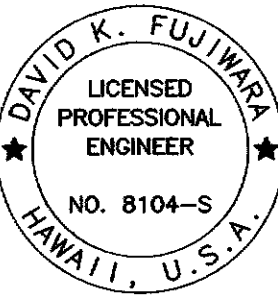


MICROPILE NOTES:

1. All nuts and bar couplings shall develop 100% of the bar's ultimate tensile strength.
2. Splices within steel casing shall develop 100% of the steel casing's ultimate tensile strength.
3. All accessories such as nuts, couplings, washers, and steel plates shall be hot-dip galvanized according to ASTM A-153.
4. Material Properties of Accessories:
 - (a) Steel Plates - ASTM A36
 - (b) Hex Nuts - ASTM A108
 - (c) Couplings - ASTM A108
 - (d) Washers - ASTM F436
5. The bonded length is estimated. The actual bonded length will be determined by the Engineer after the preproduction micropile load test.

| Micropile Load Combination (Demand) | | |
|-------------------------------------|-------------------|---------------|
| | Axial Load (kips) | Moment (k-ft) |
| Strength Limit State | 80 Compression | 30 |
| Strength Limit State | 30 Tension | 30 |



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OR UNDER MY SUPERVISION.
David K. Fujimura
KSF, INC. APRIL 30, 2012
LIC. EXP. DATE

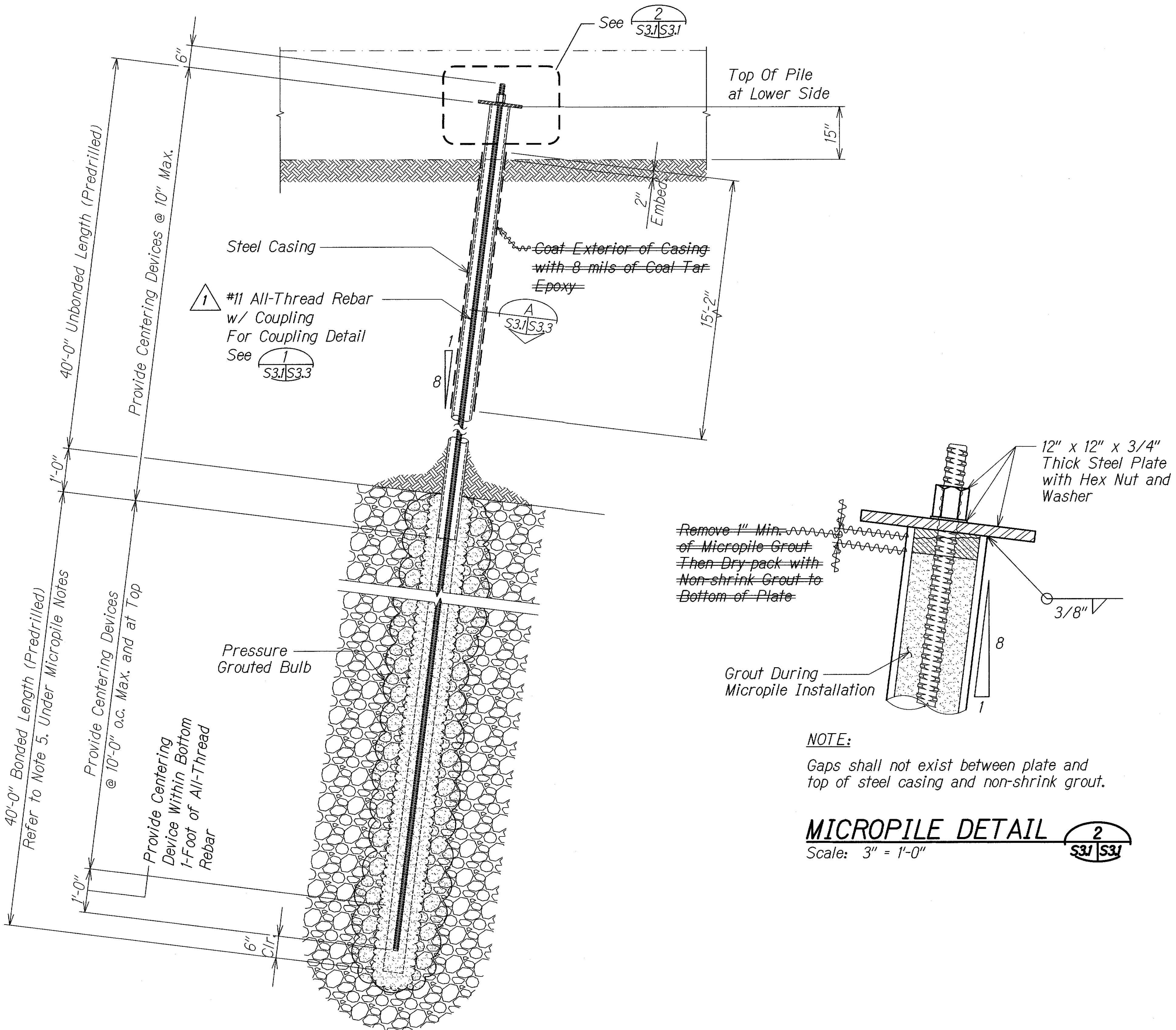
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MICROPILE DETAILS AND NOTES

