

STRUCTURAL NOTES

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(42)	1999	2	38

- I. GENERAL SPECIFICATIONS: HAWAII DEPARTMENT OF TRANSPORTATION, HAWAII STANDARD V. SPECIFICATIONS FOR ROAD, BRIDGE AND PUBLIC WORKS CONSTRUCTION, 1994.
- II. DESIGN SPECIFICATIONS: AASHTO 1994 LRFD BRIDGE DESIGN SPECIFICATIONS, 1ST EDITION AND ITS SUBSEQUENT 1996 AND 1997 INTERIM REVISIONS.
- III. CONCRETE
- A. MINIMUM 28-DAY CONCRETE COMPRESSIVE STRENGTH FOR NEW CONCRETE:
1. DRILLED SHAFTS = 4000 PSI
2. ALL OTHER CONCRETE = 4000 PSI
- B. REINFORCING STEEL
1. ALL NEW DEFORMED REINFORCING BARS:
- a. BEAM STIRRUP AND COLUMN TIE BARS SHALL CONFORM TO ASTM A615, GRADE 40.
- b. ALL OTHER BARS SHALL CONFORM TO ASTM A615, GRADE 60.
- C. CONCRETE PROTECTION FOR REINFORCING (UNLESS OTHERWISE NOTED)
1. BOTTOM AND SIDES OF FOOTINGS AND WHERE CONCRETE DEPOSITED ON GRADE = 3" CLR
2. FORMED SURFACE EXPOSED TO EARTH OR WEATHER = 2" CLR
3. FORMED SURFACES NOT EXPOSED TO EARTH OR WEATHER = 1-1/2" CLR
- D. ANCHOR BOLTS AND REBARS TO BE EMBEDDED INTO EXISTING CONCRETE OR MASONRY SHALL BE WITH A TWO COMPONENT, HIGH STRENGTH, EPOXY RESIN SYSTEM APPROVED BY THE ENGINEER. ANCHOR BOLTS SHALL BE THREADED TYPE. INSTALLATION SHALL BE ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

- IV. STRUCTURAL STEEL
- A. MATERIALS
1. ALL STRUCTURAL BOLTS SHALL BE HOT-DIP GALVANIZED AND CONFORM TO THE FOLLOWING SPECIFICATIONS:
- a. ASTM A307, GRADE A FOR BOLTS EMBEDDED IN CONCRETE.
- b. ASTM A325, TYPE 1 FOR STEEL TO STEEL CONNECTIONS.
2. NUTS SHALL BE HOT-DIP GALVANIZED AND CONFORM TO THE FOLLOWING SPECIFICATIONS:
- a. ASTM A563, GRADE DH FOR ALL GALVANIZED BOLTS.
3. WASHERS, WHERE REQUIRED, SHALL CONFORM TO ASTM F436, TYPE 1 AND SHALL BE HOT-DIP GALVANIZED. WASHERS ARE REQUIRED WHERE BOLT HOLES ARE SLOTTED.
4. ALL ROLLED SHAPE SECTIONS AND MISCELLANEOUS PLATES, BARS AND RODS SHALL CONFORM TO ASTM A36, HOT-DIP GALVANIZED AFTER FABRICATION.
5. WELDS SHALL HAVE A MINIMUM ULTIMATE STRENGTH OF 70,000 PSI.
6. ALL THREADED TENDONS, ANCHORS, AND ANCHOR PLATES SHALL BE HOT-DIPPED GALVANIZED, BE IDENTIFIED AS "DYWIDAG SYSTEM," "WILLIAMS SYSTEM," OR AN APPROVED EQUAL, AND BE THE PRODUCT OF A SINGLE MANUFACTURER. ALL THREADED TENDONS SHALL CONFORM TO ASTM A-722, TYPE II WITH AN ULTIMATE STRENGTH (f_{pu}) OF 150 KSI.
- B. ALL ASTM A307 BOLTS SHALL BE SHEAR-BEARING SNUG TIGHT TYPE WITH THREADS EXCLUDED FROM THE SHEAR PLANE UNLESS OTHERWISE NOTED.
- C. ALL ASTM A325 BOLTS SHALL BE SHEAR-BEARING SNUG TIGHT TYPE WITH THREADS NOT REQUIRED TO BE EXCLUDED FROM THE SHEAR PLANE UNLESS OTHERWISE NOTED.
- D. ALL STEEL TO STEEL CONNECTIONS SHALL BE FULL WELDED UNLESS NOTED OTHERWISE.

