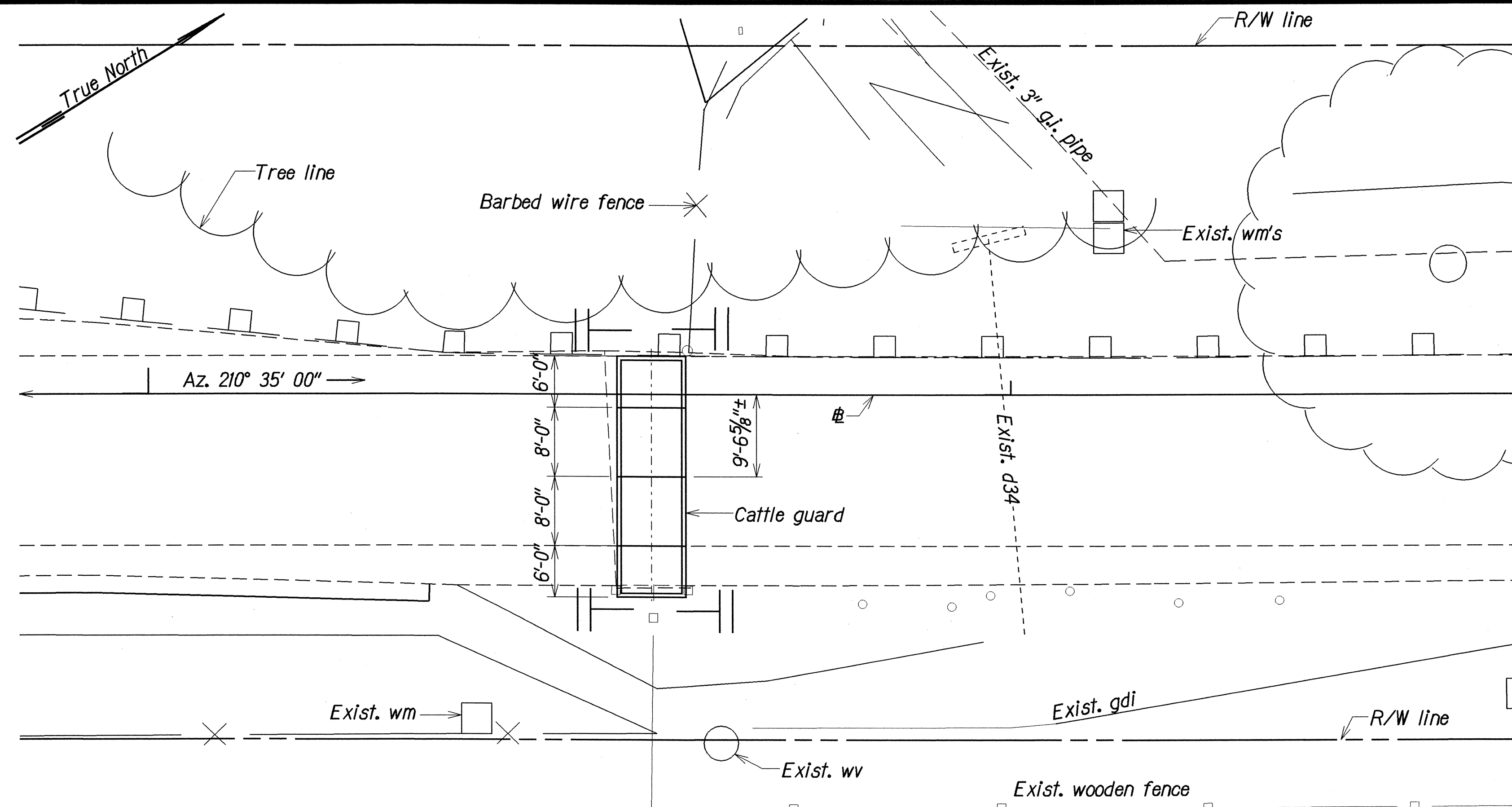
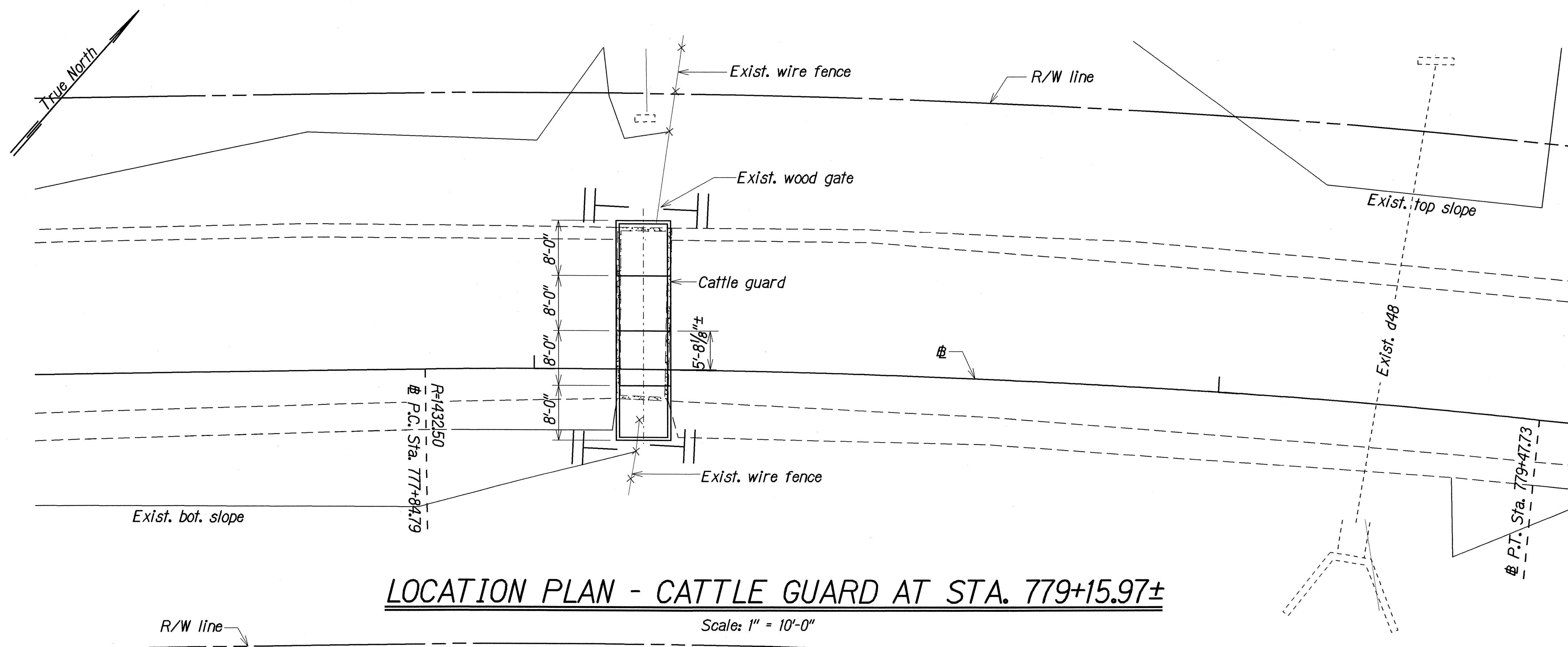