CASTLE HILLS ACCESS ROAD
Drainage Improvements, Phase 2
Federal-Aid Project No. STP-0300(125)

Scale: As Shown Date: Dec. 2011

SHEET No. S31 OF 17 SHEETS



TYPICAL MICROPILE DETAIL
Scale: 3/4" = 1'-0"

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

| | |
|----------|-----------------------------------------|
| 01/19/12 | Revised Bar Size. Revised Demand Loads. |
| DATE | REVISION |

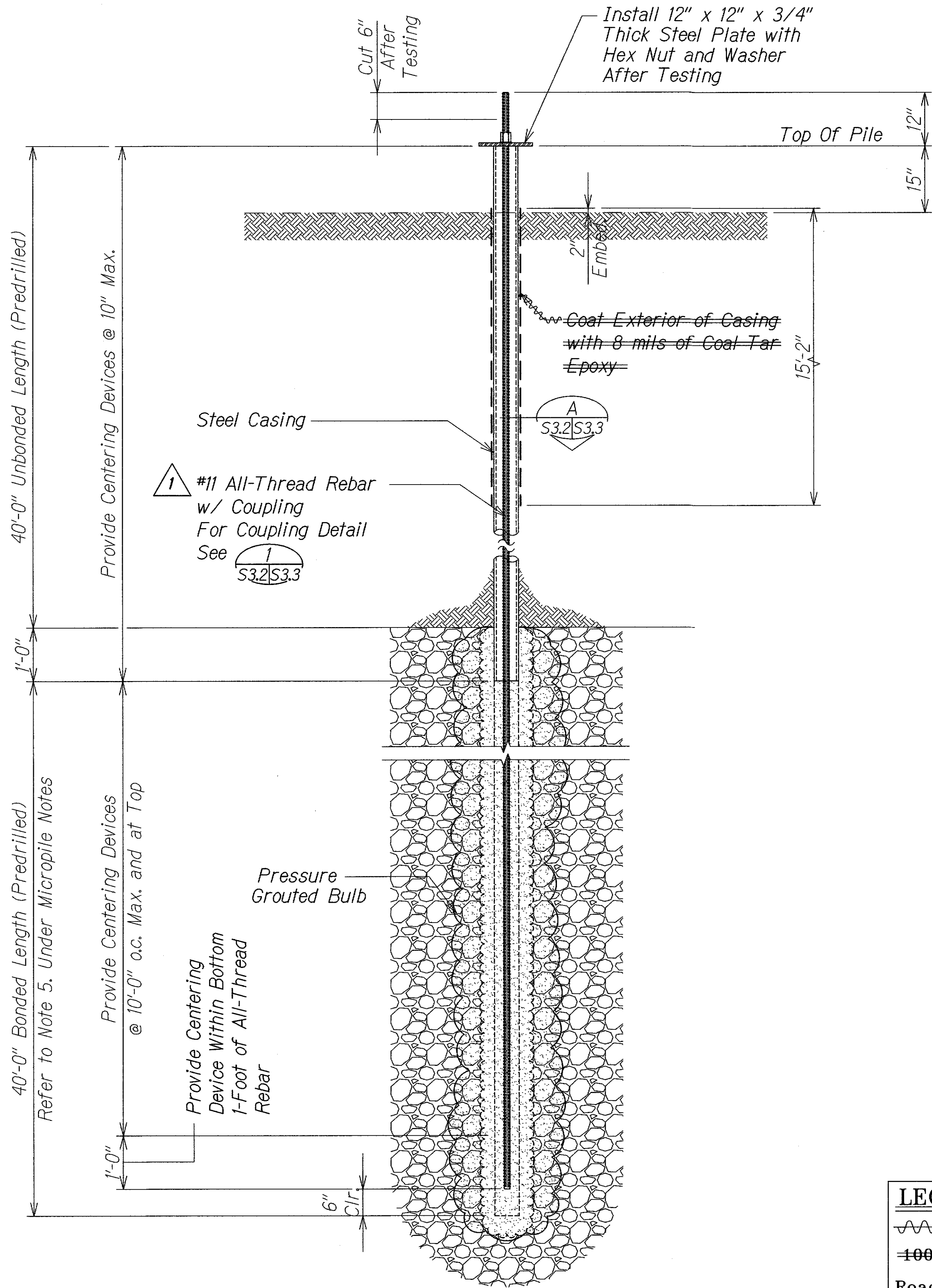
AS-BUILT

ADD. 42

| | |
|-------------------|------|
| ORIGINAL PLAN | DATE |
| NOTE BOOK | |
| DESIGNED BY | |
| CHECKED BY | |
| QUANTITIES BY | |
| TRACED BY | |
| DRAWN BY | |
| SURVEY LOCATED BY | |

DRAWING NAME: Z:\00 ONCOMING\9041.2 CASTLE HILLS POST DESIGN PHASE II\TA\01 CAD\02-13-18.ASB-CO\CH-S301 ADD ASB.DWG PLOT TIME: 02-12-18, 5:10 PM

