

STATE OF HAWAII
 DEPARTMENT OF LAND AND NATURAL RESOURCES

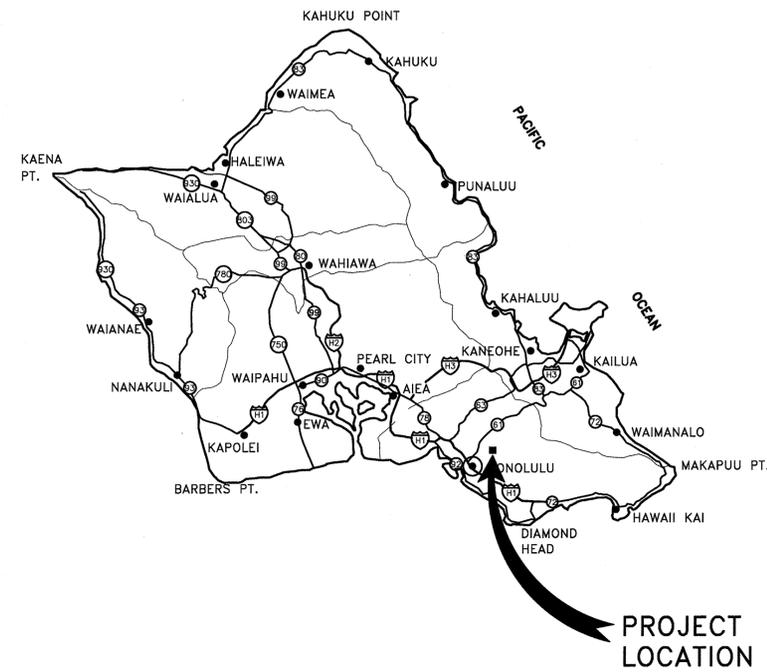
ENGINEERING DIVISION

JOB NO. J38CO56A

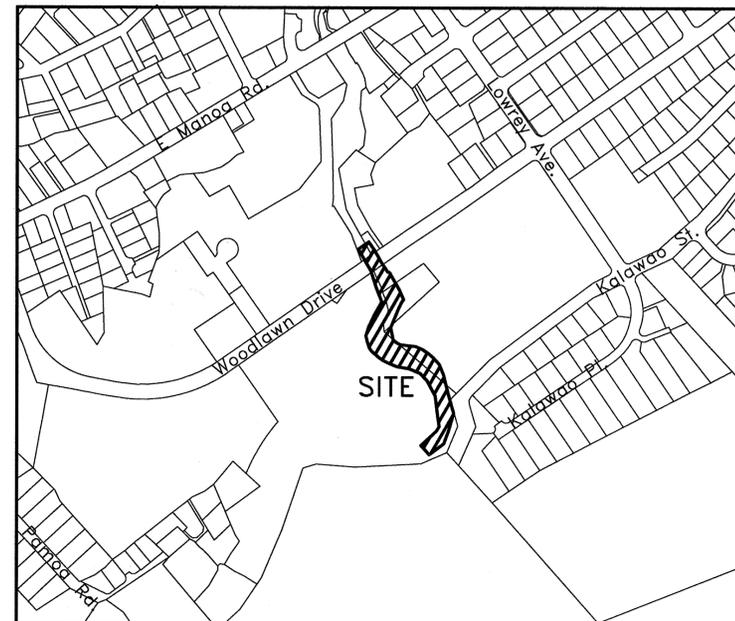
MANOA STREAM IMPROVEMENTS AT WOODLAWN DRIVE BRIDGE

Manoa, Oahu, Hawaii

INDEX		
SHEET NO.	DWG. NO.	DESCRIPTION
		<u>CIVIL</u>
1	T-1	TITLE AND INDEX
2 - 4	C-1 thru 3	NOTES 1 - 3
5	C-4	GENERAL SITE PLAN
6	C-5	TREE REMOVAL PLAN
7	C-6	EROSION CONTROL PLAN
8	C-7	TYPICAL SECTIONS & DETAILS
9	C-8	PLAN & PROFILE
10	C-9	PHASING DETAILS
11 - 13	C-10 thru 12	CROSS SECTIONS 1 - 3



OAHU - VICINITY MAP



LOCATION MAP
 NOT TO SCALE



APPROVED

CARTY S. CHANG, CHIEF ENGINEER
 ENGINEERING DIVISION
 DEPARTMENT OF LAND AND NATURAL RESOURCES

5/4/16
 DATE

General Notes

1. This project primarily involves improvements to Manoa Stream and the reconstruction of a drop structure under the Woodlawn Drive Bridge to prevent debris build-up and consequent flooding.
2. All work shall be performed in conformance to the "Interim General Conditions" of the Department of Land and Natural Resources (DLNR), State of Hawaii dated 1994, unless noted or directed by the Engineer.
3. The Contractor shall limit his operations and access to the project to existing access roads and pathways as shown on the plans. Other pathways and areas may be used only with prior written approval of the Engineer.
4. The Contractor is to comply with the directions of the State of Hawaii Occupational Safety and Health (DOSH) law.
5. When excavating adjacent to or under existing structures or facilities, the Contractor is responsible for properly sheeting and bracing the excavation and stabilizing the existing ground to render it safe and secure from possible slides, cave-ins and settlement, and for properly supporting existing structures and facilities with beams, struts or underpinning to fully protect it from damage.
6. The Contractor shall be liable for any damages to HECO's facilities.
7. The Contractor shall report any damages to HECO's facilities to the HECO trouble dispatch at 549-7961.
8. Marshalling yard, storage site and field office to be approved and coordinated with DLNR or Engineer.
9. No work shall be done on Sat., Sun. & holidays at anytime. Work hours are to be from 8:00 a.m. to 5:00 p.m..
10. The Contractor shall verify and check all dimensions and details shown on the drawings prior to or during construction. Any discrepancy or conflict shall be immediately brought to the attention of the engineer for clarification, and shall not proceed until the discrepancy or conflict is resolved.
11. All work called for on the plans and not itemized in the proposal and all work not called for but required for installation, repairs and replacement for this project, shall be considered incidental to the project.
12. The existence and location of utilities, manholes, monuments, pavements, and other features as shown on the plans are from the latest available data but the accuracy is not guaranteed. The encountering of other obstacles during the course of work is possible. The Contractor shall make an independent check to verify the exact locations and depths of the existing utilities and obstructions.
13. Contractor shall dispose or deliver any removed material, as directed by the Engineer, at no cost to the State.

General Notes (Cont'd)

14. The Contractor shall be held liable for any damages incurred to the existing facilities, utilities and other features as a result of his operations. All damaged portions shall be replaced in accordance with the requirements of the affected owner or user at the Contractor's expense.
15. All existing utilities to remain in use, whether or not shown on the plans, shall be protected at all times by the Contractor unless specified on the plans to be abandoned. Any damage to the existing utilities shall be repaired and paid for by the Contractor.
16. Existing utilities shall remain in service and in place at all times. If relocation of the existing utilities is required by the Contract Documents or for the Contractor's convenience, interruption of service shall be kept to a minimum and shall be done at the Contractor's expense, and only with the approval of the Engineer and the affected utility company.
17. The Contractor shall field verify the operational status of all existing utilities to be removed or abandoned in place. Any discrepancy shall be brought to the attention of the Engineer.
18. The Contractor shall notify the Engineer and State Historic Preservation Division (SHPD) upon uncovering any potential historical artifacts or items of archaeological significance. See Special Provisions Subsection 649.
19. The existing improvements on the premises and in adjacent areas that are not to be removed shall be preserved and protected. Any and all damages resulting from the Contractor's construction operations shall be replaced and repaired to original condition, to the satisfaction of the owner.
20. No material and/or equipment shall be stockpiled or otherwise stored within the property except at locations designated in writing and approved by the Engineer. If use of a location is approved by the Engineer, a permit to use the property site shall be obtained from the DLNR.

Grading Notes

1. All grading work shall be done in accordance with State of Hawaii Standard Specifications for Road, Bridge, and Public Works Construction.
2. No contractor shall perform any grading operation so 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 the Contractor's 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 (HAR), Title 11, Chapter 60.1, "Air Pollution Control."
4. The underground pipes, cables or ductlines known to exist by the Design Engineer from his/her 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. Wherever connections of new utilities are shown on the plans, the Contractor shall expose the existing lines at the proposed connections to verify their locations and depths prior to excavation for the new lines.
5. Surface waters shall not damage the cut face of an excavation or the sloped surfaces of a fill. Furthermore, sediment-laden runoff all not leave the site.
6. All slopes and exposed areas shall be sodded, planted, or hydromulched, within 15 days of final grades being 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.

Grading Notes (Cont'd)

7. No grading work shall be done on Saturdays, Sundays and holidays at any time without prior written notice and acceptance by the Engineer, provided such grading work is also in conformance with the community noise control standards contained in the Hawaii Administrative Rules, Title 11, Chapter 46, "Community Noise Control."
8. The limits of the area to be graded shall be flagged before the commencement of the grading work.
9. All grading operations shall be performed in conformance with the applicable provisions of the water quality and water pollution control standards contained in Hawaii Administrative Rules, Title 11, Chapter 54, "Water Quality Standards," and Title 11, Chapter 55, "Water Pollution Control" and if applicable, the NPDES, permits for the project.
10. 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.
13. The limits of the area to be graded shall be flagged before the commencement of the grading work.
12. Temporary erosion control procedures shall be submitted for approval prior to application for permit.
13. If the grading work involves contaminated soil, then all grading work shall be done in conformance with applicable State and Federal requirements.

In the event any potential historical items of archaeological significance, artifacts, or human remains are uncovered during construction operations, the contractor shall immediately suspend work and notify SDOT, the Engineer, the Police Department, DLNR-State Historic Preservation Division (SHPD 692-8015).

14. 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.

NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION MANOA STREAM IMPROVEMENTS AT WOODLAWN DRIVE BRIDGE MANOA, OAHU, HAWAII					
NOTES - 1					
DESIGNED: SKYA		SUBMITTED: SKYA <i>[Signature]</i>			
DRAWN: TL/RY		DATE: May 2016			
CHECKED: SKYA		SCALE: AS SHOWN			
 THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. APRIL 30, 2016 EXPIRATION DATE OF LICENSE R. M. TOWILL CORPORATION CHIEF ENGINEER		 APPROVED R. M. TOWILL CORPORATION CHIEF ENGINEER		DRAWING NO. C-1	
MAY - 4 2016 DATE					

Water Pollution And Erosion Control Notes

1. General

The Contractor is reminded of the requirements of Section 209 – Water Pollution and Erosion Control, in the "Hawaii Standard Specifications for Road, Bridge and Public Works Construction," as amended. Section 209 describes but is not limited to: submittal requirements; scheduling of a water pollution and erosion control conference with the Engineer; construction requirements; method of measurement; and basis of payment. No work shall commence without a site specific Best Management Practices (BMP) plan approval by the Department of Health.

The Contractor shall follow the guidelines in the "Best Management Practices Manual for Construction Sites in Honolulu," dated May 1999 in developing, installing and maintaining the BMPs for the project. The Contractor may submit alternate methods to the Engineer for acceptance.

The Contractor shall keep a copy of the approved BMP, National Pollutant Discharge Elimination System (NPDES) permit, etc. on the project site. The BMP shall be updated to reflect any changes made during the course of construction for the duration of the project.

The Engineer may assess liquidated damages of up to \$27,500 for non-compliance of each BMP requirement and each requirement stated in Section 209, for every day of non-compliance. There is no maximum limit on the amount assessed per day.

The Engineer will deduct the cost from the progress payment for all citations received by the department for non-compliance, or the Contractor shall reimburse the State for the full amount of the outstanding cost incurred by the State, whichever is greater.

For projects that require an NPDES Permit from the Department of Health (DOH), install a rain gage prior to any field work including the installation of any site-specific best management practices. The rain gage shall have a tolerance of at least 0.05 inches of rainfall, and have an opening of at least one-inch in diameter. Install the rain gage on the project site in an area that will not deter rainfall from entering the gage opening. The rain gage installation shall be stable and plumbed. Do not begin field work until the rain gage is installed and site-specific BMPs are in-place.

The Contractor shall submit to the Engineer a copy of the weekly inspection report promptly after each weekly inspection and/or after each occurrence of 0.5" rainfall within a 24-hour period.

2. Waste Disposal

- A. **Waste Materials:** All waste materials shall be collected and stored in a securely lidded metal dumpster that does not leak. The dumpster shall meet all local and State solid waste management regulations. All trash and construction debris from the site shall be deposited in the dumpster. The dumpster shall be emptied a minimum of twice per week or as often as is deemed necessary. No construction waste materials shall be buried onsite. The Contractor's supervisory personnel shall be instructed regarding the correct procedure for waste disposal. Notices stating these practices shall be posted in the office trailer and the Contractor shall be responsible for seeing that these procedures are followed.
- B. **Hazardous Waste:** All hazardous waste materials shall be disposed of in the manner specified by local or State regulation or by the manufacturer. The Contractor's site personnel shall be instructed in these practices and shall be responsible for seeing that these practices are followed.
- C. **Sanitary Waste:** All sanitary waste shall be collected from the portable units a minimum of once per week, or as required.

