DEPARTMENT OF LAND UTILIZATION
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DEPUTY DIRECTOR

94/SMA-086(AC)
94/SV-008(AC)

October 31, 1995

The Honorable Gary Gill, Director
Office of Environmental Quality Control
220 South King Street, 4th Floor
State of Hawaii
Honolulu, Hawaii 96813

Dear Mr. Gill:

Acceptance Notice For
Proposed Ewa Gentry Drainage Channel
Tax Map Keys: 9-1-10: 04, 14 and 15
Final Environmental Impact Statement (FEIS)

We are notifying you of our ACCEPTANCE of the FEIS for the proposed Ewa Gentry Drainage Channel. Pursuant to Section 11-200-23 (e), Chapter 200, Title 11 "Environmental Impact Statement Rules" of the Hawaii Administrative Rules, this ACCEPTANCE NOTICE should be published in the November 23, 1995 Environmental Notice.

We have attached our Acceptance Report of the FEIS for the Ewa Gentry Drainage Channel and the "DOCUMENT FOR PUBLICATION". Should you have any questions, please call Art Challacombe of our staff at 523-4107.

Very truly yours,

PATRICK T. ONISHI
Director of Land Utilization

PTO:am
Attachment

cc: Fred J. Rodriguez

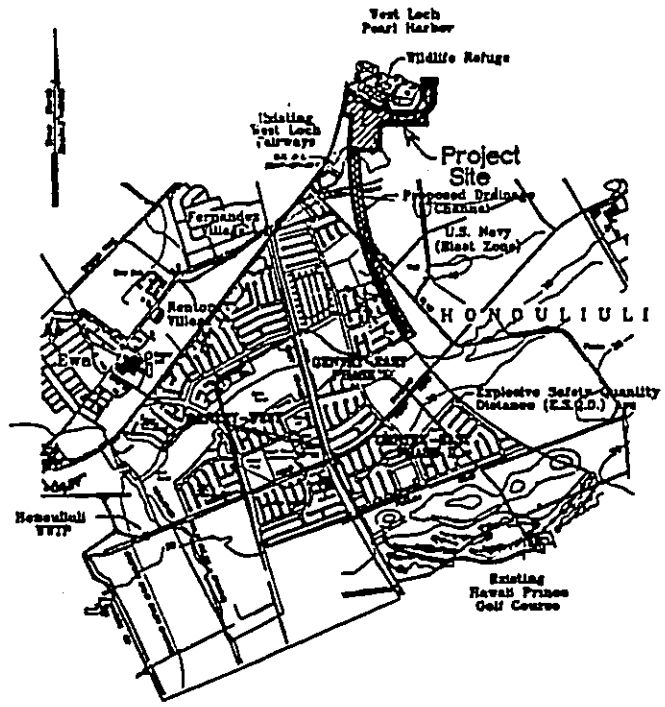
g:geneislr.adc

1995- Oahu- FEIS-
Ewa Gentry Drainage

Final Environmental Impact Statement
Chapter 343, Hawaii Revised Statutes

EWA BY GENTRY - EAST OFFSITE DRAINAGE PLAN

Construction / Operation / Maintenance of a Drainage Channel, Detention Basin, and Outlet Structure on Navy Lands Ewa, Oahu, Hawaii



LOCATION MAP

City and County of Honolulu
Department of Land Utilization
SEPTEMBER, 1995

Final Environmental Impact Statement

EWA BY GENTRY - EAST
OFFSITE DRAINAGE PLAN

Construction/ Operation/ Maintenance of a Drainage Channel,
Detention Basin and Outlet Structure on Navy Lands

Ewa, Oahu, Hawaii
TMK: 9-1-10: 15

Submitted Pursuant to Chapter 343, Hawaii Revised Statutes

to the

City and County of Honolulu
Department of Land Utilization

Prepared for
Gentry Homes, Ltd.

Prepared by
- Environmental Communications
- Park Engineering, Inc.
- F.G.E., LTD.

September, 1995

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EXHIBITS

FIGURES

1. EXECUTIVE SUMMARY

Gentry Homes, Ltd. proposes to design and build a vegetated-lined channel with a supportive detention basin and outlet works on U.S. Navy lands. The project will drain into the West Loch of Pearl Harbor. Upon completion of construction, the Navy will grant easement rights to the City & County of Honolulu Department of Public Works for operation and maintenance purposes. The project is located in the Ewa District, Oahu, Hawaii (**See Figure 1**).

The purpose of the project is to provide a common drainage outlet for stormwater runoff from the properties in the area, including the proposed Gentry East development. The Applicant is required to meet applicable City & County of Honolulu standards for drainage and surface water runoff , and has chosen, with the concurrence of the U. S. Navy and the City & County of Honolulu, the preferred alternative as the best method for meeting these standards. Alternatives considered and rejected are shown in section 6.4.

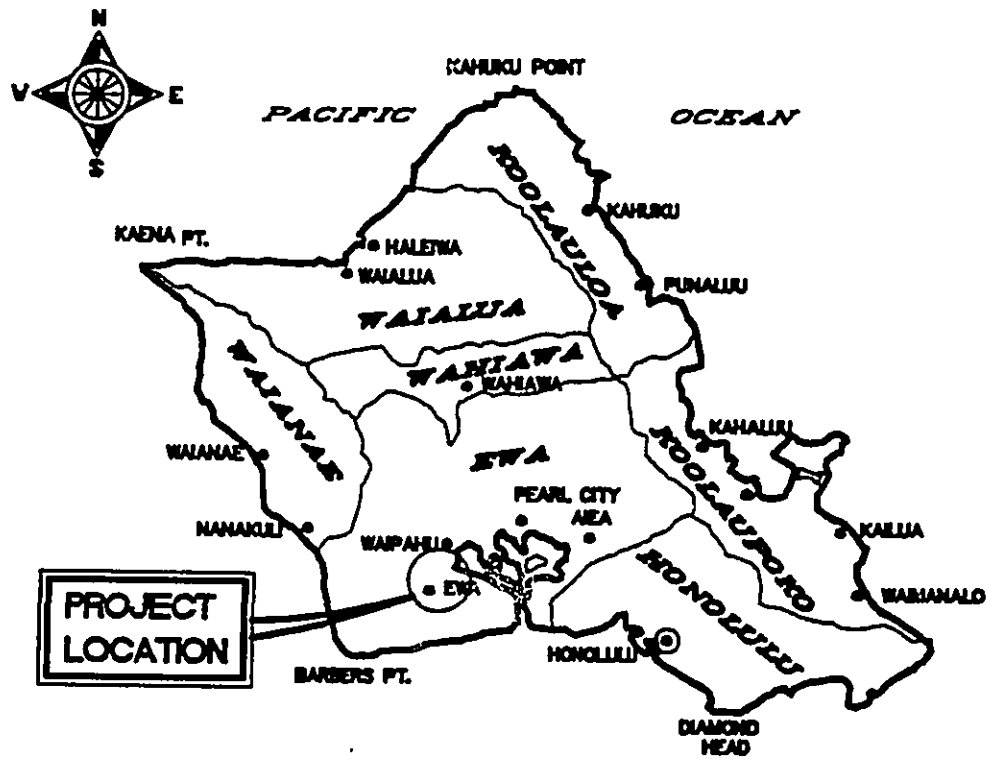
The proposed project is expected to generate temporary construction-related impacts to air quality and noise levels. Project construction is expected to create fugitive dust, increased noise levels, and temporary water quality impact to the West Loch, Pearl Harbor receiving waters. Mitigative measures will be employed during construction of the channel, detention basin and outlet works to minimize the adverse impacts. The U.S. Fish & Wildlife, Department of Interior has requested special consideration that construction avoid the nesting/breeding periods at the Refuge.

Disposition of surface water runoff in the project vicinity is expected to improve as a result of the proposed drainage project. Construction expenditures will generate sales and temporary employment in the City & County of Honolulu. No negative indirect or cumulative impacts are expected from the proposed project after completion and dedication to the City and County of Honolulu.

The proposed project is compatible with land use plans and policies as provided in Section 6. 3. An amendment to the City Development Plan Public Facilities Map to change the symbol for the project is in process.

Permits required have been listed and are shown on 6. 3. 4, pp 6-10/11. There are a total of eleven permits and/or approvals required for this project.

The unresolved issues facing this drainage facility deal with the required government permits and obtaining the Navy's concurrence for a suitability to lease the subject parcel to the City & County of Honolulu.



VICINITY MAP

NOT TO SCALE

N

NO SCALE

Figure 1
Vicinity Map
Ewa By Gentry–East
Off–Site Drainage Plan
Environmental Communications

2. INTRODUCTION

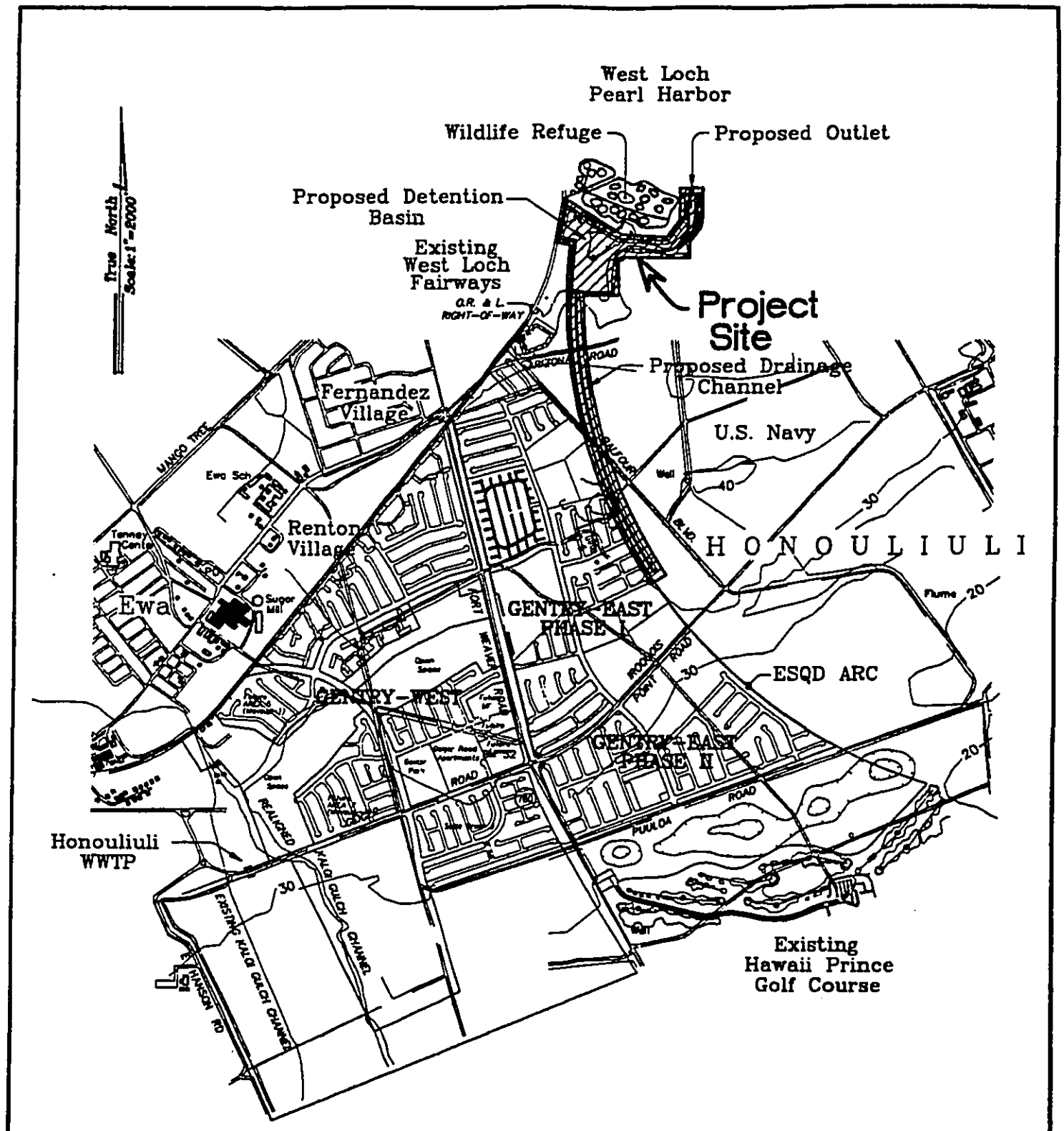
2.1 TYPE OF DOCUMENT

The City and County of Honolulu Department of Land Utilization has determined that the proposed action warrants a Draft and Final Environmental Impact Statement for the purposes of the environment review requirements of the Special Management Area Permit required for the proposed project. This document analyzes the environmental impacts of construction and operation of a stormwater drainage channel and supportive detention basin and outlet works on the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge and West Loch, Pearl Harbor, Oahu, Hawaii.

This document is prepared in compliance with Chapter 343 HRS as required by the Department of Land Utilization for the purpose of the Special Management Area Permit requirements. It will also be responsive to the State Department of Land and Natural Resources requirements for a Conservation District Use Application (CDUA) permit.

2.2 BACKGROUND INFORMATION

The proposed project is located on the Leeward side of Oahu in the Ewa District. The Honouliuli Unit of the Pearl Harbor National Wildlife Refuge is adjacent to the project detention basin and outlet structure. Ewa by Gentry-East is situated approximately 15 miles west of the Primary Urban Center (Honolulu), and approximately 3 miles south of Interstate Highway H-1 at Kunia Junction. West Loch of Pearl Harbor is estimated to be approximately a mile from the Gentry East development. Fort Weaver Road and an Oahu Railway and Land (OR&L) right of way separates Ewa by Gentry-East from the existing subdivisions of Ewa by Gentry-West and West Loch Fairways, respectively. Bordering Gentry-East to the south and the east are fallowed sugar cane fields, caused by the closure of Oahu Sugar Company.



LOCATION MAP

Scale: 1" = 2000'

N

0 1000 2000

SCALE IN FEET

Figure 2 - Location Map

Ewa By Gentry–East
Off–Site Drainage Plan

Environmental Communications

3. PURPOSE AND NEED

The purpose of the Project is to provide a common drainage outlet facility for stormwater runoff from the properties in the area, including the proposed Gentry East development. The Applicant is required to meet applicable City & County of Honolulu standards for drainage and surface water runoff, and has chosen with the concurrence of the U.S. Navy and the City & County of Honolulu, the preferred alternative as the best method for meeting these standards. Funds for project design and construction will be provided by GentryHomes, Ltd. The project site is owned by the United States Navy and presently leased to the Oahu Sugar Company for sugarcane cultivation. However, the fields are presently fallow. There are no existing drainage improvements in the area and flooding occurs periodically.

The project site is within the U.S. Navy Explosive Safety Quantity Distance (ESQD) arc and is therefore inappropriate for habitable structures. Further, entry on Navy lands is prohibited by the Pearl Harbor Defensive Sea Area, and entry rights must be requested from the Navy. The Wildlife Refuge is also prohibited entry due to also being on Navy lands.

This document is a requirement of the City & County of Honolulu as a disclosure document to analyze the potential impacts to the Special Management Area (SMA) . The impacts to be analyzed will include those temporary construction related impacts as well as the permanent operational and maintenance impacts. In addition to the SMA review, the document will be responsive to the State Department of Land and Natural Resources requirements for a Conservation District Use Application (CDUA) permit.

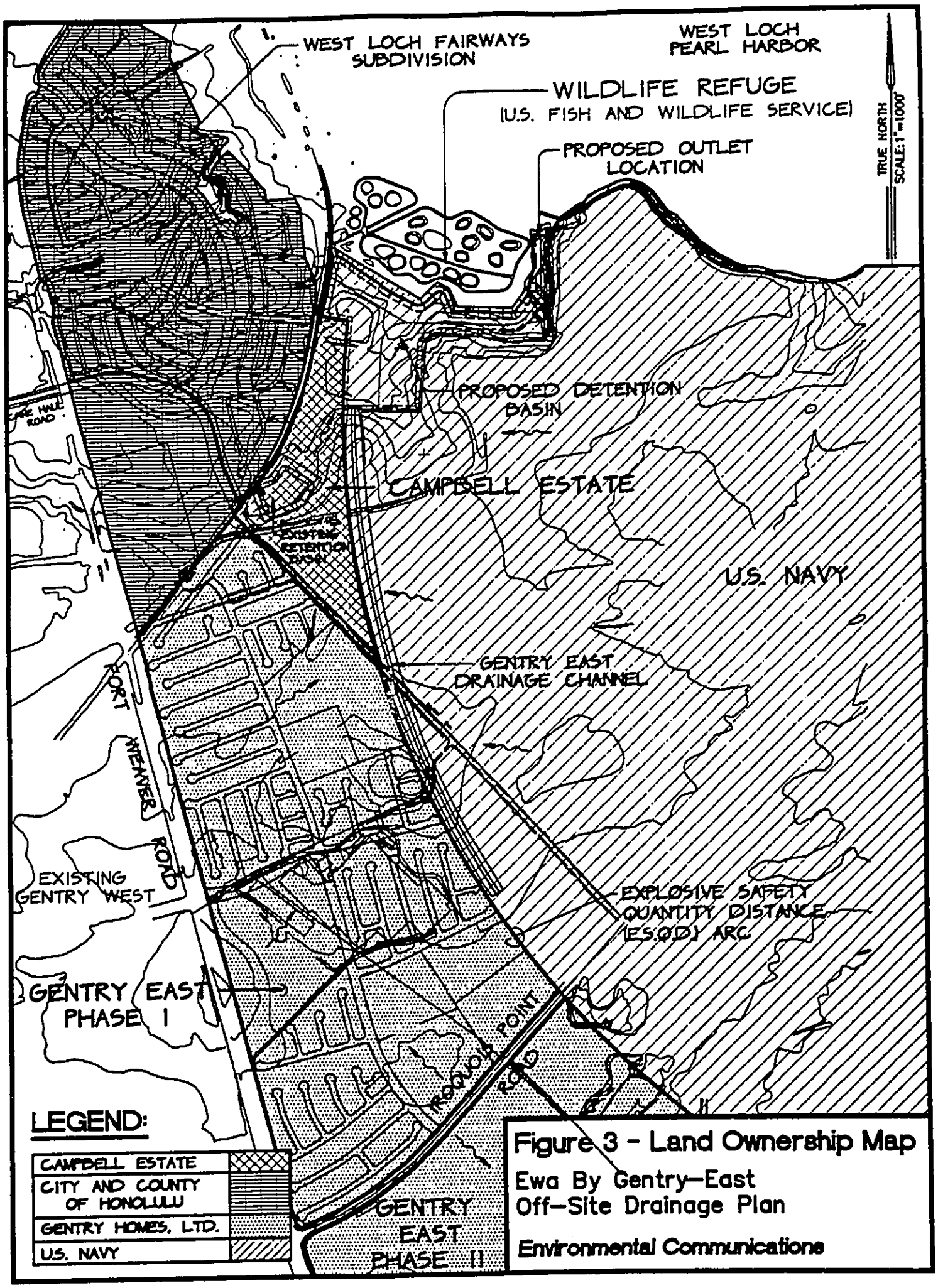


Figure 3 - Land Ownership Map

Ewa By Gentry–East
Off–Site Drainage Plan

Environmental Communications

4. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

The following alternatives were considered and led to the current drainage plan under consideration.

4.1. NO-ACTION ALTERNATIVE

Selection of the No-Action Alternative would not meet City and County requirements for drainage controls necessary for the Ewa By Gentry-East developments.

4.2 SITING DRAINAGE SYSTEM ON GENTRY LANDS

Siting of the Off-Site Drainage System on Gentry lands can not be accommodated without the sacrifice of Urban-Residential zoned lands. Further, the need for an outlet to West Loch, Pearl Harbor would still be a requirement. Negotiations with the U.S. Navy has provided an effective compromise of using Navy lands within the ESQD arc which are not suitable for habitable structures. Protection to the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge will be improved with the scope of the channel works, the detention basin, the outlet channel, and the outlet works.

4.3 CONCRETE-LINED CHANNEL DESIGN

A concrete-lined channel would be a technically feasible alternative and would possibly have long-term economic advantages. The ability to rapidly de-water the improved urban residential developments would protect life and property. In addition, the concrete sides and channel bottoms would result in easier operation and maintenance since periodic cleanup of the accumulated silt and urban debris would be reduced. This alternative would, however, partially eliminate any chance of percolation into the soil and result in additional infusion of stormwater pollutants directly into West Loch of Pearl Harbor. The velocity of the runoff would also negatively impact the Wildlife Refuge during heavy storm events.

Two alternative designs were reviewed:

4.3.1 Concrete-Lined Channel Without A Detention Basin

This is probably the simplest engineering solution for stormwater conveyance and disposal. However, with the EPA's mandate for stormwater quality improvements under the National Pollutant Discharge Elimination System (NPDES) permit program, this alternative does not address the stormwater quality concerns and issues related to urban runoff discharging directly into West Loch of Pearl Harbor.

This alternative will probably have the greatest impact on the receiving water, have a moderately high initial cost and low maintenance cost. Potential negative impacts to the coastal zone of West Loch, Pearl Harbor could also result from the velocity of the runoff being conveyed through the concrete lined channel. Silt loading and adverse impacts to West Loch could be significant. Although this alternative drainage improvement may be designed to mitigate flooding of the area (or provide flood protection of the area) and protect the wildlife refuge from flood related damages, this alternative does not address the stormwater quality concerns and issues related to urban runoff discharging directly into West Loch, Pearl Harbor, and the potential of significant adverse impacts to the Coastal Zone.

4.3.2 Concrete-Lined Channel With A Detention Basin

This drainage improvement system is probably the most costly alternative due to the use of a concrete lined channel and the larger area required for the detention basin and outlet works improvements. With the addition of a detention basin, this alternative addresses the stormwater quality issue to a greater degree than the previous alternative. This alternative will have a high initial cost and moderate maintenance cost.

4.4 MINIMUM-SIZED DRAINAGE SYSTEM

Under current City & County standards, the Ewa by Gentry-East project is required to provide adequate drainage improvements for its residential development. Based on established design formulas, Gentry could meet its own requirement with a noticeably smaller drainage plan. This was discarded to avoid piece-meal planning and construction of separate drainage outlets to West Loch by neighboring developers/land owners. Gentry is coordinating the planning and design of a single system that will discharge into West Loch, Pearl Harbor.

4.5 MASTER PLAN DRAINAGE SYSTEM

A master-planned drainage system that would accommodate all lands* within the natural drainage basin and mitigate the impacts to the wildlife refuge and West Loch, Pearl Harbor coastal zone was determined to be the most environmentally responsible drainage solution. An ancillary component to the master plan system will be an interim drainage plan that will permit Gentry to phase Ewa By Gentry-East development. This interim plan will permit development of the urban residential project and maintain a protective posture towards the wildlife refuge. This concept of incremental development of both the urban-residential and the compulsory drainage system will be designed to meet City standards and remain environmentally cognizant of the wildlife

1983 International Symposium on Urban Hydrology, Hydraulics and Sediment Control
(University of Kentucky, Lexington, Kentucky – July 25-28, 1983)

AN EVALUATION OF URBAN STORM WATER POLLUTANT REMOVAL THROUGH GRASSED SWALE TREATMENT

by

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Abstract. Urban storm water pollutant removal efficiency of a grassed waterway (swale) has been investigated. Vegetated with reed-canary grass (Phalaris arundinacea), the swale was designed following Soil Conservation Service (USDA) guidance for a parabolic waterway with dimensions 100' length, 10' top width, 1' bottom depth, and 1.5% slope intended to reduce runoff velocities to a maximum of 2 fps. The base of the swale was sealed with clay to prevent losses to groundwater infiltration. The swale was installed down-gradient of a paved parking lot contributing approximately 1 acre of impervious surface runoff area. Measurements of storm water quality and flow into and out of the swale were collected to enable flow weighted composite samples at both locations.

Analysis of 11 storm events shows swale treatment is an effective means of reducing storm water-borne pollutants, even where groundwater infiltration is not an integral component of the treatment scheme.

Introduction

The use of vegetated waterways for erosion control and sediment filtration, particularly in association with agricultural land stabilization, is well documented.[1] Municipal wastewater renovation with rooted aquatic plant waterways has also been reported.[2,3] This technology has recently been applied to urban storm water treatment. Typical applications involve an integrated treatment scheme of runoff conveyance and detention in grassed surface depressions, with subsequent groundwater infiltration.[4] Pollutant mass removal efficiency of 99% for BOD_5, N, P, and TSS has been reported for this type of treatment, where 80% of the runoff volume is removed through groundwater infiltration.[5] Recognizing the inherent ability of vegetated waterways to remove waterborne pollutants by filtration, absorption, adsorption, volatilization, and perhaps other means, this paper summarizes a study which addresses urban storm water runoff pollutant removal efficiency of a vegetated waterway (swale), where groundwater infiltration is not the intended sink for pollutant mass removal.

Study Area

Located adjacent to a small stream in Durham, New Hampshire, the swale receives storm water runoff from an asphalt-covered commercial supermarket parking lot of dimensions 240' by 140'. The runoff area is contained by granite-curbed traffic islands and two 30' slotted drain sections embedded in the pavement. Surface runoff is routed into the swale via slotted drain and a catch basin located at the base of the parking lot.

The swale was designed following guidance presented by the United States Soil Conservation Service for a parabolic vegetated waterway.[6] With dimensions of 10' top width by 1' bottom depth and slope of 1.5% over the 100' swale length, the design criteria were based upon the requirement to reduce runoff velocity through the structure to a maximum of 2 fps. The swale will produce the desired velocity reductions up to a peak runoff rate of 10 cfs, which would result from rainfall intensities expected to recur at 100-year intervals in the catchment area. The swale was intentionally over-designed due to scale economy and to allow for potential expansion of parking lot runoff area contributing to the structure.

The site selected for the swale installation was naturally vegetated with a nearly pure standing crop of reed-canary grass (Phalaris arundinacea) which is a recommended vegetative cover type for erosion control in grassed waterways (SCS). The soil was of a silty clay loam texture with very low permeability. Since site modifications were necessary and rapid stabilization of the structure was desired, the top 6" to 8" of soil and root-mat was stripped back with a bulldozer and later replaced after the site modifications were completed.

Approximately 96 yards of fill were required to elevate the structure, thereby enabling flow measurements at the discharge location from the

swale. Consistent with the study objective to evaluate storm water-borne pollutant removal without groundwater infiltration, clay of silty loam texture was used as the fill material.

Construction activities were performed during the period May 19-21, 1982. A stabilization period of 22 days followed, during which time the grass had grown to a height of approximately 12".

Instrumentation and Sampling Procedures

Sampling stations were located at the head and tail ends of the 100' structure. Continuous discharge monitoring was accomplished with H-flumes used in combination with ISCO Model 1870 flow meters. Water quality samples were collected with ISCO Model 1670 sequential discrete samplers. When used in combination with the flow meters, the sample collection frequency was paced according to pre-defined flow volume increments, thereby enabling flow weighted composite sampling of the entire event. Pacing of sample collection frequencies was synchronized at the two monitoring locations.

Samples were collected as soon as possible after the runoff event, usually within 24 hours. Aliquots of the composite sample were filtered on-site for determination of dissolved metal fractions. Aliquots were also prepared for total metals, nutrients, solids, bacteria, physical-mineral, and oxygen demand analysis of the composite sample. All samples were preserved on-site and analyzed according to Environmental Protection Agency or Standard Methods protocols.[7,8]

Results and Discussion

Storm water-borne contaminant removal results are summarized in Table 1. Of the 17 constituents which show an overall removal over the 100' swale length, 12 are significant at the $\alpha \leq .05$ level. More specifically, COD, total residue, NH_3, NO_2+NO_3, and both total and dissolved fractions of Cd, Cu, Pb, and Zn concentrations were significantly reduced as a result of grassed swale treatment. Increases in pH were also significant, averaging 1.42 units.

Swale treatment did not result in significant removal of BOD, turbidity, specific conductance, org-N, or total P, and overall concentration increases were observed for suspended residue, PO_4, total and fecal coliform, and fecal streptococci bacteria.

Results for swale treatment of oxygen demanding materials suggest only marginal removal efficiency. Overall BOD removal was only 11%, and although COD removal was significant, only 25% was removed overall.

Total residue removal averaging 33% was significant. Results obtained for suspended residue indicate that the dissolved solids fractions were being removed while suspended fractions were not. This result was unexpected and may be due to scouring of soil in the structure, since the swale had not completely stabilized before use. Turbidity results also reflect poor suspended solids removal.

Specific conductance showed basically no overall change as a result of swale treatment. light of the dissolved solids results presented above, significant reduction in conductance was expected.

Review of nutrient results suggests good

Table 1. Grassed Swale Treatment Results (11 Storms)

	Storm Water Runoff Composite Concentrations[a]				Overall Removal	Significance[b] Level
	0'-SWL		100'-SWL			
	Mean	Range	Mean	Range	%	$\alpha \leq .05$
BOD	5.9	2.5-8.7	4.9	2.0-8.8	11	-
COD	76.9	16.0-168.0	50.3	10.0-152.0	25	.034
Residue, Total	117	12-242	67	13-127	33	.011
Residue, Susp.	24	1-115	16	1-88	-	-
Turbidity, NTU	30.5	4.6-120.0	20.9	17.0-100.0	-4	-
Spec. Cond., uMHOs	46.8	19.2-95.0	44.5	19.0-126.0	1	-
pH	4.02	3.58-4.95	5.44	4.95-6.60	1.42 units	.000
Org-N	0.76	0.36-1.28	0.60	0.25-0.98	16	-
NH_3	0.24	<0.10-0.56	0.12	<0.10-0.29	51	.008
NO_2+NO_3	0.76	0.22-1.43	0.44	0.12-0.99	32	.006
PO_4	0.017	<0.001-0.030	0.025	<0.001-0.084	-	-
P	0.152	0.042-0.274	0.124	0.069-0.260	5	-
Cd, Total	0.003	<0.001-0.006	0.002	<0.001-0.004	56	.015
Cd, Diss.	0.002	<0.001-0.006	0.002	<0.001-0.004	42	.046
Cu, Total	0.06	<0.03-0.11	0.04	<0.03-0.10	48	.002
Cu, Diss.	0.06	<0.03-0.10	0.04	0.02-0.10	53	.006
Pb, Total	0.122	0.025-0.200	0.036	<0.010-0.080	65	.000
Pb, Diss.	0.062	0.025-0.140	0.017	<0.010-0.060	63	.010
Zn, Total	0.34	0.09-0.80	0.14	0.09-0.24	51	.006
Zn, Diss.	0.28	0.06-0.76	0.13	0.09-0.18	47	.036
Total Coli., MPN	4.45×10^4	930-11.00×10^6	6490	15000-3.90×10^5	-	-
Fecal Coli., MPN	83	<30-460	461	<20-4300	-	-
Fecal Strep.	49	<30-230	879	300-4074	-	-

a - results in mg/l unless indicated
b - paired t-test, 1-tail prob.

...rogen removal but poor phosphorus removal efficiencies. Significant reductions in NH_3 (51%) and NO_2+NO_3 (32%) were encountered, perhaps due to plant uptake. Poor removal efficiency of org-N (16%) is indicated. Results for phosphorus suggest swale treatment is not an efficient means of removal. Total P reductions averaged a meager 5%, and an overall increase in PO_4 was measured.

Consistently significant removal of heavy metals is reflected in Table 1. Overall removal ranged from 42% for dissolved cadmium to 65% for total lead.

No attempt was made to determine the actual mechanisms involved in contaminant removal by the swale; however, it is probable that the rather dramatic increases in pH through the swale, which average 1.42 units, may be an important factor in the removal process. Swale-mediated pH increases become even more interesting when viewed in consideration of the acid precipitation problem which plagues this area of the United States. Rain pH ranged between 3.3 and 4.5 for the 9 storm events sampled.

Bacteriological results show overall increases in contamination for each of the three groups tested - total coliform, fecal coliform, and fecal streptococci bacteria. These results suggest the possibility of animal wastes deposited in the structure.

Summary and Conclusions

The quality of storm water runoff was significantly improved as a result of grassed swale treatment. For the 11 storms sampled during the study period, removal of COD, total residue, NH_3, and NO_2+NO_3 averaged 25%, 33%, 51%, and 32%, respectively. Average removal of both total and dissolved fractions of Cd, Cu, Pb, and Zn ranged from 42% for dissolved Cd to 65% for total Pb. Increases in pH averaged 1.42 units.

Decreases in BOD, turbidity, specific conductance, org-N, and total P were not significant, with average removals of 11%, 4%, 1%, 16%, and 5%, respectively, and increases in suspended residue, PO_4, and total, fecal, and fecal streptococci bacteria were observed.

Based upon these findings the following can be concluded:

- Diversion of storm water runoff through the swale structure was found to be an effective means of reducing storm water-borne pollutants. Since swale treatment did not include pollutant mass losses to groundwater infiltration, the observed results can be attributed to mechanisms involving plant-soil interactions. Where poor soil permeability or space limitations preclude storm water infiltration areas, vegetated waterways may still be installed to provide for substantial pollutant reductions prior to receiving water discharge.

- Increases in pH as a result of swale treatment are presumed active in the observed decreases in heavy metals concentrations.

- In areas where acid precipitation is a concern, swale-induced pH increases can be of considerable benefit.

Acknowledgements

This study was supported in part by the United States Environmental Protection Agency in connection with the Nationwide Urban Runoff Program.

References

1. C. F. Fogg, "USDA Soil Conservation Service Standards for Livestock Manure Management Practices," Restoration of Lakes and Inland Waters International Symposium, EPA-440/5-81-010, USEPA, pp. 260-264, Sept. 1980.

2. P. R. Pope, "Wastewater Treatment by Rooted Aquatic Plants in Sand and Gravel Trenches," EPA-600/52-81-091, USEPA, July 1981.

3. T. J. Jenkins and A. J. Palazzo, "Wastewater Treatment by a Prototype Slow Rate Land Treatment System," U. S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory, Hanover, N.H., CRREL Report 81-14, Aug. 1981.

4. W. G. Lynard, E. J. Finnemore, J. A. Loop and R. M. Finn, "Urban Stormwater Management and Technology: Case Histories," EPA-600/8-80-035, USEPA, Aug. 1980.

5. M. P. Wanielista, Y. A. Yousef and J. S. Taylor, "Stormwater Management to Improve Lake Water Quality," EPA-600/2-82-048, USEPA, March 1982.

6. USDA-Soil Conservation Service, "Erosion and Sediment Control Design Handbook for Developing Areas of New Hampshire," USDA-SCS, Durham, N.H., May 1981.

7. U. S. Environmental Protection Agency, "Handbook for Sampling and Sample Preservation of Water and Wastewater," EPA-600/4-82-029, USEPA, April 1982.

8. Standard Methods for the Examination of Water and Wastewater, 15th Edition, APHA-AWWA-WPCF, 1980.

refuge. This plan will provide flood control and water quality improvements for stormwater runoff from the Gentry East development, the City and County of Honolulu's West Loch subdivision, and U.S. Navy land.

* **See Figures 4-1 and 4-2 for Drainage map areas (ParEn, Inc. 5-95 Drainage Report, Ex: D)**

The components of the Master Plan Drainage System alternative are described below.

4.5.1 Grass-Lined Drainage Channel

Two alternative designs were reviewed:

Grass-lined channel without a detention basin
Similar to the concrete-lined channel alternative, runoff will discharge directly into West Loch. This alternative will provide some stormwater quality improvements due to the reduced velocity for sedimentation (maximum permissible for grass-lined channels is 5 feet per second, as required by the City and County of Honolulu, Department of Public Works), contact with plants for nutrient removal, and exposure to a permeable surface (coral) for infiltration losses. This design will probably have a low initial cost and moderate maintenance cost.

Grass-lined channel with detention basin
Of the alternatives investigated, this drainage improvement has the greatest potential for stormwater quality improvements. This design has moderate construction and maintenance costs. A grass-lined channel is being proposed to convey stormwater runoff from the Gentry East development, north of Iroquois Point Road, to the proposed detention basin located adjacent to the wildlife refuge, then to West Loch of Pearl Harbor. Several aspects of a grass-lined channel will be beneficial to this project and future projects with similar drainage concerns. Aspects relating to water quality include the following:

Under the criteria of channel design, the City & County of Honolulu, Department of Public Works, Division of Engineering, Storm Drain Standards, dated May 1988, maximum flow velocities for grass-lined and concrete lined channels were established at 5 feet per second and "No Limitations," respectively.

Given the length of the drainage channel, approximately 4,240 linear feet, the time required for stormwater runoff to traverse from originating source to the drainage outlet will generally be slower for a grass lined channel than a concrete lined channel. This will be true for daily low flows as well as the 100-year storm events. In turn, the potential for sediment deposition and groundwater recharge is greater in a grass-lined channel than a concrete-lined channel. The deposited

silt will require periodic maintenance, but would not significantly impact West Loch.

Grass-lined channels may remove unwanted nutrients (i.e. nitrates, phosphates, etc.) and possibly heavy metals which may be harmful to the downstream environment (Oakland, P.H. 1983).

The proposed channel alignment will follow the U.S. Navy ESQD arc to the detention basin site. This alignment will cross Balfour Boulevard and another cane haul service road, Arizona Road.

The channel will be designed to convey a 100 year runoff, 24 hour event from adjacent Navy, City & County of Honolulu, and Gentry lands. Maximum permissible velocity for grass-lined earth channels has determined the channel slope, geometry, and hydraulic properties. For the Gentry East drainage channel, preliminary design has indicated that a bottom width of 30 feet will be sufficient. Side slopes will not exceed 2 horizontal: 1 vertical or as recommended by the Soils Engineer. Also, a longitudinal slope of 0.15 – 0.20 percent will result in an acceptable flow velocity. The final design will be determined upon computation of peak runoff and drainage channel hydraulics.

4.5.2 Detention Basin

A detention basin system is also being proposed for the containment and gradual release of stormwater runoff. An earth berm would be constructed along the inland boundary of the wildlife refuge to create this basin. Previously, drainage channels were designed for the rapid transport and removal of floodwaters. Detention basins and unlined channels will permit increased infiltration of the stormwater into the soil, thus achieving groundwater recharge. Silt loading into the coastal zone will also be minimized, and be beneficial to the waters of West Loch, as well as the wildlife refuge. The requirements for NPDES permits, CZM Certification for Consistency, and compliance with Section 401 of the Clean Water Act have been responsible for the increased use of detention basins and unlined channels. Additional grading will be required to increase the storage capacity of the basin. The berm along the wildlife refuge will be set at an elevation of 20.0 feet above Mean Sea Level (MSL), with approximately 1.6 feet of freeboard included in the height. A 200 foot wide weir with the crest elevation at 15 feet MSL will be required to pass the routed peak discharge of 3,970 cubic feet per second (cfs). Storage volume at the maximum flood elevation (18.4 feet MSL) is approximately 273 acre-feet. It would take approximately 54 hours from the start of the storm to drain the detention basin.

Based on the permeability test results indicated in the *"Subsurface Investigation Report Proposed Ewa East Detention Basin and Drainage Channel, Ewa By Gentry East*

Development , Ewa, Oahu , Hawaii, June 30, 1994" and the detention basin geometry, no seepage water through or beneath the detention basin embankment is anticipated. All improvements will be constructed with construction plans approved by required building standards and approved by the City & County of Honolulu.

At present, the City & County of Honolulu does not have criteria or standard guidelines for the design of a detention basin. **(State DLNR correspondence 3-31-95 has confirmed that the proposed detention basin will not fall under the Dam Safety rules.)** In the past, the City & County of Honolulu has required developers to provide detention facilities to control runoff quantity to reduce peak flow rates. To date, the application of detention basins for stormwater runoff quality concerns is not widely utilized in Hawaii. Because this project has an outlet to West Loch, Pearl Harbor, the drainage concerns for this project relate to water quality, not quantity. Thus, the design criteria for this detention basin is to provide storage to contain runoff generated by a 2-year 24-hour storm event, and release of the runoff over a minimum duration of 24 hours (Schuler, T.R. 1987, Detention Basin Sizing Rule No. 3). Schuler has reported that such extended detention ponds may remove 60 to 100 percent of the suspended solids. Low flow outlet works will be designed to maximize sediment removal. For less frequent storms, the spillway and detention basin will also be designed to convey the 100-year peak stormwater runoff rate as well as the 2 year, 24 hour storm event . Embankment and channel protection will also be considered in the design of this drainage facility. Provisions for the maintenance of the detention basin and outlet works will be considered during the planning and design stages.

4.5.3 Outlet Drainage Channel

A grass-lined drainage channel will also be utilized to convey the routed 100-year 24-hour peak stormwater runoff rate from the detention basin to West Loch of Pearl Harbor. The proposed location of this outlet drainage channel is in the extreme western boundary of the Wildlife Refuge. The original drainage channel and outlet structure have been revised to respond to comments from the U.S. Fish & Wildlife Service staff. The alignment for the basin and outlet structure are outside the existing Refuge security fence line, but remain on Navy lands under Refuge jurisdiction. Topography of the surrounding area determined the alignment of the channel. An existing 32-foot high earth bank will be partially excavated to provide sufficient space to maintain drainage improvements entirely outside of the fence enclosing the Wildlife Refuge. The proposed drainage improvements, including a turn-around area for maintenance purposes, will be located on approximately 0.81 acre of refuge land. **(See Figure 5, Sheet 3 of 13 Sheets).**

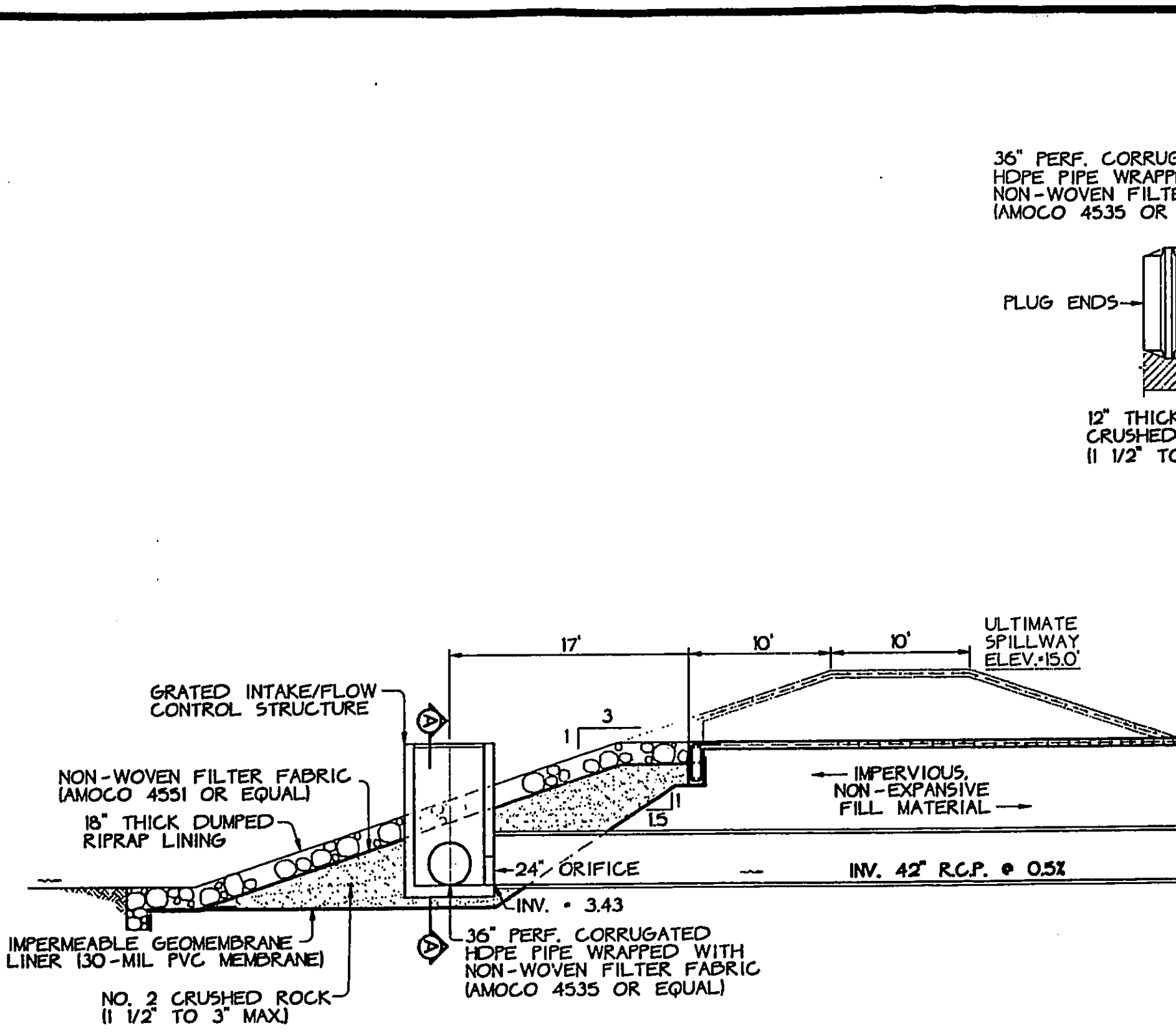
The alternative of locating this drainage channel and the outlet structure totally outside the Refuge land/parcel was not economically feasible due to the need to extensively grade approximately 119,000 cubic yards of existing hillside.

