FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	77	140

Structural General Notes:

A. Workmanship and materials shall conform to the AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017, including its subsequent interim revisions, AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 1st Edition, 2015, with 2017 Interim Revisions as its design reference, HDOT Design Criteria for Bridges and Structures, August 8, 2014, Memorandum Changes to Design Criteria for Bridges and Structures, January 8, 2018, and the Hawaii Standard Specifications for Bridge and Road Construction, 2005 as modified by the State of Hawaii Department of Transportation.
B. The contractor shall compare all the contract documents with each other and report in writing to the engineer all inconsistencies and 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 work. Report in writing to the engineer all inconsistencies and omissions.
D. The contractor shall be responsible for coordinating the work of all trades and for means and methods of construction, workmanship and job safety.
E. The contractor shall provide temporary shoring and bracing as required for stability of structural members and systems.
F. 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.
G. The contractor shall be responsible for protection of the adjacent properties, structures, streets and utilities during the construction period. Any damaged or deteriorated property shall be restored to the condition prior to the beginning of work or better at no cost to the State.
H. Details noted as typical on the structural drawings shall apply in all conditions unless specifically shown or noted otherwise.
I. Elevations and details of the existing bridges and other miscellaneous structures as shown on these plans are based on as-built drawings. The contractor shall be responsible for verifying all existing elevations and existing structure details and shall notify the engineer in writing of any discrepancies for further action.
J. Except as noted otherwise, all vertical dimensions are measured plumb.

Design Criteria:

A. Dead load
   - Weight of all components of the structures, appurtenances attached thereto, and earth covers.
   - Unit weight of concrete ---------- 160 pcf
   - Compacted earth ---------- 120 pcf

B. Live load ---------- AASHTO HL-93
C. Railing Test Level ---------- AASHTO TL-3
D. Seismic

	Stiff Soil Condition	Soft Soil Condtion
- 0.2-sec spectral response coefficient, s_s ----------	0.476	0.806
- 1.0-sec spectral response coefficient, s_1 ----------	0.184	0.378
- Peak seismic ground acceleration coefficient, A_s --------	0.208	0.332
- Site class ----------	C	E
- Seismic design zone ----------	2	3

E. Basic wind speed ---------- 120 MPH
F. Design soil parameters for structures
   - Bearing capacity
     - Extreme event limit state ---------- 10,500 psf
     - Strength limit state ---------- 4,700 psf
     - Service limit state ---------- 3,500 psf
   - Passive earth pressure
     - Extreme event limit state ---------- 350 pcf
     - Strength limit state ---------- 175 pcf
   - Lateral earth pressure
     - Active (level backfill) ---------- 34 pcf
     - At-rest (level backfill) ---------- 53 pcf
   - Dynamic lateral earth pressure ---------- $10.0H^2$ psf
   - Coefficient of Friction
     - Extreme event limit state ---------- 0.45
     - Strength limit state ---------- 0.36

Foundation:

A. Foundation design is based upon the Technical Memorandum, Highway Lighting Improvements, Moanalua Freeway Halawa Heights Off-Ramp to Middle Street Overpass F.A.P. No. NH-H201(005) Geotechnical Recommendations by Geolabs, Inc., dated July 21, 2017.
B. Contractor shall provide for de-watering of excavation from either surface water, ground water or seepage. NPDES permit required for discharging into State waters.
C. Contractor shall provide for design and installation of all cribbing, sheeting, and shoring necessary for personnel safety and to preserve excavations and earth banks, and adjacent structures and property for damage.
D. Excavation boundaries and grade elevations for footing shall be approved by the Geotechnical Engineer prior to placing the concrete and reinforcing.
E. Backfill behind the retaining structures (above the groundwater level) may consist of the on-site suitable soils or select granular fills (Type A Structure Backfill). Backfill shall be placed in uniform lifts of no more than 8 inches in loose thickness and uniformly compacted to at least 95 percent relative compaction.

