FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-01-12	2012	8	123

GRADING NOTES

1. All grading work shall be done in accordance with Chapter 14, Articles 13, 14, 15 and 16, as related to grading, soil erosion and sediment control, of the Revised Ordinances of Honolulu, 1990, as amended.

2. No contractor shall perform any grading operation as to cause falling rocks, soil or debris in any form to fall, slide or flow onto adjoining properties, streets or natural watercourses. Should such violations occur, the contractor may be cited and the Contractor shall immediately make all remedial actions necessary.

3. The Contractor, at his own expense, shall keep the project area and surrounding area free from dust nuisance. The work shall be in conformance with the air pollution control standards contained in the Hawaii Administrative Rules, Title 11, Chapter 60.1, "Air Pollution Control".

4. The underground pipes, cables or ductlines known to exist by the engineer from his search of records are indicated on the plans. The Contractor shall verify the locations and depths of the facilities and exercise proper care in excavating in the area.

5. Adequate provisions shall be made to prevent surface waters from damaging the cut face of an excavation or the sloped surfaces of a fill. Furthermore, adequate provisions shall be made to prevent sediment-laden runoff from leaving the site.

6. All slopes and exposed areas shall be sodded or planted as soon as final grades have been established. Planting shall not be delayed until all grading work has been completed. Grading to final grade shall be continuous, and any area within which work has been interrupted or delayed shall be planted.

7. Fills on slopes steeper than 5:1 shall be continuously keyed and benched as the fill is brought up in lifts.

8. No grading work shall be done on Saturdays, Sundays and holidays at any time without prior notice and approval from the Contracting Officer.

9. The limits of the area to be graded shall be flagged before the commencement of the grading work.

10. Where applicable and feasible, the measures to control erosion and other pollutants shall be in place before any earth moving phase of the grading is initiated.

11. Temporary erosion controls shall not be removed before permanent erosion controls are in-place and established.

12. All grading and construction work shall implement measures to ensure that the discharge of pollutants from the construction site will be reduced to the maximum extent practicable and will not cause or contribute to an exceedance of water quality standards.

13. Non-compliance to any of the above requirements shall mean immediate suspension of all work, and remedial work shall commence immediately. All costs incurred shall be billed to the violator. Furthermore, violators shall be subjected to administrative, civil and/or criminal penalties.

SOIL PREPARATION NOTES

1. The Contractor shall be responsible for protecting the highway and all appurtenances from damage resulting from the Contractor's activities. The Contractor shall be solely responsible for repairing any damage resulting from the clearing and/or other construction activities.

2. The Contractor shall protect the traffic on the highway from any rockfall hazards at all times during the Contractor's activities.

3. Prior to installing the erosion control matting, drilling the soil/rock anchors for the anchored wire mesh, or conducting work along the slope faces, the slope face shall be cleared of vegetation where indicated on the plans.

4. The slope face to receive the erosion control matting or anchored wire mesh shall be hand scaled to remove loose and/or excess materials to expose a firm substrate on the slope face to the Engineer's satisfaction.

5. The tops of all slopes shall be rounded to the Engineer's satisfaction.

6. The Contractor shall exercise extra care in the hand scaling work and shall avoid over-steepening the slope face that may cause instability of the slope face. If the Contractor encounters unstable slope conditions that may constitute a potential landslide during the slope preparation work, notify the Engineer immediately. The Contractor shall verify the existing slope conditions and incorporate these potential landslide or unstable conditions into the price of their bid.

7. Debris or other materials that hang up on the slope during the slope preparation operations shall be removed and completed to the satisfaction of the Engineer.

8. The Contractor shall maintain equipment on-site at all times to remove debris from the highway to allow the passage of emergency vehicles in the event that emergency vehicles require passage through the project area along the highway during the lane closure times. The slope preparation activities shall be temporarily suspended to allow the passage of the emergency vehicles through the project area along the highway.

ANCHORED WIRE MESH CONSTRUCTION SEQUENCE (FOR SITE 15 ONLY)

1. Clear slope face of vegetation and loose materials where indicated on the plans.

2. Stake out grouted soil and/or rock anchors in general accordance with the project spacing requirements taking into account the low spots.

3. Excavate the dell for pre-tensioning of the anchored wire mesh before drilling the grouted soil and/or rock anchors.

4. Install the grouted soil and/or rock anchors (final anchor heads shall not project above the terrain line or predominant slope line).

5. Install erosion control matting with pins in accordance with the plans and specifications.

6. Plant hydromulch seeding on the slope.

7. Lay the steel wire mesh panels on the slope over the anchors installed in Step 4 and the installed matting.

8. Join the steel wire mesh panels together with Connection clips.

9. Fit the boundary wire ropes around the perimeter of the anchored wire mesh system, and fasten the wire mesh to the boundary ropes with compression claws.

10. Install the spike plates and pre-tension the anchors with torque wrench in order to tension the anchored wire mesh to the grouted soil and/or rock anchors to at least 6.7 kips.