3. Erosion and Sediment Control Inspection and Maintenance Practices

- A. All control measures shall be inspected at least once each week and within 24 hours following any rainfall event of 0.5 inches or greater. The Contractor shall provide and maintain a rain gauge and install it at a location agreed to by the State. The Engineer will choose the type of rain gauge. All measures shall be maintained in good working order. If repair is necessary, it shall be initiated within 24 hours after the inspection.
- B. Built-up sediment shall be removed from silt fence when it has reached one-third the height of the fence.
- C. The Contractor shall select and provide the names of a minimum of three personnel who shall be responsible for inspections, maintenance and repair activities and filling out the inspection and maintenance report.
- D. Personnel selected for the inspection and maintenance responsibilities shall receive training from the Contractor. They shall be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.
- E. All slopes and exposed areas shall be grassed within 15 days. Grading to final grade shall be continuous, and any area in which work has been interrupted or delayed or exposed for more than 15 days shall be grassed in order to prevent dust, erosion and silt runoff. Areas with imported soils shall be grassed not more than 5 working days after final grades have been established.

- F. Temporary erosion controls shall not be removed before permanent erosion controls are in-place and established.
- G. Dust screen, 15' high, shall be installed along the makai perimeter of the project site. (approximately 6,000 LF)
- H. Silt screen or fence shall be inspected once a week for depth of sediment, tears, to verify that the fabric is securely attached to the fence posts or concrete slab and to verify that the fence posts are firmly in the ground.
- I. Temporary and permanent seeding and planting shall be inspected once a month for bare spots, washouts and healthy growth.

4. Good Housekeeping Best Management Practices:

A. Materials Pollution Prevention Plan

- (1) Applicable materials or substances listed below are expected to be present onsite during construction. Other materials and substances not listed below shall be added to the inventory of the Construction Contractor's site-specific BMP plan.

Concrete	Fertilizers
Detergents	Petroleum Based Products
Paints (enamel and latex)	Cleaning Solvents
Metal Studs	Wood
Tar	Masonry Block

- (2) Material management practices shall be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff. An effort shall be made to store only enough product as is required to do the job.
- (3) All materials stored onsite shall be stored in a neat, orderly manner in their appropriate containers and if possible under a roof or other enclosure.
- (4) Products shall be kept in their original containers with the original manufacturer's label.
- (5) Substances shall not be mixed with one another unless recommended by the manufacturer.
- (6) A product shall be used up completely before disposing of the container.
- (7) Manufacturer's recommendations for proper use and disposal shall be followed.
- (8) The Contractor shall conduct a daily inspection to ensure proper use and disposal of materials onsite.

B. Hazardous Material Pollution Prevention Plan

- (1) Products shall be kept in original containers unless they are not resealable.
- (2) Original labels and Material Safety Data Sheets (MSDS) shall be retained and made available to the Engineer upon request.
- (3) Surplus products shall be disposed of according to manufacturers' instructions or local and state recommended methods.

C. Onsite and Offsite Products Specific Plan

- (1) The following product specific practices shall be followed onsite:
 - a. **Petroleum Based Products:** All onsite vehicles shall be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products shall be stored in tightly sealed containers which are clearly labeled. Any asphalt substances used onsite shall be applied according to the manufacturer's recommendation.
 - b. **Fertilizers:** Fertilizers used shall be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer shall be worked into the soil to limit exposure to storm water. Storage shall be in a covered shed. The contents of any partially used bags of fertilizer shall be transferred to a sealable plastic bin to avoid spills.
 - c. **Paints:** All containers shall be tightly sealed and stored when not required for use. Excess paint shall not be discharged to the highway drainage system but shall be properly disposed of according to manufacturers' instructions or State and local regulations.
 - d. **Concrete Trucks:** Concrete trucks shall be allowed to wash out or drum wash water only at designated site. Water shall not be discharged in the highway drainage system or waters of the United States (i.e. streams, rivers, harbors). The Contractor shall contact Drinking Water Branch, Department of Health at 586-4258 to receive permission to designate a disposal site. The Contractor shall clean the disposal site as required or as requested by the Engineer at no cost to the owner or the State.

D. Spill Control Plan

- (1) The Contractor shall have a spill prevention plan which shall be posted and adjusted to include a description and cause of each spill, measures to prevent and clean up each spill.
- (2) The Contractor shall be the spill prevention and cleanup coordinator. The Contractor shall designate at least three site personnel who shall receive spill prevention and cleanup training. These individuals shall each become responsible for a particular phase of revention and cleanup. The names of responsible spill personnel shall be submitted to the State and posted in the material storage area and in the office trailer onsite.

NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
					
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION MANOA STREAM IMPROVEMENTS AT WOODLAWN DRIVE BRIDGE MANOA, OAHU, HAWAII					
NOTES - 2					
DESIGNED: SKYA		SUBMITTED: SKYA <i>SKYA</i>			
DRAWN: TL/RY		DATE: May 2016			
CHECKED: SKYA		SCALE: AS SHOWN			
APPROVED: <i>SKYA</i>		R. M. TOWILL CORPORATION		MAY - 4 2016	
CHIEF ENGINEER		DATE		DRAWING NO. C-2	

Water Pollution And Erosion Control Notes (Cont'd)

- (3) Manufacturers' recommended methods for spill cleanup shall be clearly posted and site personnel shall be made aware of the procedures and the location of the information and cleanup supplies.
- (4) Materials and equipment necessary for spill cleanup shall be kept in the material storage area onsite.
- (5) All spills shall be cleaned up immediately after discovery.
- (6) The spill area shall be kept well ventilated and personnel shall wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- (7) Spills of toxic hazardous material shall be reported to the appropriate State or local government agency, regardless of the size.

5. Permit Requirements

- A. The Contractor shall submit to the Engineer ten (10) sets of the water pollution and erosion control submittals as detailed in Subsection 209.04 of the specifications. No work shall begin until the submittal has been reviewed and approved by the Engineer.
- B. The Contractor shall comply with all applicable State and Federal permit conditions.
- C. Permits may include but are not limited to the following:

NPDES Permit for Construction Activities
U.S. Department of the Army Permit
Water Quality Certification
Coastal Zone Management (CZM) Federal
Consistency Certification

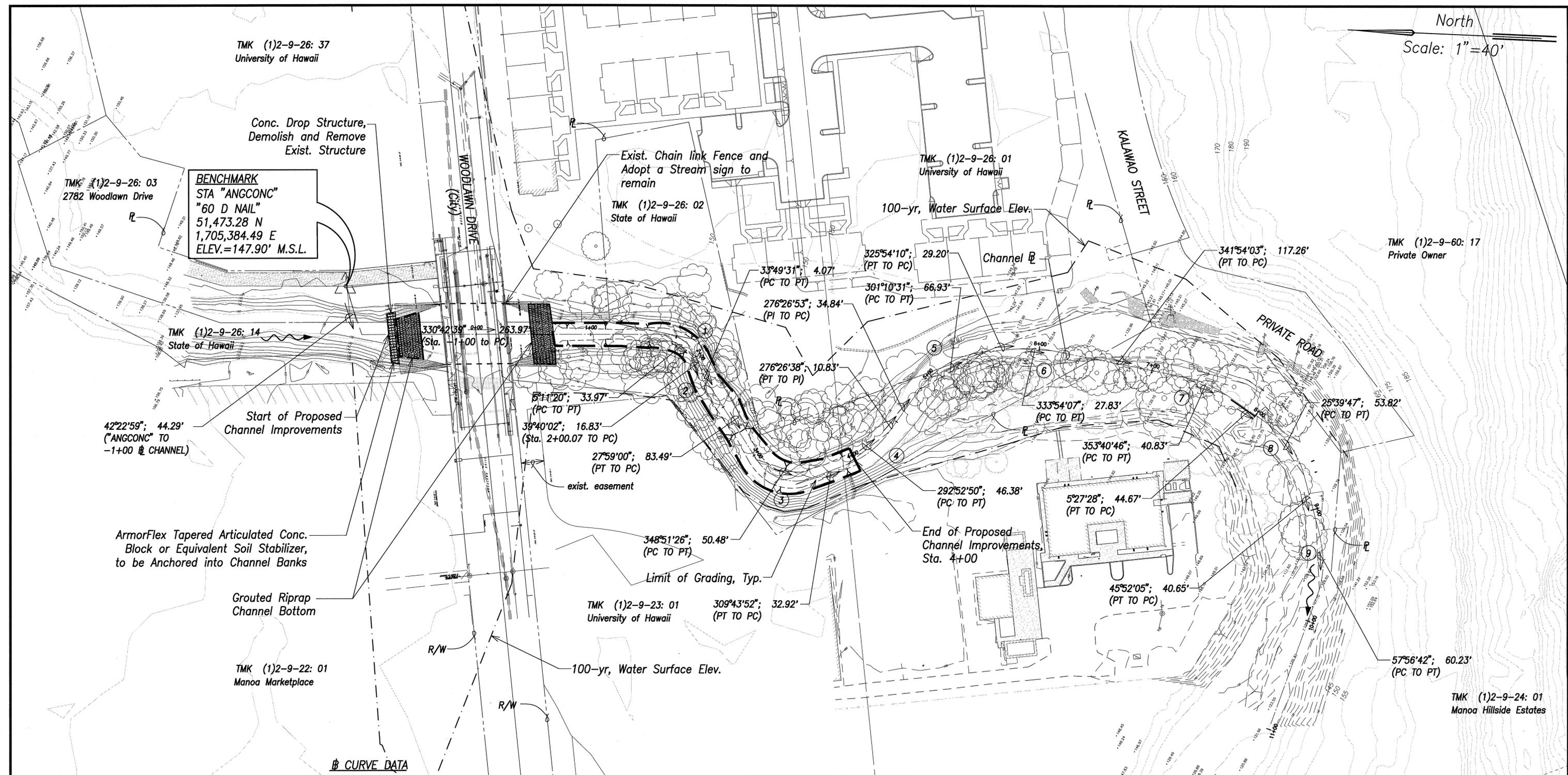
- 6. The Contractor shall be responsible for conformance with the applicable provisions of Chapter 54, Water Quality Standards, and Chapter 55, Water Pollution Control of HAR Title 11, of the State Department of Health.
- 7. The Contractor, at the Contractor's own expense, shall keep the project area and surrounding areas free from dust nuisance and any material tracked on to the roadways. The work shall be in conformance with the Air and Water Pollution Control Standards and Regulations of the State Department of Health.

National Pollutant Discharge Elimination System (NPDES) Requirements:

- 1. The Contractor shall obtain and comply with the National Pollutant Discharge Elimination System (NPDES) requirements for Oahu District permit projects. This is available at the Oahu District Office at 727 Koko Street (Ph. 831-6793). Due to potential cost impacts, the Contractor needs to be aware of these requirements.
- 2. The Contractor shall complete and submit a Contractor's Certification of NPDES Compliance, including completion of the Best Management Practice (BMP) checklist and submittal of a written BMP Plan and Drawings, prior to issuance of the Permit to perform work upon State Highways.

RMT/C JOB NO. 21222-05 Manoa Flood Control

NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;">  <p style="font-size: 8px;">THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.</p> <p style="font-size: 8px;">APPROVED: <i>[Signature]</i> APRIL 30, 2018 EXPIRES DATE OF LICENSE</p> <p style="font-size: 8px;">R. M. TOWILL CORPORATION</p> </div> <div style="width: 80%; text-align: center;"> <p>STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION</p> <p>MANOA STREAM IMPROVEMENTS AT WOODLAWN DRIVE BRIDGE MANOA, OAHU, HAWAII</p> <p>NOTES - 3</p> </div> </div>					
DESIGNED: SKYA		SUBMITTED: SKYA <i>[Signature]</i>			
DRAWN: TL/RY		DATE: May 2016			
CHECKED: SKYA		SCALE: AS SHOWN			
APPROVED:		MAY - 4 2016		DRAWING NO. C-3	
CHIEF ENGINEER: <i>[Signature]</i>		DATE			



BENCHMARK
STA "ANGCONC"
"60 D NAIL"
51,473.28 N
1,705,384.49 E
ELEV.=147.90' M.S.L.

TMK (1)2-9-26: 14
State of Hawaii

Start of Proposed
Channel Improvements
("ANGCONC" TO
-1+00 @ CHANNEL)

ArmorFlex Tapered Articulated Conc.
Block or Equivalent Soil Stabilizer,
to be Anchored into Channel Banks

Grouted Riprap
Channel Bottom

TMK (1)2-9-22: 01
Manoa Marketplace

WOODLAWN DRIVE
(City)

Exist. Chain link Fence and
Adopt a Stream sign to
remain
TMK (1)2-9-26: 02
State of Hawaii

TMK (1)2-9-26: 01
University of Hawaii
100-yr, Water Surface Elev.

Channel @

TMK (1)2-9-60: 17
Private Owner

PRIVATE ROAD

exist. easement

Limit of Grading, Typ.

TMK (1)2-9-23: 01
University of Hawaii

End of Proposed
Channel Improvements,
Sta. 4+00

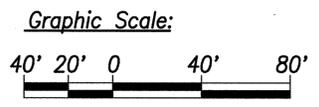
100-yr, Water Surface Elev.

