

STRUCTURAL GENERAL NOTES:

1. General:

- A. Workmanship and materials shall conform to the AASHTO LRFD Bridge Design Specification, 6th Edition, 2012, including all subsequent interim revisions and editions, HDOT Design Criteria for Bridges and Structures, March 1, 2013, and the Hawaii Standard Specifications for Bridge and Road Construction, 2005 Edition, as modified by the State of Hawaii Department of Transportation.
- B. The contractor shall compare all contract documents with each other and report in writing to the engineer all inconsistencies or omissions.
- C. The contractor shall take field measurements and verify field conditions and shall compare such field measurements and conditions with the drawings before commencing the work. Report in writing to the engineer all inconsistencies or omissions.
- D. The contractor shall be responsible for coordinating the work of all trades.
- E. The contractor shall be responsible for methods of construction, workmanship and job safety.
- F. The contractor shall provide temporary shoring and bracing as required for stability of embankments, structural members, and systems.
- G. Construction loading shall not exceed design live load unless special shoring is provided. Permitted construction loads shall be properly reduced in areas where the structure has not attained full design strength.
- H. The contractor shall be responsible for protection of the adjacent properties, structures, streets, and utilities during the construction period. Any damage or deteriorated property shall be restored to the condition prior to the beginning of work or better at no cost to the state.
- I. Details noted as typical on structural drawings shall apply in all conditions unless specifically shown or noted otherwise.

2. Design Criteria:

- A. Lateral Earth Pressure
 - Active----- 40 pcf
 - Uniform Lateral Earth Pressure----- 30H psf
- B. Bearing Capacity
 - Strength Limit State----- 4500 psf
 - Extreme Limit State----- 6000 psf
- C. Ultimate Tieback Anchor Bond Stress----- 720 psf
- D. Seismic
 - 0.2-second spectral response acceleration coefficient----- Ss = 1.469
 - 1.0-second spectral response acceleration coefficient----- S1 = 0.566
 - Horizontal peak ground acceleration coefficient----- PGA = 0.655
 - Site Class----- C
 - Seismic Design Zone----- 4

3. Foundation:

- A. Retaining system design is based on Geotechnical Investigation by Fewell Geotechnical Engineering, dated January 23, 2013 and the Supplemental Geotechnical Recommendations (Tieback Retaining Wall), dated August 16, 2013.
- B. The contractor shall provide for de-watering of excavation from either surface water, ground water or seepage.
- C. The contractor shall provide for design and installation of cribbing, sheeting and shoring necessary to preserve excavations and earth banks and adjacent structures and property from damage.
- D. Blasting will not be allowed on the project.
- E. Excavations boundaries and grade elevations for footing shall be approved by the Geotechnical Engineer (provided by contractor) prior to placement of concrete and reinforcing.

- F. Footings shall bear on either intact basalt (minimum 6" embedment) or the medium dense AA Clinker layers. Bottom of footings shall be compacted to provide a relatively firm and smooth bearing surface prior to placement of reinforcing steel and concrete. Cavities found in the intact basalt should be cleaned out and backfilled with concrete. If soft and/or loose materials are encountered at the bottom of footing excavations, they shall be over-excavated to expose the underlying firm materials. The over-excavated area shall be backfilled with select granular material compacted to a minimum of 95% relative compaction as determined by laboratory compaction test AASHTO T-180 or the footing bottom may be extended down to the underlying competent material. Contractor may substitute flowable concrete for the granular material upon approval from the engineer.
- G. Engineered fill and backfill shall be in accordance with Section 703.20 of the Hawaii Standard Specifications for Road and Bridge Construction, 2005 Edition.
- H. Fill should be moisture conditioned to within two percent of the optimum moisture content and placed in horizontal lifts not to exceed eight inches. Fill shall be compacted to minimum 95% (90% for wall backfill) relative density as determined by laboratory compaction test AASHTO T-180.
- I. Excavations of a lateral extent of more than 2.5 feet horizontally into the existing slopes or deeper than 6 feet within 10 feet of the toe of slopes shall not be allowed due to the overall slope stability.
- J. Where the excavation is intact basalt, the backfill shall be controlled low-strength material (CLSM) and shall have a 28-day compressive strength of 300 psi.
- K. Controlled low-strength material (CLSM) shall be in accordance with entire Section 314 of the Hawaii Standard Specifications for Road and Bridge Construction, 2005 Edition. The CLSM shall be placed as shown in the drawings or as approved by the Engineer in writing.

