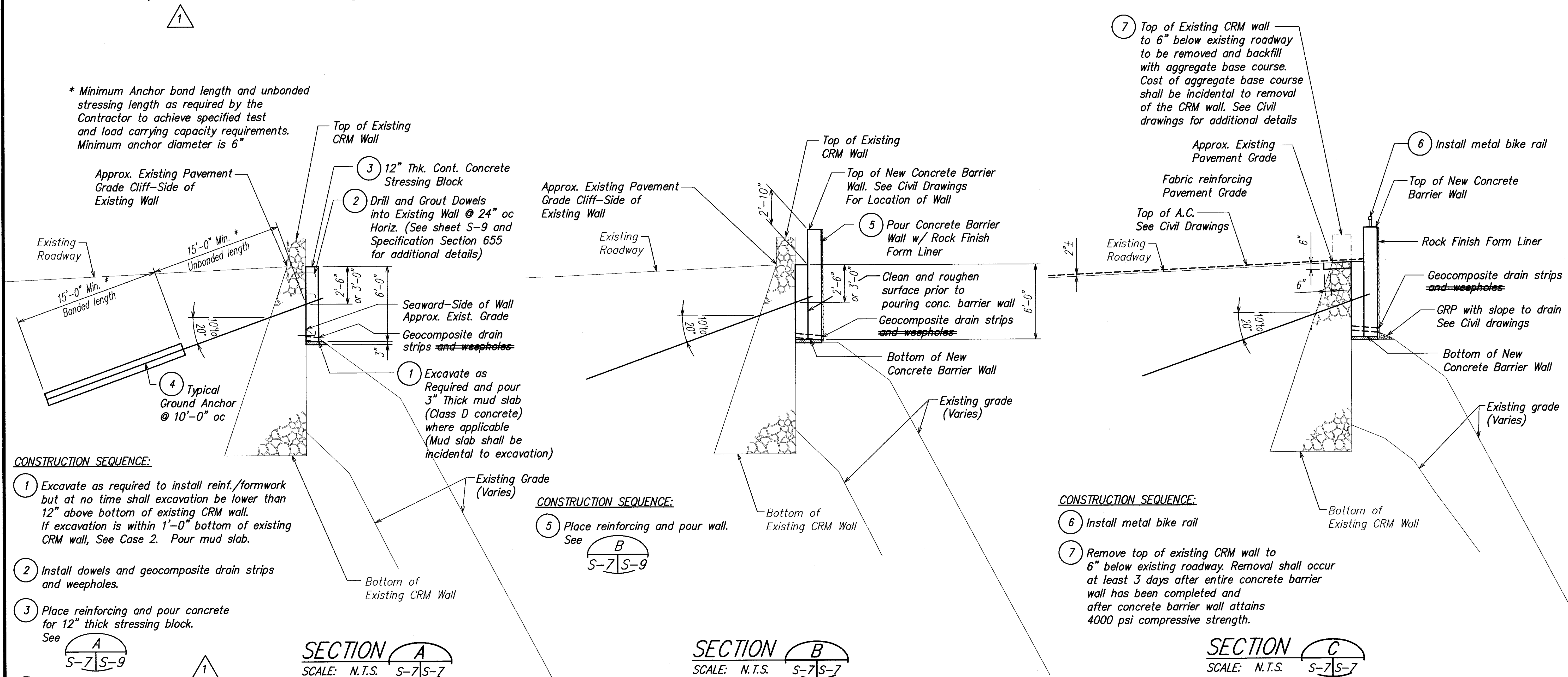
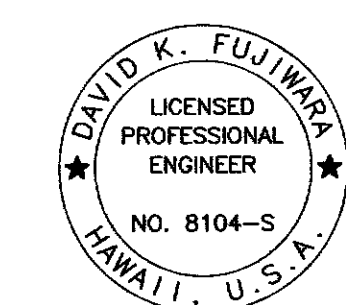


FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	ADD. 33	106

# CASE 1 (Bottom of stressing block above bottom of existing CRM wall)



DESIGNED BY	DATE
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	



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Signature: *David K. Fujiwara* 4-30-12  
EXPIRATION DATE OF THE LICENSE

3/9/09	<div>1</div> Revised Note and Title
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<b><u>GROUND ANCHOR AT</u></b> <b><u>HIGH CRM WALLS</u></b>	
<i>Kalanianaʻole Highway Improvements Retaining Wall at Makapuu, Oahu Federal-Aid Project No. NH-072-1(51)</i>	
Scale: As Noted	Date: April 2007
SHEET No. S-7 OF 15 SHEETS	

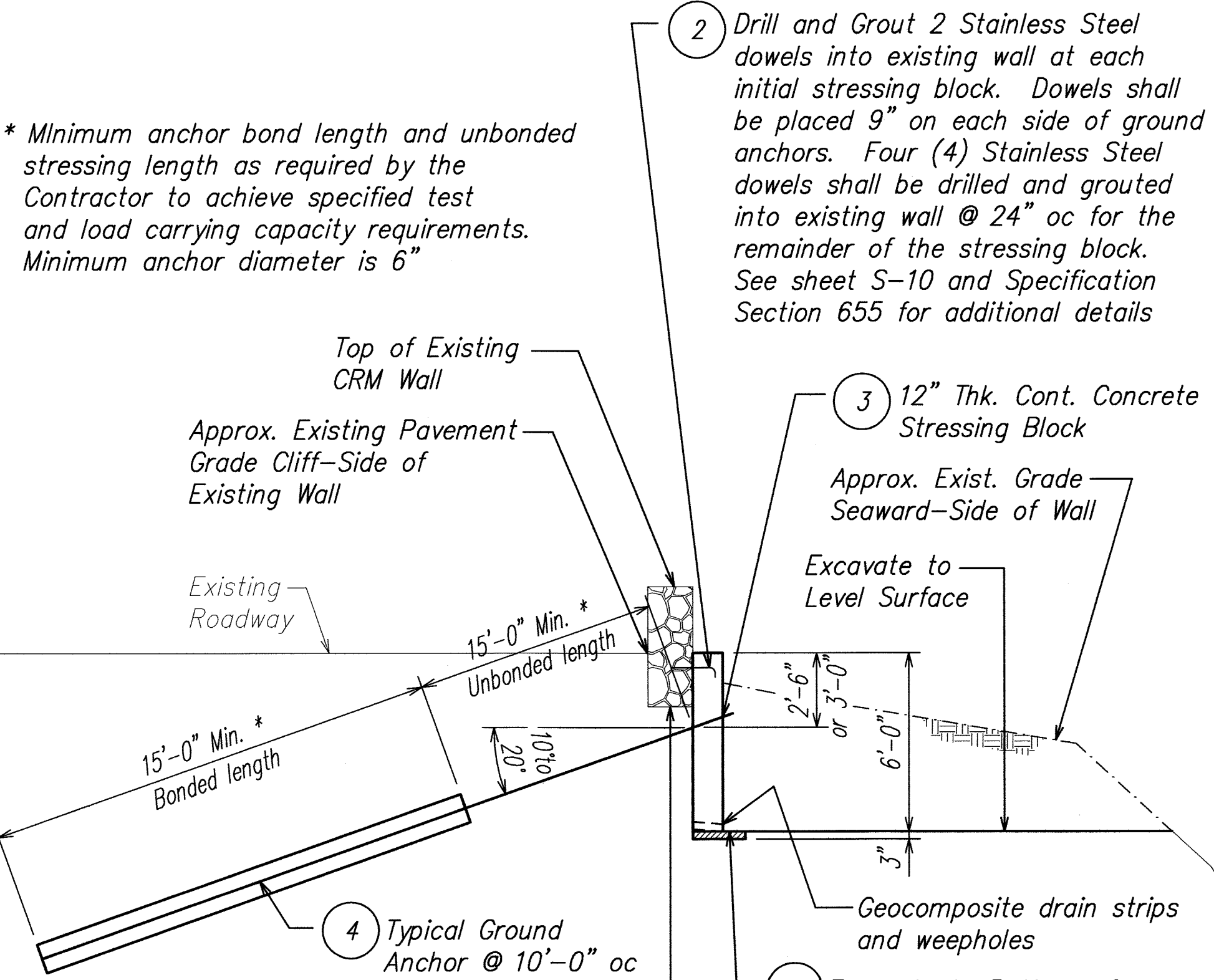
"AS-BUILT"

ADD. 33

CASE 2 (Ground anchor below bottom of existing wall)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	34	106

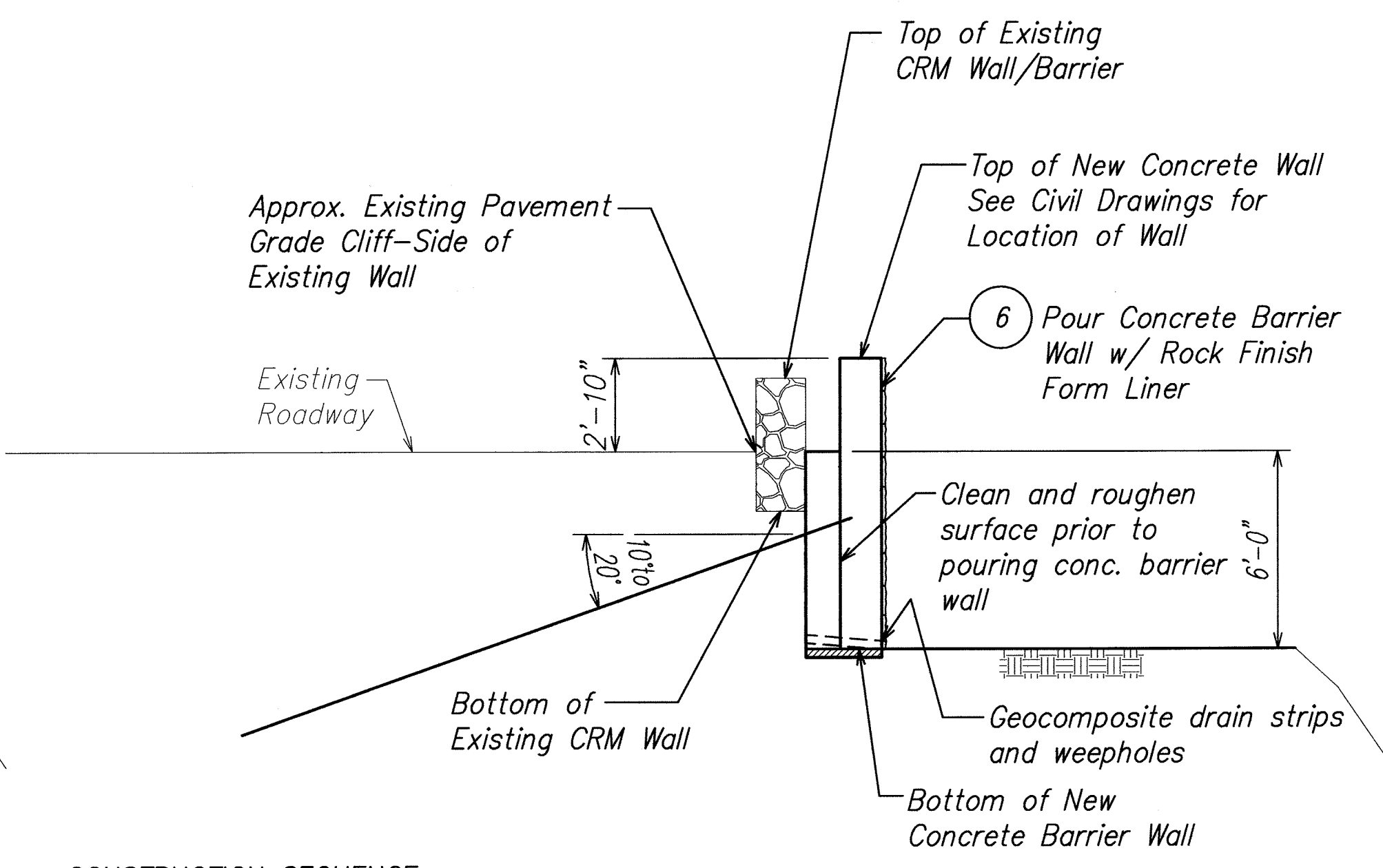
\* Minimum anchor bond length and unbonded stressing length as required by the Contractor to achieve specified test and load carrying capacity requirements. Minimum anchor diameter is 6"



CONSTRUCTION SEQUENCE:

- 1 Excavate to bottom of new concrete wall and pour mud slab. Excavation shall be done in 5'-0" wide slots. Adjacent slots shall not be excavated at the same time. Once the ground anchor of the first slot has been completely installed, the adjacent slot can be excavated.
- 2 Install dowels.
- 3 Place reinforcing and pour concrete for 12" thick x 2'-0" wide initial stressing block. See  $\frac{A}{S-8|S-10}$
- 4 Install ground anchors, (Stressing block shall have aged 7 days and shall attain 4,000 psi compressive strength prior to stressing.) See S-11 and S-12. Alternate vertical locations of anchors as shown on sheets S-4, S-5 & S-6. The contractor shall install ground anchors in a pattern such that adjacent anchor are not installed consecutively.
- 5 Once all 12" thick x 2'-0" wide stressing blocks have been constructed, excavate between slots. Excavation between slots shall be done similar to slot excavation, where no consecutive/adjacent openings will be done at the same time. Install geocomposite drain strips and weepholes. Install reinforcing and pour remainder of stressing block. The Contractor shall submit working drawings and calculations for bracing / falsework details needed to protect the existing CRM wall from cave ins, damage and collapse due to but not limited to construction work and loading and vehicle impact. See Special Provision Section 206B for additional requirement. The Contractor shall also submit slot excavation and stressing block construction and stressing sequences.

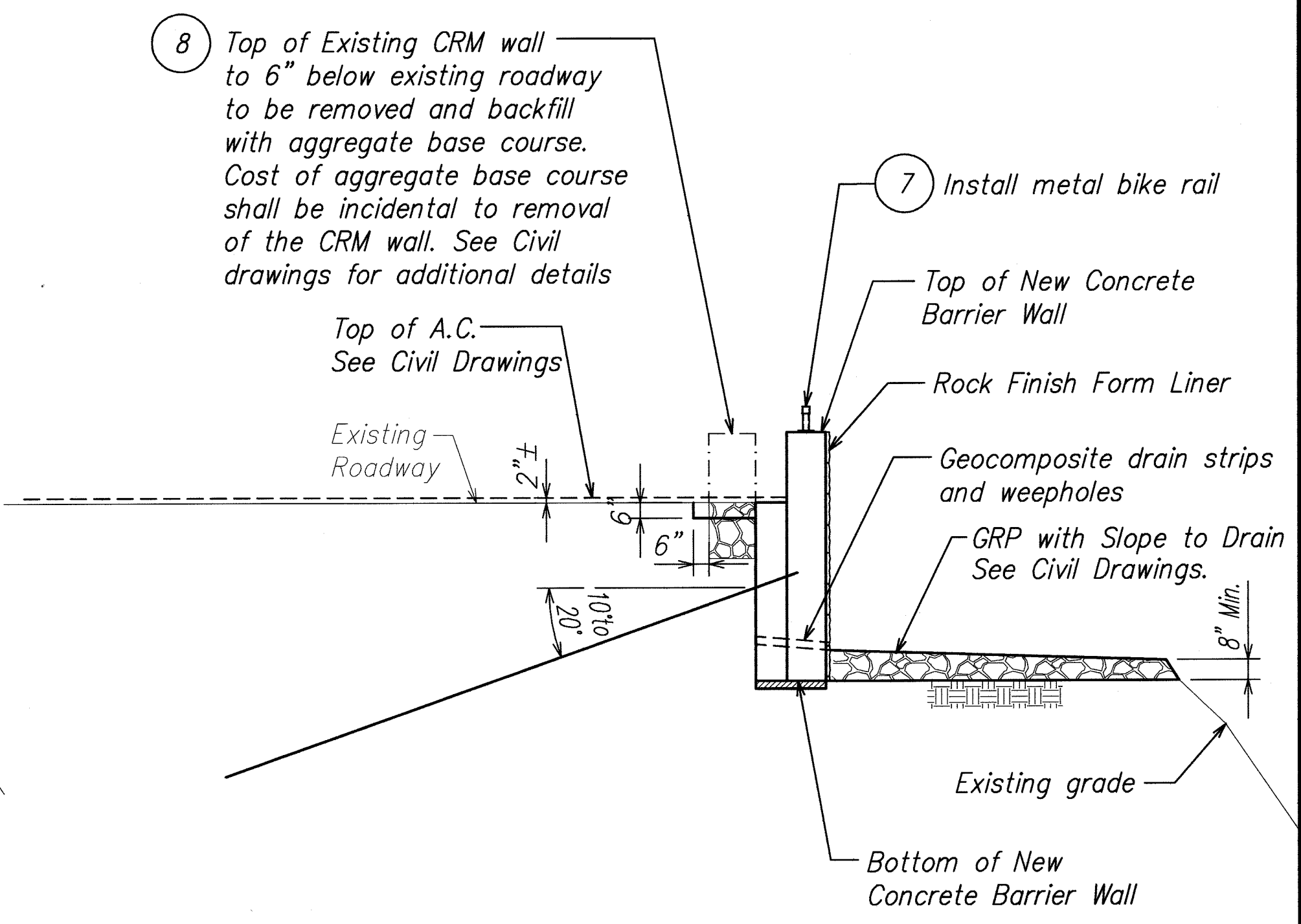
SECTION  $\frac{A}{S-8|S-10}$   
SCALE: N.T.S.



CONSTRUCTION SEQUENCE:

- 6 Place reinforcing and pour concrete barrier wall. See  $\frac{B}{S-8|S-10}$

SECTION  $\frac{B}{S-8|S-10}$   
SCALE: N.T.S.

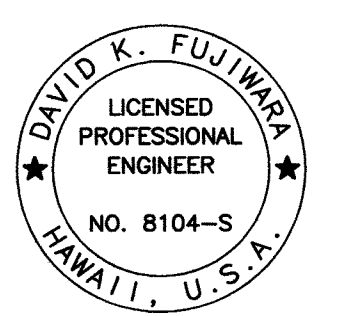


CONSTRUCTION SEQUENCE:

- 7 Install metal bike rail
- 8 Remove top of existing CRM wall to 6" below existing roadway. Removal shall occur at least 3 days after entire concrete barrier wall has been completed and after concrete barrier wall attains 4000 psi compressive strength.

SECTION  $\frac{C}{S-8|S-10}$   
SCALE: N.T.S.

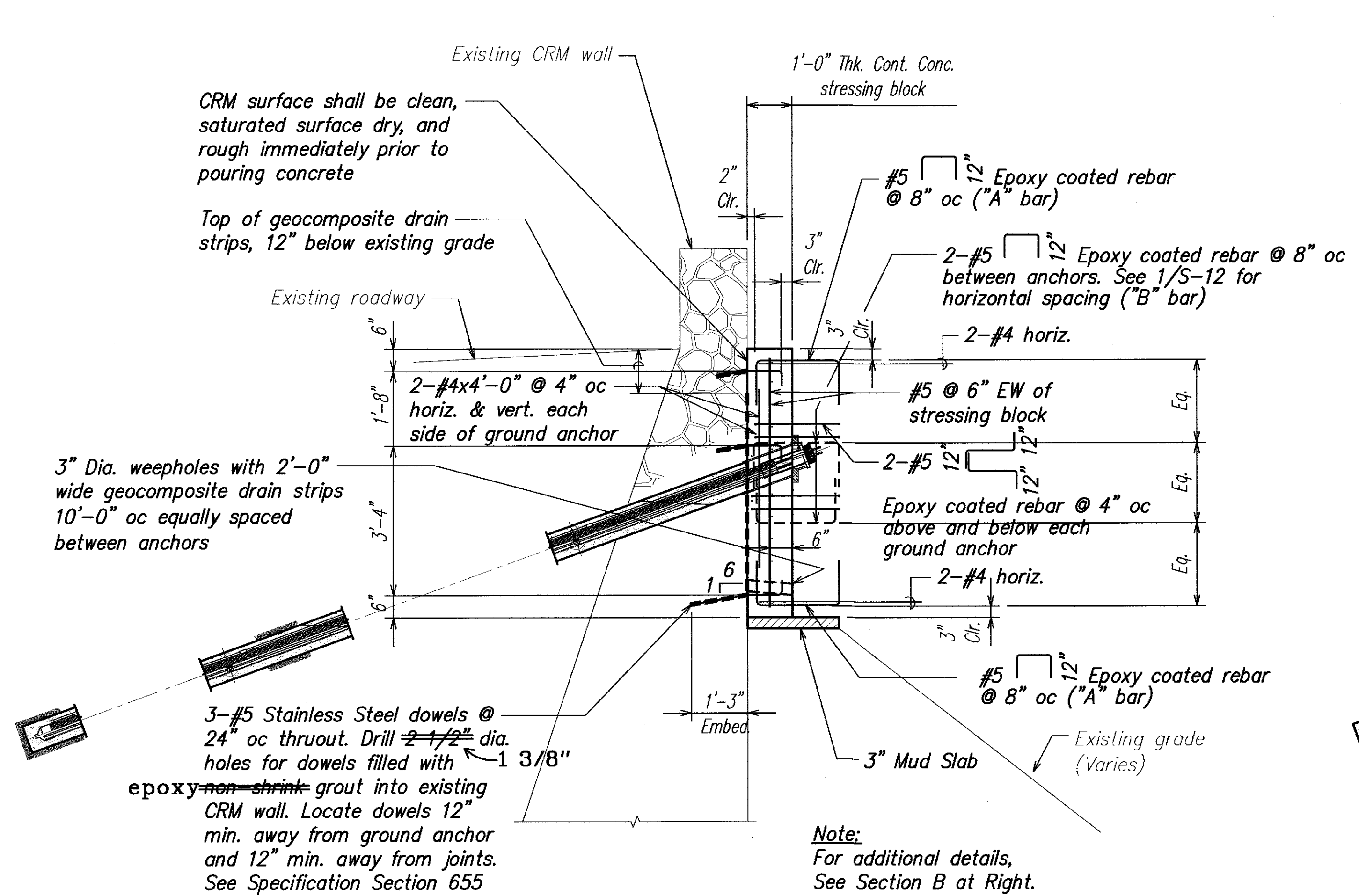
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DESIGNED BY	
TRACED BY	
NOTED BY	
QUANTITIES BY	
CHECKED BY	
No.	



