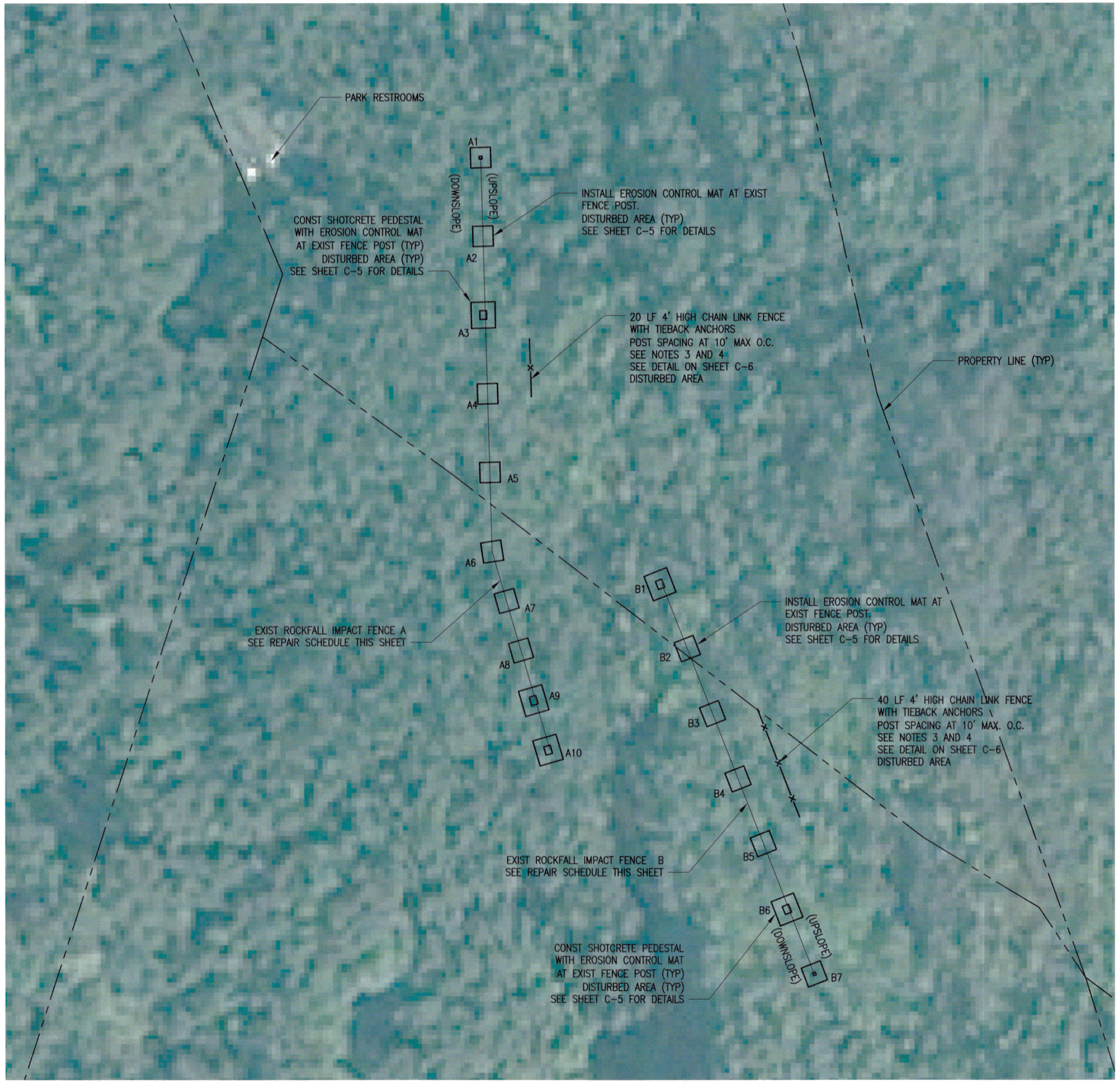

SITE PLAN 1
SCALE: 1" = 20'

1" = 20' 0 20 40 60 SCALE FEET

LEGEND

- PROPERTY LINES
- EXIST ROCKFALL IMPACT FENCE
- 4' HIGH CHAIN LINK FENCE W/TIEBACK ANCHORS
- EXIST FENCE POST W/EROSION CONTROL MAT
- EXIST FENCE POST W/SHOTCRETE PEDESTAL AND EROSION CONTROL MAT