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	378A-01-04M	2004	85	88



LOCATION PLAN - CATTLE GUARD AT STA. 448+60

Scale: 1" = 10'-0"



LOCATION PLAN - CATTLE GUARD AT STA. 779+15.97±

Scale: 1" = 10'-0"

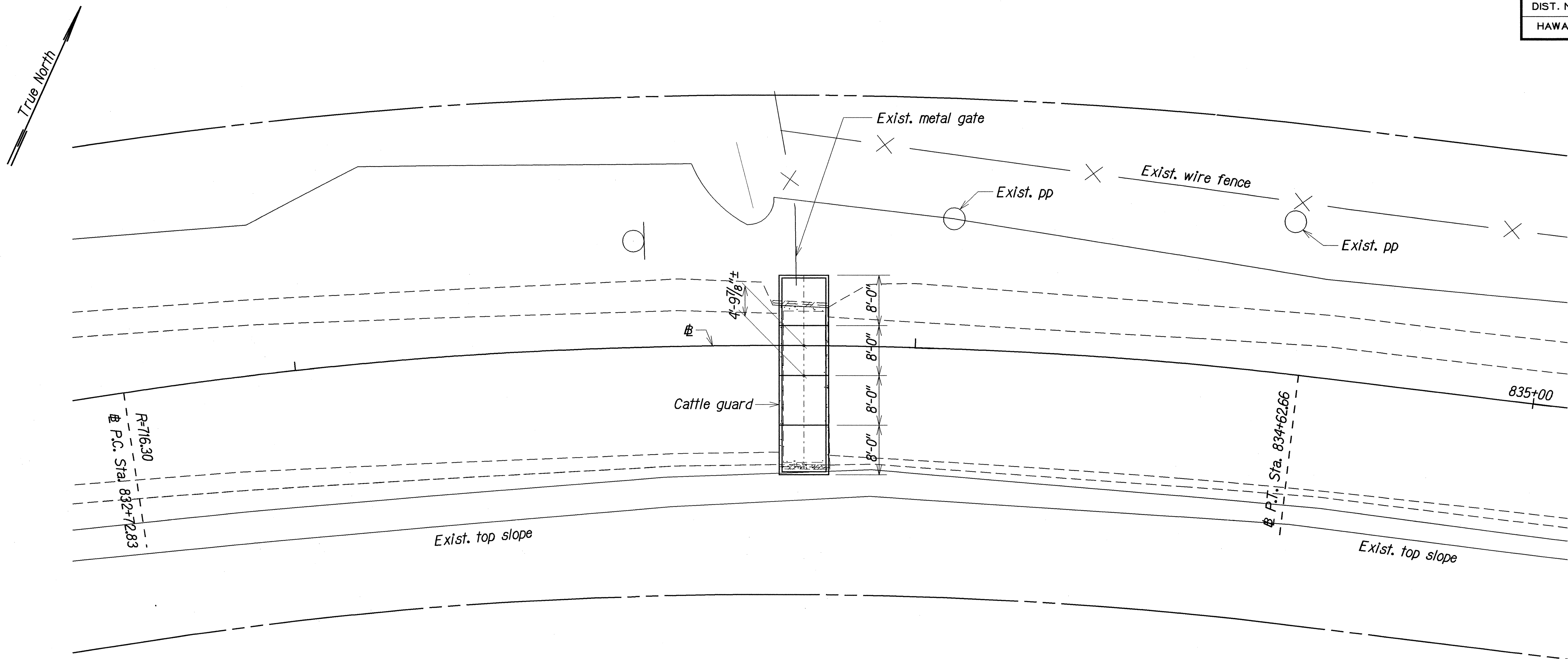
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	APR 2004
NO. 810119.0.dwg	TRACED BY	APR 2004
	DESIGNED BY	APR 2004
	QUANTITIES BY	APR 2004
	CHECKED BY	APR 2004

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CATTLE GUARD
LOCATION PLAN
AT STA. 448+60 & STA. 779+20
HALEAKALA CRATER ROAD RESURFACING
KEKAULIKE AVENUE TO HALEAKALA NATIONAL PARK
Project No. 378A-01-04M