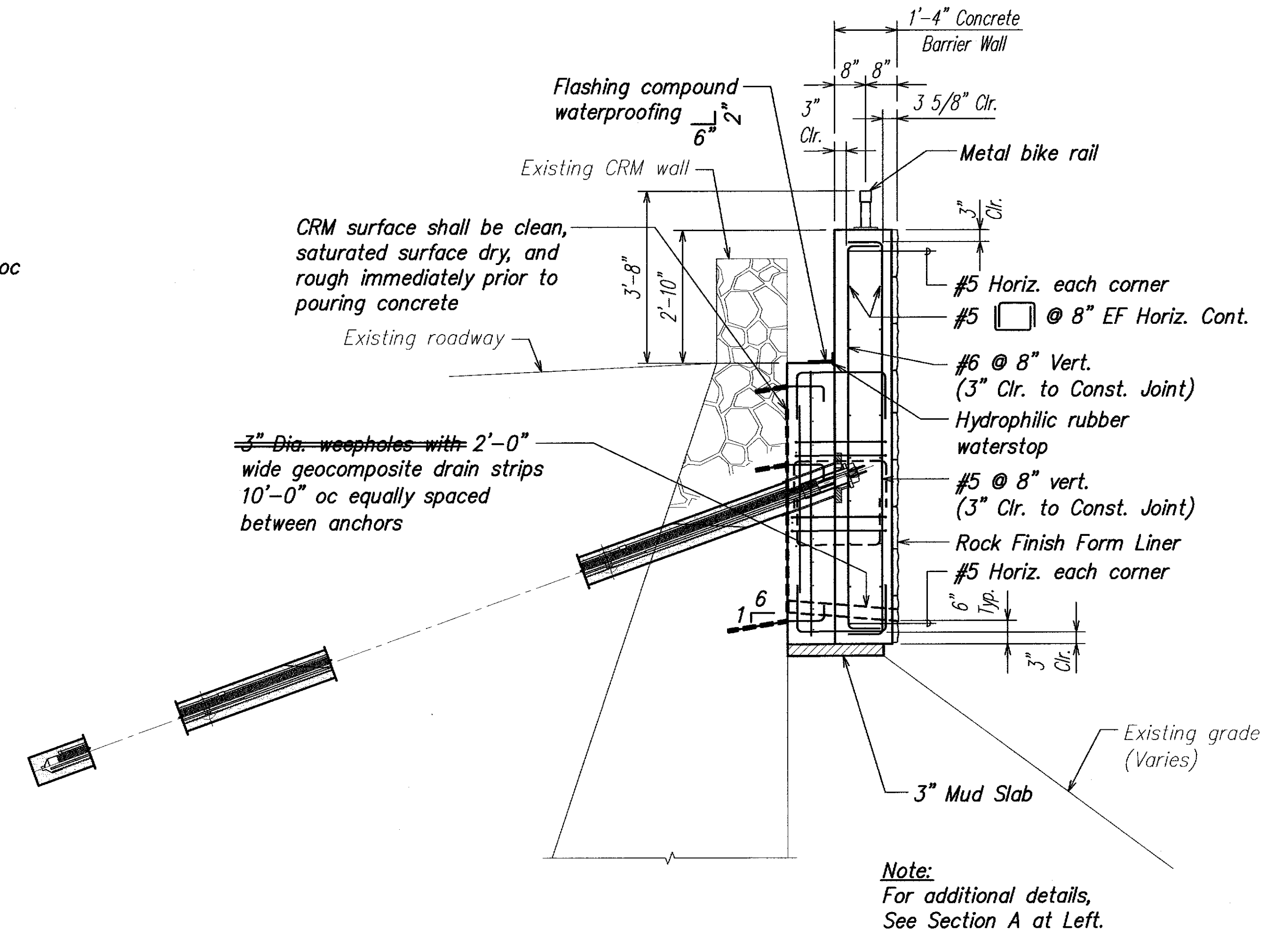
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.  
*David K. Fujiwara*  
SIGNATURE EXPIRATION DATE OF THE LICENSE 4-30-08

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**GROUND ANCHOR AT LOW CRM WALLS**  
*Kalaniana'ole Highway Improvements Retaining Wall at Makapuu, Oahu*  
Federal-Aid Project No. NH-072-1(51)  
Scale: Date: April 2007  
SHEET No. S-8 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	35	106



SECTION A  
SCALE: 1/2" = 1'-0" S-7/S-9



SECTION B  
SCALE: 1/2" = 1'-0" S-7/S-9

SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
CHECKED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

**LEGEND FOR AS-BUILT POSTINGS**

Squiggly line for as-built deletion

Double line for as-built deletion

Roadway Text for as-built posting

DAVID K. FUJIMURA  
LICENSED PROFESSIONAL ENGINEER  
NO. 8104-S  
HAWAII, U.S.A.

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*David K. Fujimura*  
SIGNATURE  
4-30-12  
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**GROUND ANCHOR SECTIONS (CASE 1)**

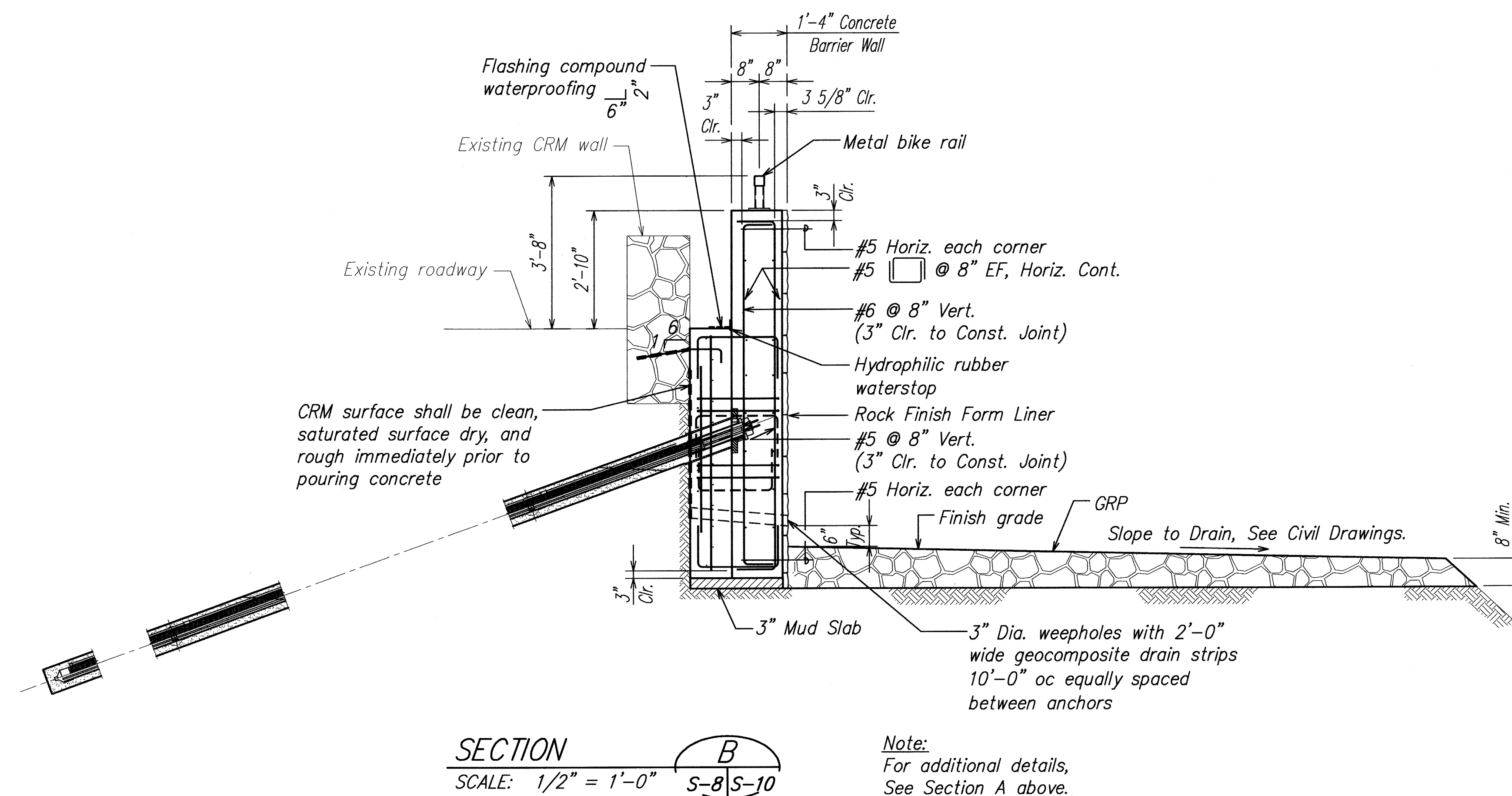
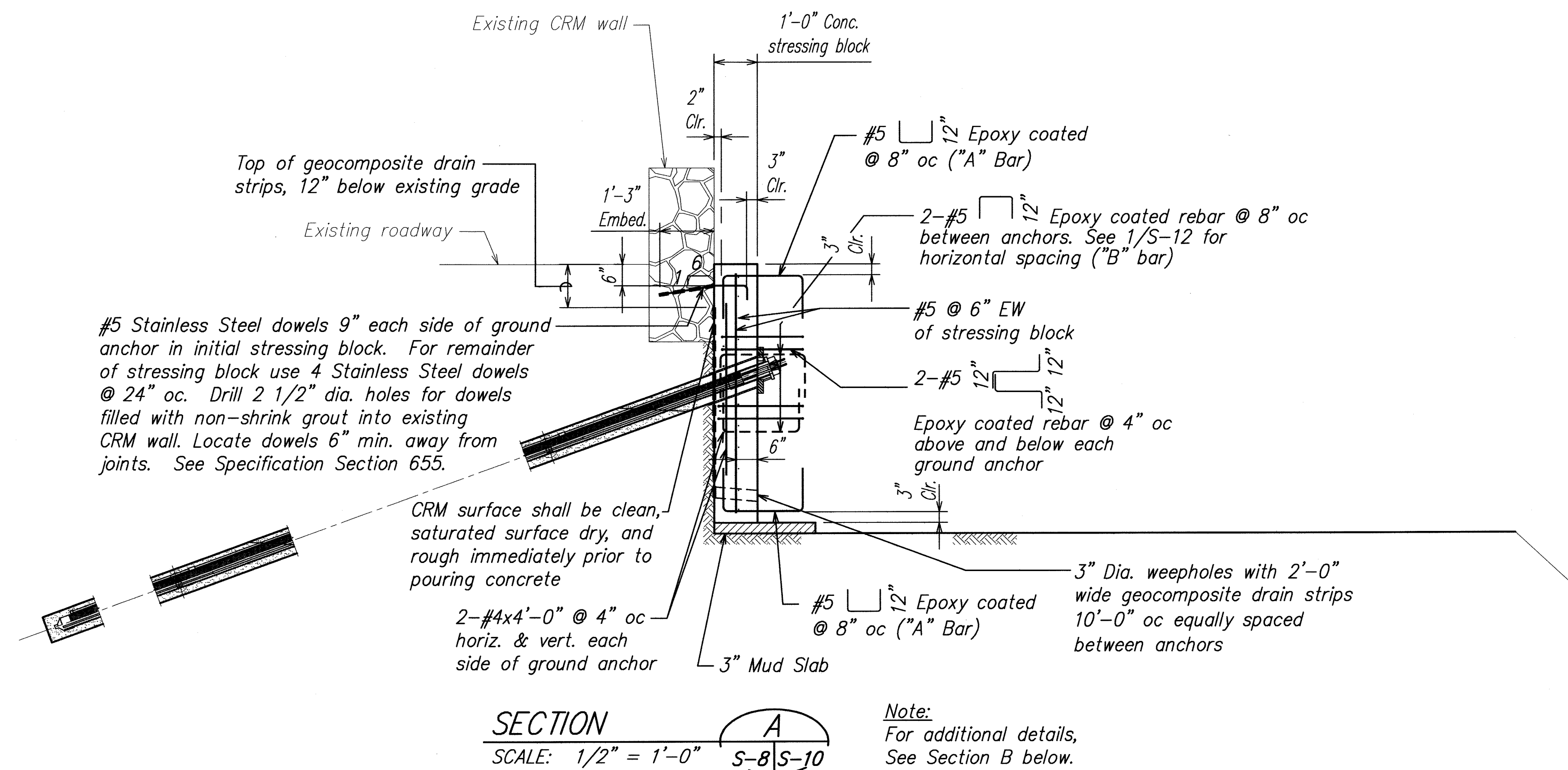
Kalaniana'ole Highway Improvements  
Retaining Wall at Makapuu, Oahu  
Federal-Aid Project No. NH-072-1(51)

Scale: As Noted Date: April 2007


SHEET No. S-9 OF 15 SHEETS



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	36	106



ORIGINAL PLAN NOTE BOOK No. _____	SURVEY PLOTTED BY _____	DATE _____
	DRAWN BY _____	_____
	DESIGNED BY _____	_____
	QUANTITIES BY _____	_____
	CHECKED BY _____	_____



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LICENSED  
PROFESSIONAL  
ENGINEER  
NO. 8104-S  
HAWAII, U.S.A.

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*David K. Fujiwara*

SIGNATURE EXPIRATION DATE OF THE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**GROUND ANCHOR**  
**SECTIONS (CASE 2)**

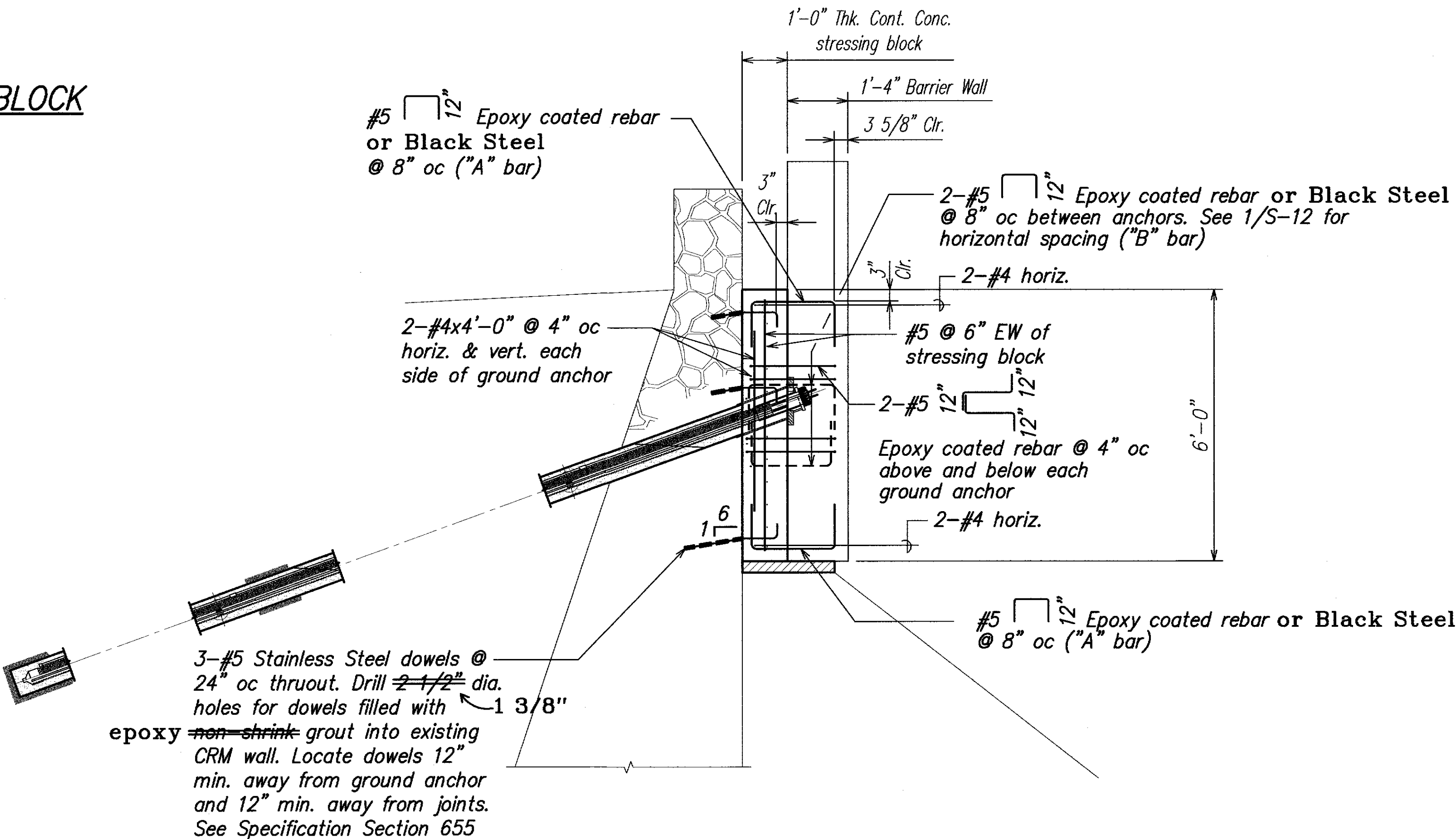
*Kalanianaʻole Highway Improvements*  
*Retaining Wall at Makapuu, Oahu*  
*Federal-Aid Project No. NH-072-1(51)*

Scale: \_\_\_\_\_ Date: April 2007

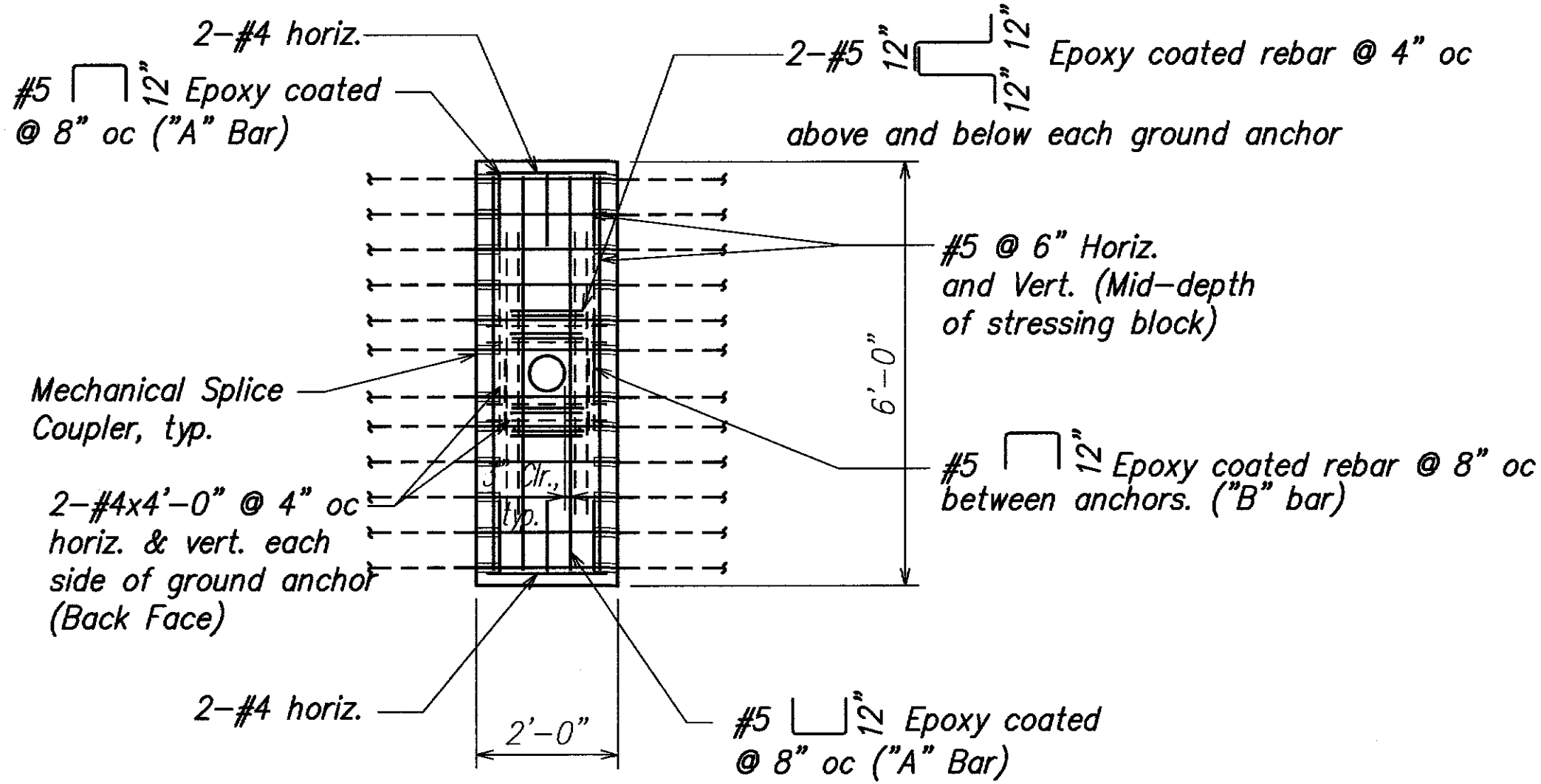
SHEET NO. S-10 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 36S-1	106

**TYPE A: STRESSING BLOCK**  
**(2'W x 6'H)**



**SECTION A**  
SCALE: 1/2" = 1'-0" S-10A S-10A



**STRESSING BLOCK ELEVATION B**  
SCALE: 1/2" = 1'-0" S-10A S-10A

- Notes:**
1. See Sheets S-9 and S-10 for Barrier Wall Reinforcing and Additional Information not shown.
  2. Mechanical Splice Couplers shall be of Similar Material as the Rebar it is Splicing (i.e. epoxy, stainless steel, etc)
  3. Separate Dissimilar Metals E.G. Stainless and Non-Stainless Steel Rebar, with Teflon Tape at Contact are Only.