FENCE A REPAIR SCHEDULE

POST ID	NEW PARTS & MATERIALS *			
	¾" CLIPS	⅝" CLIPS	EROSION CONTROL MAT	SPECIAL MITIGATION
A1	40	15		–
A2	30	15	YES	–
A3	20	15	YES	SHOTCRETE PEDESTAL **
A4	20	15	YES	–
A5	20	15	YES	–
A6	20	15	YES	–
A7	20	15	YES	–
A8	20	15	YES	–
A9	20	15	YES	SHOTCRETE PEDESTAL ** & INSTALL 10'W x 20'L RING NET PANEL (2'x14' GAP UNDER FENCE)
A10	40	20	YES	SHOTCRETE PEDESTAL **

FENCE B REPAIR SCHEDULE

POST ID	NEW PARTS & MATERIALS *			
	¾" CLIPS	⅝" CLIPS	EROSION CONTROL MAT	SPECIAL MITIGATION
B1	40	15	YES	SHOTCRETE PEDESTAL **
B2	20	15	YES	INSTALL 10'W x 20'L RING NET PANEL (2'x10' GAP UNDER FENCE)
B3	20	15	YES	–
B4	20	15	YES	–
B5	20	15	YES	–
B6	20	15	YES	SHOTCRETE PEDESTAL **
B7	40	15	–	–

*– SEE NOTE 6 BELOW **– SEE SHEET C-5 FOR DETAILS

NOTE:

1. SEE SHEET C-5 AND C-6 FOR DETAILS.
2. RING NET PANEL SHALL BE COMPOSED OF 3MM HIGH TENSILE STRENGTH CARBON STEEL WIRE COILED INTO A 12" DIAMETER LOOP WITH A MINIMUM 7 LOOPS PER RING. EACH RING SHALL CONNECT TO A MINIMUM OF FOUR ADJOINING RINGS BY PASSING THROUGH THEM. THE WIRE SHALL BE HOT DIPPED GALVANIZED WITH A MINIMUM WEIGHT OF COATING OF 259 G/M2 PER ASTM A856, CLASS 3. COORDINATE ACTUAL PLACEMENT LOCATION OF RING NET PANEL WITH THE ENGINEER IN THE FIELD. FOR INSTALLATION DETAILS, SEE DETAIL 6/C-5.
3. LOCATIONS OF 4' HIGH CHAIN LINK FENCE WITH TIEBACK ANCHORS AS SHOWN ARE APPROXIMATE. LINEAR FOOTAGE INDICATED REPRESENTS THE TOTAL LENGTH OF CHAIN LINK FENCE WITH TIEBACK ANCHORS AND MAY CONSIST OF MULTIPLE INDEPENDENT FENCE SEGMENTS (10' MIN. LENGTH, 2 SEGMENTS MAX FOR 20 LF SECTION AND 3 SEGMENT MAX FOR 40 LF SECTION.) EQUAL TO THE INDICATED TOTAL LENGTH. COORDINATE LOCATION(S) OF CHAIN LINK FENCE WITH TIEBACK ANCHORS WITH THE ENGINEER IN THE FIELD. FOR INSTALLATION DETAILS, SEE SHEET C-6.
4. 4' HIGH CHAIN LINK FENCE WITH TIEBACK ANCHORS SHALL BE USED TO STORE RELOCATED CLEARED MATERIAL AND DEBRIS.
   a) EXIST FENCE A SHALL HAVE APPROXIMATELY 5 CY OF CLEARED MATERIAL AND DEBRIS.
   b) EXIST FENCE B SHALL HAVE APPROXIMATELY 10 CY OF CLEARED MATERIAL AND DEBRIS.
5. PRIOR TO INSTALLATION OF VARIOUS CONTRACT ITEMS AND IMPROVEMENTS, ALL VEGETATION, DEBRIS, AND ROCKS SHALL BE CLEARED OR CUT FLUSH WITHIN THE LIMITS OF THE IMPROVEMENTS AND AS NEEDED OR AS DIRECTED BY THE ENGINEER IN THE FIELD.
6. PRIOR TO ORDERING OF ANY MATERIAL IDENTIFIED IN THESE DOCUMENTS, THE CONTRACTOR SHALL CONFIRM ALL SIZES AND DIMENSIONS AND NOTIFY THE ENGINEER IN WRITING IN CASE OF ANY DISCREPANCIES.

