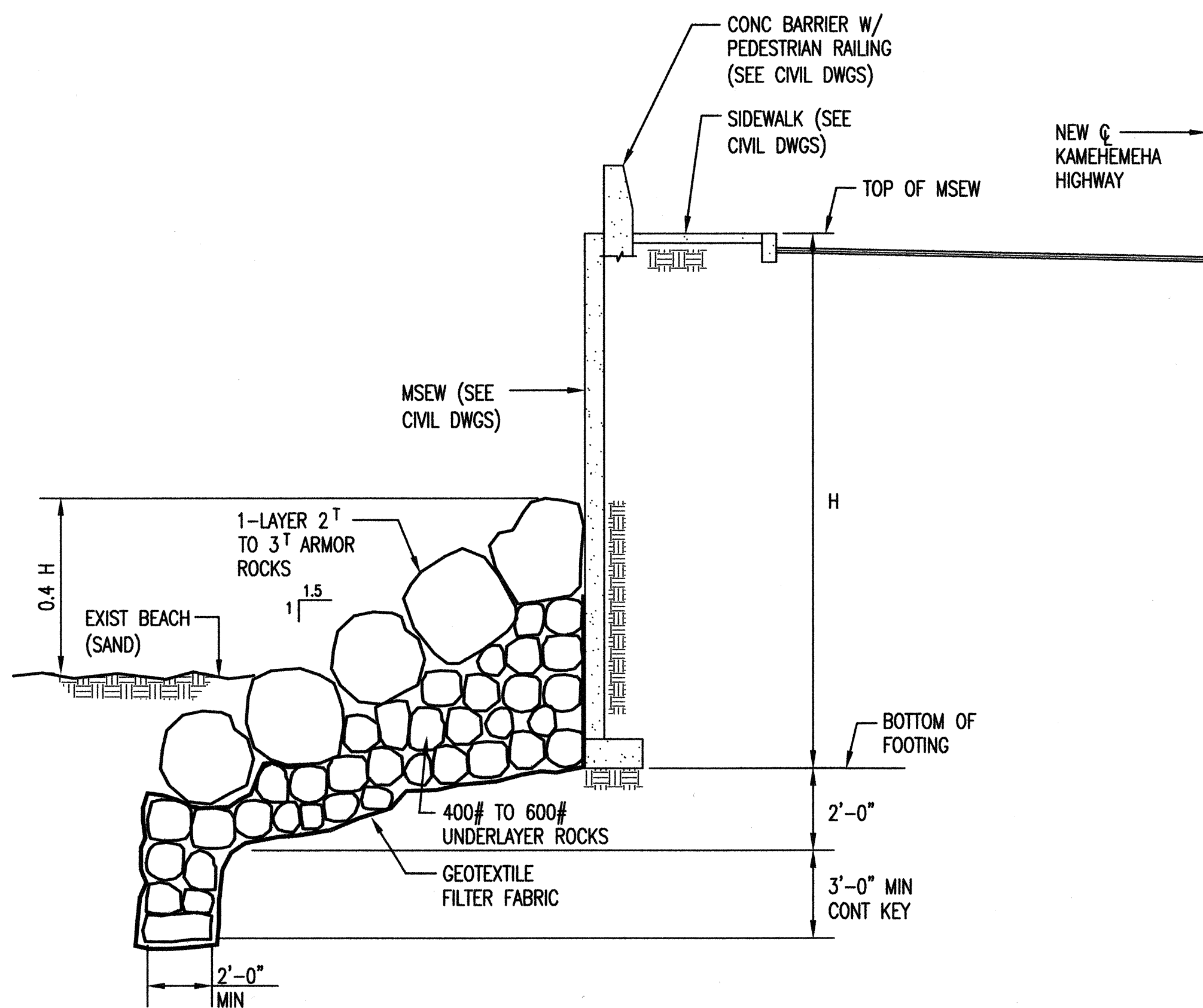
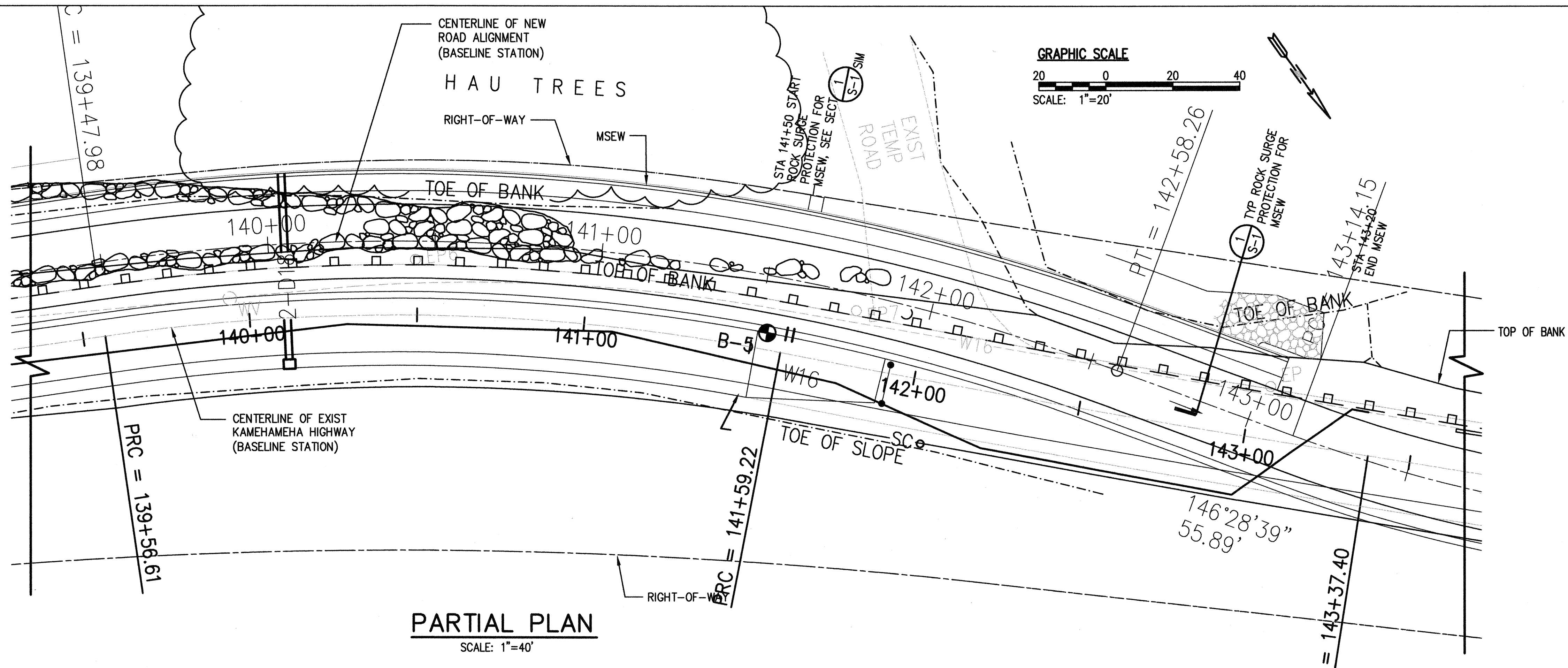