4. Reinforcing steel:

- A. Reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 60. Any reinforcing steel to be welded shall be low-alloy deformed bars conforming to ASTM A706.
- B. Clear concrete coverage for reinforcing bars shall be as follows, unless otherwise noted:
 - 1. Footing, etc. Cast against earth-----3"
 - 2. Footing formed and exposed to earth-----2"
 - 3. Wall faces exposed to earth or weather-----2"
 - 4. All others-----2"
- C. Splices:
 - 1. Reinforcing steel shall be detailed in accordance with the 6th Edition of the AASHTO LRFD Bridge Design Specifications unless otherwise noted. Reinforcing steel shall be spliced where indicated on plans. Provide lap splice length per typical details and schedule, unless otherwise noted.
 - 2. Mechanical splice connectors shall develop in tension 125 percent of the specified ultimate tensile strength of reinforcing bars.
 - 3. Plain welded wire fabric shall be lapped 8 inches or one full mesh plus 2 inches, whichever is greater.
 - 4. Deformed welded wire fabric shall be lapped 12 inches or one full mesh plus 2 inches, whichever is greater. The overlap measured between the outmost cross wires of each fabric sheet shall not be less than 2.0 inches.
 - 5. Offset laps of adjoining welded wire fabric sheet widths to prevent continuous laps in either direction.
- D. Bar bends and hook shall be "standard hooks" in accordance with the AASHTO 5.11.2 or as shown in detail 2-30/30, whichever is greater.
- E. Minimum reinforcement bend diameters shall comply with AASHTO 5.10.2.3
- F. Reinforcing steel shall be placed and secured in conformance with CRSI Manual of Standard Practice with placement tolerances per ACI Standard 117.

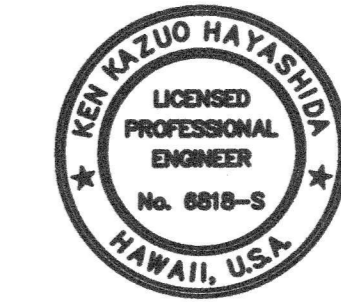
5. Concrete:

- A. Concrete, including shotcrete, shall be regular weight hard rock concrete having a 4,000 psi minimum 28 day compressive strength. The maximum water-cement (w/c) ratio shall not exceed 0.45.
- B. Concrete delivery tickets shall record all free water in the mix at batching plant, added for consistency by driver, and any additional request by Contractor up to the maximum allowed by the mix design.
- C. All inserts, anchor bolts, plates, and other items to be cast in the concrete shall be hot-dipped galvanized according to ASTM A153 unless otherwise noted.
- D. Reinforcing bars, anchor bolts, inserts, and other items to be cast in the concrete shall be secured in position prior to placement of concrete.
- E. Conduits, pipes, and sleeves passing through a slab or footing that do not conform to typical details shall be located and the proposed construction detail submitted to the Engineer for approval.
- F. Construction joints may be located by the Contractor and submitted to the Engineer for approval. Construction joints shall be made and located as not to impair the strength of the structure and to minimize shrinkage stresses. Submit proposed locations of construction joints to the Engineer for approval. All construction joints shall be cleaned, laitance removed and wetted prior to placing new concrete.
- G. Unless otherwise noted, chamfer all exposed concrete edges 3/4".
- H. Non-shrink grout shall be a premixed non-metallic formula, capable of developing a minimum compressive strength of 4,000 psi in 1 day and 7,000 psi in 28 days.
- I. Joint filler shall be ASTM D1751 or ASTM D994; asphalt impregnated fiberboard or felt.

6. Geocomposite Drain:

- A. Submit geocomposite drain manufacturer's literature, product data, and installation instructions for Engineer's review prior to placing the order.
- B. Geocomposite drains shall be installed to ensure that the drains are hydraulically connected from the top to bottom of the tieback wall.
- C. Geocomposite drains shall be attached to excavation surface by placing geotextile fabric in 2 feet wide strips directly against cut surface and shall be located as to avoid tieback anchor locations. Install as shown in plans and in accordance with manufacturer's instructions to maintain continuity of flow channel through the drain.
- D. Geocomposite drains and drain strips shall be suitably wrapped, protected from damage, deleterious contamination, and exposure to direct sunlight.
- E. If geotextile cover fabric is damaged during installation by tearing or puncturing, the damaged section shall be completely cut out and replaced. If, in the judgment of the engineer, the damage is not serious enough to warrant removal, the damaged area shall be repaired by overlaying a piece of fabric with a 4 inch overlap on all sides secured with 3 inch wide strips of waterproof, plastic tape.
- G. The cost for all geocomposite drain components shall be considered incidental to the structural shotcrete wall, including, but not limited to, geocomposite drain strip, filter materials, geotextile fabric, PVC weep holes, and drain grates.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0190(016)	2016	29	36



EXPIRATION DATE OF THE LICENSE 4/30/2016
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL GENERAL NOTES

MAMALAHOA HIGHWAY

DRAINAGE IMPROVEMENTS

Vicinity of Puuwaawaa Ranch Road

Federal Aid Project No. STP-0190(016)

Scale: As Noted Date: April 2016

SHEET No. 1 OF 8 SHEETS