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

4/15/10 New Sheet

DATE REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**GROUND ANCHOR TYPE A**

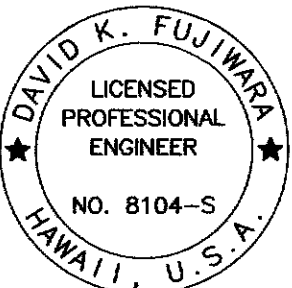
**SECTION AND ELEVATION**

*Kalaniana'ole Highway Improvements  
Retaining Wall at Makapuu, Oahu*

*Federal-Aid Project No. NH-072-1(51)*

Scale: As Noted Date: April 2007

SHEET No. S-10A OF 15 SHEETS



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SIGNATURE EXPIRATION DATE OF THE LICENSE

"AS-BUILT"

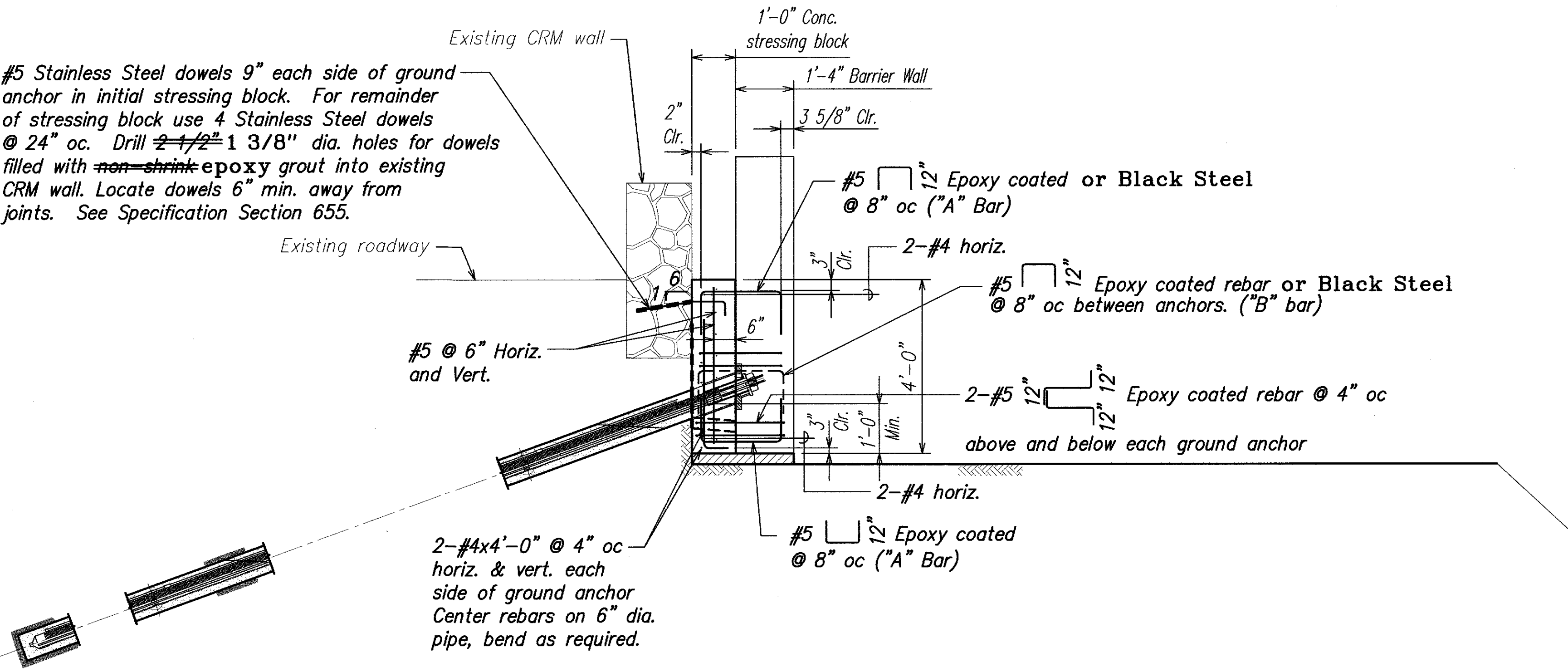
C.O. 36S-1

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	No.
NOTE BOOK	

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 36S-2	106

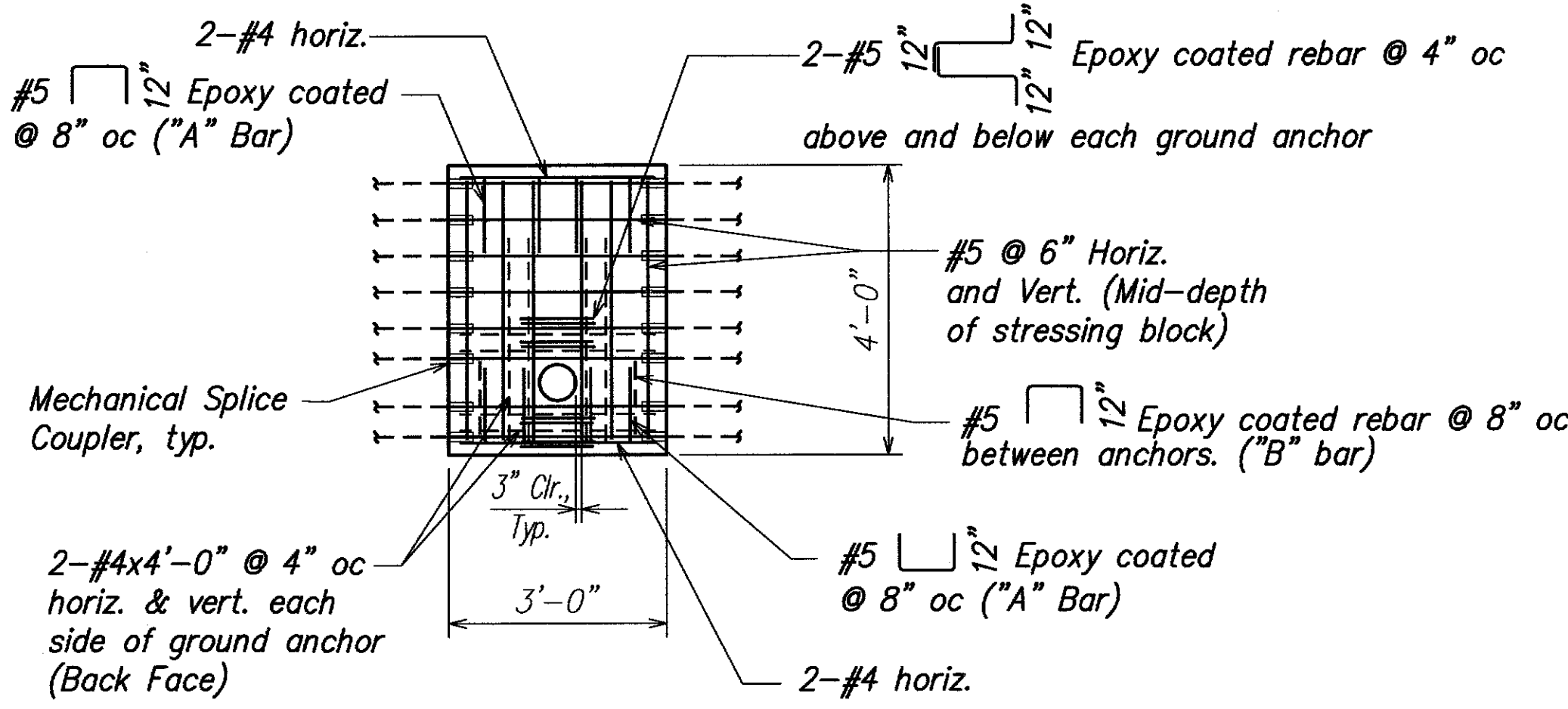
# **TYPE B: STRESSING BLOCK** (3'W x 4'H)

#5 Stainless Steel dowels 9" each side of ground anchor in initial stressing block. For remainder of stressing block use 4 Stainless Steel dowels @ 24" oc. Drill ~~2-1/2"~~ 1 3/8" dia. holes for dowels filled with ~~non-shrink~~ epoxy grout into existing CRM wall. Locate dowels 6" min. away from joints. See Specification Section 655.



**SECTION A**  
SCALE: 1/2" = 1'-0" S-10B | S-10B

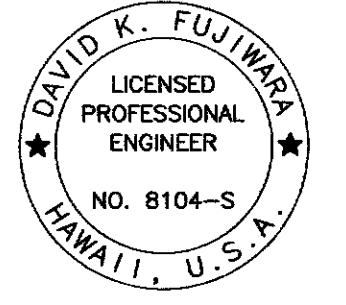
- Notes:**
1. See Sheets S-9 and S-10 for Barrier Wall Reinforcing and Additional Information not shown.
  2. Mechanical Splice Couplers shall be of Similar Material as the Rebar it is Splicing (i.e. epoxy, stainless steel, etc)



**STRESSING BLOCK ELEVATION B**  
SCALE: 1/2" = 1'-0" S-10B | S-10B

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

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TRACED BY	
NOTED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
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CHECKED BY	
No.	



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EXPIRATION DATE OF THE LICENSE: 4-30-12

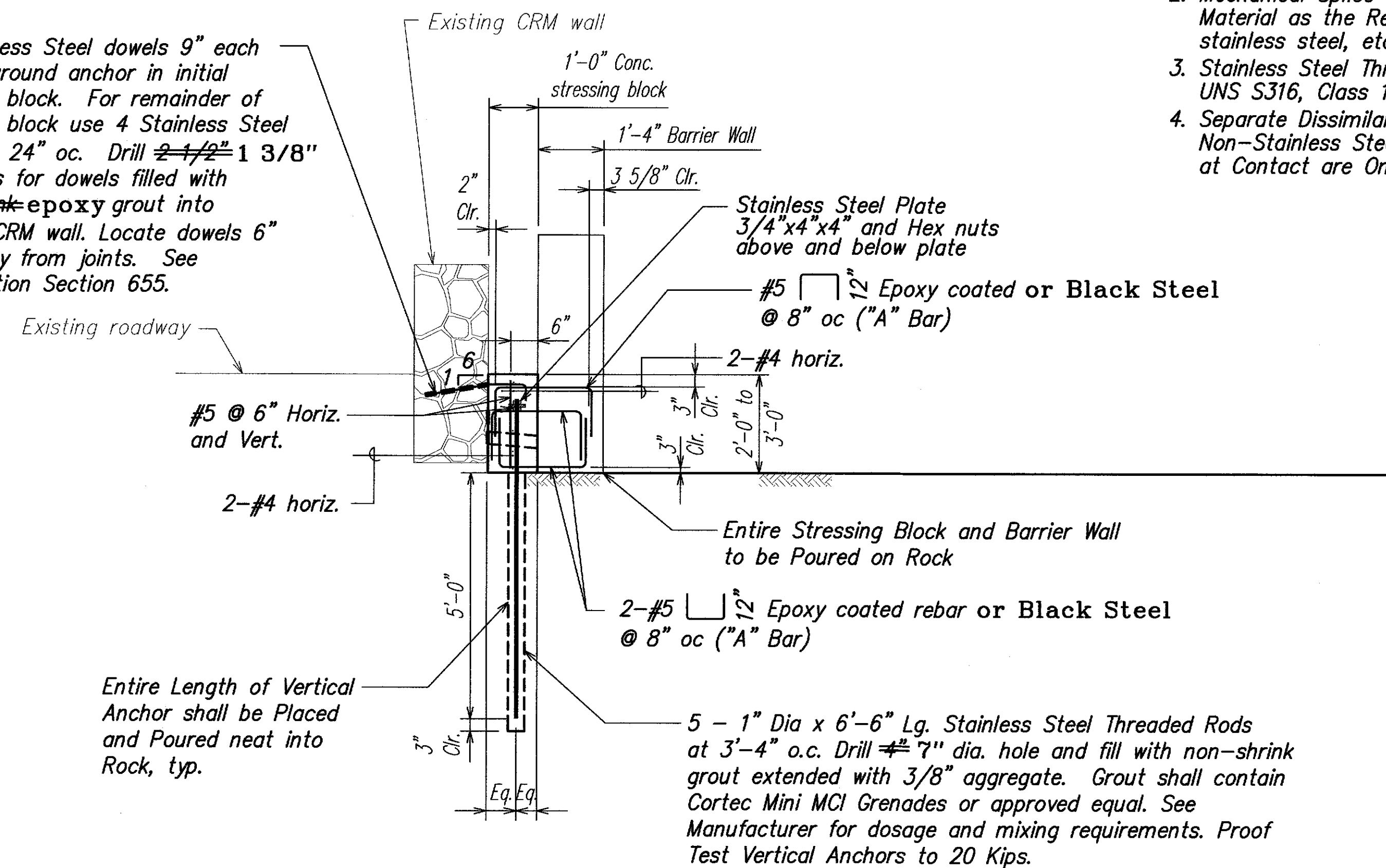
4/15/10	New Sheet
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <b>GROUND ANCHOR TYPE B</b> <b>SECTION AND ELEVATION</b> Kalaniana'ole Highway Improvements Retaining Wall at Makapuu, Oahu Federal-Aid Project No. NH-072-1(51) Scale: As Noted Date: April 2007 SHEET No. S-10B OF 15 SHEETS	



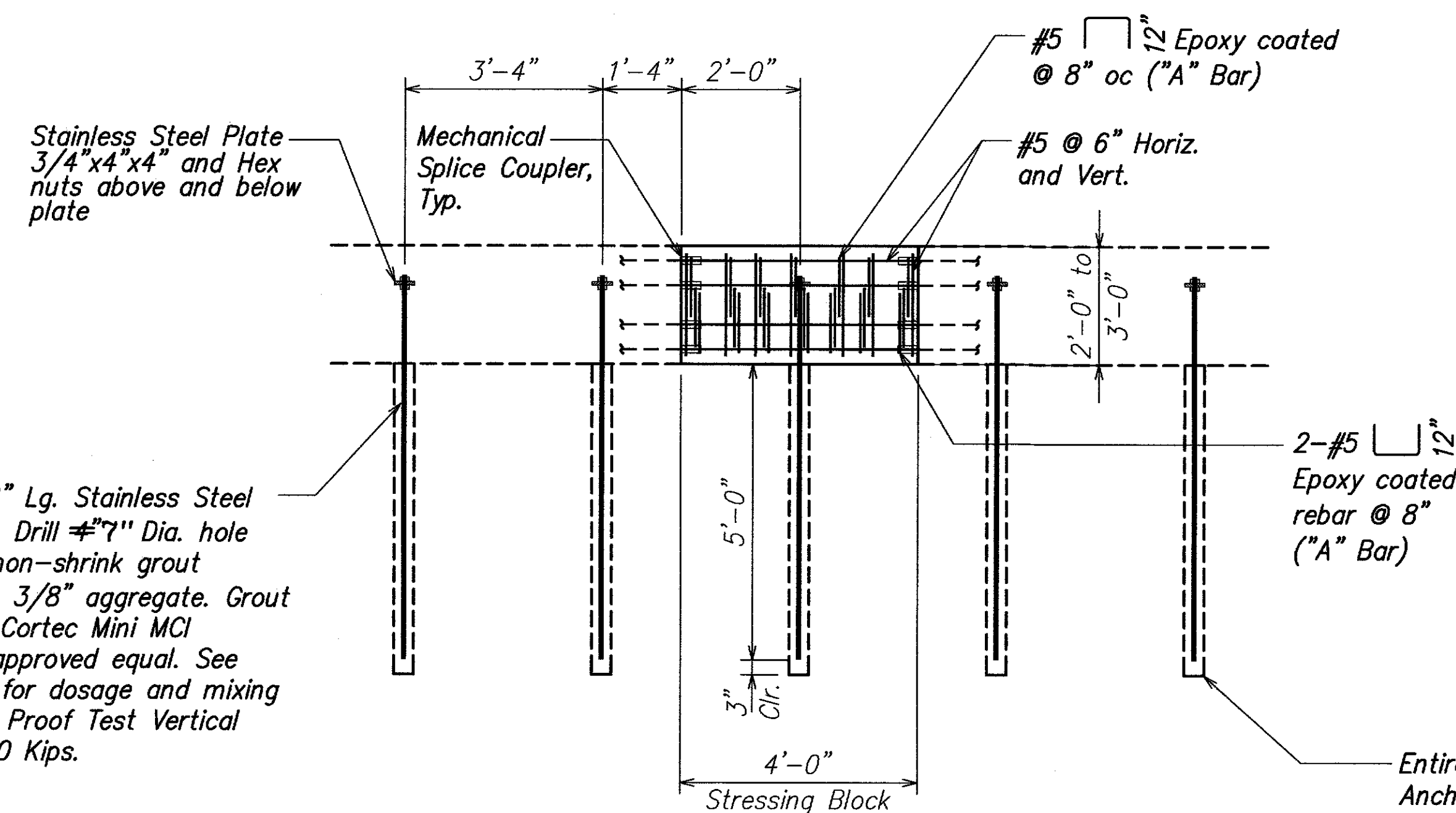


# **TYPE D: STRESSING BLOCK** **4'W x (2'H to 3'H)**

#5 Stainless Steel dowels 9" each side of ground anchor in initial stressing block. For remainder of stressing block use 4 Stainless Steel dowels @ 24" oc. Drill  $\frac{1}{2}$ " 1 3/8" dia. holes for dowels filled with non-shrink epoxy grout into existing CRM wall. Locate dowels 6" min. away from joints. See Specification Section 655.