Concrete

A. Concrete shall be regular weight hard rock concrete and shall have the following minimum 28-day compressive strengths and water to cement ratios:

	Structural Item	Minimum Compressive Strength f'c (28 days)	Maxmium (W/C)
1.	Drilled Shafts	4,500 psi	0.40
2.	Traffic Railing/Barrier	4,000 psi	0.40
3.	Glare Screens	4,000 psi	0.40
4.	All other concrete	4,000 psi	0.45

G. The use of any calcium chloride in any concrete is prohibited.
H. 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 amount allowed by the mix design.
I. Conduits, pipes, and sleeves passing through a wall not conforming to typical details shall be located and submitted to the structural engineer for approval.
J. Construction joints may be relocated by the contractor and submitted to the structural engineer for approval. Construction joints shall be made and relocated as not to impair the strength of the structure and to minimize shrinkage stresses. All construction joints shall be cleaned, laitance removed and wetted. See typical details for specific requirements.
K. Unless otherwise noted, chamfer all exposed concrete edges 3/4".
L. Reinforcing bars, anchor bolts, inserts and other items to be cast in the concrete shall be secured in position prior to placement of concrete.
M. All inserts, anchor bolts, plates, and other structural items to be cast in the concrete shall be hot-dip galvanized according to ASTM A153 unless otherwise noted.
N. Non-shrink Grout shall conform to Section 712.04 of the Standard Specification.
O. A shrinkage reducing admixture (SRA), Tetraguard AS20 by BASF, Eclipse by W.R. Grace & Co, or an approved equal shall be added to the concrete. The minimum dosage requirement shall be 128 oz per cubic yard of concrete. The concrete shall have a maximum shrinkage strain of 0.00006 at 28 days and 0.000145 at 56 days according to ASTM C512.
P. A corrosion inhibiting admixture shall be included in the concrete mix for all concrete. The corrosion inhibiting admixture shall contain a minimum of 30% calcium nitrate by mass and shall be added at a dosage rate of 4.0 gallons per cubic yard of concrete or as recommended by the manufacturer. The admixture shall be Masterline CI 30 Calcium Nitrate-Based corrosion inhibitor, DCI S corrosion inhibitor or an approved equal. Addition of corrosion inhibiting admixture shall be as recommended by the manufacturer.
Q. Epoxy-bonding compound shall be two part epoxy resin adhesive conforming to AASHTO M235, Type V, Class C.
R. Stay-in-Place forms shall not be allowed.

Reinforcing Steel:

A. Deformed and Plain Carbon Steel Bars for Concrete Reinforcement shall meet the requirements of AASHTO M31M/M31-19, Grade 60 (ASTM A615/ A615M-16, Grade 60).
B. Deformed and Plain Carbon Steel Bars for Concrete Reinforcement to be spliced by welding or otherwise welded, such as welded hoops, or for seismic reinforcing shall meet the requirements of AASHTO M31M/M31-19, Grade 60 (ASTM A615/ A615M-16, Grade 60) and meet the requirements of ASTM A706/A706M-16.
C. The welding of reinforcing steel shall be in accordance with the Structural Welding Code-Reinforcing Steel AWS D1.4.
D. Zinc (Hot-Dip Galvanizing) Coatings for deformed bars shall conform to ASTM A767 unless otherwise noted.
E. Epoxy-coated dowels and deformed bars shall conform to ASTM A775, Grade 60 unless otherwise noted.
F. The contractor shall not damage the epoxy coating on the dowels and deformed bars in any way during shipment, handling, or placement. Damaged epoxy coated dowels and deformed bars shall be replaced at no cost to the State. Repair of epoxy coating as approved by the Engineer shall meet ASTM A775.
G. Clear concrete cover for reinforcing bars shall be as follows, unless otherwise noted:
   1. Footing, walls, etc, cast against earth ---------- 3"
   2. Exterior concrete in coastal region ---------- 3"
   3. Exterior concrete other than above ---------- 2"

   Measured to the closest part of the bars.
M. At the time concrete is placed, reinforcing shall be free from mud, oil, laitance or other coatings which may adversely affect bond strength.
N. Minimum clear spacing between parallel bars shall be one and one-half (1½") times the diameter of the larger bar (for non-bundled bars), but in no case shall the clear distance between the bars be less than one and one-half (1½") times the maximum coarse aggregate size.
O. All dimensions relating to reinforcing bars (e.g. spacing of bars etc.) are to centers of bars unless noted otherwise.
P. Reinforcing steel shall be spliced only where indicated on plans. Provide lap splice length per typical details and schedule, unless otherwise noted.
Q. Mechanical splice connectors shall develop, in tension, 125 percent of the specified minimum yield strength of reinforcing bars.
R. Stagger all splices where possible.
S. Bar bends and hook shall be "standard hooks" in accordance with typical details.
T. Minimum reinforcement bend diameters shall comply with AASHTO 5.10.2.3.

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

KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
No. 6818-S
HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2022
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL GENERAL NOTES

MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2

Scale: As Shown Date: July 2020

SHEET No. S0.1 OF 25 SHEETS