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	STP-083-1(45)	2000	16	32



1
S-1 SECTION - ROCK SURGE PROTECTION FOR MSEW
SCALE: 1/4"=1'-0"

NOTES:

- FIELD TESTING OF STONES: THE CONTRACTOR SHALL FIELD TEST REPRESENTATIVE ROCK PIECES SELECTED BY THE STATE BY DROPPING FROM A VERTICAL HEIGHT OF 10' ONTO A SOLID ROCK SURFACE OR A BED OF COMPARABLE SIZE ROCKS PROPOSED FOR THE PROJECT. BROKEN, CRACKED OR OTHERWISE DAMAGED STONE FOUND BY DROPPING SHALL NOT BE ACCEPTABLE AND SHALL BE DISPOSED OF BY THE CONTRACTOR AT HIS EXPENSE.
- ALL ROCKS SHALL BE DENSE, DURABLE, FREE FROM CRACKS, SEAMS AND OTHER DEFECTS THAT WOULD TEND TO INCREASE UNDULY ITS DETERIORATION FROM NATURAL CAUSES.
- PHYSICAL PROPERTIES OF THE ROCK SHALL CONFORM TO ASTM C127 WITH BULK SPECIFIC GRAVITY (SATURATED SURFACE DRY) NOT LESS THAN 2.5 AND ABSORPTION NOT MORE THAN 4%.
- UNDERLAYER ROCK SHALL BE PLACED TO THE LINES, GRADE AND THICKNESS INDICATED AS SOON AS PRACTICAL AFTER PLACING THE GEOTEXTILE FILTER FABRIC.
- ARMOR ROCK SHALL BE PLACED WITHIN THE LIMITS INDICATED TO PROVIDE A ONE-ROCK THICKNESS. ROCKS SHALL BE GENERALLY RECTANGULAR IN CROSS SECTION, THE LEAST DIMENSION OF ANY ARMOR ROCK BEING NOT LESS THAN ONE-HALF ITS GREATEST DIMENSION.
- SIZE OF VOIDS BETWEEN ARMOR ROCKS SHALL BE KEPT TO A MINIMUM TO PREVENT UNDERLAYER ROCK FROM PASSING THROUGH VOIDS. CHICKING OF VOID SPACES SHALL NOT BE PERMITTED.
- ARMOR ROCK SHALL BE PLACED ON PREPARED UNDERLAYER ROCK SURFACE USING EQUIPMENT SUITABLE FOR HANDLING THE SIZES INDICATED WITHOUT DAMAGE TO THE ROCKS.
- THE CONTRACTOR SHALL FURNISH THE STATE MILL CERTIFICATED OR AFFIDAVIT ATTESTING THAT THE GEOTEXTILE FABRIC MEETS THE CHEMICAL, PHYSICAL AND MANUFACTURING REQUIREMENTS INDICATED.
- THE GEOTEXTILE FABRIC SHALL BE A NON-WOVEN PERVIOUS SHEET OF PLASTIC YARN AS DEFINED IN ASTM D123. THE GEOTEXTILE FIBER SHALL CONSIST OF A LONG-CHAIN SYNTHETIC POLYMER COMPOSED OF AT LEAST 85% BY WEIGHT OF PROPYLENE, ETHYLENE, ESTER, AMIDE OR VINYLIDENS-CHLORIDE, AND SHALL CONTAIN STABILIZERS AND/OR INHIBITORS ADDED TO THE BASE PLASTIC TO MAKE THE FILAMENTS RESISTANT TO DETERIORATION DUE TO ULTRA-VIOLET AND HEAT EXPOSURE. THE EDGES OF THE GEOTEXTILE FABRIC SHALL BE FINISHED TO PREVENT THE OUTER FIBER FROM PULLING AWAY.
- SEAMS OF THE GEOTEXTILE SHALL BE SEWN WITH THREAD OF A MATERIAL MEETING THE CHEMICAL REQUIREMENTS OF THE GEOTEXTILE. STRENGTH OF THE SEAMS SHALL BE NOT LESS THAN 90% OF THE REQUIRED TENSILE STRENGTH OF THE UNAGED GEOTEXTILE IN ANY PRINCIPAL DIRECTION.

