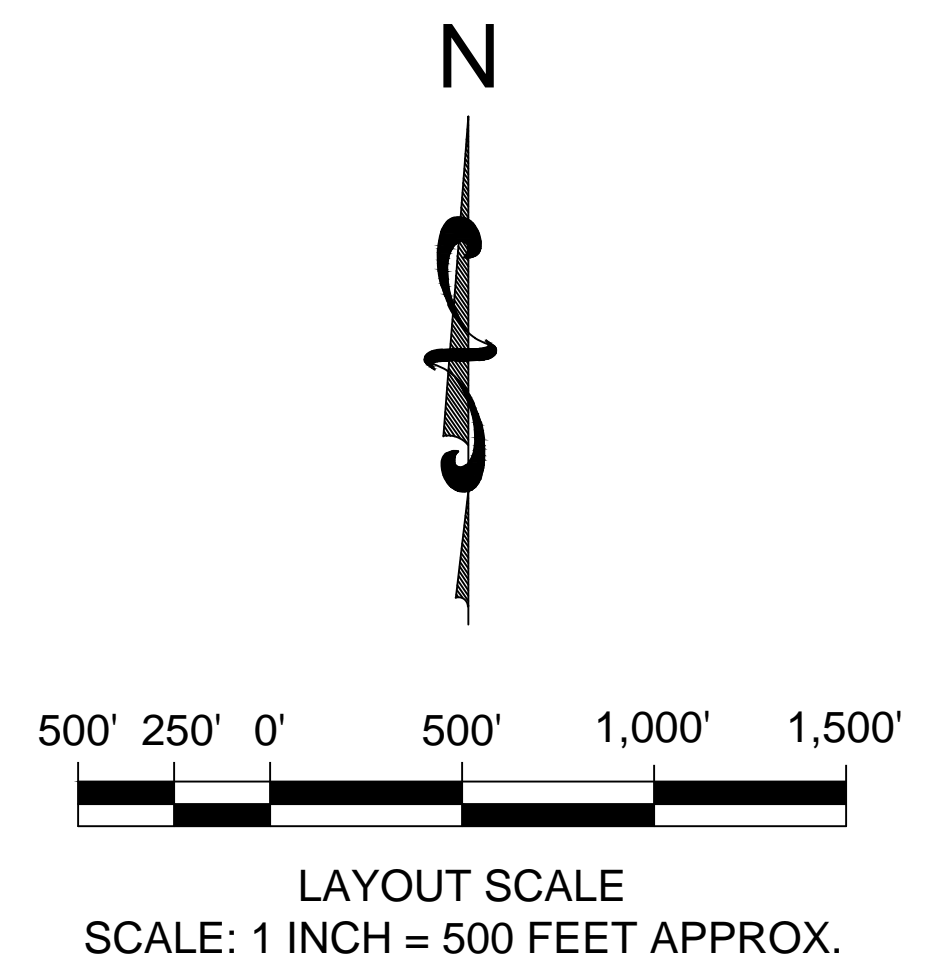
SCALE: 1" = 100'-0"  
DATE: 2018 10-04  
PROJECT NO: KGT18-18

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**IMAGERY LOCATION NOTE:**  
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SAN YSIDRO CANYON DEBRIS FLOW MITIGATION SCHEDULE			
NET DESIGNATION	GEOBRUGG NET TYPE	GPS COORDINATES	EST. DEBRIS RETENTION VOLUME
SY-7	SVX180-H6	N 34° 28.118'	8,500-YD <sup>3</sup>
		W 119° 37.385'	
SY-18	SVX180-H6	N 34° 27.573'	6,200-YD <sup>3</sup>
		W 119° 37.399'	
<b>TOTAL</b>			<b>14,700-YD<sup>3</sup></b>



**2018 10-23 REVISION**

**SAN YSIDRO CANYON DEBRIS FLOW MITIGATION LAYOUT**

SCALE: 1" = 500'-0"  
 DATE: 2018 10-04  
 PROJECT NO: KGT18-18

DRAWN BY: BUJ  
 DESIGNED BY: WFK  
 CHECKED BY: WFK

SHEET 4 OF 16

**WILLIAM F. KANE, INC.**  
 PROFESSIONAL ENGINEER  
 No. 22-2048  
 C 055718  
 Exp. 12-31-2018

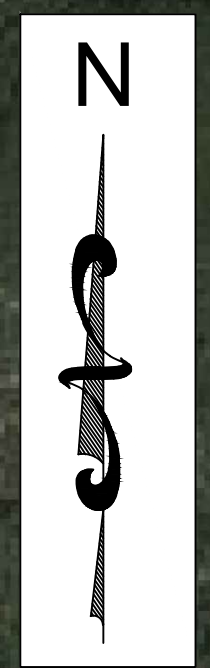
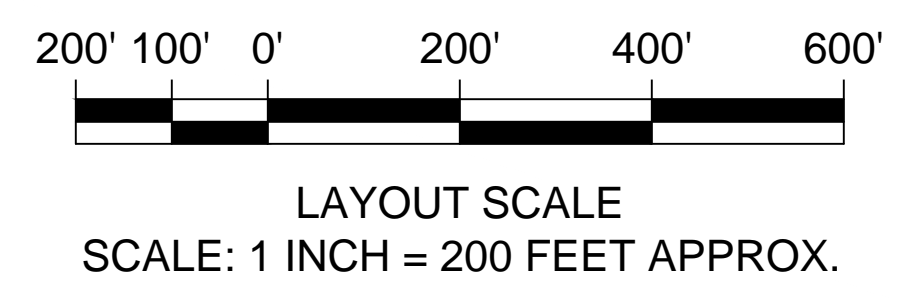
**KANE**  
 Geotechnical, Inc.  
 Geotechnical Consultants

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1441 Kapiolani Blvd., Suite 1115  
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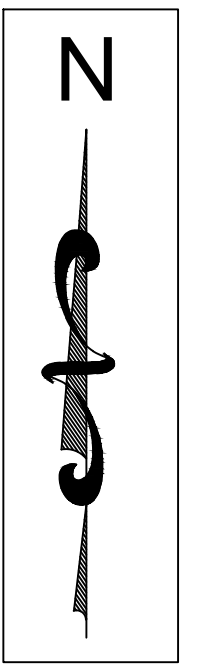
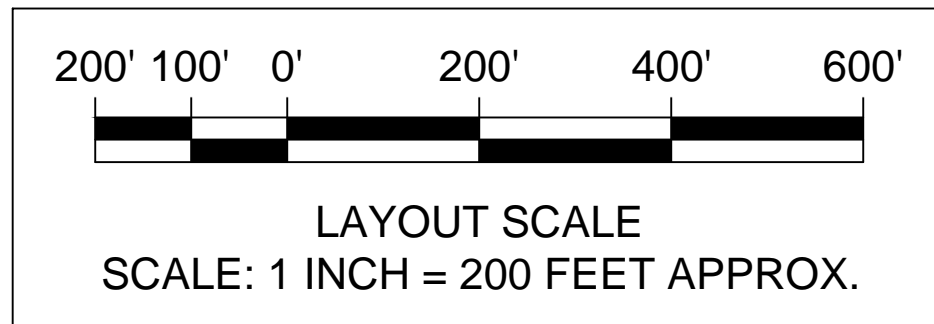
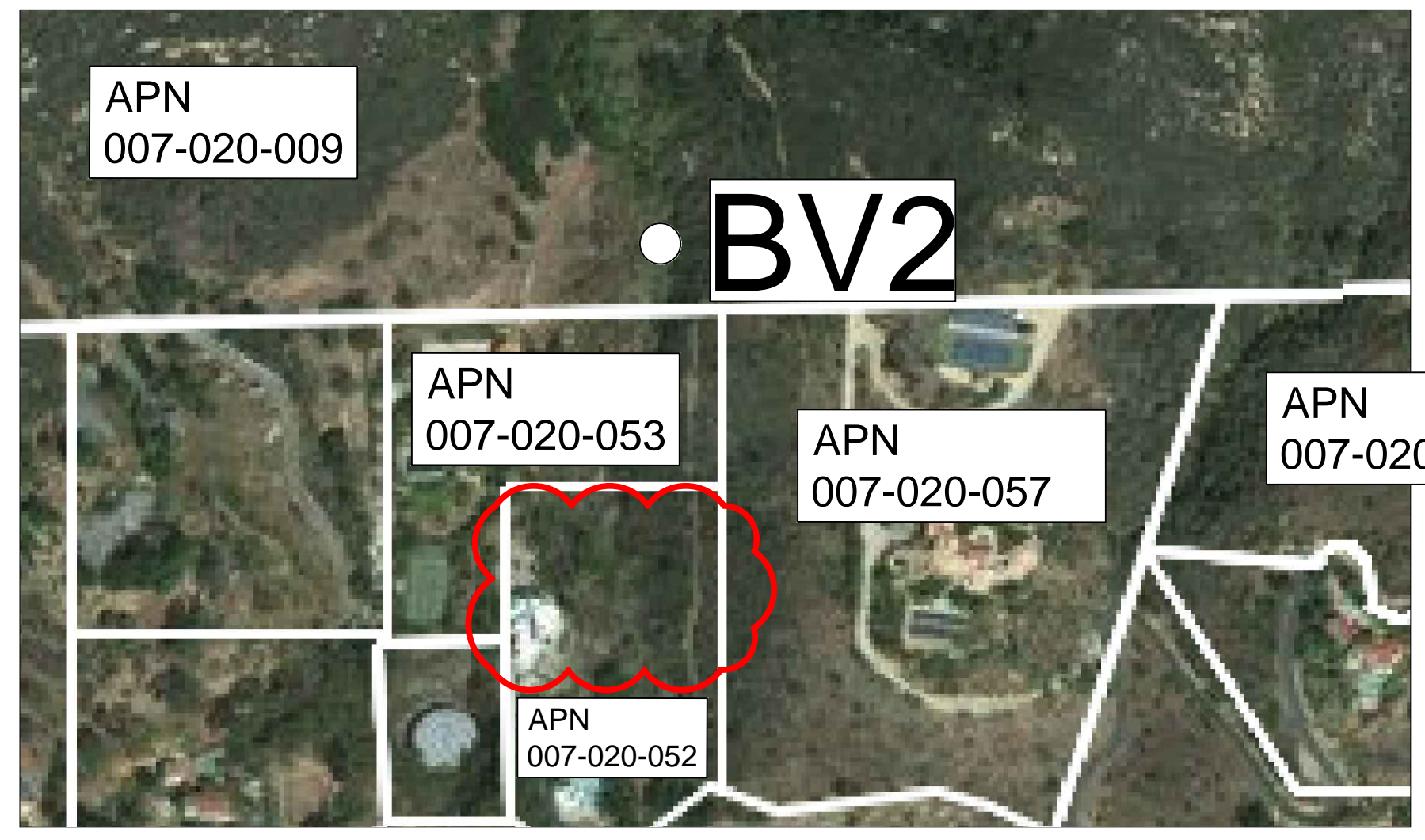
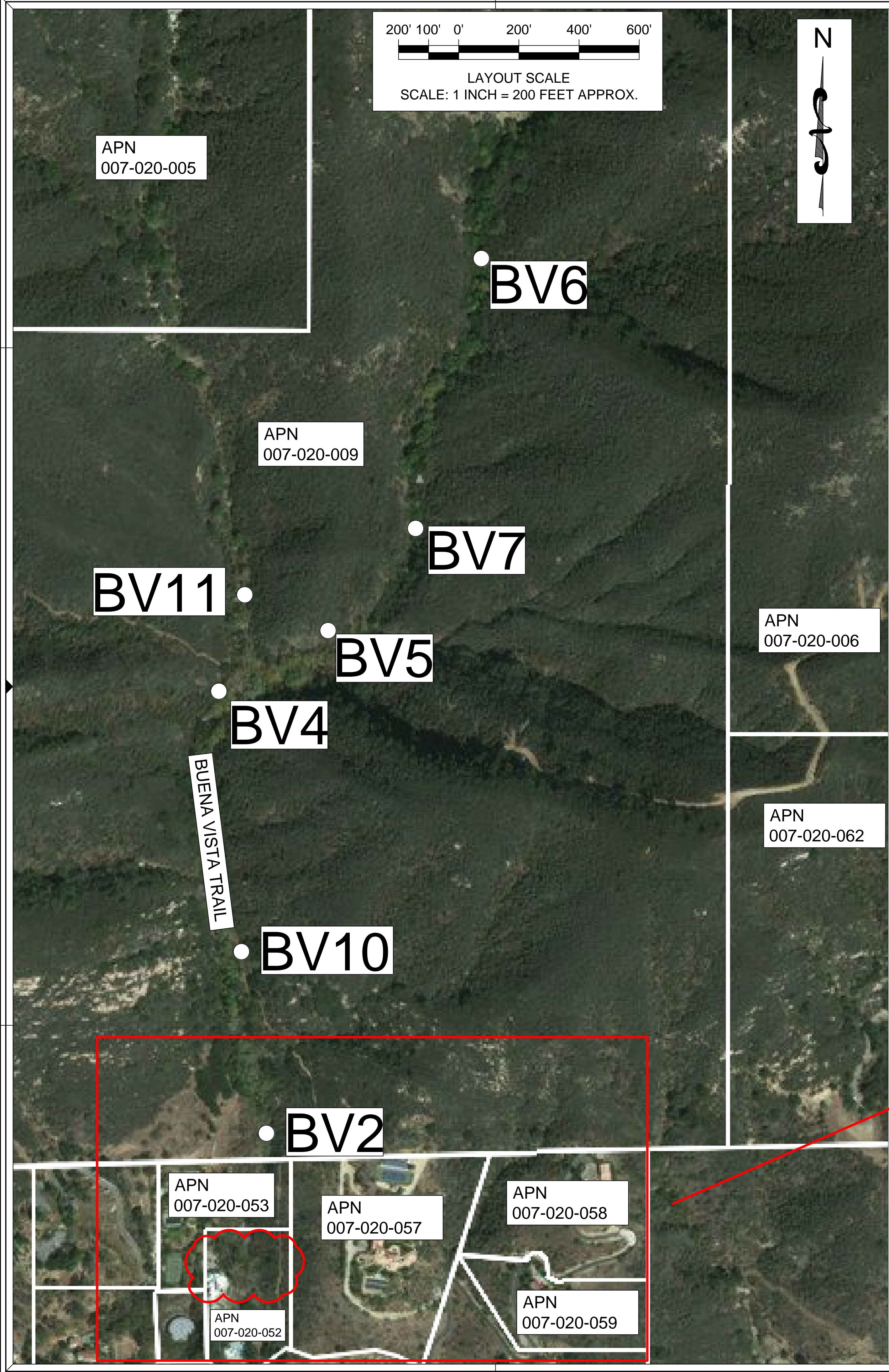
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 Debris Flow Mitigation Systems  
 Santa Barbara County, California  
 PREPARED AT THE REQUEST OF  
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 Montecito, California

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**IMAGERY LOCATION NOTE:**  
 1. LOCATIONS OF STREAMS AS DEPICTED ON THE AERIAL IMAGES ARE NOT PRECISE SHOULD BE CONSIDERED APPROXIMATE. DEBRIS NETS WERE LOCATED IN THE FIELD USING GPS EQUIPMENT AND SHOULD BE CONSIDERED ACCURATE.