Scale: As Noted Date: Apr. 2004

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	378A-01-04M	2004	86	88



LOCATION PLAN - CATTLE GUARD AT STA. 883+82.09±

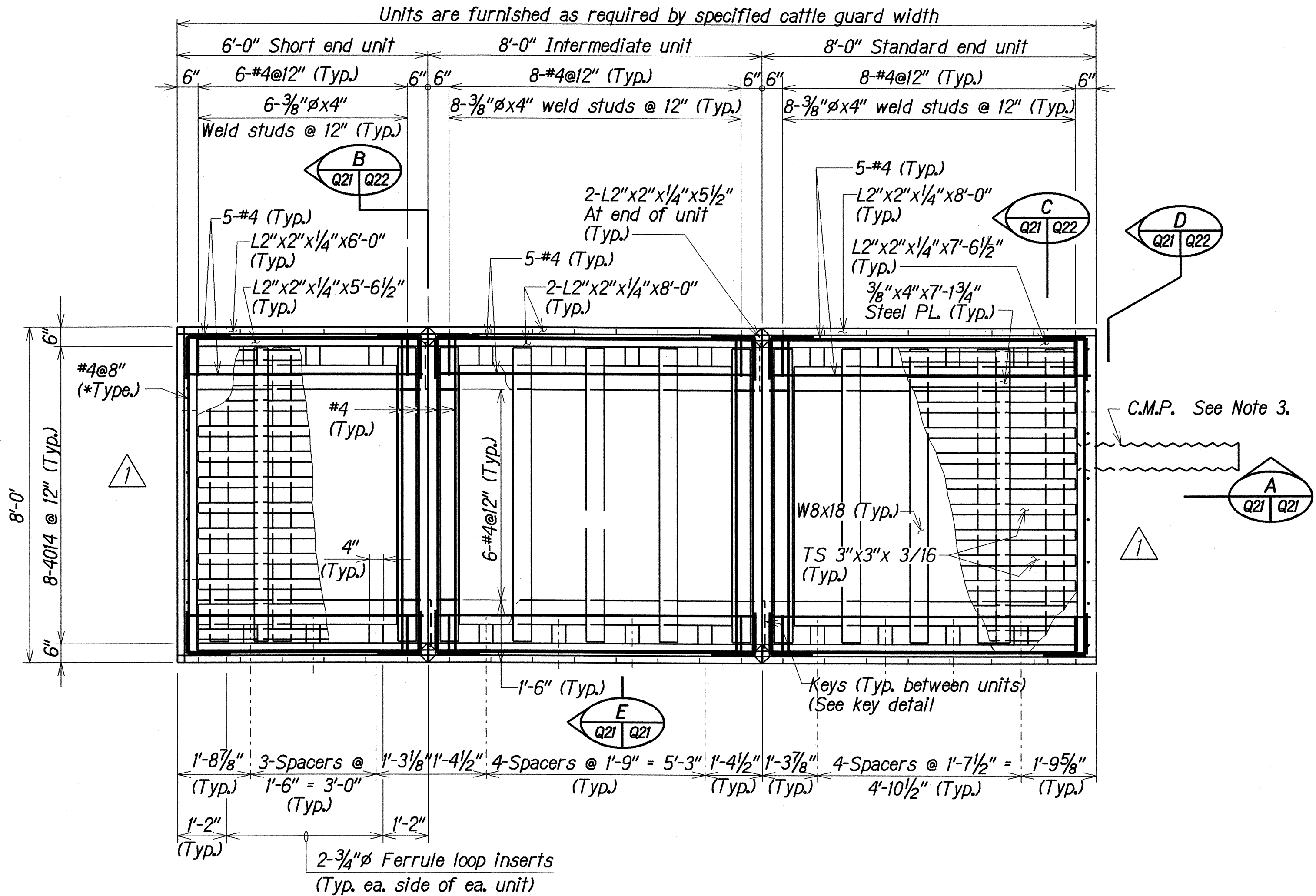
Scale: 1" = 10'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	APR 2004
	TRACED BY	APR 2004
	QUANTITIES BY	APR 2004
	CHECKED BY	APR 2004

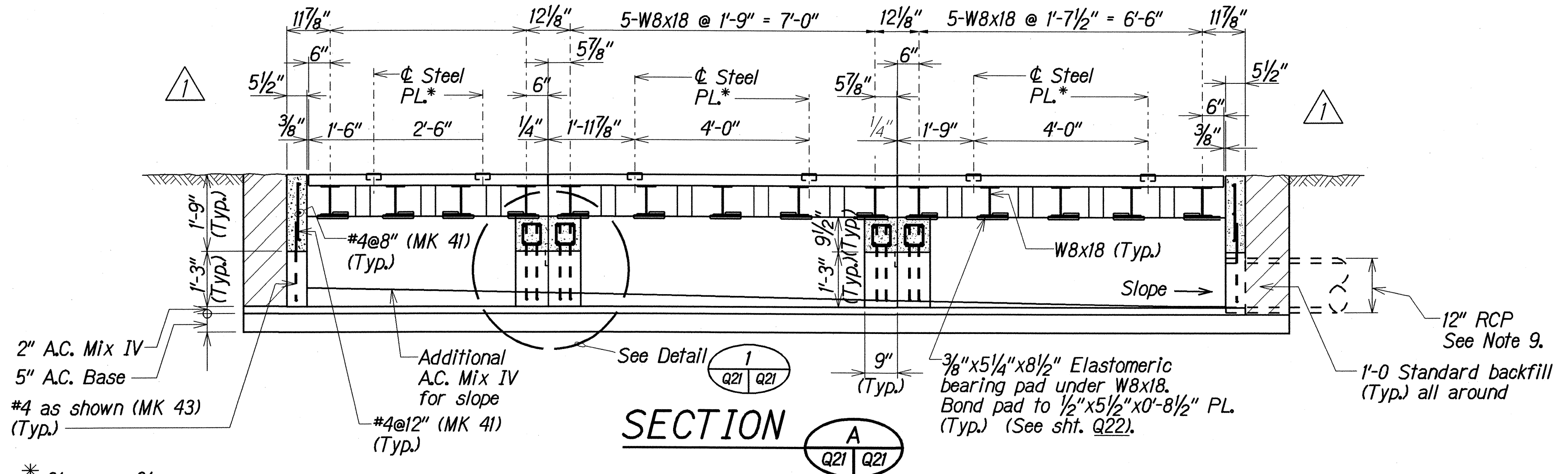
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CATTLE GUARD
LOCATION PLAN
AT STA. 883+90
HALEAKALA CRATER ROAD RESURFACING
KEKAULIKE AVENUE TO HALEAKALA NATIONAL PARK
Project No. 378A-01-04M
Scale: As Noted Date: Apr. 2004

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	378A-01-04M	2004	ADD. 87	88