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED

ARDALAN R. NIKOU
LICENSED PROFESSIONAL ENGINEER
No. 6198-C
HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

Signature 4/30/16 Expiration Date of the License

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

ROCKFALL MITIGATION IMPROVEMENTS
FERN GROTTO
WAILUA, KAUAI, HAWAII

SITE PLAN 1

DESIGNED: RMO	SUBMITTED:
DRAWN: RMO	DATE: OCTOBER 2015
CHECKED: ARN	SCALE: AS NOTED
APPROVED: NOV 2 4 2015 CHIEF ENGINEER DATE	DRAWING NO. C-3

SITE PLAN 2
SCALE: 1" = 20'

1" =20' 0 20 40 60
SCALE FEET

N

LEGEND

- PROPERTY LINES
- EXIST ROCKFALL IMPACT FENCE
- 4' HIGH CHAIN LINK FENCE W/TIEBACK ANCHORS
- EXIST FENCE POST W/EROSION CONTROL MAT
- EXIST FENCE POST W/SHOTCRETE PEDESTAL AND EROSION CONTROL MAT

FENCE C REPAIR SCHEDULE

POST ID	NEW PARTS & MATERIALS *			
	3/4" CLIPS	5/8" CLIPS	EROSION CONTROL MAT	SPECIAL MITIGATION
C1	30	15	–	SHOTCRETE PEDESTAL ** & INSTALL 10'W x 30'L RING NET PANEL
C2	20	15	YES	INSTALL 10'W x 30'L RING NET PANEL
C3	20	15	YES	INSTALL 10'W x 30'L RING NET PANEL
C4	20	15	YES	INSTALL 10'W x 30'L RING NET PANEL
C5	20	15	YES	INSTALL 10'W x 30'L RING NET PANEL
C6	30	15	–	SHOTCRETE PEDESTAL ** & INSTALL 10'W x 30'L RING NET PANEL

*– SEE NOTE 6 BELOW **– SEE SHEET C–5 FOR DETAILS

NOTE:

1. SEE SHEET C–5 AND C–6 FOR DETAILS.
2. RING NET PANEL SHALL BE COMPOSED OF 3MM HIGH TENSILE STRENGTH CARBON STEEL WIRE COILED INTO A 12" DIAMETER LOOP WITH A MINIMUM 7 LOOPS PER RING. EACH RING SHALL CONNECT TO A MINIMUM OF FOUR ADJOINING RINGS BY PASSING THROUGH THEM. THE WIRE SHALL BE HOT DIPPED GALVANIZED WITH A MINIMUM WEIGHT OF COATING OF 259 G/M2 PER ASTM A856, CLASS 3. COORDINATE ACTUAL PLACEMENT LOCATION OF RING NET PANEL WITH THE ENGINEER IN THE FIELD. FOR INSTALLATION DETAILS, SEE DETAIL 6/C–5.
3. LOCATIONS OF 4' HIGH CHAIN LINK FENCE WITH TIEBACK ANCHORS AS SHOWN ARE APPROXIMATE. LINEAR FOOTAGE INDICATED REPRESENTS THE TOTAL LENGTH OF CHAIN LINK FENCE WITH TIEBACK ANCHORS AND MAY CONSIST OF MULTIPLE INDEPENDENT FENCE SEGMENTS (10' MIN LENGTH, 3 SEGMENTS MAX.) EQUAL TO THE INDICATED TOTAL LENGTH. COORDINATE LOCATION(S) OF CHAIN LINK FENCE WITH TIEBACK ANCHORS WITH THE ENGINEER IN THE FIELD. FOR INSTALLATION DETAILS, SEE SHEET C–6.
4. 4' HIGH CHAIN LINK FENCE WITH TIEBACK ANCHORS SHALL BE USED TO STORE RELOCATED CLEARED MATERIAL AND DEBRIS.
   a) EXIST FENCE C SHALL HAVE APPROXIMATELY 15 CY OF CLEARED MATERIAL AND DEBRIS
5. PRIOR TO INSTALLATION OF VARIOUS CONTRACT ITEMS AND IMPROVEMENTS, ALL VEGETATION, DEBRIS, AND ROCKS SHALL BE CLEARED OR CUT FLUSH WITHIN THE LIMITS OF THE IMPROVEMENTS AND AS NEEDED OR AS DIRECTED BY THE ENGINEER IN THE FIELD.
6. PRIOR TO ORDERING OF ANY MATERIAL IDENTIFIED IN THESE DOCUMENTS, THE CONTRACTOR SHALL CONFIRM ALL SIZES AND DIMENSIONS AND NOTIFY THE ENGINEER IN WRITING IN CASE OF ANY DISCREPANCIES.