TMK (1)2-9-24: 01
Manoa Hillside Estates

① CURVE DATA

①	②	③	④	⑤	⑥	⑦	⑧	⑨
$\Delta = 68^{\circ}57'22''$	$\Delta = 11^{\circ}41'01''$	$\Delta = 78^{\circ}15'08''$	$\Delta = 33^{\circ}42'05''$	$\Delta = 49^{\circ}27'17''$	$\Delta = 15^{\circ}59'53''$	$\Delta = 23^{\circ}33'25''$	$\Delta = 40^{\circ}24'37''$	$\Delta = 7^{\circ}27'57''$
$\Delta/2 = 34^{\circ}28'41''$	$\Delta/2 = 5^{\circ}50'31''$	$\Delta/2 = 39^{\circ}7'34''$	$\Delta/2 = 16^{\circ}51'03''$	$\Delta/2 = 24^{\circ}43'39''$	$\Delta/2 = 7^{\circ}59'57''$	$\Delta/2 = 11^{\circ}46'42''$	$\Delta/2 = 20^{\circ}12'19''$	$\Delta/2 = 3^{\circ}43'59''$
R = 30.00'	R = 20.00'	R = 40.00'	R = 80.00'	R = 80.00'	R = 100.00'	R = 100.00'	R = 77.91'	R = 158.26'
T = 20.60'	T = 2.05'	T = 32.54'	T = 24.23'	T = 36.84'	T = 14.05'	T = 20.85'	T = 28.67'	T = 10.33'
C = 33.97'	C = 4.07'	C = 50.48'	C = 46.38'	C = 66.93'	C = 27.83'	C = 40.83'	C = 53.82'	C = 20.61'
LC = 36.11'	LC = 4.08'	LC = 54.63'	LC = 47.06'	LC = 69.05'	LC = 27.92'	LC = 41.11'	LC = 54.95'	LC = 20.62'

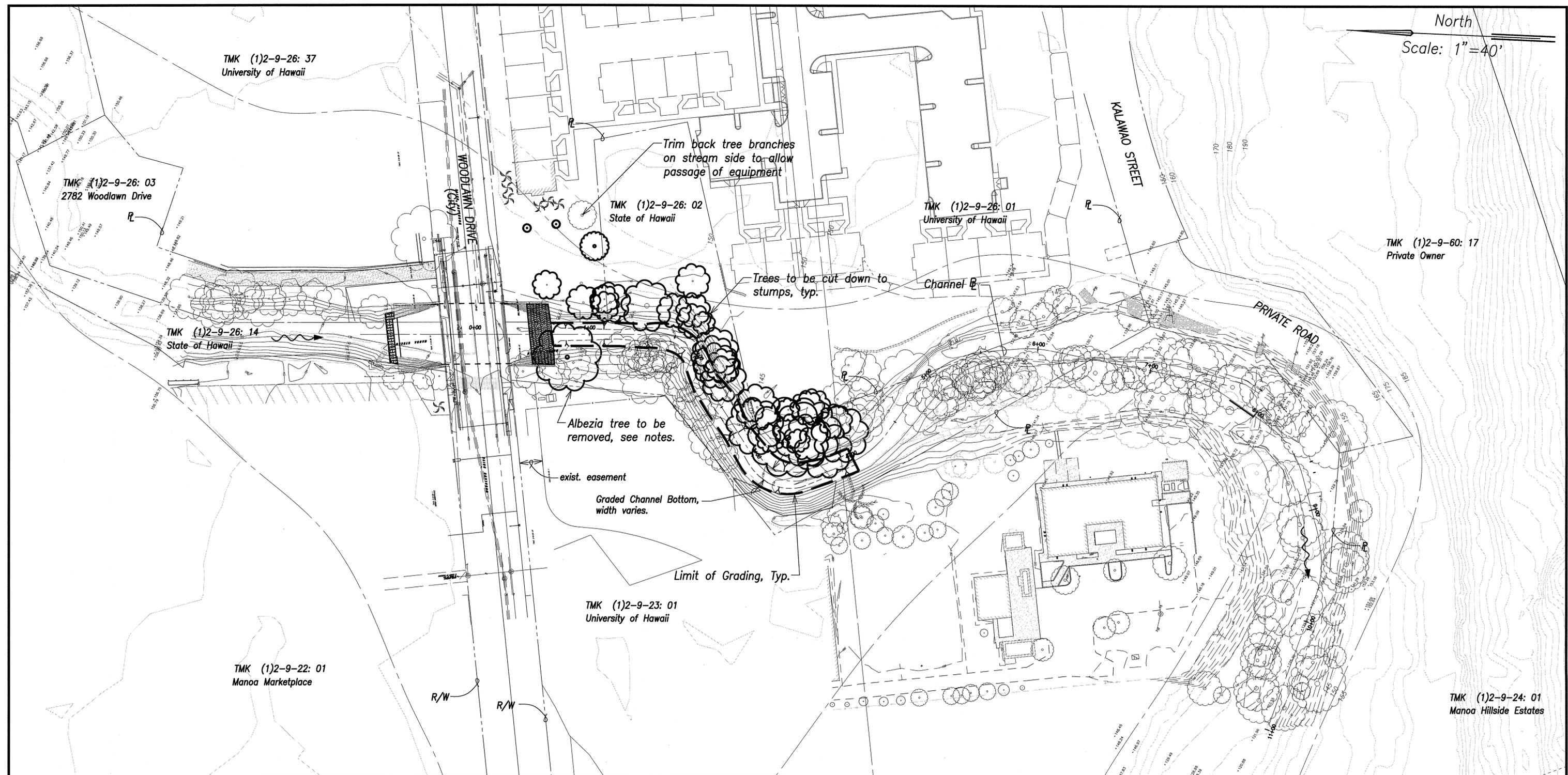
- LEGEND:**
- $\ast 141.54$ exist. ground elev.
 - exist. contour
 - LIMITS OF GRADING
 - - - ROW / PROPERTY LINE
 - CHANNEL CENTERLINE
 - FLOW DIRECTION
 - CUT / FILL SLOPE



General Site Plan
Scale: 1" = 40'

NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
<p>STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION</p> <p>MANOA STREAM IMPROVEMENTS AT WOODLAWN DRIVE BRIDGE MANOA, OAHU, HAWAII</p> <p>GENERAL SITE PLAN</p>					
DESIGNED:	SKYA	SUBMITTED:	SKYA	DATE:	May 2016
DRAWN:	TL/RY	CHECKED:	SKYA	SCALE:	AS SHOWN
APPROVED:	<i>[Signature]</i>	CHIEF ENGINEER	DATE:	MAY - 4 2016	DRAWING NO. C-4

North
Scale: 1"=40'



Notes:
Contractor shall remove Albezia stump and all seedlings in the soil or apply Ranger Pro herbicide (or approved equal) to treat area and prevent seedlings from sprouting.

LEGEND:

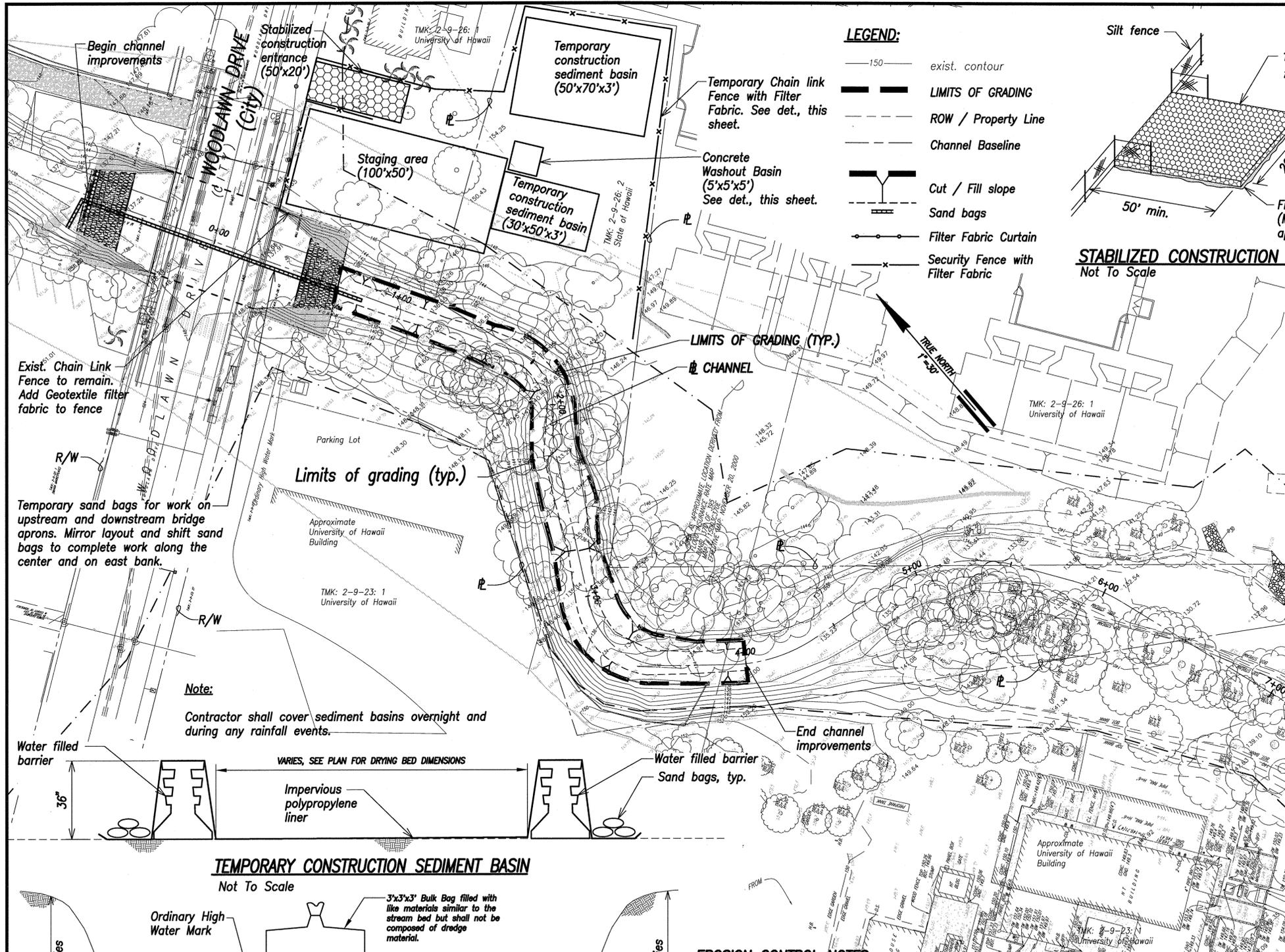
- exist. tree to remain
- TREE TO BE REMOVED
- exist. ground elev.
- exist. contour
- LIMITS OF GRADING
- ROW / PROPERTY LINE
- CHANNEL CENTERLINE
- FLOW DIRECTION
- CUT / FILL SLOPE

Tree Removal Plan
Scale: 1" = 40'

Graphic Scale:
1" = 40' 20' 0 40' 80'

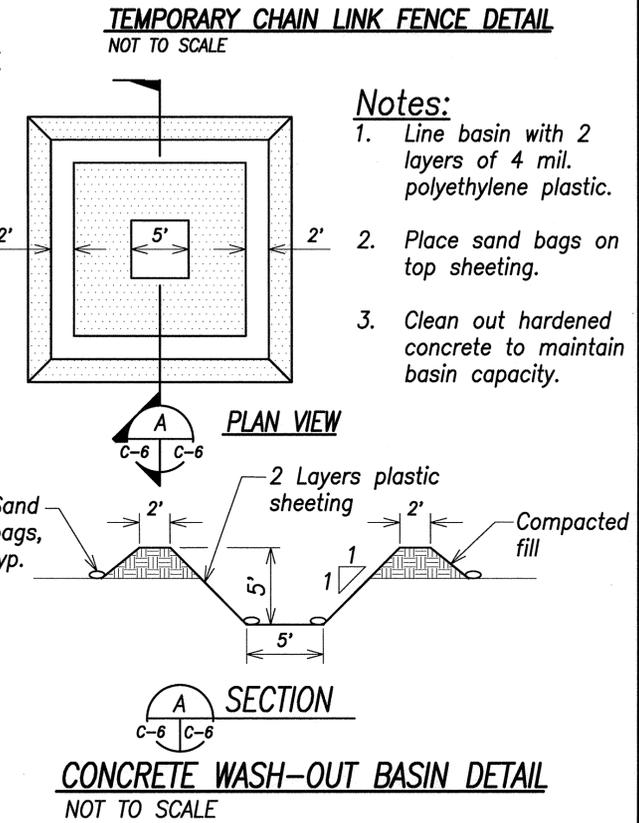
NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION MANOA STREAM IMPROVEMENTS AT WOODLAWN DRIVE BRIDGE MANOA, OAHU, HAWAII TREE REMOVAL PLAN					
DESIGNED:	SKYA	SUBMITTED:	SKYA	DATE:	May 2016
DRAWN:	TL/RY	CHECKED:	SKYA	SCALE:	AS SHOWN
APPROVED:		DATE:	MAY - 4 2016	DRAWING NO.:	C-5
R. M. TOWILL CORPORATION CHIEF ENGINEER					