BUENA VISTA CANYON DEBRIS FLOW MITIGATION SCHEDULE			
NET DESIGNATION	GEOBRUGG NET TYPE	GPS COORDINATES	EST. DEBRIS RETENTION VOLUME
BV-2	VX140-H4	N 34° 27.048'	1,300-YD <sup>3</sup>
		W 119° 36.664'	
BV-4	SVX180-H6	N 34° 27.284'	7,200-YD <sup>3</sup>
		W 119° 36.690'	
BV-5	VX140-H4	N 34° 27.317'	1,900-YD <sup>3</sup>
		W 119° 36.622'	
BV-6	VX160-H6	N 34° 27.502'	2,350-YD <sup>3</sup>
		W 119° 36.527'	
BV-7	VX160-H6	N 34° 27.368'	6,950-YD <sup>3</sup>
		W 119° 36.568'	
BV-10	VX160-H6	N 34° 27.146'	4,500-YD <sup>3</sup>
		W 119° 36.676'	
BV-11	SVX180-H6	N 34° 27.338'	14,400-YD <sup>3</sup>
		W 119° 36.677'	
<b>TOTAL</b>			<b>42,100-YD<sup>3</sup></b>



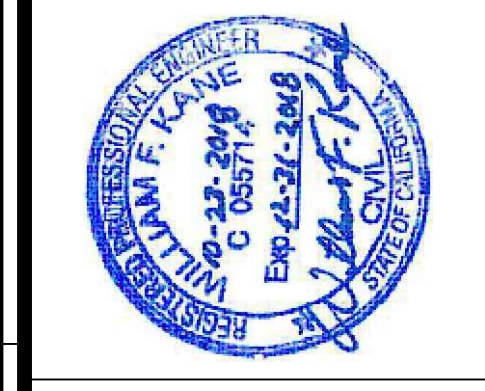
2018 10-23 REVISION

**BUENA VISTA CANYON DEBRIS FLOW MITIGATION LAYOUT**

2018 10-23: Removed Site BV-1.

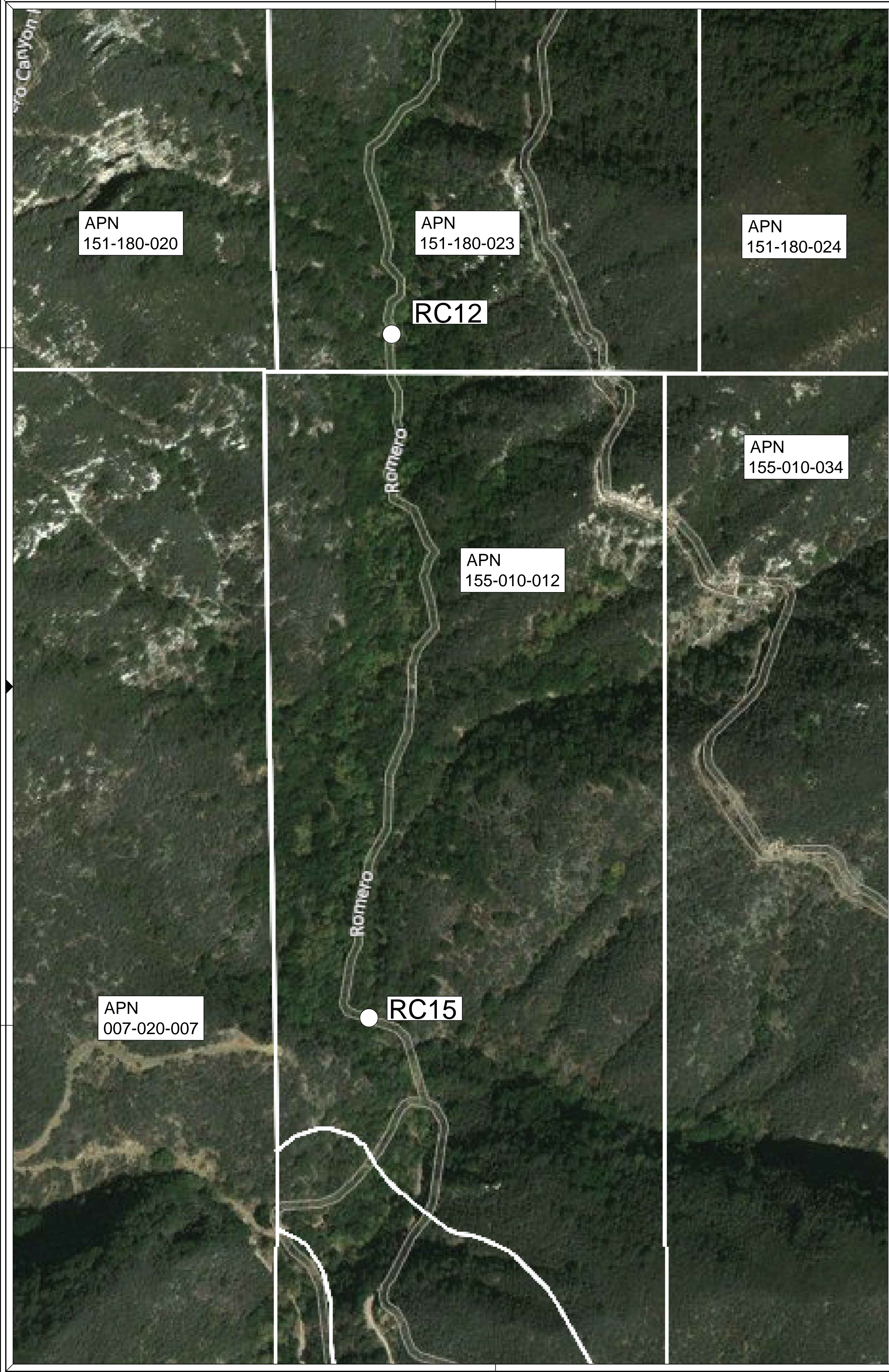
REVISOR: Montecito Debris Flow Mitigation Systems, Santa Barbara County, California. PREPARED AT THE REQUEST OF Partnership For Resilient Communities, Montecito, California.

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 7400 Shoreline Drive, Suite 6 Stockton, California 95219 Tel: 209-472-1822  
**Geoengineering Consultants**



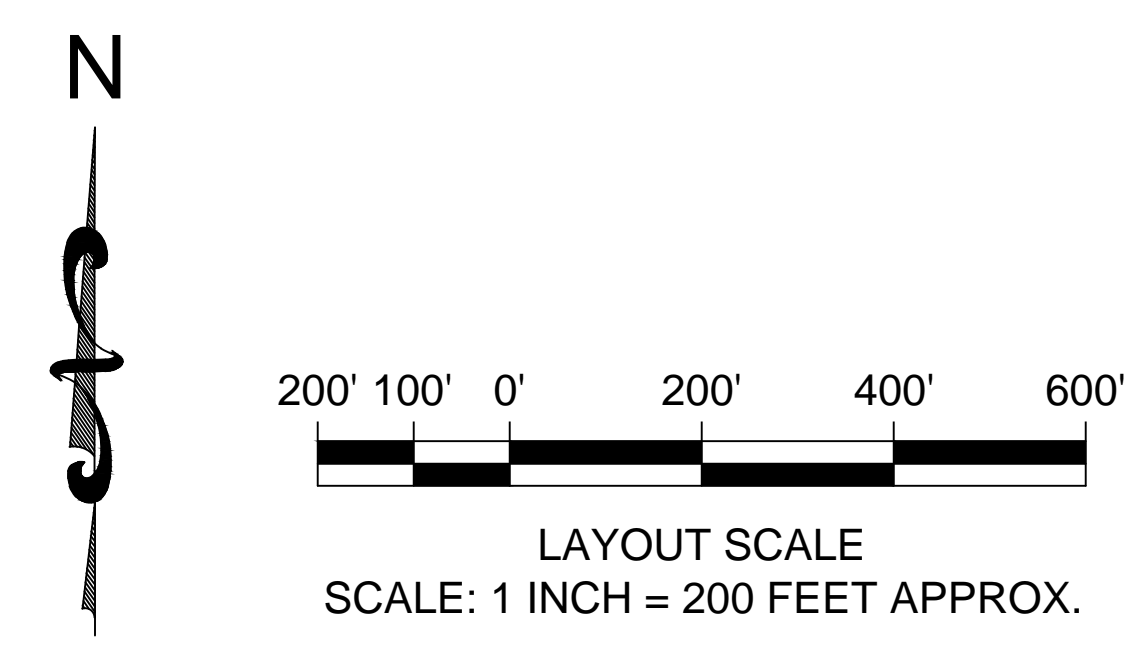
SHEET 5 OF 16

SCALE: 1" = 200'-0"  
 DATE: 2018 10-04  
 PROJECT NO: KGT18-18  
 DRAWN BY: BUF  
 DESIGNED BY: WFK  
 CHECKED BY: WFK



**IMAGERY LOCATION NOTE:**  
 1. LOCATIONS OF STREAMS AS DEPICTED ON THE AERIAL IMAGES ARE NOT PRECISE SHOULD BE CONSIDERED APPROXIMATE. DEBRIS NETS WERE LOCATED IN THE FIELD USING GPS EQUIPMENT AND SHOULD BE CONSIDERED ACCURATE.

ROMERO CANYON DEBRIS FLOW MITIGATION LOCATION SCHEDULE			
NET LOCATION DESIGNATION	GEOBRUGG SYSTEM TYPE	GPS COORDINATES	EST. DEBRIS RETENTION VOLUME
RC-12	SVX180-H6	N 34° 27.908'	2,700-YD <sup>3</sup>
		W 119° 35.457'	
RC-15	VX160-H6	N 34° 27.525'	1,250-YD <sup>3</sup>
		W 119° 35.490'	
<b>TOTAL</b>			<b>3,950-YD<sup>3</sup></b>



**2018 10-23 REVISION**

**ROMERO CANYON DEBRIS FLOW MITIGATION LAYOUT**

SCALE: 1" = 200'-0"  
 DATE: 2018 10-04  
 PROJECT NO: KGT18-18

DRAWN BY: BJJ  
 DESIGNED BY: WFK  
 CHECKED BY: WFK

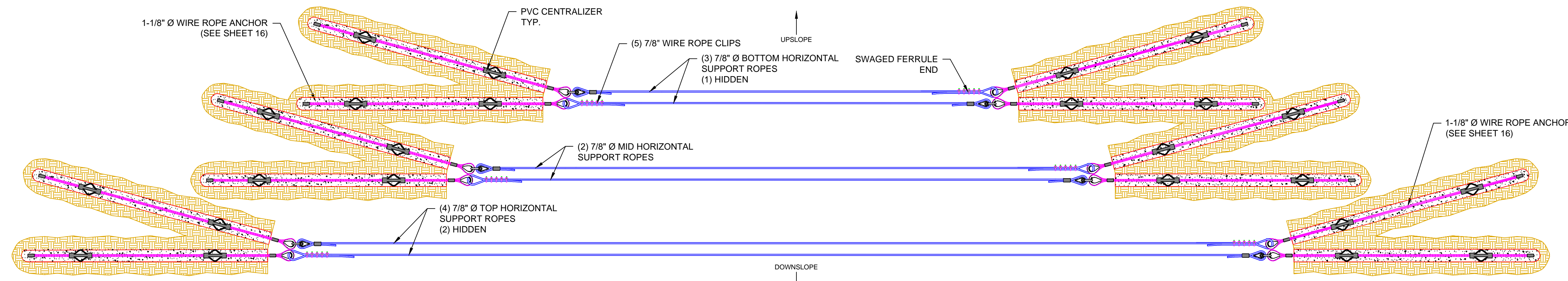
SHEET **6** OF 16

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 Tel: 808-306-2868

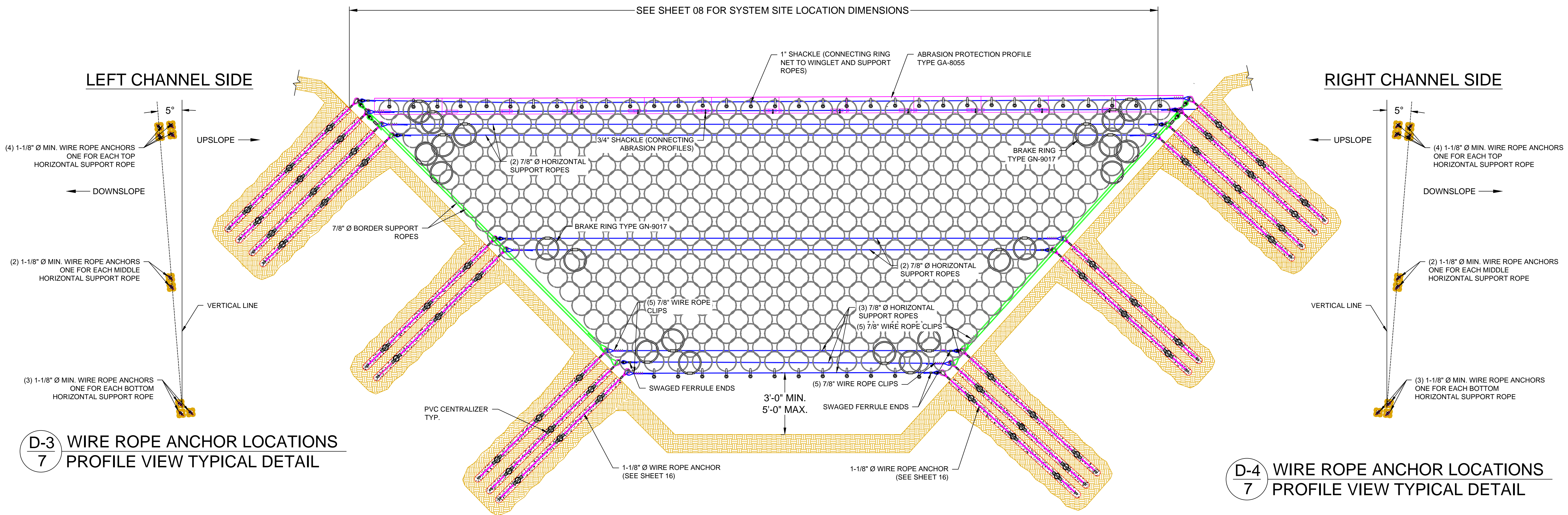
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 Debris Flow Mitigation Systems  
 Santa Barbara County, California  
 PREPARED AT THE REQUEST OF  
 Partnership For Resilient Communities  
 Montecito, California

REVISED



**D-1**  
7  
**GEOBRUGG VX140-H4 DEBRIS FLOW MITIGATION SYSTEM**  
SCALE: N.T.S.



**D-2**  
7  
**GEOBRUGG VX140-H4 DEBRIS FLOW MITIGATION SYSTEM**  
SCALE: N.T.S.

**D-3**  
7  
**WIRE ROPE ANCHOR LOCATIONS**  
PROFILE VIEW TYPICAL DETAIL

**D-4**  
7  
**WIRE ROPE ANCHOR LOCATIONS**  
PROFILE VIEW TYPICAL DETAIL

- NOTES:**
- MIDDLE HORIZONTAL SUPPORT ROPES INSTALLED ON THE DOWNSLOPE (VALLEY) SIDE OF THE GEOBRUGG ROCCO® RING NET
  - DETAIL D-2/7 ELEVATION VIEW IS LOOKING UPSTREAM DIRECTION.
  - ANCHORS SHALL NOT BE INSTALLED WITHIN 0.5 x BOREHOLE DIAMETER OF EACH OTHER.

2018 10-23 REVISION

**GEOBRUGG VX140-H4 ELEVATION AND PLAN TYPICAL DETAILS**

REVISIONS

REVISED

Montecito Debris Flow Mitigation  
Debris Flow Mitigation Systems  
Santa Barbara County, California

PREPARED AT THE REQUEST OF  
Partnership For Resilient Communities  
Montecito, California

**KANE**  
Geoengineering Consultants  
GeoTech, Inc.

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7400 Shoreline Drive, Suite 6  
Stockton, California 95219  
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PROFESSIONAL ENGINEER  
No. 22-2048  
Exp. 12-31-2018  
C 065718

SHEET 7 OF 16

DRAWN BY:  
BUF

DESIGNED BY:  
WFK

CHECKED BY:  
WFK

SCALE: N.T.S.