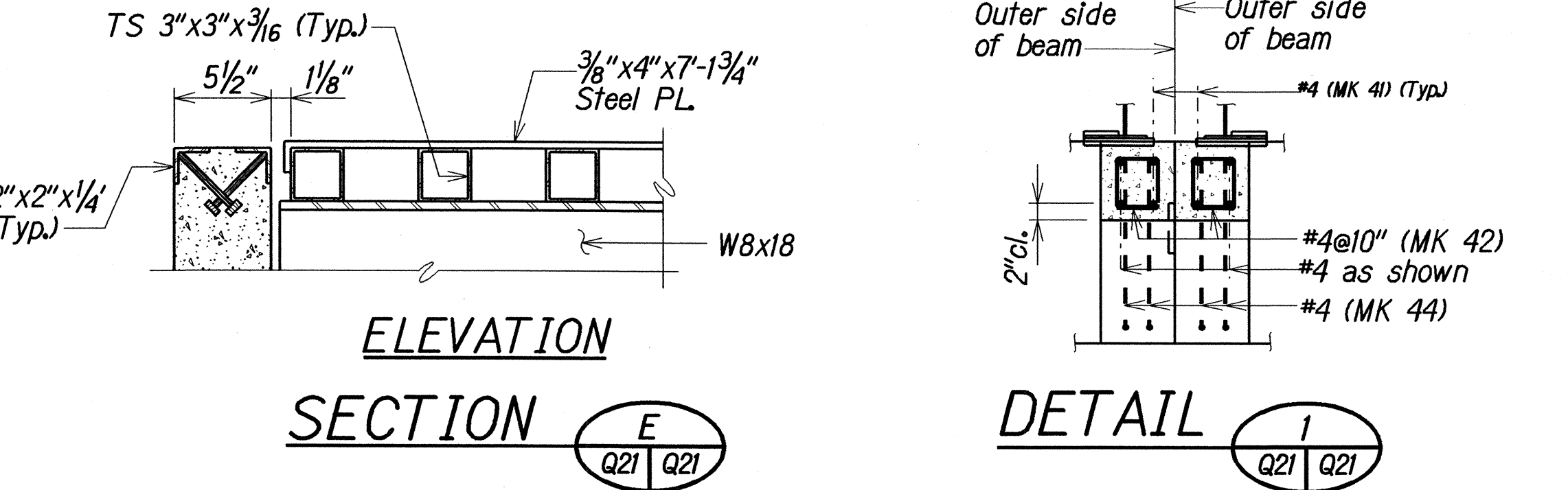
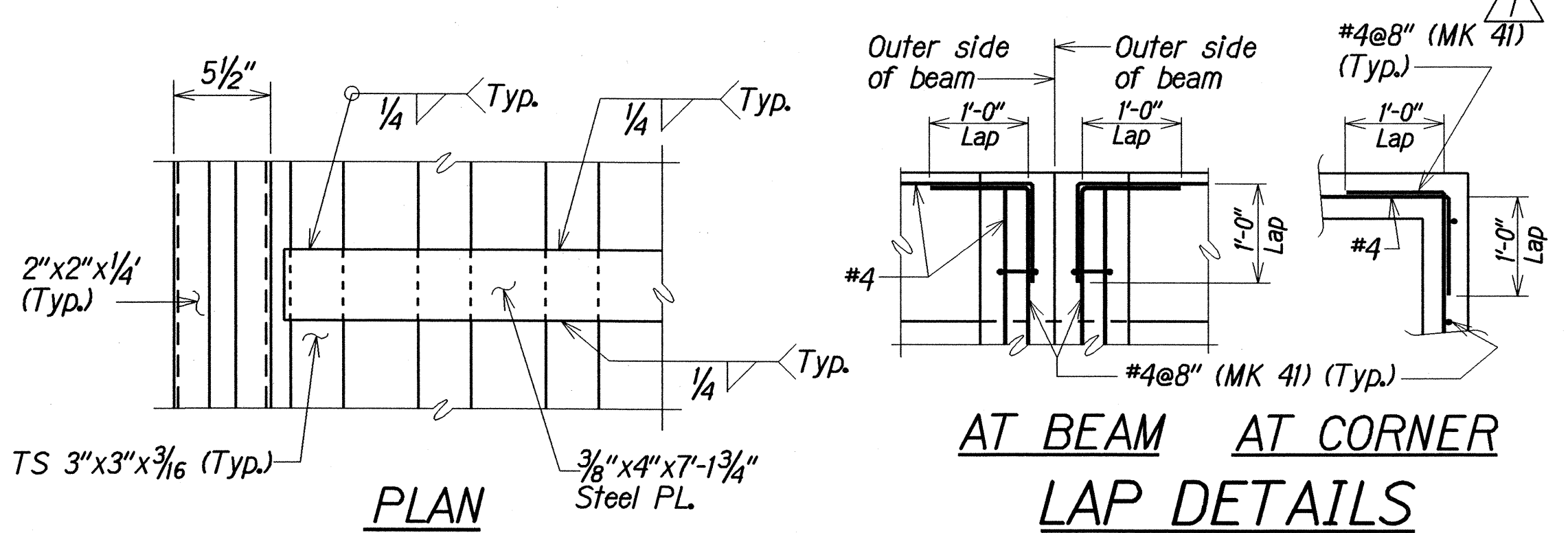


PLAN



SECTION A

NOTE: For Details not shown in Sections B, C, D, F, Detail I, see sh. Q22.



- GENERAL NOTES**
- Precast concrete shall reach $F_c' = 5000$ Psi at 28 days. All other concrete shall be class A.
 - Reinforcing steel shall be Grade 60.
 - Design live load HL-93.
 - Subgrade to be min. 5" A.C. base with min. 2" A.C. Mix IV over soil compacted to not less than 95% density and hand leveled.
 - Structural steel shall conform to ASTM A588, Grade 50.
 - Fasteners shall be galvanized.
 - Bearing pads shall be 50 durometer hardness.
 - Cattle guard shall be sloped to conform to the roadway cross section.
 - When cattle guard is installed adequate drainage shall be provided to insure against possible subgrade damage. Drainage 12" RCP to be installed at low end, minimum 2% slope. Daylight drain as directed by the Engineer.
 - Shop drawings showing the details of fabrication and the proposed layout of units shall be submitted to the Engineer for approval.
 - Cattle guard width shall include a 2'-0" shy distance from the normal edge of pavement, each side (per AASHTO).
 - Structural excavation and backfill to be considered incidental.

SURVEY PLOTTED BY	DATE
DRAWN BY	MAR 2004
CHECKED BY	OKT
QUANTITIES BY	OKT
NOTES BY	OKT
ORIGINAL PLAN	
NOTE BOOK	
CHECKED BY	OKT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