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED

ARDALAN R. NIKOU
LICENSED PROFESSIONAL ENGINEER
No. 6198-C
HAWAII U.S.A.

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Signature 4/30/16 Expiration Date of the License

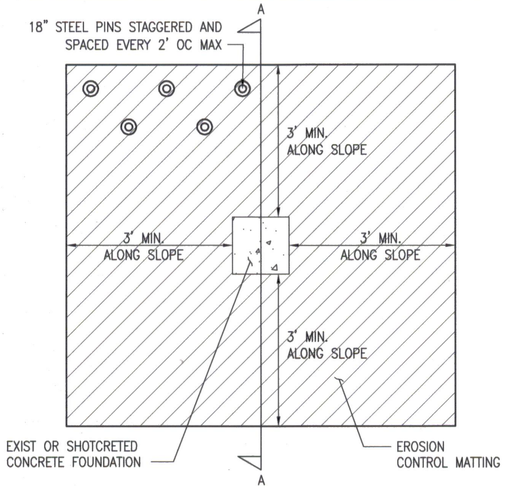
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

ROCKFALL MITIGATION IMPROVEMENTS
FERN GROTTO
WAILUA, KAUAI, HAWAII

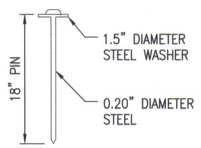
SITE PLAN 2

DESIGNED: RMO	SUBMITTED:
DRAWN: RMO	DATE: OCTOBER 2015
CHECKED: ARN	SCALE: AS NOTED

APPROVED: CHIEF ENGINEER — NOV 2 4 2015 DATE — DRAWING NO. C-4



1 C-5 EROSION CONTROL MATTING – PLAN
NOT TO SCALE



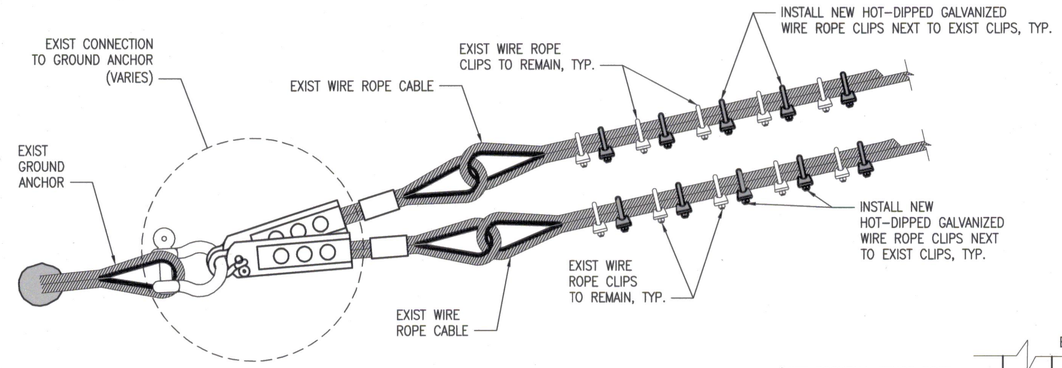
STEEL PIN DETAIL
NOT TO SCALE

2 C-5 EROSION CONTROL MATTING – SECTION A–A
NOT TO SCALE

NOTE:
EROSION CONTROL MATTING SHALL EXTEND 3' (MEASURED ALONG THE CURRENT GRADE) BEYOND EACH SIDE OF THE EXISTING ROCKFALL IMPACT FENCE FOOTING.