RMT/C JOB NO.: 21222-05 Manoa Flood Control



**BEST MANAGEMENT PRACTICES
TEMPORARY EROSION CONTROL NOTES
DURING CONSTRUCTION**

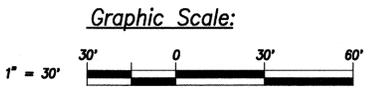
- PRIOR TO CLEARING LAND FOR GRADING, TEMPORARY EROSION CONTROL MEASURES, SUCH AS SAND BAGS AND TEMPORARY CONSTRUCTION SEDIMENT BASINS SHALL BE INSTALLED.
- STABILIZED CONSTRUCTION ENTRANCES SHALL BE ESTABLISHED AS SHOWN ON PLANS, PRIOR TO GRADING OPERATIONS.
- FOLLOW SEQUENCE OF OPERATION AS RECOMMENDED BY THE "RULES RELATING TO SOIL EROSION STANDARDS AND GUIDELINES," DEPARTMENT OF PLANNING AND PERMITTING, CITY AND COUNTY OF HONOLULU, APRIL 1999.
- THE CONTRACTOR SHALL MINIMIZE THE AMOUNT OF LAND TO BE EXPOSED AT ANY ONE TIME.
- EXCAVATED MATERIAL MUST BE PLACED IN THE TEMPORARY CONSTRUCTION SEDIMENT BASINS AND BE ALLOWED TO DRY OUT COMPLETELY. THE MATERIAL SHALL BE COVERED OVERNIGHT. IN THE EVENT OF A RAIN STORM, THE MATERIAL SHALL BE COVERED TO MINIMIZE SEDIMENT RUNOFF.
- PERIODIC REMOVAL OF DRIED SOLID MATERIAL SHALL BE HAULED AND DISPOSED OF IN ACCORDANCE WITH APPLICABLE COUNTY REQUIREMENTS.
- THE SANDBAGS USED FOR STREAM DIVERSION SHALL BE REMOVED AT THE END OF EACH WORK DAY.
- THE CONTRACTOR SHALL USE HIS BEST PROFESSIONAL JUDGMENT (BPJ) IN DETERMINING IF SEDIMENT SAND BAGS NEED TO BE REMOVED DURING A HEAVY RAIN EVENT (E.G. THREAT TO PUBLIC HEALTH AND/OR SAFETY). CONTRACTOR SHALL LINE ALL NEWLY EXPOSED SURFACES WITH GEOTEXTILE FABRIC PRIOR TO SAND BAG REMOVAL.
- CONTRACTOR SHALL PROVIDE PERIODIC MAINTENANCE TO SEDIMENT BARRIERS AND BASINS.
- THE ABOVE PROCEDURE FOR EROSION AND SEDIMENT CONTROL MAY BE REVISED BY THE CONTRACTOR TO CONFORM TO HIS GRADING OPERATION PROCEDURE. HOWEVER, ANY REVISIONS TO THE ABOVE SHALL BE SUBMITTED TO THE CHIEF, CIVIL ENGINEERING BRANCH, DEPARTMENT OF PLANNING AND PERMITTING FOR APPROVAL.
- ACCESS POINT SHALL HAVE A STABILIZED CONSTRUCTION ENTRANCE WITH MINIMUM DIMENSIONS SHOWN ON THIS PLAN AND A SECTION CONSISTING OF 1" TO 3" COARSE AGGREGATE OR LARGER (7" MAX.), 8" THICK MIN, OVER FILTER FABRIC (MIRAFI 600X OR APPROVED EQUAL).



EROSION CONTROL NOTES

- THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM HIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS AND OTHER AREAS. THE COSTS INCURRED FOR WORK SHALL BE INCIDENTAL TO VARIOUS ITEMS OF WORK.
- 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.
- NO GRADING WORK SHALL BE DONE ON SATURDAYS, SUNDAYS AND HOLIDAYS AT ANY TIME WITHOUT PRIOR NOTICE TO THE DIRECTOR, D.P.P., PROVIDED SUCH GRADING WORK IS ALSO IN CONFORMANCE WITH THE COMMUNITY NOISE CONTROL STANDARDS CONTAINED IN THE HAWAII ADMINISTRATIVE RULES, TITLE 11, CHAPTER 46, "COMMUNITY NOISE CONTROL".
- THE LIMITS OF THE AREA TO BE GRADED SHALL BE FLAGGED BY THE CONTRACTOR BEFORE THE COMMENCEMENT OF THE GRADING WORK.
- ALL MEASURES TO CONTROL EROSION AND OTHER POLLUTANTS SHALL BE IN PLACE AND FUNCTIONAL BEFORE EARTH MOVING OPERATIONS BEGIN IN ACCORDANCE WITH HAWAII ADMINISTRATIVE RULES, CHAPTER 11-55, APPENDIX C, SPECIAL CONDITIONS FOR LAND DISTURBANCES, ITEM (A)(4).
- TEMPORARY EROSION CONTROLS SHALL NOT BE REMOVED BEFORE PERMANENT EROSION CONTROLS ARE IN-PLACE AND ESTABLISHED.
- EROSION CONTROL MEASURES SHALL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS ARE REESTABLISHED WITH GROUND VEGETATION OR OTHER MEANS OF GROUND STABILIZATION.
- CONTRACTOR SHALL STOP ALL CONSTRUCTION ACTIVITIES IN THE WORK AREA WHEN STORM RUNOFF IS PRESENT EXCEPT TO PREVENT AND CONTROL SOIL EROSION. ALL COST TO REPAIR THE EROSION CONTROL MEASURES DUE TO STORM RUNOFF AND/OR REGULAR MAINTENANCE SHALL BE DONE AT NO COST TO THE STATE.

EROSION CONTROL PLAN
SCALE: 1"=30'



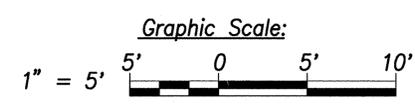
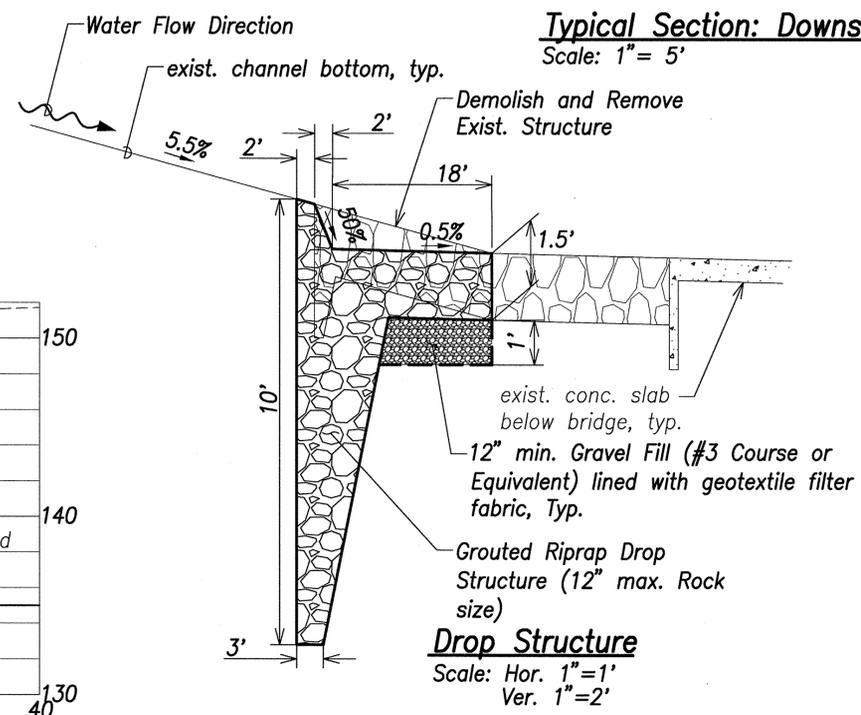
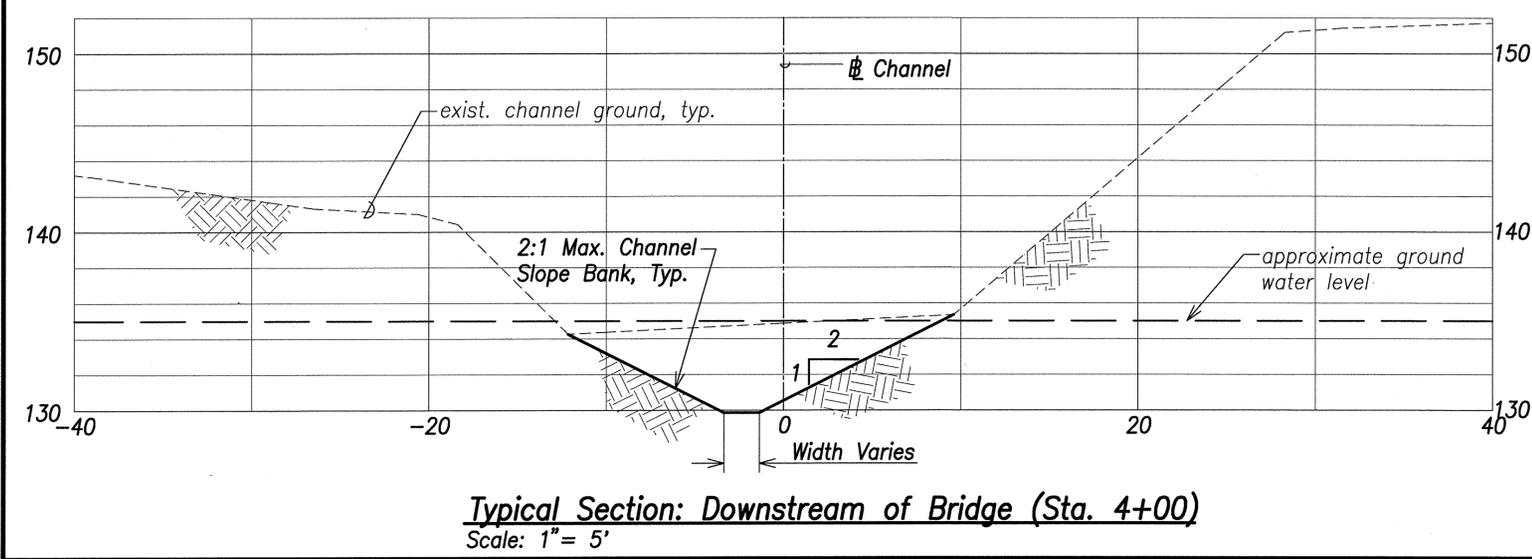
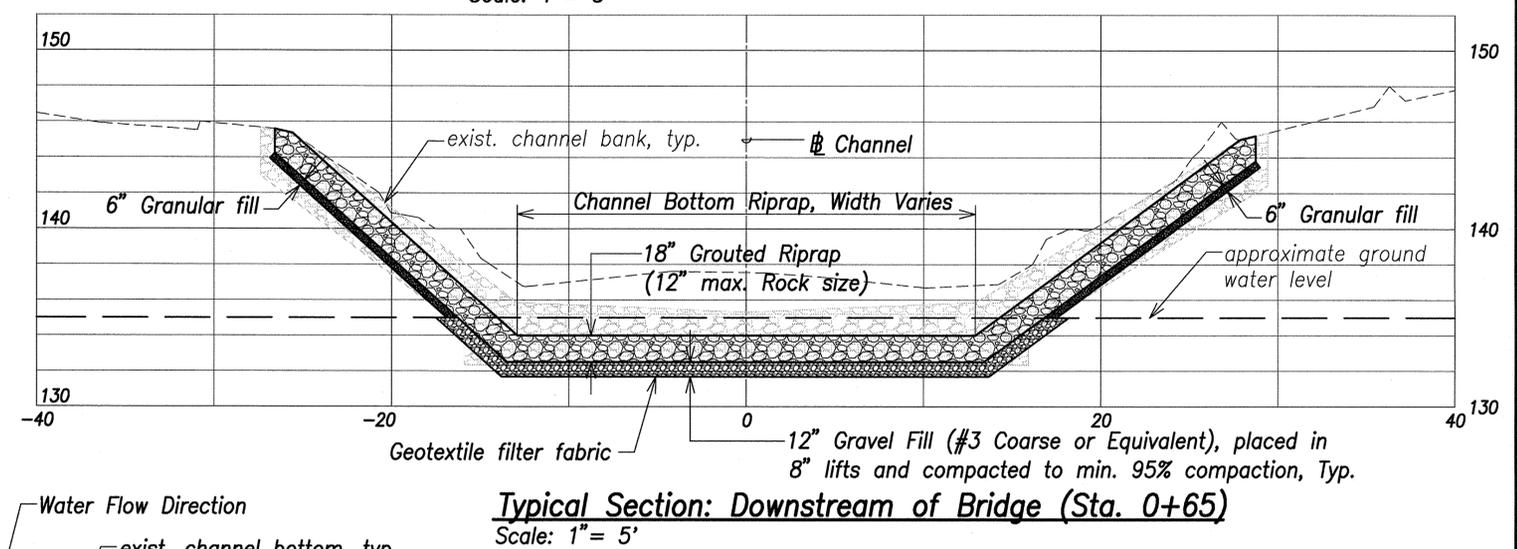
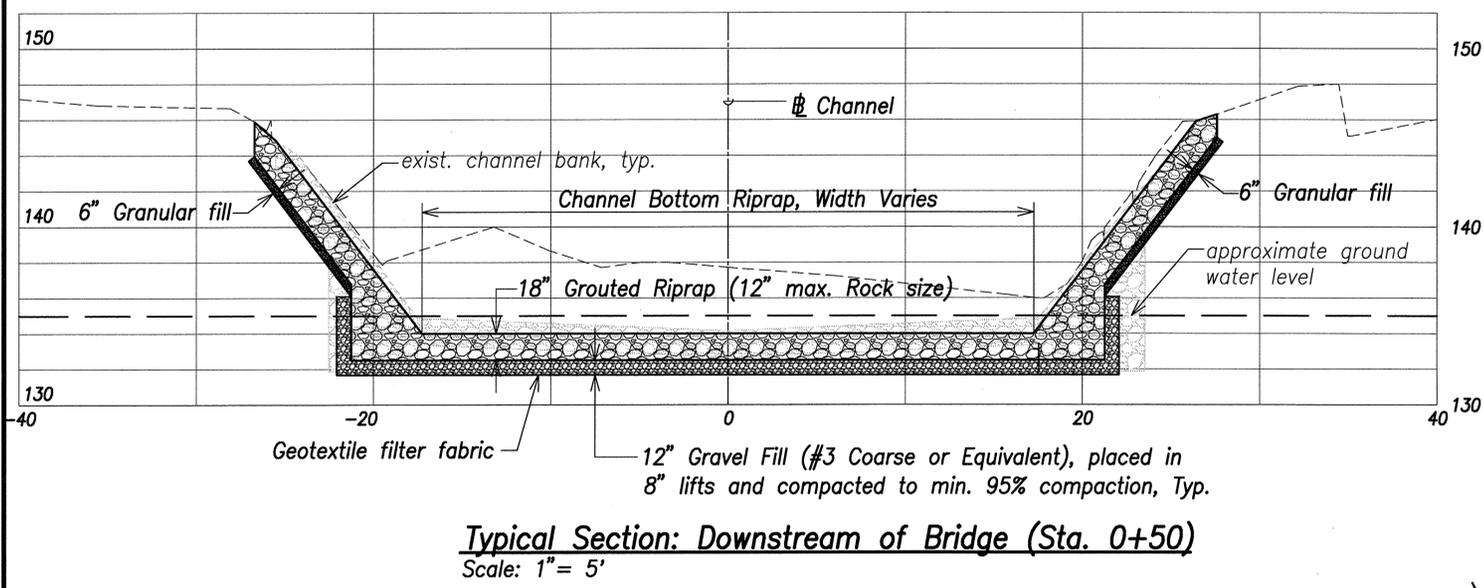
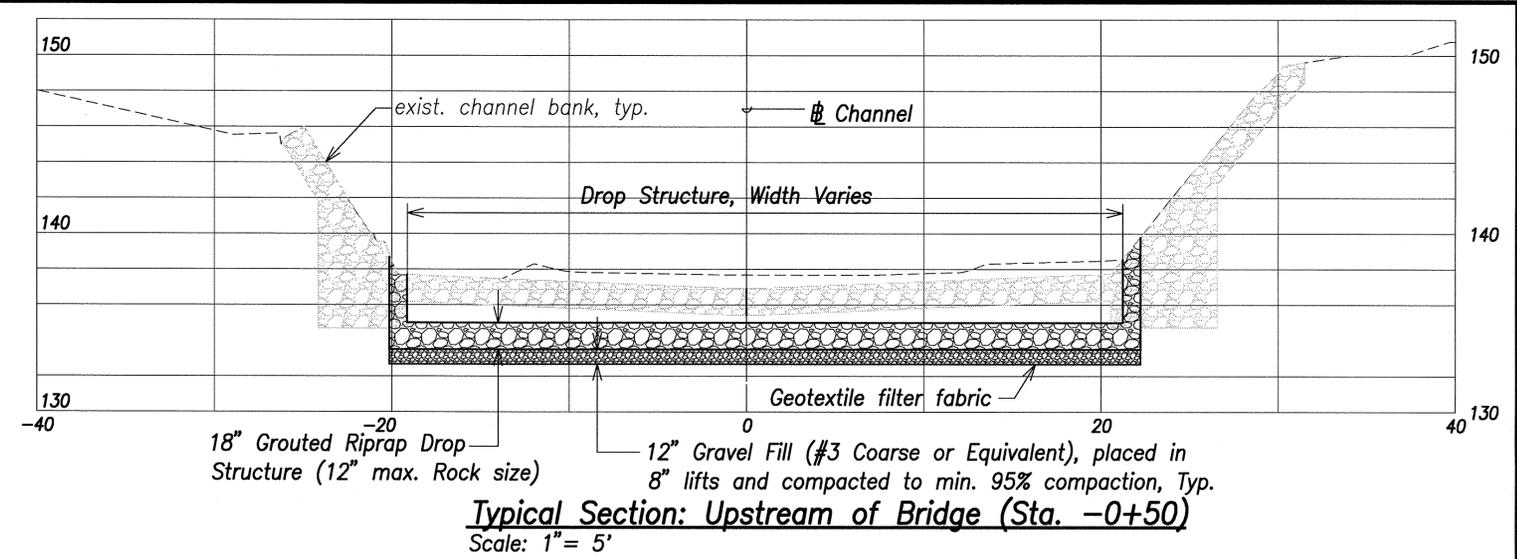
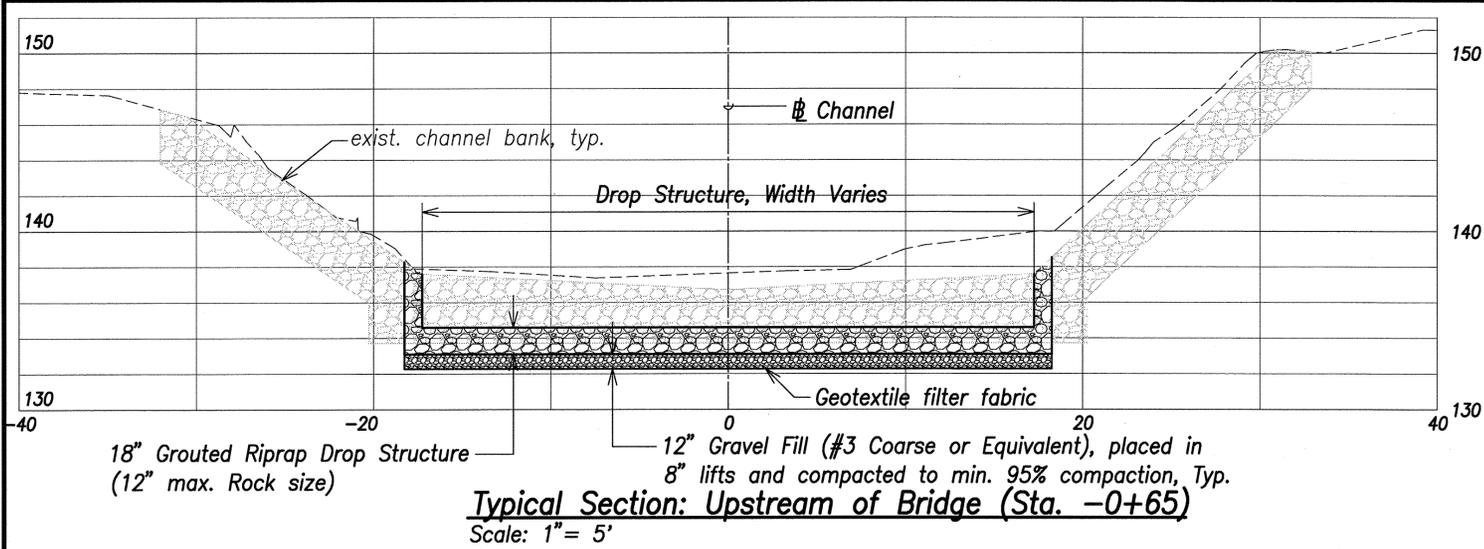
Note:
Mirror layout and shift sand bags to complete work along the center and on east bank.