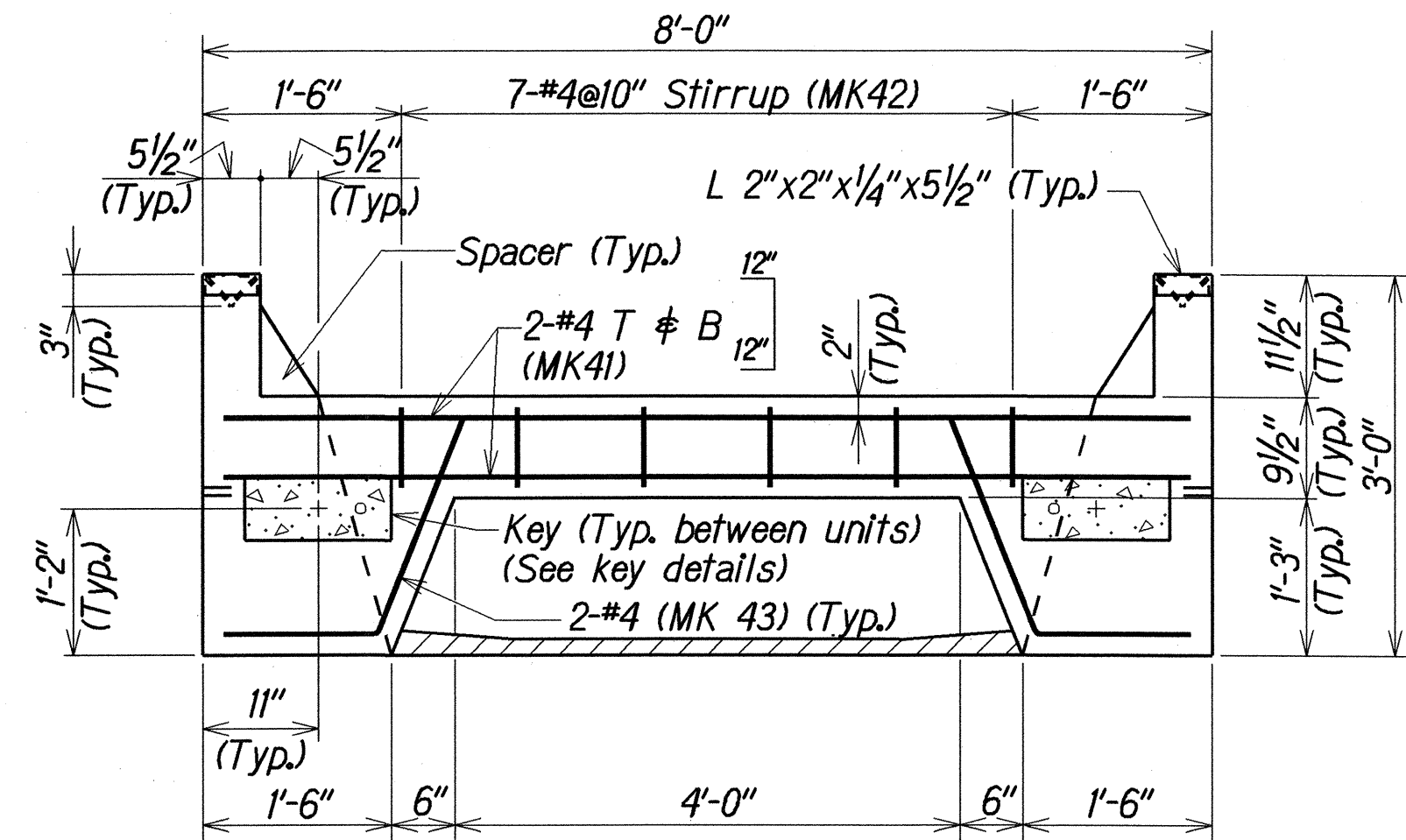
CATTLE GUARD
PLAN, SECTIONS AND DETAILS
HALEAKALA CRATER ROAD RESURFACING
KEKAULIKE AVENUE TO HALEAKALA NATIONAL PARK
Project No. 378A-01-04M

Removed metal wings # original Note 10 relating to metal wings. Removed Details symbols 2, 3, 4.

Scale: As Noted Date: Apr. 2004

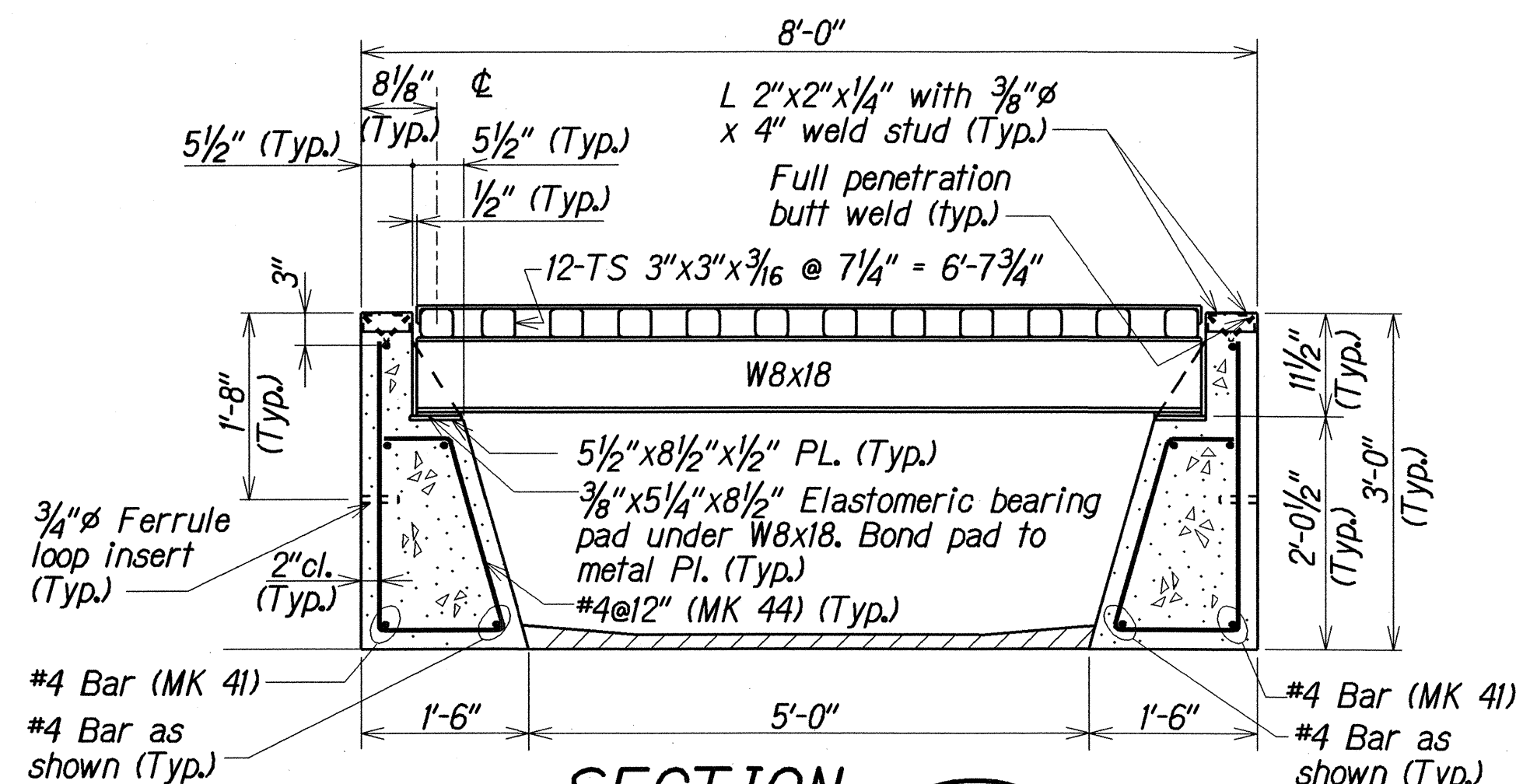
DATE	REVISIONS
5/6/04	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	378A-01-04M	2004	ADD. 88	88