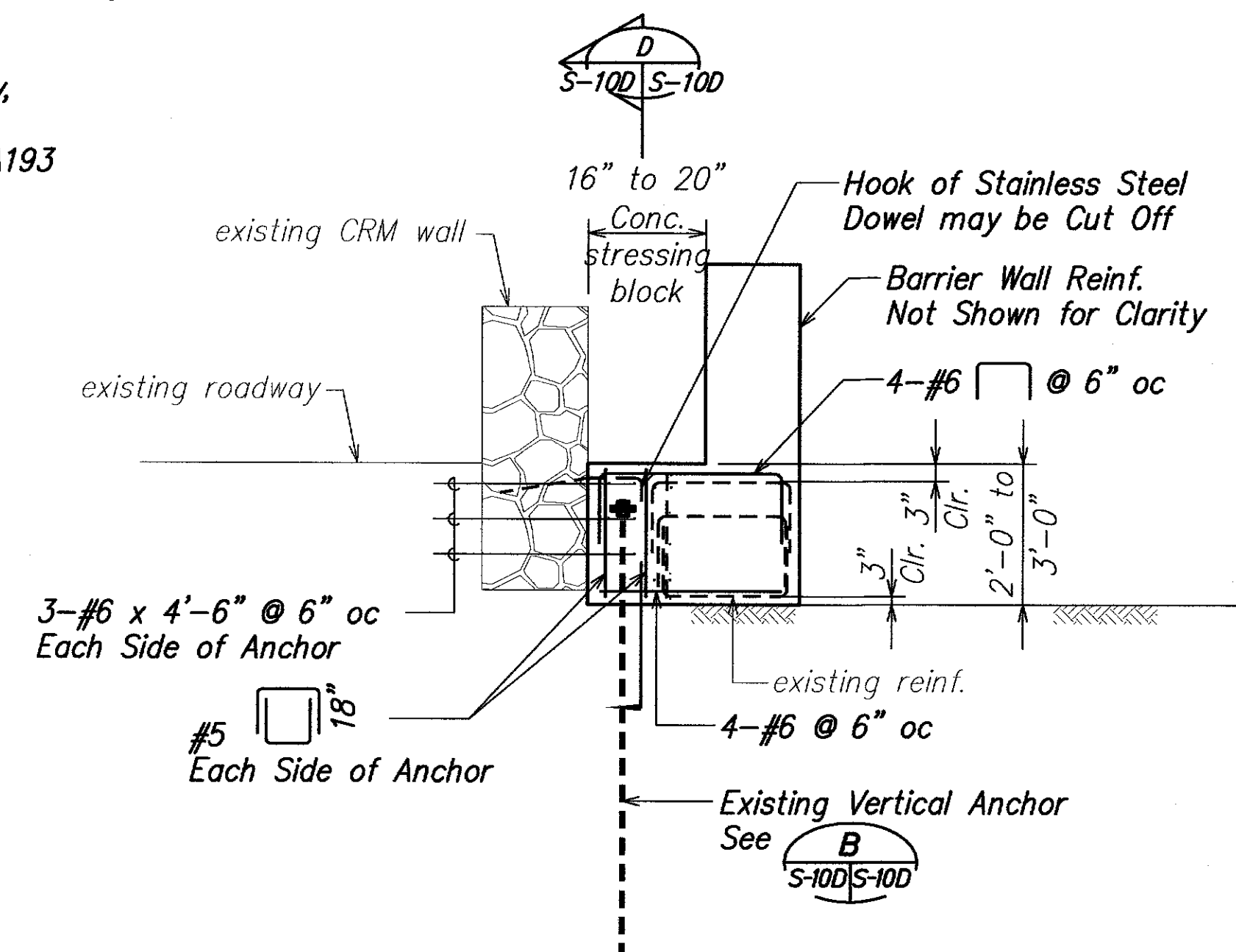
**SECTION A**  
 SCALE: 1/2" = 1'-0" S-100 S-100



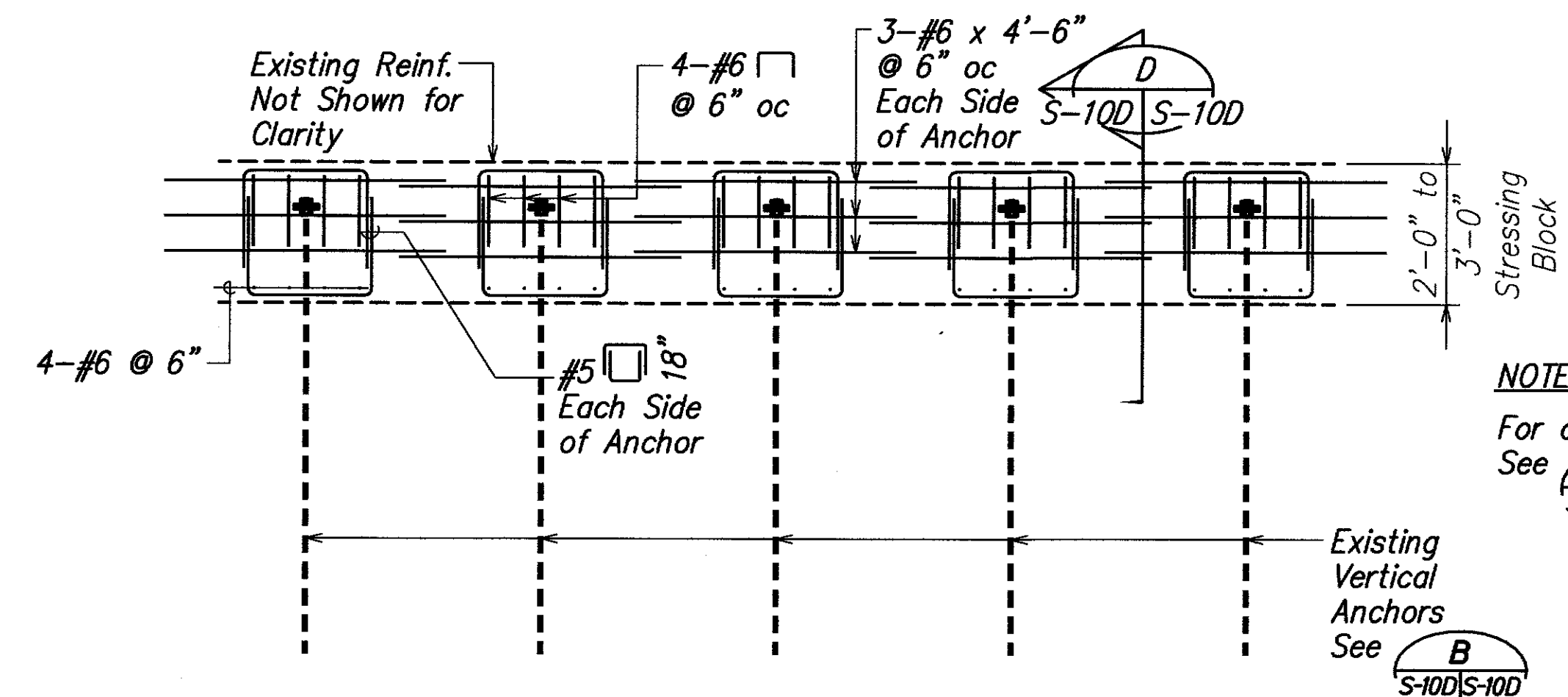
**STRESSING BLOCK ELEVATION B**  
 SCALE: 1/2" = 1'-0" S-100 S-100

## **Notes:**

1. See Sheets S-9 and S-10 for Barrier Wall Reinforcing and Additional Information not shown.
2. Mechanical Splice Couplers shall be of Similar Material as the Rebar it is Splicing (i.e. epoxy, stainless steel, etc)
3. Stainless Steel Threaded Rod shall be ASTM A193 UNS S316, Class 1, Grade B8.
4. Separate Dissimilar Metals E.G. Stainless and Non-Stainless Steel Rebar, with Teflon Tape at Contact are Only.



**SECTION C**  
 SCALE: 1/2" = 1'-0" S-100 S-100



**STRESSING BLOCK ELEVATION D**  
 SCALE: 1/2" = 1'-0" S-100 S-100

**NOTE:**  
 For additional details See A S-100 S-100

**NOTE:**  
 For additional details See B S-100 S-100

DATE	
SURVEY PLOTTED BY	
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
	Text for as-built posting
Roadway	

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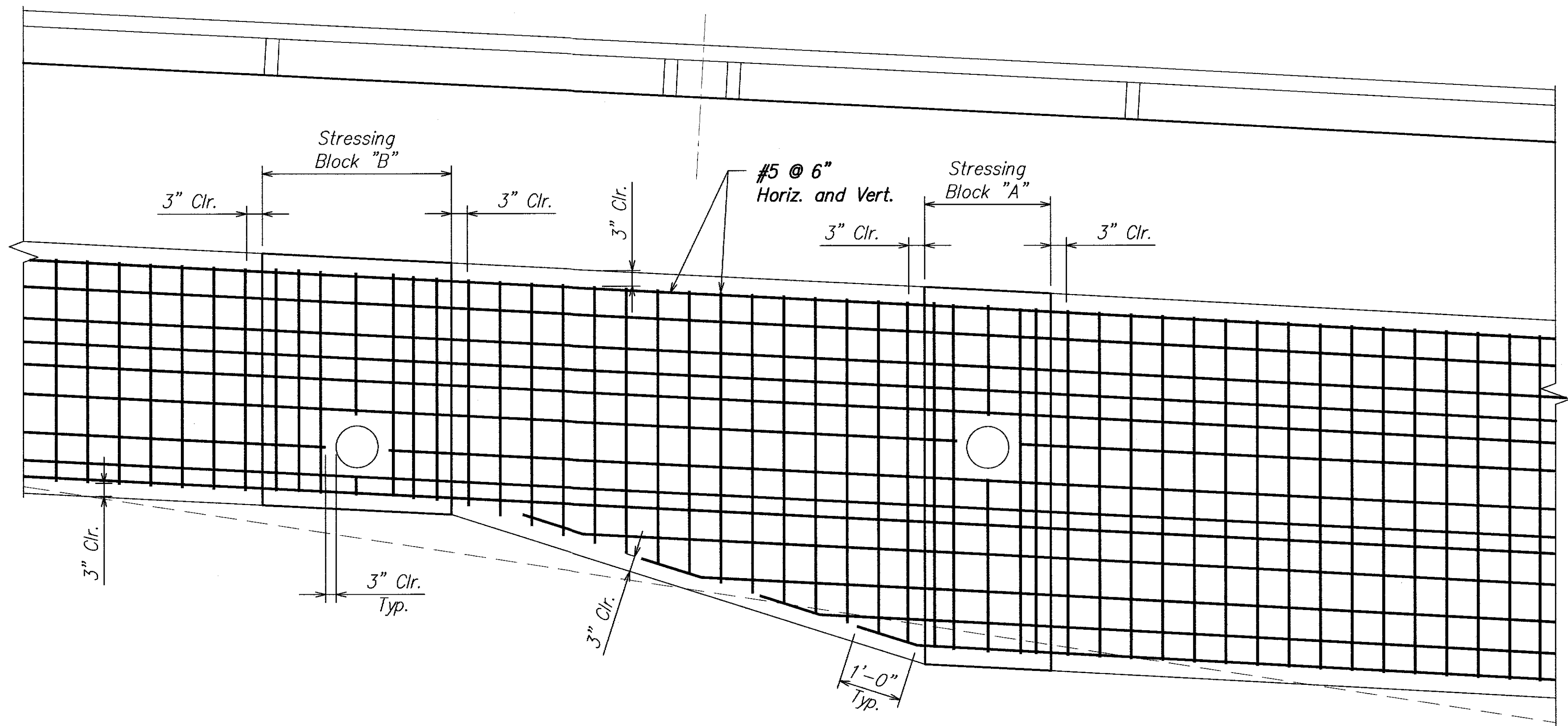
4/15/10	2 New Sheet
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<b>GROUND ANCHOR TYPE D</b>	
<b>SECTION AND ELEVATION</b>	
Kalaniana'ole Highway Improvements	
Retaining Wall at Makapuu, Oahu	
Federal-Aid Project No. NH-072-1(51)	
Scale: As Noted	Date: April 2007
SHEET No. S-10D OF 15 SHEETS	

"AS-BUILT"

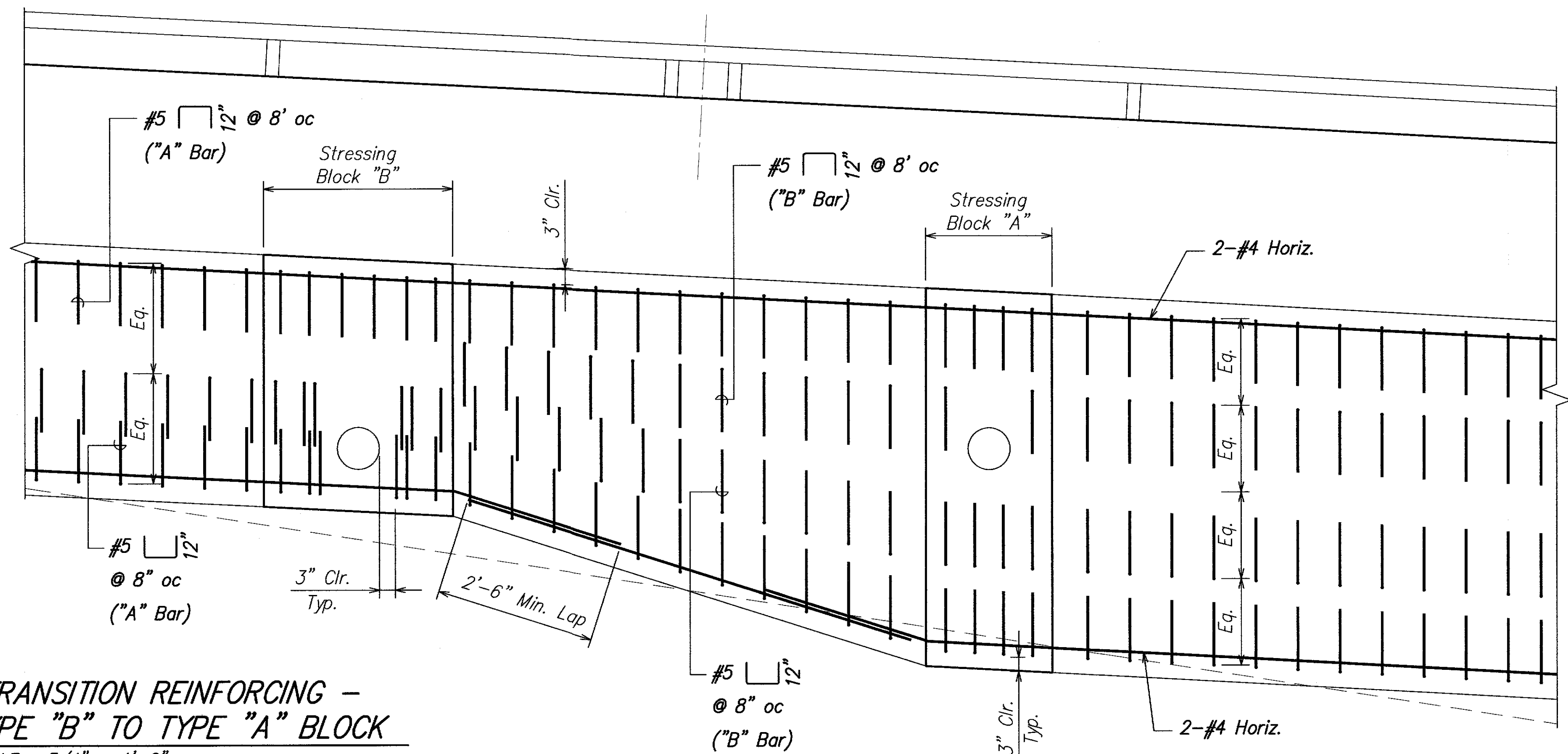
C.O. 36S-4



FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 36S-5	106

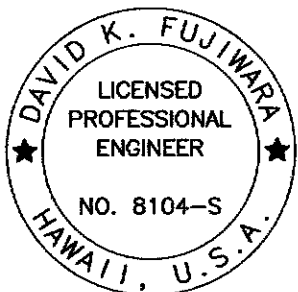


- Notes:**
1. Rebar are shown on two drawings for clarity
  2. For additional details, See original plans.



**TRANSITION REINFORCING -  
TYPE "B" TO TYPE "A" BLOCK**  
SCALE: 3/4" = 1'-0"

SURVEY PLOTTED BY	DATE
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TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

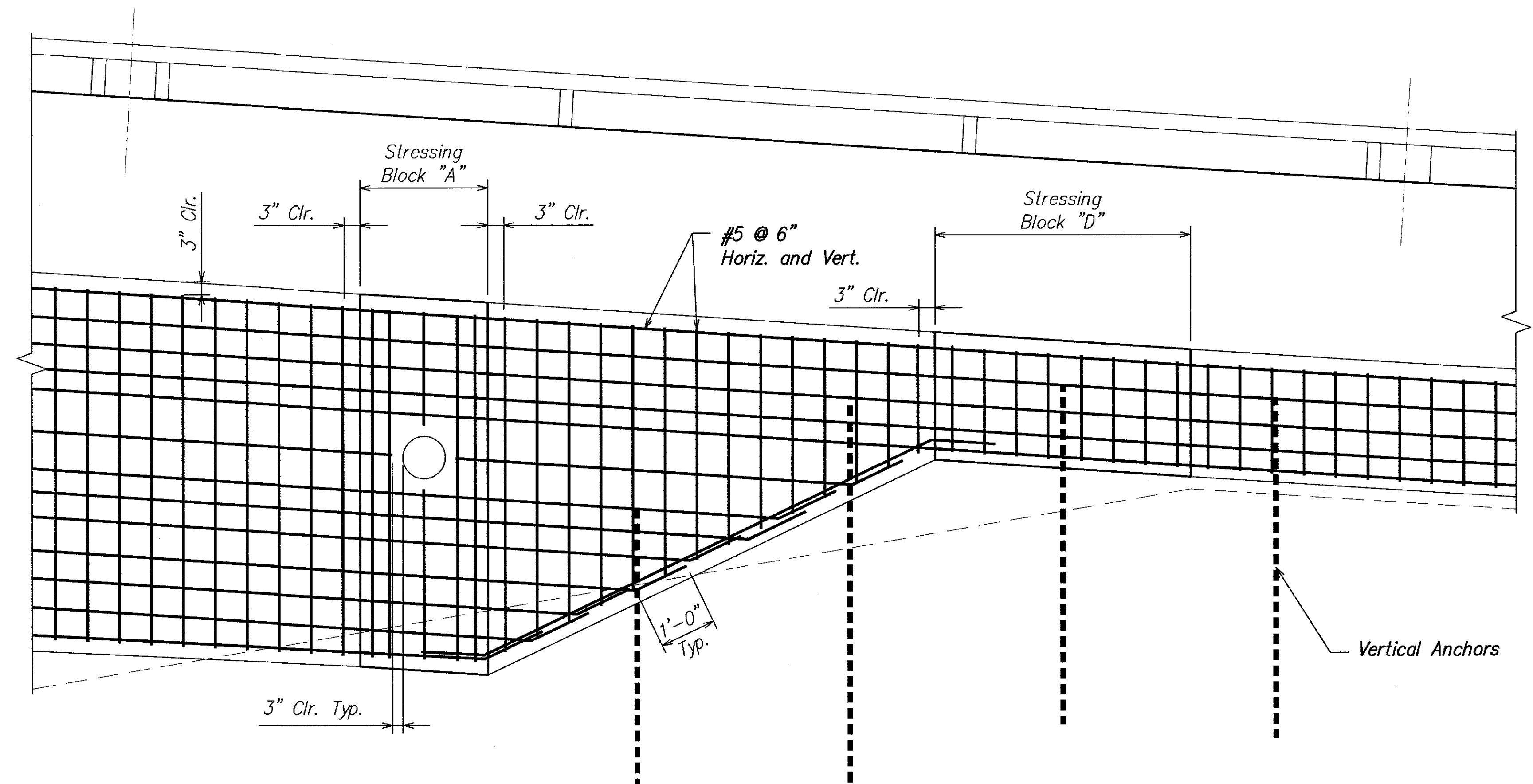


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SIGNATURE EXPIRATION DATE OF THE LICENSE 4-30-12

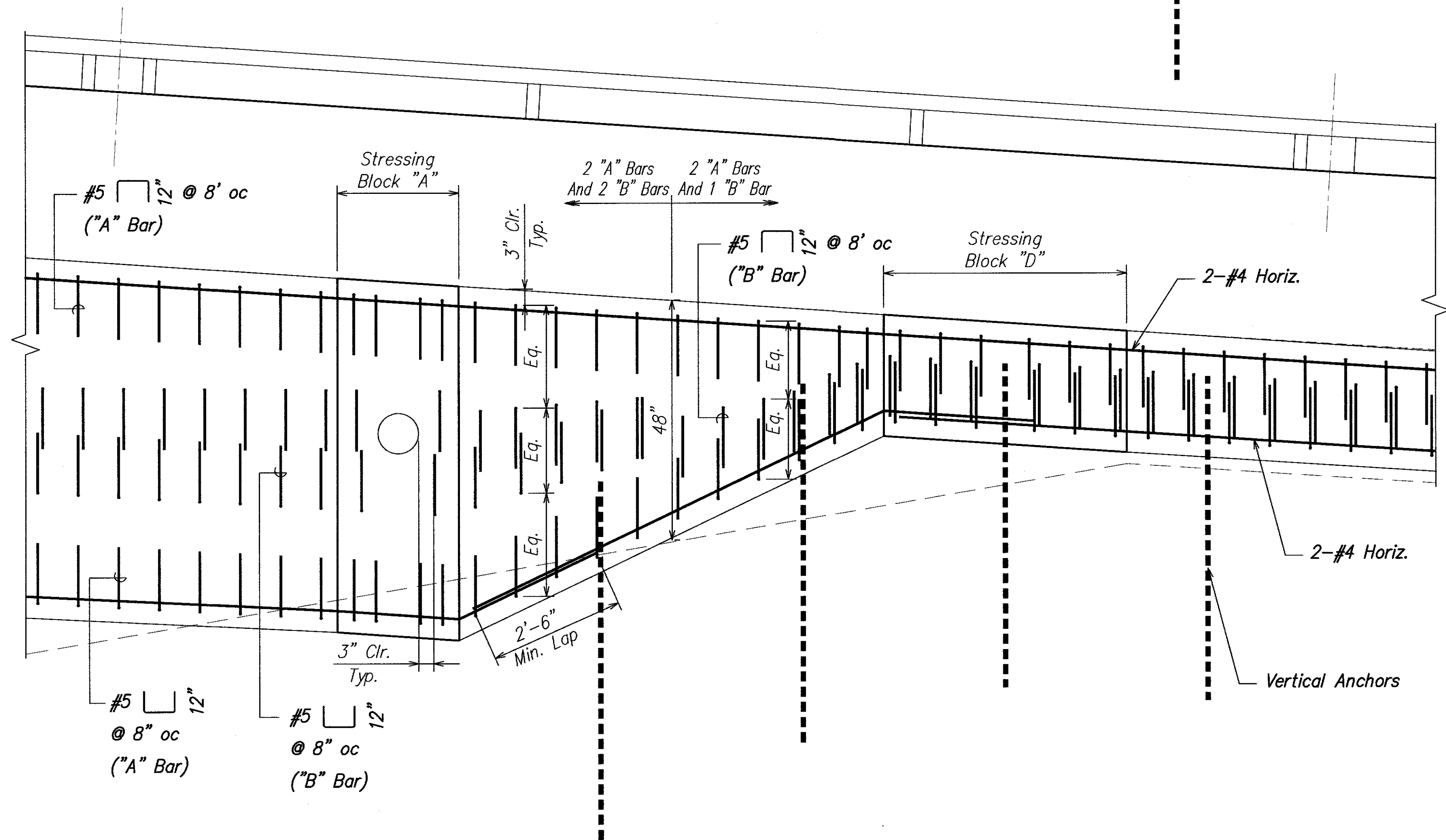
6/30/10	2	New Sheet Transition Reinforcing Detail
DATE	REVISION	
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION		
<b><u>TRANSITION REINFORCING</u></b>		
<b><u>PARTIAL ELEVATIONS</u></b>		
<u>Kalanianaʻole Highway Improvements</u> <u>Retaining Wall at Makapuu, Oahu</u> <u>Federal-Aid Project No. NH-072-1(51)</u>		
Scale: As Noted	Date: April 2007	
SHEET No. S-10E OF 15 SHEETS		