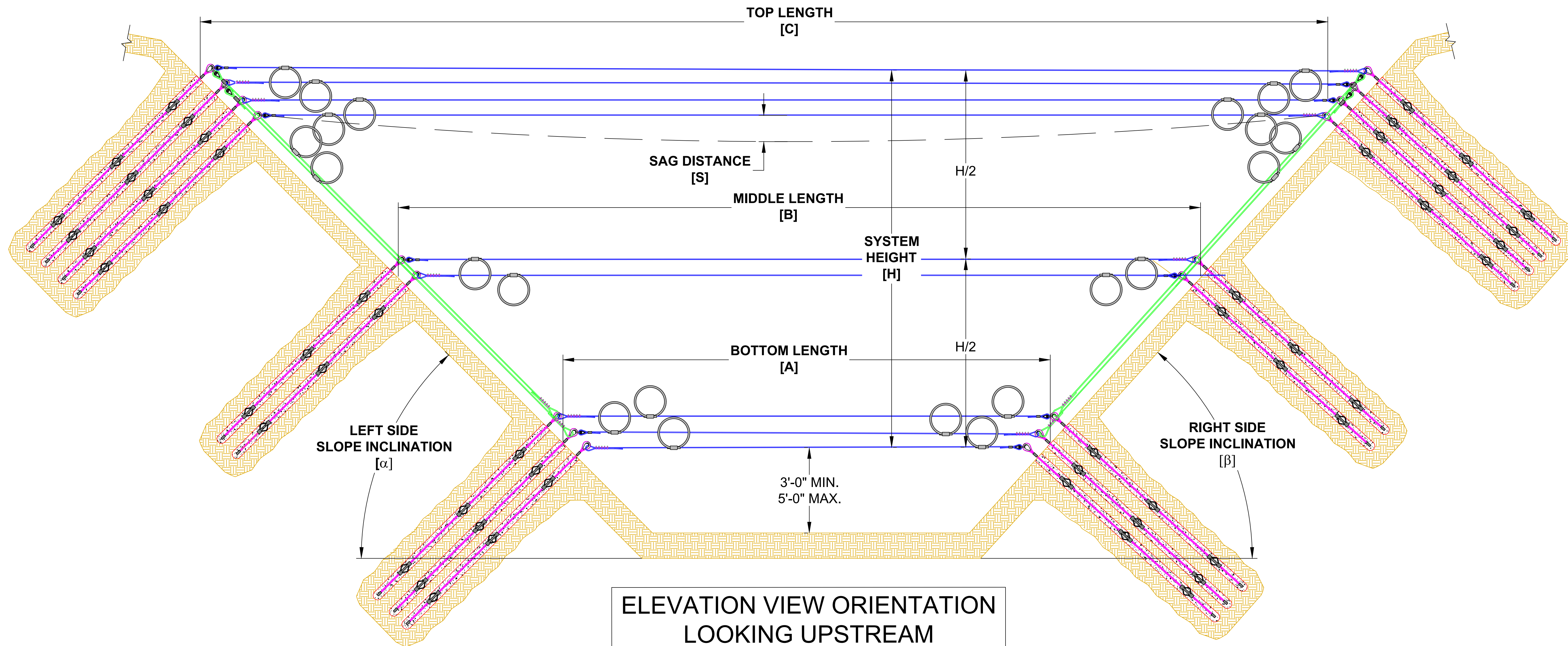
DATE: 2018 10-04

PROJECT NO:  
KGT18-18

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GEOBRUGG VX140-H4 DEBRIS FLOW MITIGATION SYSTEM DIMENSIONAL SCHEDULE							
LOCATION DESIGNATION	SYSTEM HEIGHT [H] (FT)	BOTTOM LENGTH [A] (FT)	MIDDLE LENGTH [B] (FT)	TOP LENGTH [C] (FT)	ALLOWABLE SAG DISTANCE [S] (FT)	LEFT SIDE AVG. SLOPE INCLINATION [ $\alpha$ ]	RIGHT SIDE AVG. SLOPE INCLINATION [ $\beta$ ]
BUENA VISTA BV-2	10	14	30	41	1	35°	33°
BUENA VISTA BV-5	12	27	34	37	1	70°	80°
HOT SPRINGS HS-7	11	19	35	49	1	52°	40°

NOTE: SLOPE INCLINATIONS FROM HORIZONTAL PROVIDED ARE AVERAGED.



ELEVATION VIEW ORIENTATION  
LOOKING UPSTREAM

- NOTES:
- GEOBRUGG VX140-H4 DEBRIS FLOW MITIGATION SYSTEM DIMENSIONS AND CHANNEL GEOMETRIES ARE APPROXIMATE.
  - DETAIL D-1/8 ELEVATION VIEW IS LOOKING UPSTREAM DIRECTION.

D-1  
8 GEOBRUGG VX140-H4 DEBRIS FLOW MITIGATION SYSTEM  
TYPICAL DIMENSIONAL ELEVATION VIEW SCALE: N.T.S.

2018 10-23 REVISION

GEOBRUGG VX140-H4 LOCATION DIMENSIONS

REVISIONS

Montecito Debris Flow Mitigation  
Debris Flow Mitigation Systems  
Santa Barbara County, California  
PREPARED AT THE REQUEST OF  
Partnership For Resilient Communities  
Montecito, California

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Tel: 209-472-1822

REGISTERED PROFESSIONAL ENGINEER  
No. 22-209  
C 055719  
Exp. 12-31-2018  
Albert F. Kane

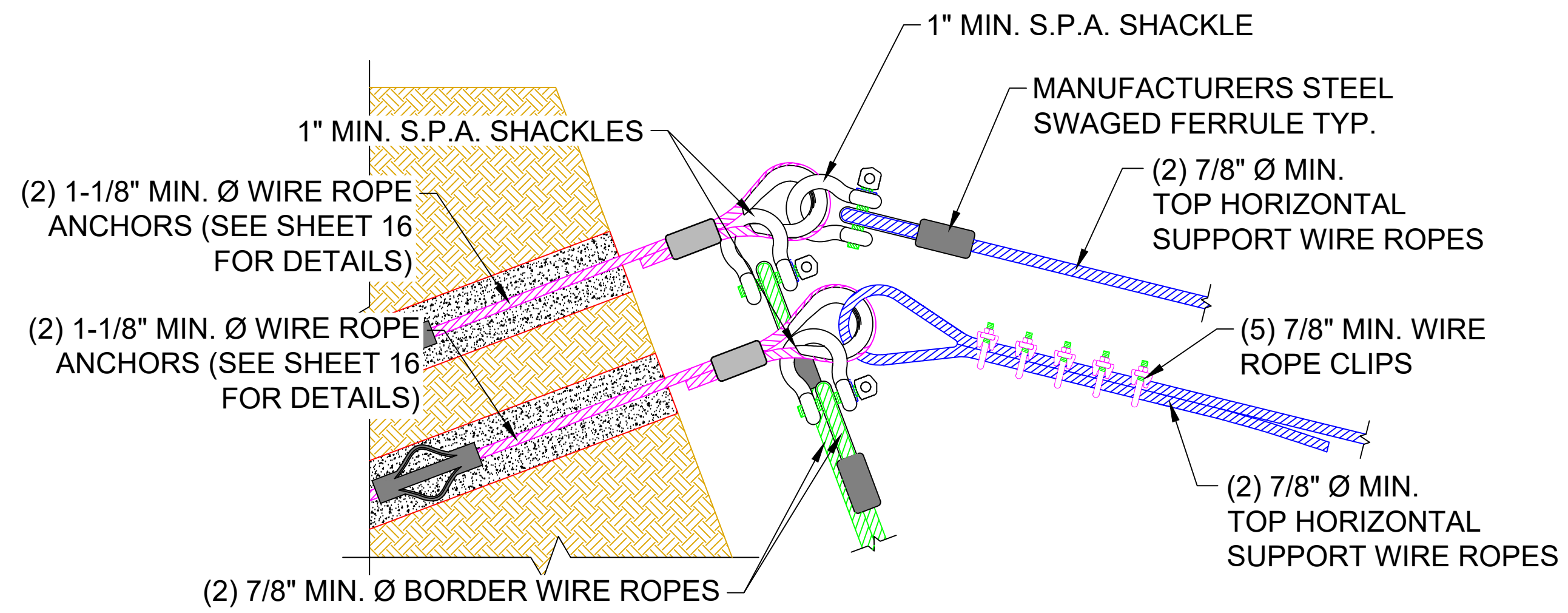
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DESIGNED BY: WFK  
CHECKED BY: WFK

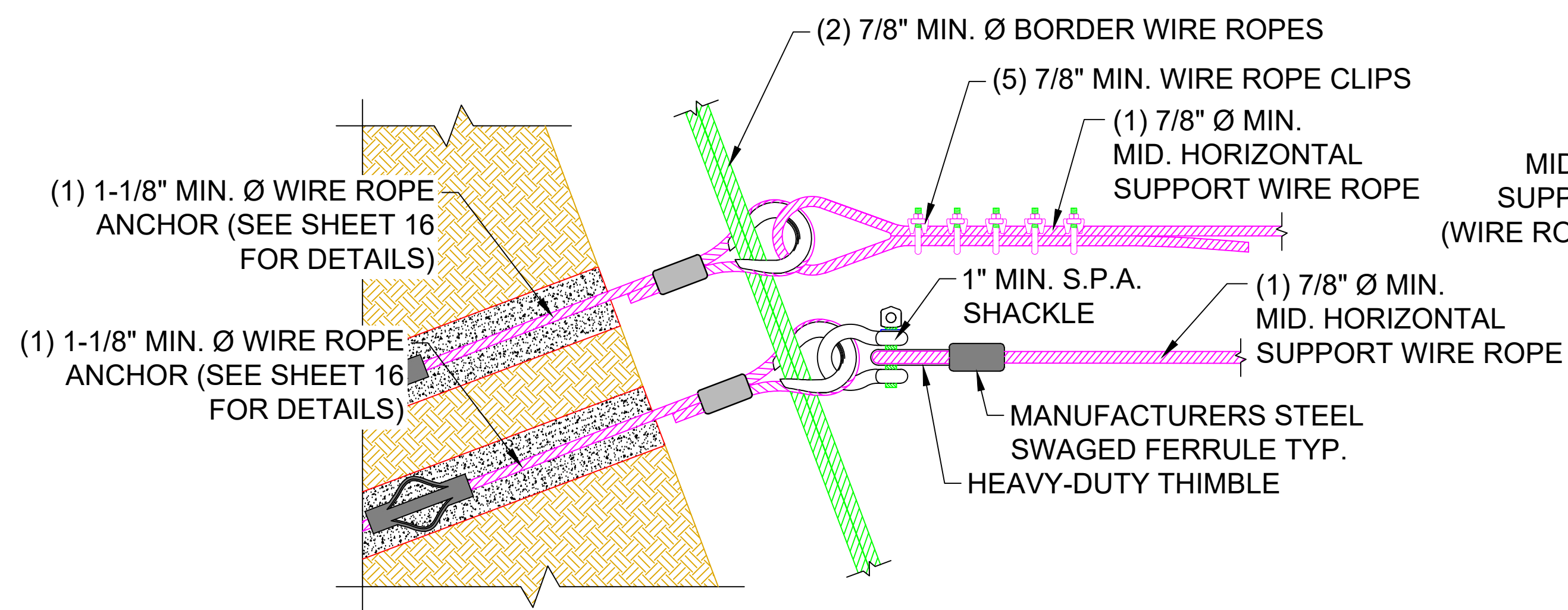
SCALE: N.T.S.  
DATE: 2018 10-04  
PROJECT NO: KGT18-18

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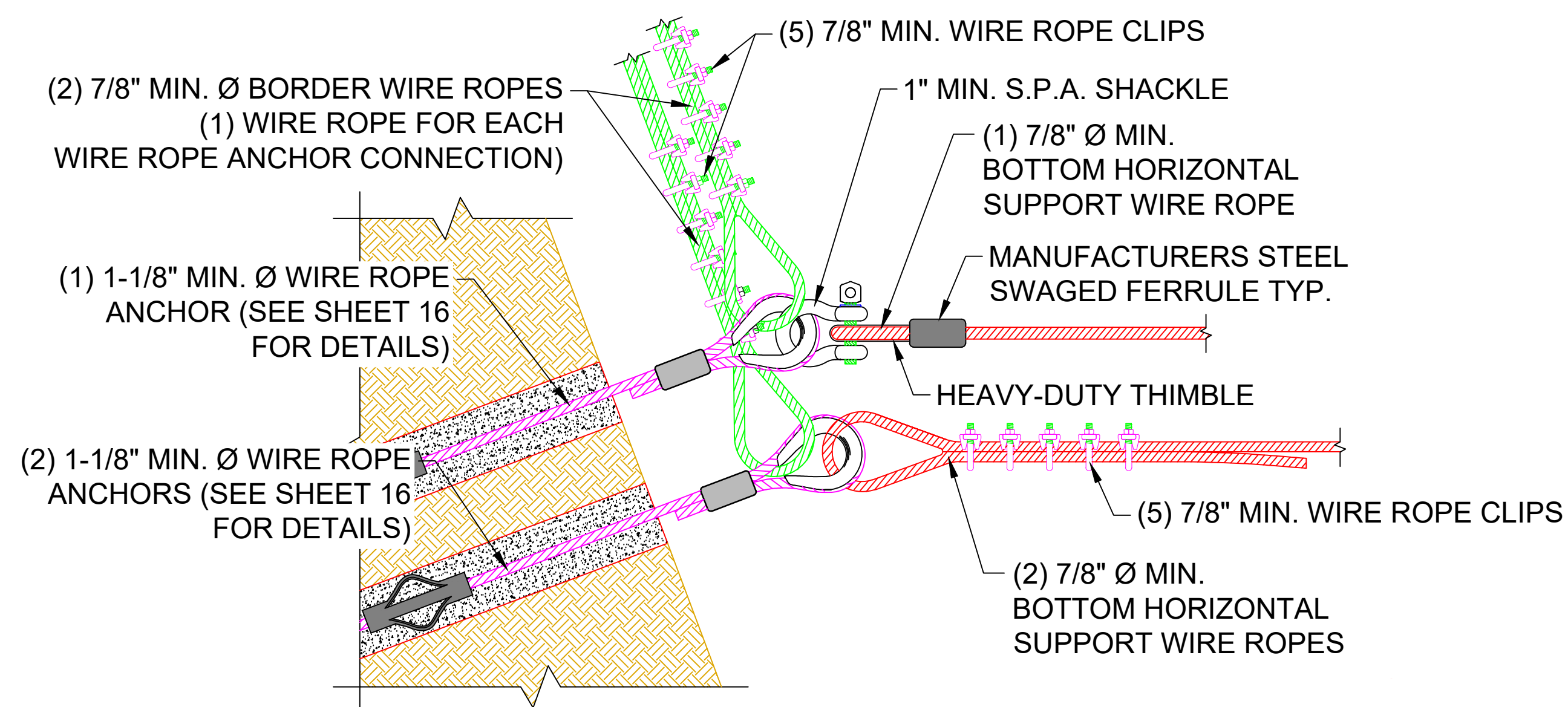