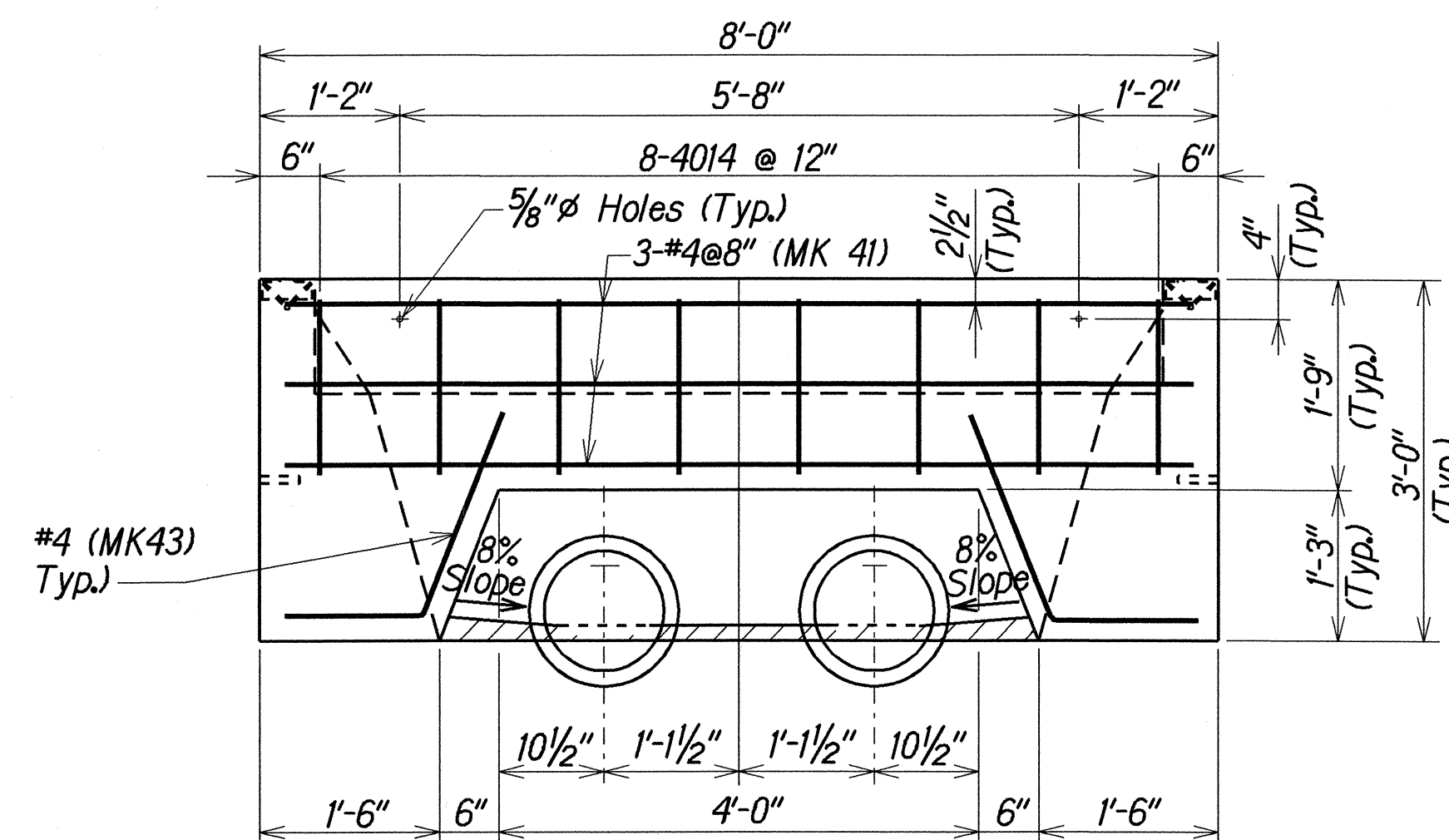
SECTION B
Q21 Q22

(All dimensions, keys, reinforcing & structural steel typical all units)