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 36S-6	106



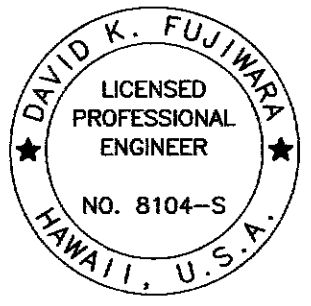
**Notes:**

1. Rebar are shown on two drawings for clarity
2. For additional details, see original plans.



**TRANSITION REINFORCING -  
TYPE "A" TO TYPE "D" BLOCK**  
SCALE: 3/4" = 1'-0"

SURVEY PLATTED BY	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

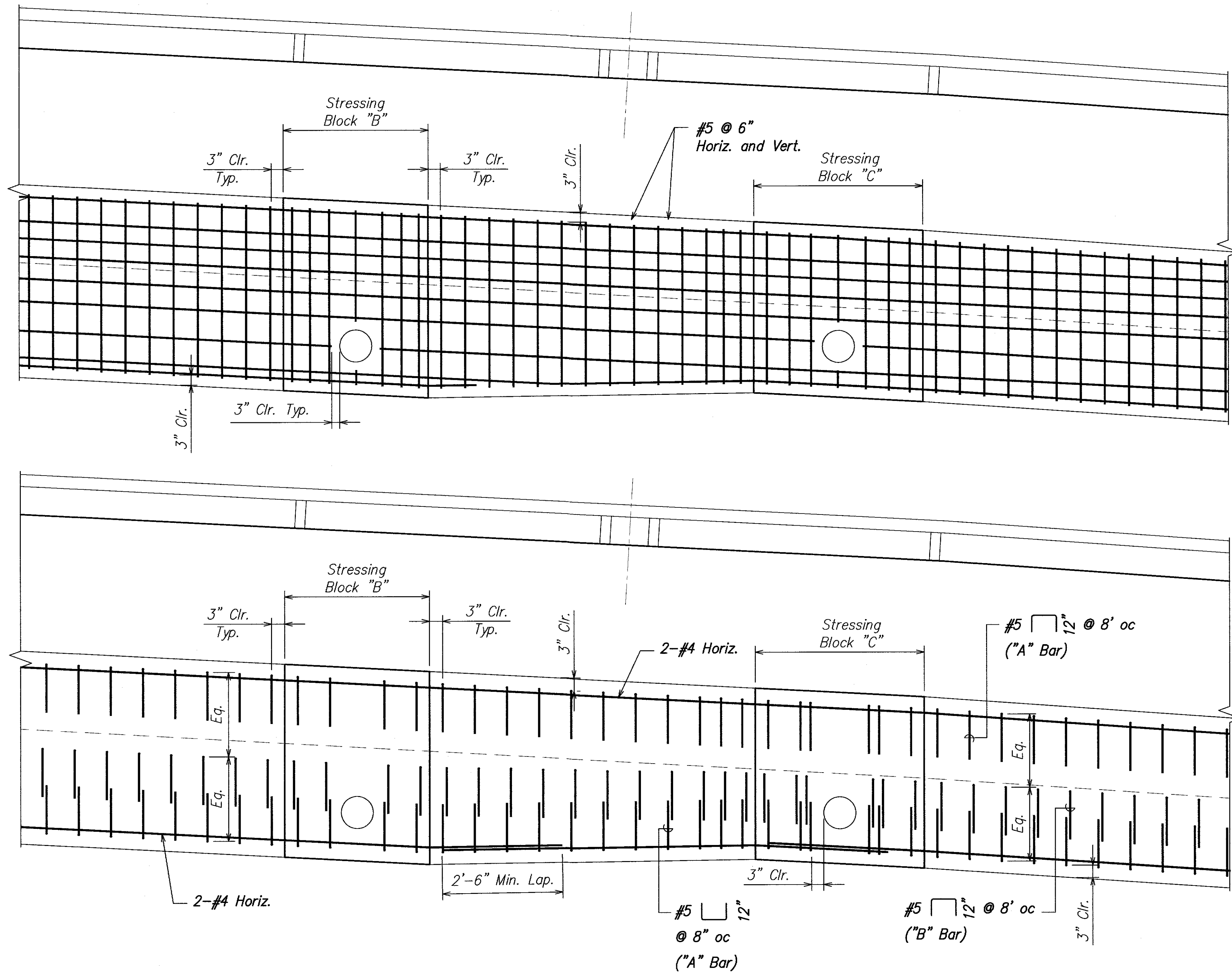


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EXPIRATION DATE OF THE LICENSE

6/30/10	2	New Sheet Transition Reinforcing Detail
DATE	REVISION	
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION		
<b>TRANSITION REINFORCING</b>		
<b>PARTIAL ELEVATIONS</b>		
<i>Kalaniana'ole Highway Improvements Retaining Wall at Makapuu, Oahu</i>		
<i>Federal-Aid Project No. NH-072-1(51)</i>		
Scale: As Noted	Date: April 2007	
SHEET No. S-10F OF 15 SHEETS		

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 36S-7	106




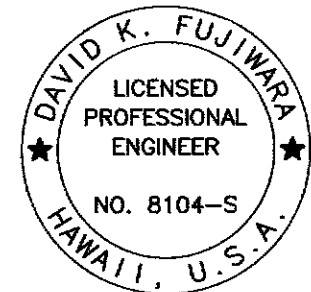
**Notes:**

1. For Block "C" to Block "B" Transition, similar but opposite hand.
2. Rebar are shown on two drawings for clarity
3. For additional details, See original plans.

**TRANSITION REINFORCING -  
TYPE "B" TO TYPE "C" BLOCK**

SCALE: 3/4" = 1'-0"

6/30/10	 New Sheet Transition Reinforcing Detail
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<b><u>TRANSITION REINFORCING</u></b>	
<b><u>PARTIAL ELEVATIONS</u></b>	
<i>Kalanianaʻole Highway Improvements Retaining Wall at Makapuu, Oahu Federal-Aid Project No. NH-072-1(51)</i>	
Scale: As Noted	Date: April 2007
SHEET No. S-10G OF 15 SHEETS	

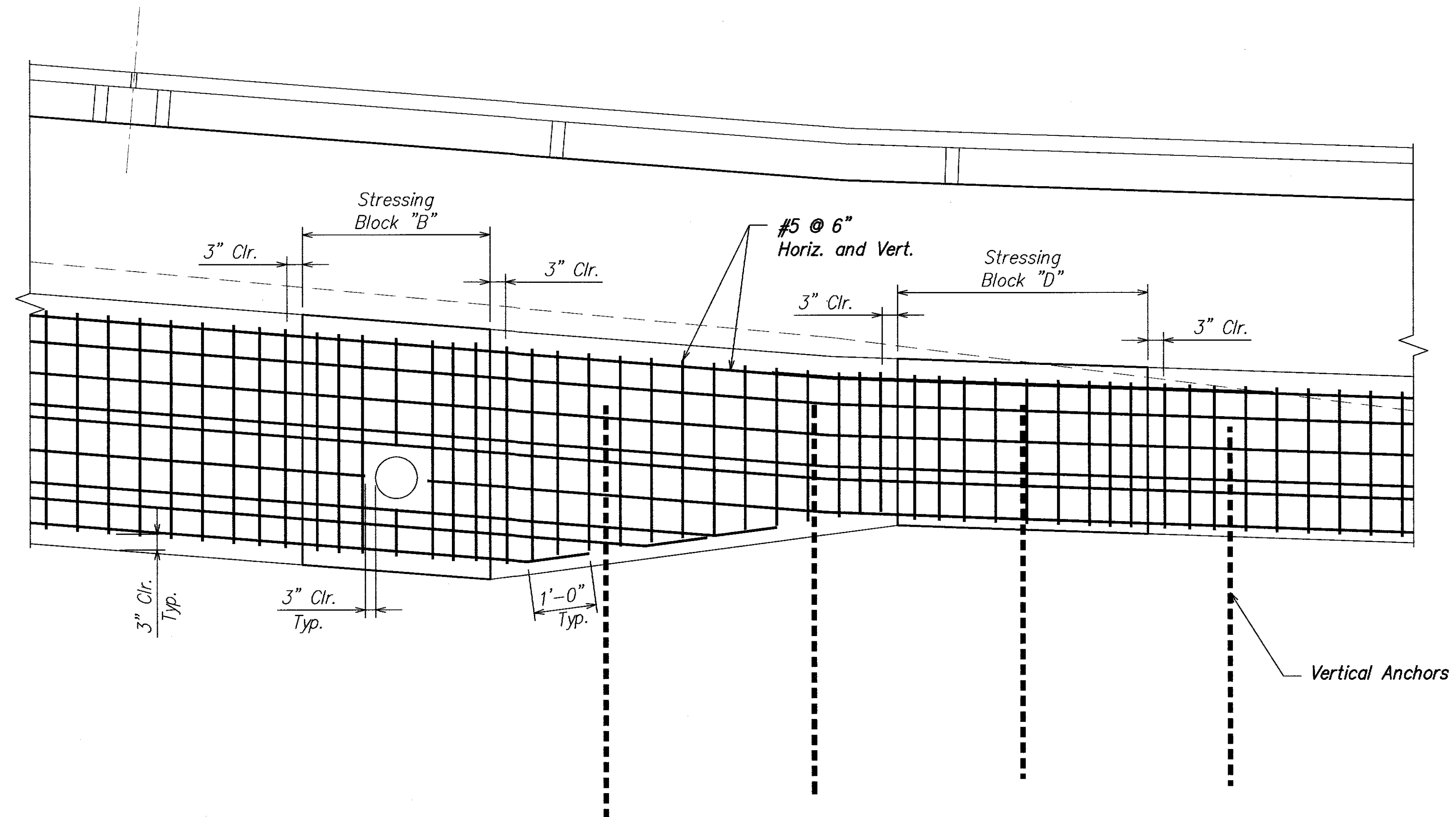


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Signature: *David K. Fujiwara*  
EXPIRATION DATE OF THE LICENSE: 4-30-12

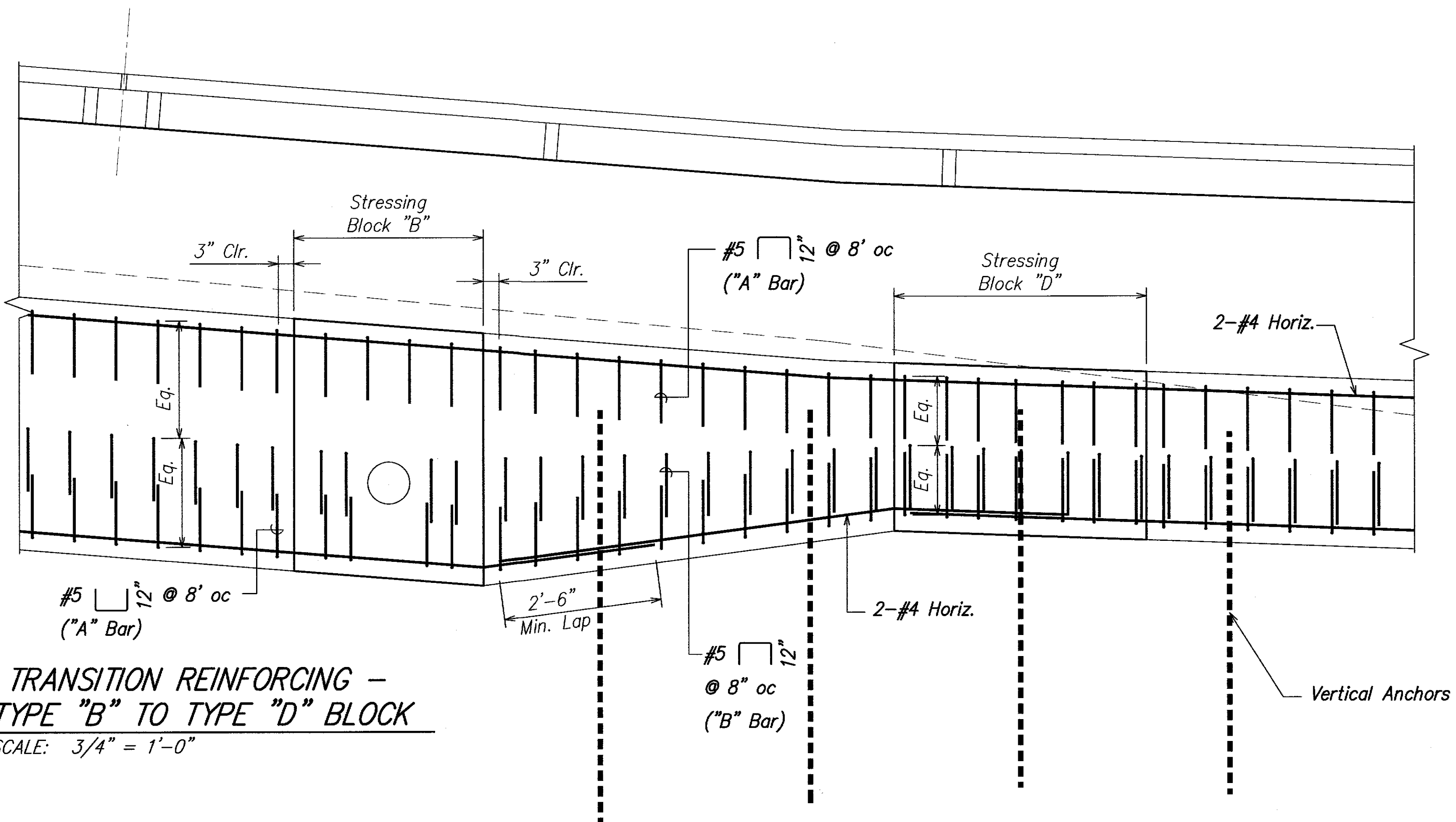


FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 36S-8	106



**Notes:**

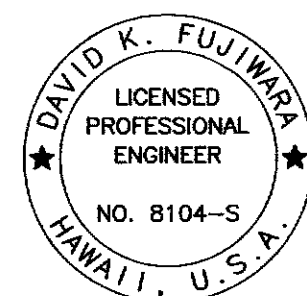
1. For Block "D" to Block "B" Transition, similar but opposite hand.
2. Rebar are shown on two drawings for clarity.
3. For additional details, see original plans.



**TRANSITION REINFORCING -  
TYPE "B" TO TYPE "D" BLOCK**

SCALE: 3/4" = 1'-0"

ORIGINAL PLAN	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
NO.	



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ME OR UNDER MY SUPERVISION.

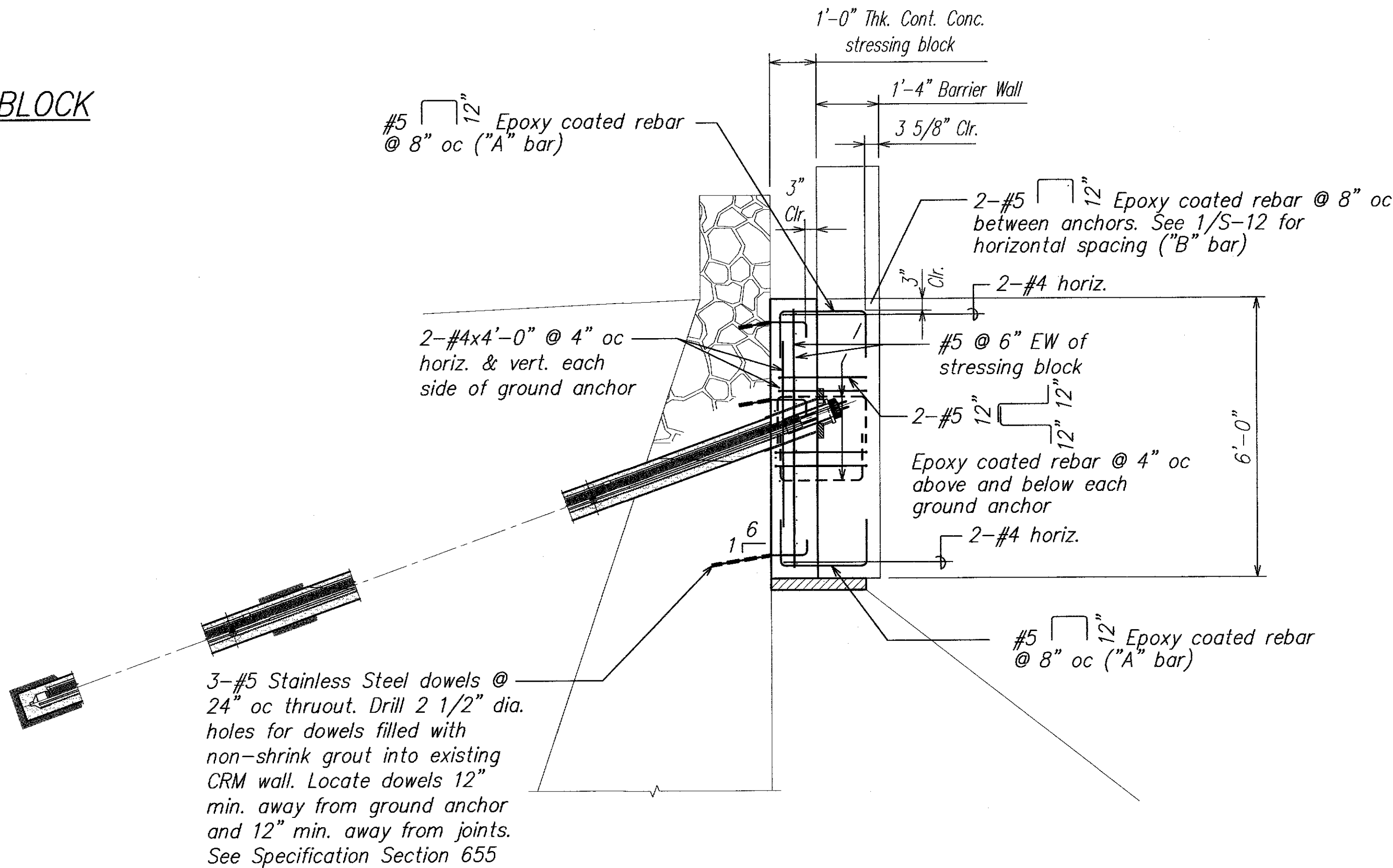
SIGNATURE: *David K. Fujiwara* 4-30-12  
EXPIRATION DATE OF THE LICENSE

6/30/10	2	New Sheet Transition Reinforcing Detail
DATE	REVISION	
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION		
<b>TRANSITION REINFORCING</b>		
<b>PARTIAL ELEVATIONS</b>		
Kalanianaʻole Highway Improvements Retaining Wall at Makapuu, Oahu		
Federal-Aid Project No. NH-072-1(51)		
Scale: As Noted	Date: April 2007	
SHEET No. S-10H OF 15 SHEETS		

C.O. 36S-8

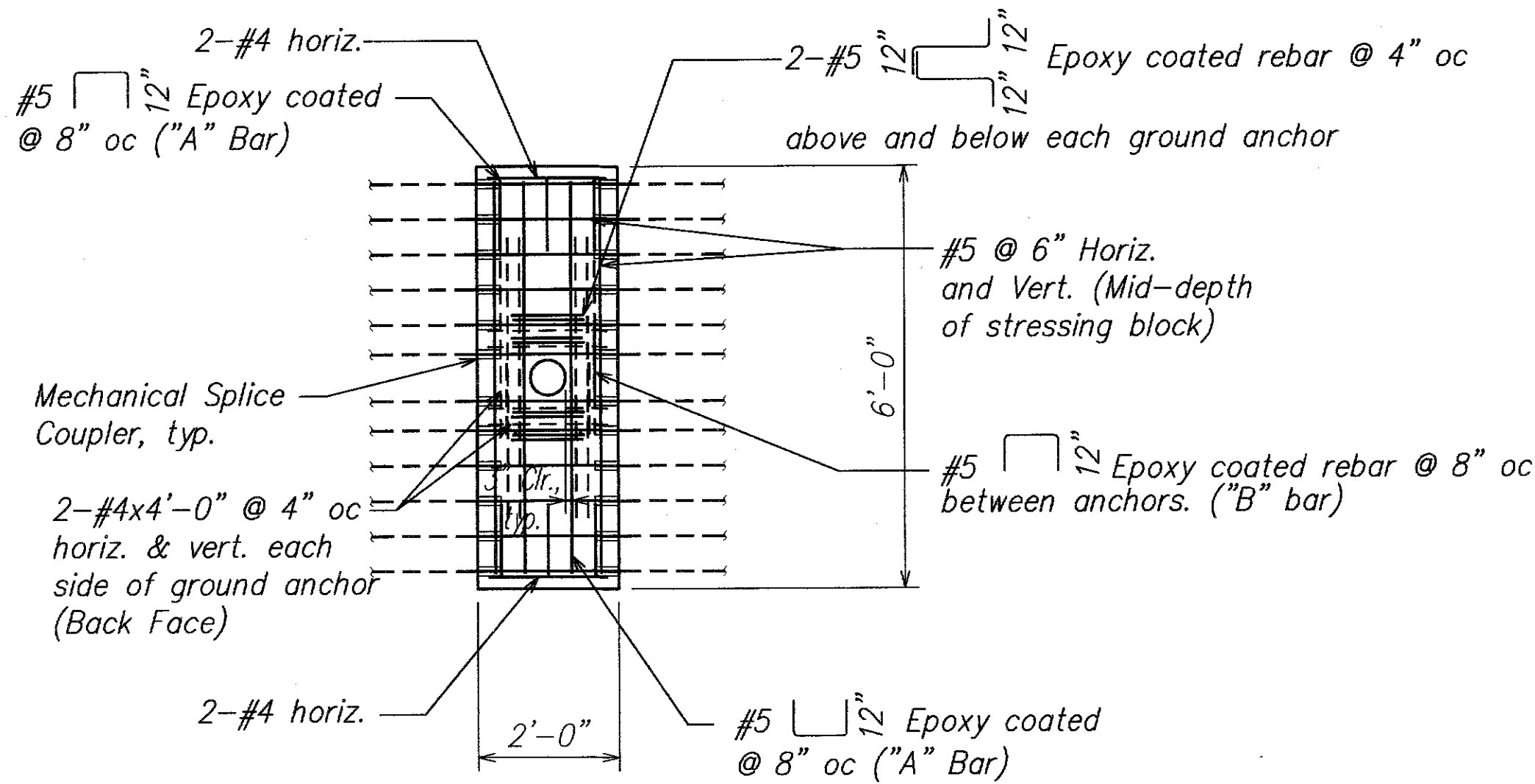
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 36S-10A	106

TYPE A: STRESSING BLOCK  
(2'W x 6'H)



- Notes:
1. See Sheets S-9 and S-10 for Barrier Wall Reinforcing and Additional Information not shown.
  2. Mechanical Splice Couplers shall be of Similar Material as the Rebar it is Splicing (i.e. epoxy, stainless steel, etc)
  3. Separate Dissimilar Metals E.G. Stainless and Non-Stainless Steel Rebar, with Teflon Tape at Contact are Only.