| FED. ROAD DIST. NO. | STATE | FED. AID PROJECT NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|----------------------|-------------|-----------|--------------|
| HAWAII | HAW. | STP-0300(125) | 2011 | ADD. 43 | 55 |



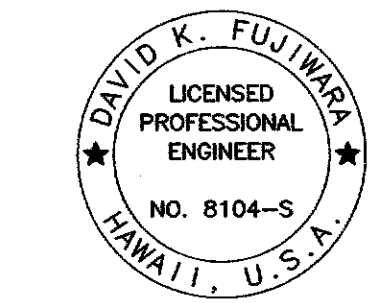
| LEGEND FOR AS-BUILT POSTINGS | |
|------------------------------|-------------------------------------|
| | Squiggly line for as-built deletion |
| | Double line for as-built deletion |
| Roadway | Text for as-built posting |

TYPICAL PREPRODUCTION MICROPILE DETAIL
Scale: 3/4" = 1'-0"

$\frac{1}{S3.2|S3.3}$

01/19/12
DATE

$\frac{1}{S3.2|S3.3}$ Revised Bar Size.
REVISION



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KSF, INC. APRIL 30, 2012
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PREPRODUCTION MICROPILE DETAIL

CASTLE HILLS ACCESS ROAD
Drainage Improvements, Phase 2
Federal-Aid Project No. STP-0300(125)