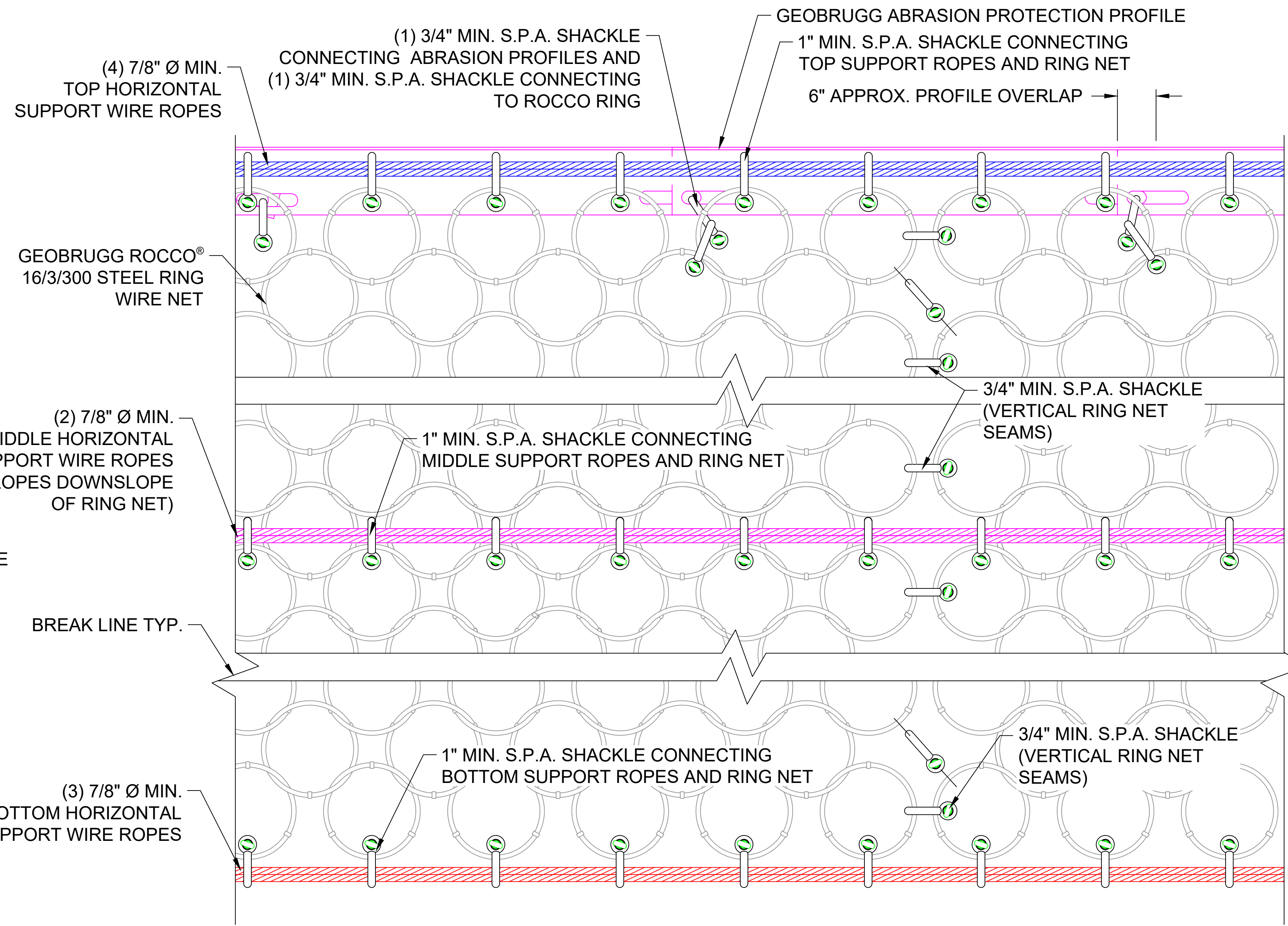
**D-1** GEOBRUGG VX140-H4 TOP SUPPORT ROPES ASSEMBLY  
**9** ELEVATION VIEW TYPICAL DETAIL SCALE: N.T.S.



**D-2** GEOBRUGG VX140-H4 MID. SUPPORT ROPES ASSEMBLY  
**9** ELEVATION VIEW TYPICAL DETAIL SCALE: N.T.S.



**D-3** GEOBRUGG VX140-H4 BOTTOM SUPPORT ROPES ASSEMBLY  
**9** ELEVATION VIEW TYPICAL DETAIL SCALE: N.T.S.



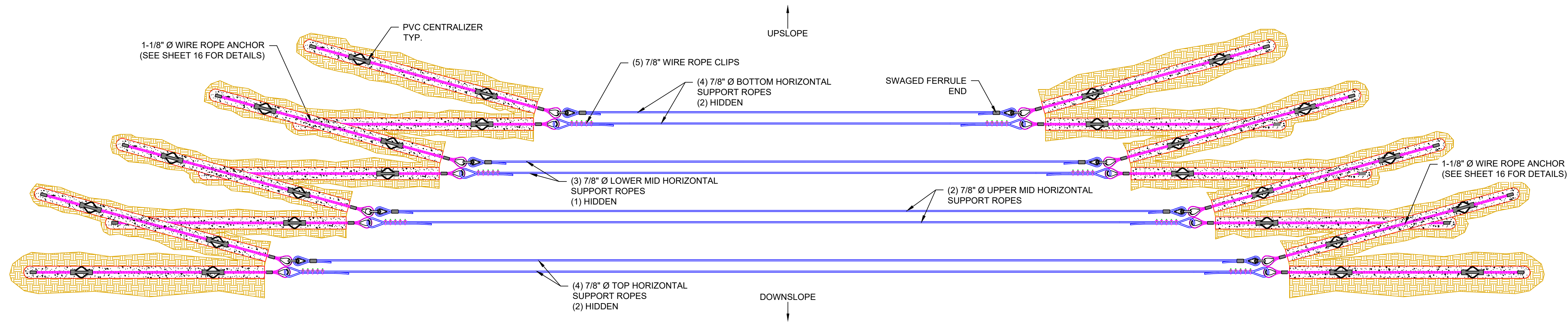
**D-4** GEOBRUGG VX140-H4 RING NET AND SUPPORT ROPE ASSEMBLY  
**9** ELEVATION VIEW TYPICAL DETAIL SCALE: N.T.S.

- NOTES:**
- MIDDLE HORIZONTAL SUPPORT ROPES INSTALLED ON THE DOWNSLOPE (VALLEY) SIDE OF THE GEOBRUGG ROCCO® RING NET
  - FOR WIRE ROPE ANCHORAGE LOCATIONS BENEATH SHOWN ELEVATION VIEWS SEE ELEVATION AND PLAN DETAILS FOR PROFILE VIEW.

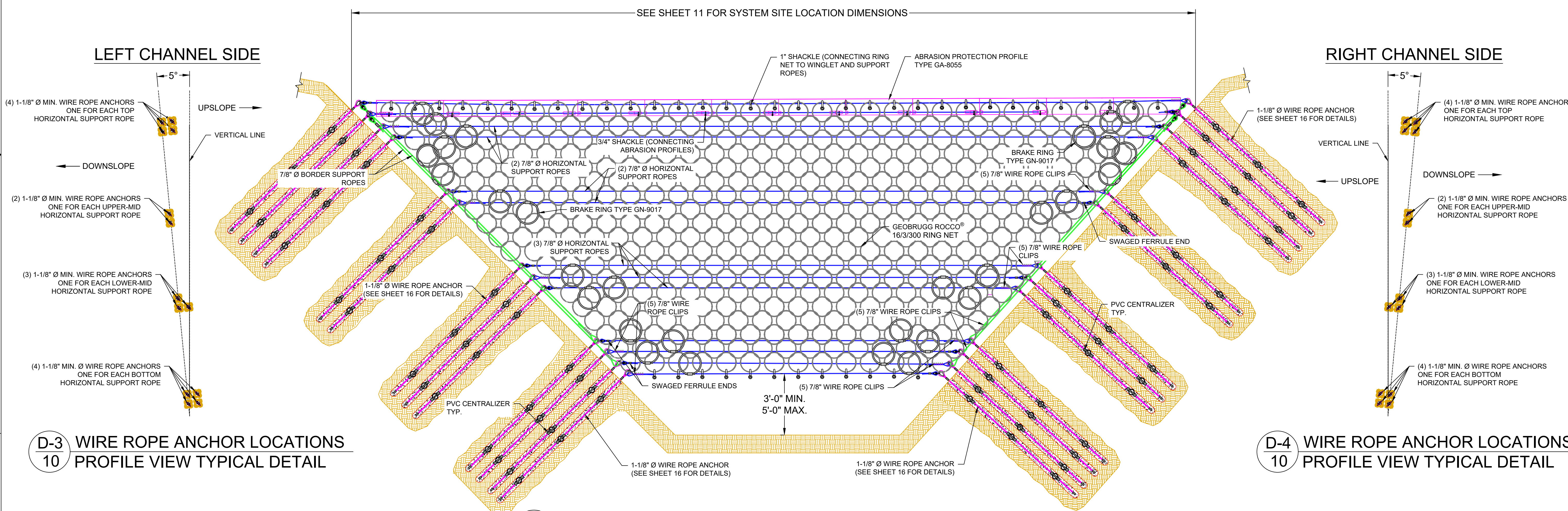
2018 10-23 REVISION

**GEOBRUGG VX140-H4 ROPE ASSEMBLY TYPICAL DETAILS**

SCALE: N.T.S.	DATE: 2018 10-04	PROJECT NO: KGT18-18
DRAWN BY: B/J	DESIGNED BY: W/K	CHECKED BY: W/K
SHEET <b>9</b> OF 16		
Montecito Debris Flow Mitigation Debris Flow Mitigation Systems Santa Barbara County, California PREPARED AT THE REQUEST OF Partnership For Resilient Communities Montecito, California		
7400 Shoreline Drive, Suite 6 Stockton, California 95219 Tel. 209-472-1822		
1441 Kapiolani Blvd., Suite 1115 Honolulu, Hawaii 96814 Tel. 808-536-2688		



**D-1** GEOBRUGG VX160-H6 DEBRIS FLOW MITIGATION SYSTEM  
**10** PLAN VIEW  
 SCALE: N.T.S.



**D-2** GEOBRUGG VX160-H6 DEBRIS FLOW MITIGATION SYSTEM  
**10** ELEVATION VIEW  
 SCALE: N.T.S.

**D-3** WIRE ROPE ANCHOR LOCATIONS  
**10** PROFILE VIEW TYPICAL DETAIL

**D-4** WIRE ROPE ANCHOR LOCATIONS  
**10** PROFILE VIEW TYPICAL DETAIL

- NOTES:**
- MIDDLE HORIZONTAL SUPPORT ROPES INSTALLED ON THE DOWNSLOPE (VALLEY) SIDE OF THE GEOBRUGG ROCCO® RING NET
  - DETAIL D-2/10 ELEVATION VIEW IS LOOKING UPSTREAM DIRECTION.
  - ANCHORS SHALL NOT BE INSTALLED WITHIN 0.5 x BOREHOLE DIAMETER OF EACH OTHER.

2018 10-23 REVISION

**GEOBRUGG VX160-H6 ELEVATION AND PLAN TYPICAL DETAILS**

REVISED

Montecito Debris Flow Mitigation  
 Debris Flow Mitigation Systems  
 Santa Barbara County, California  
 PREPARED AT THE REQUEST OF  
 Partnership For Resilient Communities  
 Montecito, California

**KANE**  
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 Honolulu, Hawaii 96814  
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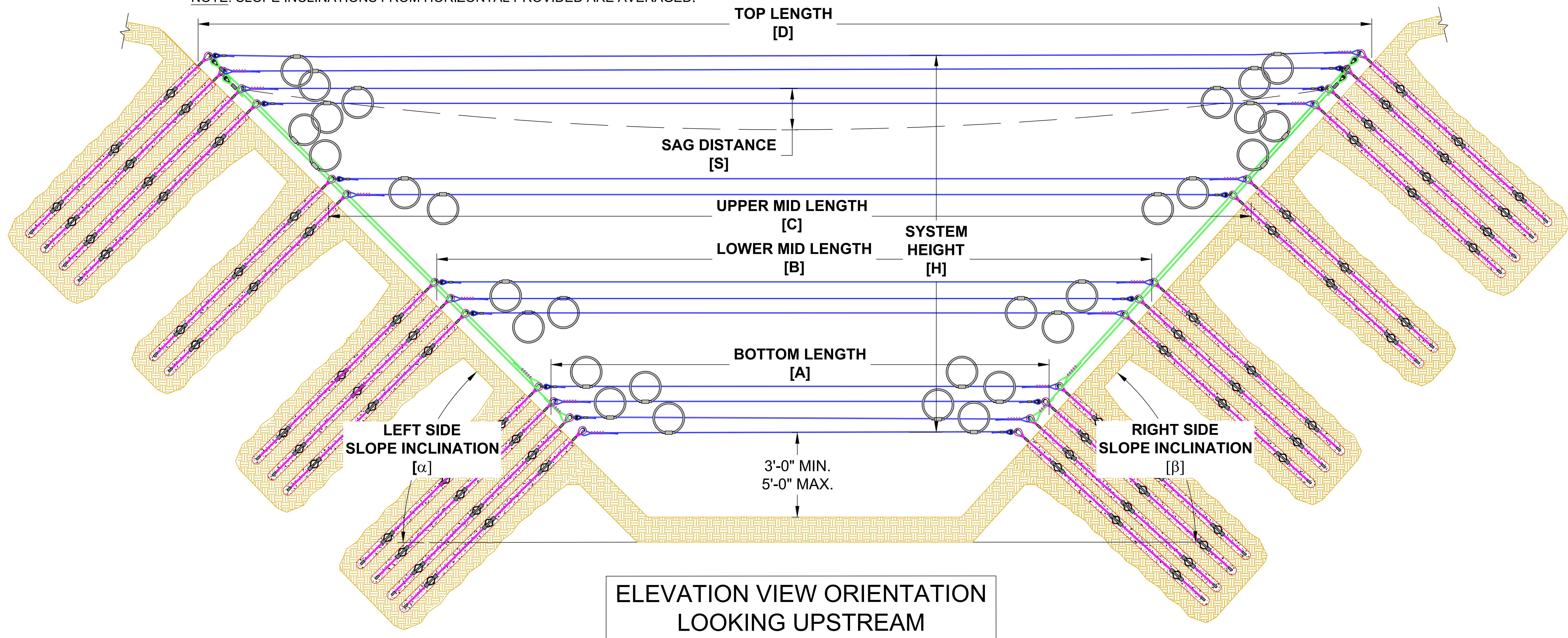


SHEET **10** OF 16

SCALE: N.T.S.	DATE: 2018 10-04	PROJECT NO: KGT18-18
DRAWN BY: BUJ	DESIGNED BY: WFK	CHECKED BY: WFK

GEOBRUGG VX160-H6 DEBRIS FLOW MITIGATION SYSTEM DIMENSIONAL SCHEDULE								
LOCATION DESIGNATION	SYSTEM HEIGHT [H] (FT)	BOTTOM LENGTH [A] (FT)	LOWER MID LENGTH [B] (FT)	UPPER MID LENGTH [C] (FT)	TOP LENGTH [D] (FT)	ALLOWABLE SAG DISTANCE [S] (FT)	LEFT SIDE AVG. SLOPE INCLINATION [ $\alpha$ ]	RIGHT SIDE AVG. SLOPE INCLINATION [ $\beta$ ]
BUENA VISTA BV-6	15	22.5	29	34	44	1	65°	50°
BUENA VISTA BV-7	20	20	33	41	50	1	70°	65°
BUENA VISTA BV-10	15	14	26	50	56	1	55°	25°
COLD SPRING CS-11	15	35	40	52	66	1	45°	50°
ROMERO RC-15	10	18	33	39	50	1	55°	55°

NOTE: SLOPE INCLINATIONS FROM HORIZONTAL PROVIDED ARE AVERAGED.



ELEVATION VIEW ORIENTATION  
LOOKING UPSTREAM

**D-1**  
**11** GEOBRUGG VX160-H6 DEBRIS FLOW MITIGATION SYSTEM  
TYPICAL DIMENSIONAL ELEVATION VIEW SCALE: N.T.S.

- NOTES:
- GEOBRUGG VX160-H6 DEBRIS FLOW MITIGATION SYSTEM DIMENSIONS AND CHANNEL GEOMETRIES ARE APPROXIMATE.
  - DETAIL D-1/11 ELEVATION VIEW IS LOOKING UPSTREAM DIRECTION.