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JASON H. LAU
LICENSED PROFESSIONAL ENGINEER
NO. 9360-C
HAWAII USA

4/30/12
EXP. DATE

This work was prepared by me or under my supervision.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONSTRUCTION NOTES

SLOPE IMPROVEMENTS FOR EROSION CONTROL AT VARIOUS SITES ON OAHU, PHASE 5
Project No. HWY-O-01-12

Scale: None Date: April 2012

SHEET No. N-2 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-01-12	2012	9	123

ANCHORED WIRE MESH SYSTEM MATERIALS

1. All hardware for the anchored wire mesh system shall be powder coated with a black pigment, and boundary wire rope shall be PVC coated (black in color).

2. Boundary wire rope and grouted soil and/or rock anchors (including the steel reinforcing bar for the grouted anchor, wire rope, heavy duty wire rope thimbles, wire rope clips such as cable clamps, steel plates, heavy hex nuts, washers, etc.) shall be hot dipped galvanized. All exposed hardware shall be powder coated black.

3. Heavy-duty wire rope thimble shall not be in contact with the threads of the steel reinforcing bar.

4. The Contractor shall follow the wire rope manufacturer's recommendation for the installation sequence and procedures.

5. The grouted soil and/or rock anchors shall have a design pullout capacity (design load), as shown on the following table. The Contractor shall test a minimum number of the grouted soil and/or rock anchors (as shown on the following table) for pullout in accordance with the specification in the presence of the Engineer. The test anchors shall be selected by the Engineer.

6. The steel wire mesh for the anchored wire mesh system shall be manufactured from 0.157-inch (4 mm) diameter high-tensile steel wire. The high-tensile steel wire shall have a minimum tensile strength of 256,000 psi.

7. The grouted soil and/or rock anchor shall consist of hollow threaded bar with outside and inside diameters of 1.25 and 0.59 inches, respectively, and minimum yield load capacity of 90 kips. The non-shrink grout shall be non-shrink, non-metallic, non-gaseous and shall have a minimum unconfined compressive strength of 4,000 psi or greater.

SOIL AND/OR ROCK ANCHOR SCHEDULE

TYPE OF SOIL NAIL	NAIL LENGTH (FT)	NO. OF NAILS	DESIGN LOAD (KIPS)	NO. OF ANCHOR TESTS
A	10	113	11.0	12
B	15	169	17.0	17
C	20	203	22.0	21
D	6	57	-	-

ARTICULATED CONCRETE BLOCK MAT (ACBM) NOTES

1. Preparation of ACBM Areas:
   a. Clear all surface objects including rocks, clods, vegetative of other obstructions within the limit of work areas indicated on the plans to a minimum depth of 4¾ inches.
   b. Grade areas to remove any rills and gullies. Backfill eroded areas to restore intended existing grades if necessary.
   c. Apply Geotextile to the prepared surface prior to installation of Articulated Concrete Block Mat.
   d. For Site 21, prepare subgrade and place geogrid, aggregate base, and sand beneath areas to be protected with ACBM Type 2 blocks.

2. The Contractor shall fill all voids between the Articulated Concrete Block Mat and existing structures or obstructions with uncompacted 3B Fine aggregate.

PUBLIC HEALTH, SAFETY, AND CONVENIENCE NOTES

1. Contractor shall observe and comply with all federal, state, and local laws required for the protection of public health, safety and environmental quality.

2. The Contractor, at his own expense, shall keep the project and its surrounding areas free from dust nuisance. The work shall be in conformance with the Air Pollution Standards and Regulations of the State Department of Health. The State shall require supplementary measures if required.

3. The Contractor shall be responsible for the cleaning and removal of all silt and debris generated by his work and deposited and accumulated within downstream waterways, ditches and drain pipes and public and private roadways. The Contractor agrees to reimburse the State for all costs expended in performance of above work if required for public health and safety or made necessary by non-performance by the Contractor.

4. The Contractor shall not perform any construction operation so as to cause falling rocks, soil or debris in any form to fall, slide or flow into existing city drainage systems, or adjoining properties, streets or natural watercourses. Should such violations occur, the Contractor may be cited and the Contractor shall immediately make all remedial actions necessary.

5. The Contractor shall provide, install and maintain all necessary signs, lights, flares, barricades, markers, cones, and other protective facilities and shall take all necessary precautions for the protection, convenience and safety of the public.

6. The Contractor's attention is directed to Chapter 46, Public Health Regulations, Department of Health, State of Hawaii, "Community Noise Control," in which maximum permissible noise levels have been set. If the construction work requires a permit from the Director of Health, the Contractor shall obtain a copy of Chapter 46 and become familiar with the noise level restrictions and the procedures for obtaining a permit for the construction activities. Application and information on variances are available from the Environmental Protection and Health Services Division, 1250 Punchbowl St., Honolulu, HI 96813 or by telephone (586-4576).

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JASON H. LAU
LICENSED PROFESSIONAL ENGINEER
NO. 9360-C
HAWAII USA
4/30/12
EXP. DATE
This work was prepared by me or under my supervision.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONSTRUCTION NOTES

SLOPE IMPROVEMENTS FOR EROSION CONTROL AT VARIOUS SITES ON OAHU, PHASE 5
Project No. HWY-O-01-12

Scale: None Date: April 2012