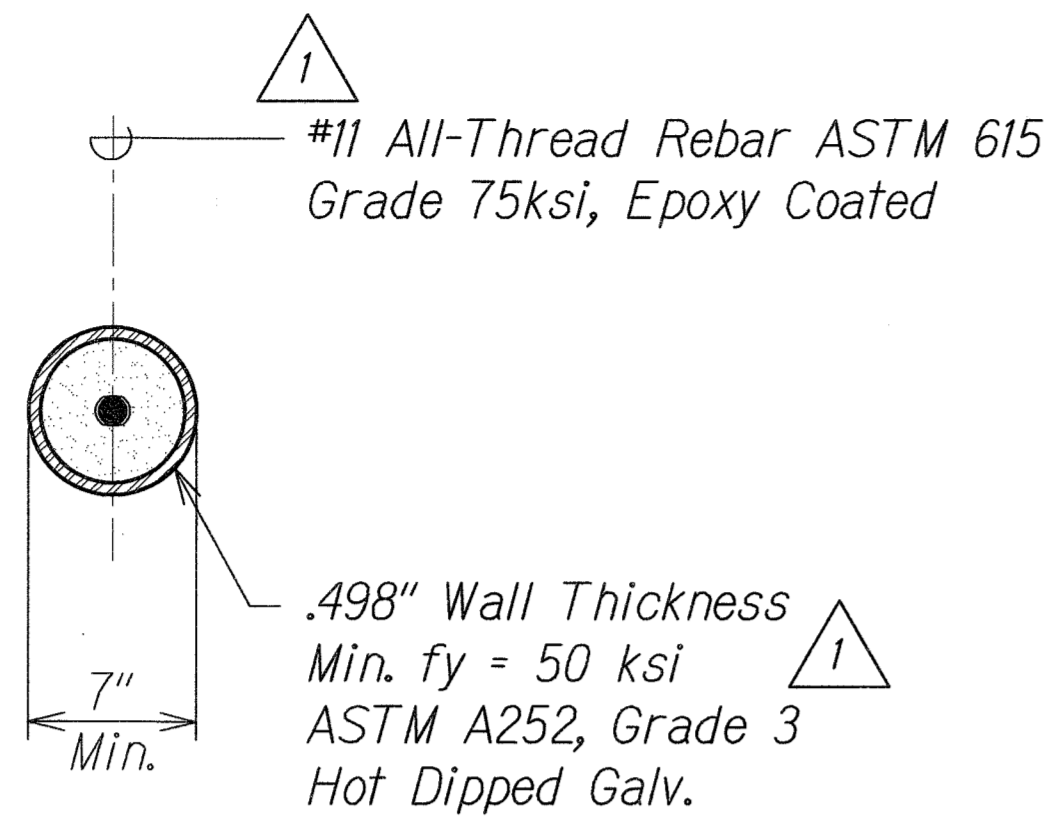
Scale: As Shown
Date: Dec. 2011

SHEET No. S32 OF 17 SHEETS

"AS-BUILT"

ADD. 43

| FED. ROAD DIST. NO. | STATE | FED. AID | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|---------------|-------------|-----------|--------------|
| HAWAII | HAW. | STP-0300(125) | 2011 | ADD. 44 | 55 |