2018 10-23 REVISION

GEOBRUGG VX160-H6 LOCATION DIMENSIONS

REVISIONS

Montecito Debris Flow Mitigation  
Debris Flow Mitigation Systems  
Santa Barbara County, California  
PREPARED AT THE REQUEST OF  
Partnership For Resilient Communities  
Montecito, California

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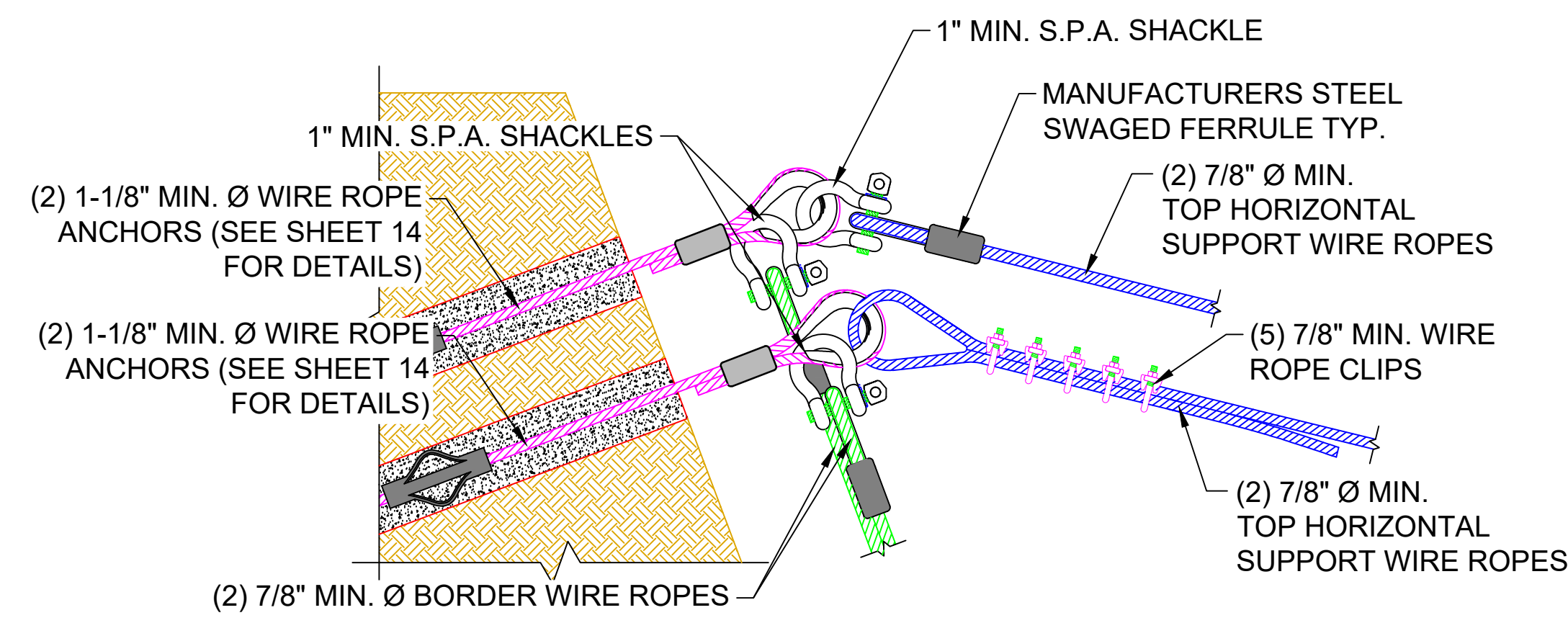
REGISTERED PROFESSIONAL ENGINEER  
C 055719  
Exp. 12-31-2018

SHEET 11 OF 16

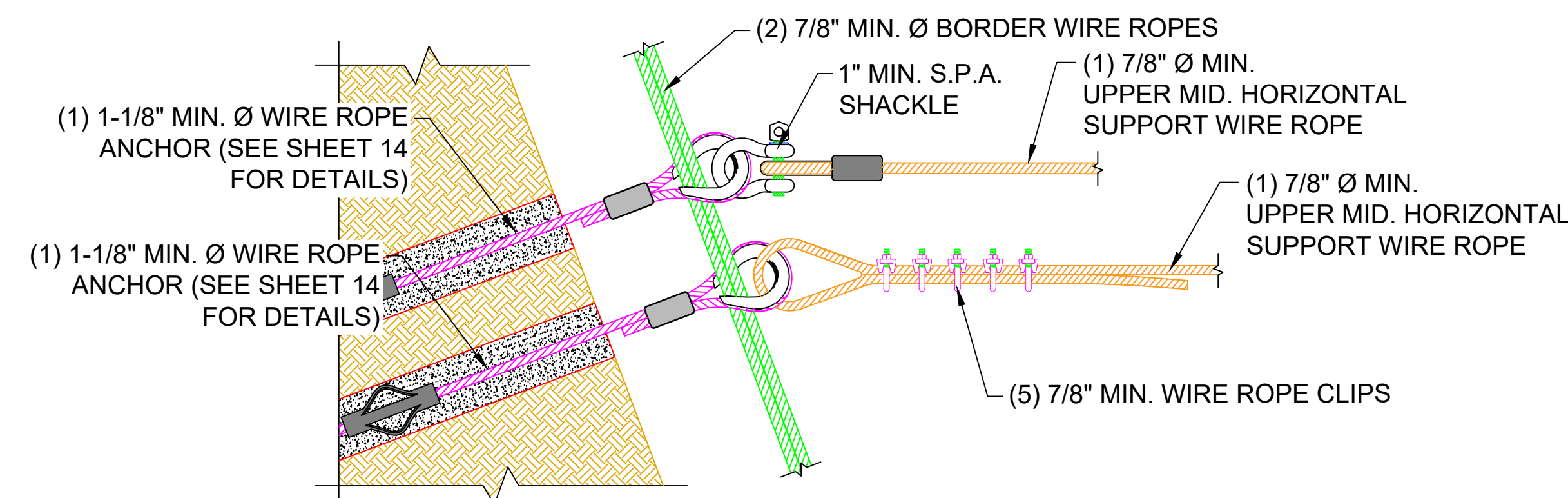
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DESIGNED BY: WFK  
CHECKED BY: WFK

SCALE: N.T.S.  
DATE: 2018 10-04  
PROJECT NO: KGT18-18

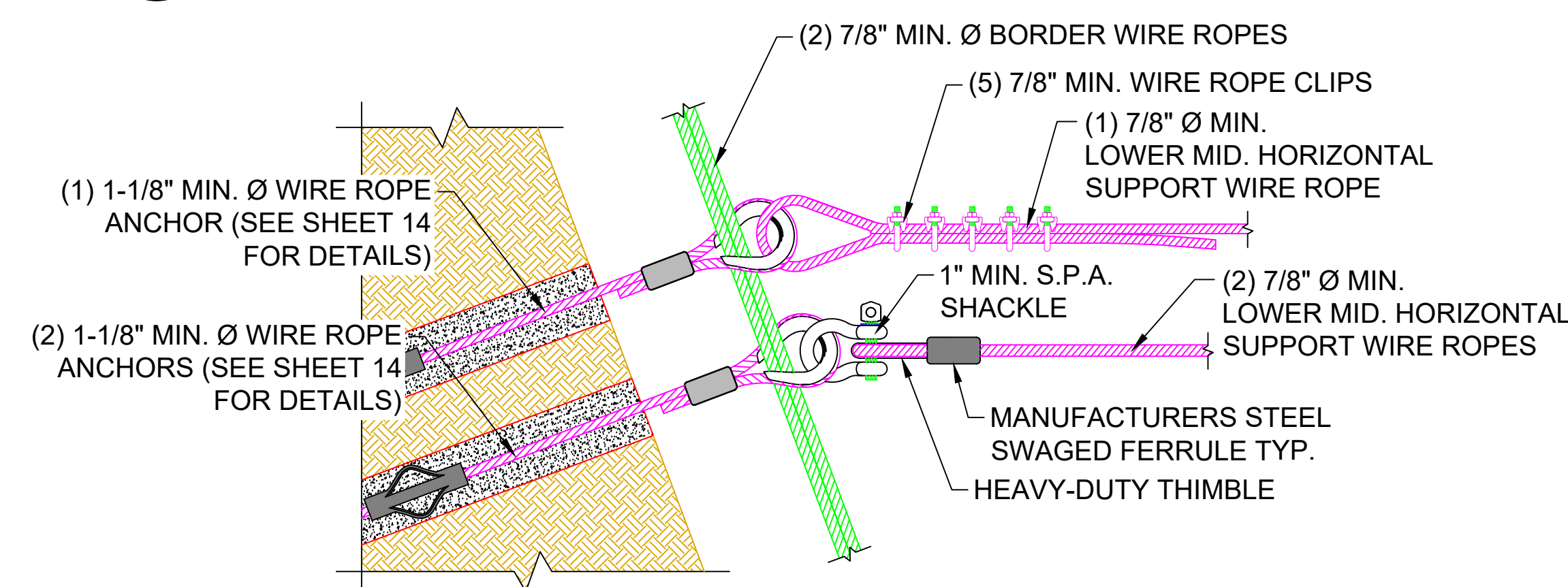
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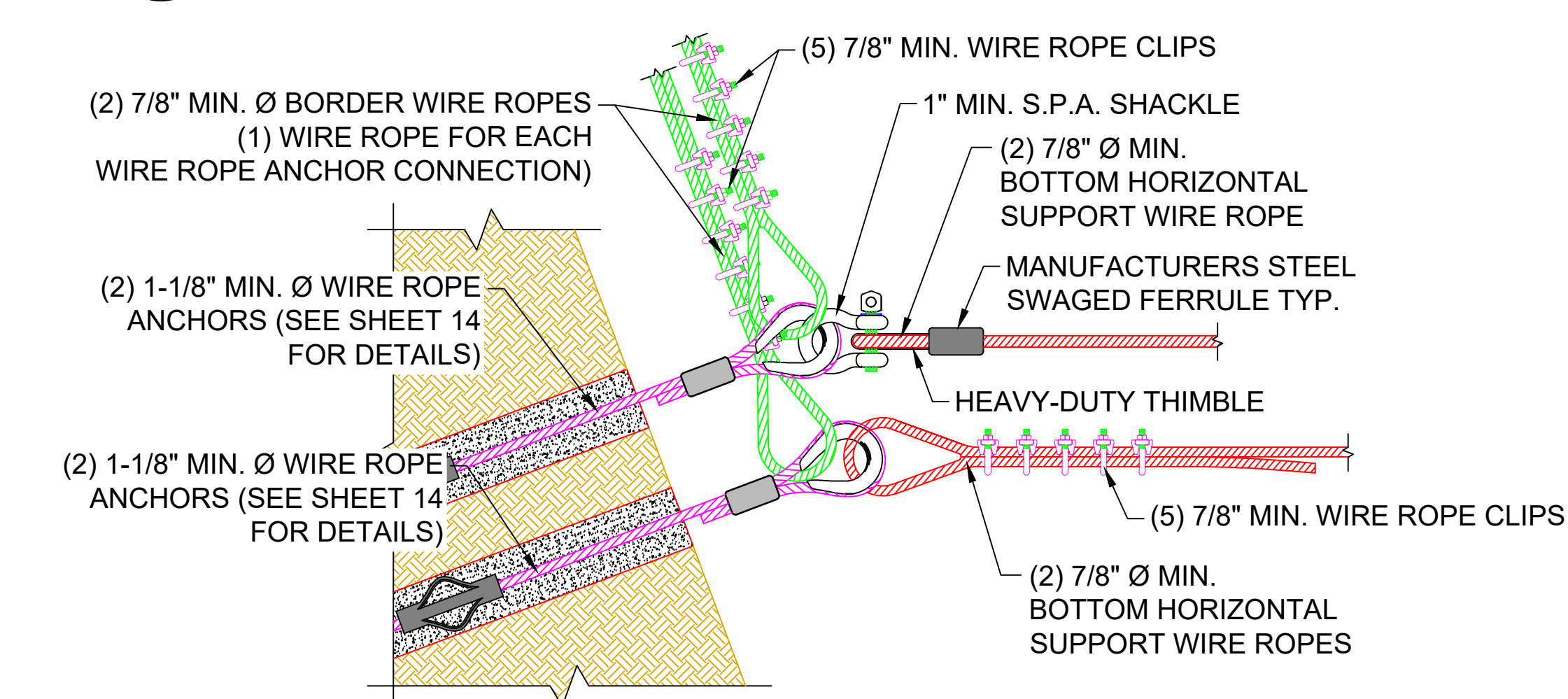
**D-1** GEOBRUGG VX160-H6 TOP SUPPORT ROPES ASSEMBLY  
**12** ELEVATION VIEW TYPICAL DETAIL  
 SCALE: N.T.S.



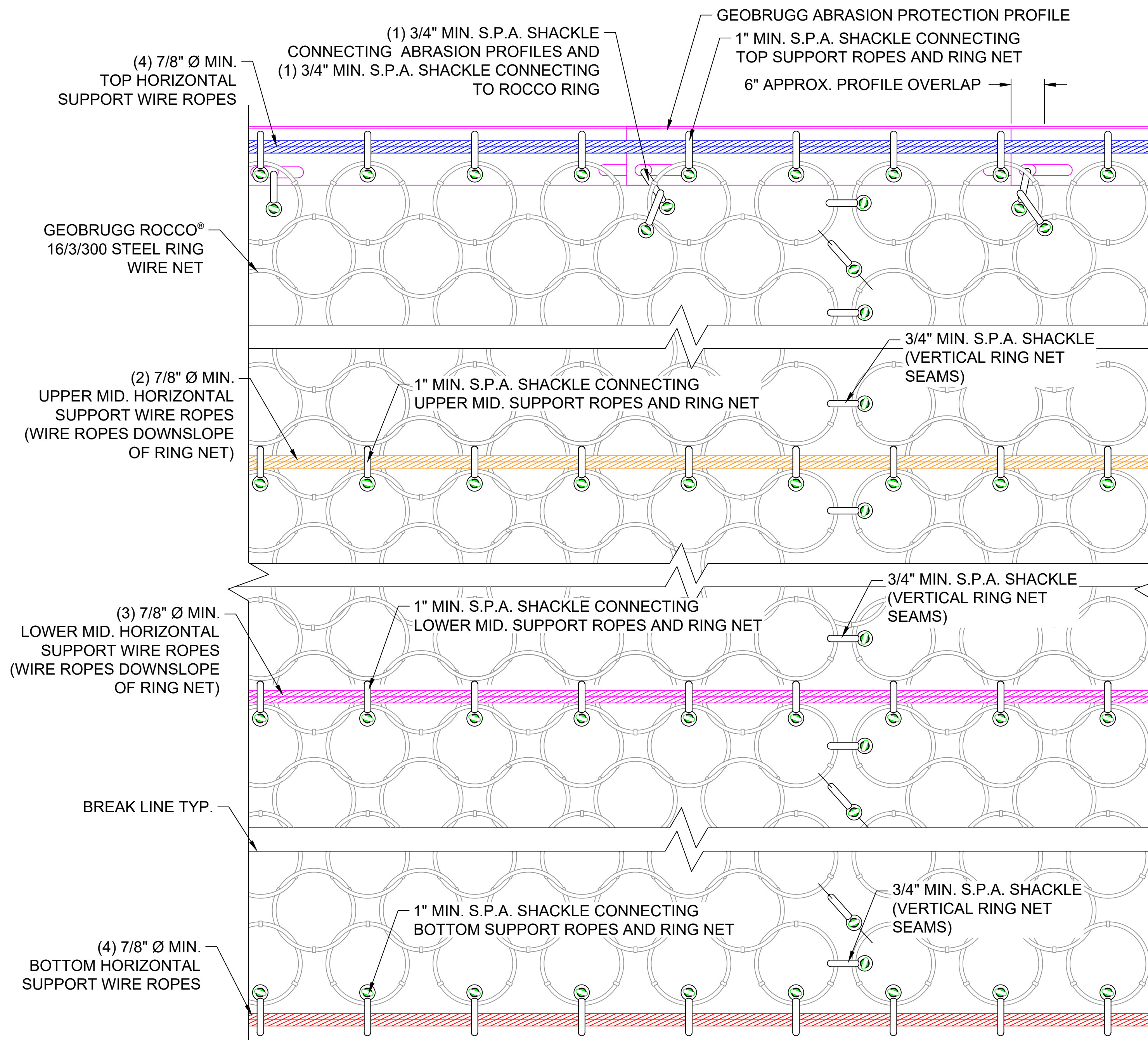
**D-2** GEOBRUGG VX160-H6 UPPER MID. SUPPORT ROPES ASSEMBLY  
**12** ELEVATION VIEW TYPICAL DETAIL  
 SCALE: N.T.S.