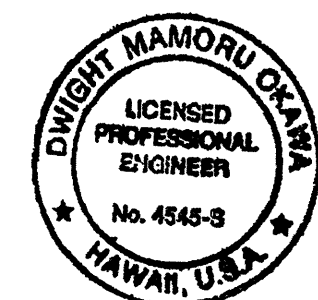
TABLE NO. 1 - PHYSICAL REQUIREMENTS FOR GEOTEXTILE FILTER FABRIC

PHYSICAL PROPERTY	TEST PROCEDURE	ACCEPTABLE VALUES ++
GRAB TENSILE STRENGTH (UNAGED GEOTEXTILE)	ASTM D 4632	200 POUND MIN. IN ANY PRINCIPAL DIRECTION
GRAB ELONGATION (UNAGED GEOTEXTILE)	ASTM D 4632	200 PERCENT MIN. IN ANY PRINCIPLE DIRECTION
PUNCTURE STRENGTH (UNAGED GEOTEXTILE)	ASTM D 4833	80 POUNDS PER SQUARE INCH MIN.
APPARENT OPENING SIZE (AOS)	ASTM D 4751	NO FINER THAN THE U.S. STANDARD SIEVE NO. 70 AND NO COARSER THAN THE U.S. STANDARD SIEVE NO. 30
TRAPEZOIDAL TEAR STRENGTH & PRINCIPAL DIRECTION	ASTM D 4533	50 LBS. MIN. IN ANY PRINCIPAL DIRECTION
MULLEN BURST STRENGTH	ASTM D 3786	320 LBS. PER SQ. INCH
GEOTEXTILE PERMEABILITY (kg)	ASTM D 4491	THE PERMEABILITY OF THE GEOTEXTILE SHALL BE GREATER THAN 0.10 CM PER SECOND

+ UNAGED GEOTEXTILE IS DEFINED AS GEOTEXTILE IN THE CONDITION RECEIVED FROM THE MANUFACTURER OR DISTRIBUTOR.

++ ALL NUMERICAL VALUES REPRESENT MINIMUM AVERAGE ROLL VALUES (I.E., ANY ROLL IN A LOT SHOULD MEET OR EXCEED THE MINIMUM IN THE TABLE).

- AT THE TIME OF INSTALLATION, THE GEOTEXTILE SHALL BE REJECTED IF IT HAS DEFECTS, RIPS, HOLES, FLAWS, DETERIORATION OR DAMAGE. THE GEOTEXTILE SHALL BE PLACED WITH THE LONG DIMENSION PARALLEL TO THE SHORELINE AND LAID SMOOTH AND FREE OF TENSION, FOLDS, WRINKLES OR CREASES. STRIPS SHALL BE PLACED TO PROVIDE A MINIMUM WIDTH OF 36" OF OVERLAP FOR EACH JOINT. TEMPORARY PINNING OF THE GEOTEXTILE TO HELP HOLD IT IN PLACE UNTIL THE OVERLYING MATERIAL IS PLACED WILL BE ALLOWED. THE TEMPORARY PINS SHALL BE REMOVED AS THE OVERLYING MATERIAL IN PLACED. ANY DAMAGE TO THE GEOTEXTILE DURING ITS INSTALLATION OR DURING PLACEMENT OF THE OVERLYING MATERIAL SHALL BE REPLACED BY THE CONTRACTOR AT NO COST TO THE STATE.



3/21/00
Dwight M. Ojima
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MSEW SURGE PROTECTION

**KAMEHAMEHA HIGHWAY
WAMEA BAY
EMERGENCY ROCKFALL REMEDIATION**

FEDERAL-AID PROJECT NO. STP-083-1(45)

Scale: As Shown Date: April 2000

SHEET No. 16 OF 39 SHEETS

"AS-BUILT"