SECTION A  
SCALE: 1/2" = 1'-0" S-10A S-10A



STRESSING BLOCK ELEVATION B  
SCALE: 1/2" = 1'-0" S-10A S-10A

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QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
LICENSED PROFESSIONAL ENGINEER  
NO. 8104-S  
HAWAII, U.S.A.

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Signature: David K. Fujiwara  
EXPIRATION DATE OF THE LICENSE: 4-30-12

4/15/10	2 New Sheet
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <b>GROUND ANCHOR TYPE A SECTION AND ELEVATION</b> <i>Kalanianaʻole Highway Improvements Retaining Wall at Makapuu, Oahu</i> Federal-Aid Project No. NH-072-1(51) Scale: As Noted Date: April 2010	
SHEET No. S-10A OF 15 SHEETS	

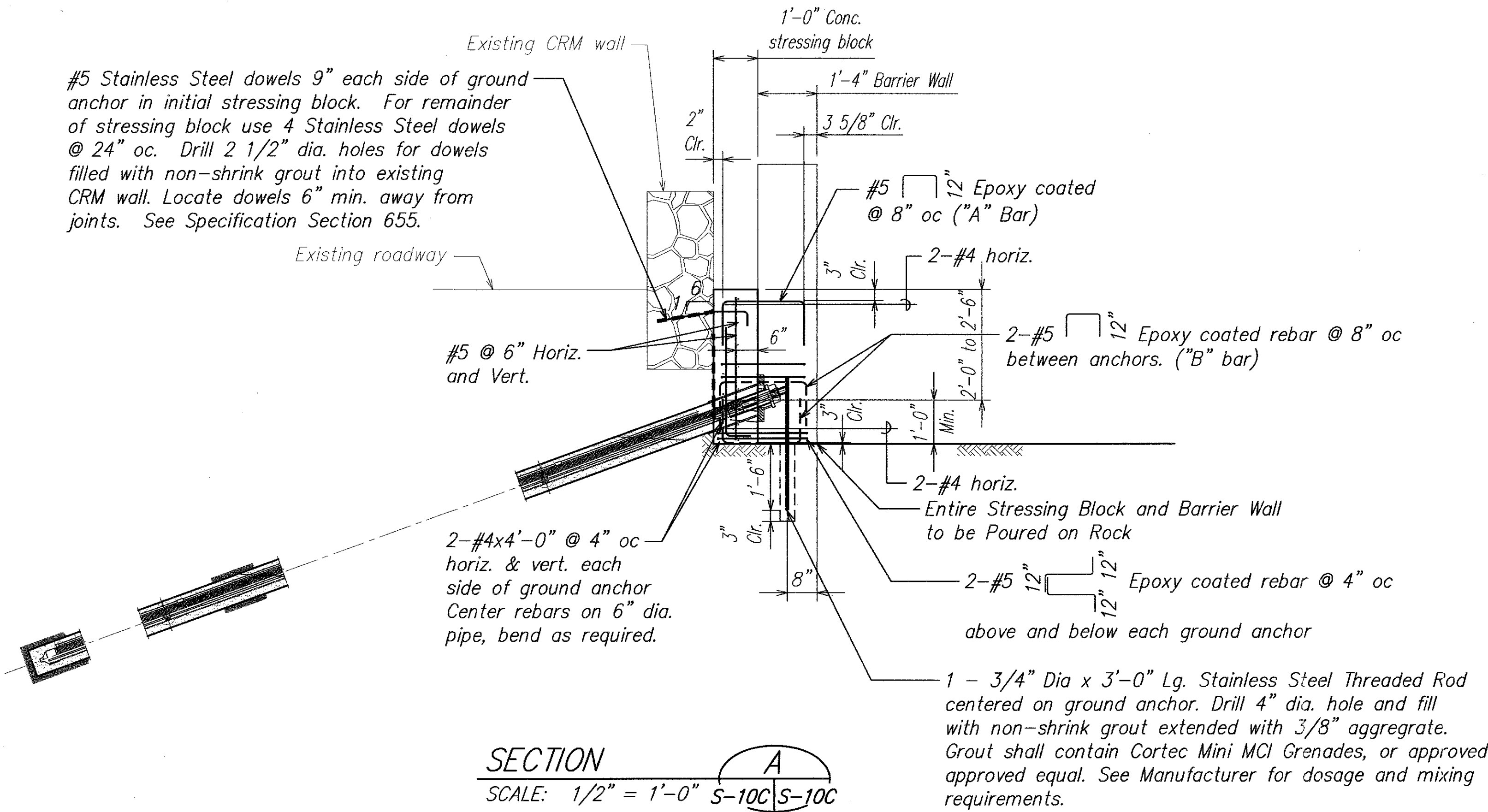




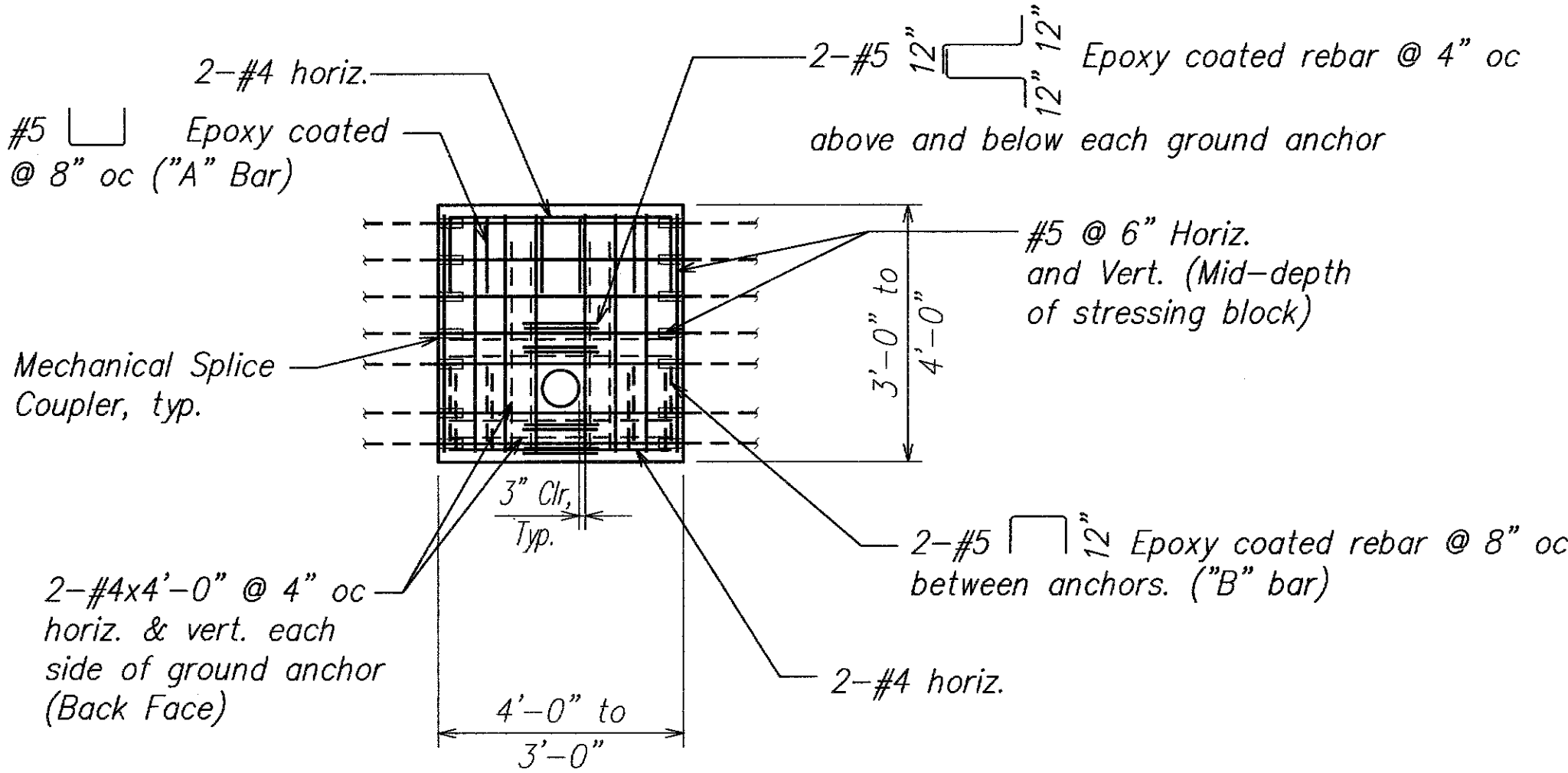
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 36S-10C	106

TYPE C: STRESSING BLOCK  
(3'H to 4'H)

#5 Stainless Steel dowels 9" each side of ground anchor in initial stressing block. For remainder of stressing block use 4 Stainless Steel dowels @ 24" oc. Drill 2 1/2" dia. holes for dowels filled with non-shrink grout into existing CRM wall. Locate dowels 6" min. away from joints. See Specification Section 655.



- Notes:
1. See Sheets S-9 and S-10 for Barrier Wall Reinforcing and Additional Information not shown.
  2. Mechanical Splice Couplers shall be of Similar Material as the Rebar it is Splicing (i.e. epoxy, stainless steel, etc)
  3. Stainless Steel Threaded Rod shall be ASTM A193 UNS S316, Class 1, Grade B8.
  4. Separate Dissimilar Metals E.G. Stainless and Non-Stainless Steel Rebar, with Teflon Tape at Contact are Only.



4/15/10 2 New Sheet

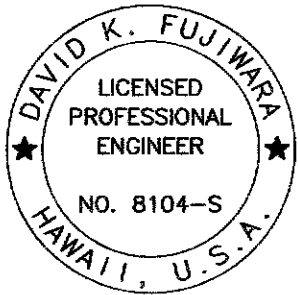
DATE REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**GROUND ANCHOR TYPE C**  
**SECTION AND ELEVATION**

*Kalaniana'ole Highway Improvements  
Retaining Wall at Makapuu, Oahu  
Federal-Aid Project No. NH-072-1(51)*

Scale: As Noted Date: April 2010

SHEET No.S-10C OF 15 SHEETS



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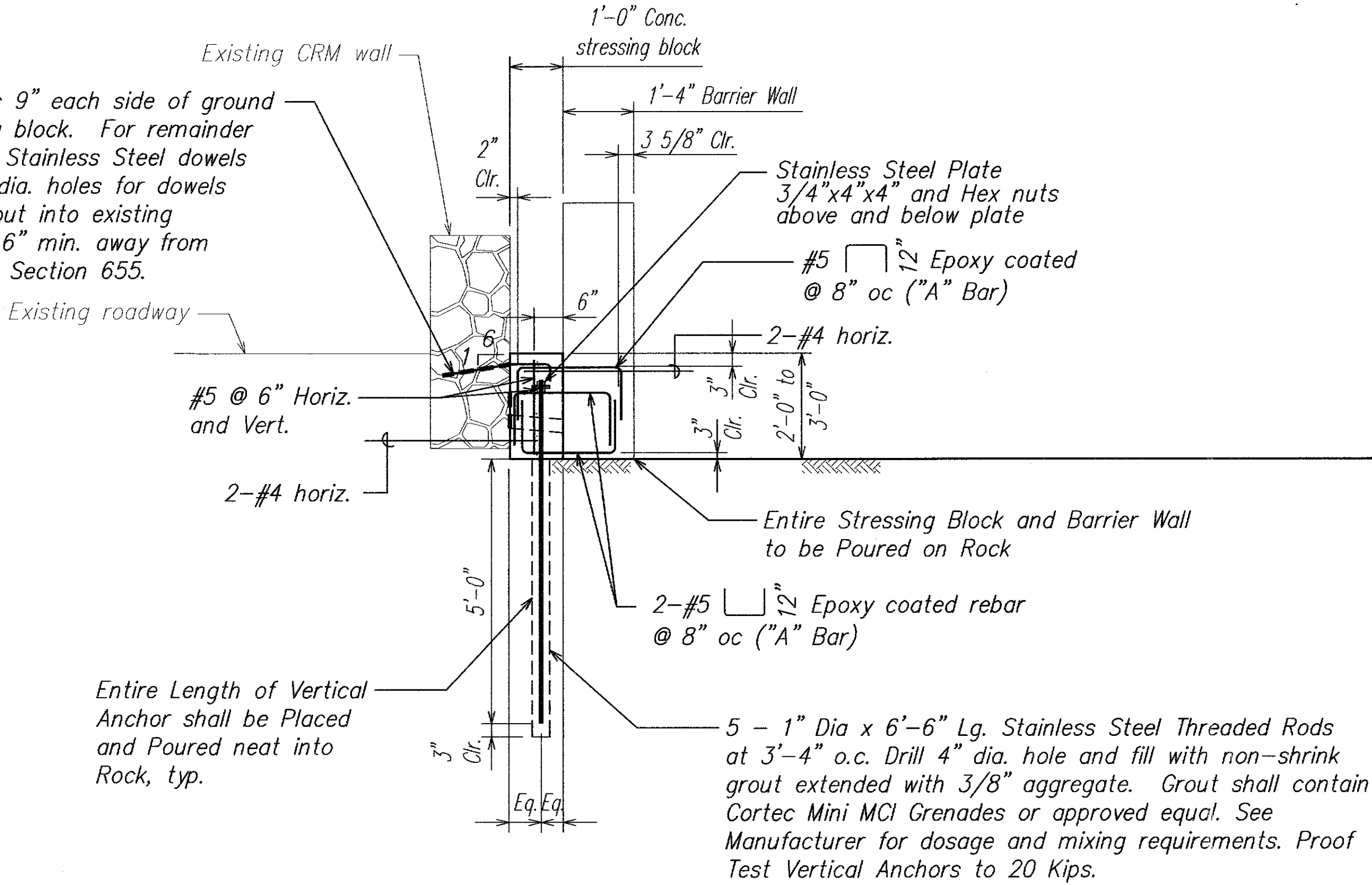
*David K. Fujiwara*  
SIGNATURE EXPIRATION DATE OF THE LICENSE 4-30-12

C.O. 36S-10C

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 36S-100	106

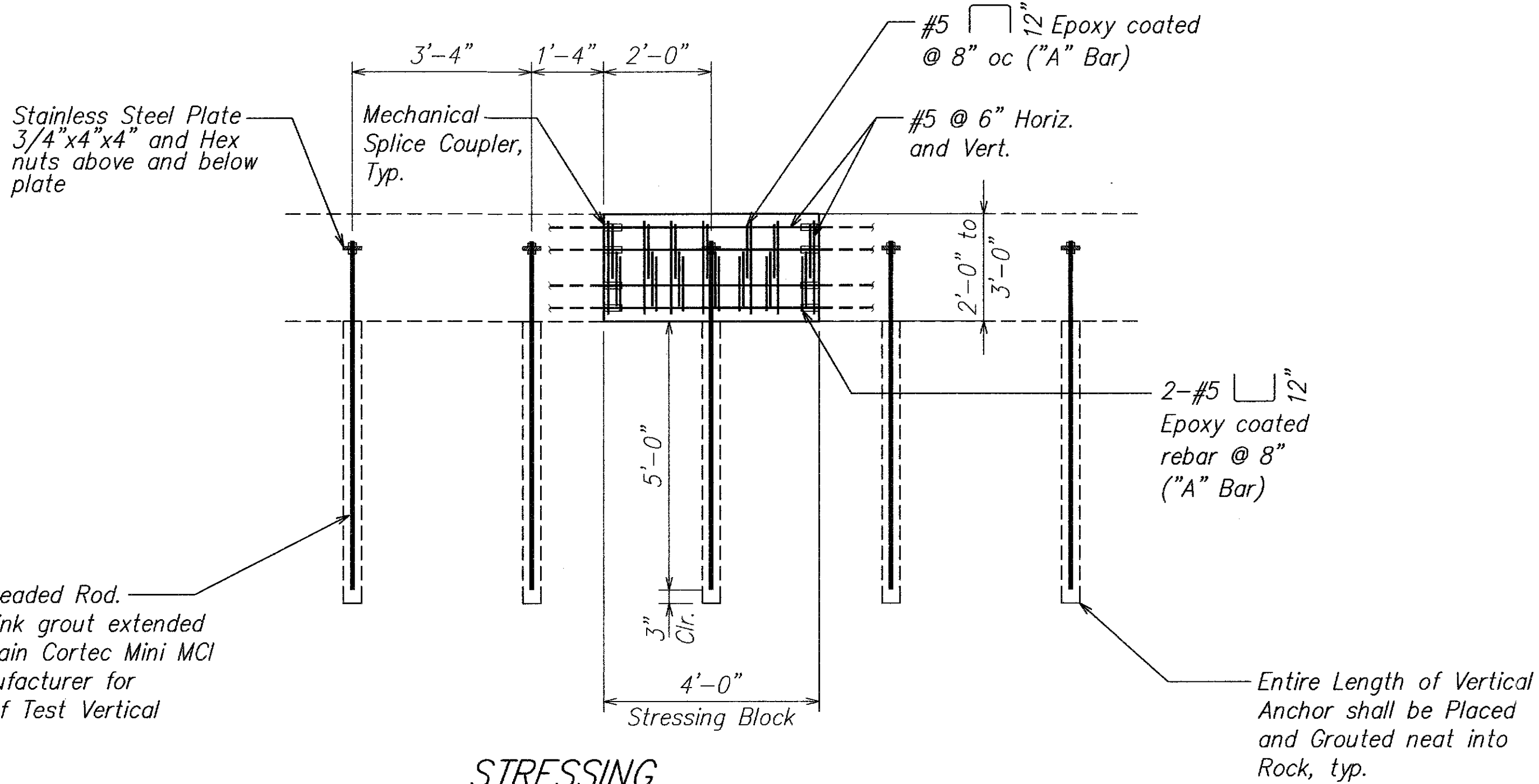
# **TYPE D: STRESSING BLOCK** **4'W x (2'H to 3'H)**

#5 Stainless Steel dowels 9" each side of ground anchor in initial stressing block. For remainder of stressing block use 4 Stainless Steel dowels @ 24" oc. Drill 2 1/2" dia. holes for dowels filled with non-shrink grout into existing CRM wall. Locate dowels 6" min. away from joints. See Specification Section 655.



**SECTION A**  
 SCALE: 1/2" = 1'-0" S-100 S-100

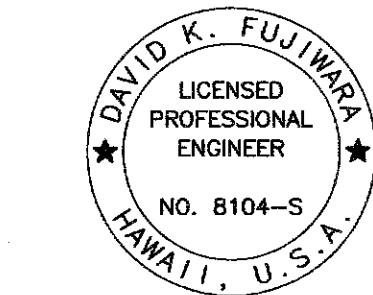
- Notes:**
- See Sheets S-9 and S-10 for Barrier Wall Reinforcing and Additional Information not shown.
  - Mechanical Splice Couplers shall be of Similar Material as the Rebar it is Splicing (i.e. epoxy, stainless steel, etc)
  - Stainless Steel Threaded Rod shall be ASTM A193 UNS S316, Class 1, Grade B8.
  - Separate Dissimilar Metals E.G. Stainless and Non-Stainless Steel Rebar, with Teflon Tape at Contact are Only.



**STRESSING BLOCK ELEVATION B**  
 SCALE: 1/2" = 1'-0" S-100 S-100

1" Dia x 6'-6" Lg. Stainless Steel Threaded Rod. Drill 4" Dia hole and fill with non-shrink grout extended with 3/8" aggregate. Grout shall contain Cortec Mini MCI Grenades or approved equal. See Manufacturer for dosage and mixing requirements. Proof Test Vertical Anchors to 20 Kips.