**D-3** GEOBRUGG VX160-H6 LOWER MID. SUPPORT ROPES ASSEMBLY  
**12** ELEVATION VIEW TYPICAL DETAIL  
 SCALE: N.T.S.



**D-4** GEOBRUGG VX160-H6 BOTTOM SUPPORT ROPES ASSEMBLY  
**12** ELEVATION VIEW TYPICAL DETAIL  
 SCALE: N.T.S.



**D-5** GEOBRUGG VX160-H6 RING NET AND SUPPORT ROPE ASSEMBLY  
**12** ELEVATION VIEW TYPICAL DETAIL  
 SCALE: N.T.S.

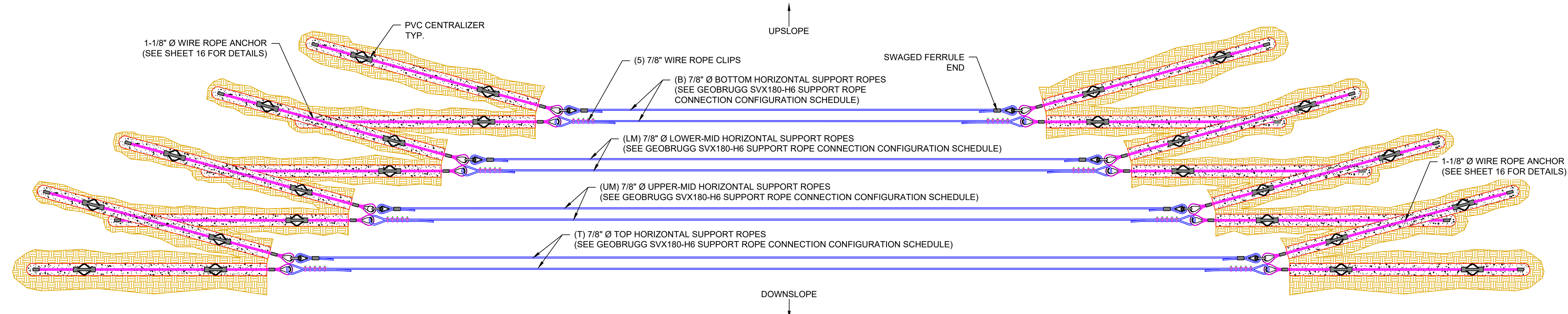
**NOTES:**

- MIDDLE HORIZONTAL SUPPORT ROPES INSTALLED ON THE DOWNSLOPE (VALLEY) SIDE OF THE GEOBRUGG ROCCO® RING NET
- FOR WIRE ROPE ANCHORAGE LOCATIONS BENEATH SHOWN ELEVATION VIEWS SEE ELEVATION AND PLAN DETAILS FOR PROFILE VIEW.

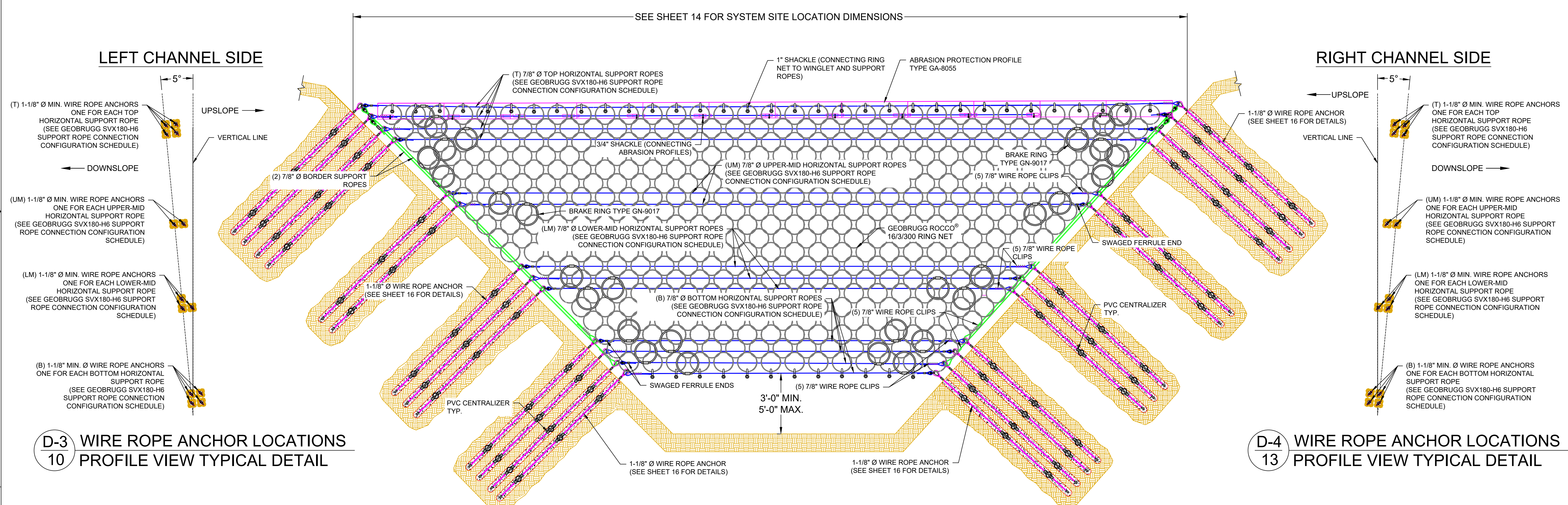
**2018 10-23 REVISION**

**GEOBRUGG VX160-H6 ROPE ASSEMBLY TYPICAL DETAILS**

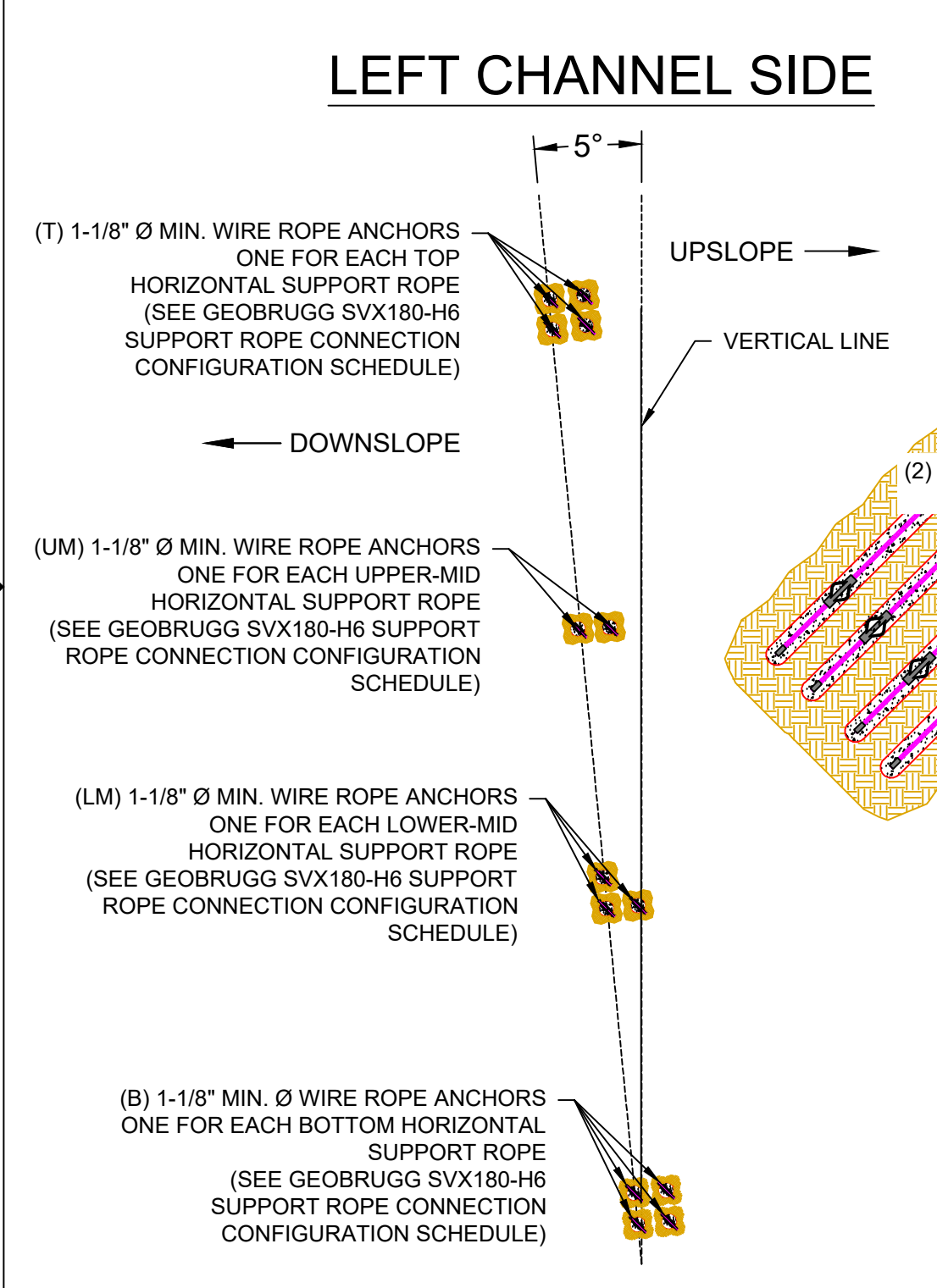
SCALE: N.T.S.	DATE: 2018 10-04	PROJECT NO: KGT18-18
DRAWN BY: B/JF	DESIGNED BY: W/K	CHECKED BY: W/K
SHEET <b>12</b> OF 16		
Montecito Debris Flow Mitigation Debris Flow Mitigation Systems Santa Barbara County, California PREPARED AT THE REQUEST OF Partnership For Resilient Communities Montecito, California		
REVISED		



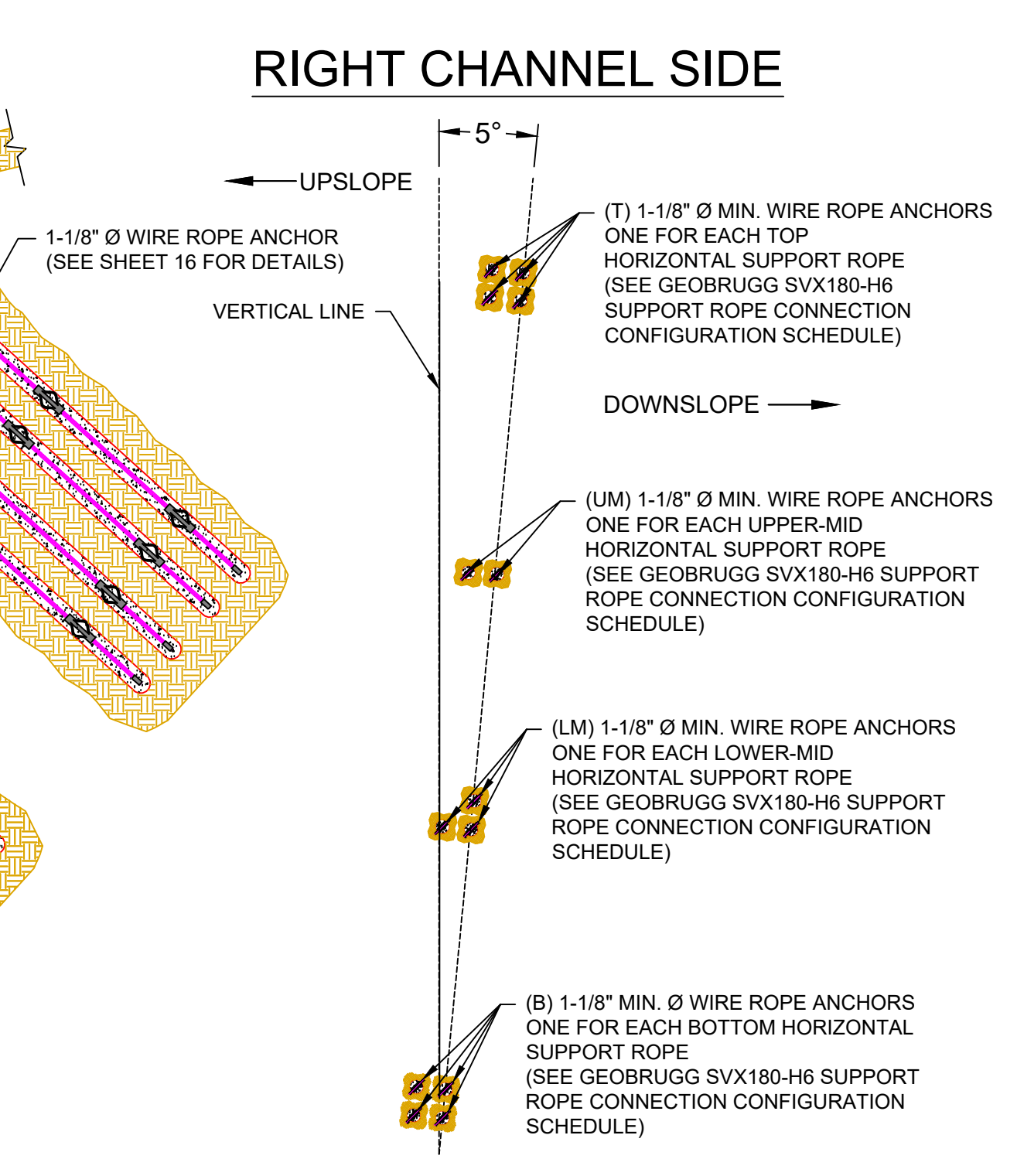
**D-1** GEOBRUGG SVX180-H6 DEBRIS FLOW MITIGATION SYSTEM  
**13** TYPICAL PLAN VIEW  
 SCALE: N.T.S.



**D-2** GEOBRUGG SVX180-H6 DEBRIS FLOW MITIGATION SYSTEM  
**13** TYPICAL ELEVATION VIEW  
 SCALE: N.T.S.



**D-3** WIRE ROPE ANCHOR LOCATIONS  
**10** PROFILE VIEW TYPICAL DETAIL



**D-4** WIRE ROPE ANCHOR LOCATIONS  
**13** PROFILE VIEW TYPICAL DETAIL

GEOBRUGG SVX180-H6 SUPPORT ROPE CONFIGURATION SCHEDULE				
LOCATION DESIGNATION	BOT. SUPPORT ROPE QUANTITY (B)	LOWER MID SUPPORT ROPE QUANTITY (LM)	UPPER MID SUPPORT ROPE QUANTITY (UM)	TOP SUPPORT ROPE QUANTITY (T)
BUENA VISTA BV-4	5	5	7	7
BUENA VISTA BV-11	7	8	9	9
HOT SPRINGS HS-6	6	6	7	7
COLD SPRING CS-18	6	6	8	7
SAN YSIDRO SY-7	4	5	6	6
SAN YSIDRO SY-18	3	4	6	4
ROMERO RC-12	2	3	4	3

- NOTES:**
- MIDDLE HORIZONTAL SUPPORT ROPES INSTALLED ON THE DOWNSLOPE (VALLEY) SIDE OF THE GEOBRUGG ROCCO® RING NET
  - DETAIL D-2/13 ELEVATION VIEW IS LOOKING UPSTREAM DIRECTION.
  - ANCHORS SHALL NOT BE INSTALLED WITHIN 0.5 x BOREHOLE DIAMETER OF EACH OTHER.