The trapezoidal channel will have a bottom width of 80 feet. Side slopes will vary from 3:1 adjacent to the emergency spillway to 2:1 at baseline station 4+00. The longitudinal slope will be set at 0.15 percent to minimize the flow velocity to 5 feet per second during peak flow. The invert of the channel was established starting from the high water mark elevation of 2.0 feet MSL near the shoreline of West Loch.

Approximately 140 lineal feet of channel will be concrete lined to eliminate erosion in the area immediately downstream of the spillway. Additional erosion control measures will also be constructed near the shoreline of West Loch. Eighteen inch thick grouted riprap lining will be used to protect approximately 60 lineal feet of channel, including an area between the shoreline and elevation 2.0 feet MSL. Dumped boulder riprap lining will be used to protect the area approximately 30 feet into West Loch, from elevation 0 feet MSL to approximately (-) 1.5 feet MSL.

Dewatering will take place at two sites. One is located at the outlet along the shoreline of West Loch. Dewatering may be required at this location for the installation of the 18-inch thick grouted riprap lining. The second site will be located at the emergency spillway. Dewatering will be required for the installation of the 3'0" cutoff walls shown on Figure 4, Detention Basin Outlet Works. Anticipated volume of dewatering effluent is unknown at this time. The NPDES permit is under preparation at this time and a detailed dewatering plan will be prepared and included in the NPDES application.

FIG-4 5/23/05 PM

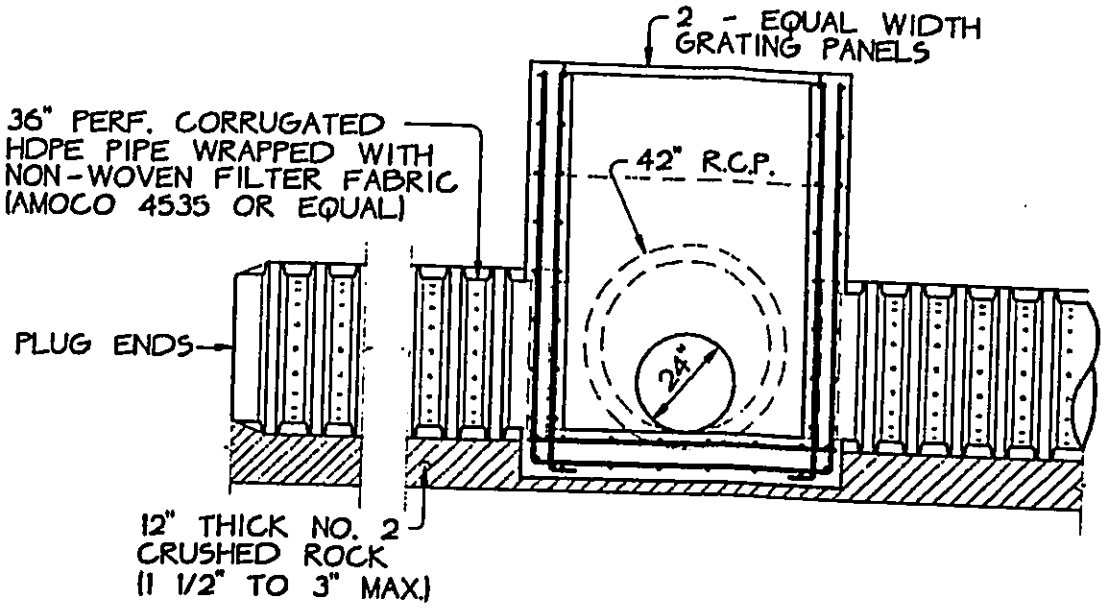


SECTION THRU EMERGENCY SPILLW

NOT TO SCALE

Figure 4 - Detention Basin Outlet Wo

Ewa By Gentry–East
Off–Site Drainage Plan



SECTION A-A
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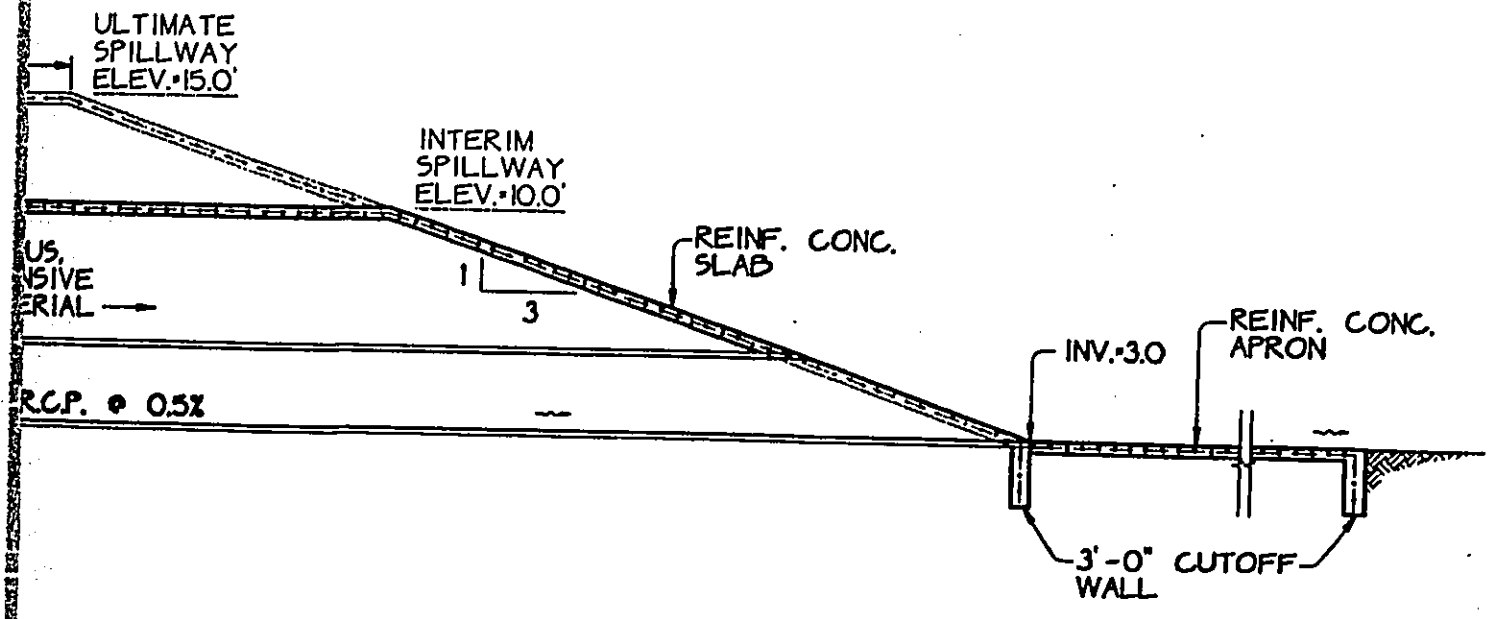


MERGENCY SPILLWAY
TO SCALE

on Basin Outlet Works
Gentry–East
Drainage Plan

Environmental Communications

INDEX TO DRAWINGS

DESCRIPTION	SHEET NO.
TITLE SHEET	1
GENERAL LAYOUT	2
GRADING PLAN – DETENSION BASIN	3
PLAN AND PROFILE – OUTLET DRAINAGE CHANNEL	4
PLAN AND PROFILE, DRAINAGE CHANNEL – 1 THRU 4	5–8
CROSS–SECTIONS	9
DRAINAGE DETAILS	10–11
DETAILS – PERIMETER SECURITY FENCE	12
EROSION CONTROL PLAN	13

FILE: EWADRAIN

Figure 5
Index to Drawings
Off-Site Drainage Plans
Ewa by Gentry-East

EWA BY GENTRY –

OFF-SITE DRAINAGE

AT HONOULIULI, EWA, OAHU, H

DEVELOPER: GENTRY HOMES, L

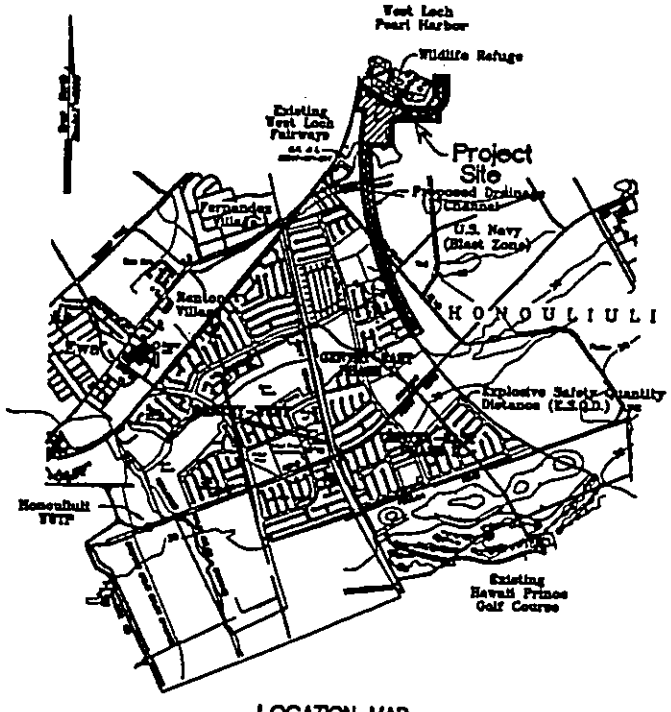
TAX MAP KEY: 9-1-10: POR. 4, 14 AND 1

DATE: JUNE 23, 1995

Prepared By:

ParEn Inc., dba
PARK ENGINEERING
ENGINEERS, SURVEYORS, PLANNERS

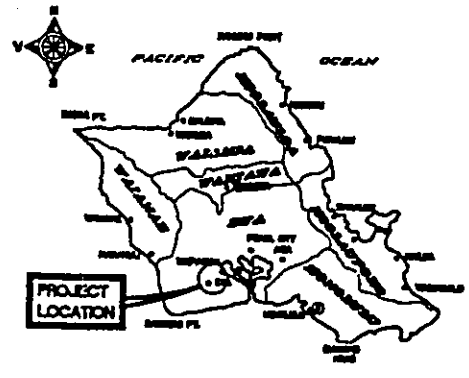
567 SOUTH KING STREET SUITE 300
HONOLULU, HAWAII 96813-3036



LOCATION MAP
Scale: 1" = 2000'

INDEX TO DRAWING

DESCRIPTION	S
TITLE SHEET	
GENERAL LAYOUT	
GRADING PLAN – DETENTION BASIN	
PLAN AND PROFILE – OUTLET DRAINAGE CHANNEL	
PLAN AND PROFILE, DRAINAGE CHANNEL – 1 THRU 4	
CROSS-SECTIONS	
DRAINAGE DETAILS	
DETAILS – PERIMETER SECURITY FENCE	
EROSION CONTROL PLAN	



VICINITY MAP
NOT TO SCALE

CORRECTION

THE PRECEDING DOCUMENT(S) HAS BEEN REPHOTOGRAPHED TO ASSURE LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

EWA BY GENTRY

OFF-SITE DRAINAGE

AT HONOULIULI, EWA, OAHU

DEVELOPER: GENTRY HOME

TAX MAP KEY: 9-1-10: POR. 4, 14 A

DATE: JUNE 23, 1995

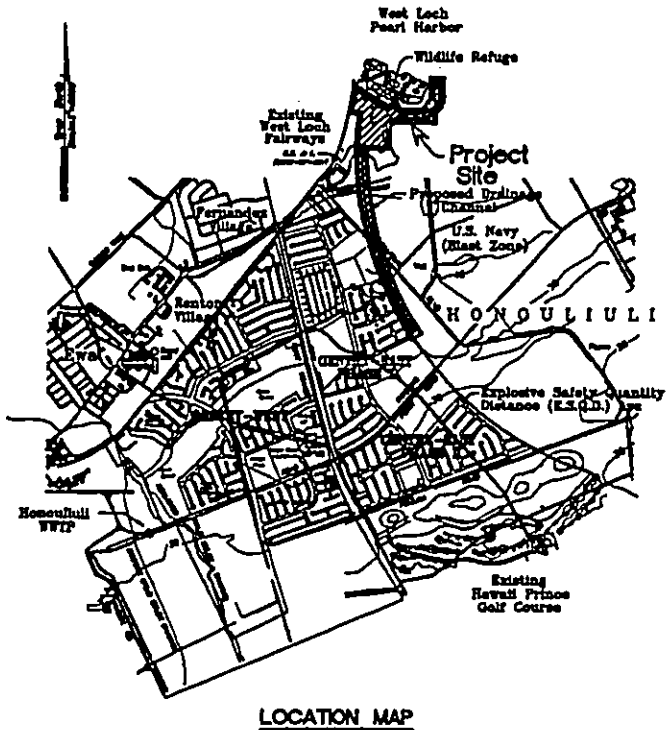
Prepared By:

ParEn Inc., dba
PARK ENGINEERING
ENGINEERS, SURVEYORS, PLAN

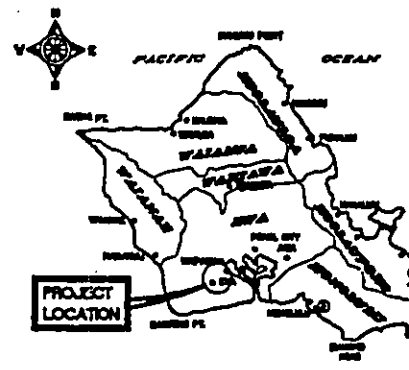
567 SOUTH KING STREET SUITE 300
HONOLULU, HAWAII 96813-3036

INDEX TO DRAWING

DESCRIPTION



LOCATION MAP
Scale 1" = 2000'



VICINITY MAP
NOT TO SCALE

E0000010 6/20/95 RMA

NTRY - EAST
RAINAGE PLAN
EWA, OAHU, HAWAII

GENTRY HOMES, LTD.

10: POR. 4, 14 AND 15

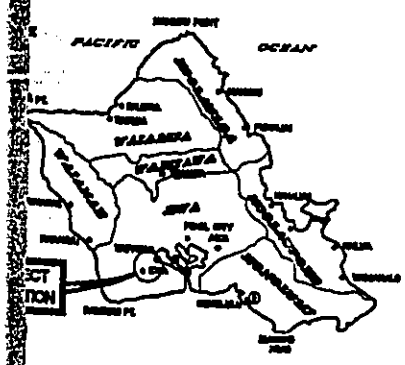
NE 23, 1995

red By:

Inc., dba
ENGINEERING
RS, SURVEYORS, PLANNERS

KING STREET SUITE 300
HAWAII 96813-3036

INDEX TO DRAWING



VICINITY MAP
NOT TO SCALE

APPROVED: DATE:

DIRECTOR AND CHIEF ENGINEER, DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU (FOR GRADING ONLY)

EWA BY GENTRY – EAST, OFF-SITE DRAINAGE PLAN, JUNE 23, 1995

CONSTRUCTION NOTES:

1. ALL CONSTRUCTION WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, SEPTEMBER 1984, AS AMENDED, AND STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, SEPTEMBER 1986, OF THE DEPARTMENT OF PUBLIC WORKS, CITY AND COUNTY OF HONOLULU.

2. 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 THE AREA. WHEREVER CONNECTIONS TO EXISTING 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 THE COMMENCEMENT OF CONSTRUCTION.

3. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION SECTION, DIVISION OF ENGINEERING, DEPARTMENT OF PUBLIC WORKS AT 527-6311 TO ARRANGE FOR INSPECTIONAL SERVICES AND SUBMIT THREE (3) SETS OF APPROVED CONSTRUCTION PLANS SEVEN (7) DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION WORK.

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 ORDINANCE OF HONOLULU, 1990, AS AMENDED, AND SOILS REPORT ENTITLED "SUBSURFACE INVESTIGATION REPORT, PROPOSED EWA EAST DETENTION BASIN AND DRAINAGE CHANNEL – EWA BY GENTRY DEVELOPMENT", BY FEWELL GEOTECHNICAL ENGINEERING, LTD., DATED JUNE 30, 1994.

2. NO CONTRACTOR SHALL PERFORM ANY GRADING OPERATION SO AS TO CAUSE FALLING ROCK, SOIL OR DEBRIS IN ANY FORM TO FALL, SLIDE OR FLOW ONTO ADJOINING PROPERTIES, STREETS OR NATURAL WATERCOURSES. SHOULD SUCH VIOLATIONS OCCUR, THE COSTS INCURRED FOR ANY REMEDIAL ACTION BY THE CHIEF ENGINEER SHALL BE PAYABLE BY THE CONTRACTOR.

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 CHAPTER 11-60, "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. 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. 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. FILL ON SLOPES STEEPER THAN 5:1 SHALL BE KEYED.

8. THE CITY SHALL BE INFORMED OF THE LOCATION OF THE BORROW/DISPOSAL SITE FOR THE PROJECT WHEN THE APPLICATION FOR GRADING PERMIT IS MADE. THE BORROW/DISPOSAL SITE MUST ALSO FULFILL THE REQUIREMENTS OF THE GRADING ORDINANCE.

9. NO GRADING WORK SHALL BE DONE ON SATURDAYS, SUNDAYS AND HOLIDAYS AT ANY TIME WITHOUT PRIOR NOTICE TO THE CHIEF ENGINEER, PROVIDED SUCH GRADING WORK IS ALSO IN CONFORMANCE WITH HAWAII ADMINISTRATIVE RULES, CHAPTER 11-43, "COMMUNITY NOISE CONTROL FOR OAHU".

10. THE LIMITS OF THE AREA TO BE GRADED SHALL BE FLAGGED BEFORE THE COMMENCEMENT OF THE GRADING WORK.

11. ALL GRADING OPERATIONS SHALL BE PERFORMED IN CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE WATER POLLUTION CONTROL AND WATER QUALITY STANDARDS CONTAINED IN HAWAII ADMINISTRATIVE RULES, CHAPTER 11-55, "WATER POLLUTION CONTROL" AND CHAPTER 11-54, "WATER QUALITY STANDARDS" AND IF APPLICABLE, THE NPDES PERMIT FOR THE PROJECT.

12. 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.

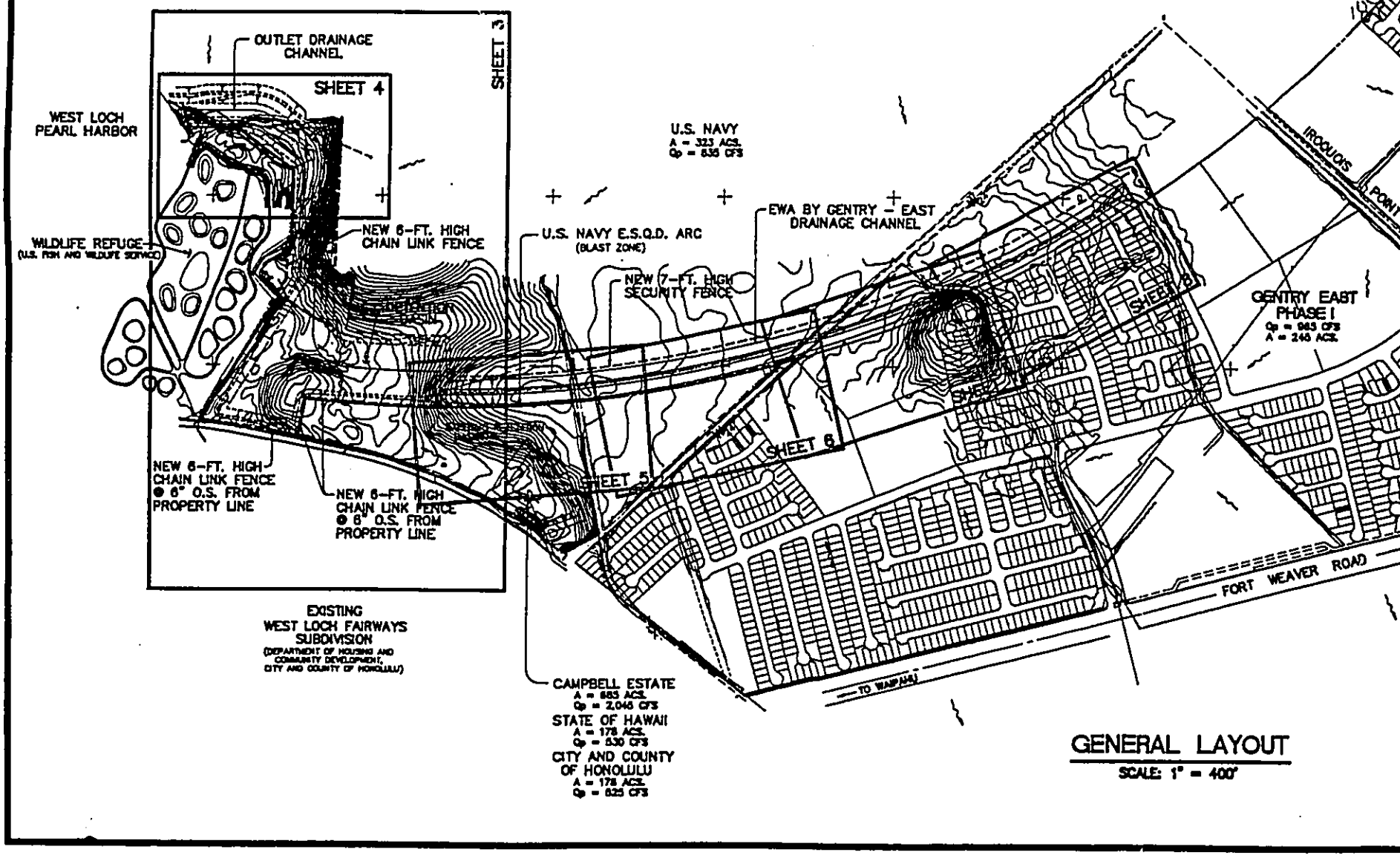
13. TEMPORARY EROSION CONTROLS SHALL NOT BE REMOVED BEFORE PERMANENT EROSION CONTROLS ARE IN-PLACE AND ESTABLISHED.

14. TEMPORARY EROSION CONTROL PROCEDURES SHALL BE SUBMITTED FOR APPROVAL PRIOR TO APPLICATION FOR GRADING PERMIT.

15. IF THE GRADING WORK INVOLVES CONTAMINATED SOIL, THEN ALL GRADING WORK SHALL BE DONE IN CONFORMANCE WITH APPLICABLE STATE AND FEDERAL REQUIREMENTS.

16. NON-COMPLIANCE TO ANY OF THE ABOVE REQUIREMENTS SHALL MEAN IMMEDIATE SUSPENSION OF ALL WORK, AND REMEDIAL WORK SHOULD COMMENCE IMMEDIATELY. ALL COSTS INCURRED SHALL BE BILLED TO THE PERMITTEE. FURTHERMORE, VIOLATORS SHALL BE SUBJECTED TO ADMINISTRATIVE, CIVIL AND/OR CRIMINAL PENALTIES.

17. FOR BENCH MARK, SEE THIS SHEET.



GENERAL LAYOUT

SCALE: 1" = 400'

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True North
Scale: 1"=400'

EXISTING
HAWAII PRINCE
GOLF COURSE

U.S. NAVY E.S.Q.D. ARC
(BLAST ZONE)

IROQUOIS POINT ROAD

GENTRY EAST,
PHASE II
A = 140 ACS.

GENTRY EAST
PHASE I
Qp = 865 CFS
A = 240 ACS.

TO EWA BEACH

FORT WEAVER ROAD

BENCH MARK
EXIST. HIGHWAY MON.
TOP OF BRASS PIN
ELEV.= 36.17'

RAL LAYOUT
LE: 1" = 400'

REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

ParEn, Inc.
dba Park Engineering
Engineers, Surveyors, Planners

EWA BY GENTRY - EAST
OFFSITE DRAINAGE PLAN
AT HONOULIULI, EWA, OAHU, HAWAII
TAX MAP KEY: 9-1-10: 4, 14 & 15
DEVELOPER: GENTRY HOMES, LTD.

GENERAL LAYOUT

APPROVED FOR GRADING ONLY: DATE

BY THE DIRECTOR OF THE DEPARTMENT OF PUBLIC WORKS

CLARENCE K. TANIGAWA
REGISTERED PROFESSIONAL ENGINEER
No. 1464-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

ParEn, Inc.
dba PARK ENGINEERING

SOIL RECOMMENDATIONS:

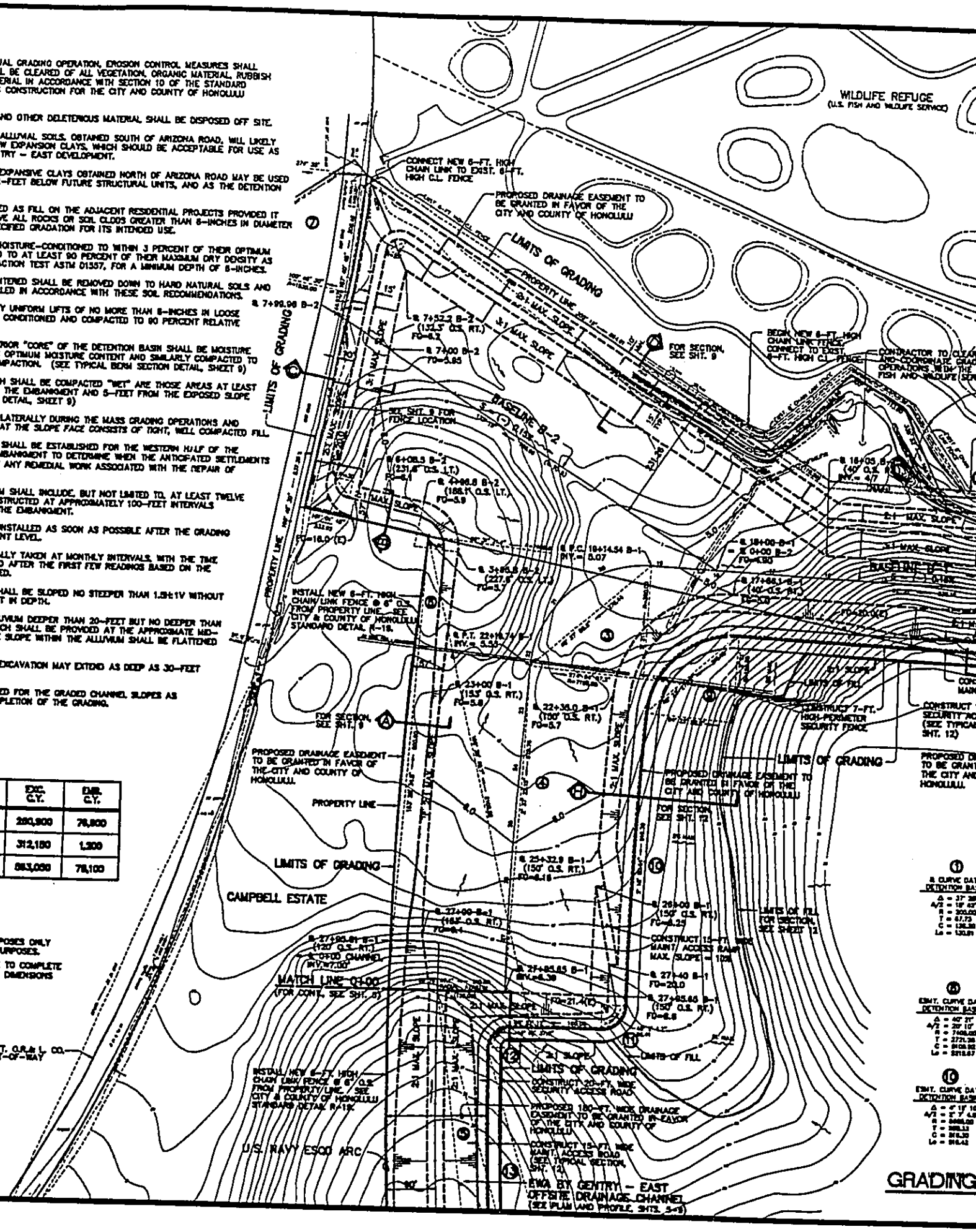
1. PRIOR TO THE START OF THE ACTUAL GRADING OPERATION, EROSION CONTROL MEASURES SHALL BE IN PLACE, THEN THE SITE SHALL BE CLEARED OF ALL VEGETATION, ORGANIC MATERIAL, RUBBISH AND ANY OTHER DELETERIOUS MATERIAL IN ACCORDANCE WITH SECTION 10 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION FOR THE CITY AND COUNTY OF HONOLULU (STANDARD SPECIFICATIONS).
2. ALL ORGANIC MATERIAL, RUBBISH AND OTHER DELETERIOUS MATERIAL SHALL BE DISPOSED OFF SITE.
3. THE MAJORITY OF THE EXCAVATED ALLUVIAL SOILS, OBTAINED SOUTH OF ARIZONA ROAD, WILL LIKELY CONSIST OF MODERATE PLASTIC, LOW EXPANSION CLAYS, WHICH SHOULD BE ACCEPTABLE FOR USE AS FILL IN THE ADJACENT EWA BY GENTRY – EAST DEVELOPMENT.
4. THE HIGHLY PLASTIC, MODERATELY EXPANSIVE CLAYS OBTAINED NORTH OF ARIZONA ROAD MAY BE USED IN DEEPER FILL AREAS, AT LEAST 2-FEET BELOW FUTURE STRUCTURAL UNITS, AND AS THE DETENTION EMBANKMENT FILL.
5. THE EXCAVATED CORAL MAY BE USED AS FILL ON THE ADJACENT RESIDENTIAL PROJECTS PROVIDED IT IS SUFFICIENTLY CRUSHED TO REMOVE ALL ROCKS OR SOIL CLODS GREATER THAN 6-INCHES IN DIAMETER AND SEGREGATED TO MEET THE SPECIFIED GRADATION FOR ITS INTENDED USE.
6. AREAS TO RECEIVE FILL SHALL BE MOISTURE-CONDITIONED TO WITHIN 3 PERCENT OF THEIR OPTIMUM MOISTURE CONTENT AND COMPACTED TO AT LEAST 90 PERCENT OF THEIR MAXIMUM DRY DENSITY AS DETERMINED BY LABORATORY COMPACTION TEST ASTM D1557, FOR A MINIMUM DEPTH OF 6-INCHES.
7. ANY LOOSE OR SOFT AREAS ENCOUNTERED SHALL BE REMOVED DOWN TO HARD NATURAL SOILS AND THE RESULTING DEPRESSION BACKFILLED IN ACCORDANCE WITH THESE SOIL RECOMMENDATIONS.
8. FILL SHALL BE PLACED IN RELATIVELY UNIFORM LIFTS OF NO MORE THAN 8-INCHES IN LOOSE THICKNESS AND SIMILARLY MOISTURE CONDITIONED AND COMPACTED TO 90 PERCENT RELATIVE COMPACTION.
9. THE EMBANKMENT FILL FOR THE INTERIOR "CORE" OF THE DETENTION BASIN SHALL BE MOISTURE CONDITIONED TO NO DRIER THAN ITS OPTIMUM MOISTURE CONTENT AND SIMILARLY COMPACTED TO AT LEAST 90 PERCENT RELATIVE COMPACTION. (SEE TYPICAL BERM SECTION DETAIL, SHEET 9)
10. PORTIONS OF THE EMBANKMENT WHICH SHALL BE COMPACTED "WET" ARE THOSE AREAS AT LEAST 5-FEET FROM THE EXPOSED TOP OF THE EMBANKMENT AND 5-FEET FROM THE EXPOSED SLOPE FACE. (SEE TYPICAL BERM SECTION DETAIL, SHEET 9)
11. FILLS SHALL BE OVER-CONSTRUCTED LATERALLY DURING THE MASS GRADING OPERATIONS AND SUBSEQUENTLY TRIMMED BACK SO THAT THE SLOPE FACE CONSISTS OF TIGHT, WELL COMPACTED FILL.
12. A SETTLEMENT MONITORING PROGRAM SHALL BE ESTABLISHED FOR THE WESTERN HALF OF THE DETENTION BASIN'S NORTHERN FILL EMBANKMENT TO DETERMINE WHEN THE ANTICIPATED SETTLEMENTS ARE ESSENTIALLY COMPLETE SO THAT ANY REMEDIAL WORK ASSOCIATED WITH THE REPAIR OF SETTLEMENT CRACKS CAN COMMENCE.
13. THE SETTLEMENT MONITORING PROGRAM SHALL INCLUDE, BUT NOT LIMITED TO, AT LEAST TWELVE SETTLEMENT MONITORING POINTS, CONSTRUCTED AT APPROXIMATELY 100-FEET INTERVALS BEGINNING AT THE WESTERN END OF THE EMBANKMENT.
14. THE SETTLEMENT MARKERS SHALL BE INSTALLED AS SOON AS POSSIBLE AFTER THE GRADING HAS ATTAINED THE TOP OF EMBANKMENT LEVEL.
15. SETTLEMENT READINGS SHALL BE INITIALLY TAKEN AT MONTHLY INTERVALS, WITH THE TIME INTERVAL BETWEEN READINGS ADJUSTED AFTER THE FIRST FEW READINGS BASED ON THE ACTUAL RATE OF SETTLEMENT MEASURED.
16. EXCAVATION WITHIN ALLUVIAL CLAYS SHALL BE SLOPED NO STEEPER THAN 1.5H±1V WITHOUT BENCHES FOR CUTS OF UP TO 20-FEET IN DEPTH.
17. FOR CUT SLOPES IN THE SURFACE ALLUVIUM DEEPER THAN 20-FEET BUT NO DEEPER THAN 30-FEET, EITHER AN 8-FEET WIDE BENCH SHALL BE PROVIDED AT THE APPROXIMATE MID-HEIGHT OF THE 1.5H±1V SLOPE, OR THE SLOPE WITHIN THE ALLUVIUM SHALL BE FLATTENED TO NO STEEPER THAN 2H±1V.
18. FOR THE FLATTER 2H±1V SLOPES, THE EXCAVATION MAY EXTEND AS DEEP AS 30-FEET WITHOUT BENCHES.
19. EROSION PROTECTION SHALL BE PROVIDED FOR THE GRADED CHANNEL SLOPES AS SOON AS PRACTICABLE AFTER THE COMPLETION OF THE GRADING.

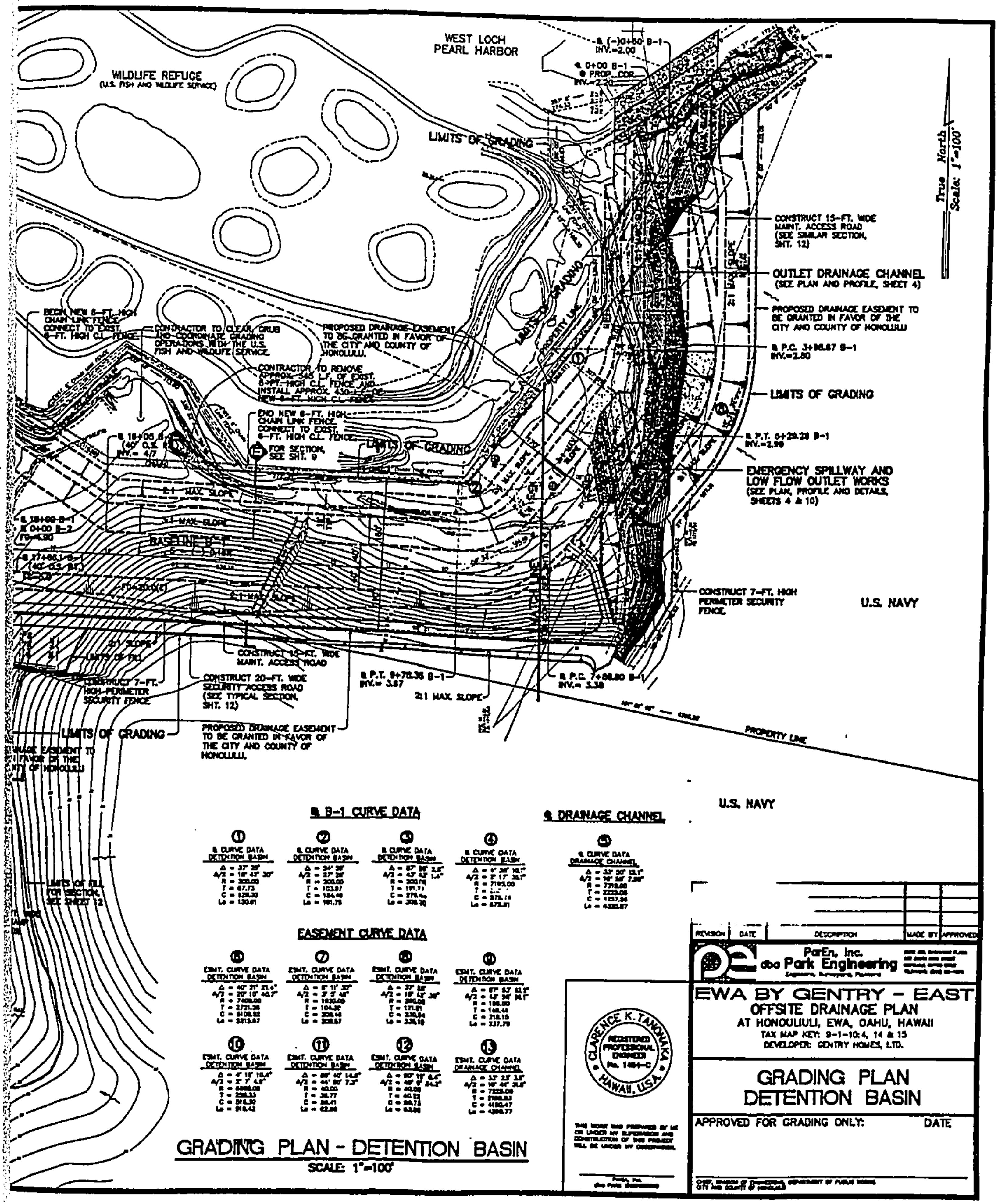
GRADING SUMMARY	AREA ACS.	EXC. C.Y.	EMB. C.Y.
DETENTION BASIN	34.3	250,900	78,900
DRAINAGE CHANNEL	21.3	312,150	1,200
TOTAL	55.6	563,050	78,100

NOTES:

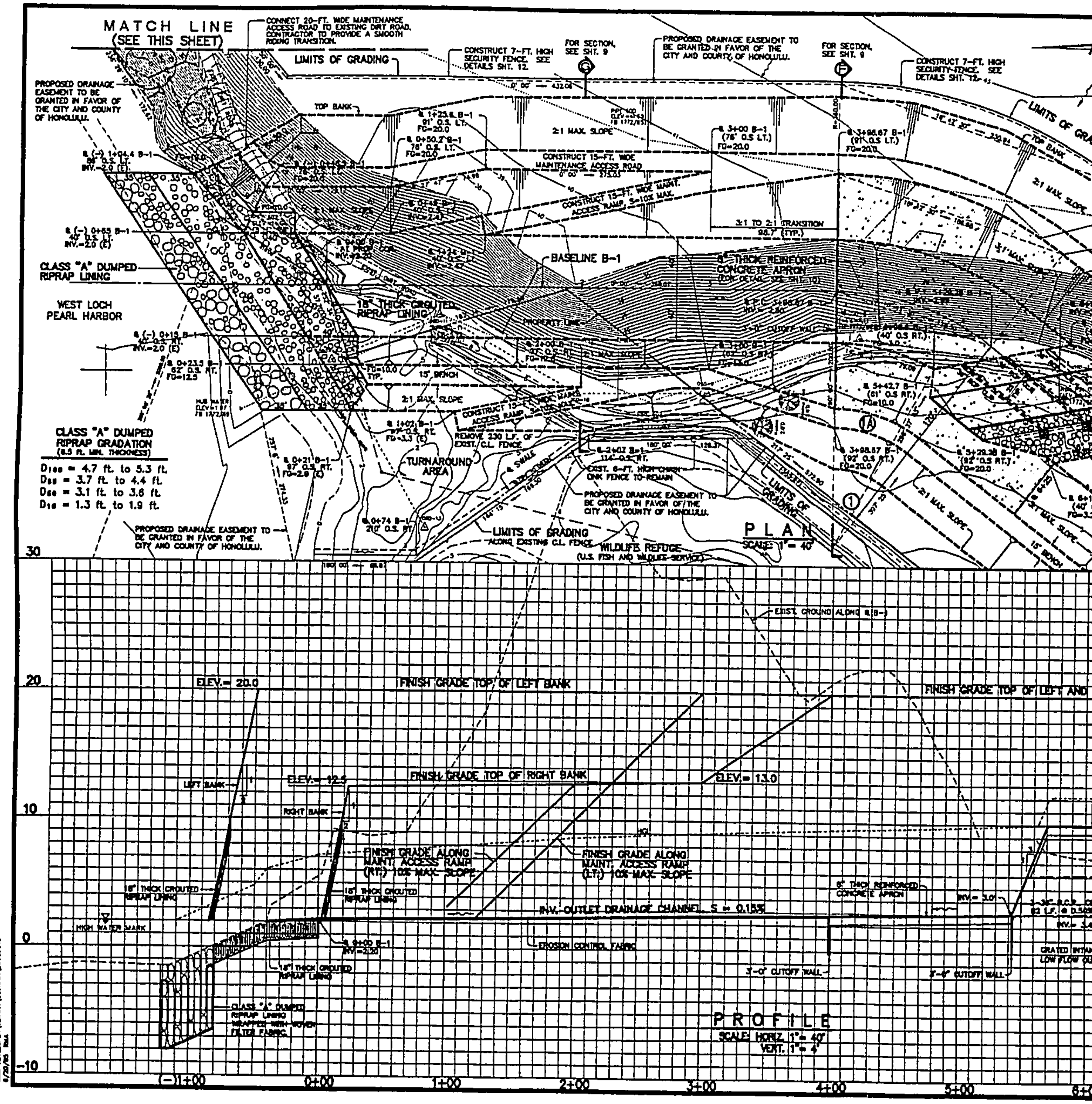
A. QUANTITIES SHOWN ARE FOR PERMIT PURPOSES ONLY AND SHALL NOT BE USED FOR BIDDING PURPOSES.