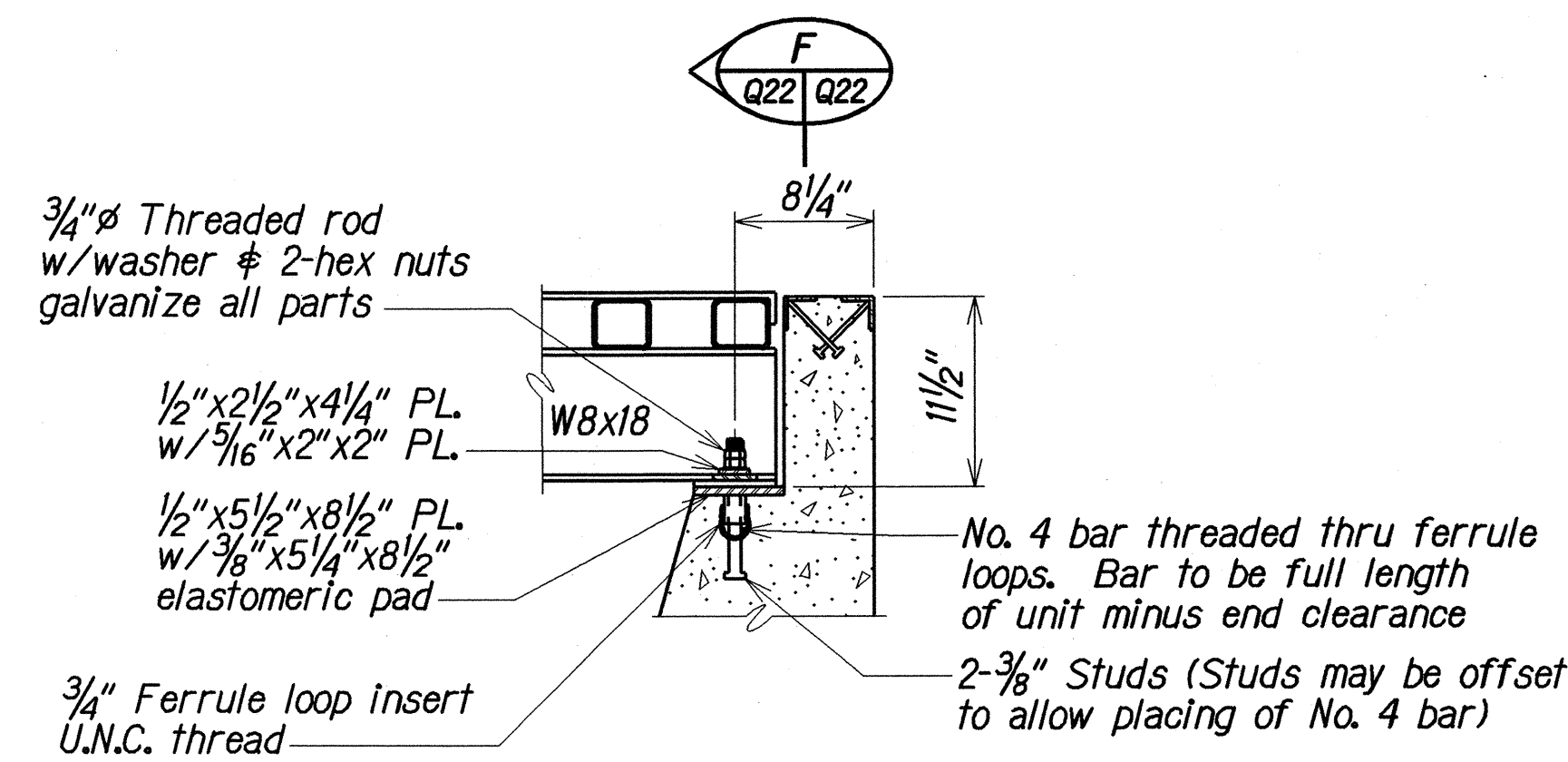
SECTION C
Q21 Q22

(All dimensions, keys, reinforcing & structural steel typical all units)