**GEOBRUGG SVX180-H6 ELEVATION AND PLAN TYPICAL DETAILS**

**2018 10-23 REVISION**

2018 10-23: Removed Site BV-1 From Schedule.

REVISION

Montecito Debris Flow Mitigation  
 Debris Flow Mitigation Systems  
 Santa Barbara County, California  
 PREPARED AT THE REQUEST OF  
 Partnership For Resilient Communities  
 Montecito, California

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REGISTERED PROFESSIONAL ENGINEER  
 STATE OF CALIFORNIA  
 No. 50577  
 Exp. 12-31-2018

SHEET **13** OF 16

DRAWN BY: B/JF  
 DESIGNED BY: W/K  
 CHECKED BY: W/K

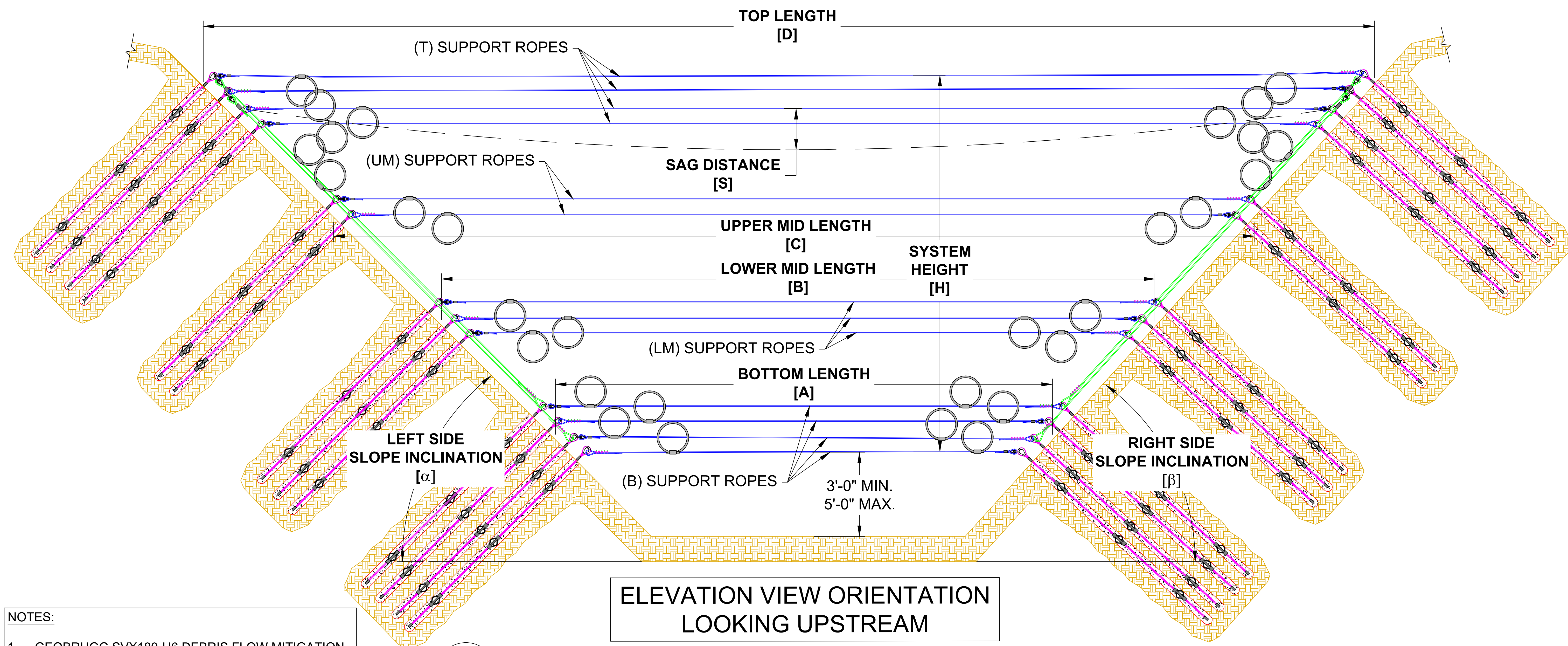
SCALE: N.T.S.  
 DATE: 2018 10-04  
 PROJECT NO: KGT18-18

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GEOBRUGG SVX180-H6 DEBRIS FLOW MITIGATION SYSTEM DIMENSIONAL SCHEDULE - 1								
LOCATION DESIGNATION	SYSTEM HEIGHT [H] (FT)	BOTTOM LENGTH [A] (FT)	LOWER MID LENGTH [B] (FT)	UPPER MID LENGTH [C] (FT)	TOP LENGTH [D] (FT)	SAG DISTANCE [S] (FT)	LEFT SIDE AVG. SLOPE INCLINATION [ $\alpha$ ] (DEG.)	RIGHT SIDE AVG. SLOPE INCLINATION [ $\beta$ ] (DEG.)
BUENA VISTA BV-4	17	45	54	69	77	1.5	55	66
BUENA VISTA BV-11	20	98	116	134	150	3	30	30
HOT SPRINGS HS-6	17	48	67	81	94	2	65	55
COLD SPRING CS-18	12	47	60	70	81	1.5	45	30
SAN YSIDRO SY-7	20	41	58	65	75	1.5	75	55
SAN YSIDRO SY-18	16	13	47	57	67	1.5	60	60
ROMERO RC-12	12	40	45	52	61	1	55	60

GEOBRUGG SVX180-H6 SUPPORT ROPE CONFIGURATION SCHEDULE - 2				
LOCATION DESIGNATION	BOT. SUPPORT ROPE QUANTITY (B)	LOWER MID SUPPORT ROPE QUANTITY (LM)	UPPER MID SUPPORT ROPE QUANTITY (UM)	TOP SUPPORT ROPE QUANTITY (T)
BUENA VISTA BV-4	5	5	7	7
BUENA VISTA BV-11	7	8	9	9
HOT SPRINGS HS-6	6	6	7	7
COLD SPRING CS-18	6	6	8	7
SAN YSIDRO SY-7	4	5	6	6
SAN YSIDRO SY-18	3	4	6	4
ROMERO RC-12	2	3	4	3

NOTE: SLOPE INCLINATIONS FROM HORIZONTAL PROVIDED ARE AVERAGED.



- NOTES:
- GEOBRUGG SVX180-H6 DEBRIS FLOW MITIGATION SYSTEM DIMENSIONS AND CHANNEL GEOMETRIES ARE APPROXIMATE.
  - DETAIL D-1/14 ELEVATION VIEW IS LOOKING UPSTREAM DIRECTION.
  - SUPPORT WIRE ROPE CONFIGURATIONS VARY BASED ON SITE LOCATION. SEE SCHEDULE 2 FOR WIRE ROPE QUANTITIES FOR EACH SECTION.

**D-1** GEOBRUGG SVX180-H6 DEBRIS FLOW MITIGATION SYSTEM  
**14** TYPICAL DIMENSIONAL ELEVATION VIEW  
 SCALE: N.T.S.

**GEOBRUGG SVX180-H6 LOCATION DIMENSIONS**

2018 10-23 REVISION

2018 10-23: Removed Site BV-1 From Schedule 1 & 2.

REVISION

Montecito Debris Flow Mitigation  
 Debris Flow Mitigation Systems  
 Santa Barbara County, California  
 PREPARED AT THE REQUEST OF  
 Partnership For Resilient Communities  
 Montecito, California

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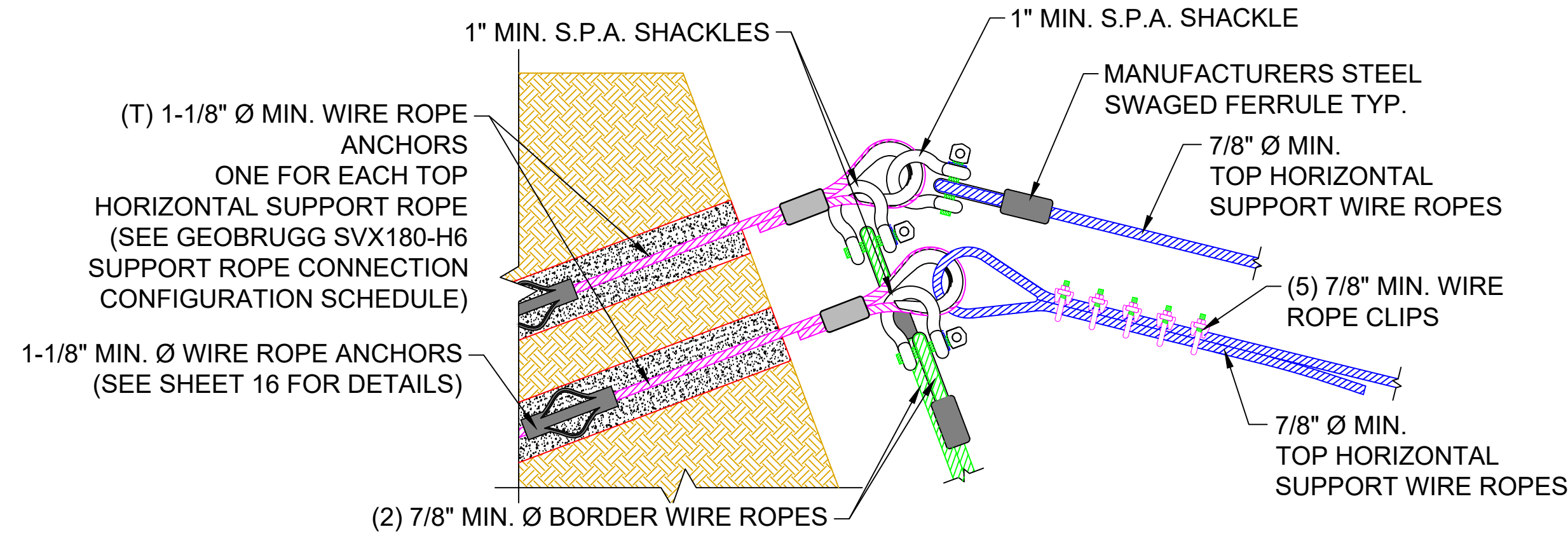
7400 Shoreline Drive, Suite 6  
 Stockton, California 95219  
 Tel: 209-472-1822

SHEET **14** OF 16

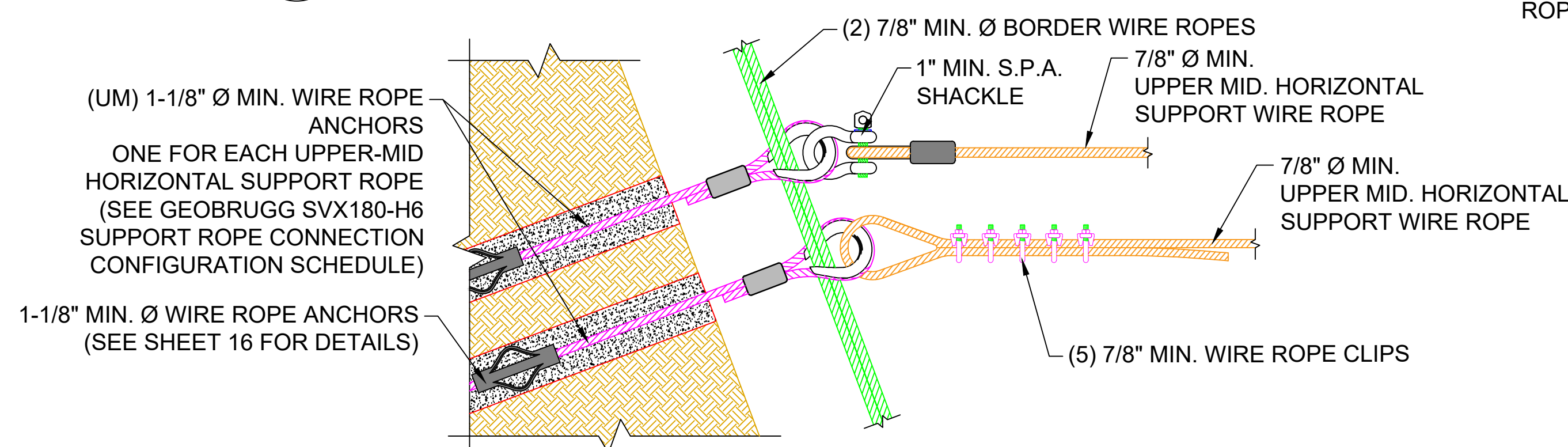
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 DESIGNED BY: WFK  
 CHECKED BY: WFK

SCALE: N.T.S.  
 DATE: 2018 10-04  
 PROJECT NO: KGT18-18

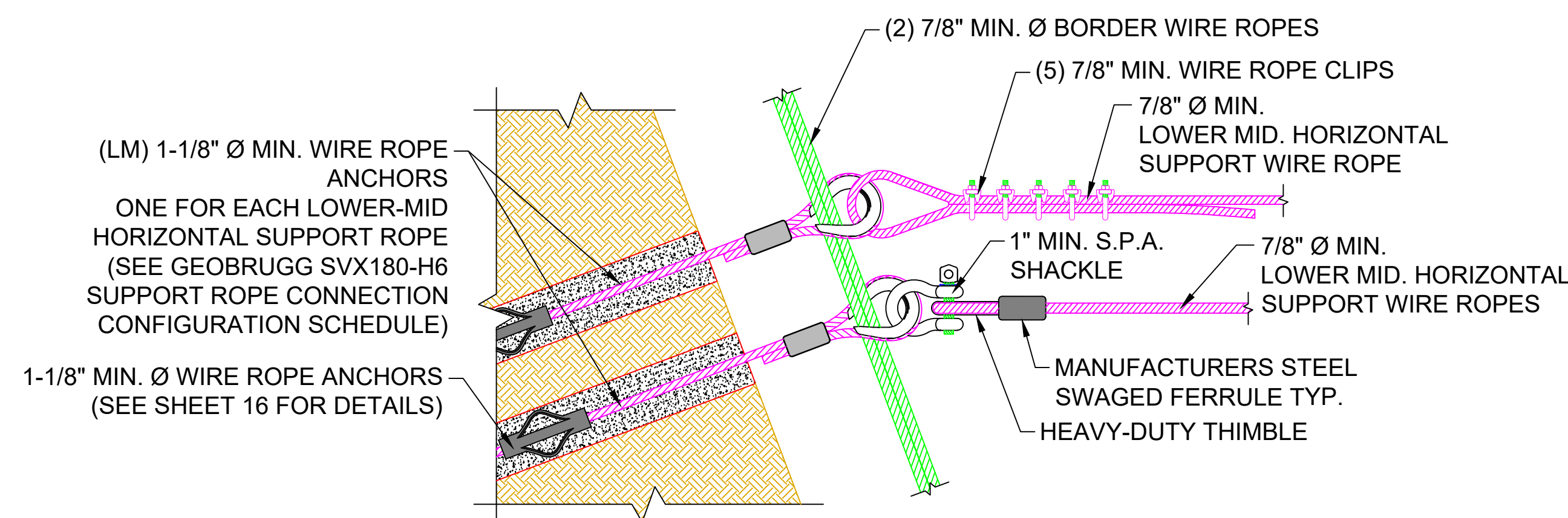
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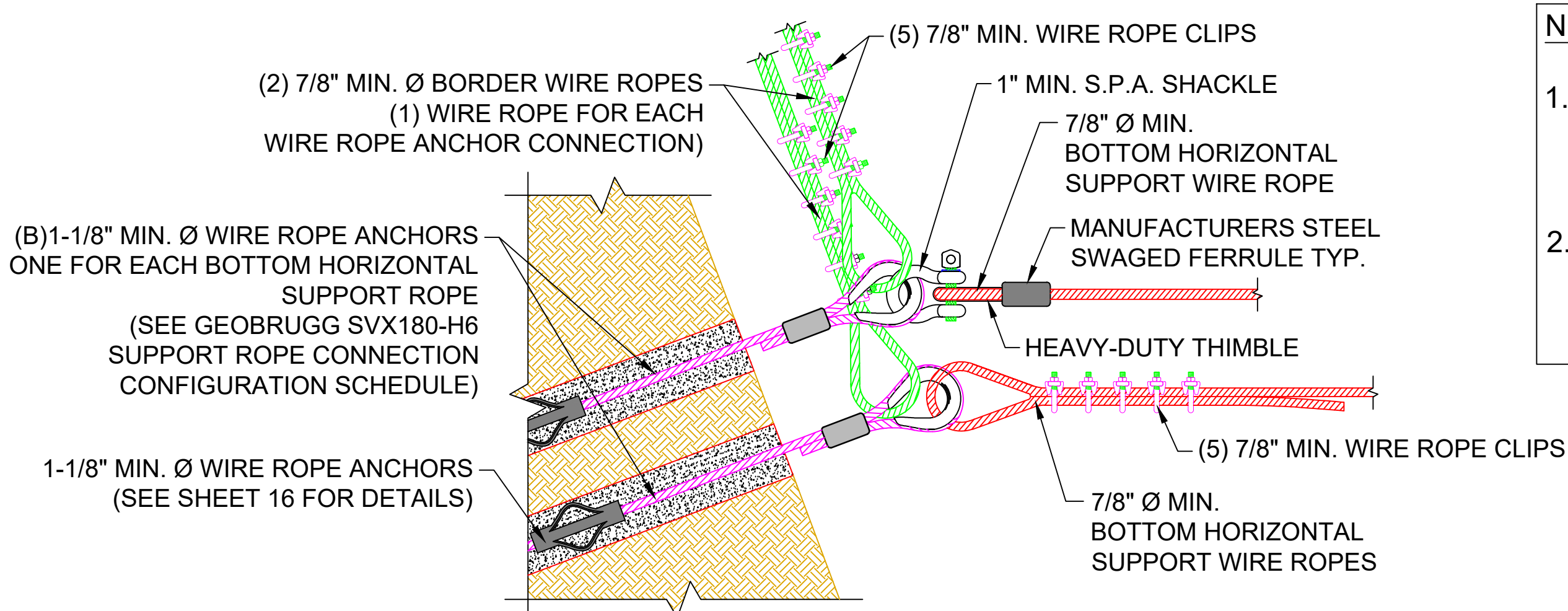
**D-1** GEOBRUGG SVX180-H6 TOP SUPPORT ROPES ASSEMBLY  
**15** ELEVATION VIEW TYPICAL DETAIL  
 SCALE: N.T.S.