B. THE CONTRACTOR SHALL BE RESPONSIBLE TO COMPLETE THE GRADING WORK TO THE GRADES AND DIMENSIONS SHOWN ON THE PLANS.

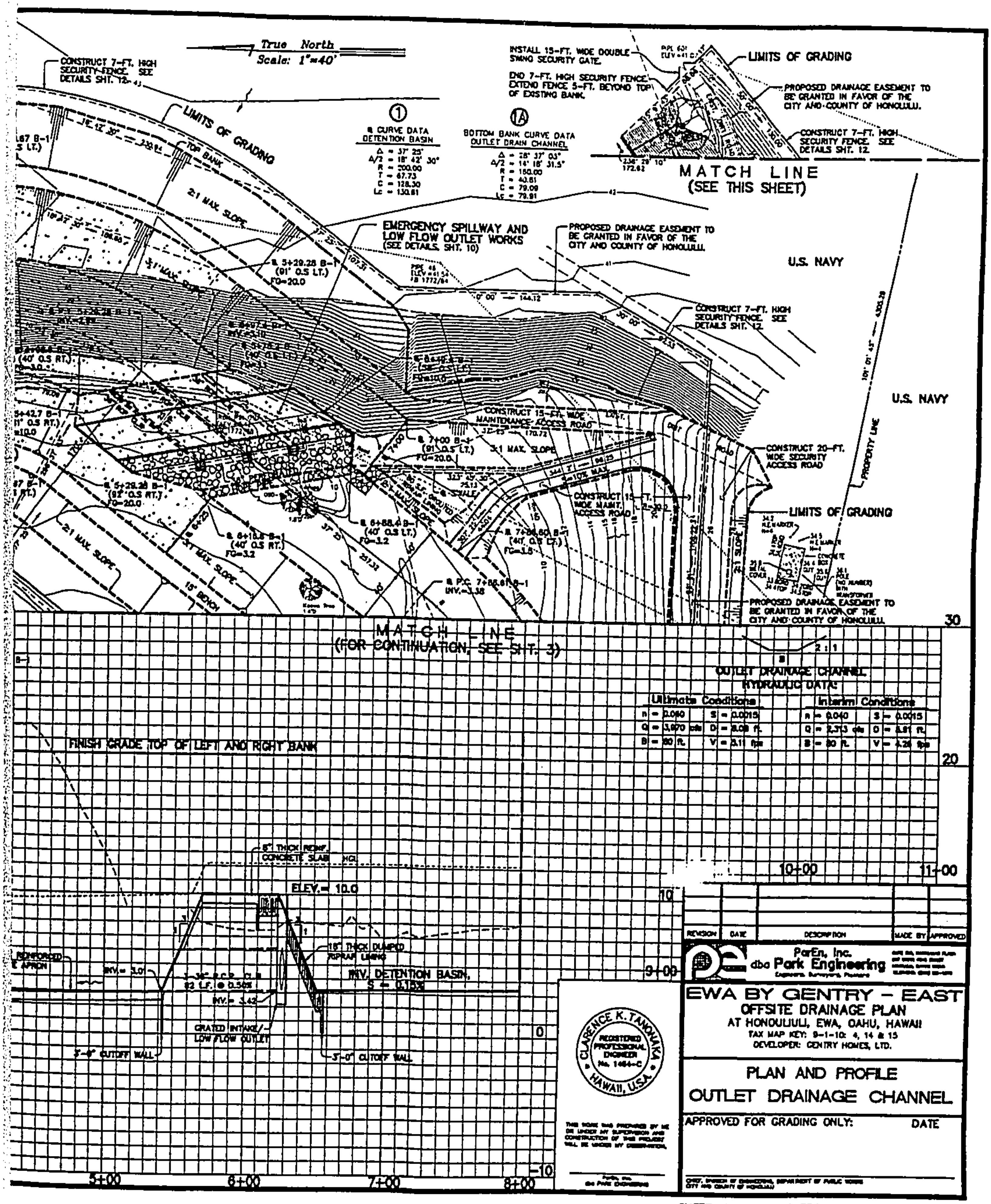




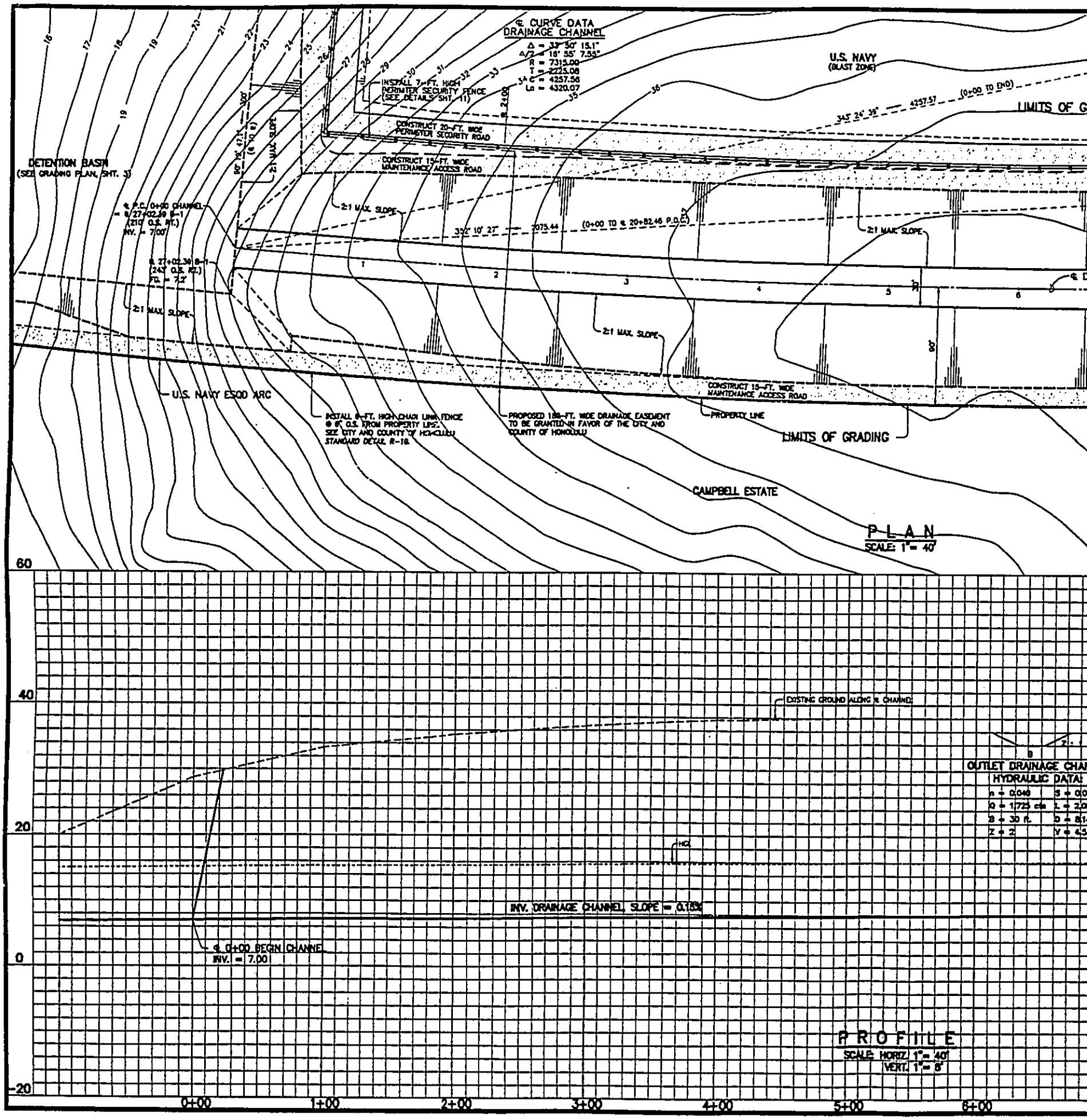
SHEET 3 OF 13 SHEETS

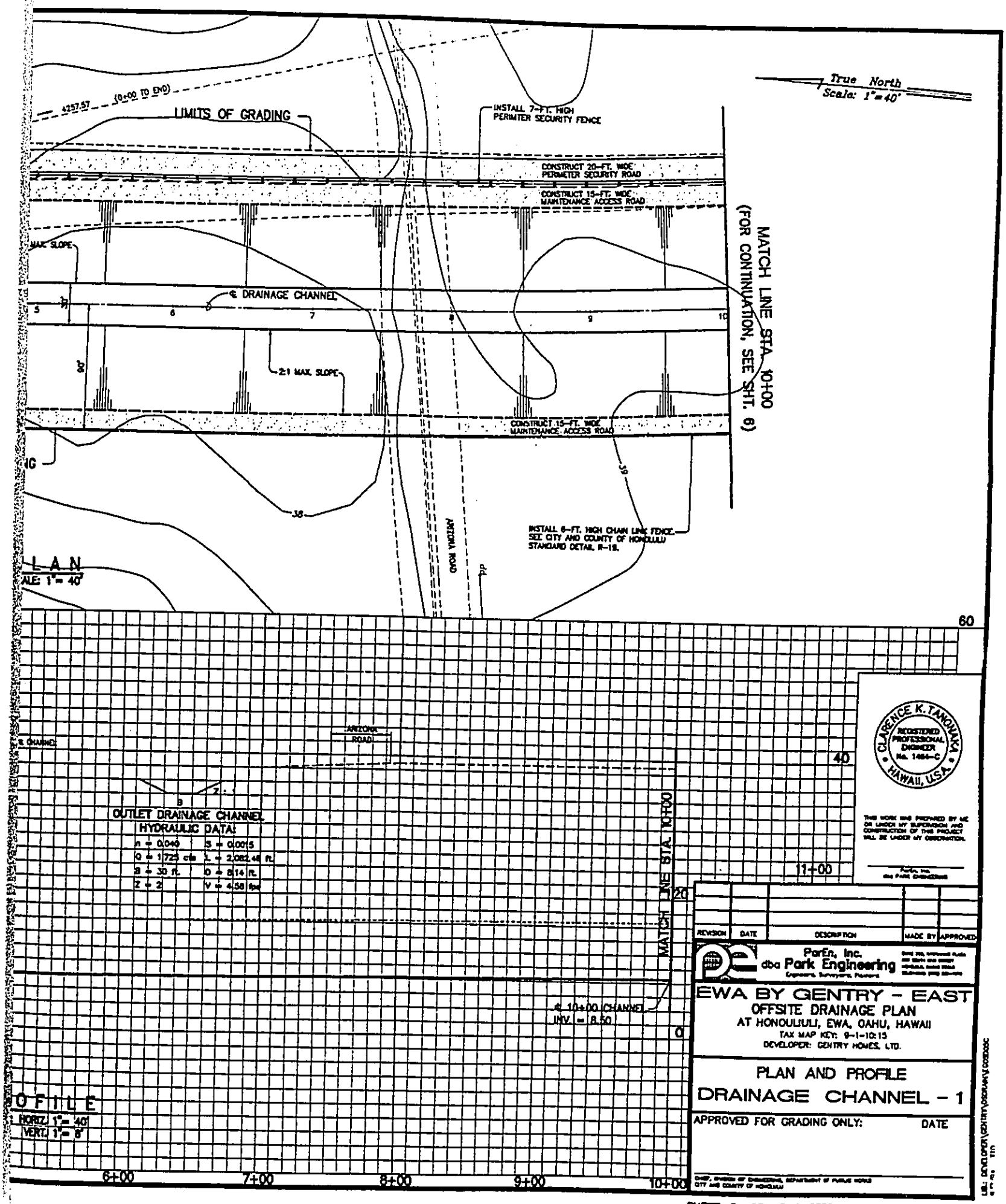


MATCH LINE
(SEE THIS SHEET)
CONNECT 20-FT. WIDE MAINTENANCE ACCESS ROAD TO EXISTING DIRT ROAD. CONTRACTOR TO PROVIDE A SMOOTH RIDING TRANSITION.
LIMITS OF GRADING
CONSTRUCT 7-FT. HIGH SECURITY FENCE. SEE DETAILS SHT. 12.
FOR SECTION, SEE SHT. 9
PROPOSED DRAINAGE EASEMENT TO BE GRANTED IN FAVOR OF THE CITY AND COUNTY OF HONOLULU.
PROPOSED DRAINAGE EASEMENT TO BE GRANTED IN FAVOR OF THE CITY AND COUNTY OF HONOLULU.
TOP BANK
2:1 MAX. SLOPE
CONSTRUCT 15-FT. WIDE MAINTENANCE ACCESS ROAD
CONSTRUCT 15-FT. WIDE MAINT. ACCESS RAMP, S=10% MAX.
3:1 TO 2:1 TRANSITION
CLASS "A" DUMPED RIPRAP LINING
WEST LOCH PEARL HARBOR
BASELINE B-1
6" THICK REINFORCED CONCRETE APRON
18" THICK GROUTED RIPRAP LINING
PROPERTY LINE
15' BENCH
REMOVE 230 L.F. OF EXIST. C.L. FENCE
TURNAROUND AREA
SWALE
EXIST. 6-FT. HIGH CHAIN LINK FENCE TO REMAIN
PROPOSED DRAINAGE EASEMENT TO BE GRANTED IN FAVOR OF THE CITY AND COUNTY OF HONOLULU.
LIMITS OF GRADING ALONG EXISTING C.L. FENCE
WILDLIFE REFUGE (U.S. FISH AND WILDLIFE SERVICE)
CLASS "A" DUMPED RIPRAP GRADATION (6.5 ft. MIN. THICKNESS)
D100 = 4.7 ft. to 5.3 ft.
D85 = 3.7 ft. to 4.4 ft.
D50 = 3.1 ft. to 3.6 ft.
D15 = 1.3 ft. to 1.9 ft.
PLAN
SCALE: 1" = 40'
EXIST. GROUND ALONG ℄ (B-1)
ELEV.= 20.0
FINISH GRADE TOP OF LEFT BANK
FINISH GRADE TOP OF LEFT AND
ELEV.= 12.5
FINISH GRADE TOP OF RIGHT BANK
ELEV.= 13.0
LEFT BANK
RIGHT BANK
FINISH GRADE ALONG MAINT. ACCESS RAMP (RT.) 10% MAX. SLOPE
FINISH GRADE ALONG MAINT. ACCESS RAMP (LT.) 10% MAX. SLOPE
18" THICK GROUTED RIPRAP LINING
6" THICK REINFORCED CONCRETE APRON
INV. OUTLET DRAINAGE CHANNEL, S = 0.15%
HIGH WATER MARK
EROSION CONTROL FABRIC
3'-0" CUTOFF WALL
3'-6" CUTOFF WALL
CLASS "A" DUMPED RIPRAP LINING WRAPPED WITH WOVEN FILTER FABRIC
GRATED INTAKE LOW FLOW OUTLET
PROFILE
SCALE: HORIZ. 1" = 40'
VERT. 1" = 4'
30
20
10
0
-10
(-)1+00
0+00
1+00
2+00
3+00
4+00
5+00



SHEET 4 OF 13 SHEETS


℄ CURVE DATA
DRAINAGE CHANNEL
Δ = 33° 50' 15.1"
Δ/2 = 16° 55' 7.55"
R = 7315.00
T = 2223.08
ᴬC = 4257.56
La = 4320.07
U.S. NAVY
(BLAST ZONE)
INSTALL 7-FT. HIGH PERIMETER SECURITY FENCE (SEE DETAILS, SHT. 11)
CONSTRUCT 20-FT. WIDE PERIMETER SECURITY ROAD
CONSTRUCT 15-FT. WIDE MAINTENANCE ACCESS ROAD
DETENTION BASIN
(SEE GRADING PLAN, SHT. 3)
2:1 MAX. SLOPE
345° 24' 39"
4257.57
(0+00 TO END)
LIMITS OF G
℄ P.C. 0+00 CHANNEL
= ℄ 27+02.39 B-1
(210' O.S. RT.)
INV. = 7.00'
℄ 27+02.39 B-1
(243' O.S. RT.)
FL. = 7.2'
352° 10' 27"
2075.44
(0+00 TO ℄ 20+82.46 P.O.C.)
U.S. NAVY ESQD ARC
INSTALL 6-FT. HIGH CHAIN LINK FENCE @ 8' O.S. FROM PROPERTY LINE. SEE CITY AND COUNTY OF HONOLULU STANDARD DETAIL R-18.
PROPOSED 188-FT. WIDE DRAINAGE EASEMENT TO BE GRANTED IN FAVOR OF THE CITY AND COUNTY OF HONOLULU
PROPERTY LINE
CONSTRUCT 15-FT. WIDE MAINTENANCE ACCESS ROAD
LIMITS OF GRADING
CAMPBELL ESTATE
PLAN
SCALE: 1" = 40'
EXISTING GROUND ALONG ℄ CHANNEL
INV. DRAINAGE CHANNEL, SLOPE = 0.15%
℄ 0+00 BEGIN CHANNEL
INV. = 7.00
PROFILE
SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'
60
40
20
0
-20
0+00
1+00
2+00
3+00
4+00
5+00
6+00



CLARENCE K. TANOUYE
REGISTERED PROFESSIONAL ENGINEER
No. 1464-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

ParEn, Inc.
dba Park Engineering

REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

EWA BY GENTRY - EAST

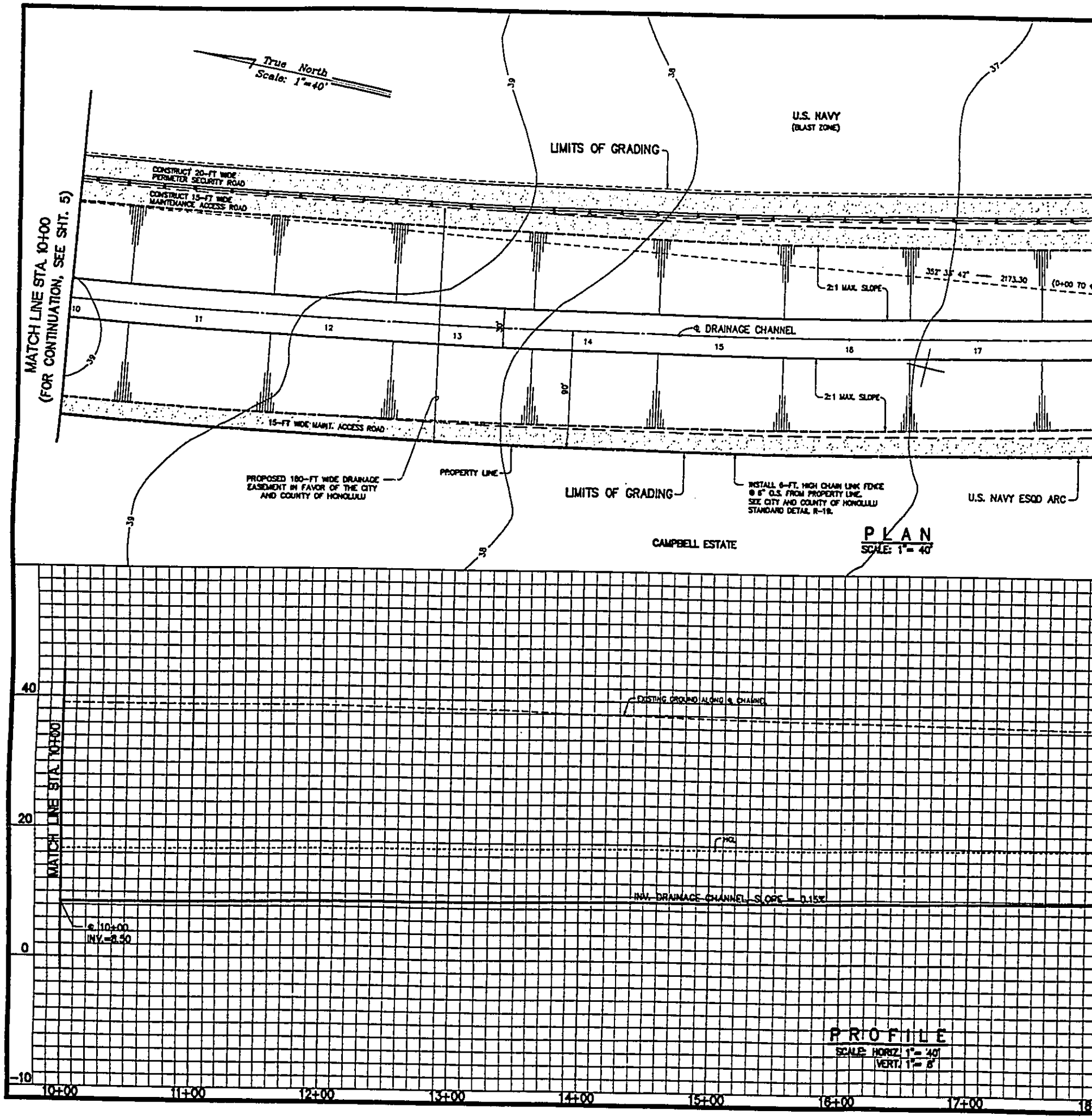
OFFSITE DRAINAGE PLAN
AT HONOULIULI, EWA, OAHU, HAWAII
TAX MAP KEY: 9-1-10:15
DEVELOPER: GENTRY HOMES, LTD.

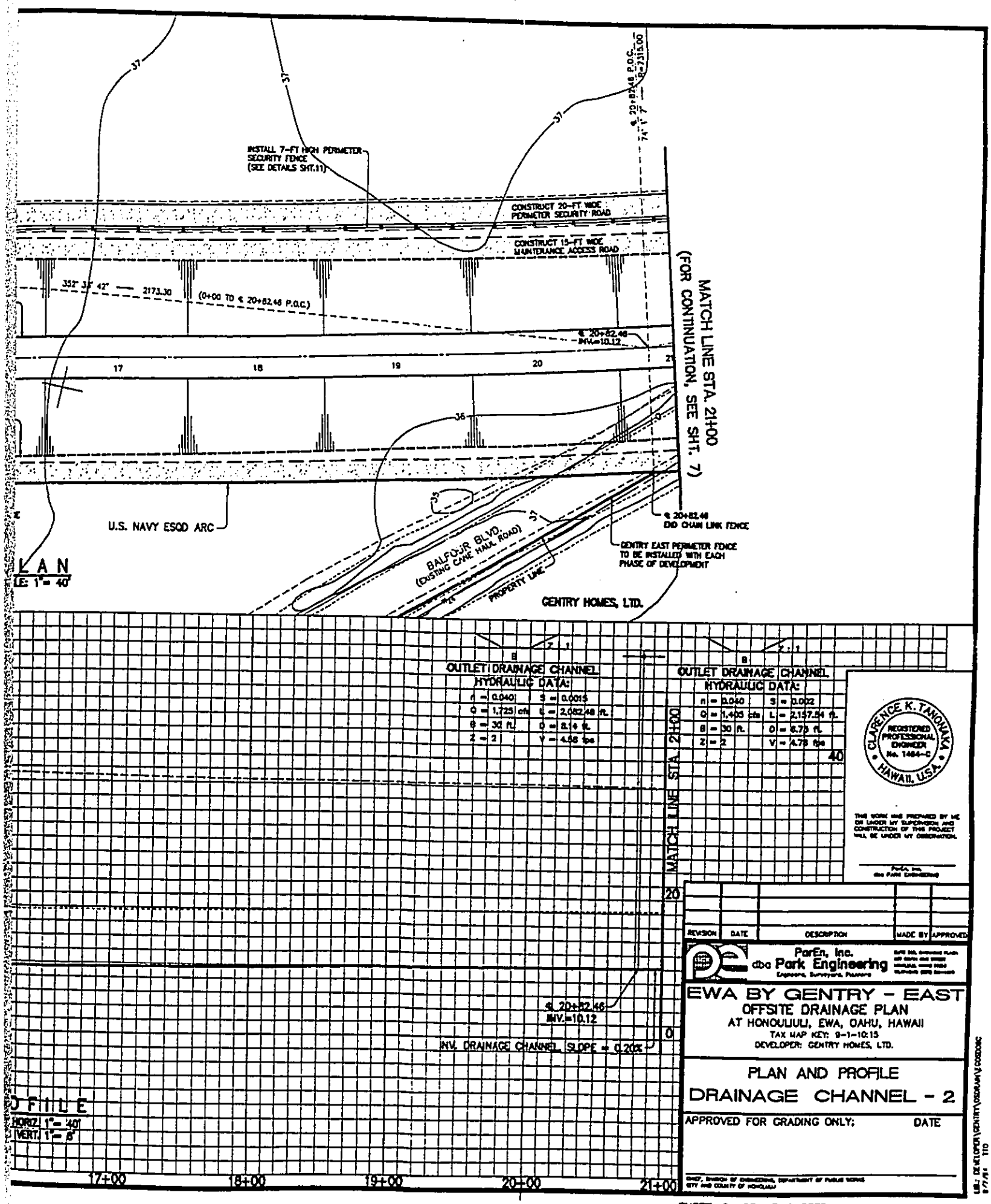
PLAN AND PROFILE
DRAINAGE CHANNEL - 1

APPROVED FOR GRADING ONLY: DATE

CHIEF, DIVISION OF ENGINEERING, DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

USE: DEVELOPER\GENTRY\DRAINAGE\DDDDDDC


True North
Scale: 1"=40'
U.S. NAVY
(BLAST ZONE)
LIMITS OF GRADING
CONSTRUCT 20-FT WIDE PERIMETER SECURITY ROAD
CONSTRUCT 15-FT WIDE MAINTENANCE ACCESS ROAD
MATCH LINE STA. 10+00
(FOR CONTINUATION, SEE SHT. 5)
352° 33' 42" 2173.30
(0+00 TO
2:1 MAX. SLOPE
℄ DRAINAGE CHANNEL
10
11
12
13
14
15
16
17
90'
15-FT WIDE MAINT. ACCESS ROAD
PROPOSED 150-FT WIDE DRAINAGE EASEMENT IN FAVOR OF THE CITY AND COUNTY OF HONOLULU
PROPERTY LINE
LIMITS OF GRADING
INSTALL 6-FT. HIGH CHAIN LINK FENCE @ 5' O.S. FROM PROPERTY LINE. SEE CITY AND COUNTY OF HONOLULU STANDARD DETAIL R-19.
U.S. NAVY ESQD ARC
CAMPBELL ESTATE
PLAN
SCALE: 1"= 40'
39
38
37
EXISTING GROUND ALONG ℄ CHANNEL
HGL
INV. DRAINAGE CHANNEL SLOPE = 0.15%
℄ 10+00
INV.=8.50
MATCH LINE STA. 10+00
40
20
0
-10
10+00
11+00
12+00
13+00
14+00
15+00
16+00
17+00
PROFILE
SCALE: HORIZ. 1"= 40'
VERT. 1"= 8'



PLAN
LE: 1" = 40'

PROFILE
HORIZ. 1" = 40'
VERT. 1" = 8'

CLARENCE K. TANIGAWA
REGISTERED PROFESSIONAL ENGINEER
No. 1484-C
HAWAII, U.S.A.

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REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

ParEn, Inc.
dba Park Engineering
Engineers, Surveyors, Planners

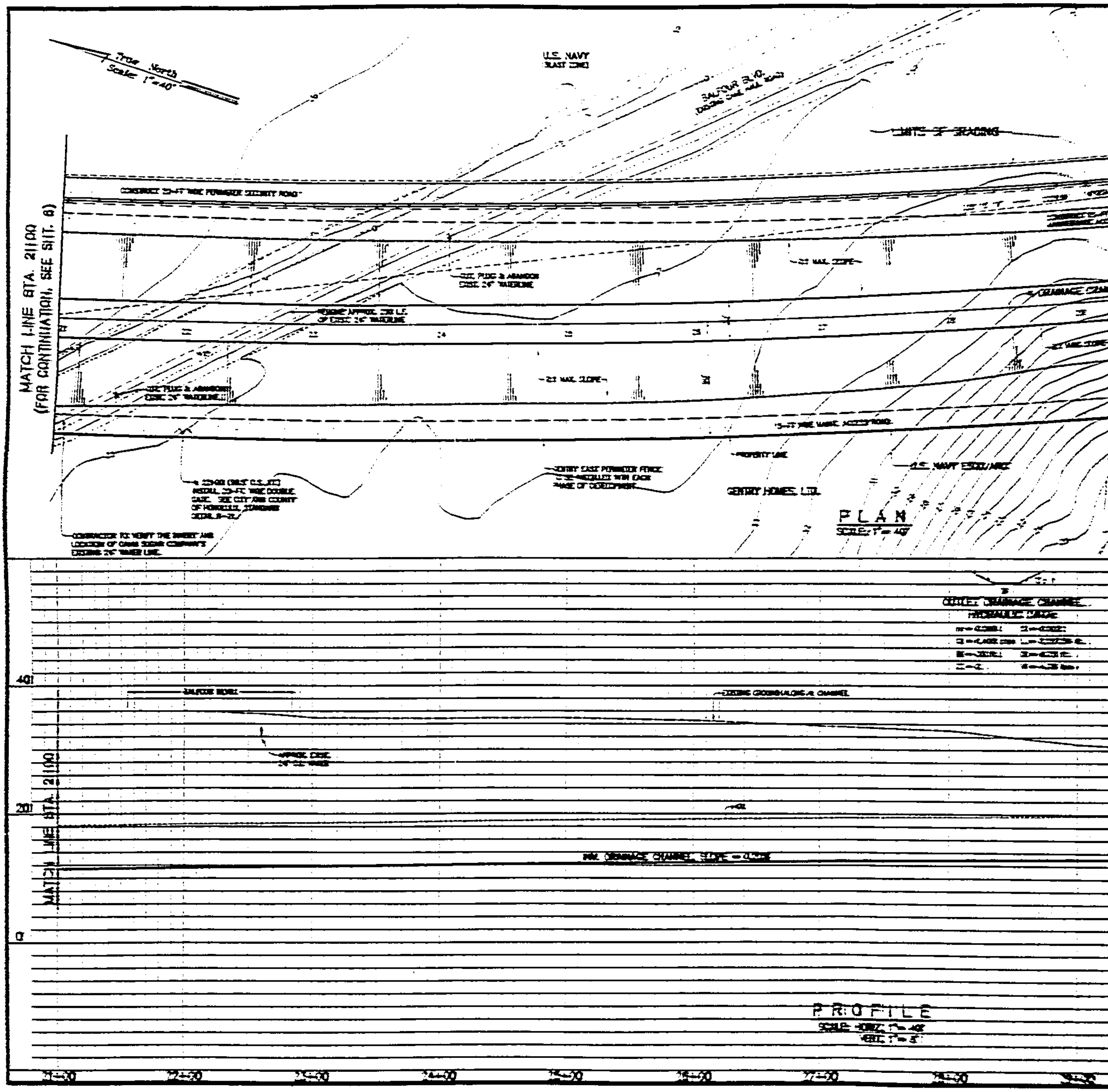
EWA BY GENTRY - EAST
OFFSITE DRAINAGE PLAN
AT HONOULIULI, EWA, OAHU, HAWAII
TAX MAP KEY: 9-1-10:15
DEVELOPER: GENTRY HOMES, LTD.

PLAN AND PROFILE
DRAINAGE CHANNEL - 2

APPROVED FOR GRADING ONLY: DATE

CHIEF, DIVISION OF ENGINEERING, DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

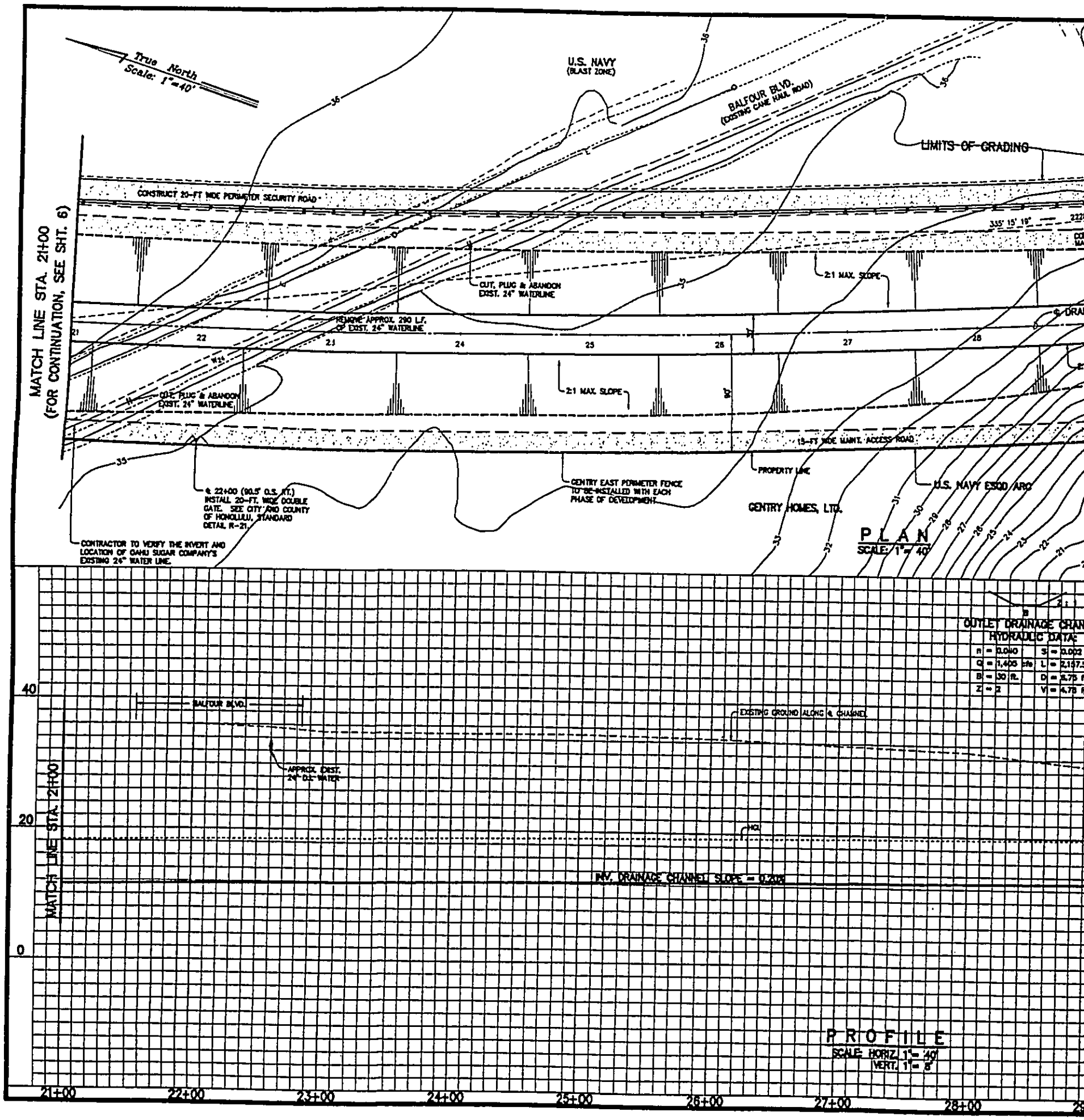
LE.: DEVELOPER\GENTRY\OSDRAIN\VOSD03NC
8/7/91 110

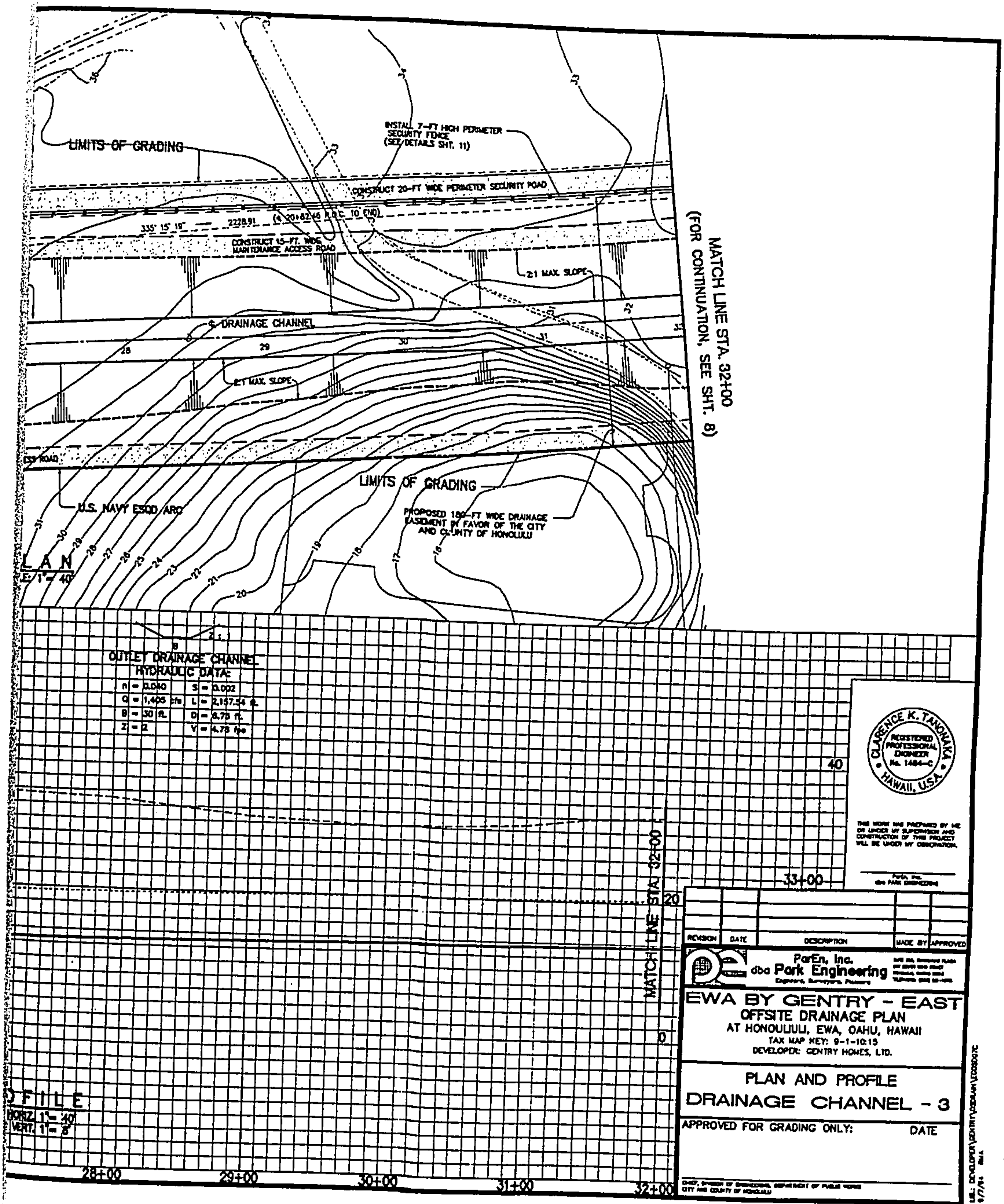


True North
U.S. NAVY
MATCH LINE STA. 21+00
PLAN
PROFILE
21+00
22+00
23+00
24+00
25+00
26+00
27+00
28+00

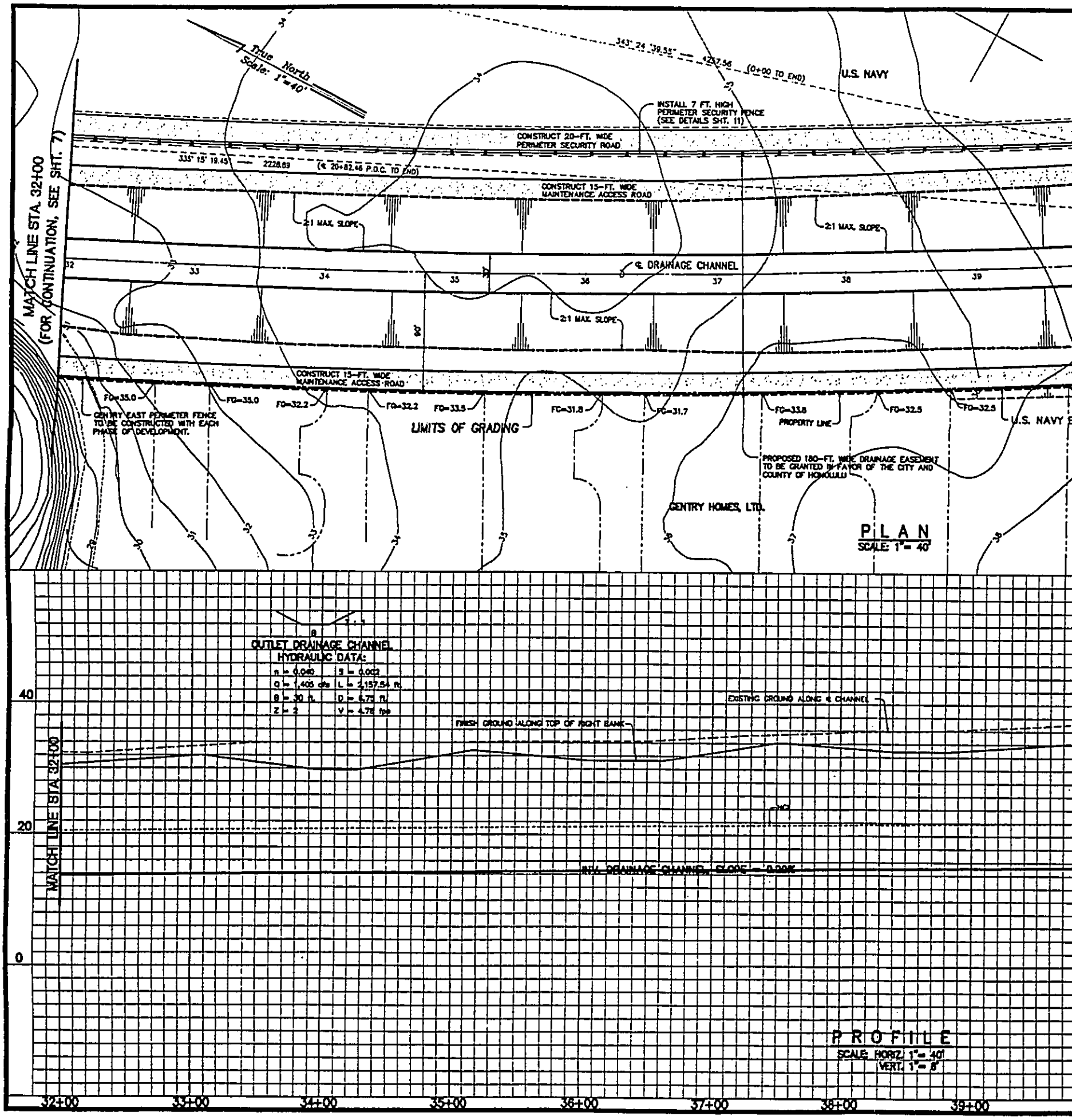
CORRECTION

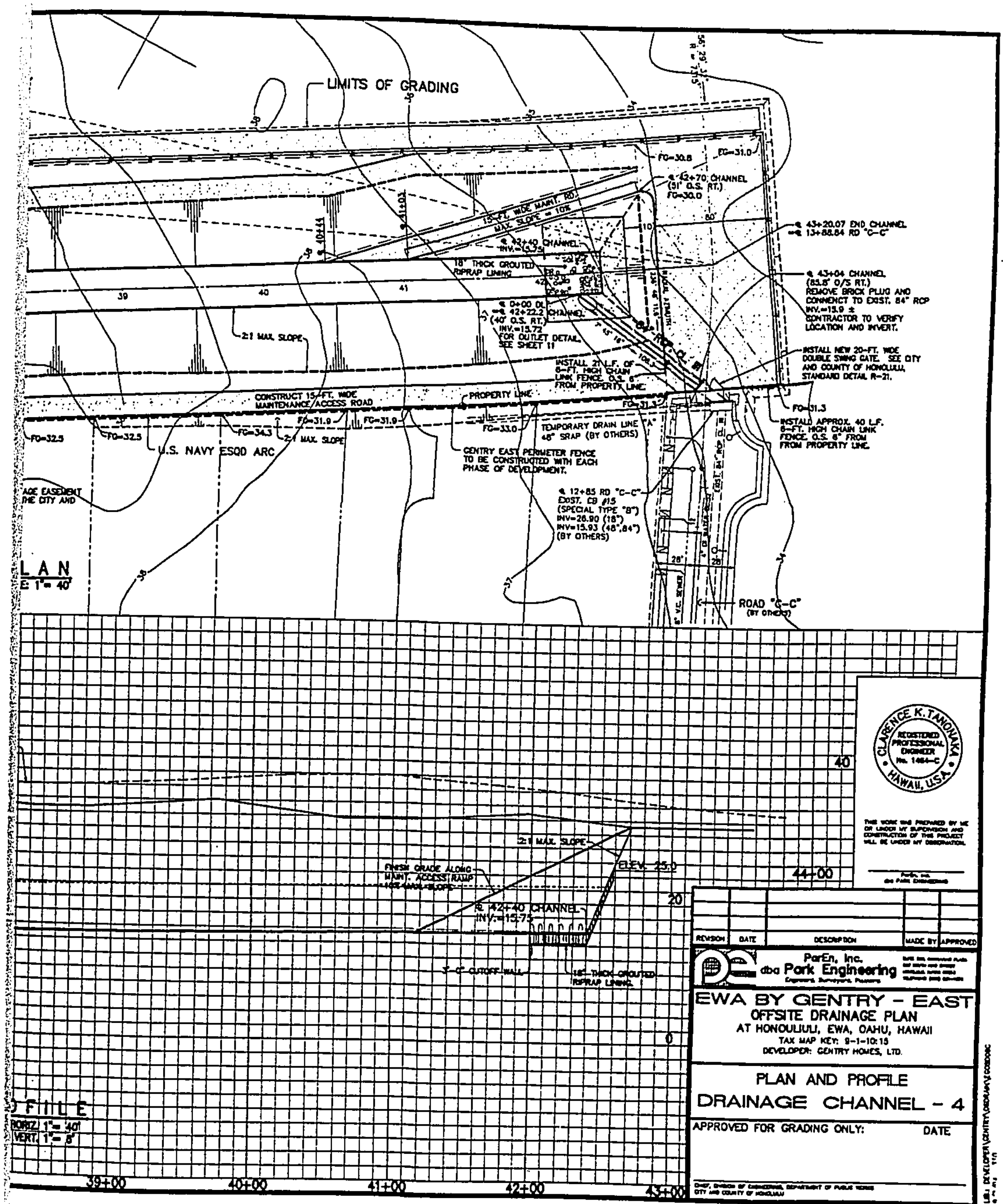
THE PRECEDING DOCUMENT(S) HAS BEEN REPHOTOGRAPHED TO ASSURE LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