- SOIL STABILIZATION:**
- PRE-CONSTRUCTION VEGETATIVE GROUND COVER SHALL NOT BE DESTROYED, REMOVED, OR DISTURBED MORE THAN TWENTY CALENDAR DAYS PRIOR TO SITE DISTURBANCE.
 - DISTURBED AREAS LEFT UNWORKED OR UNFINISHED FOR MORE THAN 30 CALENDAR DAYS WILL BE STABILIZED AS NECESSARY ACCORDING TO SOIL CONDITIONS.
 - IN DISTURBED AREAS WHERE SURFACE CONDITIONS CONSIST OF ERODIBLE SOILS, THE SURFACE WILL BE STABILIZED WITH GRASSING.
 - IN DISTURBED AREAS WHERE SURFACE CONDITIONS ARE BARE ROCK, OR NON-ERODIBLE SOILS, NO ADDITIONAL STABILIZATION WILL BE APPLIED.

- POST CONSTRUCTION**
- THE CONSTRUCTION AREA SHALL BE CLEARED OF ALL TRASH AND DEBRIS.
 - EXCAVATED MATERIAL SHALL BE DRIED AND DISPOSED OF IN ACCORDANCE WITH APPLICABLE COUNTY REQUIREMENTS.
 - FENCE AND BARRIERS SHALL BE REMOVED WHEN NO LONGER REQUIRED.

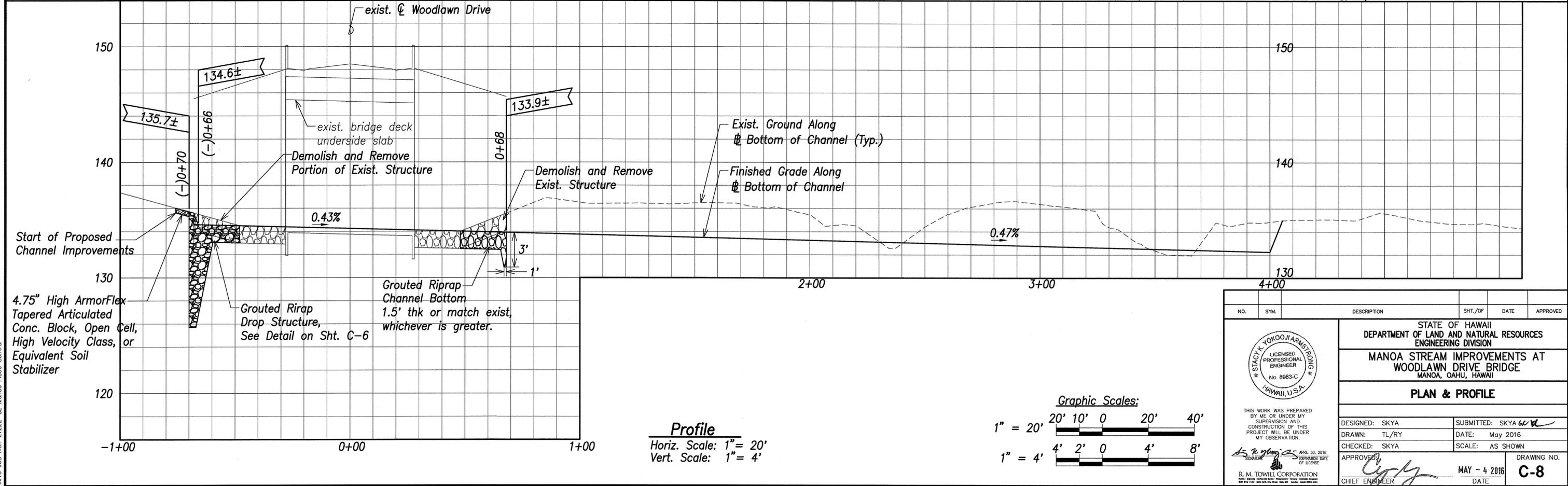
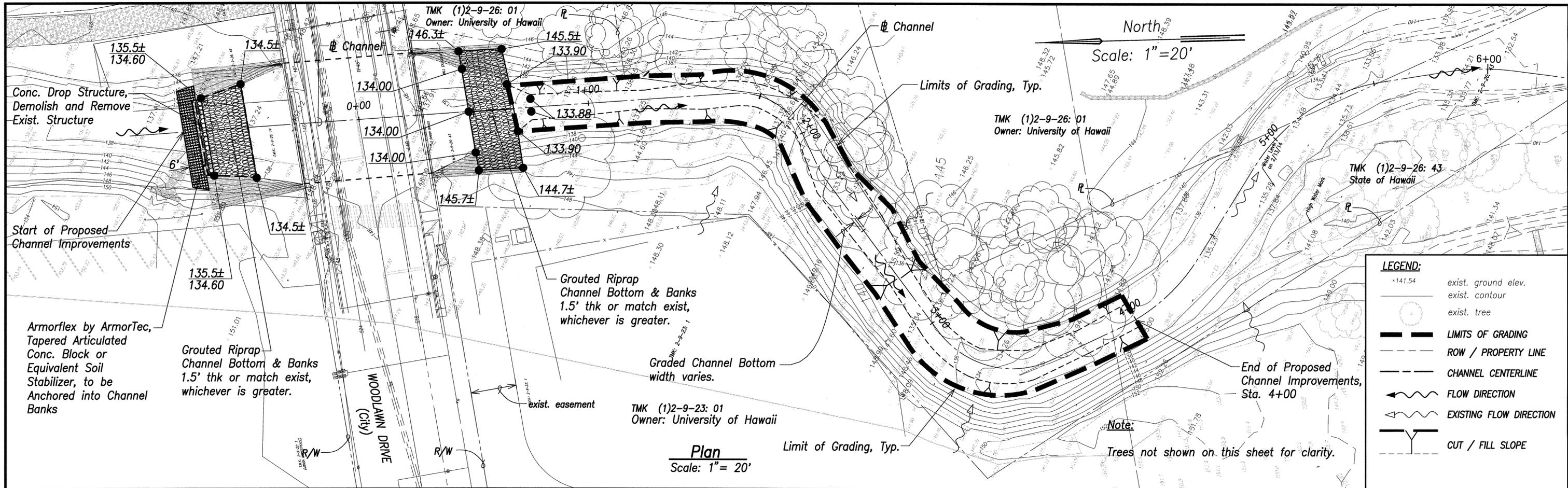
NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION					
MANOA STREAM IMPROVEMENTS AT WOODLAWN DRIVE BRIDGE MANOA, OAHU, HAWAII					
EROSION CONTROL PLAN					
DESIGNED: SKYA		SUBMITTED: SKYA <i>[Signature]</i>			
DRAWN: TL/RY		DATE: May 2016			
CHECKED: SKYA		SCALE: AS SHOWN			
APPROVED: <i>[Signature]</i>		MAY - 4 2016		DRAWING NO. C-6	
R. M. TOWILL CORPORATION CHIEF ENGINEER		DATE			