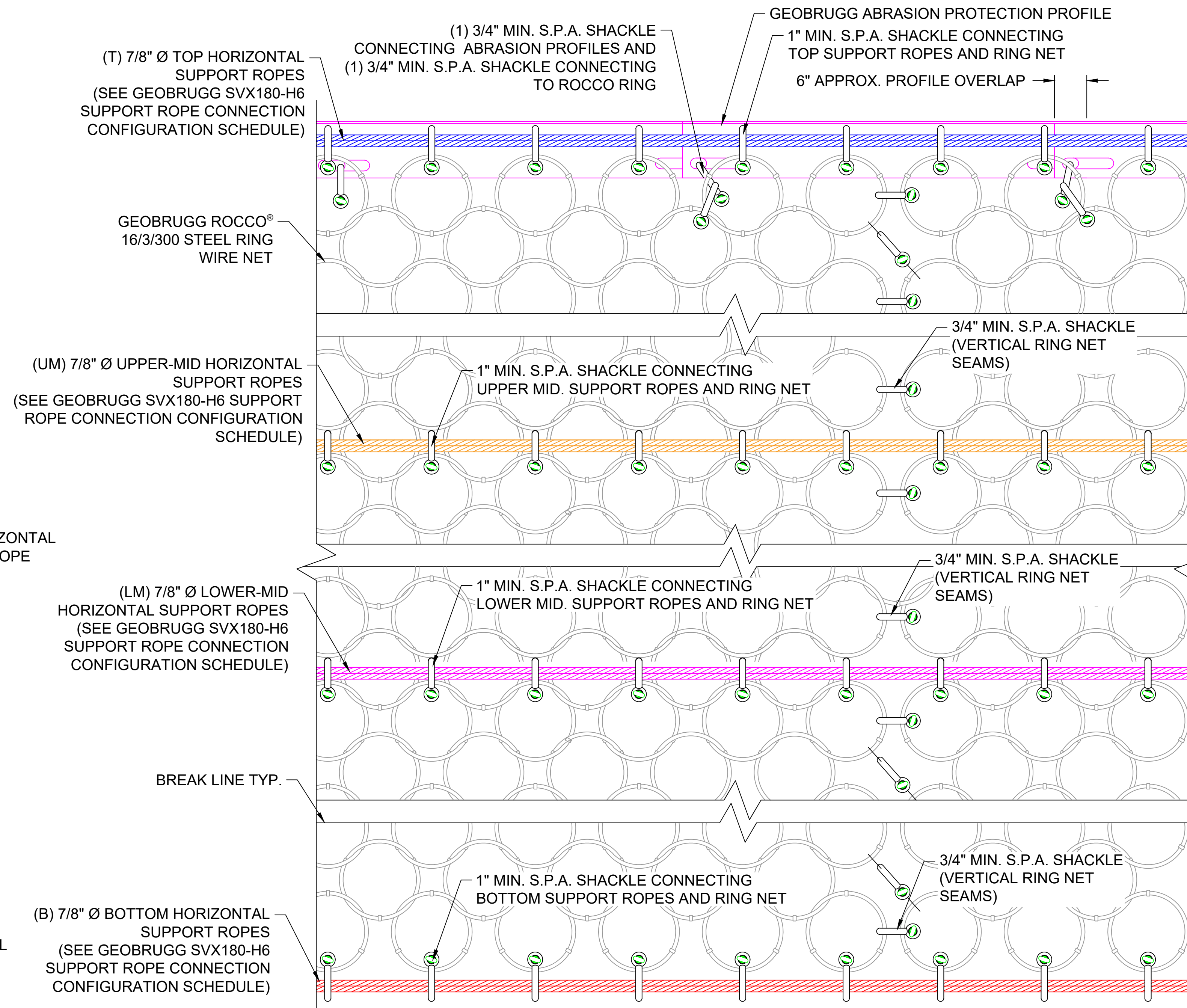
**D-2** GEOBRUGG SVX180-H6 UPPER MID. SUPPORT ROPES  
**15** ASSEMBLY ELEVATION VIEW TYPICAL DETAIL  
 SCALE: N.T.S.



**D-3** GEOBRUGG SVX180-H6 LOWER MID. SUPPORT ROPES  
**15** ASSEMBLY ELEVATION VIEW TYPICAL DETAIL  
 SCALE: N.T.S.



**D-4** GEOBRUGG SVX180-H6 BOTTOM SUPPORT ROPES ASSEMBLY  
**15** ELEVATION VIEW TYPICAL DETAIL  
 SCALE: N.T.S.



**D-5** GEOBRUGG SVX180-H6 RING NET AND SUPPORT ROPE ASSEMBLY  
**15** ELEVATION VIEW TYPICAL DETAIL  
 SCALE: N.T.S.

- NOTES:**
- MIDDLE HORIZONTAL SUPPORT ROPES INSTALLED ON THE DOWNSLOPE (VALLEY) SIDE OF THE GEOBRUGG ROCCO® RING NET
  - FOR WIRE ROPE ANCHORAGE LOCATIONS BENEATH SHOWN ELEVATION VIEWS SEE ELEVATION AND PLAN DETAILS FOR PROFILE VIEW.

GEOBRUGG SVX180-H6 SUPPORT ROPE CONFIGURATION SCHEDULE				
LOCATION DESIGNATION	BOT. SUPPORT ROPE QUANTITY (B)	LOWER MID SUPPORT ROPE QUANTITY (LM)	UPPER MID SUPPORT ROPE QUANTITY (UM)	TOP SUPPORT ROPE QUANTITY (T)
BUENA VISTA BV-4	5	5	7	7
BUENA VISTA BV-11	7	8	9	9
HOT SPRINGS HS-6	6	6	7	7
COLD SPRING CS-18	6	6	8	7
SAN YSIDRO SY-7	4	5	6	6
SAN YSIDRO SY-18	3	4	6	4
ROMERO RC-12	2	3	4	3

2018 10-23 REVISION

**GEOBRUGG SVX180-H6 ROPE ASSEMBLY TYPICAL DETAILS**

2018 10-23: Removed Site BV-1 From Schedule.

REVISIONS

Montecito Debris Flow Mitigation  
 Debris Flow Mitigation Systems  
 Santa Barbara County, California

PREPARED AT THE REQUEST OF  
 Partnership For Resilient Communities  
 Montecito, California

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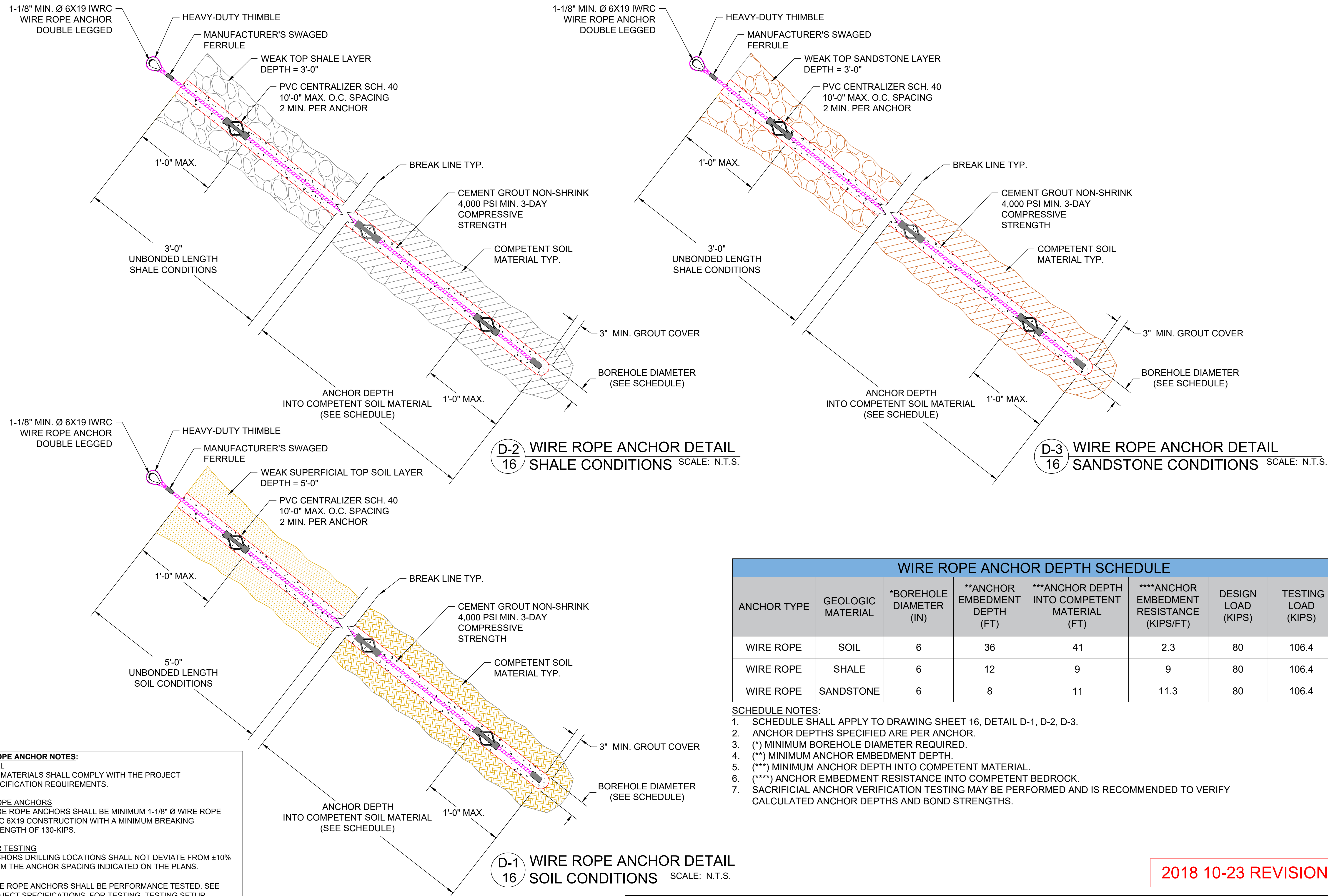
REGISTERED PROFESSIONAL ENGINEER  
 STATE OF CALIFORNIA  
 No. 055719  
 Exp. 12-31-2018

SHEET **15** OF 16

DRAWN BY: B/JF  
 DESIGNED BY: W/K  
 CHECKED BY: W/K

SCALE: N.T.S.  
 DATE: 2018 10-04  
 PROJECT NO: KGT18-18

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**WIRE ROPE ANCHOR NOTES:**  
**GENERAL**  
 1. ALL MATERIALS SHALL COMPLY WITH THE PROJECT SPECIFICATION REQUIREMENTS.  
**WIRE ROPE ANCHORS**  
 1. WIRE ROPE ANCHORS SHALL BE MINIMUM 1-1/8" Ø WIRE ROPE IWRC 6X19 CONSTRUCTION WITH A MINIMUM BREAKING STRENGTH OF 130-KIPS.  
**ANCHOR TESTING**  
 1. ANCHORS DRILLING LOCATIONS SHALL NOT DEVIATE FROM ±10% FROM THE ANCHOR SPACING INDICATED ON THE PLANS.  
 2. WIRE ROPE ANCHORS SHALL BE PERFORMANCE TESTED. SEE PROJECT SPECIFICATIONS FOR TESTING, TESTING SETUP, PROCEDURE, QUANTITY AND ADDITIONAL REQUIREMENTS.  
 3. ANCHOR TESTING SHALL BE COMPLETED UNDER OBSERVATION BY THE ENGINEER IN THE FIELD.

WIRE ROPE ANCHOR DEPTH SCHEDULE							
ANCHOR TYPE	GEOLOGIC MATERIAL	*BOREHOLE DIAMETER (IN)	**ANCHOR EMBEDMENT DEPTH (FT)	***ANCHOR DEPTH INTO COMPETENT MATERIAL (FT)	****ANCHOR EMBEDMENT RESISTANCE (KIPS/FT)	DESIGN LOAD (KIPS)	TESTING LOAD (KIPS)
WIRE ROPE	SOIL	6	36	41	2.3	80	106.4
WIRE ROPE	SHALE	6	12	9	9	80	106.4
WIRE ROPE	SANDSTONE	6	8	11	11.3	80	106.4

- SCHEDULE NOTES:**
- SCHEDULE SHALL APPLY TO DRAWING SHEET 16, DETAIL D-1, D-2, D-3.
  - ANCHOR DEPTHS SPECIFIED ARE PER ANCHOR.
  - (\*) MINIMUM BOREHOLE DIAMETER REQUIRED.
  - (\*\*) MINIMUM ANCHOR EMBEDMENT DEPTH.
  - (\*\*\*) MINIMUM ANCHOR DEPTH INTO COMPETENT MATERIAL.
  - (\*\*\*\*) ANCHOR EMBEDMENT RESISTANCE INTO COMPETENT BEDROCK.
  - SACRIFICIAL ANCHOR VERIFICATION TESTING MAY BE PERFORMED AND IS RECOMMENDED TO VERIFY CALCULATED ANCHOR DEPTHS AND BOND STRENGTHS.

# GEOBRUGG SVX/VX SYSTEM ANCHORAGE TYPICAL DETAILS

2018 10-23 REVISION

REVISIONS

Montecito Debris Flow Mitigation  
 Debris Flow Mitigation Systems  
 Santa Barbara County, California  
 PREPARED AT THE REQUEST OF  
 Partnership For Resilient Communities  
 Montecito, California

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10-22-2018  
 0 0557-8  
 Exp. 4-21-2018

SHEET 16 OF 16

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