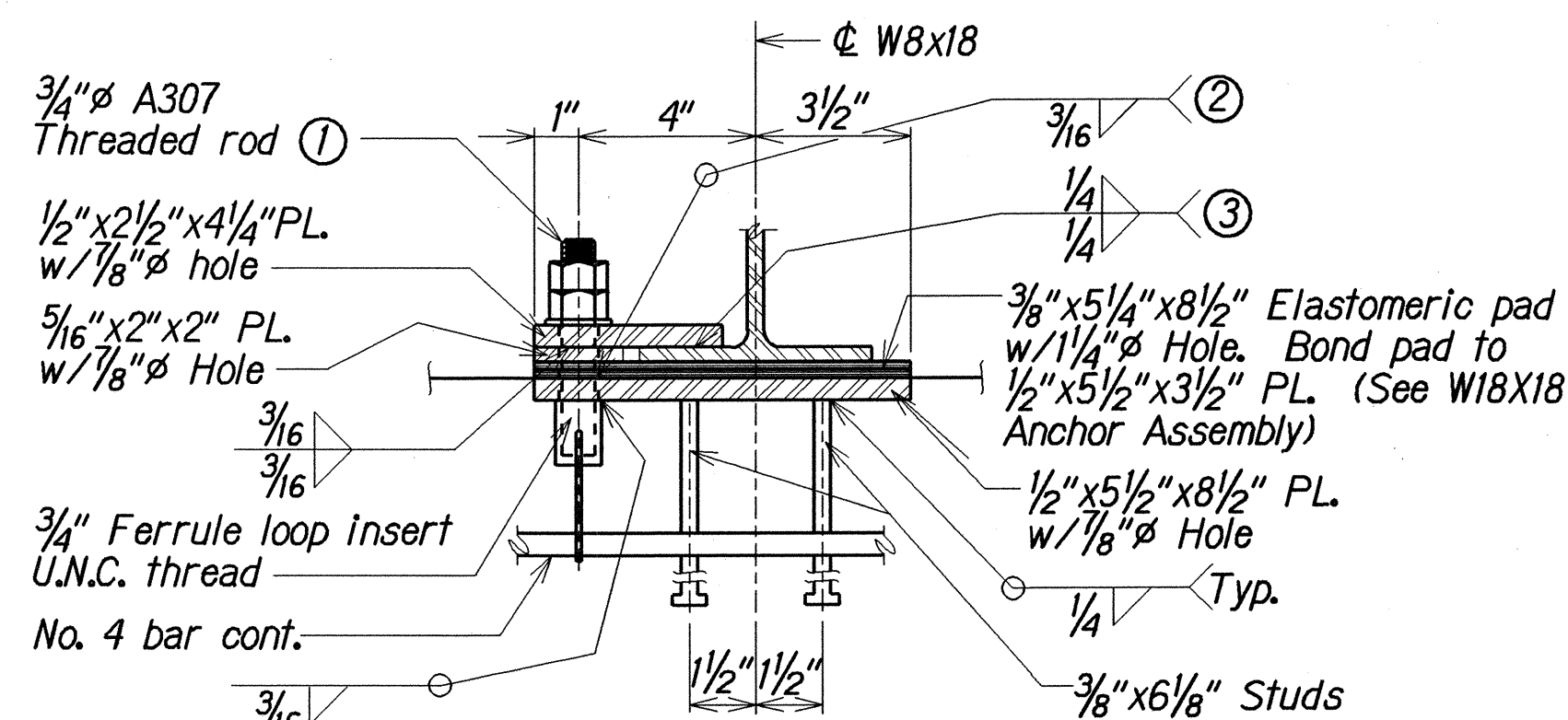


SECTION D
Q21 Q22

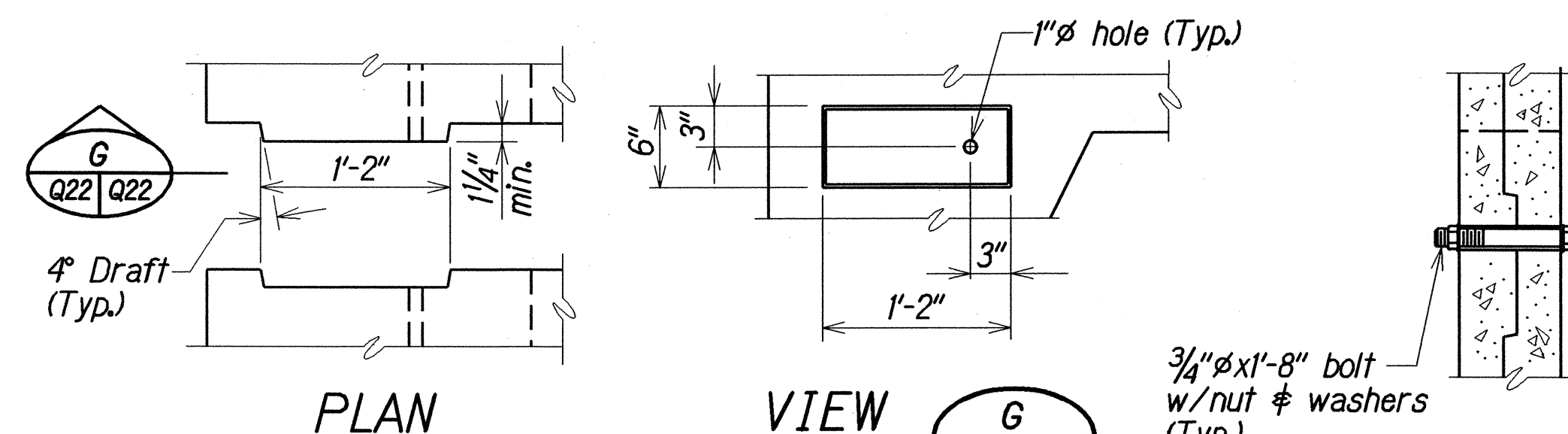
(All dimensions, keys, reinforcing & structural steel typical all units)



W8x18 ANCHOR ASSEMBLY



SECTION F
Q22 Q22

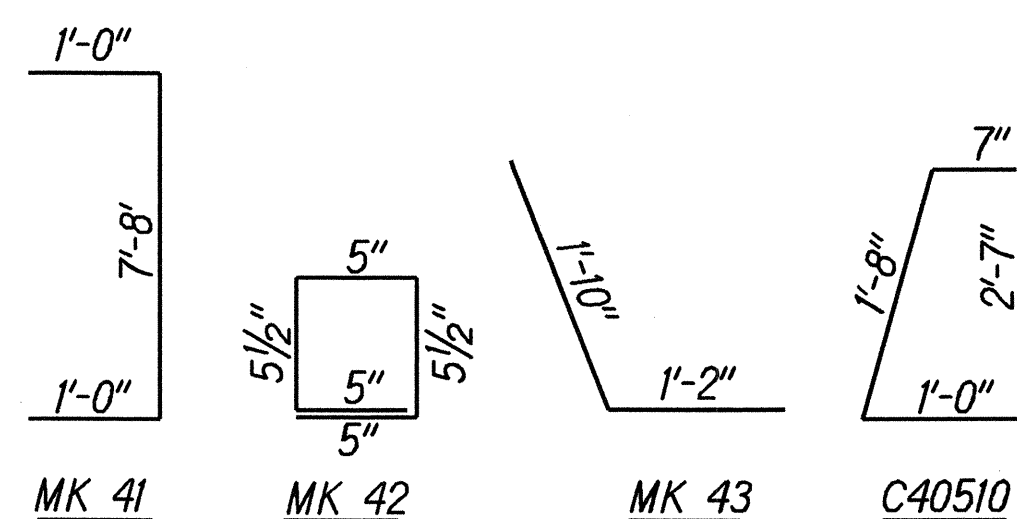


PLAN

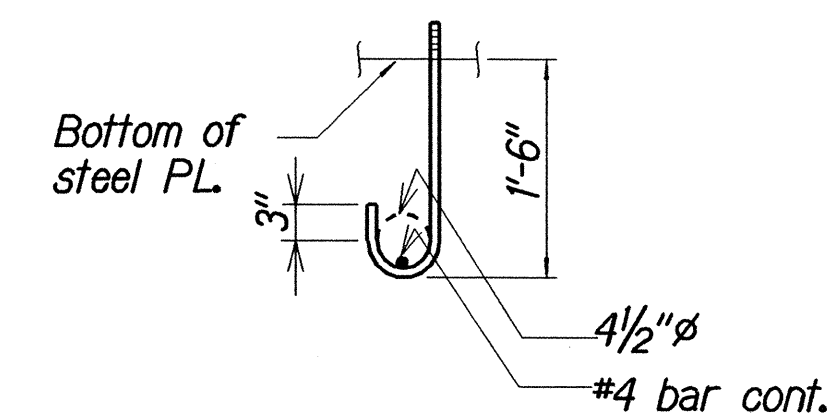
VIEW G

KEY DETAILS

TYPICAL KEY CONNECTION



BAR BENDING DETAILS



J BOLT ALTERNATIVE

GENERAL NOTES:

- 1/2"x5 1/2"x8 1/2" Plate with ferrule and studs attached is to be cast in the concrete frame. After the concrete frame as been manufactured: The 3/4" dia. A307 threaded rod (1) is to be tightened into the ferrule. The rod is then to be welded (2) to the plate. The elastomeric pad is then bonded to the plate. The steel grate is then placed and adjusted to its specific position. The metal clamps are placed and the nuts tightened. The first nut is just to be snug tight. The second nut is to be tight against the first nut to lock it in place. After a final check that the steel grate is still in its specified position, the metal clamping plate is then welded (3) to the frame of the steel grate. All welding shall be done at the place of the fabrication. If steel grate and concrete frame are shipped separately, they shall be match marked.
- Alternate: Use of "J" bolt, 1/2"x5 1/2"x8 1/2" plate with 3/4" dia. A307 "J" bolt (1) and studs attached is to be cast in the concrete frame. The "J" bolt is to be welded to both faces of the plate (2). The elastomeric pad is bonded to the plate. The steel grate is placed and adjusted to its specified position. The metal clamps are placed and the nuts tightened. The first nut is just to be snug tight. The second nut is to be tight against the first nut to lock it in place. After a final check that the steel grate is in its specified position, the metal clamping plate is welded (3) to the frame of the steel grate. All welding shall be done at the place of fabrication. If steel grate and concrete frame are shipped separately, they shall be match marked.
- Precast concrete shall reach $F_c' = 5000$ psi at 28 days. All other concrete shall be class A.

DATE	BY
MAR 2004	LMA
MAR 2004	DET
MAR 2004	XXX
MAR 2004	PTS
MAR 2004	PTS

DATE	REVISIONS
5/6/04	Deleted Details 2 Q21/Q22, 3 Q21/Q22, 4 Q21/Q22 Rearranged details.
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION CATTLE GUARD SECTIONS AND DETAILS HALEAKALA CRATER ROAD RESURFACING KEKAULIKE AVENUE TO HALEAKALA NATIONAL PARK Project No. 378A-01-04M
Scale: As Noted	Date: Apr. 2004
SHEET No. Q22 OF 22 SHEETS	