RMTCC JOB NO.: 21222-0E Manoa Flood Control

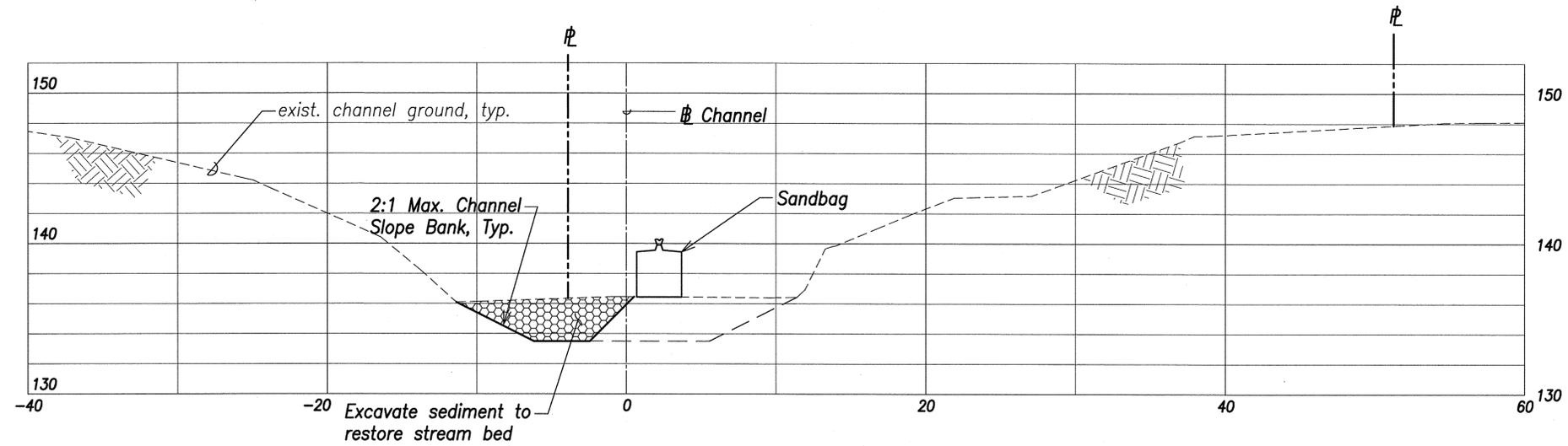


NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION					
MANOA STREAM IMPROVEMENTS AT WOODLAWN DRIVE BRIDGE MANOA, OAHU, HAWAII					
TYPICAL SECTIONS AND DETAIL					
DESIGNED: SKYA		SUBMITTED: SKYA <i>SKYA</i>			
DRAWN: TL/RY		DATE: May 2016			
CHECKED: SKYA		SCALE: AS SHOWN			
APPROVED: <i>SKYA</i>		MAY - 4 2016		DRAWING NO. C-7	
R. M. TOWILL CORPORATION CHIEF ENGINEER		DATE			

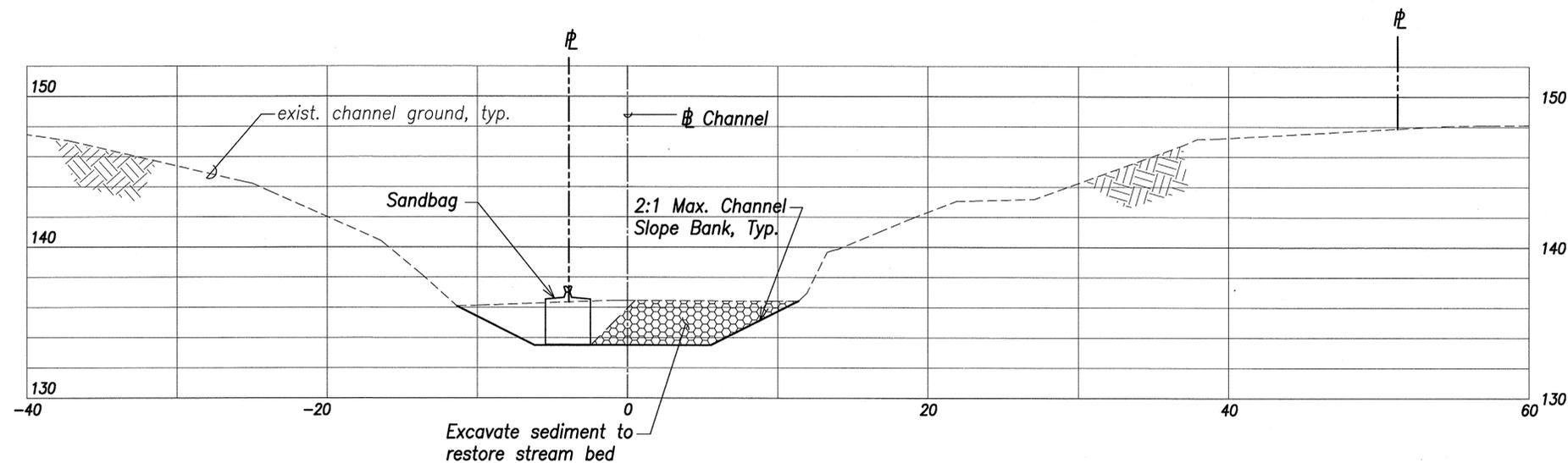
RMTC JOB NO.: 21222-0E Manoa Flood Control



RMTC JOB NO.: 21222-0E Manoa Flood Control



Typical Phasing Section: Stream Dredging Work
Scale: 1" = 5'

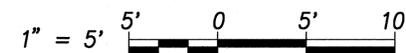


Typical Phasing Section: Stream Dredging Work
Scale: 1" = 5'

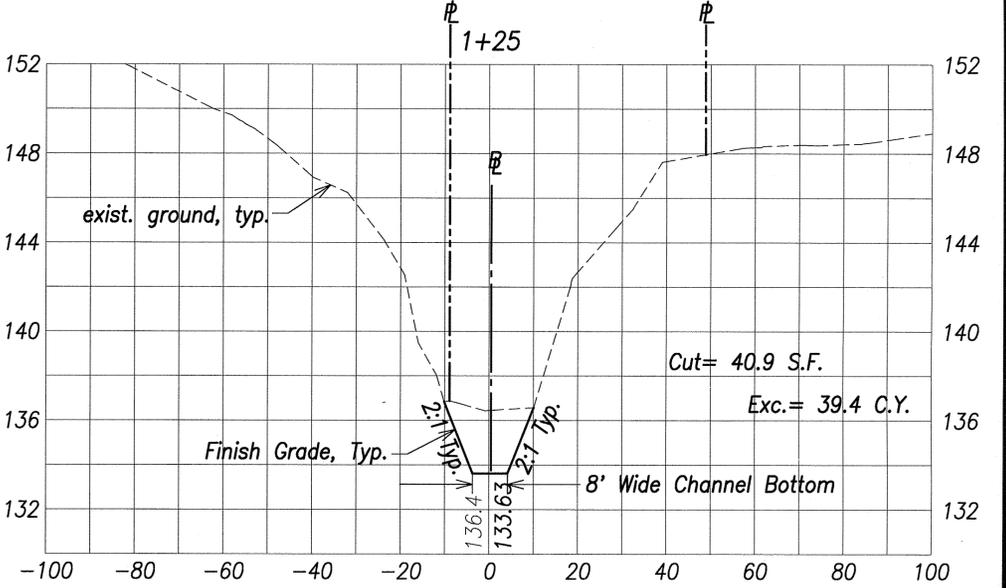
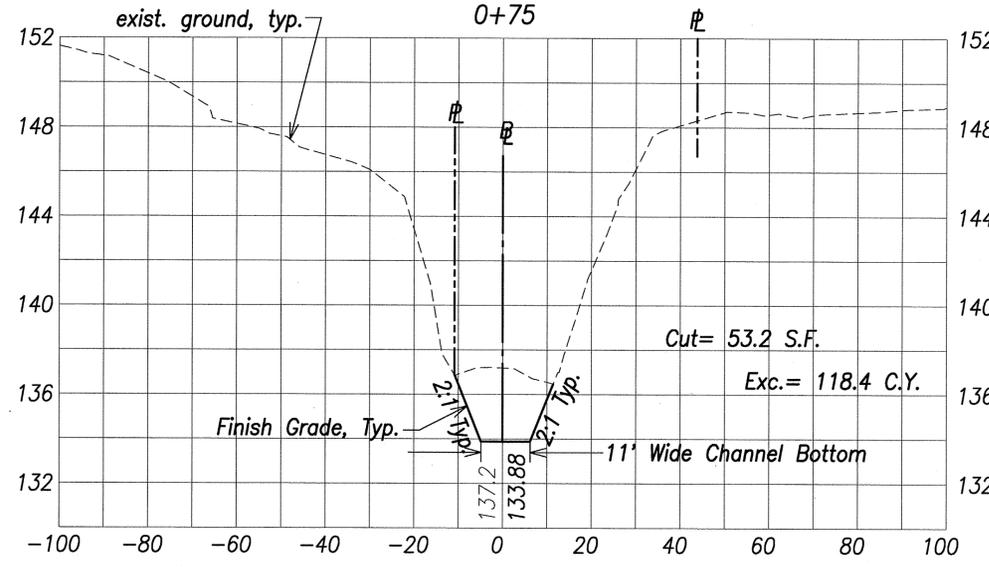
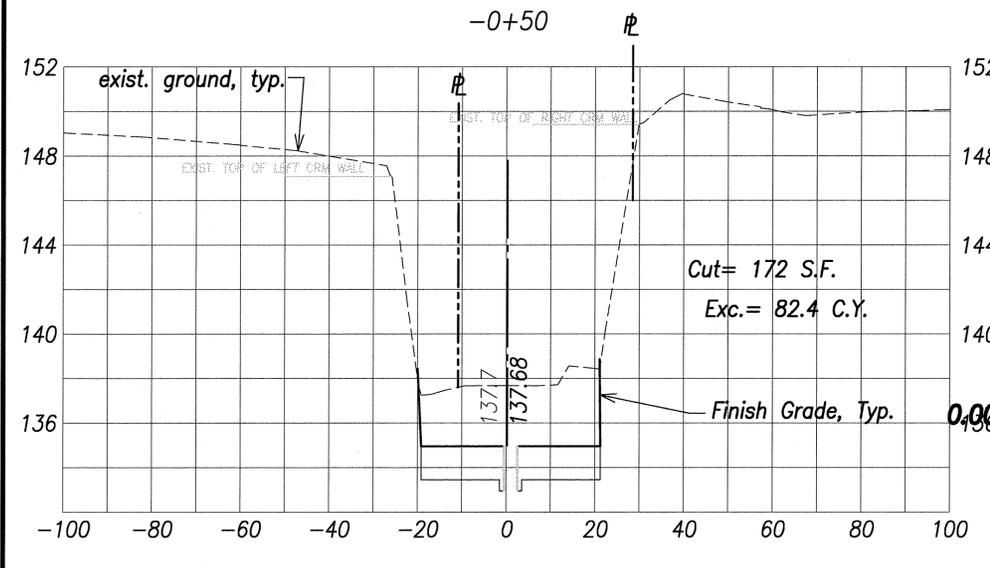
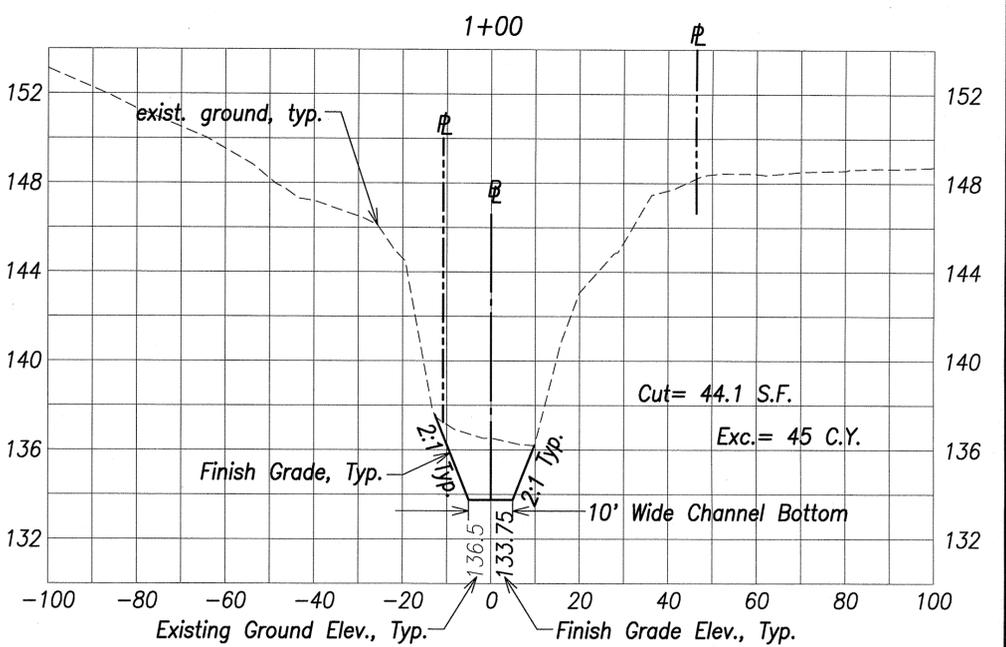
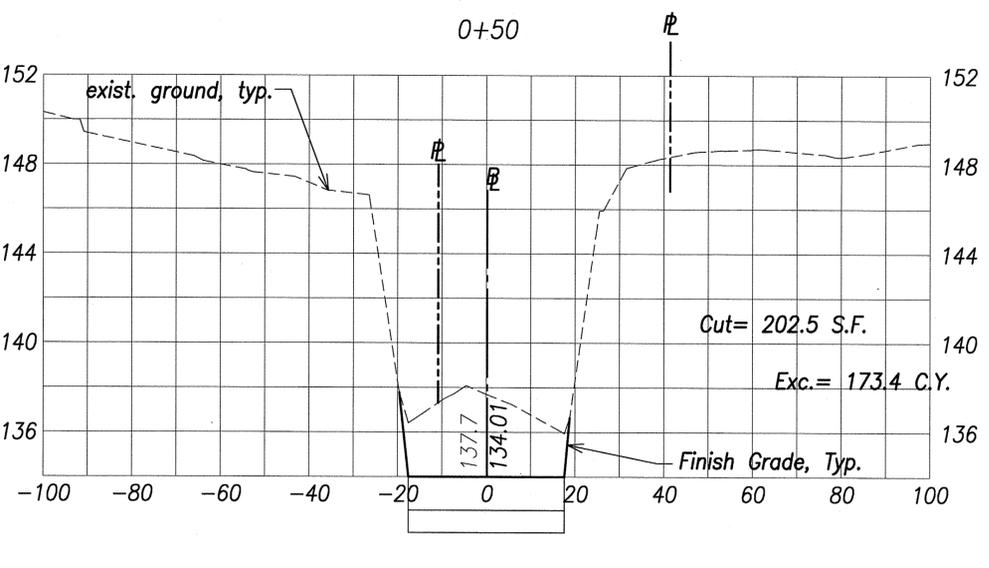
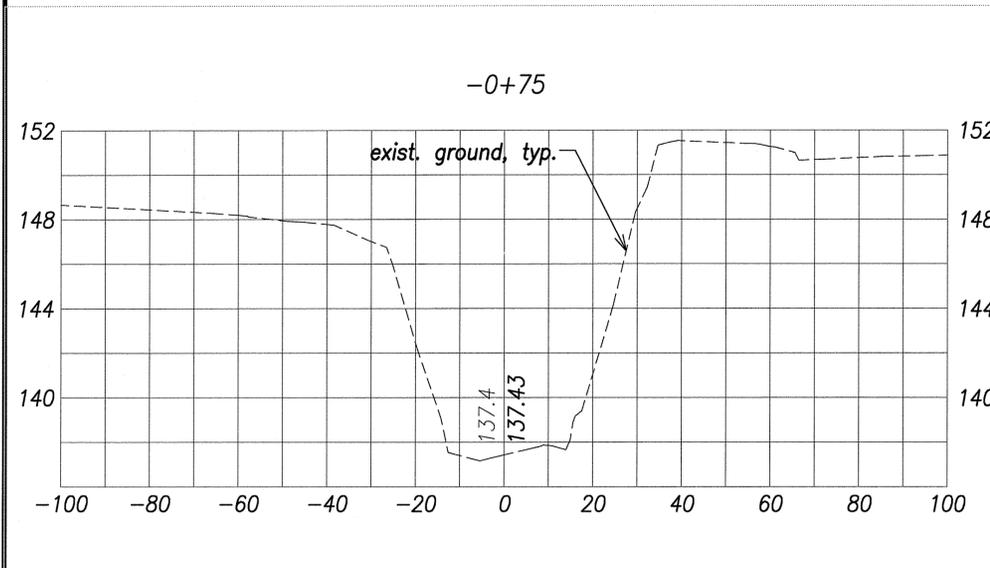
Notes:

1. Sandbags shall be removed at the end of each work day.
2. Drying beds shall be covered overnight and before any significant rainfall event.
3. Work shall stop when any significant rainfall event is approaching. Sandbags shall be removed from the stream and any exposed surfaces shall be covered with geotextile fabric.

Graphic Scale:

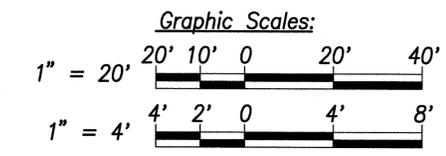


NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION MANOA STREAM IMPROVEMENTS AT WOODLAWN DRIVE BRIDGE MANOA, OAHU, HAWAII					
PHASING DETAILS					
DESIGNED: SKYA		SUBMITTED: SKYA <i>ce</i>			
DRAWN: TL/RY		DATE: May 2016			
CHECKED: SKYA		SCALE: AS SHOWN			
		APPROVED: <i>SKYA</i> CHIEF ENGINEER		MAY - 4 2016 DATE	
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.		APRIL 30, 2018 EXPIRES DATE OF LICENSE		DRAWING NO. C-9	
R. M. TOWILL CORPORATION CHIEF ENGINEER					



Cross Sections 1: Woodlawn Drive Bridge

Horiz. Scale: 1" = 20'
Vert. Scale: 1" = 4'

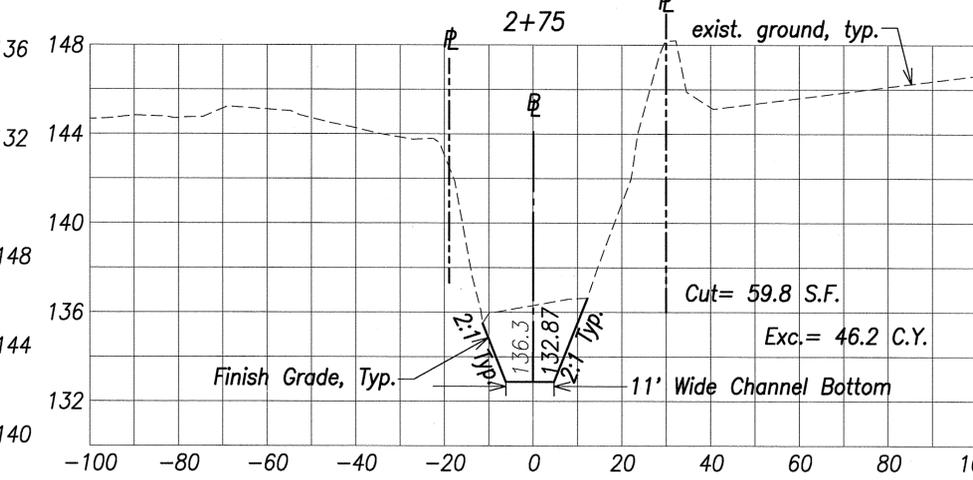
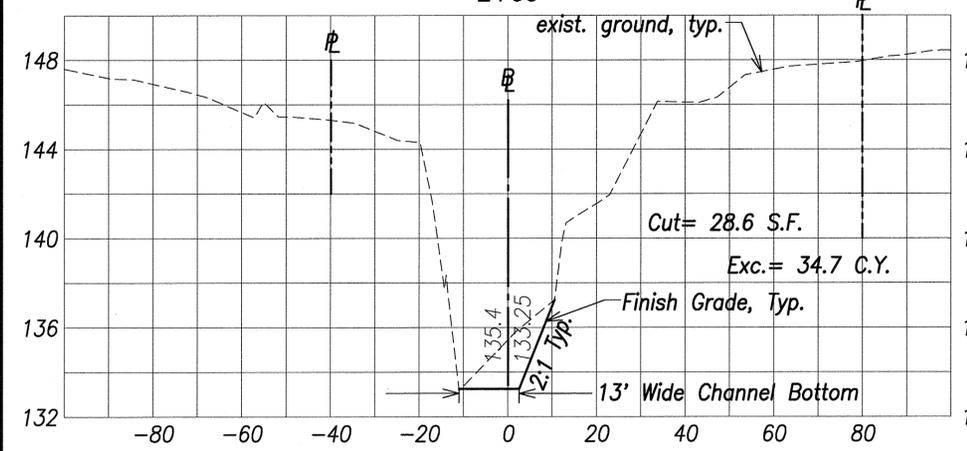
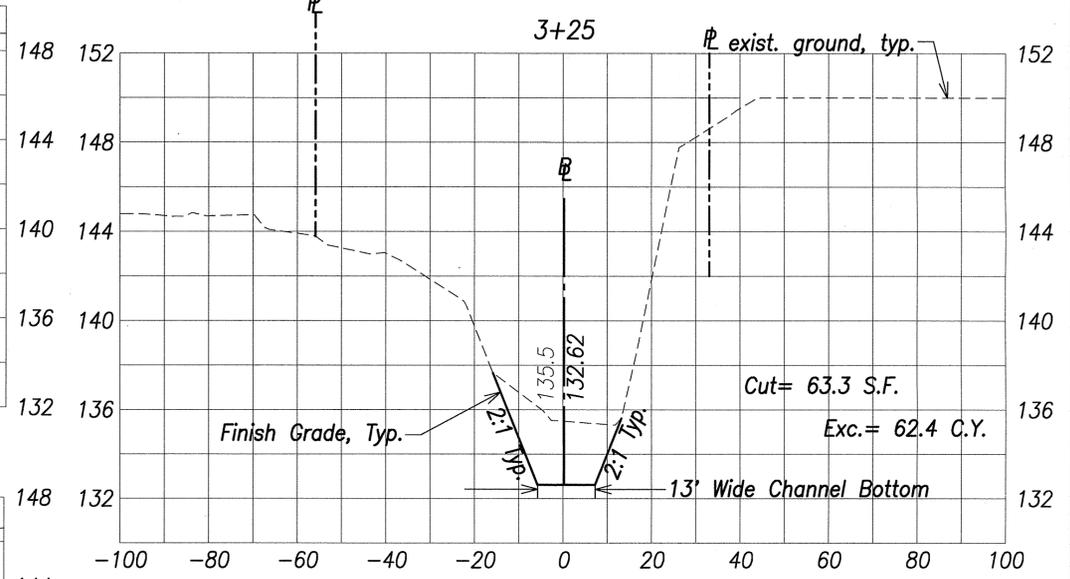
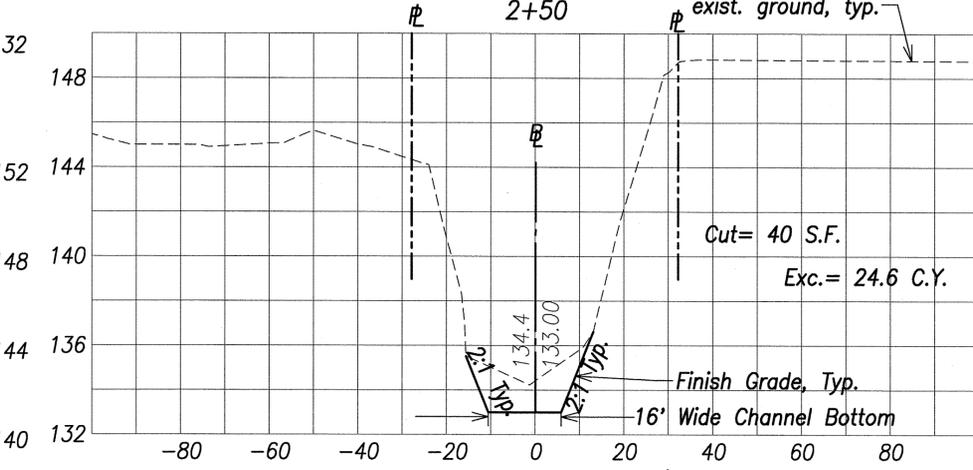
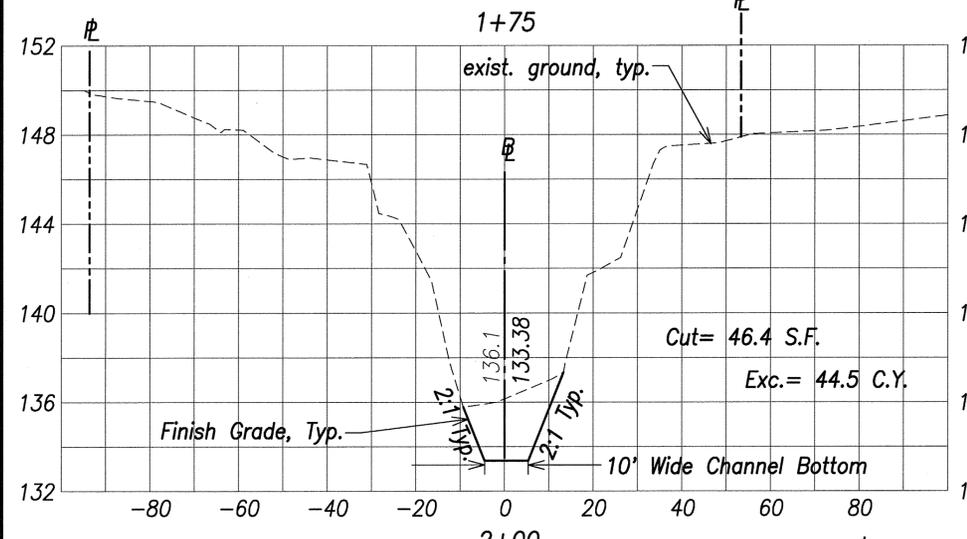
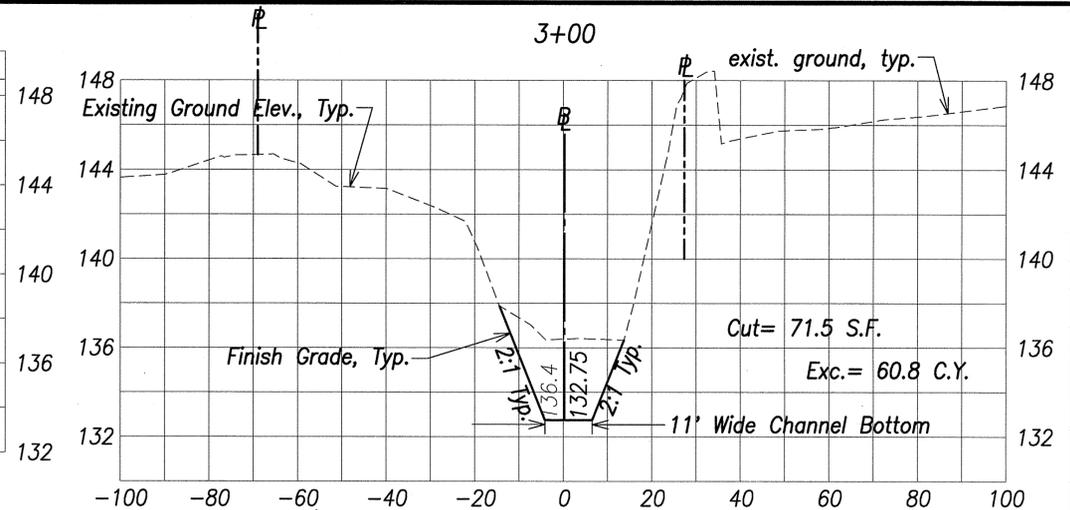
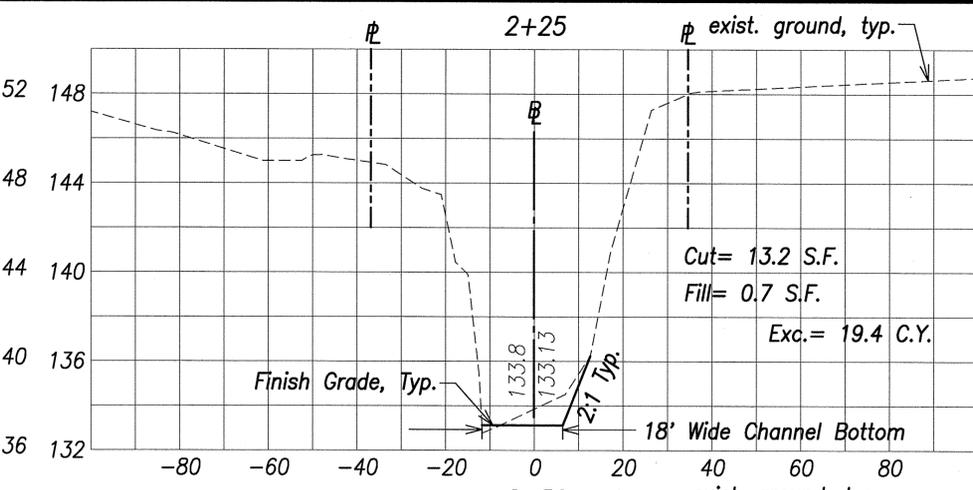
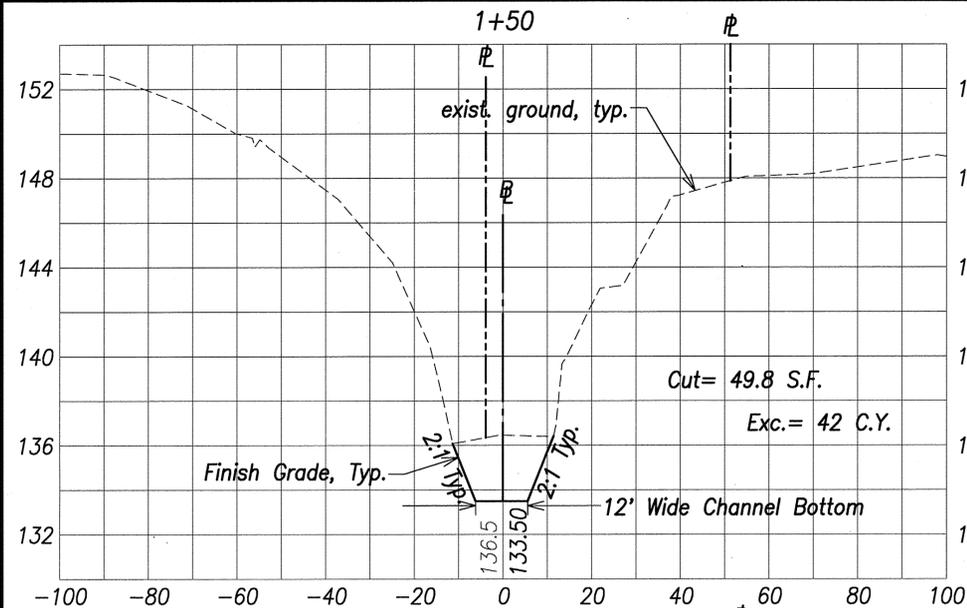