EROSION CONTROL MATTING NOTES:

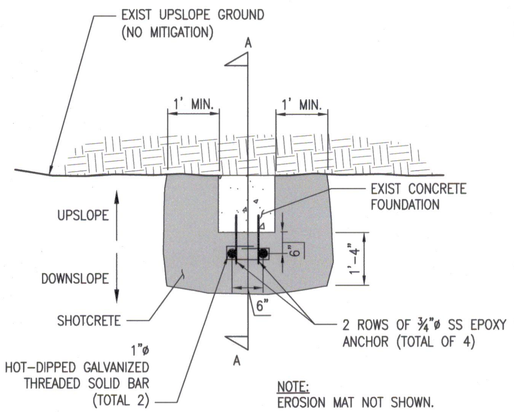
1. CLEAR ALL SURFACE VEGETATION AND SMOOTHEN SLOPE SURFACE WITHIN THE EROSION CONTROL MATTING LIMITS PRIOR TO INSTALLATION.
2. EROSION CONTROL MATTING SHALL BE TENSAR NORTH AMERICAN GREEN C350 OR APPROVED EQUAL. SEE SPECIFICATIONS.
3. SECURE EROSION CONTROL MATTING USING STAPLES/STAKES AS RECOMMENDED BY THE MANUFACTURER.
4. OVERLAPS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.
5. CUTTING AND OVERLAPPING OF EROSION CONTROL MATTING SHALL BE PER MANUFACTURER'S RECOMMENDATIONS.
6. EROSION CONTROL MATTING INSTALLATION DETAILS SHOWN ON THIS SHEET ARE FOR GENERAL GUIDANCE AND REPRESENT THE MINIMUM REQUIREMENTS. CONTRACTOR SHALL FOLLOW THE MANUFACTURER'S DESIGN DRAWINGS AND DETAILS WHICH HAVE BEEN ACCEPTED BY THE ENGINEER.



3 C-5 TYPICAL WIRE ROPE CLIP INSTALLATION DETAIL
NOT TO SCALE

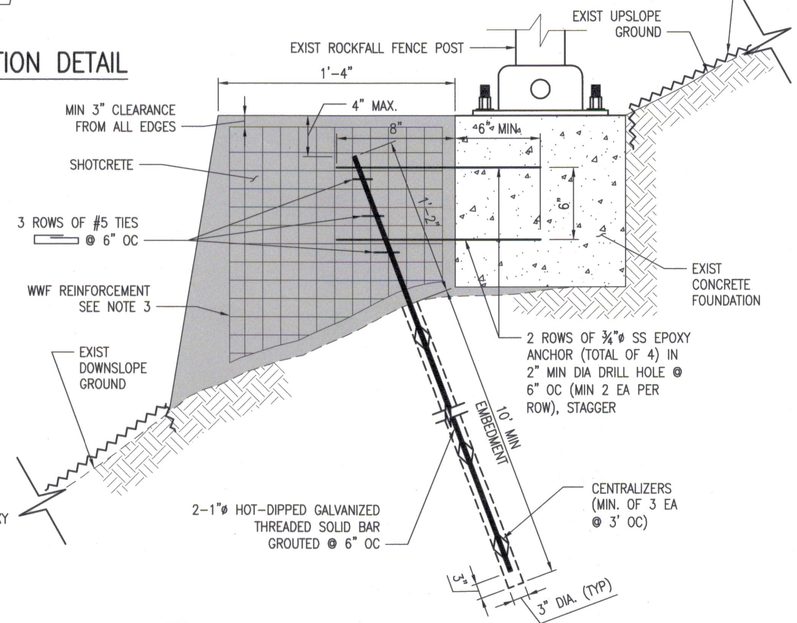
WIRE ROPE CLIP NOTES:

1. ALL NEW WIRE ROPE CLIPS TO BE INSTALLED SHALL BE HOT–DIPPED GALVANIZED WITH A MINIMUM WEIGHT OF COATING OF 250 G/M2.
2. SADDLE/NUTS OF WIRE ROPE CLIPS SHALL BE INSTALLED ON LIVE END OF WIRE ROPE.
3. SEE SCHEDULE ON SITE PLANS FOR NUMBER OF CLIPS PER WIRE ROPE.
4. NO. OF WIRE ROPE CABLES CONNECTED TO EACH GROUND ANCHOR VARIES. CONFIRM LOCATIONS OF NEW WIRE ROPE CLIPS WITH THE ENGINEER PRIOR TO STARTING WORK.



NOTE:
EROSION MAT NOT SHOWN.