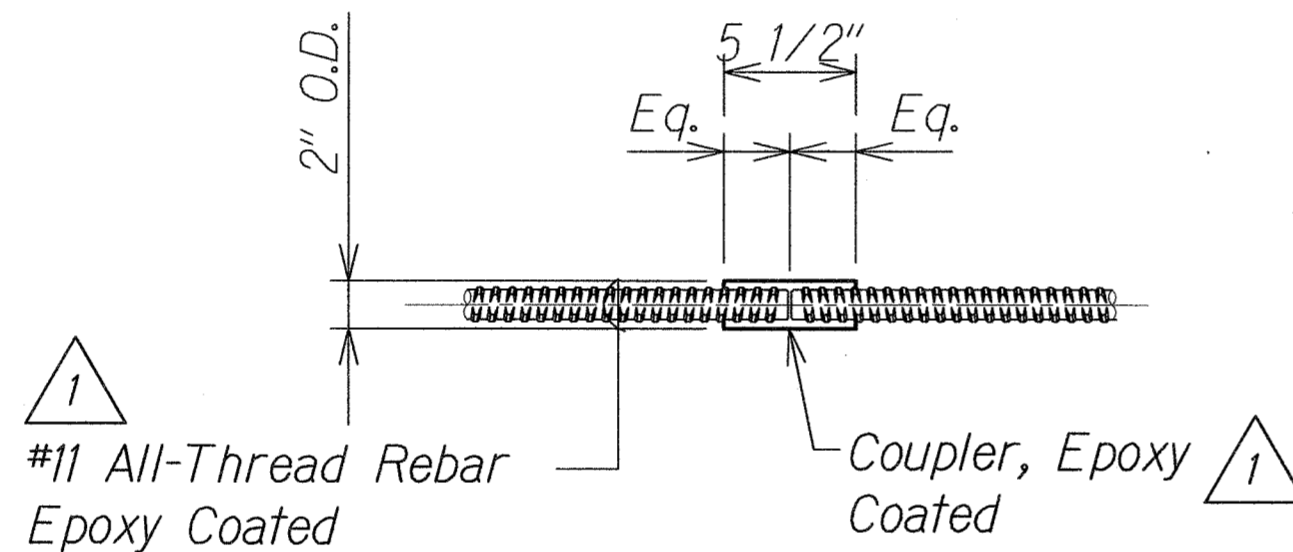
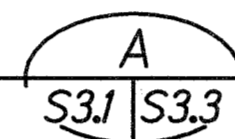


NOTES:

1. Centering devices (centralizers) shall be fabricated from plastic or material non-detrimental to the reinforcing steel.
2. The centralizer shall support the reinforcing such that a minimum of 2" of grout cover is provided and shall permit grout to flow freely up the drill hole.

TYPICAL MICROPILE SECTION

Scale: 1 1/2" = 1'-0"

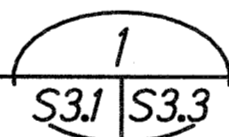


NOTE:

Coupler to develop full ultimate tensile strength of All-Thread Rebar.

COUPLER DETAIL OF ALL-THREAD REBAR

Scale: 1 1/2" = 1'-0"



COUPLER INSTALLATION PROCEDURE

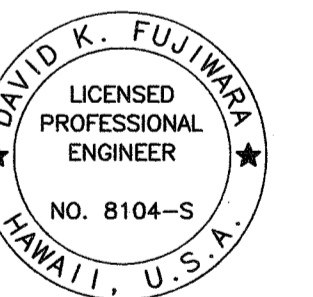
1. Apply corrosion inhibiting grease to the bare ends of the bars and the inside of the coupler.
2. Connect the two bar ends with the coupler. Each end shall be screwed into the coupler half the length of the coupler.
3. Add another coat of grease to bare bar and coupler and wrap with two layers of denso tape.

PREPARATION FOR FIELD CUT BARS

1. Cut corrosion protection and all-thread rebar with an abrasive saw (DO NOT USE A TORCH).

| | |
|-------------------|------|
| SURVEY PLOTTED BY | DATE |
| DRAWN BY | |
| TRACED BY | |
| CHECKED BY | |
| QUANTITIES BY | |
| CHECKED BY | |

DRAWING NAME: Z:\00 ONGOING\9041-CASTLE HILLS KAPUNAHALA STR DRAINAGE IMPROVEMENT\01-19-12 ADD\CH-S303 ADD1.DWG PLOT TIME: 01-20-12, 8:45 AM



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LIC. EXP. DATE

01/19/12



Revised Bar Size. Revised Casing
Properties. Revised Coupler
Properties.

DATE

REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MICROPILE DETAIL AND SECTION

CASTLE HILLS ACCESS ROAD
Drainage Improvements, Phase 2
Federal-Aid Project No. STP-0300(125)

Scale: As Shown Date: Dec. 2011

SHEET No. S3.3 OF 17 SHEETS