LEGEND:

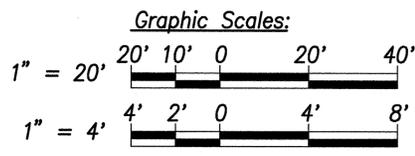
- exist. ground
- Finish Grade

NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION MANOA STREAM IMPROVEMENTS AT WOODLAWN DRIVE BRIDGE MANOA, OAHU, HAWAII CROSS SECTIONS 1					
DESIGNED: SKYA		SUBMITTED: SKYA <i>uc</i>			
DRAWN: TL/RY		DATE: May 2016			
CHECKED: SKYA		SCALE: AS SHOWN			
APPROVED: <i>SKYA</i> R. M. TOWILL CORPORATION CHIEF ENGINEER			MAY - 4 2016 DATE		DRAWING NO. C-10

RMT/C JOB NO. 21222-05 Manoa Flood Control



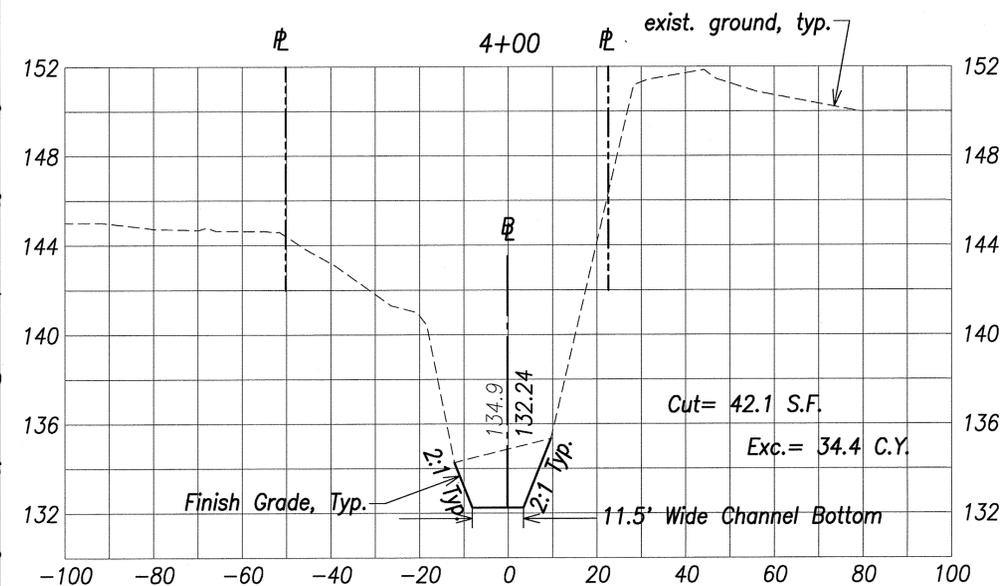
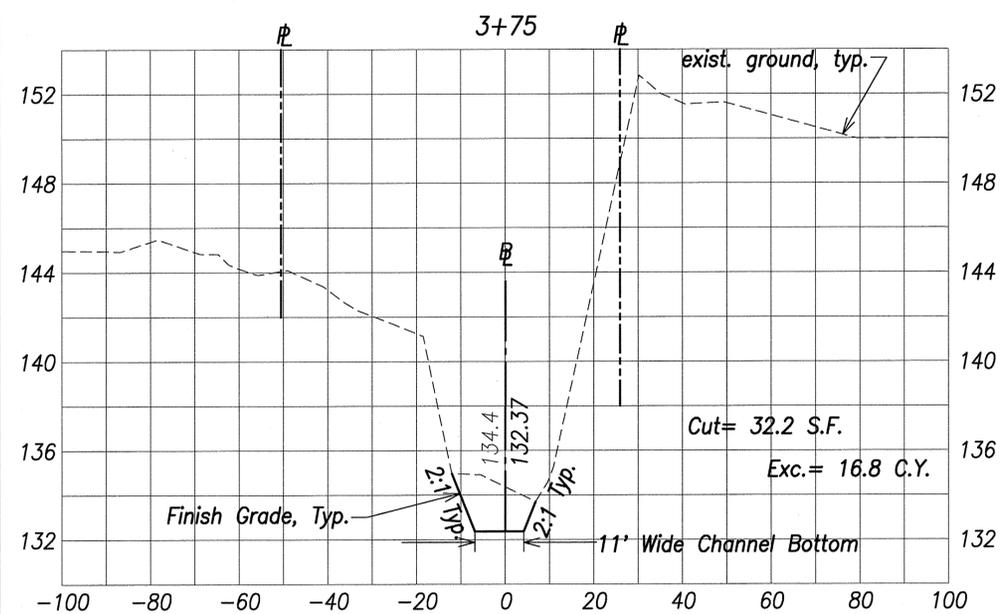
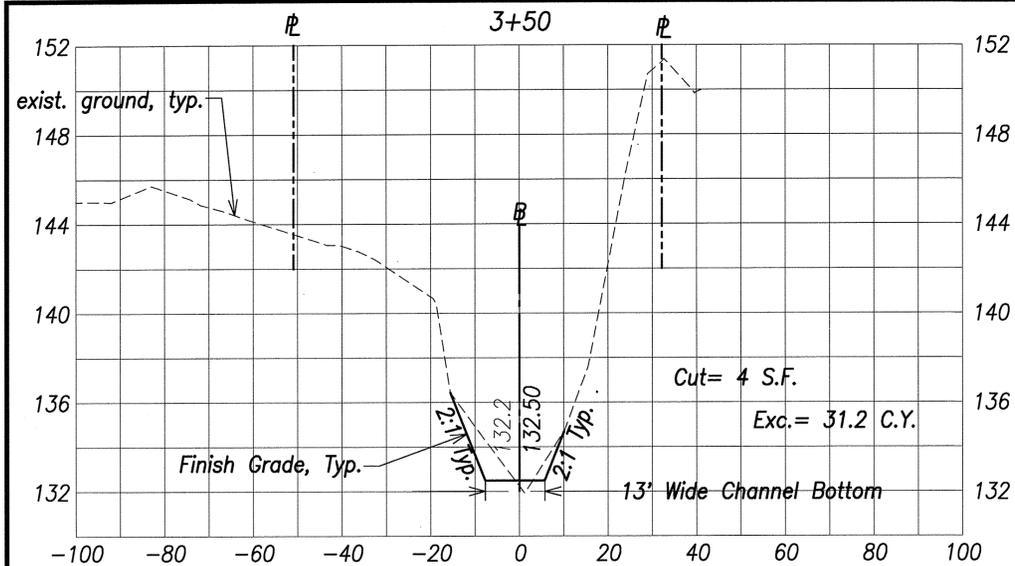
Cross Sections 2: Woodlawn Drive Bridge
 Horiz. Scale: 1" = 20'
 Vert. Scale: 1" = 4'



LEGEND:
 - - - - - exist. ground
 ————— Finish Grade

NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION MANOA STREAM IMPROVEMENTS AT WOODLAWN DRIVE BRIDGE MANOA, OAHU, HAWAII CROSS SECTIONS 2					
DESIGNED:	SKYA	SUBMITTED:	SKYA		
DRAWN:	TL/RY	DATE:	May 2016		
CHECKED:	SKYA	SCALE:	AS SHOWN		
APPROVED:	 R. M. TOWILL CORPORATION CHIEF ENGINEER		APRIL 30, 2016 EXPIRATION DATE OF LICENSE	MAY - 4 2016 DATE	DRAWING NO. C-11

RMTIC JOB NO.: 21222-05 Manoa Flood Control



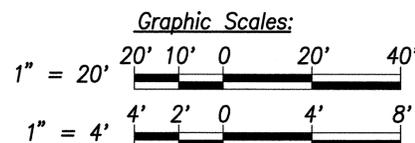
Earthwork Summary:

(Approximate Quantities for Permit purposes Only)

Excavation = 875 Cu. Yd.

Cross Sections 3: Woodlawn Drive Bridge

Horiz. Scale: 1" = 20'
Vert. Scale: 1" = 4'



LEGEND:

----- exist. ground

————— Finish Grade

NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION MANOA STREAM IMPROVEMENTS AT WOODLAWN DRIVE BRIDGE MANOA, OAHU, HAWAII CROSS SECTIONS 3					
DESIGNED:	SKYA	SUBMITTED:	SKYA	DATE:	May 2016
DRAWN:	TL/RY	CHECKED:	SKYA	SCALE:	AS SHOWN
APPROVED:	<i>[Signature]</i>	DATE:	MAY - 4 2016	DRAWING NO.:	C-12
R. M. TOWILL CORPORATION LICENSED PROFESSIONAL ENGINEER No. 8883-C HAWAII, U.S.A. APRIL 30, 2018 EXPIRATION DATE OF LICENSE THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.					

RMTC JOB NO.: 21222-DE Manoa Flood Control