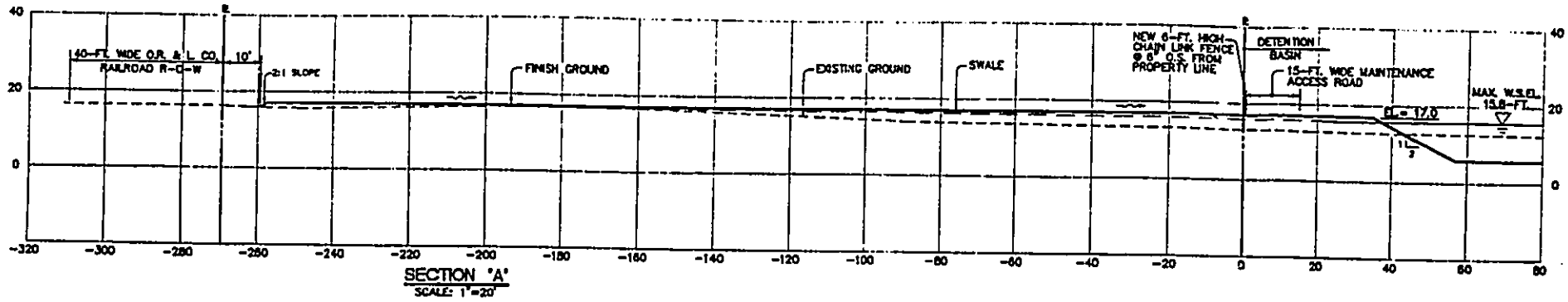

True North
Scale: 1"=40'
U.S. NAVY
(BLAST ZONE)
BALFOUR BLVD.
(EXISTING CANE HAUL ROAD)
LIMITS OF GRADING
CONSTRUCT 20-FT WIDE PERIMETER SECURITY ROAD
MATCH LINE STA. 21+00
(FOR CONTINUATION, SEE SHT. 6)
CUT, PLUG & ABANDON EXIST. 24" WATERLINE
REMOVE APPROX. 290 L.F. OF EXIST. 24" WATERLINE
2:1 MAX. SLOPE
15-FT WIDE MAINT. ACCESS ROAD
PROPERTY LINE
GENTRY EAST PERIMETER FENCE TO BE INSTALLED WITH EACH PHASE OF DEVELOPMENT
@ 22+00 (90.5' O.S. FT.) INSTALL 20-FT. WIDE DOUBLE GATE. SEE CITY AND COUNTY OF HONOLULU, STANDARD DETAIL R-21
CONTRACTOR TO VERIFY THE INVERT AND LOCATION OF OAHU SUGAR COMPANY'S EXISTING 24" WATER LINE.
U.S. NAVY ESQD ARC
GENTRY HOMES, LTD.
PLAN
SCALE: 1" = 40'
OUTLET DRAINAGE CHAN
HYDRAULIC DATA:
n = 0.040
Q = 1,405 cfs
B = 30 ft.
Z = 2
S = 0.002
L = 2,157.
D = 4.75 f
V = 4.78 f
BALFOUR BLVD.
EXISTING GROUND ALONG ℄ CHANNEL
APPROX. EXIST. 24" O.S. WATER
HGL
RIV. DRAINAGE CHANNEL SLOPE = 0.20%
MATCH LINE STA. 12+00
PROFILE
SCALE: HORIZ. 1"= 40'
VERT. 1"= 8'
40
20
0
21+00
22+00
23+00
24+00
25+00
26+00
27+00
28+00



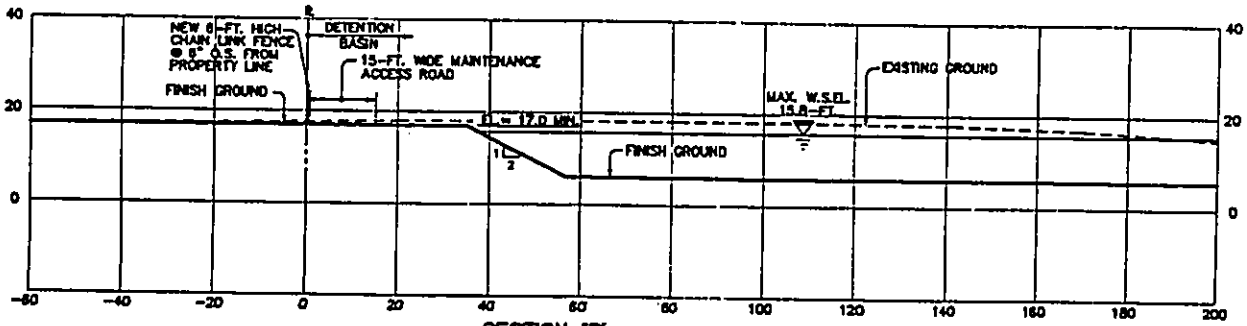
SHEET 7 OF 13 SHEETS


True North
Scale: 1"=40'
MATCH LINE STA. 32+00
(FOR CONTINUATION, SEE SHT. 7)
363° 26' 39.55" — 4257.56 (0+00 TO END)
U.S. NAVY
INSTALL 7 FT. HIGH PERIMETER SECURITY FENCE (SEE DETAILS SHT. 11)
CONSTRUCT 20-FT. WIDE PERIMETER SECURITY ROAD
335° 15' 19.45" — 2228.89 (℄ 20+82.46 P.O.C. TO END)
CONSTRUCT 15-FT. WIDE MAINTENANCE ACCESS ROAD
2:1 MAX. SLOPE
2:1 MAX. SLOPE
℄ DRAINAGE CHANNEL
2:1 MAX. SLOPE
CONSTRUCT 15-FT. WIDE MAINTENANCE ACCESS ROAD
FG=35.0
FG=35.0
FG=32.2
FG=32.2
FG=33.5
FG=31.8
FG=31.7
FG=33.8
FG=32.5
FG=32.5
GENTRY EAST PERIMETER FENCE TO BE CONSTRUCTED WITH EACH PHASE OF DEVELOPMENT.
LIMITS OF GRADING
PROPERTY LINE
U.S. NAVY
PROPOSED 180-FT. WIDE DRAINAGE EASEMENT TO BE GRANTED IN FAVOR OF THE CITY AND COUNTY OF HONOLULU
GENTRY HOMES, LTD.
PLAN
SCALE: 1"= 40'
OUTLET DRAINAGE CHANNEL
HYDRAULIC DATA:
n = 0.040 | S = 0.002
Q = 1,405 cfs | L = 2,157.54 ft.
B = 30 ft. | D = 6.75 ft.
Z = 2 | V = 4.78 fps
EXISTING GROUND ALONG ℄ CHANNEL
FINISH GROUND ALONG TOP OF RIGHT BANK
INV.
INV. DRAINAGE CHANNEL SLOPE = 0.00%
MATCH LINE STA 32+00
40
20
0
32+00
33+00
34+00
35+00
36+00
37+00
38+00
39+00
PROFILE
SCALE: HORIZ. 1"= 40'
VERT. 1"= 8'

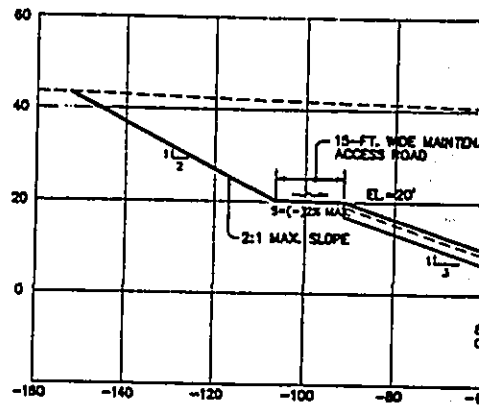

LIMITS OF GRADING
15-FT. WIDE MAINT. RD. MAX. SLOPE = 10%
18" THICK GROUTED RIPRAP LINING
2:1 MAX. SLOPE
CONSTRUCT 15-FT. WIDE MAINTENANCE/ACCESS ROAD
PROPERTY LINE
U.S. NAVY ESQD ARC
TEMPORARY DRAIN LINE "A" 48" SRAP (BY OTHERS)
GENTRY EAST PERIMETER FENCE TO BE CONSTRUCTED WITH EACH PHASE OF DEVELOPMENT.
INSTALL NEW 20-FT. WIDE DOUBLE SWING GATE. SEE CITY AND COUNTY OF HONOLULU, STANDARD DETAIL R-21.
INSTALL APPROX. 40 L.F. 6-FT. HIGH CHAIN LINK FENCE. O.S. 6" FROM FROM PROPERTY LINE.
ROAD "C-C" (BY OTHERS)
PLAN SCALE: 1"= 40'
PROFILE HORIZ. 1"= 40' VERT. 1"= 8'
FINISH GRADE ALONG MAINT. ACCESS RAMP
ELEV. 25.0
3'-0" CUTOFF WALL
18" THICK GROUTED RIPRAP LINING
39+00
40+00
41+00
42+00
43+00
44+00
CLARENCE K. TANONAKA REGISTERED PROFESSIONAL ENGINEER No. 1464-C HAWAII, U.S.A.
REVISION DATE DESCRIPTION MADE BY APPROVED
ParEn, Inc. dba Park Engineering
EWA BY GENTRY - EAST
OFFSITE DRAINAGE PLAN
AT HONOULIULI, EWA, OAHU, HAWAII
TAX MAP KEY: 9-1-10:15
DEVELOPER: GENTRY HOMES, LTD.
PLAN AND PROFILE
DRAINAGE CHANNEL - 4
APPROVED FOR GRADING ONLY: DATE
SHEET 8 OF 13 SHEETS

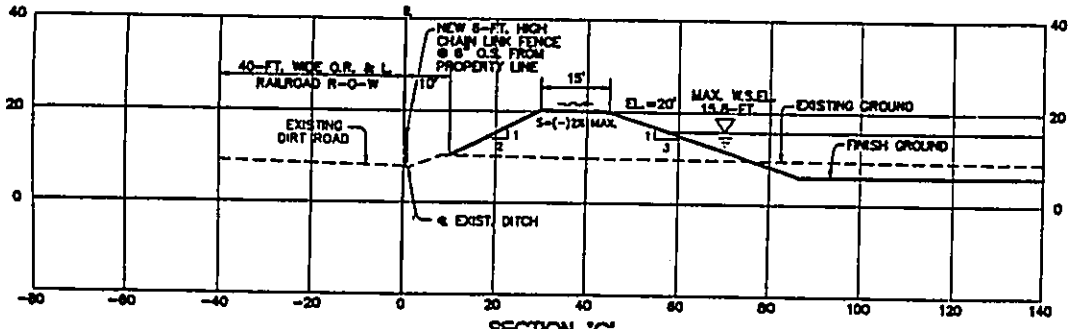


SECTION "A"
SCALE: 1"=20'

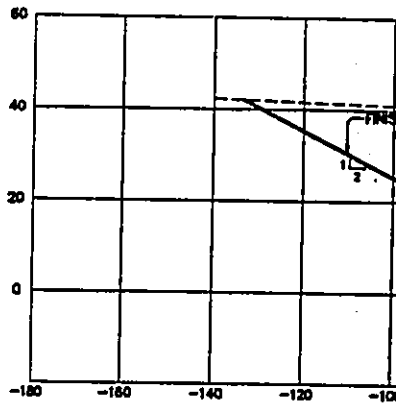


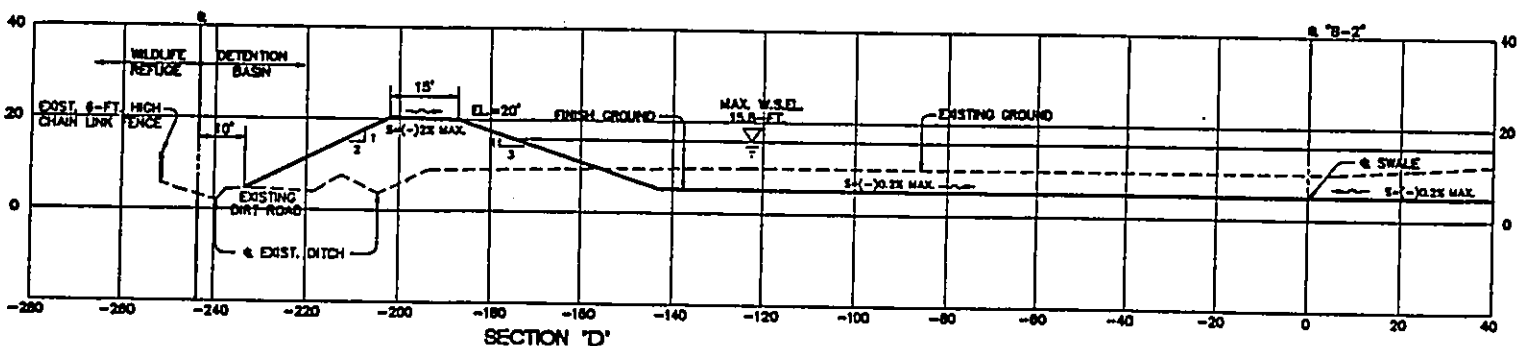
SECTION "B"
SCALE: 1"=20'



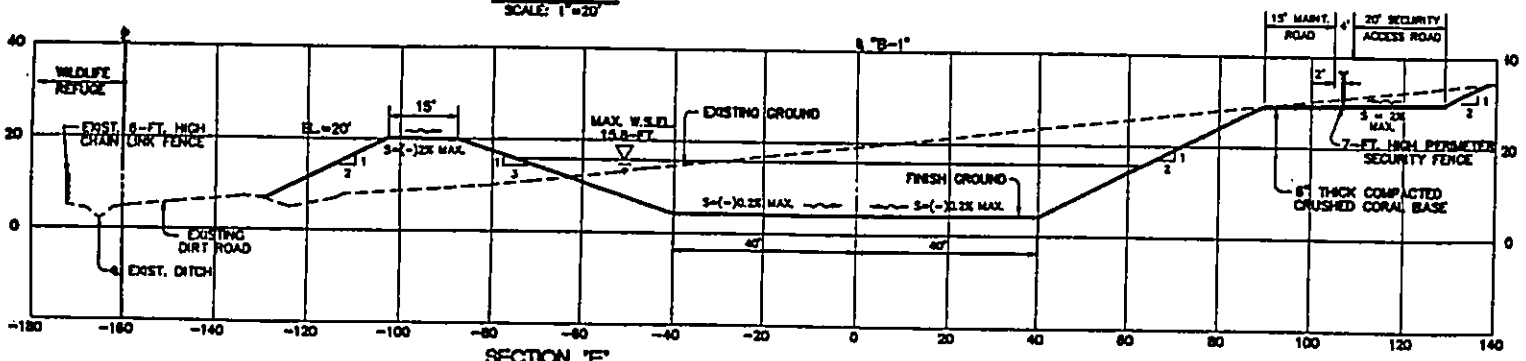


SECTION "C"
SCALE: 1"=20'

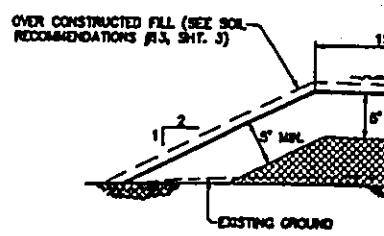




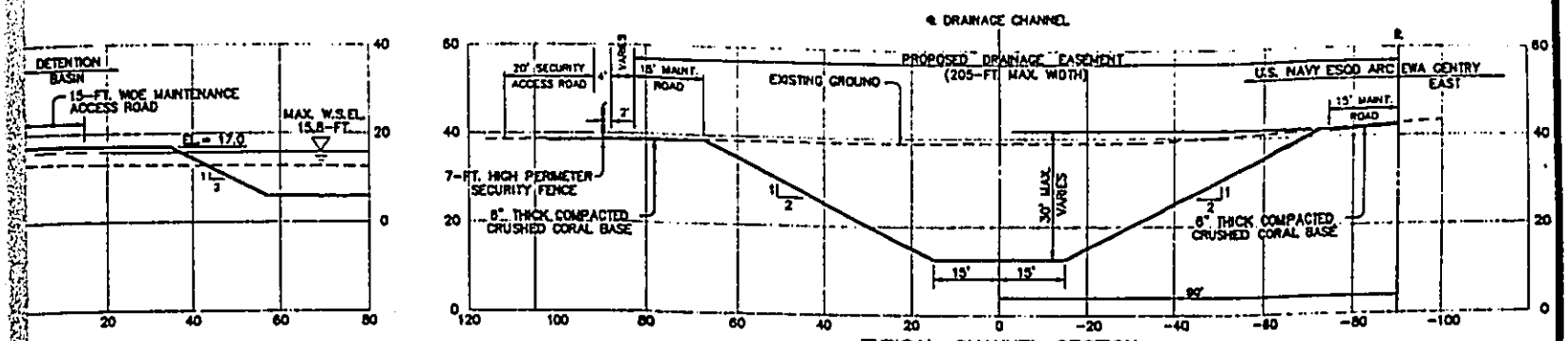
SECTION "D"
SCALE: 1"=20'



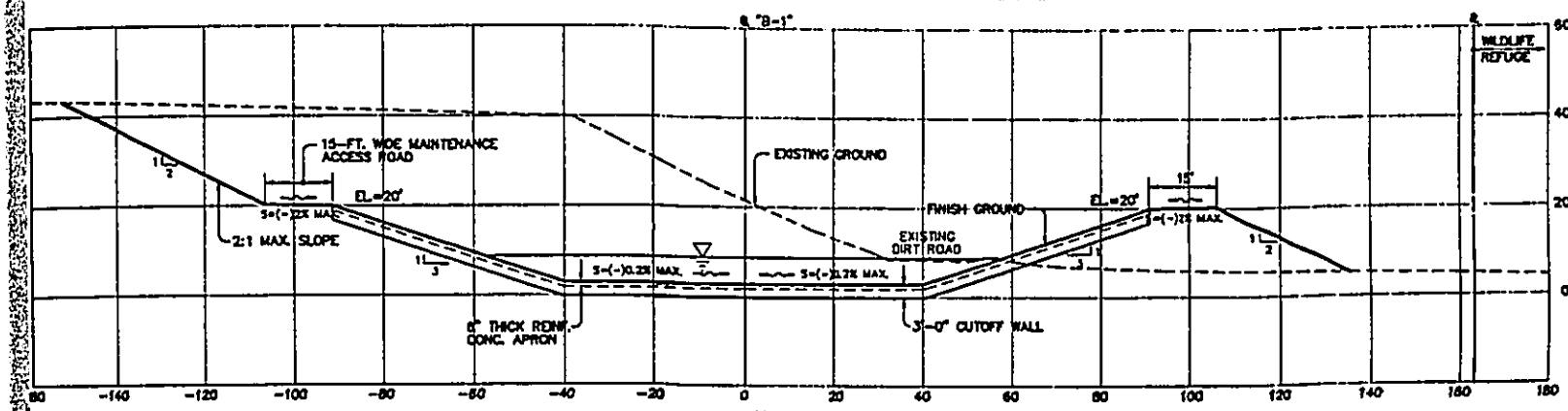
SECTION "E"
SCALE: 1"=20'



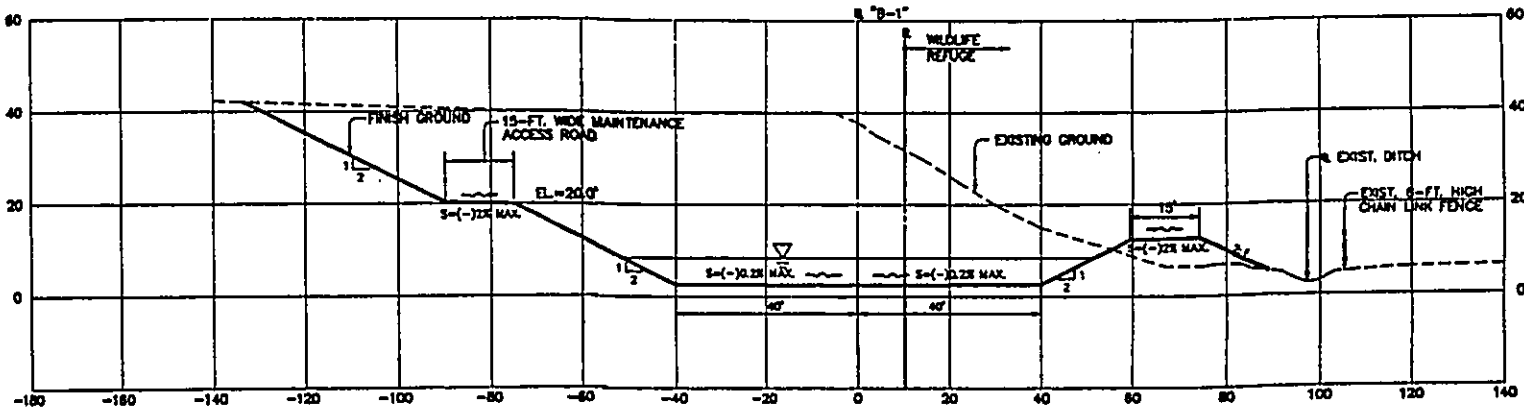
TYPICAL BE
SCA



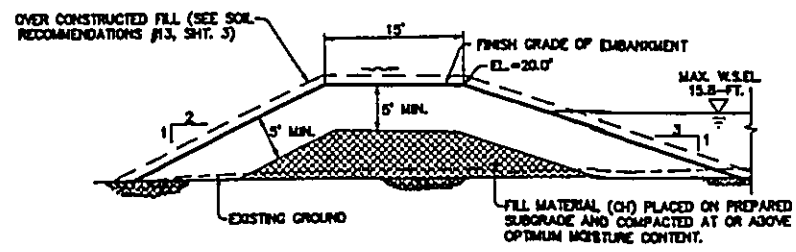
TYPICAL CHANNEL SECTION
SCALE: 1"=20'



SECTION "F"
SCALE: 1"=20'



SECTION "G"
SCALE: 1"=20'



TYPICAL BERM SECTION
SCALE: 1"=10'

REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

ParEn, Inc.
dba Park Engineering
Engineers, Surveyors, Planners

EWA BY GENTRY - EAST
OFFSITE DRAINAGE PLAN
AT HONOULIULI, EWA, OAHU, HAWAII
TAX MAP KEY: 9-1-10:15
DEVELOPER: GENTRY HOMES, LTD.

CROSS - SECTIONS

CLARENCE K. TANOMAKA
REGISTERED PROFESSIONAL ENGINEER
No. 1484-C
HAWAII, U.S.A.

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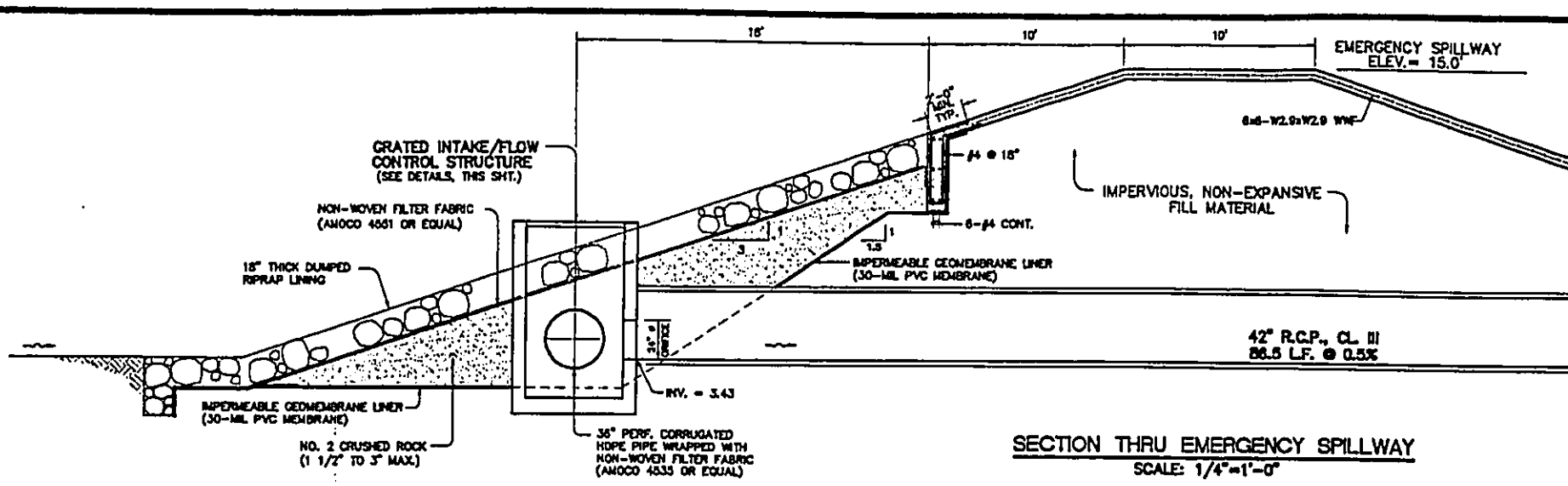
ParEn, Inc.
dba PARK ENGINEERING

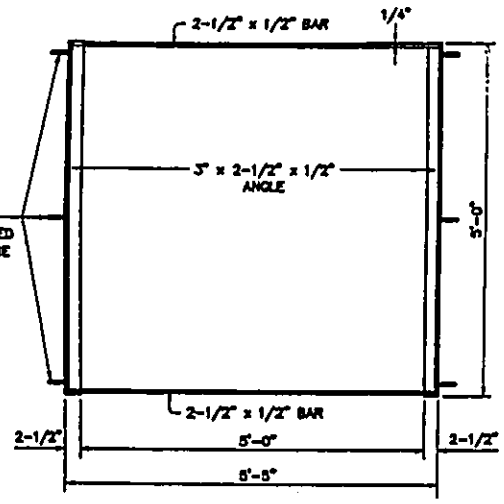
APPROVED FOR GRADING ONLY: DATE

CHIEF, DIVISION OF ENGINEERING, DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

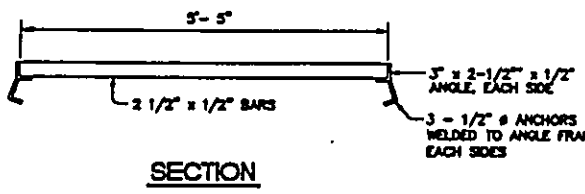


SECTION THRU EMERGENCY SPILLWAY

SCALE: 1/4"=1'-0"



PLAN



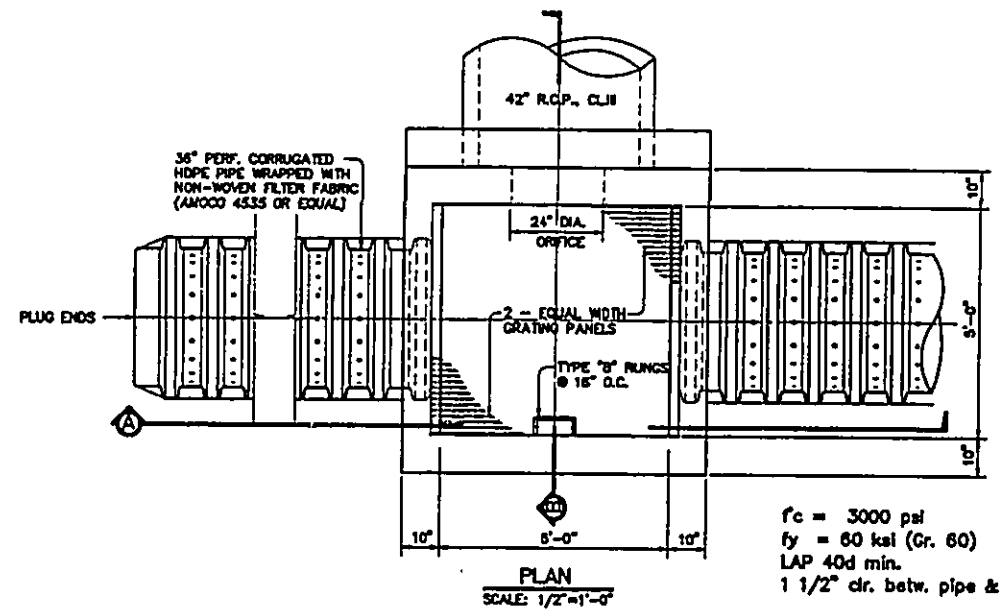
SECTION

DETAIL - STEEL INTAKE FRAME

SCALE: 3/4"=1'-0"

NOTES:

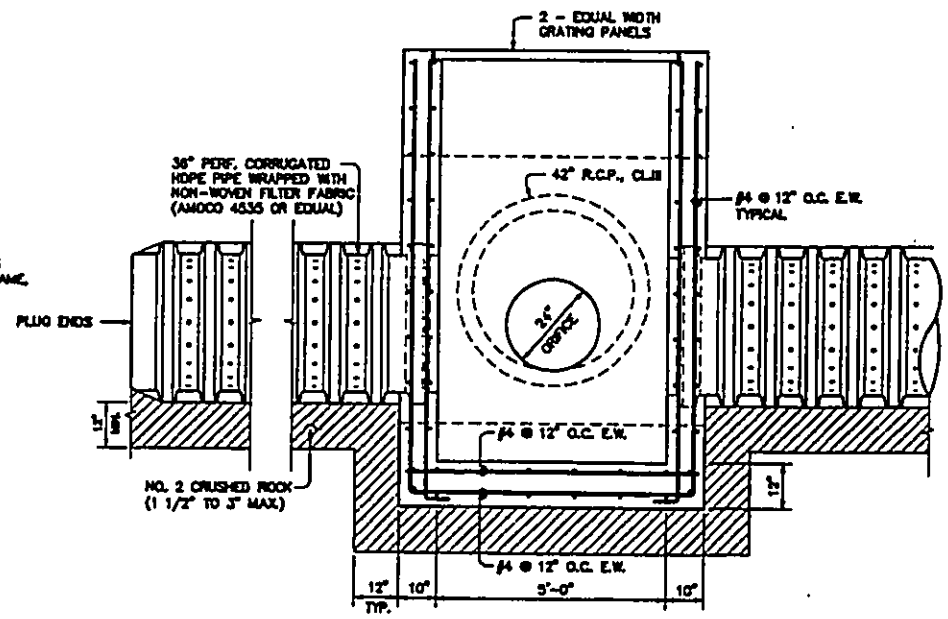
1. GRATING SHALL BE HEAVY-WELD STEEL GRATING, GARY HW1-0-250 OR EQUAL WITH 2-1/2" x 1/4" BEARING BARS @ 1-3/8" c/c AND 1/2" ROUND BARS @ 4" c/c. EACH INTAKE SHALL BE PROVIDED WITH TWO (2) EQUAL WIDTH PANELS.
2. FRAMES AND GRATINGS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
3. ALL WELDS FOR THE FRAME SHALL BE 1/4".



PLAN

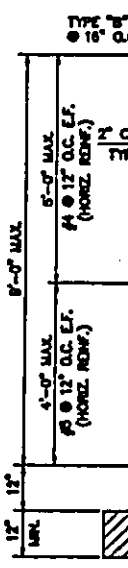
SCALE: 1/2"=1'-0"

f'c = 3000 psi
fy = 60 ksi (Gr. 60)
LAP 40d min.
1 1/2" clr. betw. pipe & steel



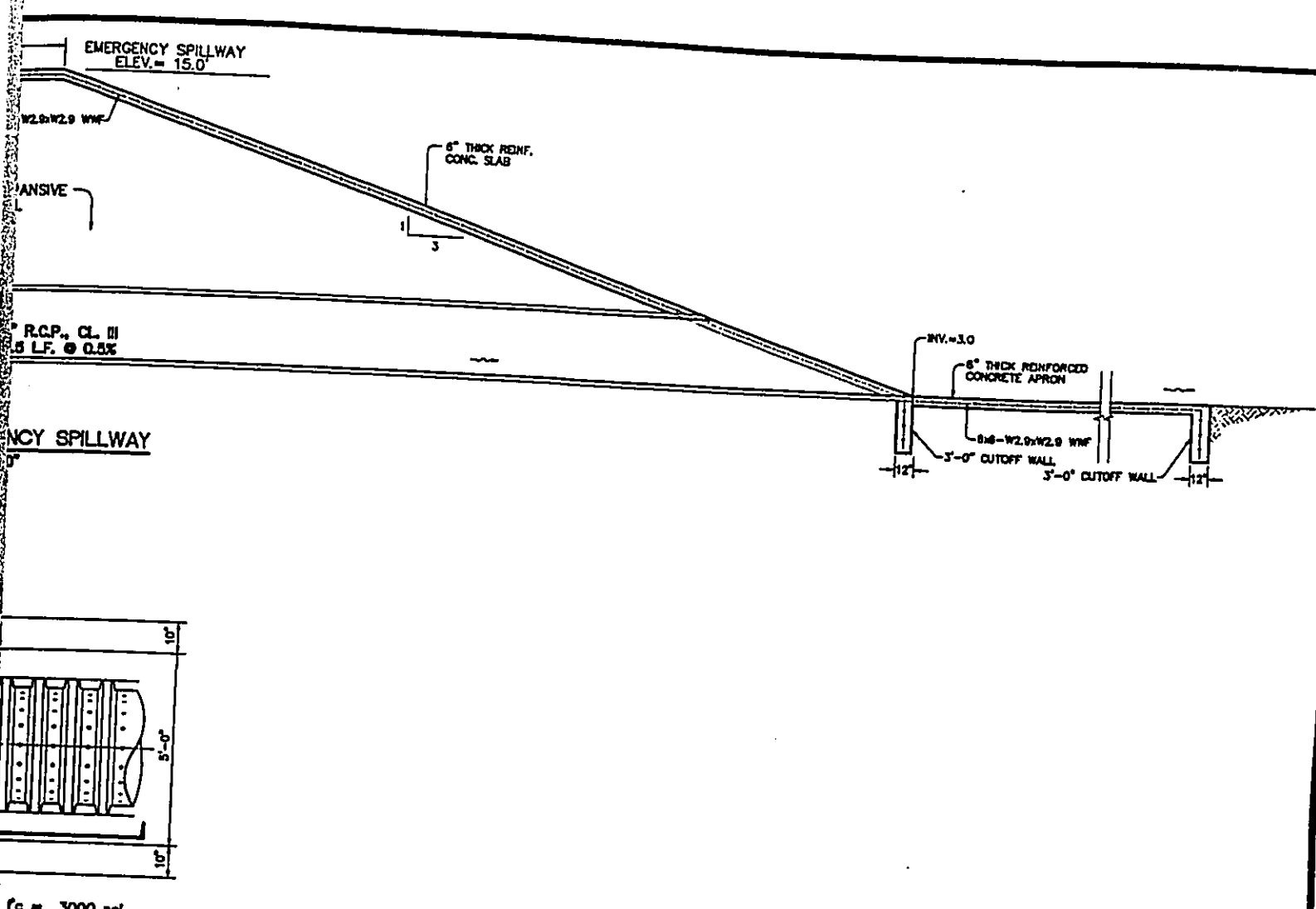
SECTION "A"

SCALE: 1/2"=1'-0"

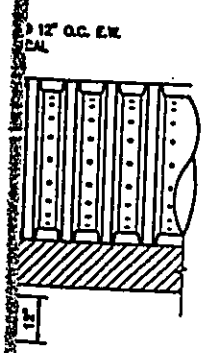


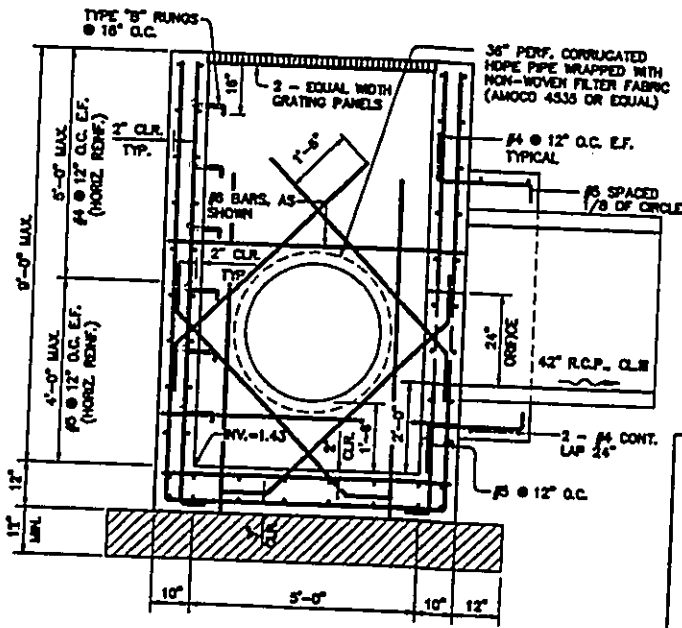
DETAIL - FLOW CONTROL STRU

SCALE: 1/2"=1'-0"



f'c = 3000 psi
fy = 60 ksi (Gr. 60)
LAP 40d min.
1 1/2" clr. betw. pipe & steel





SECTION "B"
SCALE: 1/2"=1'-0"

TAIL - FLOW CONTROL STRUCTURE
SCALE: 1/2"=1'-0"

CLARENCE K. TANOWAKA
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No. 1484-C
HAWAII, U.S.A.

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ParEn, Inc.
dba Park Engineering

REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

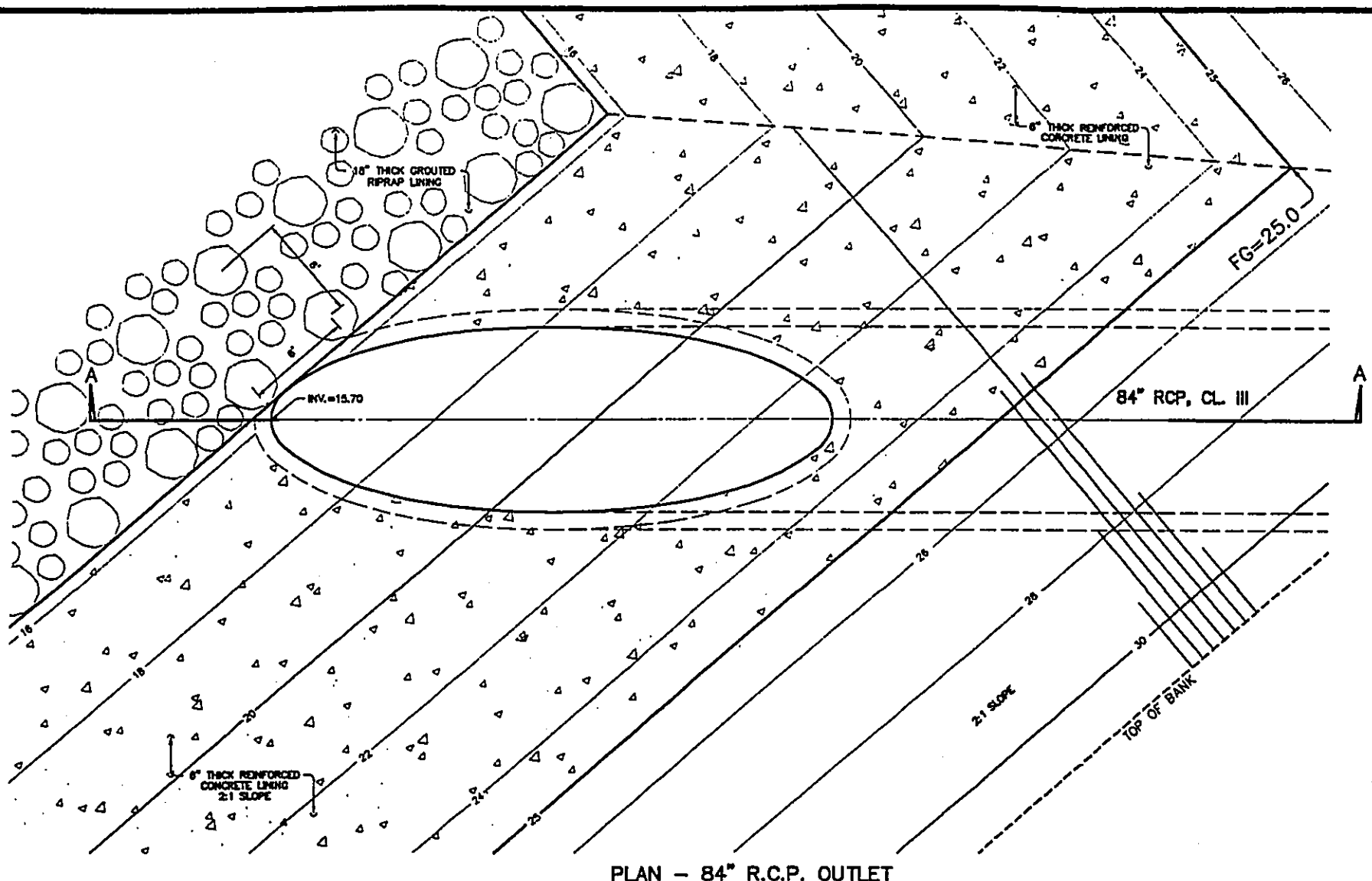
ParEn, Inc.
dba Park Engineering

EWA BY GENTRY - EAST
OFFSITE DRAINAGE PLAN
AT HONOULIULI, EWA, OAHU, HAWAII
TAX MAP KEY: 9-1-10:15
DEVELOPER: GENTRY HOMES, LTD.

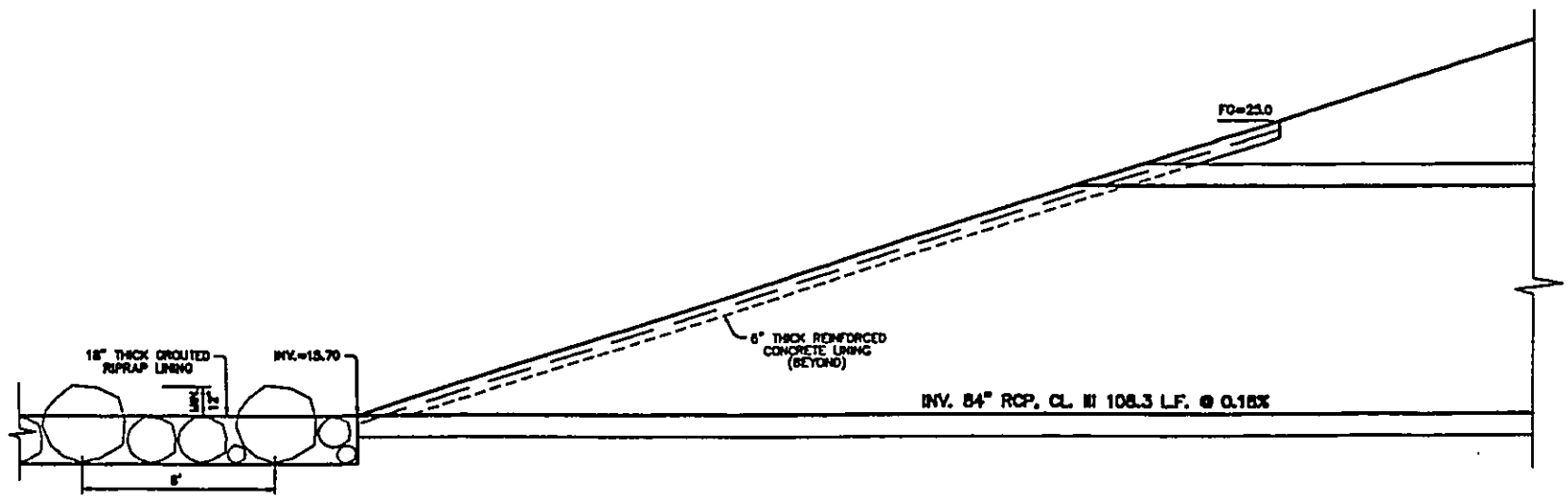
DRAINAGE DETAILS

APPROVED FOR GRADING ONLY: DATE

DIRECTOR OF TRANSPORTATION, DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

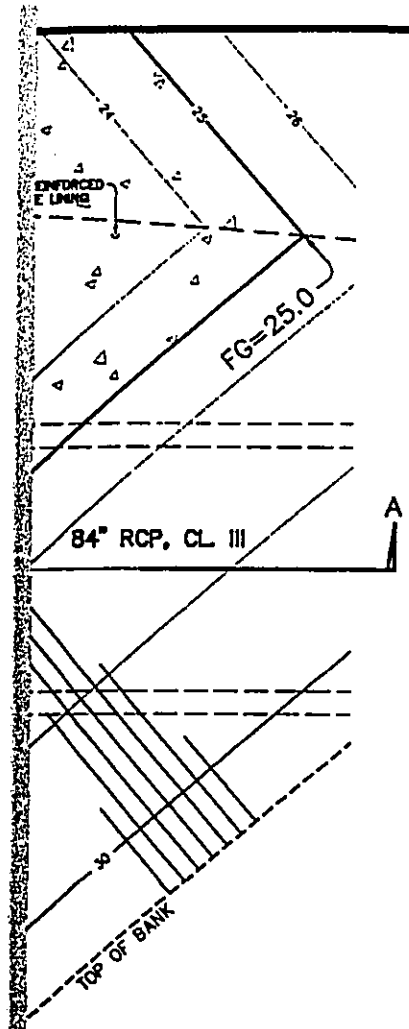


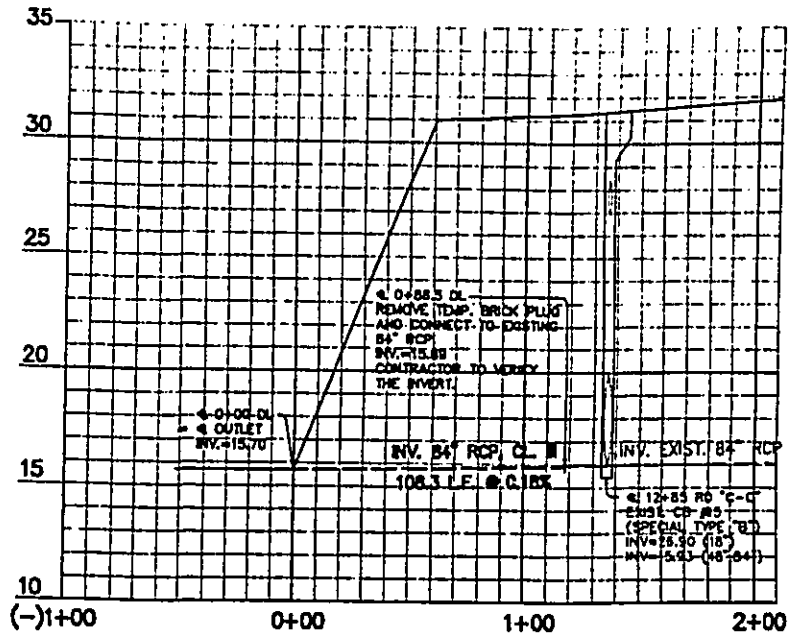
PLAN – 84" R.C.P. OUTLET
SCALE: 3/8"=1'-0"



SECTION A–A
SCALE: 3/8"=1'-0"

ROTATED BASE PT.