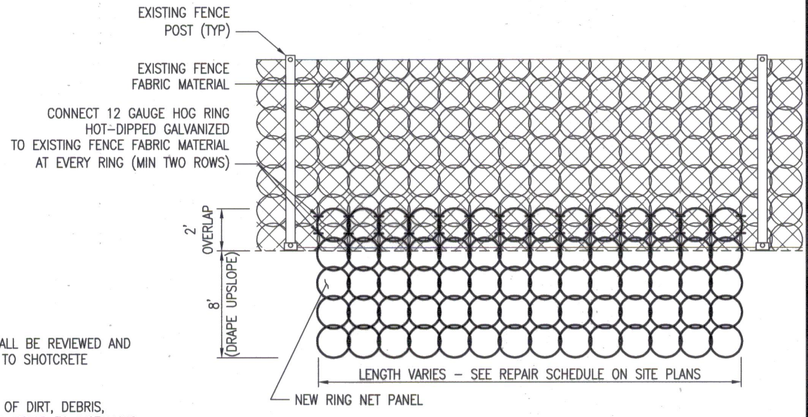
4 C-5 SHOTCRETE PEDESTAL DETAIL – PLAN
NOT TO SCALE



5 C-5 SHOTCRETE PEDESTAL DETAIL – SECTION A–A
NOT TO SCALE

SHOTCRETE NOTES:

1. ALL SUBMITTALS FOR SHOTCRETE SHALL BE REVIEWED AND APPROVED BY THE ENGINEER PRIOR TO SHOTCRETE OPERATIONS. SEE SPECIFICATIONS.
2. CONTRACTOR SHALL CLEAR SURFACE OF DIRT, DEBRIS, VEGETATION AND ALL LOOSE MATERIAL PRIOR TO INSTALLING SHOTCRETE. SHOTCRETE AREA SHALL BE MARKED BY THE CONTRACTOR AND INSPECTED AND APPROVED BY THE ENGINEER PRIOR TO SHOTCRETE OPERATIONS.
3. WELDED WIRE FABRIC WWF 6x6–W2.9xW2.9 SHALL BE HOT–DIPPED GALVANIZED AND SHALL BE INSTALLED WITH SHOTCRETE AS REQUIRED BY SHOTCRETE OPERATION IN THE FIELD AT NO ADDITIONAL COST TO THE STATE.
4. LOCATION AND DIRECTION OF ALL ANCHORS SHALL BE APPROVED BY THE ENGINEER PRIOR TO STARTING WORK.
5. ALL ANCHORS SHALL BE FULLY GROUTED IN THE PRESENCE OF THE ENGINEER. GROUTING PERFORMED WITHOUT THE ENGINEER PRESENT SHALL BE REJECTED AND REPLACED AT THE CONTRACTOR'S EXPENSE.
6. ALL SHOTCRETE SHALL CONTAIN FIBER REINFORCING FOR SHRINKAGE AND CRACK CONTROL.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY MEANS OF PROTECTION AGAINST FALLING ROCKS AND DEBRIS CAUSED BY ALL CONSTRUCTION OPERATIONS. CONTRACTOR SHALL IMPLEMENT AND MAINTAIN SUCH TEMPORARY SAFETY DEVICES AT NO ADDITIONAL COST TO THE STATE.
8. SEE SPECIFICATIONS FOR ANCHORS INSTALLATION AND MATERIAL.
9. LOCATION, ORIENTATION, AND DIRECTION OF ANCHOR PENETRATION INTO THE GROUND VARIES. CONTRACTOR SHALL COORDINATE DRILLING FOR EACH ANCHOR WITH THE ENGINEER.



ELEVATION VIEW

6 C-5 RING NET PANEL CONNECTION DETAIL
NOT TO SCALE

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

ROCKFALL MITIGATION IMPROVEMENTS
FERN GROTTO
WAILUA, KAUAI, HAWAII

TYPICAL DETAILS 1

DESIGNED: RMO	SUBMITTED:
DRAWN: RMO	DATE: OCTOBER 2015
CHECKED: ARN	SCALE: AS NOTED
APPROVED: CHIEF ENGINEER	NOV 2 4 2015 DATE

DRAWING NO. C-5

JOB NO. J45CS41B–1 SHEET NO. 6 OF 8 SHEETS