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DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	



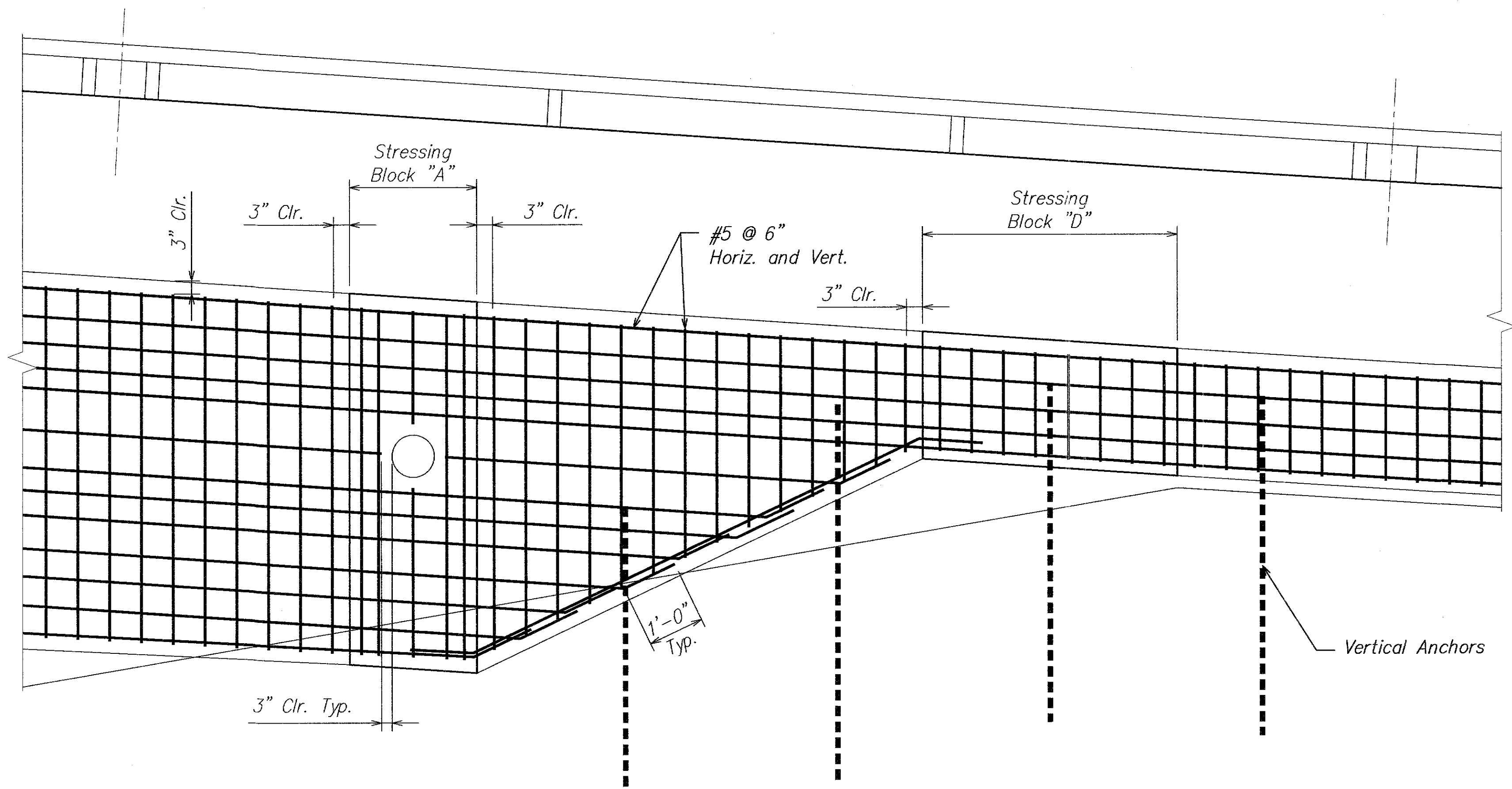
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 SIGNATURE: *David K. Fujiwara* 4-30-12  
 EXPIRATION DATE OF THE LICENSE

4/15/10	2 New Sheet
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <b>GROUND ANCHOR TYPE D</b> <b>SECTION AND ELEVATION</b> Kalaniana'ole Highway Improvements Retaining Wall at Makapuu, Oahu Federal-Aid Project No. NH-072-1(51) Scale: As Noted Date: April 2010 SHEET No. S-100 OF 15 SHEETS	

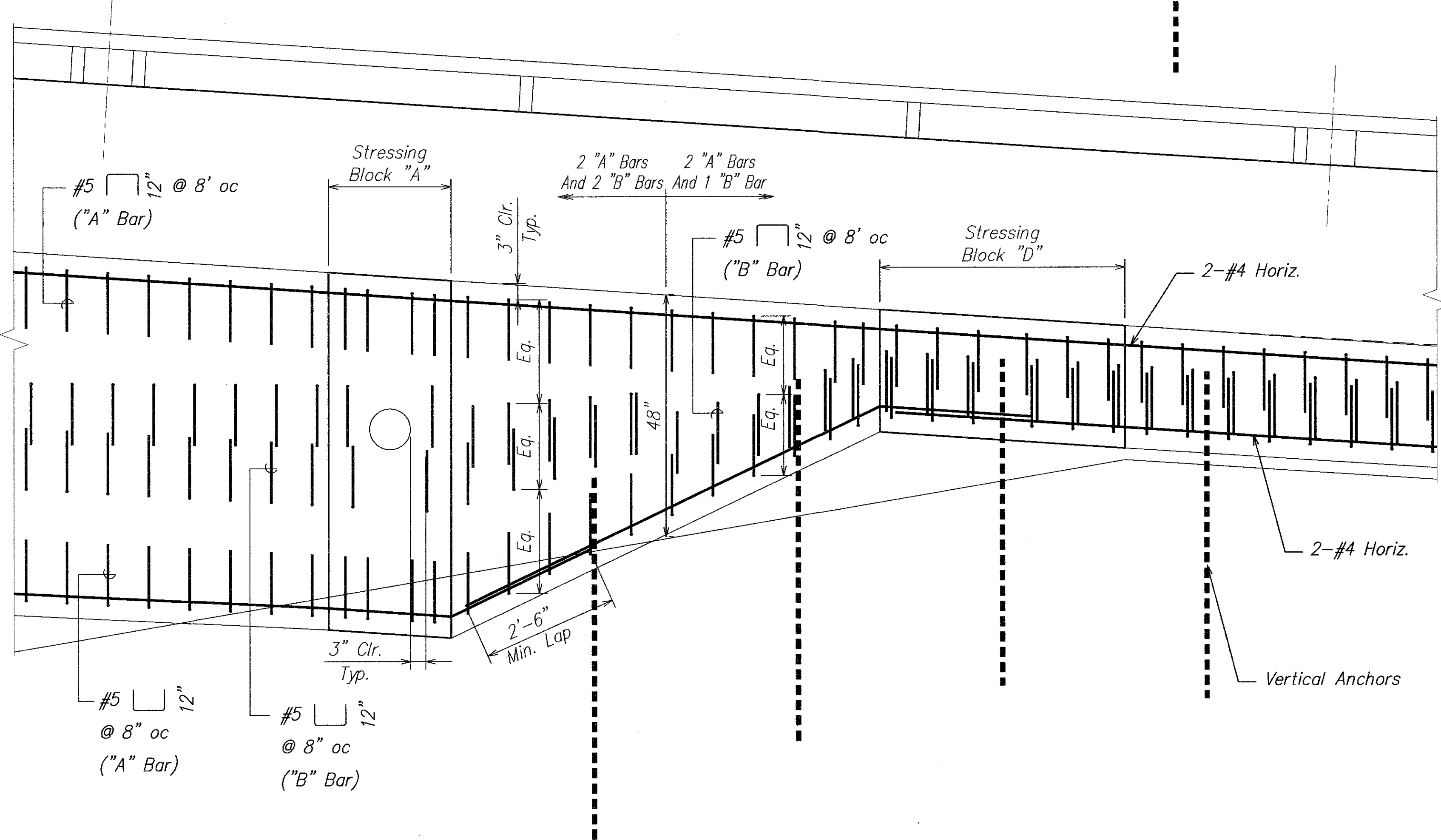




FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 36S-10F	106

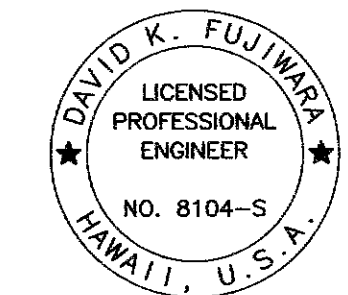


- Notes:
1. Rebar are shown on two drawings for clarity
  2. For additional details, see original plans.



**TRANSITION REINFORCING -  
TYPE "A" TO TYPE "D" BLOCK**  
SCALE: 3/4" = 1'-0"

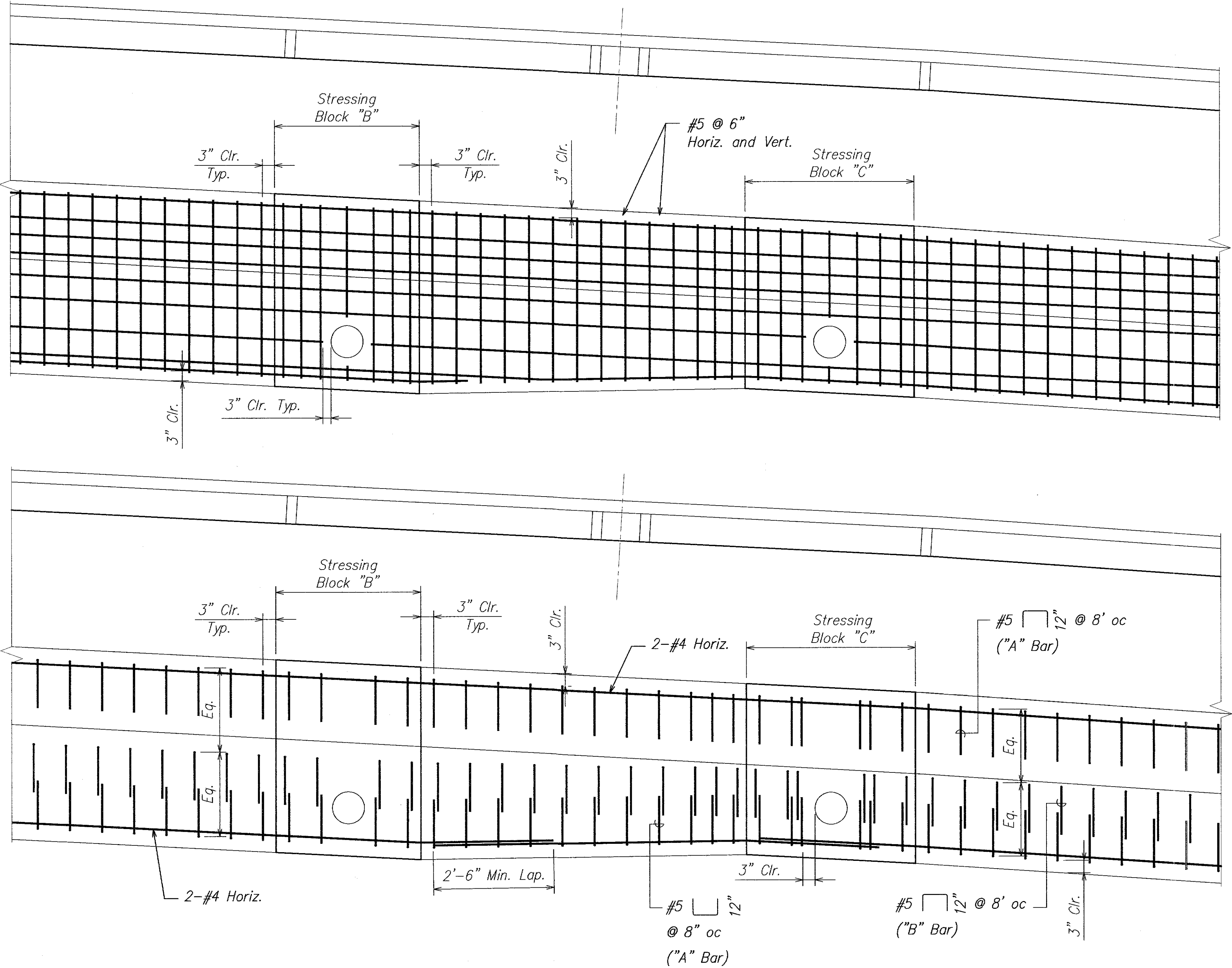
SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	



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SIGNATURE EXPIRATION DATE OF THE LICENSE 4-30-12

6/30/10	2	New Sheet Transition Reinforcing Detail
DATE	REVISION	
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <b>TRANSITION REINFORCING PARTIAL ELEVATIONS</b> <i>Kalanianaʻole Highway Improvements Retaining Wall at Makapuu, Oahu</i> Federal-Aid Project No. NH-072-1(51) Scale: As Noted Date: April 2007 SHEET No. S-10F OF 15 SHEETS		

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 36S-10G	106



- Notes:
1. For Block "C" to Block "B" Transition, similar but opposite hand.
  2. Rebar are shown on two drawings for clarity
  3. For additional details, See original plans.

SURVEY PLOTTED BY _____	DATE _____
DRAWN BY _____	DESIGNED BY _____
NOTE BOOK _____	QUANTITIES BY _____
CHECKED BY _____	No. _____

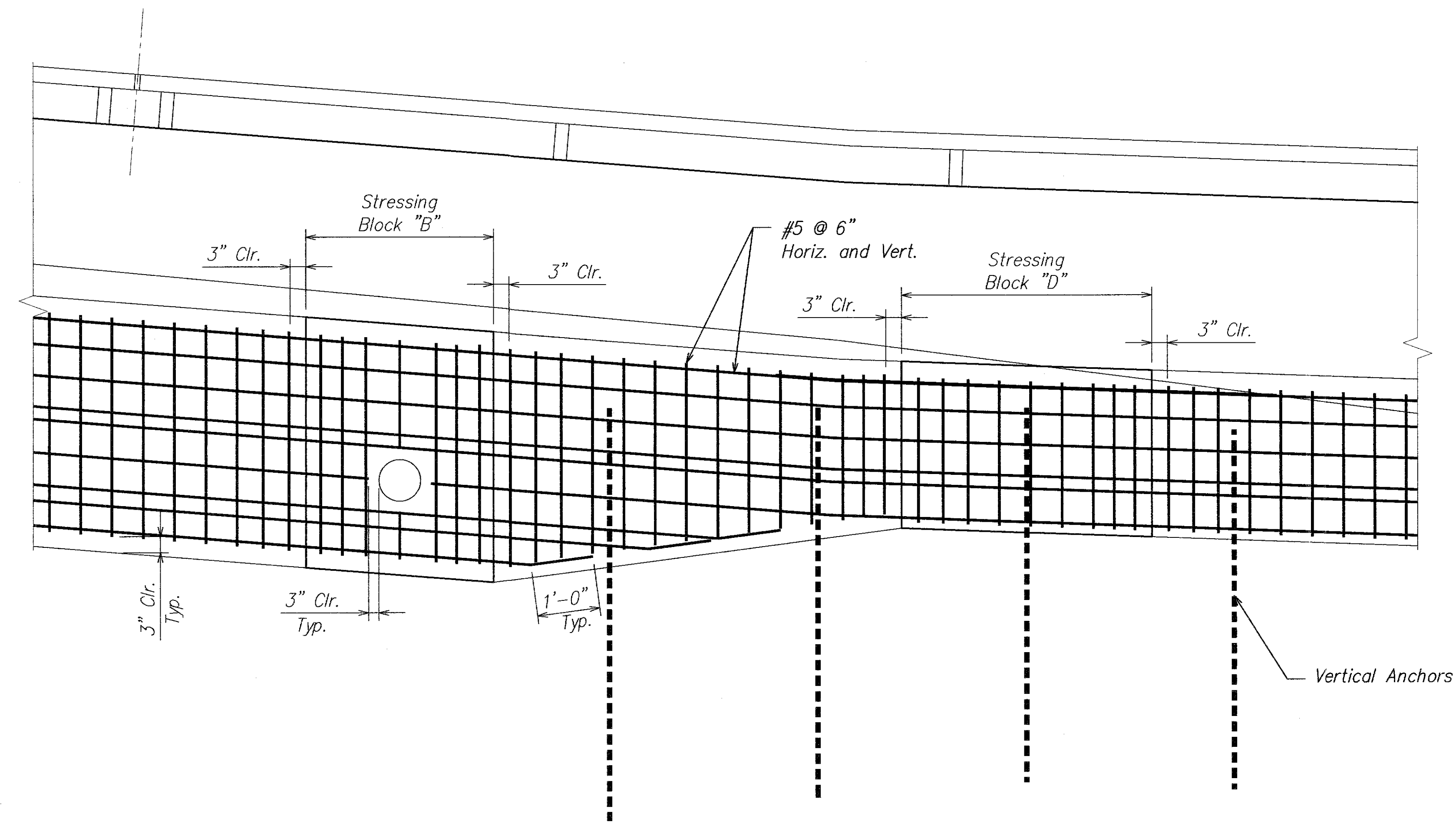
TRANSITION REINFORCING -  
TYPE "B" TO TYPE "C" BLOCK  
SCALE: 3/4" = 1'-0"

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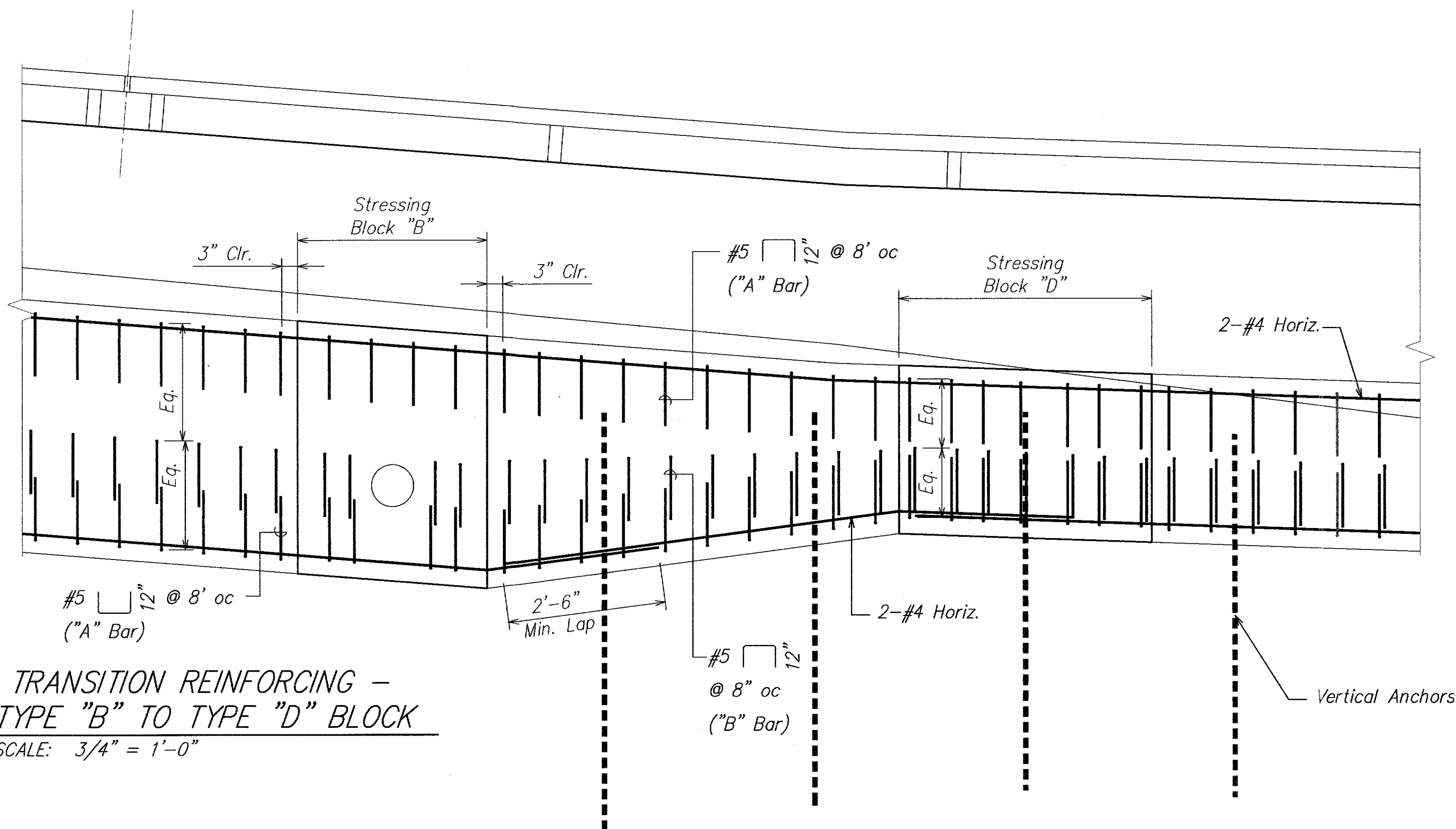
*David K. Fujimura* 4-30-12  
SIGNATURE EXPIRATION DATE OF THE LICENSE

6/30/10	<div><div>2</div></div> <div>New Sheet Transition Reinforcing Detail</div>
DATE	REVISION
<div>STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <u>TRANSITION REINFORCING</u> <u>PARTIAL ELEVATIONS</u>  <u>Kalanianaʻole Highway Improvements</u> <u>Retaining Wall at Makapuu, Oahu</u> <u>Federal-Aid Project No. NH-072-1(51)</u>  Scale: As Noted      Date: April 2007  SHEET No. S-10G OF 15 SHEETS</div>	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 36S-10H	106



- Notes:
1. For Block "D" to Block "B" Transition, similar but opposite hand.
  2. Rebar are shown on two drawings for clarity
  3. For additional details, see original plans.