PROFILE

SCALE: HORIZ. 1"= 40'
VERT. 1"= 4'

REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

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dba Park Engineering

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ParEn, Inc.
dba PARK ENGINEERING

EWA BY GENTRY - EAST

OFFSITE DRAINAGE PLAN

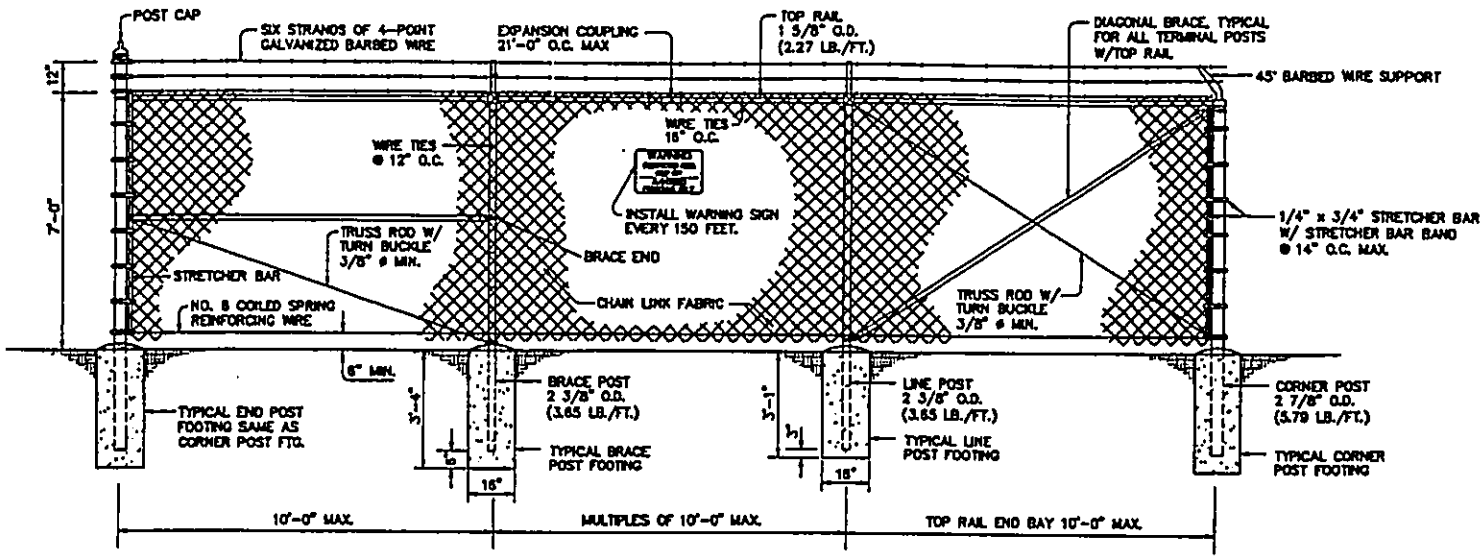
AT HONOULULI, EWA, OAHU, HAWAII
TAX MAP KEY: 9-1-10:15
DEVELOPER: GENTRY HAWAII, LTD.

DRAINAGE DETAILS

APPROVED FOR GRADING ONLY: DATE

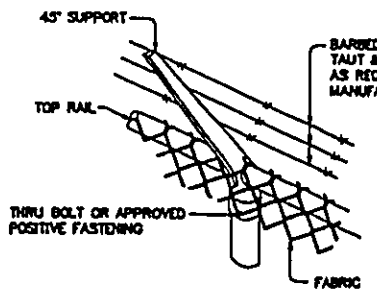
CHIEF, DIVISION OF ENGINEERING, DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

L:\B - DEVELOPER'S\GENTRY\OFFSITE\DRAINAGE\DETAILS.DWG



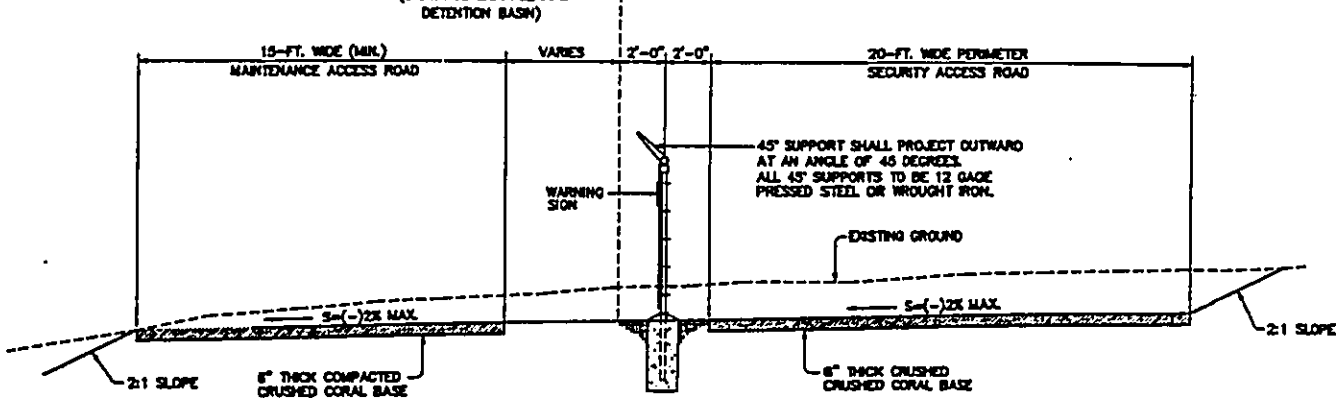
CHAIN LINK SECURITY FENCE WITH SIX STRANDS OF BARBED WIRE

NOT TO SCALE



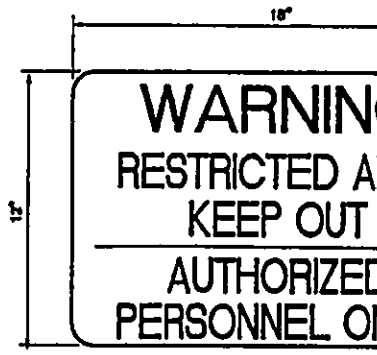
DETAIL OF 45° SUPPO

NOT TO SCALE



TYPICAL SECTION
MAINTENANCE AND SECURITY ACCESS ROAD

SCALE: 1/4" = 1'



WARNING SIGN NOTES:

1. "WARNING" SHOULD BE RED LETTERING (2 INCH WHITE BACKGROUND.
2. REMAINDER OF WORDING (1 1/2 INCHES HIGH) BLACK LETTERING ON WHITE BACKGROUND.

WARNING SIGN DETAI

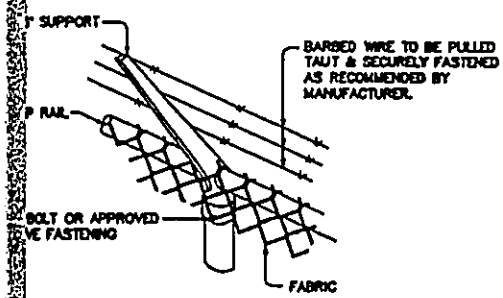
NOT TO SCALE

WIRE SUPPORT

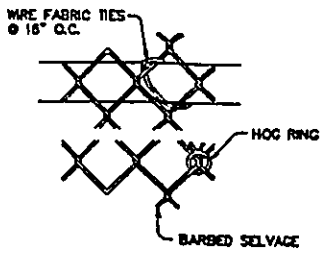
3/4" STRETCHER BAR
ETCHER BAR BAND
O.C. MAX.

POST
O.D.
#/FT.)

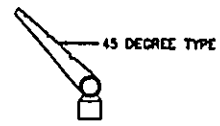
CORNER
OOTING



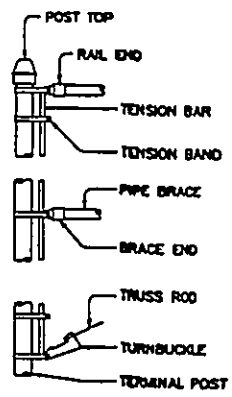
DETAIL OF 45° SUPPORT
NOT TO SCALE



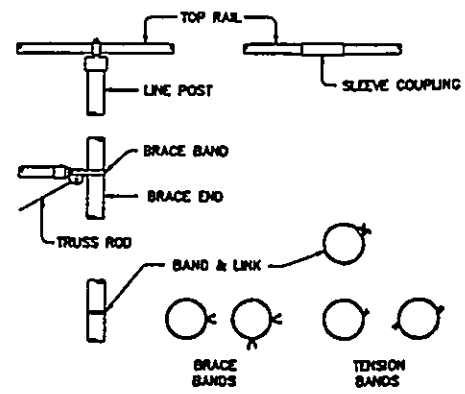
FABRIC DETAIL



45° BARBED WIRE SUPPORT



POST DETAIL



FASTENERS

TYPICAL DETAILS (ACCESSORIES)

NOT TO SCALE

NOTES:

1. FOR ADDITIONAL DETAILS NOT SHOWN ON THIS PLAN, SEE NAVFAC DRAWING NO. 947284, DEFINITIVE DRAWING, SECURITY FENCE.
2. FOR NOMINAL DIMENSIONS AND WEIGHTS OF MATERIALS, REFER TO FEDERAL SPECIFICATIONS RR-F-00191/GEN, RR-F-00191/1, RR-F-00191/2, RR-F-00191/3, AND RR-F-00191/4, LATEST COPIES.

15"

WARNING
RESTRICTED AREA
KEEP OUT
AUTHORIZED PERSONNEL ONLY

WARNING SIGN NOTES:

1. "WARNING" SHOULD BE RED LETTERING (2 INCHES HIGH) ON WHITE BACKGROUND.
2. REMAINDER OF WORDING (1 1/2 INCHES HIGH) SHOULD BE BLACK LETTERING ON WHITE BACKGROUND.

WARNING SIGN DETAIL
NOT TO SCALE

CLARENCE K. TANOMAKA
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HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVANCE.

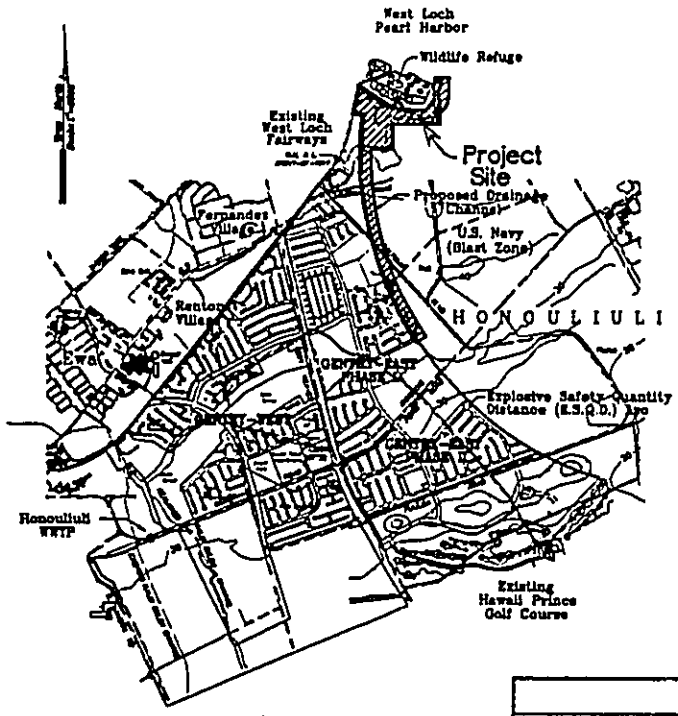
REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

ParEn, Inc.
dba Park Engineering
Engineers, Surveyors, Planners

EWA BY GENTRY - EAST
OFFSITE DRAINAGE PLAN
AT HONOULIULI, EWA, OAHU, HAWAII
TAX MAP KEY: 9-1-10:15
DEVELOPER: GENTRY HOMES, LTD.

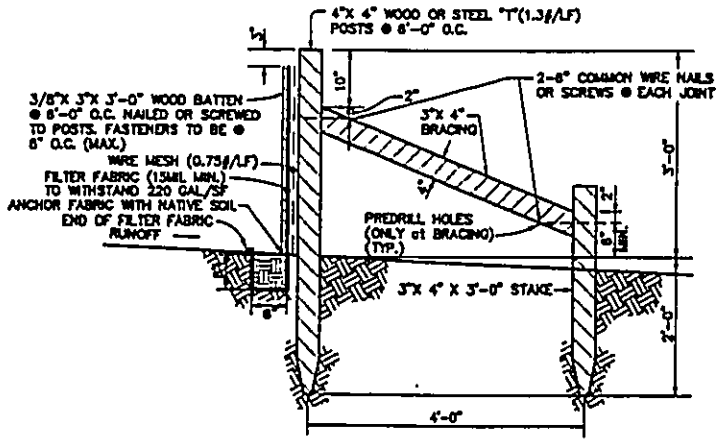
DETAILS
PERIMETER SECURITY FENCE

APPROVED: DATE



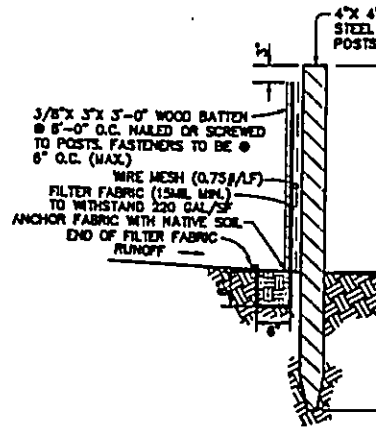
LOCATION MAP

Scale: 1" = 2000'



REINFORCED SILT FENCE DETAIL

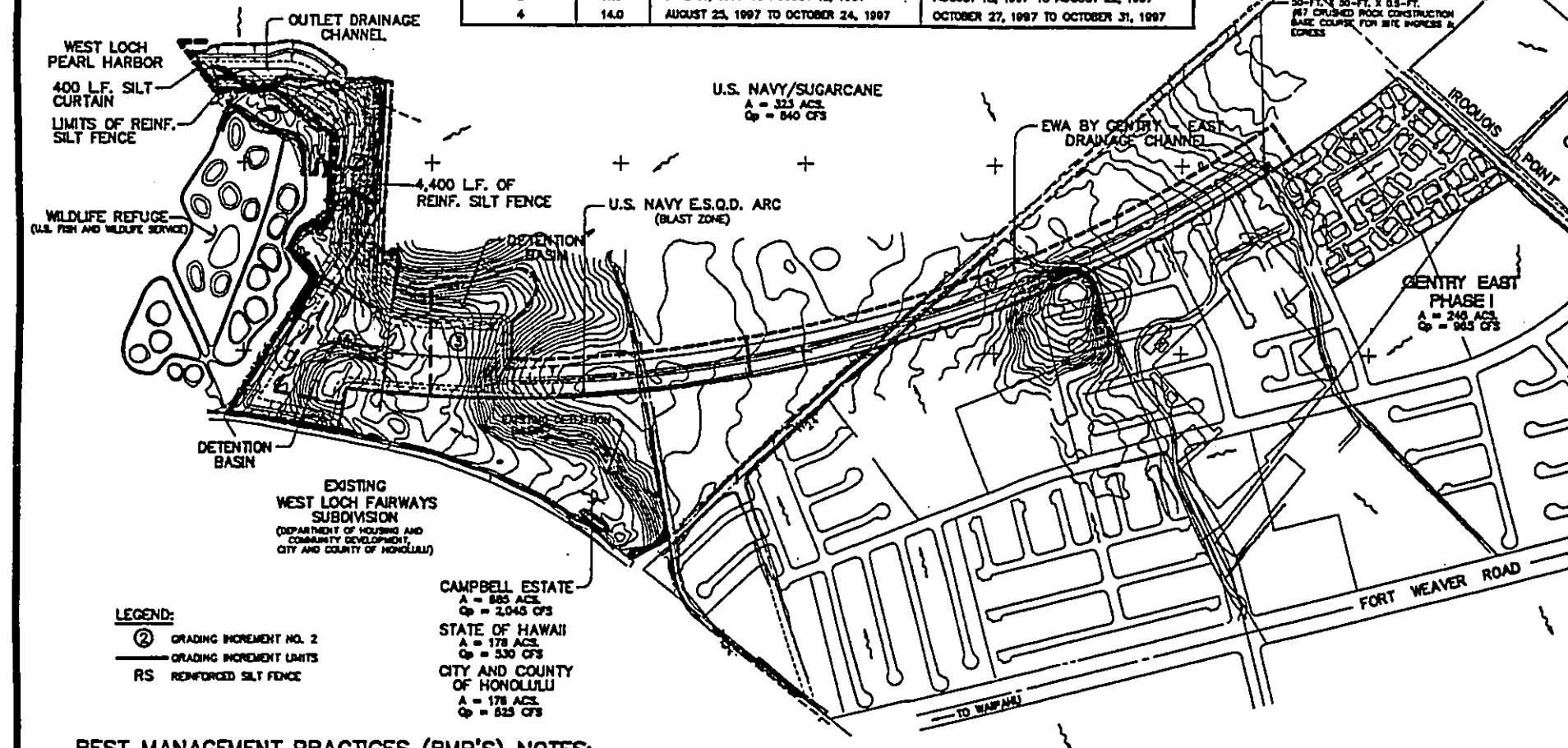
SCALE: 3/4" = 1'-0"



SILT FENCE D

SCALE: 3/4" =

CONSTRUCTION SCHEDULE			
INCREMENT NUMBER	AREA (ACRES)	GRADING DURATION	GRASSING DURATION
1	15.0	JANUARY 27, 1997 TO MARCH 28, 1997	MARCH 31, 1997 TO APRIL 4, 1997
2	15.0	APRIL 7, 1997 TO JUNE 6, 1997	JUNE 9, 1997 TO JUNE 13, 1997
3	11.5	JUNE 16, 1997 TO AUGUST 15, 1997	AUGUST 18, 1997 TO AUGUST 22, 1997
4	14.0	AUGUST 25, 1997 TO OCTOBER 24, 1997	OCTOBER 27, 1997 TO OCTOBER 31, 1997

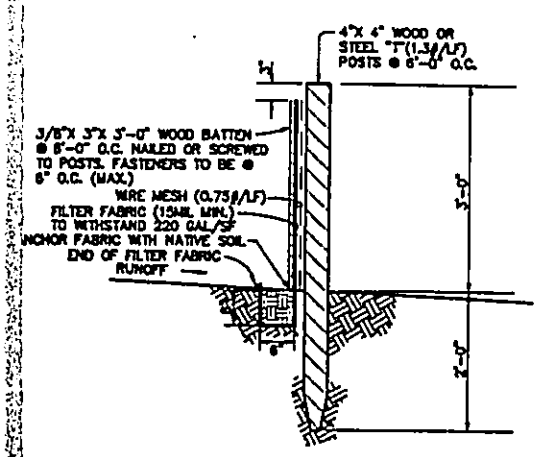


BEST MANAGEMENT PRACTICES (BMP'S) NOTES:

1. GRAVEL CONSTRUCTION ENTRANCE FOR INGRESS AND EGRESS.
2. PERIMETER RUNOFF CONTROLS (REINFORCED SILT FENCE).
3. PLANTING GROUND COVER FOR EXPOSED GRADED AREAS.

EROSION CONTROL PLAN

SCALE: 1" = 400'



SILT FENCE DETAIL
SCALE: 3/4" = 1'-0"

True North
Scale: 1"=400'

EXISTING
HAWAII PRINCE
GOLF COURSE

U.S. NAVY E.S.Q.D. ARC
(BLAST ZONE)

GARCANE

50-FT. X 50-FT. X 0.5-FT.
(@) CRUSHED ROCK CONSTRUCTION
BASE COURSE FOR SITE INGRESS &
EGRESS

IROQUOIS POINT ROAD

GENTRY EAST,
PHASE II
A = 140 ACS.

GENTRY EAST
PHASE I
A = 245 ACS.
Qp = 965 CFS

TO EWA BEACH

FORT WEAVER ROAD

BENCH MARK
EXIST. HIGHWAY MON.
TOP OF BRASS PIN
ELEV.= 35.17'

ON CONTROL PLAN
SCALE: 1" = 400'

REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

ParEn, Inc.
dba Park Engineering

CLARENCE K. TANOHATA
REGISTERED PROFESSIONAL ENGINEER
No. 1484-C
HAWAII, U.S.A.

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ParEn, Inc.
dba PARK ENGINEERING

EWA BY GENTRY - EAST
OFFSITE DRAINAGE PLAN
AT HONOULIULI, EWA, OAHU, HAWAII
TAX MAP KEY: 9-1-10: 4, 14 & 15
DEVELOPER: GENTRY HOMES, LTD.

EROSION CONTROL PLAN

APPROVED: DATE

CHIEF, BUREAU OF CONSTRUCTION, DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU (FOR GRADING CONTROL ONLY)

5.0 ENVIRONMENTAL CONSEQUENCES

Several existing depressions drain the Gentry East project area. These depressions are the remnants of the coastal plain formation when the sea level stood higher. Under sugarcane cultivation, these cavities in the coral growth helped to contain and dispose of stormwater runoff. One of the existing depressions is located on Gentry land (Area 27) adjacent to the ESQD arc boundary line. This depression will be used as an interim retention basin to contain and dispose of stormwater from the Gentry East development until the off-site drainage ditch is constructed. **(See Figures "A and B" from Tom Nance Report "Disposition of Stormwater Runoff in the Interim Development Period of the Ewa By Gentry Project" dated March, 1993 contained in ParEn, Inc. Drainage Report for the Offsite Drainage Plan revised May, 1995.)**

5.1 INTERIM RETENTION VOLUMES FOR GENTRY PROPERTIES

For the interim period until the drainage improvements are constructed on Navy land, sump volumes will be provided in two locations on Gentry property to retain all runoff from a 100-year, 24-hour storm. Freeboard in the sump and percolation into the permeable limestone will provide an added measure of safety.

5.1.1 Sump 3: East of Fort Weaver Road

Sump 3 would be located in an existing depression in the upper corner of Parcel 27 of the Ewa by Gentry Land Use Plan. The depression has approximately 50 acre-feet of storage up to an elevation of 30 feet. This would be sufficient to accommodate drainage from only one or two of the five parcels that will drain into it during the interim period. To accommodate drainage from all five parcels, the sump will be excavated to provide the storage volume required. Runoff of the 100-year, 24-hour storm from the 114-acre tributary area would be 100 acre-feet. Without percolation, the retained water level would reach 27.0 feet, 3 feet below the top of the sump.

5.1.2 Sump 4: East of Fort Weaver Road

Sump 4 is an entirely excavated feature in Parcel 22, a 12-acre future park site. A 70-acre tributary area, including five development parcels and portions of Fort Weaver and Iroquois Roads, would produce 59 acre-feet of runoff in a 100-year, 24-hour storm. This will be retained in the excavated sump to a maximum level of 26.0 feet, 4 feet below the top of the sump. The freeboard volume would be 32 acre-feet. The sump volumes are adequate to completely retain runoff of a 100-year, 24-hour storm with adequate freeboard and without deduction for any percolation in the sumps.

5.2 CONSTRUCTION SEQUENCE OF PROPOSED DRAINAGE SYSTEM

The proposed construction sequence and interim use of a completed portion of the drainage improvements will be sensitive to the potential adverse impact to the surrounding area. Mitigative measures for flood, erosion and sediment control will be implemented. These will include to the extent required those identified practices that will be employed by the Contractor as described below.

The proposed drainage improvements will provide an increased safety factor for the Refuge during the construction schedule. The extent of additional protection will exceed the protection level currently available without the proposed project.

Upon receiving approvals to construct the off-site drainage improvement, a portion of the drainage channel will be constructed first (See Figure 6, Proposed Construction Sequence, Grading Increment No. 1). As a result, flood protection to the Wildlife Refuge and adjacent lands will progressively improve as the drainage channel is extended.

As is similar to the existing Sumps No. 3 and 4, the completed portion of the drainage channel will serve as an interim retention basin, capable of containing the 100 year stormwater runoff from its tributary drainage area. Interim use of the completed portion of the drainage channel will replace the existing Sump. No. 4 and service Areas 18, 22, 23, 24, and 25, as indicated in Figure B of the report. During interim use of the drainage channel, the premises and drainage improvements will be maintained, as required, to ensure protection to the impacted areas.

The outlet drainage channel and earth berm along the Wildlife Refuge will be constructed next. (See Figure 6, Proposed Construction Sequence, Grading Increment No. 2). This phase of construction will focus on the completion of the outlet at West Loch, first, then the installation of the outlet drainage channel, and finally, grading of the earth berm along the wildlife refuge. The earth berm will divert runoff generated from areas of subsequent construction activities and provide containment of stormwater runoff during and after construction, including grading of the detention basin and remainder of the drainage channel (Grading Increment No. 3 and 4). This sequence of construction activities will provide continual flood protection, flood mitigating measures and stormwater management controls for the Wildlife Refuge.

5.3 CONSTRUCTION MANAGEMENT TECHNIQUES

The Contractor will also be responsible for continual protection to the adjacent lands during all phases of construction. Applicable construction management techniques, ground stabilization practices and structural practices will be

employed for erosion and sediment control and Best Management Practices (BMPs) in accordance with Chapter 14, Articles 13, 14, 15, and 16, relating to Grading, Soil Erosion and Sediment Control of the Revised Ordinances of Honolulu, 1990 as amended. They are given as follows:

Construction Management Techniques:

In accordance with the U.S. Fish & Wildlife Service requirements, work in the areas adjacent to the Refuge will be subject to the terms and conditions of the Refuge Manager. This is due to the times in the Spring and Summer when the breeding and nesting periods for the resident birds are most critical. All work schedules will be coordinated with the Refuge Manager or his duly appointed representative.

a. Clearing and grubbing shall be held to the minimum necessary for grading and equipment operation. (**See Figure 5, Sheets 2, and 3 of 13 Sheets, and Figure 6 for grading locations and grading volumes).**

b. Construction shall be sequenced to minimize the exposure time of cleared surface area.

c. Construction shall be staged or phased. Areas of one phase shall be stabilized before another phase can be initiated. Stabilization of the disturbed soil surface shall be accomplished by temporary or permanent means listed below.

d. Erosion and sediment control measures shall be in place and functional before earth moving operations begins, and shall be maintained throughout the construction period. Temporary measures may be removed at the beginning of the work day, but shall be replaced at the end of the work day.

e. All control measures will be inspected at least once each week and following any rainfall event of 0.5 inches or greater within a 24 hour period. During prolonged rainfall, daily checking may be necessary.

f. All control measures will be maintained in good working order. If a repair is necessary, it will be initiated within 24 hours after the inspection.

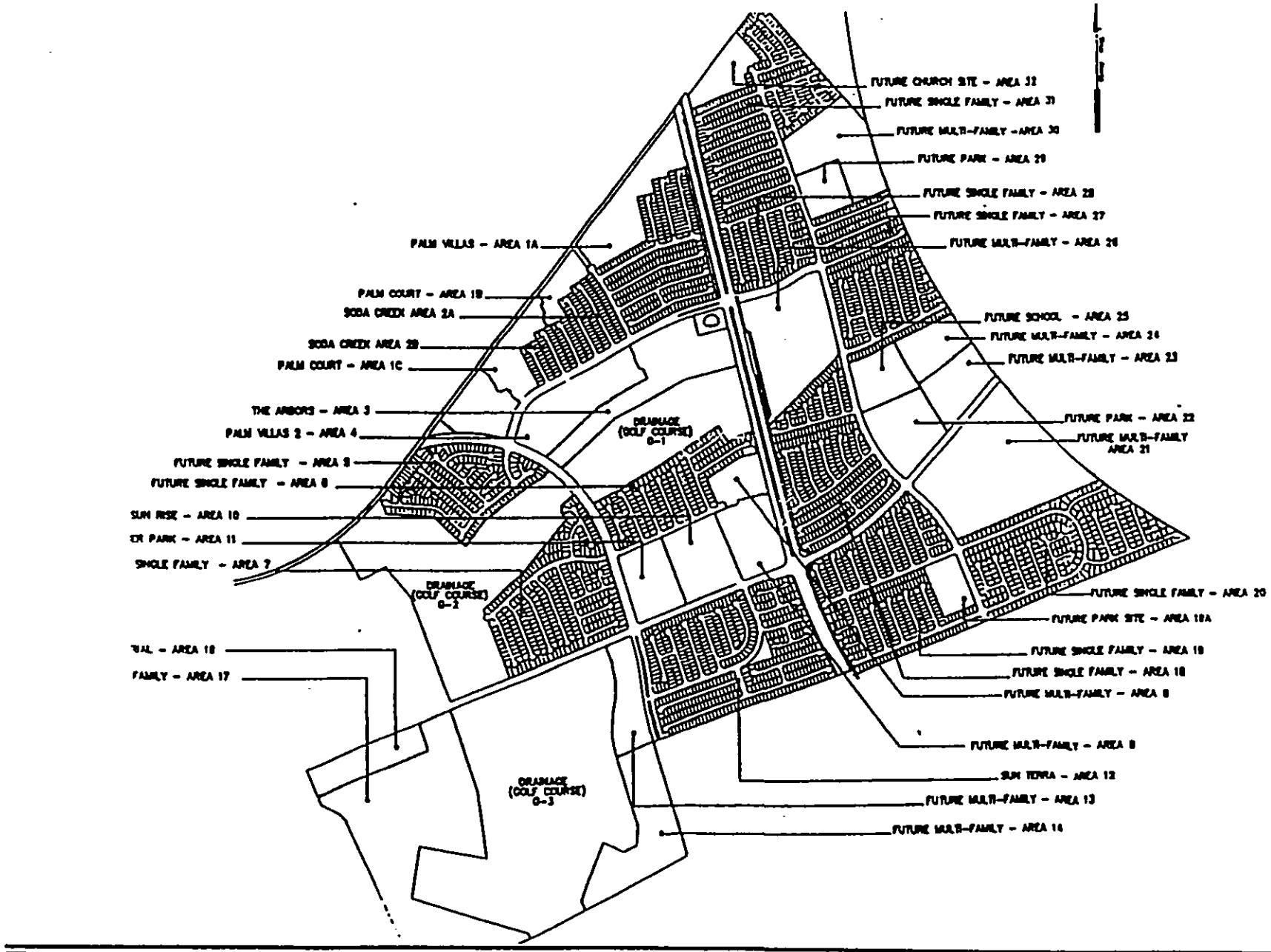
Ground Stabilization Practices:

- establishment of ground cover
- mulching or hydromulching
- Geotextiles
- chemical stabilization

- buffer zone
- preservation of natural vegetation
- sod stabilization
- soil retaining measures
- dust control

Structural Practices:

- earth dike or berm
- drainage swales
- interceptor dikes and swales
- temporary drainage crossings
- temporary storm drain diversion
- silt fences
- turbidity barriers and containment systems
- gravel or stone filter berm
- sediment trap
- temporary sediment basin
- outlet protection
- check dams
- surface roughening
- gradient terraces

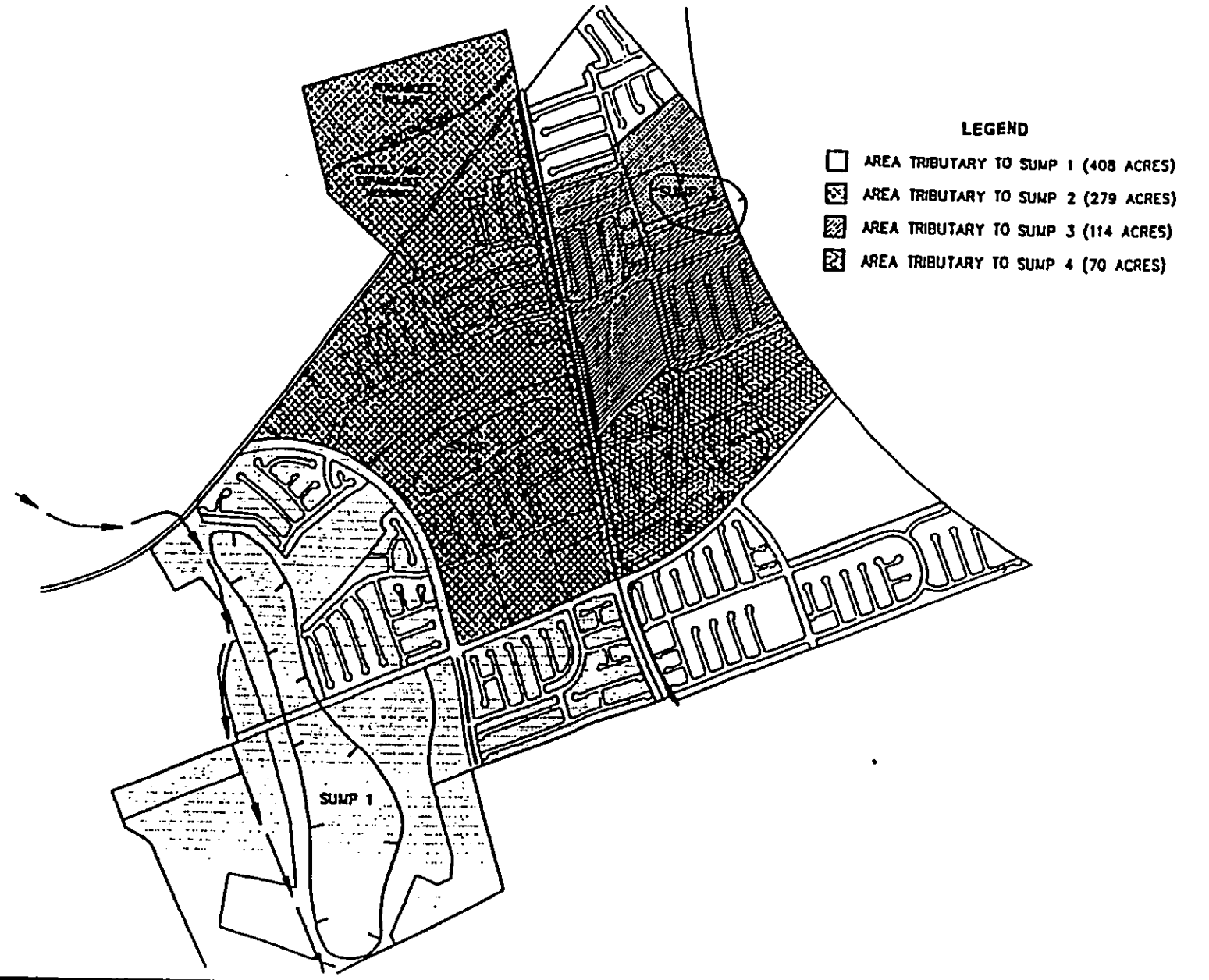


FILE: FIG2

REFERENCE: TOM NANCE REPORT "DISPOSITION OF STORMWATER RUNOFF IN THE INTERIM DEVELOPMENT PERIOD OF THE EWA GENTRY PROJECT" DATED MARCH, 1993.

NOT TO SCALE

FIGURE A
EWA BY GENTRY LAND USE PLAN
MARCH, 1993



FILE: FIG1

REFERENCE: TOM NANCE REPORT "DISPOSITION OF STORMWATER RUNOFF IN THE INTERIM DEVELOPMENT PERIOD OF THE EWA GENTRY PROJECT" DATED MARCH, 1993.

NOT TO SCALE

FIGURE B
AREAS TRIBUTARY TO THE INTERIM PERIOD DRAINAGE SUMPS

6. EXISTING ENVIRONMENT OF THE PROPOSED PROJECT

6.1 DIRECT EFFECTS AND THEIR SIGNIFICANCE

6.1.1 Physical Conditions At Project Site

The project site (channel alignment and detention basin) is relatively uniform in terms of topographic characteristics. Coastal plains dominate the Ewa Plains and the general topography of the area ranges from 0.5 percent along the proposed drainage channel alignment, to 20 percent near the Detention Basin and the Wildlife Refuge. Steeper slopes may be seen in the gully areas where erosion has occurred. The Ewa coastal plains were formed initially by ponded lava of the Koolau Volcano (Sterns, 1985). As the sea level rose, coral formation and marine sediment then deposited on the lava. Lowering of the sea level caused erosion and valley cutting of the Waianae Range and Schofield Plateau, which deposited silt on the coral formations. The steeper slopes that are seen in the gully areas resulted from the lowering of sea level. Located within the Gentry-East site as well as in the fallowed sugarcane lands to the south are existing depressions that extend into coral formations.

The following summarized data is from the ParEn, Inc. May, 1995 Drainage Report for Ewa By Gentry-East - Phase I, Section 3.6 Existing Conditions. Please refer to this document which is included as Exhibit D for the entire reference including Figure 3-3 Existing Drainage Conditions.

" Several existing depressions drain the Gentry East Phase I and II project area. Two depressions are located within the Phase I project site, one along Fort Weaver Road and the other along the U.S. Navy ESQD Arc. An existing 30-inch reinforced concrete pipe currently drains a portion of the depression along Fort Weaver Road. The four depressions located in the proposed Fairway site presently drains Gentry East, Phase II which is currently in the planning and design stages. These depressions will be used as temporary drainage sumps. Located along the boundary of the Wildlife Refuge are interceptor swales which collect and divert stormwater runoff around the Refuge. These swales only have a limited capacity to intercept and divert runoff from a portion of the tributary area.".

Water table elevations for the project alignment are indicated in a subsurface investigation conducted by Fewell Geotechnical Engineering, Ltd. dated June 30, 1994. Findings for the project alignment are as follows: In the proposed detention basin area the water table elevations are from 0.5 MSL to 1.0 MSL. The invert at the proposed detention basin and outlet drainage channel ranges from 2.2 ft. MSL to 7.0 ft. MSL. The water table elevations in the proposed drainage channel ranges from approximately 0.5 ft. MSL to 4.0 ft. MSL. The invert of the proposed drainage channel ranges from 7. 0 ft. MSL to 14.4 ft. MSL.

Soil survey maps prepared by the U.S. Department of Agriculture, Soil Conservation Service (SCS), 1972, indicate the predominant soil series types in the Ewa Coastal Plain. The predominant soil types in the Ewa Coastal Plain are the Ewa (EmA, EmB, Mamala (MnC) and Waipahu (WzA, WzB, WzC) soil series. The permeability of these soil series varies from moderately slow to moderate. Runoff is typically very slow to slow. The State Department of Agriculture "*Agricultural Lands of Importance to the State of Hawaii*" (ALISH) map for Oahu identifies the subject parcel as Prime and Other Important Agricultural Lands.

6.1.2 Existing Facilities And Utilities

The site was previously used for sugar cane cultivation. Oahu Sugar Company irrigation lines exist but are not in use.

6.1.3 Biological Resources

Marine Resources

Dr. David Zieman, Ph.D., and the Oceanic Institute conducted offshore reconnaissance surveys of the West Loch, Pearl Harbor receiving waters for the benthic organisms, bottom sediments, marine life census, and water quality samples to establish current water quality and oceanographic conditions prior to the implementation of the proposed Channel and Basin. *"In summary, the proposed Ewa by Gentry - East residential development and its associated drainage improvements will have no negative impacts on the adjacent nearshore marine environment. In fact, the proposed drainage improvements will result in a significant decrease in sediment discharge to West Loch from the project drainage basin. However, because West Loch is impacted primarily by much larger drainage basins to the north of the project, no change in water quality from the proposed site improvements is likely." O.I. further states in an addendum dated May 3, 1995, " the revisions to the original document add an additional 140 acres to the total drainage basin area. These additional lands are marginal Agriculture lands that are shown in the basin boundaries, and are not an addition to the landscaped areas or roadways. There is no difference in the changes to discharges calculated, since the new 140 acres do not undergo a land use change. There is also no change in the conclusions of no significant impact to the marine receiving waters or adjacent biological communities." This revised addendum is attached as Exhibit A.*

Terrestrial and Avifaunal Communities

Professor Philip Bruner, conducted an Avifaunal survey of the proposed project alignment and also the Detention Basin/Outlet location. His work is titled, "*Survey Of The Avifauna And Feral Mammals Along The Proposed Alignment Of The Ewa By Gentry East Off-Site Drainage Ditch, Oahu.*" His conclusion was that the alignment of the Channel was not a significant concern to avifauna and could, in fact, provide additional foraging and feeding areas, especially after periods of

heavy rains. His concern was that the Wildlife Refuge may suffer a potentially adverse impact if the detention basin and protective berm are not sized properly.

Flora

Dr. Evangeline Funk, Ph.D., conducted a Botanical survey of the proposed project alignment area. Her work is titled, *"Botanical Survey Report For The Proposed Ewa By Gentry East Offsite Drainage Ditch."*

Her conclusions were as follows: "*The flora of the proposed East Offsite Drainage Ditch's study site is composed entirely of introduced species. There are no endemic or indigenous plants in the area except for Alena which is very common. Similar vegetation is to be found on many other sites in the Islands and except for the sugarcane, vegetation of this type is frequently treated with herbicides. Therefore, nothing of botanical significance would be lost should this development go forward.*" She has further delineated the wetlands of the adjacent lands nearest the Refuge and this addendum is attached as Exhibit C. (Additional wetland delineation work by Char & Associates is complete and under review by the U.S. Army Corps of Engineers.)

6.1.4 Archaeological, Historic, and Cultural Resources and Sites

Aki Sinoto Consulting conducted a site reconnaissance survey of the Channel alignment and the Detention Basin. Their findings are summarized as follows:

Based on the results of the current archaeological investigation for the proposed Ewa Gentry East off-site drainage channel, no further archaeological work is recommended prior to commencement of construction. This determination is based on the high degree of disturbance in the area and the negative results of previous archaeological investigations in the vicinity. A Section 106 consultation is in progress with the State Historic Preservation Division, Department of Land and Natural Resources and the U.S. Navy. Correspondence with the State DLNR Historic Preservation Officer is listed in Section VIII.

Archaeological monitoring during construction is recommended with emphasis on the low-lying shoreline areas. The scope of monitoring, full-time, part-time, spot, or on-call, will be determined as the construction plans and scheduling become finalized. The proposed monitoring plan will be submitted to the State and become part of the construction plans. *Correspondence dated April 17, 1995 from the State Historic Preservation Division, Department of Land and Natural Resources advises that a required Archaeological Monitoring Plan for the proposed project has been reviewed and accepted by the applicant . This correspondence is included in Exhibit B. This has in turn been provided to the U.S. Navy.*

6.1.5 Aesthetic or Visual Impact

Description of visual characteristics of project and potential view impacts from specific view points are not of significance . The proposed project is essentially below grade. The only structural improvements above grade are the security fencing that parallel the channel and surround the detention basin.

6.1.6 Social and Economic Characteristics

Social Characteristics

The proposed drainage project will not adversely impact the social fabric of the Ewa District in the traditional ways of most land use changes. As an infrastructural requirement similar to waste water, potable water, transportation, and other utilities, proper handling of stormwater runoff is necessary in the total picture of the urbanization process. As a governmental requirement, the containment and management of runoff is essential to the prevention of flood damage to property and potential loss of life. Earlier land use policy decisions to convert agricultural lands to urban usage dictate the provision of these required physical improvements. These decisions consist of State Land Use Commission Boundary Amendments from Agriculture to Urban; City & County General Plan Land Use Policy maps from Agriculture to Public Facility; and Zoning map changes from Agriculture to Residential/ Low Density Apartment. The Environmental Impact Statement dwells primarily on the physical impacts, with emphasis on the protection and enhancement of the Federal Wildlife Refuge. These other measures have been discussed earlier in the technical characteristics section and consist of the decision to design the channel as a grass-lined structure. The economics of the grass-lined channel versus the conventional concrete-lined alternative will be discussed in general terms.