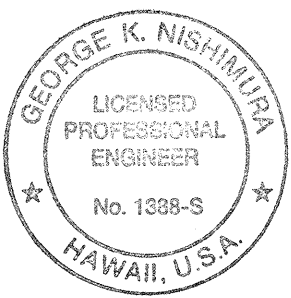
- FOUNDATION
- A. BOTTOM OF FOOTINGS SHALL BE AS INDICATED ON THE DRAWINGS AND SHALL BEAR ON FIRM ON-SITE SOILS OR PROPERLY COMPACTED FILL.
- B. ALL FILL AND BACKFILL MATERIAL SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8 INCHES AND COMPACTED TO AT LEAST 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D1557-91 PROCEDURE "C".
- C. ANY LOOSE OR SOFT SOIL ENCOUNTERED DURING EXCAVATION OR SUBGRADE COMPACTION OPERATIONS SHALL BE REMOVED TO FIRM SOIL AND REPLACED WITH PROPERLY COMPACTED FILL.
- D. IT IS IMPORTANT THAT ALL BACKFILL MATERIAL NEXT TO FOOTINGS AND FOOTING KEYS ARE PROPERLY COMPACTED IN ORDER TO PROVIDE PROPER LATERAL EARTH RESISTANCE FOR STRUCTURES.
- E. ALL BOTTOM OF FOOTING EXCAVATIONS SHALL BE THOROUGHLY TAMPED PRIOR TO PLACEMENT OF REINFORCING STEEL.
- F. THE ENGINEER SHALL BE NOTIFIED TO OBSERVE ALL FOOTING EXCAVATIONS PRIOR TO PLACEMENT OF REINFORCING STEEL AND CONCRETE.
- VII. CORROSION CONTROL
- A. ALL FERROUS SURFACES SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
- B. ALL FERROUS SURFACES IN CONTACT WITH DISSIMILAR SURFACES SHALL BE COATED WITH BITUMINOUS PAINT, 20 MILS DRY FILM THICKNESS.
- C. ALL GALVANIZED SURFACES SHALL BE PREPAINTED WITH EPOXY PRIMER AND POLYURETHANE TOP COATS PRIOR TO ERECTION.
- D. REPAIR ZINC-COATED SURFACE; CLEAN AREAS TO BE REPAIRED AND REMOVE SLAGS FROM WELDS.
- E. TOUCHUP DAMAGED PAINTED SURFACES.
- VII. DESIGN CRITERIA
- A. ACCELERATION COEFFICIENT = 0.42
- B. SEISMIC PERFORMANCE ZONE = 4
- C. SOIL PARAMETERS
1. HILO PLANTATION FLUME OVERPASS:
- a. ULTIMATE SOIL BEARING RESISTANCE = 7,000 PSF
- b. ULTIMATE PASSIVE RESISTANCE = 4,600 PSF
2. HILO PLANTATION ROAD OVERPASS:
- a. ULTIMATE SOIL BEARING RESISTANCE = 8,000 PSF
- b. ULTIMATE PASSIVE RESISTANCE = 5,000 PSF
3. PUKIHAE BRIDGE:
- a. ULTIMATE SOIL BEARING RESISTANCE:
1. AT ABUTMENTS = 6,000 PSF
2. AT PIER = 12,000 PSF
- b. ULTIMATE PASSIVE RESISTANCE:
1. SOIL = 200 PCF
2. ROCK = 1500 PCF
- c. COEFFICIENT OF FRICTION (ROCK) = 0.80
- d. ULTIMATE LATERAL LOAD CAPACITY OF DRILLED SHAFTS = 520 KIPS/SHAFT
4. WAILUKU RIVER BRIDGE
- a. PILE VERTICAL CAPACITY = 180 KIPS/PILE
- b. PILE LATERAL CAPACITY = 10 KIPS/PILE
- c. PASSIVE EQUIVALENT FLUID PRESSURE = 250 PCF
5. HONOLII BRIDGE
- a. ULTIMATE SOIL BEARING RESISTANCE:
1. AT PIERS NO. 1, 2, 7, 8 = 20,000 PSF
2. AT PIERS NO. 3, 5 = 26,000 PSF
3. AT PIER NO. 4 = 28,000 PSF
- b. ULTIMATE PASSIVE RESISTANCE:
1. SOIL = 200 PCF
2. ROCK = 1500 PCF
- c. COEFFICIENT OF FRICTION (ROCK) = 0.80
- d. ULTIMATE LATERAL LOAD CAPACITY OF DRILLED SHAFTS = 500 KIPS/SHAFT.

- VIII. SURFACE PREPARATION FOR NEW OR EXISTING CONCRETE
1. ALL EXISTING CONCRETE SURFACES WHERE NEW CONCRETE IS TO BE PLACED AGAINST SHALL BE ROUGHENED WITH A BUSH-HAMMER OR SAND-BLASTED.
2. PRIOR TO PLACEMENT OF REINFORCING STEEL AND NEW CONCRETE, EXISTING CONCRETE SURFACES SHALL BE CLEANED AND FREE OF LAITANCE.
3. EXISTING CONCRETE SURFACES SHALL BE DAMPENED WITH CLEAN POTABLE WATER PRIOR TO PLACEMENT OF CONCRETE. HOWEVER CONCRETE SHALL NOT BE PLACED AGAINST FREESTANDING OR PUDDLED WATER.

STANDARD PLANS SUMMARY

STANDARD PLAN NO.	TITLE	DATE
D-09	FIELD OFFICE	7/01/86
D-10	FIELD OFFICE	7/01/86
TE-03	GALVANIZED SQUARE TUBE SIGN POST MOUNTING	7/01/86

NOTE: STANDARD PLANS LISTED ABOVE ARE APPLICABLE TO THIS PROJECT.



THIS WORK WAS PREPARED BY ME UNDER MY SUPERVISION,

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL NOTES AND
STANDARD PLANS SUMMARY

HAWAII BELT ROAD
SEISMIC RETROFIT OF VARIOUS BRIDGES
VICINITY OF HILO
Federal Aid Project No. BR-019-2(42)

SCALE: AS NOTED DATE: APRIL 1998

SHEET No. S-0.1 OF 38 SHEETS

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