TRANSITION REINFORCING -  
TYPE "B" TO TYPE "D" BLOCK  
SCALE: 3/4" = 1'-0"

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

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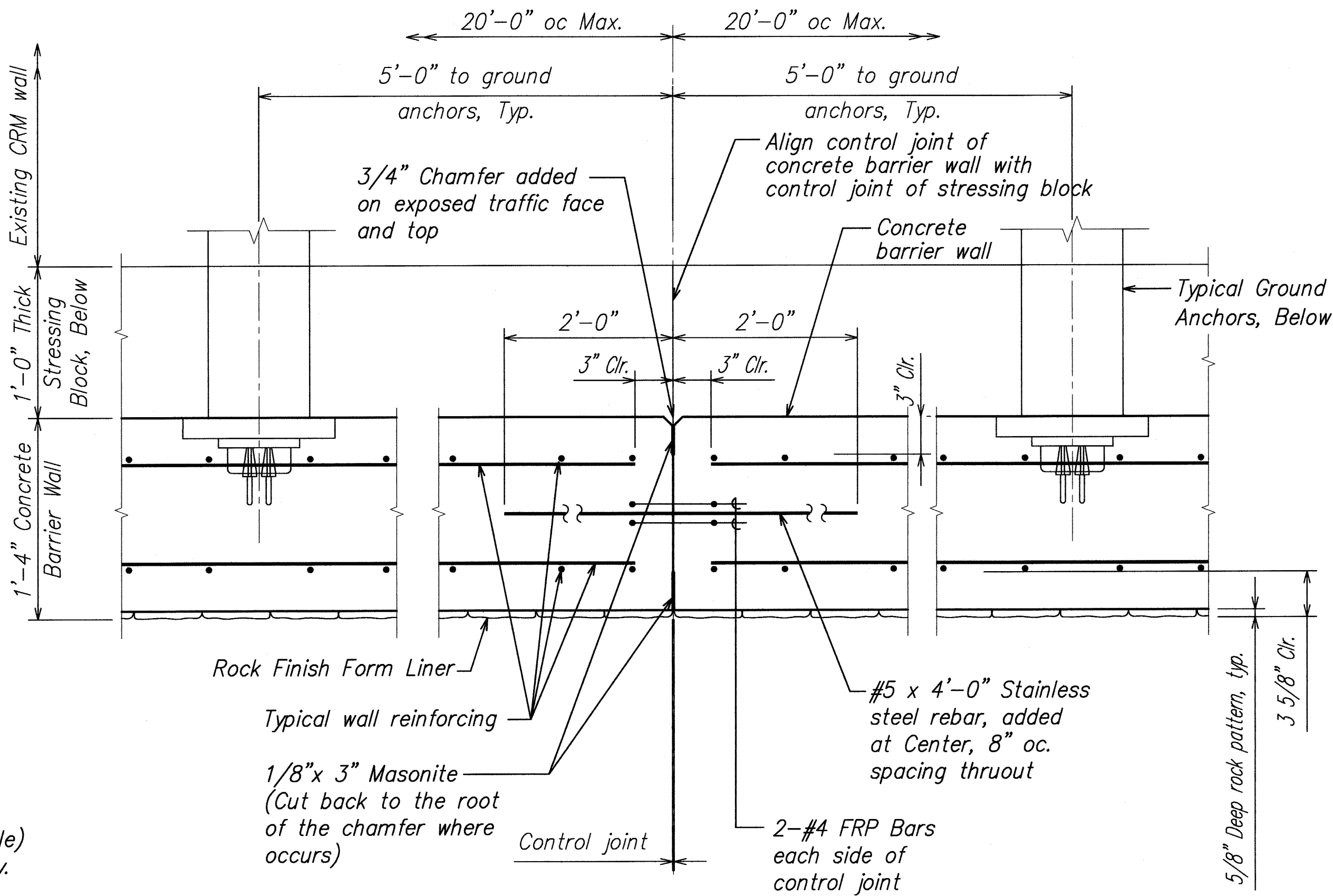
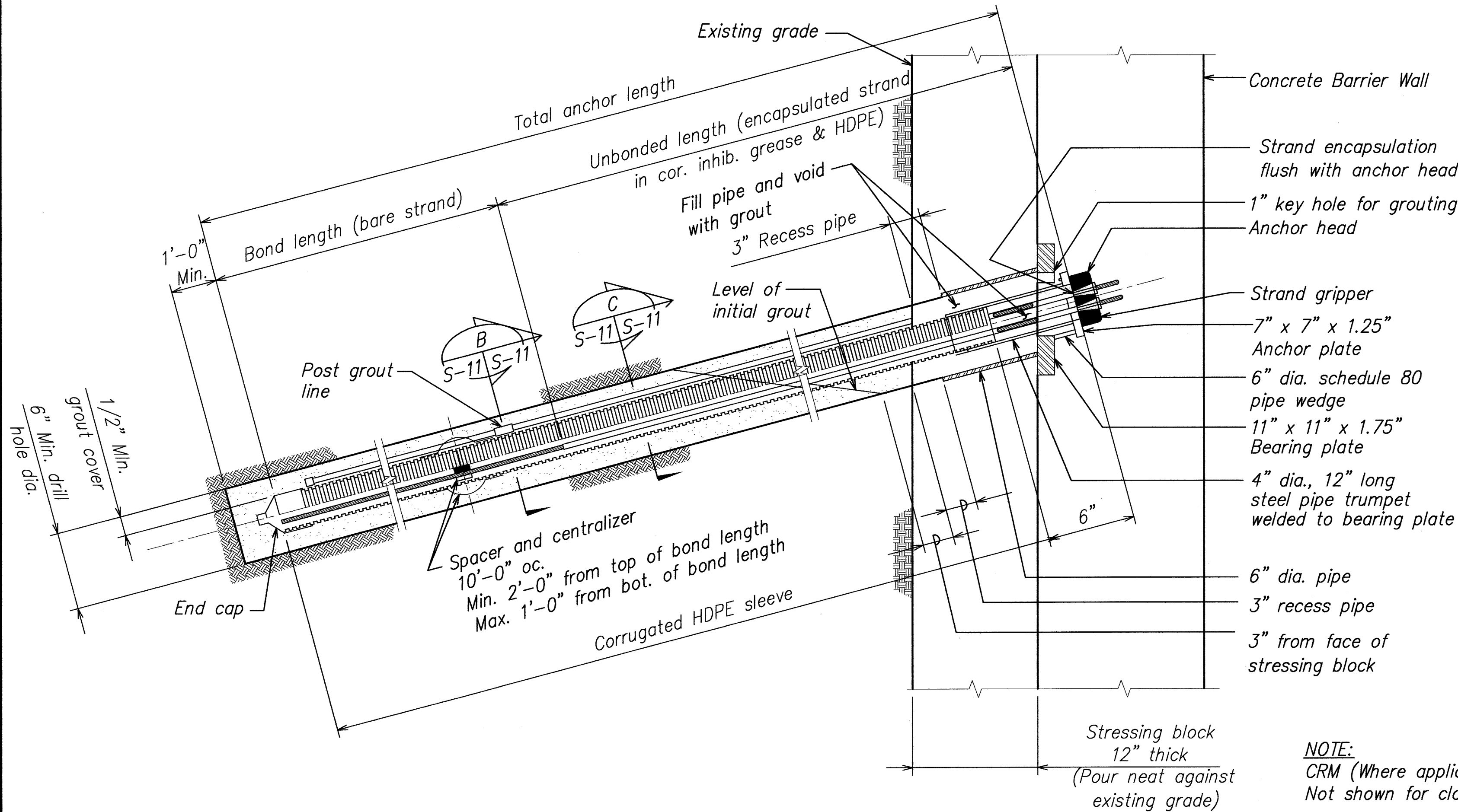
*David K. Fujimura* 4-30-12  
SIGNATURE EXPIRATION DATE OF THE LICENSE

6/30/10		New Sheet Transition Reinforcing Detail
DATE	REVISION	

<p>STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <u>TRANSITION REINFORCING</u> <u>PARTIAL ELEVATIONS</u>  <i>Kalanianaʻole Highway Improvements Retaining Wall at Makapuu, Oahu Federal-Aid Project No. NH-072-1(51)</i>  Scale: As Noted                      Date: April 2007</p>
SHEET No.S-10H OF 15 SHEETS



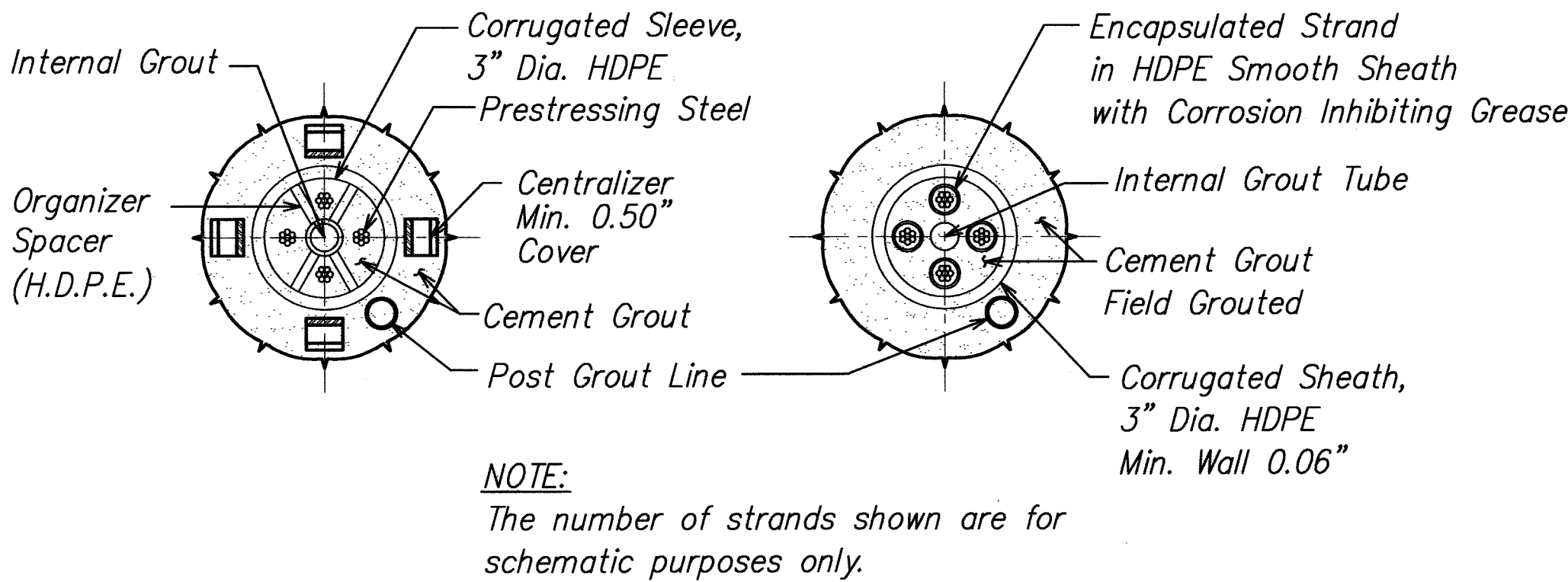
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	37	106



GROUND ANCHOR DETAIL (PRESTRESSING STEEL) 1  
S-11/S-11  
SCALE: N.T.S.

NOTE:  
Separate dissimilar metals  
e.g., stainless and non-stainless  
steel rebar, with teflon tape  
at contact area only.

TYPICAL CONCRETE BARRIER  
WALL CONTROL JOINTS A  
S-11/S-11  
NOT TO SCALE



ANCHOR SECTION  
BOND LENGTH B  
S-11/S-11  
SCALE: N.T.S.

ANCHOR SECTION  
UNBONDED LENGTH C  
S-11/S-11  
SCALE: N.T.S.

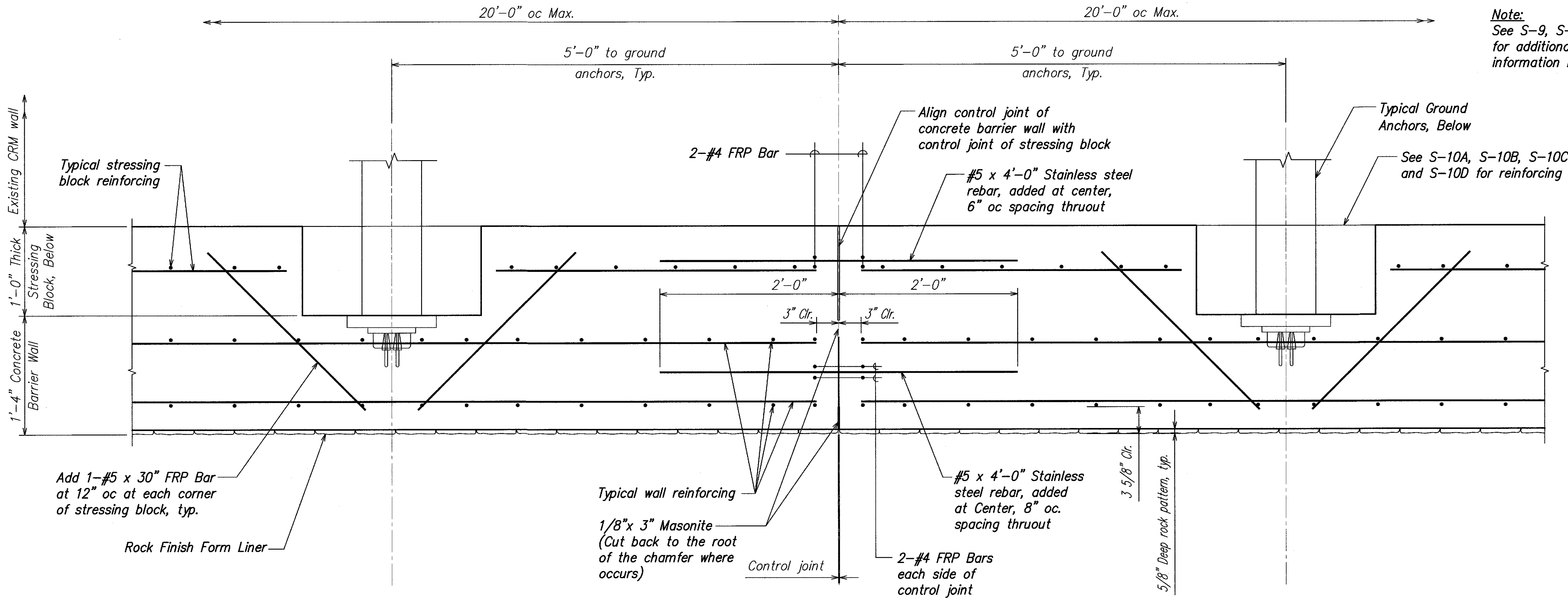


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*David K. Fujimura*  
SIGNATURE EXPIRATION DATE OF THE LICENSE 4-30-08

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**GROUND ANCHOR DETAILS AND  
CONC. BARRIER WALL DETAILS**  
*Kalanianaʻole Highway Improvements  
Retaining Wall at Makapuu, Oahu*  
Federal-Aid Project No. NH-072-1(51)  
Scale: Date: April 2007  
SHEET No. S-11 OF 15 SHEETS

37

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 37S-1	106



**Note:**  
See S-9, S-10, S-11 and S-12  
for additional reinforcing and  
information not shown.

Add 1-#5 x 30" FRP Bar  
at 12" oc at each corner  
of stressing block, typ.

Rock Finish Form Liner

Typical wall reinforcing  
1/8"x 3" Masonite  
(Cut back to the root  
of the chamfer where  
occurs)

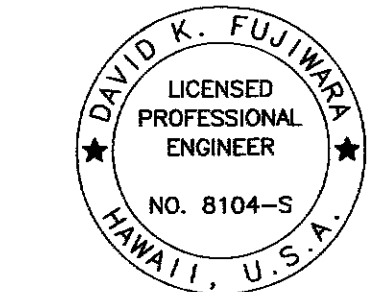
**NOTE:**  
Separate dissimilar metals  
e.g., stainless and non-stainless  
steel rebar, with teflon tape  
at contact area only.

# CONCRETE BARRIER / STRESSING BLOCK PARTIAL PLAN

NOT TO SCALE

A  
S-11 S-11

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	DESIGNED BY	
	CHECKED BY	

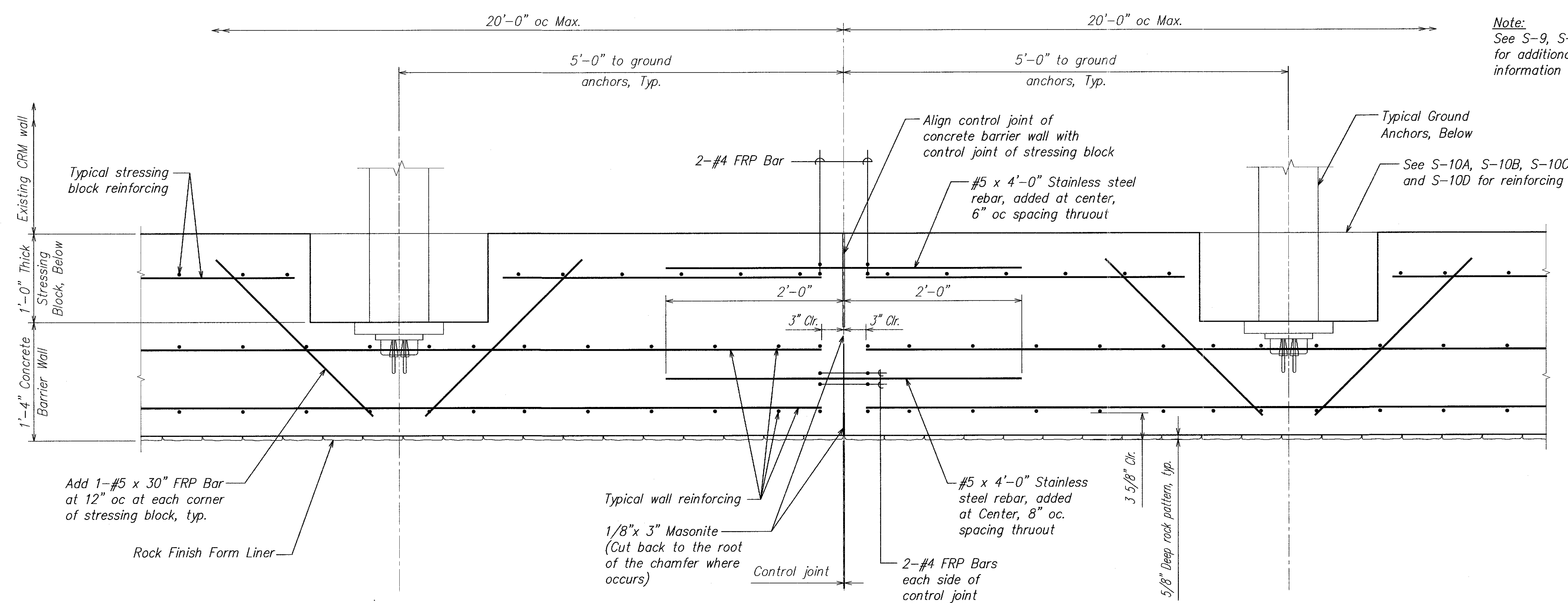


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ME OR UNDER MY SUPERVISION.

SIGNATURE: *David K. Fujiwara* 4-30-12  
EXPIRATION DATE OF THE LICENSE

4/15/10	New Sheet
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <b>CONCRETE BARRIER / STRESSING BLOCK PLAN</b> <i>Kalaniana'ole Highway Improvements Retaining Wall at Makapuu, Oahu</i> <i>Federal-Aid Project No. NH-072-1(51)</i> Scale: As Noted Date: April 2007	
SHEET No. S-11A OF 15 SHEETS	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	C.O. 37S-11A	106



**Note:**  
See S-9, S-10, S-11 and S-12  
for additional reinforcing and  
information not shown.

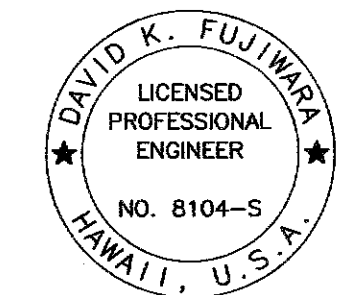
**NOTE:**  
Separate dissimilar metals  
e.g., stainless and non-stainless  
steel rebar, with teflon tape  
at contact area only.

# CONCRETE BARRIER / STRESSING BLOCK PARTIAL PLAN

NOT TO SCALE

A  
S-11/S-11

SURVEY PLOTTED BY	DATE
DESIGNED BY	
NOTED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	



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*David K. Fujiwara*  
SIGNATURE EXPIRATION DATE OF THE LICENSE 4-30-12

4/15/10	2 New Sheet
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <b>CONCRETE BARRIER / STRESSING BLOCK PLAN</b> <i>Kalanianaʻole Highway Improvements Retaining Wall at Makapuu, Oahu Federal-Aid Project No. NH-072-1(51)</i> Scale: As Noted Date: April 2010 SHEET No.S-11A OF 15 SHEETS	