Economic Characteristics

The project's economic impact falls into three general types:

1. Land acquisition costs for the channel alignment and basin;

2. Construction costs for the proposed improvements; and

3. Long term operation and maintenance " O/M " of the channel, basin, and outlet works. The finished project will be dedicated to the City & County of Honolulu for O/M. Terms and conditions are being developed between the developer and the City & County. It should be noted here that the drainage improvements will collect runoff from City drainage systems and will be fenced on both sides for security and safety purposes.

At present, the lands under consideration for the proposed improvements are all on U.S. Navy property and will involve the acquisition of an easement over approximately 50 acres. This is predicated on engineering design considerations that will comply and fulfill the purpose of the drainage project. Planning assumptions upon which the engineering design was prepared are:

1. Prevent stormwater from entering the Wildlife Refuge;

2. Reduce sediment and contaminants from entering the Wildlife Refuge and West Loch, Pearl Harbor. This will be accomplished by sizing the detention basin to contain the runoff volume from a 2-year, 24-hour storm event; and by the use of a grass lined drainage channel and detention basin.

Project Funding & Phasing The estimated construction cost, as prepared by ParEn, Inc., is approximately $4.9 million. Construction will be done as one continuous project.

6.1.7 Noise Impact

Noise impacts will be limited to temporary construction-related activities and can be minimized through proper sizing of construction machinery and efficient construction operations. Discussions with the Manager of the Wildlife Refuge, Mr. Johnny H. Beall during the preparation of the Environmental Assessment have provided the applicant with the Refuge's concerns over noise impacts to the wildlife at the Refuge. Concern to the Refuge would be construction related noise during the critical times of nesting and breeding. A coordinated schedule between the contractor and the Refuge manager will need to be defined so as not to adversely impact the wildlife-avifauna.

6.1.8 Drinking Water Supply and Quality Impacts

The water table located at the proposed improvement is within the State's ground water aquifer management zone. The entire island of Oahu with the exception of the Waianae Coast is now under the jurisdiction of the Department of Land and Natural Resources, Commission of Water Resource Management. The grass-lined channel will permit recharge via infiltration of the runoff in the channel and basin. Adverse impacts to the State's ground water aquifer are not expected. The quality of the lens beneath the project alignment is brackish and exceeds the Board of Water Supply chloride standards for potable quality water (160 parts per million) and is considered non-potable quality water. Wells located in the adjacent areas have been primarily used for irrigation of crops and are not suitable for potable consumption.

6.1.9 Solid Waste (Including Sewage) Impact

Periodic maintenance will be performed to remove any urban debris from the channel. Beyond any impact from this potential source, there are no known solid waste impacts.

6.1.10 Traffic Impact

There may be limited and temporary construction related traffic impacts from this proposed project. Once completed, no impacts are anticipated. Periodic traffic will result from maintenance trucks for routine O/M.

6.1.11 Stormwater Drainage Impact

Stormwater drainage impacts are discussed earlier in Section 5.3 Construction Management Techniques. Erosion Control will be managed and administered by the City & County of Honolulu's "*Soil Erosion Standards & Guidelines, Supplement I, Revised December, 1992*" that provides for approved procedures for the grading of parcels over one acre in size, or if a proposed cut or fill is greater than 15 feet in height. Included is a drainage and erosion control plan. Article 14 addresses Permits, Bonds, and Inspection for Grading, Soil Erosion, and Sediment Control, while Article 15 covers Grading, Grubbing and Stockpiling. The acreage to be graded will also be subject to the controls and guidelines contained in Articles 14 and 15 of the Soil Erosion Standards.

6.1.12 Hazardous Waste Management Including Petroleum, Oil, Lubricants (POL) Products and Contaminated Soil

Testing of samples taken from current runoff from the area of the proposed alignment into West Loch, Pearl Harbor, has not resulted in detectable levels of POL products on contaminated soil. The Environmental Baseline Survey - Lease, discusses the existing conditions with particular reference to the oil pipelines operated by Chevron and the Navy (pp. 1-3).

> "Based on the findings and conclusions presented in this report, it appears that the site is suitable for leasing purposes. In those areas of known pipeline installations, the contractor will be required to monitor construction to avoid excavation impacts to the existing pipeline installations." (Federal requirements will provide for Navy EA/FONSI purposes the inclusion and discussions for an Environmental Baseline Survey Lease (EBSL) Phase I and II. Further, A Finding of Suitability to Lease (FOSL) will also be prepared for Navy review and approval. Both documents are in preparation with the EBSL Phase I completed.)

6.1.13 Air Quality Impact

Impacts to the existing ambient air quality may result from the temporary construction related activities. These impacts and approved mitigating measures are described below:

Fugitive Dust Dust abatement measures will be employed to minimize fugitive dust at the drainage channel boundaries. The City & County of Honolulu's "*Soil Erosion Standards & Guidelines, Supplement I, Revised December, 1992*" Section 14-15.1(k) provides for compliance with air pollution control standards contained in Department of Health Hawaii Administrative Rules, Chapter 11-60, "Air Pollution Control."

Section 14-15.2 "Special Requirements" (e) permits the City and County of Honolulu, Department of Public Works, Chief Engineer to impose further and additional dust abatement controls, if in his opinion, the risk of exposure to fugitive dust will not otherwise be met.

Mitigative Measures for Dust Control

Established dust abatement procedures include:

1. Periodic watering of the excavation site and traffic routes to and from the site;

2. Erection of dust control baffles, (dust screens) i.e. "walls of burlap" that can be water soaked;

3. Mulching completed portions of the excavated site in a timely manner.

Mitigative Measures for Surface Runoff Control

1. Temporary sediment control basins that can be designed into the final finish elevation of the channel;

2. Scheduling of the major excavation work away from the "rainy season" as practicable;

3. Installation of silt curtains within West Loch to contain sediment loading during the construction of the outlet structure;

4. Reducing the frequency of material handling, i.e. removal of overburden and subsequent replacement; and,

5. Locating temporary stockpiled excavated material away from natural drainage ways.

Once completed, there will be no air quality concerns.

6.1.14 Electromagnetic Radiation (EMR), Electromagnetic Interference (EMI) and Electromagnetic Compatibility Impact

There are no Electromagnetic Radiation (EMR), Electromagnetic Interference (EMI) or Electromagnetic Compatibility Impacts attributable to project implementation.

6.1.15 Explosives Safety Quantity Distance (ESQD) Impact

There are no ESQD impacts attributable to project implementation. The site is, however, located within a U.S. Navy ESQD arc and is unsuitable for habitable structures (other than those such as the planned drainage improvements).

6.1.16 Demolition, Construction Debris Disposal, and Dewatering Impacts

The excess excavated material from the construction will be used on the Gentry-East project. There may be minor demolition debris and only minimal construction debris due to current fallowed agricultural land use.

De-watering of the outlet structure may be necessary to remove approximately 200 cubic yards of material prior to the placement of the Outlet Structure. This will be at the Contractor's option and will also require the placement of silt curtains within West Loch waters for sediment control during construction. The option of installing improvements in the wet will be the Contractor's decision.

6.1.17 Safety Impacts

During the construction phase, the general contractor will be responsible for onsite safety for his construction workers. Upon completion of the construction phase for the drainage channel, safety fencing will be built on the entire perimeter of the Ewa By Gentry residential development. This safety fencing will prevent access to the drainage channel. In addition, there will be a security fence installed on both sides of the drainage channel.

A temporary safety fence will be constructed around all construction areas as a contractor's responsibility. A permanent security fence system will be installed by the applicant and this permanent installation will be in accordance with the fence designs on the construction drawings and subject to review and approval by the landowner.

6.2 INDIRECT EFFECTS AND THEIR SIGNIFICANCE

There will be no permanent degradation of the existing ambient environment. During the clearing and grading for the proposed project, there may be temporary impacts to air and noise quality. These can be mitigated by compliance with the applicable Department of Health requirements. In close proximity to established Refuge - wildlife areas, "specific windows of time" for the construction work as directed by the U.S. Fish & Wildlife will restrict actual construction periods, and will mitigate any anticipated noise related impacts. No residences or businesses will be displaced by the project.

According to the Navy, there are known endangered species of plants and animals adjacent to the project limits . There are endangered bird species at the Honouliuli Unit of the Pearl Harbor Wildlife Refuge and these species will be protected by adhering to terms and conditions imposed by the U.S. Fish & Wildlife Service.

There are no known natural, historic, or archaeological sites within the project limits. The Section 106 consultation with the State Historic Preservation Officer has been completed with the review and approval of the Monitoring Plan developed by the retained archaeological consultant in cooperation with the State Historic Preservation Division, Department of Land and Natural Resources. This Plan will condition the requirements for onsite monitoring of the project alignment during the construction phase, and has the concurrence of the applicant. The State has forwarded their recommendations to the Navy.

The project is not yet fully compatible with the Development Plan Public Facilities Map for Oahu. Amendments to the Public Facilities Map have been filed with the Planning Department of the City and County of Honolulu.

Secondary adverse impacts on future development, population and public facilities would result without this project. Project development without utilities, including drainage, would not be permitted. Appropriately zoned lands for both the private and government sectors would not be able to effectively proceed without adequate or acceptable drainage facilities.

Enhancement to the estuarine habitat in the Wildlife Refuge will result from the development of the project. This is primarily the result of a vegetated channel, basin, and outlet structures. Additional drainage capacity to the resulting improved urban residential development will be provided with this project. Reduction of risk of injury, disease, and loss of life will also be achieved by the selected drainage plan that will utilize the unlined channel, basin, and outlet.

6.3 POSSIBLE CONFLICTS BETWEEN THE PROPOSED ACTION AND THE OBJECTIVES OF FEDERAL, STATE, AND LOCAL LAND USE POLICIES, PLANS AND CONTROLS

The project proponent will be in compliance with local, County, and State requirements at the completion and approval of the Development Plan Public Facilities map amendments. Federal Coastal Zone Management Consistency requirements will be determined at the time of review by the Office of State Planning, Governor's Office.

6.3.1 State Land Use Designation

The subject parcels of Navy-owned lands are designated Agricultural on the State Land Use Commission Boundary Map. No boundary amendment will be required for the proposed action.

6.3.2 County Development Plan

The City and County Development Plan Land Use Maps designate the project site as being within Military, Industrial, and Agricultural land uses. No Development Plan Land Use Map amendments will be required for the proposed project. Amendment to the Public Facilities Map is in process to bring the current language description consistent with the proposed drainage plan.

6.3.3 County Zoning Map

City and County Zoning Maps identify the project site as being within zones A-1 Low Density Apartment; R-5 Residential, P-2 General Preservation, F-1 Military and Federal Preservation, and AG-1 Restricted Agricultural.

6.3.4 Required Permits

The following permits are necessary for this project :

Federal

1. USA/COE 404 Permit - Department of the Army Corps of Engineers for working in Wetlands/Wildlife Refuge;
2. National Pollution Discharge Elimination System (NPDES) and Clean Water Act Section 401;
3. Section 7 Endangered Species Act of U.S. Fish & Wildlife;
4. Section 106 of Historic Preservation Act.

State

1. Conservation District Use Application - State of Hawaii, Department of Land and Natural Resources;

2. NPDES Permit - State of Hawaii, Department of Health

3. Coastal Zone Management Consistency Certification Requirement

4. DOH 401 Permit - Department of Health for working in Wetlands/Wildlife Refuge

County

1. Grading Permit - City and County of Honolulu Department of Public Works

2. Special Management Area Permit - City and County of Honolulu, Department of Land Utilization.

6.3.5 Coastal Zone Management Program

The potential impacts of the proposed project could have on the Coastal Zone are identified as follows:

These would include potential runoff into the State Conservation District (West Loch Pearl Harbor) and potential impacts to the Refuge.

The proposed project alignment is located within the Coastal Zone Management Area (CZMA) which now includes all projects within the State of Hawaii regardless of whether or not they are within the Special Management Area (SMA). A CZM certificate of consistency will be prepared and filed for review and acceptance by the Office of State Planning. This will be done during the DLNR/CDUA application process.

Act 91, Session Laws of Hawaii, 1993 provides that the Coastal Zone Management Area now includes all land areas as well as marine waters extending to the limits of the State's police power and management authority.

Act 258, amended Chapter 205A of the Hawaii Revised Statutes 1993 by adding two additional sets of objectives and policies, bringing the total to nine objectives and policies that must be addressed by the proposed project. They are:

a. Recreational Resources - The subject receiving waters are within the West Loch, Pearl Harbor area and under the jurisdictional authority of the U.S. Navy. The area is clearly restricted from entry without permit. Public access to the Wildlife Refuge is also prohibited.

b. Historic Resources - No known historic or archaeological resources of significance are located within the project alignment or outlet location.

c. Scenic/Open Space Resources - The proposed project has no structural view impediment by design and will not adversely impact the Scenic or Open Space perspectives.

d. Coastal Ecosystems - The decision to design and construct a grass-lined channel in conjunction with an extensive detention basin will improve upon the existing drainage situation with respect to the Wildlife Refuge. Though the drainage channel and basin will be maintained by the City and County of Honolulu and will not be part of the Wildlife Refuge, it is anticipated that the resultant grass-lined channel and basin will provide additional foraging and feeding areas for the avifauna.

e. Economic Uses - The proposed alignment has been designed in the most compatible location from an engineering perspective as well as being economically cost-effective. Since the site is located within a U.S. Navy ESQD arc, the site in unsuitable for habitable structures and alternative economic uses for the site are, therefore, limited. At present, the site is vacant and fallowed lands, previously used for sugarcane cultivation.

f. Coastal Hazards - The description of the proposed project provides detailed information on the merits of the grass-lined channel and detention basin engineering concepts. The positive results of the proposed design willfurther strengthen and support this policy and objective, namely pollution control by mitigating runoff into the Coastal Zone.

g. Managing Development - The proposed project will be reviewed by Federal, State, and County agencies, public interest groups, Neighborhood Boards, and, with respect to the Special Management Area (SMA) permit, the Honolulu City Council.

h. Public Participation - Public participation is required by law, during the local government permit review processes. Participation by the public is an integral part of the State Department of Land and Natural Resources Conservation District Use Application (CDUA) permitting process. The Board of Land and Natural Resources reviews the CDUA application and grants or rejects the application. The City & County of Honolulu, Department of Land Utilization processes the Special Management Area

(SMA) permit application and conducts formal public hearings on the proposed application. The City Council of the City and County of Honolulu can also conduct a public hearing and will grant or reject the permit application. In addition, the U.S. Army Corps of Engineers can also on request from the public, conduct a public hearing for the Section 10 permit required under the Rivers and Harbors Act of 1899, and Section 404 of the Clean Water Act.

i. Beach Protection - The outlet location into West Loch, Pearl Harbor, does not have a recreational beach. **The Pearl Harbor Defensive Sea Area regulations prohibit public access to the West Loch shoreline.**

6.3.6 Hawaii State Plan

The Hawaii State Plan identifies the goals, objectives, policies and priorities for the long-range development of the State. Several objectives and policies would be furthered with the implementation of the proposed project. Applicable sections of the Hawaii State Plan, Chapter 226, HRS are discussed below.

Section 11(a): Objectives for the physical environment - land-based, shoreline, and marine resources:

(1) Prudent use of Hawaii's land-based *shoreline, and marine resources.*
(2) Effective protection of Hawaii's unique and fragile environmental resources.

Section 11(b): Applicable Policies

(3) Take into account the physical attributes of areas when planning and designing activities.
(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.
(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.
(8) Pursue compatible relationships among activities, facilities, and natural resources.

Discussion:

The proposed project alternative has been designed to minimize or negate any adverse impacts to the wetlands area. Additionally, surface water runoff quality is expected to improve with implementation of the proposed project.

Section 13(a): Objective for the physical environment - land, air, water quality:

(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.

(2) Greater public awareness and appreciation of Hawaii's environmental resources.

Section 13(b): Applicable Policies

(2) Promote the proper management of Hawaii's land and water resources.
(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.

Discussion:
The land and water resources of the project will be properly managed with mitigative measures planned to minimize short-term adverse water quality impacts.

6.3.7 Hawaii State Functional Plans

12 State Functional Plans which serve as the primary implementing vehicle for the goals, objectives and policies of the Hawaii State Plan were adopted in 1984. Functional plans that are relevant to the proposed action with respect to the adjacent Wildlife Refuge area are described below.

State Conservation Land Functional Plan

Objective A (Management of Natural Resources)
Effective protection and prudent use of Hawaii's unique, fragile, and significant environmental resources.

Policy A (1)
Exercise an overall conservation ethic in the use of Hawaii's resources by protecting, preserving, and conserving the critical and significant natural resources.

Implementing Action A (1)

(c) Review the various rules and regulations and permit systems applicable to Conservation district lands for possible simplification and/or consolidation for effective and efficient management controls.
(e) Review applications for use of Conservation lands to control impacts on natural and cultural resources.

Policy A(2)
Establish and manage wildlife sanctuaries, marine life conservation districts, and fishery management areas.

Implementing Action A (2)

(a) Establish new wildlife sanctuaries, Marine Life Conservation Districts

Objective B (Protection of Endangered Species)
Protection of rare or endangered species and habitats native to Hawaii.

Policy B (1)
Protect and preserve habitats of rare and endangered wildlife.

Implementing Action B(1)
(a) Survey and monitor populations of endangered species and establish sanctuaries when necessary to protect critical habitats.

Objective C (Management of Open Space, Watersheds, and Natural Areas)
Effective protection and management of Hawaii's open space, watersheds, and natural area.

Policy C (3)
Protect and manage the lands with historic or natural resources value.

Implementing Action C (3)
(c) Establish criteria and evaluate areas of public land with historic or natural resource value and establish management practices to ensure the protection of areas from further degradation.

Discussion:
The proposed action is expected to contribute long-term benefit to the project area by improving surface runoff water quality. By implementing drainage flow control systems, adverse impacts to the adjacent Refuge can be controlled.

6.3.8 City and County General Plan

The following section provides an assessment of how the proposed project conforms to and implements the General Plan.

Economic Activity

Objective A
To promote employment opportunities that will enable all the people of Oahu to attain a decent standard of living.

Policy
(1) Encourage the growth and diversification of Oahu's economic base.

Discussion
Construction revenues, secondary spending and increased taxes will all result form the implementation of the project. Additionally, long-term maintenance requirements will also contribute additional employment opportunities.

Natural Environment

Objective A
To protect and preserve the natural environment.

Policy
(1) Protect Oahu's natural environment, especially the shoreline, valleys, and ridges, from incompatible development.

(8) Protect plants, birds, and other animals that are unique to the State of Hawaii and the Island of Oahu.

Discussion
The proposed conveyance system has been designed to preserve the surrounding environment to the largest degree possible. It is expected that surrounding area will benefit from the addition of a drainage control system by directing stormwater around the Wildlife Refuge.

6.4 THE ENVIRONMENTAL EFFECTS OF ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Alternative channel alignment to be sited on Campbell Estate lands, rather than on U.S. Navy lands.

This alternative was rejected by Campbell Estate on the basis that the existing master plan was for land uses of a highest and best use type, i.e. residential, industrial, or commercial.

Location of the outlet channel outside, rather than through, the Wildlife Refuge.

This was rejected due to extreme topographical constraints resulting from a 40-foot high embankment that would have to be cut away.

No detention basin to settle out silt and urban debris, i.e. residential trash, was considered. This alternative was rejected since the surface runoff would have been able to flow directly into West Loch unimpeded.

6.5 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL OF VARIOUS ALTERNATIVES AND MITIGATION MEASURES

Energy would be consumed during construction and maintenance of all action alternatives. The No-Action alternative would not result in any energy

consumption. There does not appear to be any significant difference in energy consumption between the action alternatives.

Energy will be required for the preliminary construction phase for clearing, grading, and during installation of improvements in the detention basin and outlet into West Loch, Pearl Harbor. Energy consumption will be for construction related equipment, including the mechanized machinery used in the land shaping, clearing, and excavation of the drainage channel, detention basin, and outlet works.

Periodic maintenance by field staff to remove silt and urban debris from the channel and detention basin will also require consumption of energy.

6.6 IRRETRIEVABLE AND IRREVERSIBLE RESOURCE COMMITMENTS

In the implementation of the proposed drainage facility, as much as 50 acres of sugar cane land will be lost. This loss is not anticipated to be of economic significance to the current tenant, Oahu Sugar Company, since operations of active sugar cultivation has ceased.

Development of the project will cause an interruption of the current open space view plane as a result of the security fence. The balance of the project is at grade.

Selection of the preferred alternative irretrievably commits the City and County of Honolulu to periodic inspection and maintenance of the channel and detention basin so as to keep the silt load from becoming unmanageable. Further, periodic inspection of the outlet works will be necessary to prevent erosion of the outlet during winter storm events.

6.7 SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

The use of the Navy lands for this proposed drainage facility will permanently foreclose any future long-term use of the approximately 50 acres under consideration by the Navy. These might include future housing or recreational uses. Until the closure of NAVMAG Lualualei, these are not probable. The drainage facility will provide drainage relief for the urban land uses to the north of the channel as well as future development of Navy lands. Naval operations will not be compromised once this drainage facility is in place.

6.8 PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The potential adverse impacts to the Refuge will always be a consideration due to the infringement of Man's activities . Total isolation of the Refuge which was the original basis for relocation from the Keehi Lagoon area, will decrease due to the implementation of this proposed project. Drainage impacts may result from unforeseen storm events that exceed historical storm events in terms of safety specifications; planning has been devised to provide margins of protection that will accommodate the largest recorded storms. Tsunami flooding and hurricane events are considered Acts of God and the Drainage Facility is designed to protect life and property from these unseasonable events.

6.9 CUMULATIVE IMPACTS

Besides providing drainage for the urban land uses to the north, east, and west of the channel and basin sites, the grass-lined design criteria can provide increased habitat for water-oriented birds that may fly over the channel and basin. The facility can become a source of food and also a place to rest during the foraging activities.

6.10 MEANS OF MITIGATING POTENTIALLY ADVERSE EFFECTS

Any potentially adverse effects will be mitigated by the contractor during the construction phase, as part of the "Best Management Practices" requirement of the NPDES permit. The design criteria for the detention basin and the outlet works is for a 100-year storm event and the wildlife refuge will benefit from the construction of the drainage facility.

6.11 SUMMARY OF UNRESOLVED ISSUES

At the present time, principal issues that are unresolved consist primarily of required governmental permit approvals. Navy approvals for the requested easement on Navy land to the City & County of Honolulu for Operation and Maintenance are pending the final disposition of the various permits.

6.12 BASE RELOCATION AND CLOSURE (BRAC) ENVIRONMENTAL BASELINE STUDY LEASE (EBSL), EXHIBIT H, PREPARED MAY-JUNE 1994

Summary and conclusions of the BRAC EBSL are as follows:

All environmental concerns found to exist within the project area are also common to the entire region surrounding the project site. Specific environmental concerns at the project site were not identified during the EBSL process.

Regional environmental concerns identified include the following:

- A petroleum-hydrocarbon release has occurred at the Ewa Sugar Mill. The release occurred approximately one mile southwest of the subject site. A plume of free product exists and is migrating in a southerly direction. Due to the location and directional migration of the release, it is unlikely the site will be impacted.

- West Loch Naval Magazine:

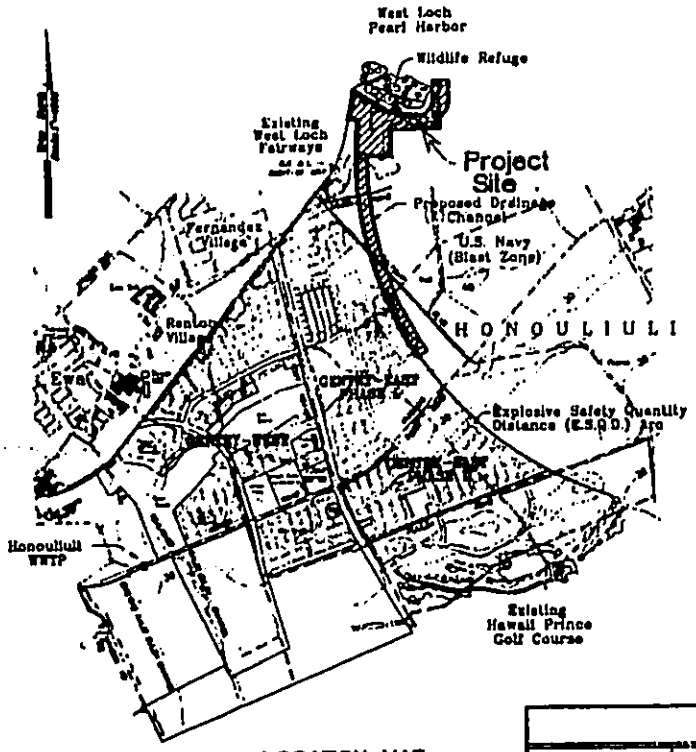
  West Loch Naval Magazine has been listed on CERCLIS and the NPL "Superfund" database. As a result, Parametrix, Inc. reviewed available reports and queried Navy and DOH environmental personnel. According to these sources, two USTs are known to have leaked fuel. Additionally, two NAVMAG -West Loch areas were identified as being potentially contaminated. It was later determined these sites contained only minor contamination with limited potential for migration. NAVMAG - West Loch is approximately one mile east from the project site. Due to the locations of NAVMAG - West Loch and the proposed drainage channel, it is unlikely that the reported contaminants released from NAVMAG - West Loch would impact the site.

- Pesticides, herbicides, fertilizers, and other chemicals were used for decades by Oahu Sugar Company. As a result of past practices, there is a possibility that detectable levels of chemical residues may be present in site topsoil. *However, this has not been documented.*

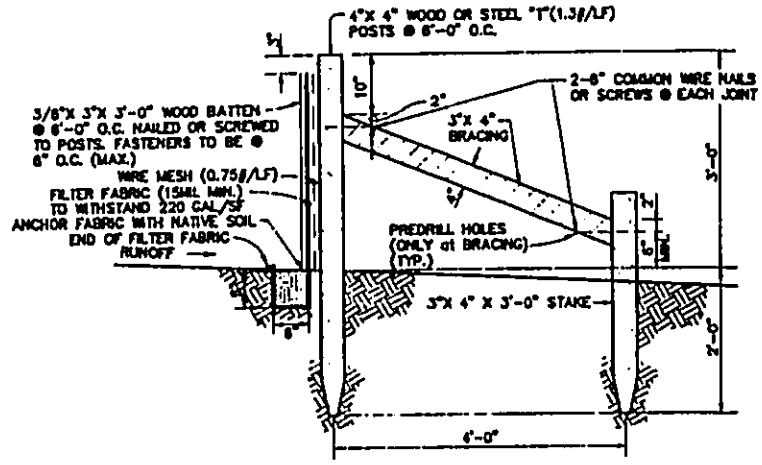
- Chevron and Navy petroleum pipelines have experienced releases in the vicinity of the site. It is possible, but not known that fuel contamination may be present in soil and groundwater beneath the project site. Observations for subsurface contamination should be made during project construction while excavation activities are performed.

  Various refuse/debris sites have been identified and will be examined in a Phase II Site review for possible contamination of the soil beneath the refuse.
  Results of the Phase II survey will be part of the written record for final disposition based on the findings.

Based on the findings, conclusions and necessary mitigation measures presented in this report, it appears that the site is suitable for leasing purposes. The Phase II review of the alignment, basin, and outlet channel will determine the extent of onsite mitigation to resolve the suitability of the parcel for the granting of an easement by the landowner, the U.S. Navy.



LOCATION MAP
Scale 1" = 4000'



REINFORCED SILT FENCE DETAIL
SCALE: 3/8" = 1'-0"

CONSTRUCTION SCHEDULE			
INCREMENT NUMBER	AREA (ACRES)	GRADING DURATION	GRASSING DURATION
1	15.0	JANUARY 27, 1997 TO MARCH 28, 1997	MARCH 31, 1997 TO APRIL 4, 1997
2	15.0	APRIL 7, 1997 TO JUNE 6, 1997	JUNE 9, 1997 TO JUNE 13, 1997
3	11.5	JUNE 16, 1997 TO AUGUST 15, 1997	AUGUST 18, 1997 TO AUGUST 22, 1997
4	14.0	AUGUST 25, 1997 TO OCTOBER 24, 1997	OCTOBER 27, 1997 TO OCTOBER 31, 1997

OUTLET DRAINAGE CHANNEL
WEST LOCH PEARL HARBOR
400 L.F. SILT CURTAIN
LIMITS OF REINF. SILT FENCE
4,400 L.F. OF REINF. SILT FENCE
WILDLIFE REFUGE
(U.S. FISH AND WILDLIFE SERVICE)
DETENTION BASIN
U.S. NAVY E.S.Q.D. ARC
(BLAST ZONE)
U.S. NAVY/SUGARCANE
A = 323 ACS.
Qp = 840 CFS
EWA BY GENTRY - EAST DRAINAGE CHANNEL
EXISTING DETENTION BASIN
DETENTION BASIN
EXISTING
WEST LOCH FAIRWAYS
SUBDIVISION
(DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT, CITY AND COUNTY OF HONOLULU)
CAMPBELL ESTATE
A = 685 ACS.
Qp = 2,045 CFS
STATE OF HAWAII
A = 178 ACS.
Qp = 530 CFS
CITY AND COUNTY OF HONOLULU
A = 178 ACS.
Qp = 525 CFS
TO WAIPAHU
FORT WEAVER
GENTRY PHASE
A = 240
Qp = 965
U.S. NAVY E.S.Q.D.
(BLAST ZONE)
SUGARCANE
(OAHU SUGAR CO)
50-FT. x 50-FT. x 0.5-FT.
#67 CRUSHED ROCK CONSTRUCTION
BASE COURSE FOR SITE INGRESS & EGRESS

LEGEND:
② GRADING INCREMENT NO. 2
GRADING INCREMENT LIMITS
RS REINFORCED SILT FENCE

BEST MANAGEMENT PRACTICES (BMP'S) NOTES:

1. GRAVEL CONSTRUCTION ENTRANCE FOR INGRESS AND EGRESS.
2. PERIMETER RUNOFF CONTROLS (REINFORCED SILT FENCE).
3. PLANTING GROUND COVER FOR EXPOSED GRADED AREAS.

PROPOSED CONSTRUCTION SCHEDULE

SCALE: 1" = 800'

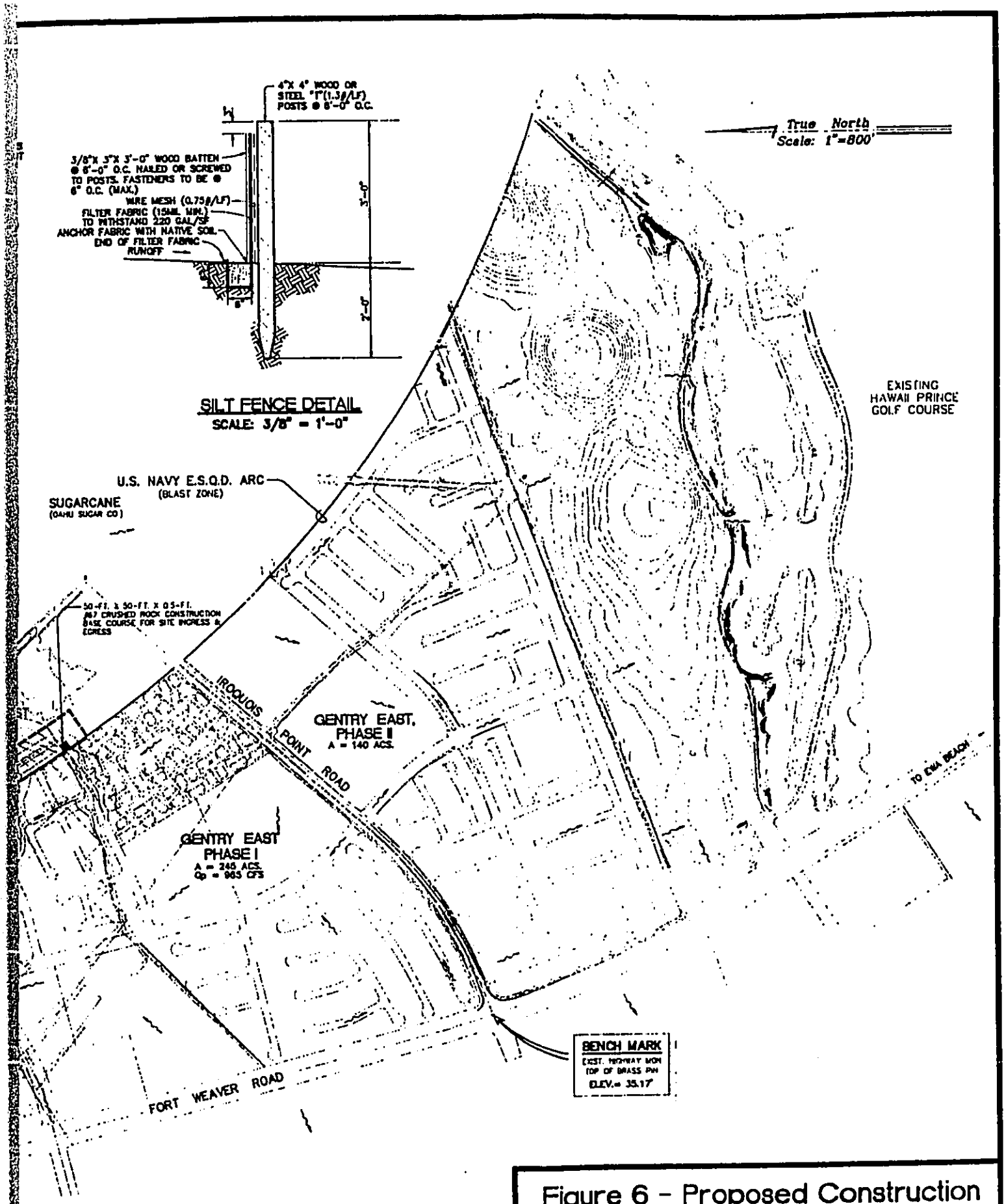


Figure 6 - Proposed Construction Schedule

Ewa By Gentry–East
Off–Site Drainage Plan
Environmental Communications

7. LIST OF PREPARERS

Environmental Communications - Draft Environmental Impact Statement

Fewell Geotechnical Engineering, Ltd. (F.G.E., Ltd.) - Geotechnical Studies

ParEn, Inc. - Civil Engineering Design

8. LIST OF AGENCIES CONSULTED DURING THE PREPARATION OF THE ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN) AND DRAFT ENVIRONMENTAL IMPACT STATEMENT

All requests for consultation were issued on March 23 and July 7, 1995. The following list notes the postmarked date in which agency and organization comments were received.

Agency	EISPN Comment Rec'd / DEIS COMMENT RECEIVED
Federal	
U.S. Department of the Interior Fish & Wildlife Service	
National Parks Service	
U.S. Geological Survey Water Resources Division	7-7-95
U.S. Army Corps of Engineers Operations Branch	7-31-95
Department of the Navy, Pacific Division Real Estate Division	
U.S. Department of Commerce National Marine Fisheries Service	
U.S. Department of Agriculture Soil Conservation Service	
EPA - Region IX	
U.S. Coast Guard	
State of Hawaii	
Department of Land & Natural Resources Office of Conservation/Environmental Affairs Aquatic Resources Water Resource Management Land Management Forestry/Wildlife State Parks	4-24-95

Agency Rec'd	EISPN	Comment DEIS
Historic Preservation Division of Water/ Land Management		8-7-95
Department of Health Environmental Management Division	5-1-95	7-26-95
Department of Transportation Highways Division	4-17-95	7-6-95
Department of Business Economic Development & Tourism, Energy Division	4-23-95	7-6-95
Land Use Commission		7-6-95
Office of the Governor Office of State Planning		
Department of Agriculture Planning/Development Office		
UH-Manoa Campus-Environmental Center		8-22-95
UH-Manoa Campus- Water Resources Research Center		8-09-95
Department of Budget & Finance Housing Finance & Development Corporation		7-17-95
Department of Defense		
Department of Accounting & General Services		7-7-95
Office of Hawaiian Affairs		7-17-95
Department of Hawaiian Home Lands		
Dept. of Education		8-2-95
Office of Environmental Quality Control		8-22-95

Agency	Date Comment Rec'd EISPN	DEIS
City & County of Honolulu		
Building Department		7-6-95
Department of Land Utilization Environmental Affairs Branch		8-30-95
Planning Department		
Department of Housing & Community Development	4-13-95	8-14-95
Department of Public Works	1-9-95	7-25-95
Board of Water Supply	4-13-95	7-18-95
Department of Transportation Services	4-18-95	7-12-95
Fire Department	4-19-95	7-13-95
Police Department		
Department of Parks & Recreation		7-14-95
Organizations		
Ewa Neighborhood Board #23		
The Estate of James Campbell	4-21-95	
Schuler Homes, Inc.		8-18-95
Hawaiian Electric Company, Inc. Environmental Branch		

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

July 25, 1995

Mr. William Meyer, Chief
United States Department of the Interior
U.S. Geological Survey
Water Resources Division
677 Ala Moana Boulevard Suite 415
Honolulu, HI 96813

Dear Mr. Meyer,

We have received your office's comments dated July 7, 1995 which advises that you will not be able to review the Draft Environmental Impact Statement (DEIS) within the prescribed 45 day review period. We will continue to provide your agency with the remaining documentation as the project proceeds through the review process.

Thank you for your timely advice and continuing support.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura- Gentry Homes, Ltd.

81 SOUTH HOTEL STREET, SUITE 211 • P.O. BOX 536 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 528-4661 • FAX (808) 528-4883

United States Department of the Interior

U.S. GEOLOGICAL SURVEY

WATER RESOURCES DIVISION
677 Ala Moana Boulevard, Suite 415
Honolulu, Hawaii 96813

July 7, 1995

Mr. Art Challacombe
City and County of Honolulu
Department of Land Utilization
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Challacombe:

Subject: Ewa by Gentry - East Offsite Drainage Plan, Draft Environmental Impact Statement (DEIS)

We are in receipt of the subject DEIS. We regret that due to prior commitments, we are unable to review the DEIS within the 45-day deadline.

We are returning the DEIS and Exhibit D to your office for your future use.

Sincerely,

William Meyer
District Chief

Enc.

cc: Ron Uemura, Gentry Homes, Ltd.
F. J. Rodriguez, Environmental Communications

JUL 13 1995

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

August 8, 1995

Mr. Ray H. Jyo, P.E.
Director of Engineering
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

Dear Mr. Jyo,

Subject: Draft Environmental Impact Statement for the Proposed Ewa By Gentry-East Offsite Drainage Plan, Phase I.

We have received your agency comments dated July 31, 1995 and we respond as follows:

a. We have initiated contact with the Regulatory Branch and have completed the Wetlands delineation analysis. This information will be incorporated in the DA permit for further review and processing.

b. The verification of the flood hazard information is acknowledged.

Thank you for your timely response and continuing support.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

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DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FORT SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

July 31, 1995

Planning Division

Mr. Art Challacombe
City and County of Honolulu
Department of Land Utilization
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Challacombe:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement for the Ewa by Gentry East Offsite Drainage Plan, Oahu (TMK 9-1-10: 4, 14, 15). The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

a. Based on the information provided, a DA permit will be required for the project. Please contact our Regulatory Branch at 438-9258 for additional information.

b. The flood hazard information provided on page 6-1 of the report is correct.

Sincerely,

/s/ J. Pelowski

Ray H. Jyo, P.E.
Director of Engineering

Copy Furnished:

Mr. F. J. Rodriguez
Environmental Communications
P.O. Box 536
Honolulu, Hawaii 96809

AUG - 2 1995

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

September 6, 1995

Mr. Patrick T. Onishi, Director
Department of Land Utilization
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Onishi:

Subject: Draft Environmental Impact Statement (DEIS) Ewa By Gentry-East Offsite Drainage Plan, Phase I.

We have received your comments dated August 30, 1995 on the subject project and respond as follows:

1. Littoral drift as a phenomena, occurs primarily along shorelines that are exposed to open ocean conditions. In embayments such as West Loch, the possibility of littoral drift is remote at best. Finally, with the terrigenous mud flats bordering the West Loch shoreline, this further eliminates potential littoral drift.

2. Lateral access to the existing shoreline is prohibited under the Pearl Harbor Defensive Sea Area regulations. This includes the Wildlife Refuge which is under the management of the U.S. Fish & Wildlife, Department of the Interior. We cite this in section 3. Purpose and Need, page 3-1. We will also expand item I Beach Protection on page 6-13.

3. The Wetlands Delineation Study has been completed and we are waiting receipt of U.S. Army Corps of Engineers acceptance of the delineation. We will include in the FEIS the study with a 100" to the inch scale map. Further, we will hand carry a 40' to the inch scale print of the delineation together with Winona Char's report. The 40 scale print was submitted to the Corps of Engineers for their use in the field.

A mitigation plan is to be finalized in conjunction with the Corps of Engineers and the U.S. Fish & Wildlife Refuge Manager. This is part of the COE 404 permit and also the Section 7 Endangered Species Act permit processing. The landowner will be the applicant to each Federal agency for permit approval.

4. Under the terms and conditions of the Base Relocation and Closure (BRAC) which requires hazardous waste materials to be cleaned as part of the proposed lease agreement between the Navy and the City & County of Honolulu, a consulting engineering firm is in the process of conducting their Phase II inspection of soils and water table sediment. This process will also require the removal of solid waste on grade materials. The Phase II report

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will be provided to the landowner (US Navy) for their approval before entering into lease/easements with the City & County of Honolulu.

We trust we have responded to your comments.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432

JEREMY HARRIS
MAYOR

PATRICK T. ONISHI
DIRECTOR

LORETTA K. C. CHEE
DEPUTY DIRECTOR

94/SMA-086(AC)
94/SV-008(AC)

August 30, 1995

Mr. Fred J. Rodriguez
Environmental Communications
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Ewa by Gentry - East Offsite Drainage Plan
Draft Environmental Impact Statement (DEIS)
Tax Map Keys: 9-1-10: 04, 14 and 15

Thank you for the opportunity to review the DEIS for the proposed Ewa by Gentry - East Offsite Drainage Plan. The Department of Land Utilization offers the following comments.

1. Shoreline Processes

A portion of the project is within the 40-foot shoreline setback and will require a Shoreline Setback Variance (SV) as well as a Special Management Area Use Permit (SMP). The final EIS should include a discussion regarding any project impacts to littoral drift along the shoreline.

2. Lateral Access

Section 6.3.5 on page 6-12 should include a statement that lateral access along the shoreline will not be affected, as the land belongs to the U.S. Navy and public access along the shoreline is prohibited.

3. Wetlands

The final EIS should contain a wetlands mitigation plan or at least a procedural guideline as to how mitigation will be achieved. If the plan cannot be finalized as part of the final EIS, it should be discussed as an unresolved issue in the final document. A plan will be required as part of the SMP. Exhibit C in the addendum is in a scale that is too small to adequately view. The Exhibit should ideally be at a scale of 200 feet to one inch.

4. Hazardous Substances

The final EIS should discuss mitigation associated with clean-up of the 1,600 square-foot dump site on the property.

Should you have any questions regarding the above comments, please contact Art Challacombe of our staff at 523-4107.

Very truly yours,

PATRICK T. ONISHI
Director of Land Utilization

PTO:am

g:gentry.adc

95-04

DEPARTMENT OF PARKS AND RECREATION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU HAWAII 96813

'95 JUL 14 PM 3 27

JEREMY HARRIS
MAYOR

DONA L. HAN
DIRECTOR

ALVIN K C AU
DEPUTY DIRECTO

July 14, 1995

TO: PATRICK T. ONISHI, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: DONA L. HANAIKE, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT PURSUANT TO CHAPTER 343, HRS FOR THE EWA BY GENTRY EAST OFFSITE DRAINAGE PLAN
LOCATION : EWA, OAHU, HAWAII
TAX MAP KEY : 9-1-010:004, 014 & 015

We have reviewed the Draft Environmental Statement for the above-described project and have no comment to offer at the present time.

Thank you for the opportunity to review this project.

Should you have any questions, please contact Lester Lai of the Advance Planning Branch at extension 4696.

For DONA L. HANAIKE
Director

DLH:js

BUILDING DEPARTMENT
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI
DIRECTOR AND BUILDING SUPERINTENDENT

ISIDRO M. BAQUILAR
DEPUTY DIRECTOR AND BUILDING SUPERINTENDENT

PB 95-483

July 6, 1995

Environmental Communications
P. O. Box 536
Honolulu, Hawaii 96809

Attn: F. J. Rodriguez

Gentlemen:

Subject: Ewa by Gentry-East Offsite Drainage Plan

We have reviewed the Draft Environmental Impact Statement for the subject project and have no comments to offer.

Very truly yours,

RANDALL K. FUJIKI
Director and Building Superintendent

cc: G. Tamashiro

ENVIRONMENTAL
COMMUNICATIONS

F J. RODRIGUEZ

August 21, 1995

Mr. Ronald S. Lim, Director
Department of Housing & Community Development
City and County of Honolulu
650 South King Street 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Lim,

Subject: Draft Environmental Impact Statement (DEIS) for the Ewa By Gentry-East Offsite Drainage Plan

Thank you for your letter comments dated August 14, 1995 on the subject project. We respond as follows:

1. The stated 54-inch double barrel culverts will be revised.

2. The stated 10-feet x 6-feet double barrel culvert will be revised.

These revisions will be made by the engineering consultant in their Drainage Report. Thank you for your timely comments and continuing support.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.
Mr. Russell Arakaki - ParEn, Inc.

81 SOUTH HOTEL STREET, SUITE 211 • P.O. BOX 536 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 528-4661 • FAX (808) 528-4883

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 5TH FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-4427 • FAX: (808) 527-5498

JEREMY HARRIS
MAYOR

RONALD S. LIM
DIRECTOR

ROLAND D. LIBBY, JR.
DEPUTY DIRECTOR

August 14, 1995

Mr. F. J. Rodriguez
Environmental Communications
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: Draft Environmental Impact Statement
Ewa by Gentry-East Offsite Drainage Plan

The Department of Housing and Community Development (DHCD) has reviewed the Draft Environmental Impact Statement (DEIS) for the above subject project and offers the following comments:

1. Page 5, Section 3.6 Existing Conditions, paragraph 4: The last sentence states "Approximately 80 acres of the Ewa Villages Golf Course and 6 acres of the existing Fernandez Village drains into the existing double 48-inch reinforced pipe culverts under Fort Weaver Road."

   We note that the existing double barrel pipe culverts under Fort Weaver Road are 54-inch and not 48-inch as indicated.

2. Page 5, Section 3.6 Existing Conditions, paragraph 5: The first sentence states "The City and County of Honolulu, Department of Housing and Community Development has extended the double barrel pipe culverts with a 15-feet x 3.5-feet concrete box culvert to the temporary retention basin."

   We note that the size of the concrete box culvert extending the double barrel pipe culvert to the temporary retention basin is 10-feet x 6-feet and not 15-feet x 3.5-feet as indicated.

Thank you for the opportunity to comment. Should you have any questions, please contact Charlotte Yoshioka of our Planning and Analysis Branch at 527-5090.

Sincerely,

RONALD S. LIM
Director

AUG 18 1995

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

August 8, 1995

Mr. Kenneth E. Sprague, Director
Department of Public Works
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Sprague;

Subject: Draft Environmental Impact Statement (DEIS) Ewa By Gentry - East Offsite Drainage Plan , Phase I on Navy lands.

We have received your department comments dated July 25, 1995 and respond as follows:

1. Provisions for the maintenance of the proposed drainage facility will include a 15-feet wide access road constructed around the drainage channel, detention basin and outlet works. A minimum turning radius of 30-feet will be provided for the maintenance vehicles, including adequate turn-around areas and a 180-feet by 80-feet staging area for equipment and materials. The access road, turn around areas and staging area will be constructed of 6-inch thick compacted crushed coral.
2. There will also be a total of five (5) access ramps that will be constructed to facilitate maintenance of the channel bottom, basin floor and outlet works. The ramps will have a maximum slope of 10-percent and will also be paved with 6-inch thick compacted crushed coral.

Thank you for your continuing support.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

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DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

KENNETH E SPRAGUE
DIRECTOR AND CHIEF ENGINEER

DARWIN J. HAMAMOTO
DEPUTY DIRECTOR

ENV 95-212

July 25, 1995

Mr. F. J. Rodriguez
Environmental Communications
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: Draft Environmental Impact Statement (DEIS)
Ewa by Gentry - East Offsite Drainage Plan, Phase I
Tax Map Key: 9-1-10: 4, 14 and 15

We have reviewed the subject DEIS and have the following comment:

The DEIS should expand discussion on the adequacy of maintenance, such as road turning radius, ramps to bottom of channel and retention basin.

Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at 523-4150.

Very truly yours,

for KENNETH E. SPRAGUE
Director and Chief Engineer

cc: DLU (Arthur Challacombe)
Gentry Homes, Ltd. (Ron Uemura)

JUL 27 1995

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

July 18, 1995

Mr. Fred Rodriguez
Environmental Communications
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: Your Letter of July 1995 Regarding the Draft Environmental Impact Statement (DEIS) for the Ewa by Gentry - East Offsite Drainage Plan, Honouliuli, Ewa, Oahu, TMK: 9-1-10: 4, 14, 15

Thank you for the opportunity to review and comment on the DEIS for the proposed Ewa by Gentry - East Offsite Drainage Plan.

We have no objections to the proposed project as it will not impact any Board of Water Supply facilities.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

JUL 19 1995

Water ... man's greatest need - use it wisely

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

July 25, 1995

Mr. Charles O. Swanson, Director
Department of Transportation Services
City & County of Honolulu
Pacific Park Plaza
711 Kapiolani Boulevard Suite 1200
Honolulu, HI 96813

Dear Mr. Swanson,

We have received your department comments dated July 12, 1995 and note your no comment position.

Thank you for your timely comments and continuing support.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, ltd.

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DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
PACIFIC PARK PLAZA
711 KAPIOLANI BOULEVARD, SUITE 1200
HONOLULU, HAWAII 96813

JEREMY HARRIS
~~FRANK F. FASI~~
MAYOR

CHARLES O. SWANSON
~~JOSEPH M. MAGALDI, JR.~~
DIRECTOR
~~AMAR GAPPAL~~
~~DEPUTY DIRECTOR~~

PL95.1.202
TE-3239

July 12, 1995

MEMORANDUM

TO: PATRICK ONISHI, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: CHARLES O. SWANSON, DIRECTOR

SUBJECT: EWA BY GENTRY -- EAST OFFSITE DRAINAGE PLAN
DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
TAX MAP KEY: 9-1-10: 4, 14, 15

We have reviewed the subject DEIS submitted by Environmental Communications and have no comments or objections to the proposed project.

Should you have any questions, please call Lance Watanabe of my staff at local 4199.

CHARLES O. SWANSON

cc: Environmental Communications
Gentry Homes, Ltd.

JUL 18 1995

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

July 25, 1995

Mr. Anthony J. Lopez, Fire Chief
Fire Department
City & County of Honolulu
3375 Koapaka Street Suite H425
Honolulu, HI 96819-1869

Dear Chief Lopez,

We have received your department comments dated July 13, 1995 and will comply with the requested requirements of Access for fire apparatus, water supply, and building code standards.

Thank you for your timely response and continuing support.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

61 SOUTH HOTEL STREET, SUITE 211 • P.O. BOX 536 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 528-4661 • FAX (808) 528-4883

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
3375 KOAPAKA STREET, SUITE H425
HONOLULU, HAWAII 96819-1869

JEREMY HARRIS
MAYOR

ANTHONY J. LOPEZ JR
FIRE CHIEF

ATTILIO K. LEONARDI
FIRE DEPUTY CHIEF

July 13, 1995

TO: PATRICK T. ONISHI, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: ANTHONY J. LOPEZ, JR., FIRE CHIEF

SUBJECT: EWA BY GENTRY-EAST OFFSITE DRAINAGE PLAN
TAX MAP KEY: 9-1-10: 4, 14, 15

We have reviewed the subject material provided and foresee no adverse impact in Fire Department facilities or services.

Access for fire apparatus, water supply and building construction shall be in conformance to existing codes and standards.

Should you have any questions, please call Acting Assistant Chief Alvin Tomita of our Administrative Services Bureau at 831-7775.

ANTHONY J. LOPEZ, JR.
Fire Chief

CW:ny

Copy to: Gentry Homes, Ltd. (Ron Uemura)
Environmental Communications (F. J. Rodriguez)

JUL 18 1995

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

August 21, 1995

Dr. Roger S. Fujioka, Ph. D.
University of Hawaii at Manoa
Water Resources Research Center
Holmes Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Dear Dr. Fujioka,

Subject: Draft Environmental Impact Statement (DEIS) for the Ewa By Gentry-East Offsite Drainage Plan

We have received your comments dated August 9, 1995 on the subject project and we respond as follows:

1. Buried Drainage Lines were not considered as a viable alternative due to:

a. Size - would require 1 - 20 ' diameter pipe, 4 - 12' diameter or, 12 - 8' diameter pipes.
b. Manhole structures would be required at frequent intervals per City & County standards for maintenance.
c. The cost of the resultant excavation, installation of the large pipes and manholes, and compacted backfill would be prohibitive.

2. The equivalent of a 20' x 20' box culvert was also considered and discarded for the same reasons.

3. The project is to be built on Navy lands which are along the Explosive Safety Distance Arc (ESQD). This is considered excellent use of Navy lands that cannot be otherwise developed for human habitation.

4. Fencing will be provided for safety purposes as well as for Navy security.

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5. The concept of a long grassed and unlined ditch provides surface runoff the opportunity to settle in the ditch/ detention basin, and percolate into the ground. This will effectively reduce any silt transport directly into West Loch, unlike a concrete lined ditch or pipe. The ditch and detention basin will also slow down the flow of storm water into West Loch and minimize any erosive action to the shoreline. The principal protective efforts would be to the wildlife refuge first and West Loch second.

6. There is no plan to maintain any kind of "viable" standing crop of grass in the ditch or basin. While it is planned to hydromulch these areas initially for dust and erosion control, most of the resultant grass is expected to be overtaken by native vegetation (weeds). This vegetation will provide the dual capability of silt retention and also afford the avifauna opportunities for feeding when standing water exists. .

Thank you for your comments and we look forward to your continuing cooperation.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283 • 2540 Dole Street
Honolulu, Hawaii 96822

9 August 1995

Environmental Communications
Attn: F. J. Rodriguez
P. O. Box 6536
Honolulu, HI 96809

Dear Mr. Rodriguez:

SUBJECT: Review of Proposed Study

Thank you for allowing WRRC to review your document entitled "Ewa by Gentry-East Offsite Drainage Plan." WRRC staff have reviewed this document and our relevant comments are included below:

1. Why is the buried drainage pipeline not considered as a viable alternative? Open drainage takes up valuable large piece of land, and may be a danger for children who play in it

2. There is a possibility to have 40% of sediment load dumped into Westlock. Will EPA/Navy allow you to do that? 4000 cfs muddy stormwater may drain into Westlock from your detention basin.

3. How is it planned to maintain a viable standing crop of grass in the channels during periods of low rainfall?

Sincerely,

Roger S. Fujioka, Ph.D.
Director, WRRC

RSF:jm
cc: Y.S. Fok
H. Gee

AUG 14 1995

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

August 31, 1995

Mr. John T. Harrison
Environmental Center
University of Hawaii
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

Dear Mr. Harrison:

Subject: Draft Environmental Impact Statement prepared for Ewa By Gentry-East Offsite Drainage Plan Ewa, Oahu

We have received your FAX communication on August 22, 1995 and commend your timely communication. We respond to your comments as follows:

1. Potential Beneficial Uses of Stormwater Discharge - The Drainage Report which was attached to the DEIS was designed to meet County standards for protection to property and life. In addition, the protection of the Wildlife Refuge is vital to the landowner, the U.S. Navy. To be used as a resource, a need based on demand needs to be established first, then cost benefit studies to determine economic feasibility conducted. The use of additional Navy lands also did not enter into the analysis since urban development plans for Barbers Point Naval Air Station are not complete at this time. Infrastructural requirements, i.e. potable water, sewerage, roads, drainage, etc. are in preliminary design stages for long term future land use changes at Barbers Point Naval Air Station.

2. Contaminants Present in Runoff - As a point of reference, we trust that your reviewers were able to avail themselves of the Draft Environmental Assessment for this proposed project that was circulated in March, 1995. We realize that there is the potential for confusion since the document was initially prepared as a joint NEPA/Ch.343 document. However, the DEA contained Technical Studies A-I as prepared by the technical consultants retained for their expertise. A critical study was prepared by O.I.Consultants, Inc. Dr. David A. Ziemann. Further, there is an addendum provided in the DEIS as Exhibit A, 5-3-95. We would direct your attention to Dr. Ziemann's works on contaminants in the surface runoff. It should also be noted that the U.S. Navy is requiring a survey of the lands under consideration for lease or easement to the City & County of Honolulu. This study is an Environmental Baseline Survey - Lease (EBSL), Phase I. This is listed as Exhibit H in the Draft EA. It is replete with technical data that includes a listing of the contaminants used by the sugar industry and found today in the Ewa Plains soils. The Phase II survey which will conduct actual sampling of the soils for specific quantities of contaminants is under way. These studies will then provide the landowner the vital data leading to a Findings of Suitability to Lease (FOSL).

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Finally, the operations and maintenance agreement between the landowner and the City & County of Honolulu to periodically clear brush, dredge accumulated sediment from the channel, detention basin, and outlet structure is under review by both parties. Plans for the City maintenance staff to conduct their O&M activities within the drainage facility and not compromise the Navy's defense perimeter boundaries are also being examined.

3. Potential Impacts on Wildlife Refuge and Triggering of Federal Endangered Species Act - A point of reference should be established at the outset of our response. We point out that in the current existing conditions without the proposed drainage facility, quantities of suspended solids and agricultural contaminants are moving naturally towards West Loch, Pearl Harbor. In today's examination of West Loch waters, it is considered of poor quality and is not a pristine body of water. Items described in this analysis as potentially hazardous, i.e. " contaminant laden drainage water could leach into the Wildlife Refuge from either the Channel or the detention basin. A third possibility is that runoff contaminants destined for the ocean could be carried back into the Wildlife Refuge as a result of wave and tidal action." This is happening now with or without the drainage project. The applicant is in the process of preparing a NEPA Environmental Assessment in which the landowner discusses with the Department of Interior, U.S. Fish & Wildlife Service, the various aspects of positive and negative impacts to the Refuge. This is mandatory since is the landowner who must obtain the Section 7 approval from the USFWS for the proposed improvements. In this review and negotiation between landowner and regulatory agency, the technical and legal ramifications identified by your reviewers will be resolved. Again, we refer your reviewers to the Draft E.A. which contains Dr. Philip Bruner's work on the avifauna found in the area and also the specific specie types residing at the Refuge. His work is identified as Exhibit D.

4. Need for a Cost-Benefit Analysis - Page 6-5 of the DEIS identifies the cost as $4.9 million dollars. All costs will be borne by the applicant with no tax dollars involved.

Conclusion: We trust that we have responded adequately to the Center's concerns.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

95-04721

BENJAMIN J CAYETANO
[redacted]
GOVERNOR

ROY S OSHIRO
[redacted]
ACTING EXECUTIVE DIRECTOR

'95 JUL 19 P3 21

STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 QUEEN STREET, SUITE 300
HONOLULU, HAWAII 96813
FAX (808) 587-0600

IN REPLY REFER TO:
95:PPE/4256

July 17, 1995

Mr. Art Challacombe
Department of Land Utilization
City & County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Challacombe:

Subject: Draft Environmental Impact Statement for Ewa by Gentry, East Offsite Drainage Plan

We have reviewed the subject draft EIS and have no comments to offer.

Thank you for the opportunity to comment.

Sincerely,

Roy S. Oshiro
Acting Executive Director

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

July 11, 1995

Mr. Gordon Matsuoka
State Public Works Engineer
Department of Accounting & General Services
State of Hawaii
P.O. Box 119
Honolulu, HI 96810

Dear Mr. Matsuoka,

We have received your department comments dated July 7, 1995 on the Draft Environmental Impact Statement (DEIS) for the Ewa by Gentry-East Offsite Drainage Plan. We acknowledge your support for the efforts to improve the overall area's drainage system. We also note your plans for the development of the Ewa II Elementary School. Thank you for your timely comments and continuing support.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura- Gentry Homes, Ltd.

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(P)1483.5

JUL [illegible]

Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813-3017

Attention: Mr. Art Challacombe

Gentlemen:

Subject: Ewa by Gentry-East
Offsite Drainage Plan
Ewa, Hawaii
Draft Environmental Impact Statement

Thank you for the opportunity to review the subject document. The Department of Accounting and General Services is master planning the proposed Ewa II Elementary school, which is located in the subject area. We are in support of all efforts to improve the overall area's drainage system since they will benefit the aforementioned school.

If there are any questions regarding the above, please call Mr. Ralph Yukumoto of the Planning Branch at 586-0488.

Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

RY:jy
cc: Gentry Homes, Ltd.
Environmental Communications

JUL 10 1995

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

July 25, 1995

Mr. Dante K. Carpenter, Administrator
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard Suite 500
Honolulu, HI 96813-5249

Dear Mr. Carpenter,

We have received your office's comments dated June 17, 1995 (July?) and respond in the following: (We are providing the abstract provided earlier in December, 1994 in the Draft Environmental Assessment. We note that the E.A. was not provided to OHA and regret the oversight.)

1. The references to the descriptive statistics in Exhibit A describe the total drainage basin which will be serviced by the offsite drainage facility. The actual size of the drainage facility is approximately 50 acres and is located entirely on U.S. Navy lands. These agricultural designated lands were leased to Oahu Sugar Co. which has ceased sugar cultivation operations. The alignment of the proposed facility will be located on the Explosive Quantity Safety Distance (ESQD) arc which prohibits development suitable for human habitation.

2. The comments contained in Exhibit A were prepared in response to certain questions raised by the Department of Land Utilization, City & County of Honolulu in earlier correspondence which identified certain acreage discrepancies in the total drainage basin size. All references contained in Exhibit A relate to correcting that total drainage basin discrepancy, and do not reflect the total size of the planned drainage plans.

We regret any confusion and misunderstanding that came about due to our omitting your agency in the initial distribution of the Environmental Assessment. If you would like to have us mail you a copy of the E.A., we can provide this post haste.

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Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

HDM

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813-5249
PHONE (808) 594-1888
FAX (808) 594-1865

June 17, 1995

Mr. Art Challacombe
Dept. of Land Utilization
City & County of Honolulu
650 South King St.
Honolulu, HI 96813

Dear Mr. Challacombe:

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) for the Ewa by Gentry-East Offsite Drainage Plan, Ewa, Island of Oahu.

We find the information contained in the DEIS helpful to ascertain the need to develop a drainage plan for the leeward side of Oahu in the Ewa district. We generally concur with the applicant's effort to establish a drainage outlet for water and runoff removal from the project area. But we have some concerns about the project itself and potential adverse effects which have not been fully addressed in the DEIS. Specifically we refer to the size of the area to be used for the development of the proposed drainage system. The project area comprises about 1607 acres, of which 1556 acres are termed agricultural and 14.5 acres are presently occupied by structures (Table 2, Exhibit A). Upon completion, the agricultural area will be reduced to 323 acres while the area occupied by drainage structures will increase to 369 acres. This is roughly equivalent to a reduction in the agricultural land from 97% to 20% and an increase in the area for drainage structures from 0.9% to 23%. A further review of the narrative in page 6-17 and the data in Table 2 of Exhibit A raises the following concerns. First, in page 6-17 it is stated that:

> "In the implementation of the proposed drainage facility, as much as 50 acres of sugarcane lands will be lost."

It is unclear how this estimate was obtained in light of the statistics shown above.

Second, in Appendix A it is stated the following:

"It is clear from the calculations summarized in Table 2 that the annual loads of nitrogen, suspended solids, and pesticides discharged into the ocean under existing agriculture land use will decrease after completion of the projected development."

The report in Appendix A fails to state that the decrease in discharge loads is a direct result of the reduction in the size of the agricultural area rather than to improved drainage *per se*. Furthermore, the report fails to state that the area termed as landscape will increase from 34 to 861 acres and this will produce an 25 fold increase in nitrogen, total solids, and pesticide discharge loads.

Overall, although the data in Table 2 does not substantiate the contention that overall reductions in major pollutants will result from the proposed project, we are inclined to believe that the drainage project will improve the overall removal of runoff and soil losses. But the project will bear some costs in terms of (i) irreversible loss of agricultural land, and (ii) a likely increase in yearly pollutant loads. Please contact me, or Luis A. Manrique of the Land and Natural Resources Division (594-1935), should you have any questions on this matter.

Sincerely yours,

Dante K. Carpenter
Administrator

LM:lm
cc BOT

JOHN WAIHEE
GOVERNOR

BRIAN J. J. CHOY
Director

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185

Dear Participant:

Attached for your information is a Final Environmental Impact Statement which was prepared pursuant to the EIS law (Hawaii Revised Statutes, Chapter 343) and the EIS rules (Administrative Rules, Title 11, Chapter 200).

TITLE OF PROJECT: Ewa By Gentry-East Offsite Drainage Plan

LOCATION: *ISLAND* Oahu *DISTRICT* Ewa

TAX MAP KEY NUMBERS: 9-1-10: 14, 15

AGENCY ACTION: _____ *APPLICANT ACTION:* XX

ACCEPTING AUTHORITY: Department of Land Utilization

ADDRESS: City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

CONTACT: Mr. Art Challacombe *PHONE:* 523-4107

PROPOSING AGENCY OR APPLICANT: Gentry Homes, Ltd.

ADDRESS: P.O. Box 295
Honolulu, Hawaii 96809

CONTACT: Mr. Ron Uemura *PHONE:* 599-8283

CONSULTANT: Environmental Communications

ADDRESS: 81 South Hotel Street Rm. 211
Honolulu, Hawaii 96813

CONTACT: Mr. Fred Rodriguez *PHONE:* 528-4661

If you no longer need this EIS, please return it to OEQC (please do not recycle document). Thank you for your participation in the Environmental Impact Statement process!

University of Hawai'i at Mānoa

Environmental Center
A Unit of Water Resources Research Center
Crawford 317 • 2550 Campus Road • Honolulu, Hawai'i 96822
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

August 22, 1995
RE: 0663

Mr. Art Challacombe
City and County of Honolulu
Department of Land Utilization
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Challacombe:

Draft Environmental Impact Statement
Ewa by Gentry-East Offsite Drainage Plan
Ewa, Oahu

The referenced project is a plan by Gentry Homes, Ltd. to design and construct an offsite drainage facility to provide drainage for the Ewa by Gentry-East residential developments. The planned improvements will consist of a vegetated drainage channel, detention basin, outlet channel and outlet structure. The project will require the use of approximately 50 acres of U.S. Navy lands.

This review was completed with the assistance of Yu-Si Fok, Civil Engineering; Dave Penn, Geography; Malia Akutagawa and Tom Hawley, Environmental Center.

Potential Beneficial Uses of Stormwater Discharge

There are several subjects which this Draft EIS does not cover in adequate detail. Given the size of this project, it is probable that large amounts of water will be present in the drainage system at any given time and especially following storm conditions. This could be considered a source of water supply but the Draft EIS does not include any mention of a plan which considers utilization of this stormwater as a resource. This is an especially important consideration given that the proposed project is located in a water shortage district on Oahu.

Our reviewers suggest that benefits could be derived by using more Navy lands than the project currently calls for. This would allow for greater detention area which would in turn permit greater levels of recharge to the aquifer in the area. Similarly, the possible benefits of tying this project into an effluent reuse program have not been explored. This type of alternative could benefit both the drainage project and effluent disposal efforts for the Gentry Homes area.

Contaminants Present in Runoff

We are also concerned that the Draft EIS does not consider the possibility that drainage water from this area could contain fertilizer and other harmful agents. The Final EIS needs to incorporate some analysis of this possibility and appropriate mitigative measures. Similarly, no mention is made in the Draft EIS of expected sediment corrosion and how it will be disposed. The drainage channel and detention basin for the proposed project will require periodically dredging and disposal of dredged material, yet the Draft EIS contains no mention of how this procedure will be performed, how frequently or what the expected impacts of such maintenance will be.

Potential Impacts on Wildlife Refuge and Triggering of Federal Endangered Species Act

Another major concern is the proximity of the detention basin to the U.S. Fish and Wildlife Service's Wildlife Refuge adjacent to the West Loch of Pearl Harbor. Our reviewers cited several possibilities which could adversely impact the Refuge. First, it is unclear from the Draft EIS whether the terminus of the drainage channel at the West Loch is configured in such a way as to prevent the discharge of drainage water into the Wildlife Refuge. Second, even if the configuration of the drainage channel is adequate, the possibility remains that contaminant-laden drainage water could leach into the Wildlife Refuge from the either the channel itself or the detention basin. A third possibility is that runoff contaminants destined for the ocean could be carried back into the Wildlife Refuge as a result of wave and tidal action. Finally, we are concerned that increased nutrient inputs could be absorbed into the waters of the Wildlife Refuge, thus changing marine ecological relationships and possibly altering feeding patterns. In view of these concerns, we find the absence of a sustained discussion of these issues significant and disturbing.

An analysis of the types of fauna which inhabit the Wildlife Refuge should be included in the document, especially if there are any endangered species. Section 11-200-19 of the Hawaii Administrative Rules (H.A.R.) states:

> *In developing the EIS ... [t]he scope of the statement may vary with the scope of the proposed action and its impact. Data and analyses in a statement shall be commensurate with the importance of the impact, and less important material may be*

> *summarized, consolidated, or simply referenced. Statements shall indicate at appropriate points in the text any underlying studies, reports, and other information obtained and considered in preparing the statement, including important issues and to ensure that the statement remains an essentially self-contained document, capable of being understood by the reader without the need for undue cross-reference.*

A survey of fauna is necessary to a determination of potential impacts on existing wildlife, and therefore, is required under Section 11-200-19, H.A.R.

We suspect that the Refuge serves as critical wetland habitat for native and/or migratory birds that may be listed as threatened or endangered. If this is so, then the Draft EIS must determine whether or not the proposed action is a "taking" of endangered species prohibited under the Endangered Species Act (ESA), 16 U.S.C., Section 1538(a)(1)(B). If a taking is anticipated, then the project must be halted. The definition for "take" is "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct," Section 1532(19).

Recent case law has been instructive in defining the word "harm" to suffice a taking. In Palila v. Hawaii Department of Land and Natural Resources, 631 F. Supp. 787 (D. Hawaii, 1985) the court reiterated it's finding in *Palila I* that "harm" includes "significant environmental modification or degradation which actually injures or kills wildlife," 471 F. Supp. at 985, 995 (D. Haw. 1979). This decision is binding as a rule of *stare decisis*. Moreover, this summer, the United States Supreme Court also held in the Sweet Homes v. Babbitt case that habitat modification constitutes a harm and is therefore a taking of an endangered species. This Supreme Court ruling is not only binding on Hawaii, but on all states.

In light of prohibitions under the Endangered Species Act and recent case law, we recommend that the applicant assess seriously the potential direct and indirect impacts of urban runoff on existing wildlife and the Refuge as their habitat. The following are some considerations for assessing impacts and determining whether the proposed action might constitute a taking:

- Estimated volumes of discharge water as they occur temporally. How will changes in salinity affect ecological relationships between coastal marine and terrestrial organisms as important components of the food web and Wildlife Refuge habitat?
- Identification and estimated quantification of specific chemical contaminants, nutrients, and fecal bacteria sustained in discharge waters. Depending on soil permeability and water volume, how much of these contaminants will be absorbed and how much will flow directly into the ocean? Again, will ecological relationships alter? Will chemicals bio-accumulate into the food chain, producing

harmful effects in native and endangered birds, and other organisms? Will growth of plants associated with the wetland refuge area be affected by chemical contamination?

- Estimated turbidity. Will light inhibition due to an increase in suspended particles adversely affect algal growth? Will reduced primary productivity also affect secondary productivity?

If after addressing these issues, the applicant finds that the proposed project will likely constitute a taking of endangered species, then it must halt the project and situate its drainage way at a more suitable location that will not harm the Wildlife Refuge habitat and its residents.

Need for a Cost-Benefit Analysis

The Draft EIS also does not provide a cost estimate for the project and fails to identify who will pay for it. If the intent is for the cost to be borne by tax payers, then the Draft EIS should include a cost/benefit analysis.

Conclusion

There are several deficiencies in the Draft EIS that must be remedied before a decision can be rendered on the acceptability of this project. We recommend that the Draft EIS be resubmitted to include and address the following issues:

- Beneficial uses of discharge water;
- Submit a study of various fauna located at the project site and in the adjacent Wildlife Refuge;
- Identify impacts of runoff contaminants and volume of discharge water on the Wildlife Refuge and its inhabitants;
- Explore whether the proposed action triggers the Endangered Species Act, and if so, the associated legal ramifications;
- Include a cost/benefit analysis for the project.

Thank you for the opportunity to review this document.

Sincerely,

John T. Harrison
Environmental Coordinator

cc: OEQC
Gentry Homes, Ltd.
Environmental Communications
Roger Fujioka
Dave Penn
Yu-Si Fok
Malia Akutagawa
Tom Hawley

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

August 28, 1995

Mr. Harvey L. Goth
Schuler Homes, Inc.
828 Fort Street Mall 4th Floor
Honolulu, Hawaii 96813

Dear Mr. Goth,

Subject: Ewa By Gentry-East, Offsite Drainage Plan Draft Environmental Impact Statement

We have received your comments dated August 18, 1995 and we respond as follows:

1.Figure 4-1 indicates that the drainage area for lands currently owned by the State and Campbell Estate is approximately 919 acres. An additional 107 acres of drainage area will exceed the 937 acres reported in the Ewa District Runoff Map, Drainage Areas and Peak Flows, prepared by Engineering Concepts, Inc. dated April 3, 1991, And revised July 9, 1993/

2. A. Construction plans for the Ultimate Conditions will be included in the Final EIS.

Your continuing support is appreciated.

Sincerely,

F. J. Rodriguez

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

81 SOUTH HOTEL STREET, SUITE 211 • P.O. BOX 536 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 528-4661 • FAX (808) 528-4883

SCHULER HOMES, INC.

August 18, 1995

Mr. Fred Rodriques
Environmental Communications
P. O. Box 536
Honolulu, Hawaii 96809

Subject: Ewa by Gentry - East Offsite Drainage Plan
Draft Environmental Impact Statement

Dear Mr. Rodriquez:

We have reviewed the Draft Environmental Impact Statement dated July, 1995 for the Ewa by Gentry - East Offsite Drainage Plan and have the following comments:

1) The Tributary drainage area for lands mauka of Ewa Villages as presently owned by the State of Hawaii and Campbell Estate is approximately 107 acres greater than shown on the current plans.

   The drainage boundary contained on Figure No. 4-1 Drainage Map as contained in Exhibit D follows a west property line boundary of the State owned land, whereas the actual drainage boundary is further west of the property line.

2) The Environmental Impact Statement is to cover the Ultimate Conditions. Recommend that this be made clear and further clarifications be made to avoid misinterpretation.

   A) Construction Plans contained are for the Interim Condition. Recommend that Ultimate Conditions Plans be included as the EIS is for the Ultimate Conditions.

   B) Project Funding & Phasing, page 6-5. The estimated construction cost of $4.9 million is for the Ultimate Conditions. Construction might be done in two phase based upon the Interim Condition Plan.

We appreciate this opportunity to comment on the Draft Environment Impact Statement and are supportive of the proposed Construction/Operation/Maintenance of Drainage Channel, Detention Basin, and Outlet Structure.

Very truly yours,

Harvey L. Goth
Senior Vice President
Schuler Homes, Inc.

HG/GHB:dh:saks
cc: Department of Land Utilization, Mr. Art Challacombe
Department of Public Works, Mr. Ken Sprague
Gentry Homes, Mr. Barry Edwards

AUG 2 2 1995

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ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

August 28, 1995

Mr. Gary Gill, Director
Office of Environmental Quality Control
State of Hawaii
220 South King Street 4th Floor
Honolulu, Hawaii 96813

Dear Mr. Gill:

Subject: Draft EIS for the Ewa By Gentry-East Offsite Drainage Plan

We have received your office's comments dated August 22, 1995 and we respond in the following: (A telephone conversation on August 24, 1995 with Jeyan Thurignanam discussed several of the points we will now cover.)

1. The City & County of Honolulu Department of Public Works administers the entire drainage system for the island of Oahu, and as such, determines standards and values for dedicable drainage facilities. In this capacity, the ability of a private developer to provide dedicable standard for the drainage generated by the project under design, is governed by the City on a cumulative basis, not only for the project drainage, but also for the drainage above his project. This insures the tie-in with the total City system and relieves developer from having to provide drainage capacity for areas beyond his jurisdiction. Example: Kapolei developments will not address projects to either side, (Makaiwa Gulch or Kaloi Gulch) since those projects have already designed and provided their drainage plans to the City for approval.

2. ParEn, Inc. developed the Drainage Report for Ewa by Gentry-East, Phase I and on page 4, section 3.4 Land Use, paragraph 3, it states, " The total drainage area under investigation is approximately 2.51 square miles, or equivalent to 1,607 acres. Current and projected land owners and their drainage area contributions are given as follows:
Campbell Estate - 685 acres (42.6%)
City & County of Honolulu - 176 acres (11.0%)
Gentry Development Company - 245 acres (15.2%)
State of Hawaii - 178 acres (11.1 %)
U.S. Navy - 323 acres (20.1%)
Existing drainage patterns will be altered to insure that runoff values comply with City dedicable standards. Each contributing project will design drainage facilities that meet City code standards that will meet drainage channel codes.

3. Section 5.0 *Environmental Consequences* describes and discusses the new and revised uses for the sumps on Gentry lands. These sumps will enable the land for development be more effectively used in an interim manner during the construction of the drainage facility on Navy lands. The alternative of moving the drainage facility on navy lands from Gentry lands enables the applicant-developer the opportunity to use the sumps for park space after they have functioned as interim capacity for runoff during construction of the drainage channel and basin.

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4. Section 6.3.4 *Required Permits* identifies the mandatory permits that will need to bed prior to actual construction. The permits range from the COE 404 permit for working in the wetlands to Navy EBSL Environmental Baseline Survey Lease. These are the types of environmental measures that will need to be employed prior to and during the construction phase.

5. O.I. Consultants, Inc. conducted a marine biology impact study identified as Exhibit F and provided with the Draft Environmental Assessment in January, 1994. Further O.I. Consultants, Inc. by letter revision dated May 3, 1995 expanded on their earlier document. Their conclusions did not change and stated: " In summary, the proposed Ewa By Gentry-East residential and its associated drainage improvements will have no negative impacts on the adjacent nearshore marine environment . In fact, the proposed drainage improvements will result in a significant decrease in sediment discharge to West Loch from the project drainage basin. However, because West Loch is impacted primarily by much larger drainage basins to the north of the project, no change in overall water quality in the loch from the proposed site improvements is likely."

6. Section 5.3 *Construction Management Techniques addresses the specific construction methods that will be employed at the request of the U. S. Fish & Wildlife Service.* In addition to the construction management practices to be employed, there will also be adherence to a strict Refuge management to pursue construction only during non-breeding and feeding times.

7. Pursuant to the applicable EIS rules, we will expand the Executive Summary section to include specifically, the requested items by direct listing or by reference to the appropriate section where it is provided. We are providing a copy of the revision.

Thank you for your timely comments and continuing cooperation.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.
Enclosure: Executive Summary

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

August 14, 1995

Dr. Herman M. Aizawa, Ph.D., Superintendent
Department of Education
State of Hawaii
P.O. Box 2360
Honolulu, HI 96804

Dear Dr. Aizawa:

Subject: Draft Environmental Impact Statement (DEIS) for the Ewa By Gentry-East Offsite Drainage Plan, Ewa, Oahu, Hawaii

We have received your comments dated August 2, 1995 regarding the subject project. We duly note your department's concerns regarding the interim use of the park site adjacent to your proposed site for the Ewa II Elementary School. The temporary use as a drainage basin will be kept to the absolute minimum time possible.

We are cognizant of the DOE concerns over park playground space and will be making every effort to mitigate this conflict in land use. Thank you for your expression of concern.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

81 SOUTH HOTEL STREET, SUITE 211 • P.O. BOX 536 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 528-4661 • FAX (808) 528-4883

15-04 112

HERMAN M. AIZAWA, PH.D.
SUPERINTENDENT

Benjamin J. Cayetano
GOVERNOR

'95 AUG 7 AM 8 13

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

August 2, 1995

Mr. Art Challacombe
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Challacombe:

SUBJECT: Draft Environmental Impact Statement
Ewa by Gentry - East Off-site Drainage Plan
TMK: 9-1-10: 15

We have reviewed the subject environmental impact statement and have the following comments on the proposed Ewa by Gentry - East Off-site Drainage Plan. The Department of Education (DOE) has no objections to the proposed off-site drainage plan. The DOE is concerned that if the off-site drainage plan is not implemented then the park site next to the proposed new elementary school will be impacted since it currently serves as a temporary drainage basin for the Gentry development in Ewa.

The Ewa II Elementary School is projected to open in September, 1996. The school will be built on an eight-acre school site next to the proposed county park. If the proposed county park is not constructed because the area must be used as a temporary drainage basin, the school will lack valuable permanent playground space for the elementary age students. A temporary park will be provided but will not be acceptable as a long-term solution.

Should there be any questions, please call the Facilities Branch at 733-4862.

Sincerely,

Herman M. Aizawa, Ph.D.
Superintendent

HMA:jml

cc: A. Suga
A. Maeda, Leeward

BENJAMIN J. CAYETANO
GOVERNOR

GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-2482

August 22, 1995

Mr. Patrick T. Onishi
Director of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Onishi,

Subject: Draft EIS for the Ewa by Gentry-East Offsite Drainage Plan

Thank you for the opportunity to review the subject document. We have the following comments.

1. Please describe in detail how this project relates to the West Loch tributary basin and the Kaloi Gulch drainage basin. Is there a connection between the two basins? How does this project fit in with the drainage plans of other developers in this area? How does this drainage system match any regional drainage plan that has been/will be developed for Ewa?

2. Please clearly describe all the land areas that will be served by this drainage system and how the drainage pattern will be altered to fit with the proposed drainage channel.

3. The 1988 Final EIS for Ewa by Gentry indicated that detention sumps will be constructed within the Ewa Gentry-East property or immediately adjacent on Navy property to control water flows. Please state why this alternative is no longer being considered. The detention sumps alternative must also be discussed in the alternatives section of the EIS.

4. With increased urbanization within the drainage area, non-point source pollution is expected to increase. Please describe all the measures that will be taken to reduce future non-point source pollution.

5. How is the water quality of the receiving water going to change with increased urbanization?

6. The wildlife refuge may suffer adverse impacts if the detention basin and protective berm are not sized properly. What are the minimum design standards that will be used to control stormwater runoff from adversely impacting the wildlife refuge.

7. Pursuant to §11-200-17(b), EIS Rules, please concisely discuss the following in the executive summary:

   i) alternatives considered;
   ii) unresolved issues;
   iii) compatibility with land use plans and policies; and
   iv) listing of permits or approvals.

If you have any questions, please call Jeyan Thirugnanam at 586-4185. Mahalo.

Sincerely,

Gary Gill
Director

c: Mr. Fred Rodriquez

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
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CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

August 7, 1995

Art Challacombe
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

LOG NO: 15041
DOC NO: 9508TD08

Dear Mr. Challacombe:

SUBJECT: **Draft Environmental Impact Statement (DEIS), Ewa by Gentry-East**
Offsite Drainage Plan
Honouliuli, `Ewa, O`ahu
TMK: 9-1-10: 4, 14, 15

The DEIS accurately summarizes and reproduces our acceptance of the archaeological monitoring plan for this project, which includes some minor changes to the plan (LOG NO: 14265). We believe that successful completion of the modified monitoring plan will ensure that this project has "no adverse effect" on historic sites that might be discovered during project construction.

If you have any questions please call Tom Dye at 587-0014.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

TD:jk

cc. F. J. Rodriguez, Environmental Communications, P.O. Box 536, Honolulu, HI 96809

AUG 18 1995

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

August 21, 1995

Mr. Don Hibbard, Administrator
Department of Land and Natural Resources
State of Hawaii
State Historic Preservation Division
33 South King Street
Honolulu, Hawaii 96813

Dear Mr. Hibbard:

Subject: Draft Environmental Impact Statement (DEIS) for the Ewa By Gentry-East Offsite Drainage Plan Honouliuli, Ewa, Oahu

Thank you for your letter dated August 7, 1995 regarding the subject project. The acceptance of the archaeological monitoring plan by your office is duly noted. Adherence to this plan will be an integral part of the construction phase.

Thank you for your continuing cooperation and timely comments.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

81 SOUTH HOTEL STREET, SUITE 211 • P.O. BOX 536 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 528-4661 • FAX (808) 528-4883

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

August 8, 1995

Dr. Lawrence Miike, Director
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Miike,

Subject: Draft Environmental Impact Statement for the Ewa By Gentry-East
Phase I Offsite Drainage Plan, Ewa, Oahu
TMK: 9-1-10: 4-14-156

We have received your department comments dated July 26, 1995 on the proposed improvements and we respond as follows:

1. All clearing , grubbing, and grading will be done in accordance with the City & County of Honolulu ordinance for grading. The prescribed limits of grading not more than 5 acres will be maintained in accordance with the ordinance, and Best Management Practice (BMP) will also be adhered to.

2. All areas that are cleared and graded will be mulched and grassed in accordance with the City Grading Ordinance. Erosion controls will also be maintained to mitigate surface runoff . Temporary detention basins are identified in the DEIS grading plan so prevent or reduce impacts of surface runoff to the West Loch receiving waters.

3. Proper housekeeping will be maintained by the contractor, with particular emphasis on the channel and detention basin works.

4. The vegetated cover material in the drainage channel, the detention basin, and the outlet channel will be existing exotic vegetation. Periodic maintenance by the City & County of Honolulu will insure against the sediment loading, and urban debris that will occur. The maintenance program will consist essentially of weed control and removal of debris and silt.

5. The design and installation of the three main elements of the drainage plan will be monitored with care during and after completion of the construction phase. This is extremely critical due to the proximity of the wildlife refuge immediately adjacent to the drainage facility. Post construction maintenance will be a key element to the successful operation of the facility.

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We trust that we have adequately addressed your concerns. Thank you for your timely comments and continuing support.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

LAWRENCE MIIKE
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer to

July 26, 1995

95-052/epo

Mr. Art Challacombe
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Challacombe:

Subject: Draft Environmental Impact Statement

Ewa By Gentry-East, Phase I Offsite Drainage Plan
Ewa, Oahu
TMK: 9-1-10: 4-14-156

Thank you for allowing us to review and comment on the subject project. We have the following comments to offer:

Nonpoint Source Pollution Concerns

The proposed project is located on the island of Oahu above Pearl Harbor, one of sixteen Water Quality Limited Segments identified by the Hawaii State Department of Health. Currently, state monitoring of coastal waters show significant violations of water quality standards for nitrogen, phosphorus, turbidity, and fecal coliform.

Proper planning, design, and use of erosion control measures and best management practices will substantially reduce the total volume of runoff, erosion, and potential of nonpoint source pollution from draining into the West Loch of Pearl Harbor. As part of the proposed project, we recommend the following additional measures to reduce sediment and improve water quality:

1. Grub areas sequentially so that only a small portion of the total area is bare at any one time.

2. Replant or cover bare areas from construction activities as soon as grading or grubbing work is completed. New plantings will require soil amendments, fertilizers, and temporary irrigation to become established. Use high planting and/or seeding rates to ensure rapid stand establishment.

AUG 2 1995

3. Properly and promptly dispose of all loosened and excavated soil and debris material from channel and basin construction work.

4. Once established, manage and maintain the grass in the channel. A well-established, properly maintained vegetation cover will help to remove sediment and other pollutants from draining into the harbor.

5. Proper installation, operation, and maintenance of the grass-lined channel with detention basin and outlet are critical. Drainage outlets for stormwater runoff require sediment removal and frequent maintenance to sustain their runoff capacity and to remain effective.

If you should have any questions regarding this matter, please contact Ms. Shirley Nakamura of the Environmental Planning Office at 586-4345.

Sincerely,

LAWRENCE MIIKE
Director of Health

c: CWB
EPO (Shirley Nakamura)
Environmental Communications
Gentry Homes, Ltd.

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

July 11, 1995

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, HI 96813-5097

Dear Mr. Hayashida,

We have received your department comments dated July 6, 1995 on the Ewa by Gentry-East Offsite Drainage Plan Draft Environmental Impact Statement (DEIS). Your position of No impact to the State transportation facilities is duly noted.

Thank you for your timely comments and continuing support.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

81 SOUTH HOTEL STREET, SUITE 211 • P.O. BOX 536 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 526-4661 • FAX (808) 526-4663

BENJAMIN CAYETANO
GOVERNOR

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS

GLENN M. OKIMOTO

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
STP 8.6898

July 6, 1995

Mr. Patrick T. Onishi
Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Onishi:

Subject: Ewa By Gentry - East Offsite Drainage Plan
Draft Environmental Impact Statement (DEIS)

Thank you for requesting our comment on the subject DEIS.

The proposed development will not impact our State transportation facilities.

We appreciate the opportunity to comment.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Director of Transportation

c: Mr. F. J. Rodriguez, Environmental Communications

JUL 11 1995

BENJAMIN CAYETANO
GOVERNOR

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
SAM CALLEJO
GLENN M. OKIMOTO

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
STP 8.6691

April 6, 1995

Mr. Fred J. Rodriguez
Environmental Communications
P. O. Box 536
Honolulu, Hawaii 95809

Dear Mr. Rodriguez:

Subject: Ewa by Gentry - East Off-site Drainage Plan
Environmental Impact Statement Preparation Notice

Thank you for your transmittal requesting our comments on the subject development.

The proposed development will not impact our State transportation facilities.

Thank you for the opportunity to provide comments.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Director of Transportation

APR 17 1995

BENJAMIN J. CAYETANO
Governor
SELJI F. KAYA
Director
RICK EGGED
Deputy Director

DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT, AND TOURISM

ENERGY DIVISION, 335 MERCHANT ST., RM. 110, HONOLULU, HAWAII 96813 PHONE: (808) 587-3800 FAX: (808) 587-3820

048

July 6, 1995

Mr. F. J. Rodriguez
Environmental Communications
P.O. Box 536
Honolulu, HI 96809

Dear Mr. Rodriguez:

SUBJECT: Ewa By Gentry-East Offsite Drainage Plan

We wish to inform you that we have no comments regarding the subject Ewa by Gentry-East Offsite Drainage Plan.

Thank you for the opportunity to submit any comments or recommendations.

Sincerely,

for Maurice H. Kaya
Energy Program Administrator

ENVIRONMENTAL
COMMUNICATIONS

F. J. RODRIGUEZ

August 8, 1995

Ms. Esther Ueda, Executive Officer
Land Use Commission
State of Hawaii
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Ms. Ueda,

Subject: Draft Environmental Impact Statement (DEIS) for the proposed Ewa by Gentry-East Offsite Drainage Plan, Phase I.

We have received your agency comments dated July 6, 1995 and we respond as follows:

1. Confirmation of the subject parcel in the State Land Use Agricultural District is acknowledged.

2. The proximity of the proposed improvements adjacent to the Gentry East, Phase I is acknowledged.

3. The advice that the Office of State Planning is recommending reclassification of the approximately 42 acres of the subject lands currently designated Agriculture to Conservation is duly noted. Further, we will incorporate this OSP recommendation with the attendant data into the Final EIS.

Thank you for your continuing cooperation and support.

Sincerely,

F. J. Rodriguez

cc: Mr. Ron Uemura - Gentry Homes, Ltd.

81 SOUTH HOTEL STREET, SUITE 211 • P.O. BOX 536 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 526-4661 • FAX (808) 526-4883

BENJAMIN J. CAYETANO
GOVERNOR
SEIJI F. NAYA
DIRECTOR
RICK EGGED
DEPUTY DIRECTOR

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

Central Pacific Plaza, 220 South King Street, 11th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 586-2355
Fax: (808) 586-2377

July 31, 1995

MEMORANDUM

TO: Mr. F.J. Rodriguez
Environmental Communications

FROM: Shelley M. Mark
Senior Advisor to Director

SUBJECT: Ewa by Gentry-East Offsite Drainage Plan

The State Land Use Commission has prepared the attached comments regarding the subject project.

Thank you for allowing us to comment.

Enclosure

BENJAMIN J. CAYETANO
GOVERNOR

ESTHER UEDA
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813
Telephone: 587-3822

July 6, 1995

SUBJECT: Director's Referral No. 95-077-K
Draft Environmental Impact Statement - Ewa by Gentry East Offsite Drainage Plan

We have reviewed the subject draft environmental impact statement (DEIS) and have the following comments to offer:

1) We confirm that the project site, as depicted on Figure 2 of the DEIS, and identified as TMK: 9-1-10: por. 04, por. 14, and por. 15, is within the State Land Use Agricultural District.

2) The project site is adjacent to Gentry East, Phase I, which is a portion of an area consisting of approximately 685 acres reclassified from the Agricultural District to the Urban District on May 8, 1989 [LUC Docket No. A88-627/Gentry Development Company].

3) The Office of State Planning, through its report entitled State Land Use District Boundary Review - Oahu (1992), has recommended reclassification of approximately 42 acres from the Agricultural District to the Conservation District in the immediate area.

   The Priority 2 recommendation would reclassify the Honouliuli Unit and Apokaa Ponds within the Pearl Harbor National Wildlife Refuge to protect the wildlife habitat of endangered Hawaiian waterbirds.

   For your information, we are enclosing a copy of the recommendation text and location map from the above-referenced document.

We have no further comments to offer at this time.

EU:LA:la

enclosure

STATE LAND USE DISTRICT BOUNDARY REVIEW

OAHU

Office of the Governor

OFFICE OF STATE PLANNING

1992

EWA

34. Pearl Harbor National Wildlife Refuge: Honouliuli Unit and Apokaa Ponds, 42 acres (A to C)

The proposed reclassification of Pearl Harbor National Wildlife Refuge: Honouliuli Unit and Apokaa Ponds, from the Agricultural District to the Conservation District meets the following standards and criteria for the Conservation District contained in Section 205-2(e), HRS: Conservation districts shall include areas necessary for . . . conserving indigenous or endemic plants, fish and wildlife, including those which are threatened or endangered . . .

The proposed reclassification area is located southeast of Honouliuli and is roughly bounded by West Loch on the east, sugar lands on the south, and the West Loch housing development on the west and north.

The proposed reclassification of Pearl Harbor National Wildlife Refuge: Honouliuli Unit and Apokaa Ponds, from the Agricultural District to the Conservation District will impact favorably the following areas of statewide concern set forth under Section 205-17, HRS: Preservation or maintenance of important natural systems or habitats; and Maintenance of valued cultural, historical, or natural resources.

The proposed land use district boundary amendment meets the following standards for determining Conservation District boundaries contained in the Hawaii Land Use Commission Rules:

> Section 15-15-20(5) It shall include lands necessary for . . . conserving natural ecosystems of endemic plants, fish, and wildlife . . .

The Pearl Harbor National Wildlife Refuge: Honouliuli Unit and Apokaa Ponds are being proposed for reclassification to protect the wildlife habitat of endangered Hawaiian waterbirds. It is a portion of a larger complex of wetlands scattered along the Pearl Harbor area which support endangered Hawaiian waterbirds as well as migratory waterbirds. The wetland has been identified in the Hawaiian Waterbird Recovery Plan as primary habitat for endangered Hawaiian coot, stilt, koloa, and gallinule and is managed by the Federal and City governments for this purpose. As stilt habitat along the reef runway is lost, the Pearl Harbor area increases in importance to the stilts on Leeward Oahu.

The proposed reclassification also conforms to the objectives and policies of the Hawaii State Plan for the physical environment, Sections 226-11, 12 and 13, HRS, including but not limited to, encouraging the protection of rare or endangered plant and animal species and habitats native to Hawaii, and Priority Guidelines for population growth and land resources, Section 226-104, HRS, including but not limited to, identifying critical environmental areas in Hawaii.

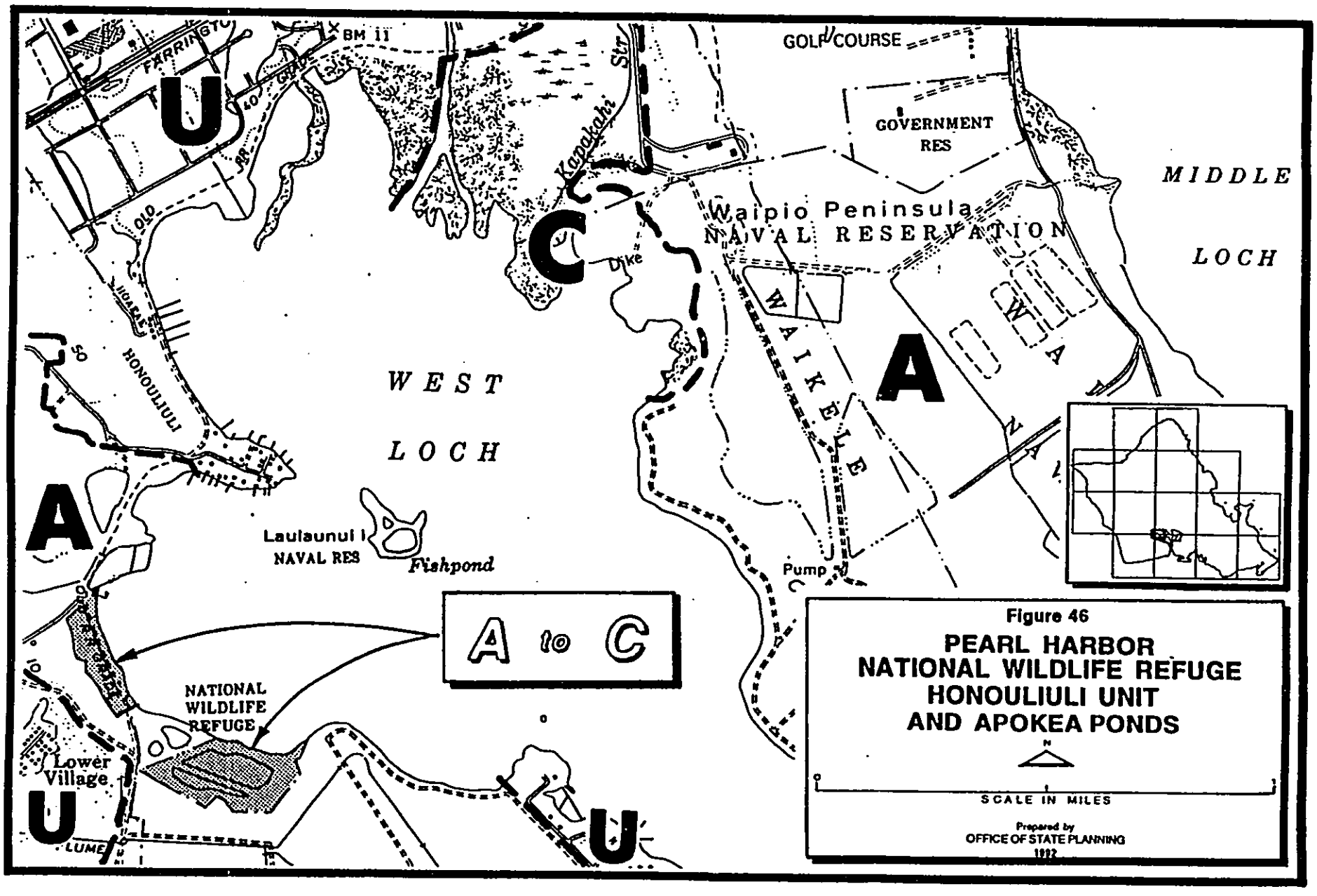

Figure 46

PEARL HARBOR NATIONAL WILDLIFE REFUGE HONOULIULI UNIT AND APOKEA PONDS

9. EXHIBITS

EXHIBIT A OI Consultants, Inc.
Revised Marine Impacts Report 5-3-95

OI CONSULTANTS INC
A DIVISION OF
THE OCEANIC INSTITUTE

May 3, 1995

Mr. Fred Rodriguez
Environmental Communications
81 South Hotel Street, Suite 211
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Ewa by Gentry - East
Off-Site Drainage Plan

OI Consultants, Inc. is pleased to submit the enclosed revised marine impacts assessment for the above project. This revision responds to review comments by the Department of Land Utilization in their letter of March 3, 1995 (section 1.E) relating to the marine impacts study. The revision incorporates a new estimate of the drainage basin area (an increase of 140 acres) and presents in more detail the current and projected land uses and related discharge loads. The conclusion reached in our original assessment, that the proposed drainage improvements would not result in significant negative marine environmental impacts, does not change.

If you have any questions or require further information, please contact me at our offices.

Sincerely,

David A. Ziemann, Ph.D.

DAZ/rmn

Enclosure

41-202 Kalanianaole Highway, Waimanalo, Hawaii 96795 ■ (808)259-7951 ■ FAX (808)259-5971
2000 L Street NW, Suite 200, Washington, DC 20036 ■ Phone (202)785-8505 ■ FAX (202)416-1656

IMPACT ASSESSMENT:

The impact of the proposed drainage improvements is assessed by quantifying the changes in surface flow and water quality from the site to West Loch due to the Ewa by Gentry - East development, and estimating the potential for impacts to the existing water quality and biological communities by these changes.

The existing and proposed land uses and their areas of coverage are presented in Table 1. For each of the major land parcels, the distribution by land use type was estimated from typical land use distributions in similar developments. The percentage attributed to each land use is presented in parentheses. The total future land use coverage for each general land use type is calculated as the total for each type.

At present, 1556 acres of the 1,607-acre drainage basin are in agriculture (sugar cane) use; the remaining acreage is in existing residential developments and roadways. After development, only 323 acres will remain in agriculture. The 245-acre Ewa by Gentry - East (Phase I) development will consist of approximately 80% residential, 10% park, 5% commercial and 5% impervious surfaces (roadways, sidewalks, etc.). The 654 acre Campbell Estate lands will consist of 75% residential, 10% parks and recreational areas, 5% commercial, 5% schools and 5% roadways and sidewalks. The 178 acre State of Hawaii parcel will consist primarily of the West Oahu campus of the University of Hawaii. Land use coverage will be approximately 70% structures (classed as residential), 20% parks and recreational, 5% commercial and 5% roadways.

The quality of the runoff associated with each substrate type is presented in Table 5. For the purpose of this analysis, we assigned the various land use categories to one of four typical drainage/runoff surfaces: agriculture, landscape, roadway or structure. The current and future ag lands were classified as agriculture and the roadway areas were classified as roadway. Since residential, commercial and school land uses consist of both structures and landscaped areas, the land use areas were partitioned into landscape or structure based on a 30% structure and 70% landscape distribution.

Each drainage/runoff type has a different runoff water quality. The major potential pollutants which may now or after development be generated and discharged into the ocean are various forms of inorganic and organic nitrogen; suspended solids (primarily eroded

soils); pesticides (both herbicides and insecticides); lead from automotive products deposited on roadways; and petroleum products deposited on roadways. Representative values of the average daily wash off rates (pounds per square mile per day) of these materials from each substrate type, based on values established by the E.P.A. (U.S.E.P.A., 1976) and used in previous drainage impact studies for similar areas in Hawaii (Dames and Moore, 1985), are presented in Table 2. The total annual discharge load (pounds per year) for each potential pollutant for the predevelopment and development cases are presented in Table 2.

It is clear from the calculations summarized in Table 2 that the annual loads of nitrogen, total suspended solids, and pesticides discharged into the ocean under existing agriculture land use will decrease after completion of the projected development. These decreases can be attributed to the decreased soil erosion under residential landscaping, and the decreased areal rates of application of fertilizers and pesticides for residential land uses.

A small amount of lead and petroleum products would be generated by the new roadways within the development. However, the amounts generated would be comparable to those generated in other nearby residential developments, none of which have been shown or suggested to have caused any detectable environmental impact. Marine biological surveys reported above found no sensitive communities within the area likely to be immediately affected by storm discharge.

Surface flow rates before and after development of the proposed Ewa by Gentry - East residential community were calculated by ParEn, Inc. (1992). A detention basin at the base of the development has been designed to contain the surface flows from up to 2-year, 24-hour storm event, and then to discharge this water slowly over a 24-hour period. This basin serves to both decrease the magnitude of the storm discharge effects on the marine environment and remove up to 90% of the particulate and adsorbed materials from the discharge flow. Flows greater than the 2-year, 24-hour event will overtop the drainage basin dike and discharge directly into West Loch. The drainage basin berms are designed to prevent flow into the wildlife refuge.

There would not be any major change in the quantity of water discharged into West Loch after construction of the proposed drainage system. Under current conditions, water from lands east

of Fort Weaver Road and lands between Fort Weaver Road and the Mango Tree (cane haul) Road drains into a low area located near the position of the proposed sedimentation basin. Under low storm flow, water entering this basin does not flow into West Loch but percolates into the ground. Under heavy storm flow, the capacity of the basin is exceeded and the water flows into West Loch via an unlined channel just south of the wildlife refuge. Lands west of the cane haul road drain into a swale along the road, under Fort Weaver Road and into a swale which passes through the West Loch Fairways subdivision and thence to West Loch at the north of the wildlife refuge. The capacity of this drainage pathway to retain storm runoff is limited. Under the proposed drainage plan, storm water from all these lands will be collected and directed to the sedimentation basin, and thence to West Loch.

In addition to the decreases in the major constituent loads due to changes in land use, the construction of the detention basin will result in significant decreases in annual discharge loading from the drainage basin as well. Runoff from west of the cane haul road which is not now retained will be directed to the detention basin. The detention basin will serve as a sedimentation basin, allowing sediment in runoff water to settle out before the water is discharged. There would be little change in the nitrogen discharge loading, since most of that material would be in the dissolved phase. Chlorinated hydrocarbons, however, are known to adsorb to soil particles, and thus the sedimentation of suspended particles would remove some of the hydrocarbons from the discharge as well.

In summary, the proposed Ewa by Gentry - East residential development and its associated drainage improvements will have no negative impacts on the adjacent nearshore marine environment. In fact, the proposed drainage improvements will result in a significant decrease in sediment discharge to West Loch from the project drainage basin. However, because West Loch is impacted primarily by much larger drainage basins to the north of the project, no change in overall water quality in the loch from the proposed site improvements is likely.

Table 1. Current and Projected Land Use Distribution for Lands Constituting the Drainage Basin for the Proposed Ewa by Genrty - East Detention Basin and Outlet Drainage Channel

Parcel	acres	Current Use	Future Use
Navy ESQD Blast Zone	323	Cane	Ag
Genrty East Phase I	245	Cane	Mixed Residential/Commercial (1)
City & County - West Loch Fairways	45	Residential	Residential
City & County	45	Cane	Golf Course
Campbell Estate	31	Cane	Drainage Basin
Campbell Estate	654	Cane	Mixed Residential/Commercial (2)
State of Hawaii	178	Cane	Mixed Residential/Commercial (3)
City & County	80	Cane	Golf Course
City & County - Fernandez Village	6	Residential	Residential
TOTAL	1607		

Distribution of Current and Future Land Uses		
Agriculture	1556	323
Mixed (details below)		
Residential	48.5	862.1
Commercial Centers		53.9
Schools		32.7
Parks and Recreational		125.5
Roadways, etc.	2.6	53.9
Golf Course	0.0	125.0
Drainage Basin	0.0	31.0
TOTAL	1607	1607

Future Land Use Distribution	Acres
(1) Gentry East Phase I	245
Residential (80%)	196
Commercial (5%)	12.25
Park (10%)	24.5
Roadways, etc. (5%)	12.25
(2) Campbell Estate	654
Residential (75%)	490.5
Commercial Centers (5%)	32.7
Schools (5%)	32.7
Parks and Recreational (10%)	65.4
Roadways, etc. (5%)	32.7
(3) State of Hawaii	178
UH West Hawaii Campus	
Residential (70%)	124.6
Commercial (5%)	8.9
Parks and Recreational (20%)	35.6
Roadways, etc. (5%)	8.9

Table 2. Calculated Discharge Loads of selected materials from general land use types under current and future land uses in the Ewa by Gentry area.

Land Use	Agriculture	Landscape	Roadway	Structures		
Wash Off Rates		pounds/sq mile/day				
Nitrogen	15	2	0.00114	0		
Total Solids	2500	400	7.32	0		
Pesticides	0.0425	0.02	0	0		
Lead	0	0	0.0858	0		
Petroleum products	0	0	0.002	0		
		Current			Total	Change
Area Covered (acres)	1556	33.9	2.6	14.5	1607	
Discharge load (#/year)						
Nitrogen	13,311	39	0	0	13,350	
Total Solids	2,218,516	7,737	11	0	2,226,263	
Pesticides	37.71	0.39	0	0	38.10	
Lead	0	0	0.125	0	0.125	
Petroleum products	0	0	0.003	0	0.003	
		Future				
Area Covered (acres)	323	861.1	53.9	369.0	1607	
Discharge load (#/year)						
Nitrogen	2,763	982	0.04	0	3,745	(9,604)
Total Solids	460,527	196,440	225	0	657,192	(1,569,071)
Pesticides	7.83	9.82	0	0	17.65	(20)
Lead	0	0	2.635	0	2.635	2.510
Petroleum products	0	0	0.061	0	0.061	0.059

ASC93-9:95a

ARCHAEOLOGICAL MONITORING PLAN FOR THE PROPOSED OFF-SITE DRAINAGE SYSTEM EWA GENTRY EAST HONOULIULI, 'EWA, O'AHU ISLAND (TMK 9-1-10:15)

Prepared For:

Environmental Communications, Inc.
81 South Hotel Street
Suite 211
Honolulu, Hawai'i 96813

March 1995

EXHIBIT B Aki Sinoto Consulting
Archaeological Monitoring Plan 3/95

Aki Sinoto Consulting
2333 Kapiolani Blvd., No. 2704
Honolulu, Hawai'i 96826

INTRODUCTION

At the request of Environmental Communications, Inc., Aki Sinoto Consulting of Honolulu proposes to conduct archaeological monitoring during the excavation of the drainage alignment for the proposed off-site drainage system for the Ewa Gentry East development. The project area is located in Honouliuli *ahupua'a*, 'Ewa District, O'ahu Island (Fig. 1). An archaeological inventory survey of the subject area completed in October 1993 by Aki Sinoto Consulting resulted in no significant remains. This plan will identify potentially sensitive areas and be used to guide the monitoring procedures.

PROJECT AREA

The proposed drainage channel is 4600 feet in length, 150 feet in width, and 20-25 feet in depth. The majority of the proposed drainage channel alignment traverses through existing sugar cane fields and haul roads. A 25 acre detention basin is planned for the eastern terminus of the channel prior to the outlet into West Loch of Pearl Harbor. The sediment outlet channel will extend from the southeast corner of the detention basin and discharge into West Loch past the southern boundary of the U.S. Fish and Wildlife Refuge (Figs. 2a -2c). The vegetation around the detention basin and the spill-way include *kiawe* (*Prosopis pallida*), *koa haole* (*Leucaena leucocephala*), and various grasses. The shoreline areas are dominated by mangrove (*Rhizophora mangle*) and California grass (*Brachiaria mutica*). The other channel areas are dominated by cultivated sugarcane (*Saccharum* sp.).

PREVIOUS ARCHAEOLOGY

No previous subsurface testing has been undertaken within the current project area. A summary of work completed in the general vicinity is included in the earlier inventory survey report (Pantaleo and Sinoto, 1993). Subsurface testing in the area closest to the current project area was undertaken by Bishop Museum (Davis, 1988). No evidence of *in-situ* cultural remains were identified in any of eighteen backhoe trenches excavated. PHRI, Inc. (Dicks *et al.*, 1987) conducted augering and backhoe trenching for the neighboring West Loch golf course and parks project. Seven sites, ranging from surface historic artifact scatters to buried prehistoric habitation deposits, human burials, and fishponds, were identified.

SITE EXPECTABILITY

The results of previous archaeological studies indicate that the widespread effect of long-term, intensive sugarcane cultivation have obscured and/or destroyed archaeological sites on the Ewa Plain. Thus, surface structural remains and other indications of past human

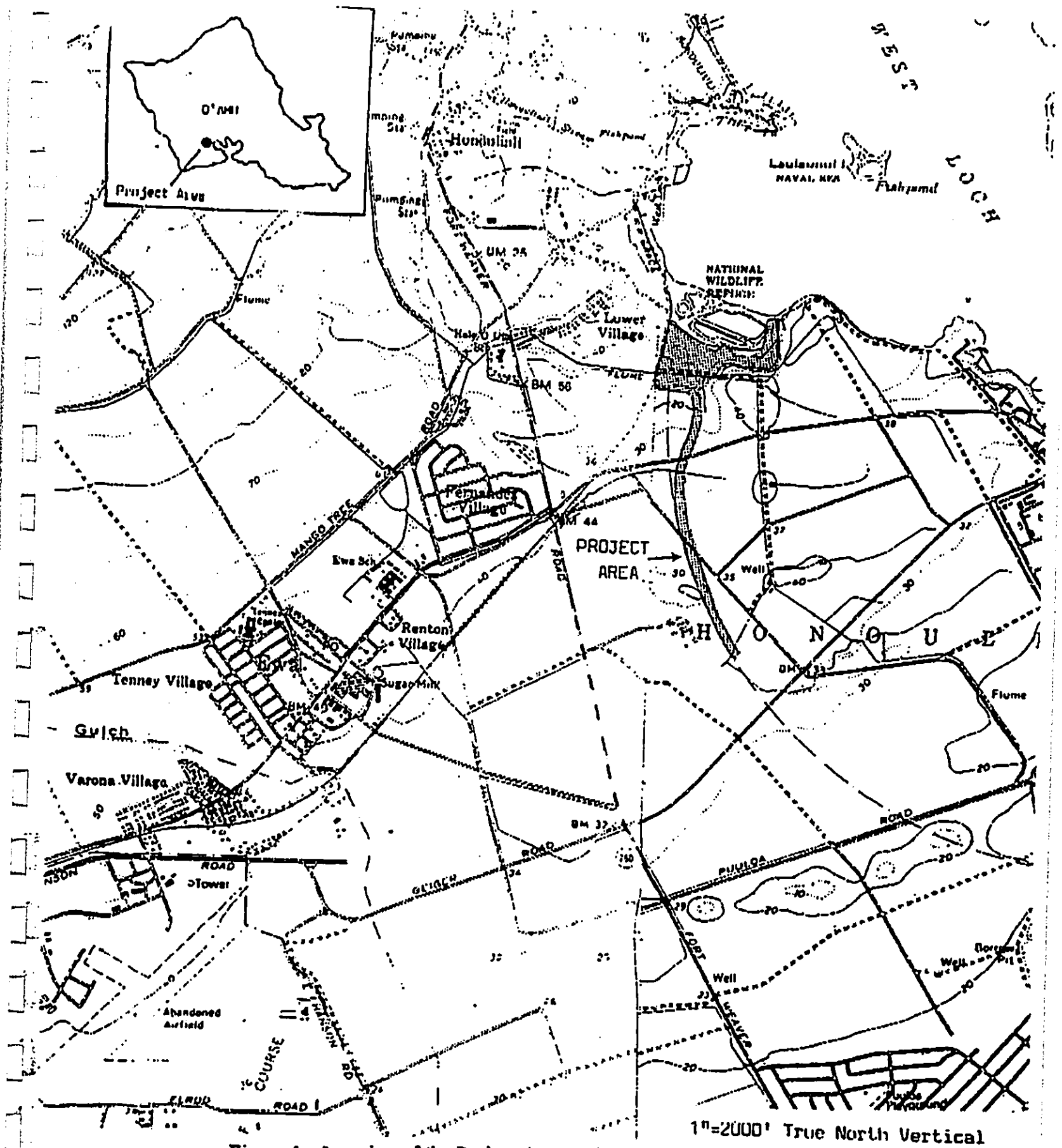

Figure 1. Location of the Project Area on USGS Honouliuli Quadrangle.

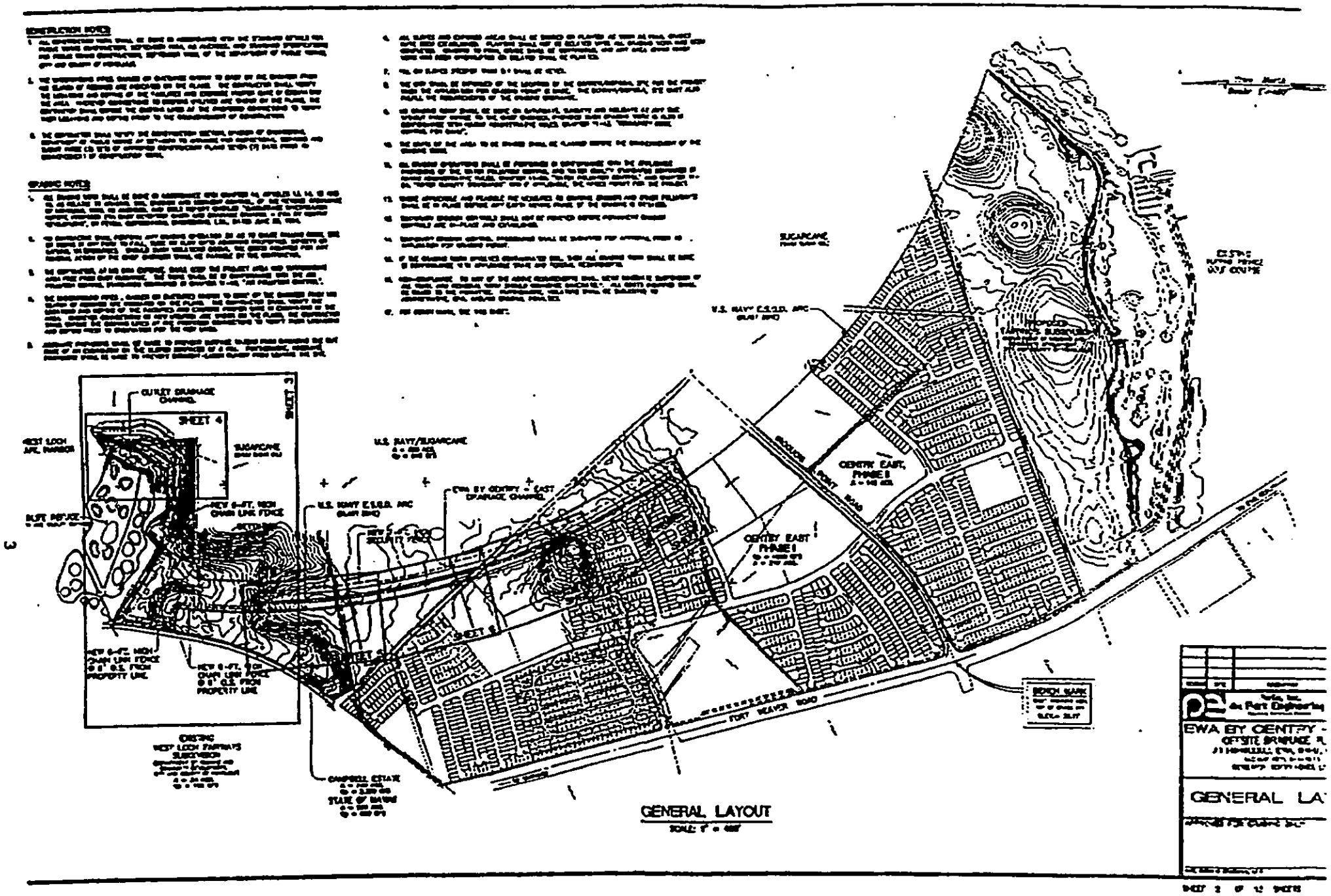

Figure 2a. General Layout of the Drainage Plan (Park Engineering).

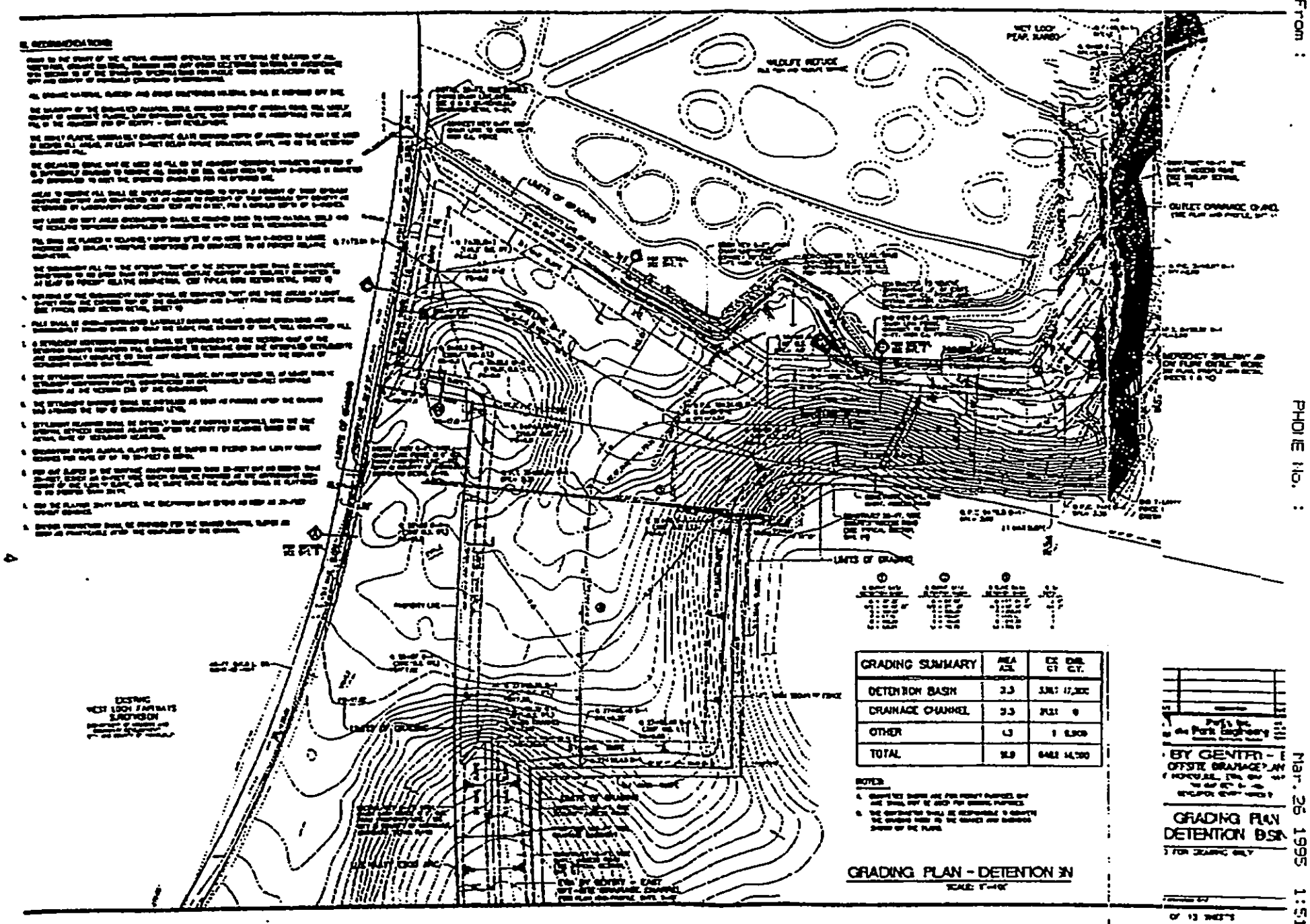

Figure 2b. Detention Basin Grading Plan (Park Engineering).

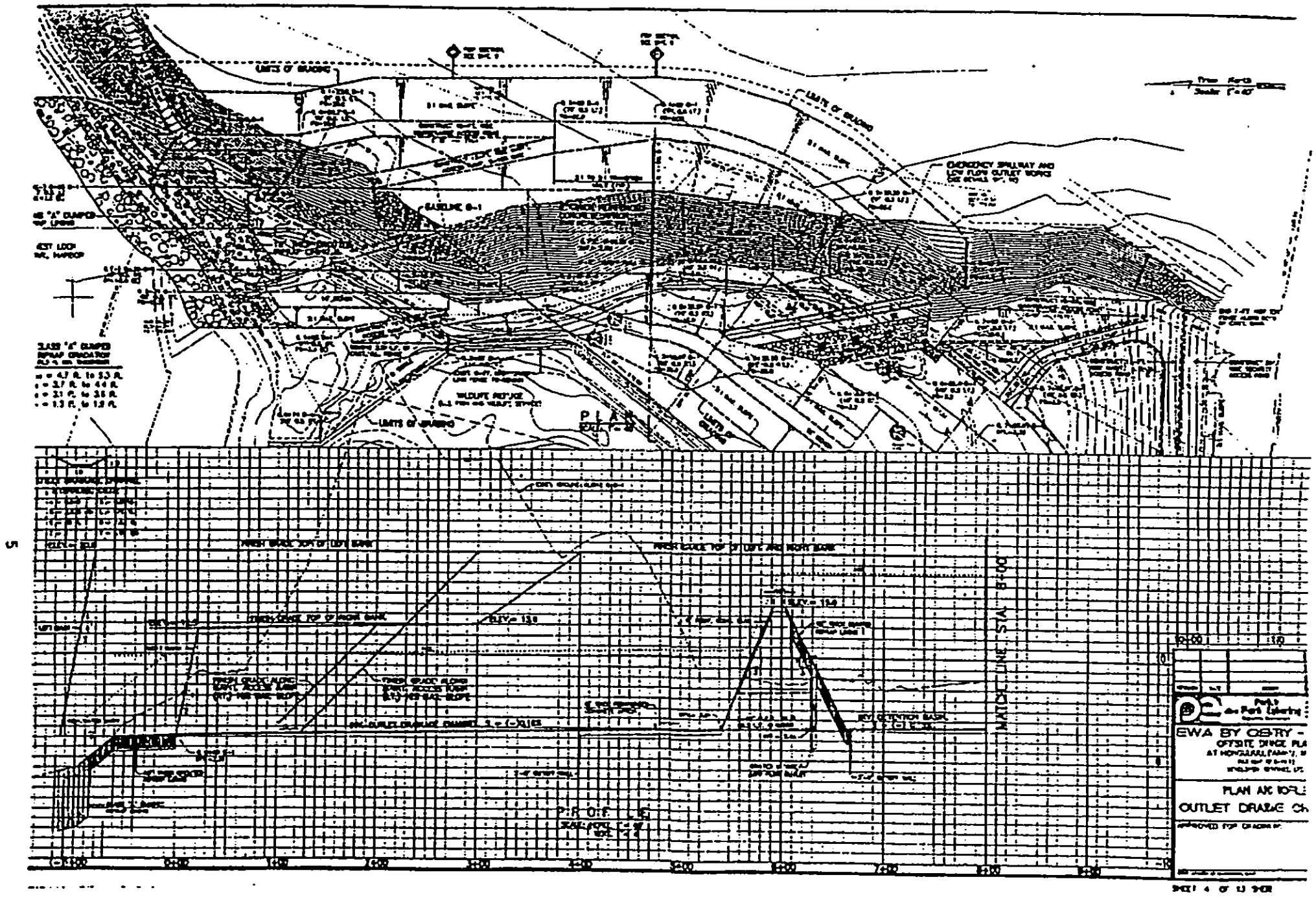

Figure 2c. Plan and Profile of Outlet Drainage Channel (Park Engineering).

activities are not expected. However, the potential for subsurface archaeological remains would be highest along the lower shoreline areas of West Loch that are undisturbed by sugar cultivation. Although the presence of early prehistoric sites is unlikely due to the accretionary nature of the area, site types that may be located include habitation deposits, fishponds, salt ponds, and burials. Based on historic documentation and maps, no fishponds were located within or in the immediate vicinity of the subject project area.

Results of borings conducted for engineering studies revealed an organic clayey silt roughly ten feet below surface from Boring No. 1 near the northwest corner of the project area at the outlet spill-way. The discovery and investigation of similar sediments from other areas of Pearl Harbor have revealed important past environmental data. Thus, the deposit which occurs in the vicinity of Boring No. 1 has the potential to yield similarly significant data regarding past land use and environment(s).

MONITORING PLAN

Prior to commencement of construction and monitoring activities, a coordination meeting will be held with representatives of all pertinent parties. The scope and procedures to be followed for monitoring, authority of the monitor to halt work in the immediate vicinity of a discovery, and the kinds of archaeological features of interest will be discussed and explained.

Initial stages of the commencement of channel excavations will be closely observed in order to define the subsurface character of the area. Based on the results of the initial observations, either periodic, on call, or full-time monitoring will be implemented for the channel corridor leading to the detention basin. Full-time monitoring will be instituted for the detention basin and outlet spill-way areas. Particular attention shall be given to the organic layer that occurs near Boring No. 1. Should this layer be encountered, its provenience and character will be recorded, and quantitative samples will be gathered for appropriate analyses including, archaeo-botanical, palynological, and radiocarbon.

Should any significant remains be exposed, construction-related activities in the immediate area shall be halted until proper recording and mitigation procedures can be completed. Standard archaeological methods and practices for recording and collection of data shall be followed. Should any human remains be encountered, all activities shall be halted in the immediate vicinity. If possible without further disturbance to the remains, determination of the temporal and ethnic origins of the burial shall be attempted. If the remains are

determined to be or suspected to be native Hawaiian, measures will be taken to ensure temporary protection of the remains *in-situ*. The State Historic Preservation Division of the Department of Land and Natural Resources shall be notified. A burial treatment plan shall be prepared for approval by SHPD/DLNR and the Oahu Island Burial Council.

Following the field phase of this project, all necessary laboratory procedures will be undertaken. This may include; the processing, cataloging, and analysis of artifacts; analyses of any collected samples as warranted; and outside consultant analyses of radiocarbon and archaeo-botanical samples. The collected data shall be synthesized and compiled into a final report. All records, notes, photographs, and maps generated in the course of this project will be archived at Aki Sinoto Consulting. The final disposition of artifactual and sample material shall be determined in coordination with the landowner.

REFERENCES CITED

Davis, Bertell
1988 *Archaeological Subsurface Survey of the Proposed Ewa Gentry Project Area, Honouliuli, 'Ewa, O'ahu.* Applied Research Group, Bishop Museum.

Dicks, A., A. Haun, and P. Rosendahl
1987 *Archaeological Reconnaissance Survey for Environmental Impact Statement, West Loch Estates-Golf Course and Parks.* PHRI, Hawaii.

Pantaleo, Jeffrey and Aki Sinoto
1993 *Archaeological Inventory Survey for the Proposed Off-site Drainage System, Ewa Gentry East, Honouliuli, 'Ewa, O'ahu Island (TMK 9-1-10:15).* Aki Sinoto Consulting, Honolulu.

BENJAMIN J. CAYETANO
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DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

April 17, 1995

Mr. Aki Sinoto
Aki Sinoto Consulting
2333 Kapiolani Blvd., No. 2704
Honolulu, Hawaii 96826

LOG NO: 14265
DOC NO: 9504TD08

Dear Mr. Sinoto:

SUBJECT: **Chapter 6E Review—Archaeological Monitoring Plan for the Proposed Off-Site Drainage System, Ewa Gentry East Honouliuli, `Ewa, O`ahu**
TMK: 9-1-10: 15

Thank you for the opportunity to review this monitoring plan. The project proposes excavation of a 4,600 foot long drainage channel 150 feet wide and 20 to 25 feet deep, and a 25 acre detention basin. Previous inventory survey at the project area revealed the absence of surface historic sites. Subsurface historic sites that might be affected by project construction include habitation deposits, fishponds, salt ponds, and burials. These are likely to occur in the vicinity of the detention basin, being buried quite deeply. In addition, an organic clay silt at the northwest corner of the project area has the potential to yield information on environmental change important for Hawaiian history and prehistory.

The plan indicates that the archaeologist conducting the monitoring will have the authority to halt construction in the immediate area of a find. In the case of a human burial, the SHPD burials program will be notified. Other historic sites will be recorded using standard archaeological methods and appropriate samples will be collected for analysis.

Please ensure that a coordination meeting with the construction team and the archaeological monitor takes place, so the construction team is aware of their role in the monitoring plan.

We request that an end-of-fieldwork letter report be submitted to our office, and that an acceptable final report of the project be submitted within six months of the letter report. If this schedule proves impossible, please notify us in writing of the reasons for the delay.

The plan does not specify the arrangements that will be made to archive the collections made during monitoring. Please note that the collections must be archived in a way that makes them available for future research. These arrangements can be spelled out in the end-of-fieldwork letter report.

Please let us know in writing if your client concurs with the small changes to the monitoring plan we have requested. If so, then this letter is sufficient evidence of our agreement on these changes. If not, then we will need to schedule a meeting to resolve any differences.

If you have any questions please call Tom Dye at 587-0014.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

TD:amk

CHAR & ASSOCIATES
Botanical/Environmental Consultants
4471 Puu Panini Ave.
Honolulu, Hawaii 96816
(808) 734-7828

26 June 1995

WETLANDS SURVEY
'EWA BY GENTRY - EAST
OFFSITE DRAINAGE AREA
HONOULIULI, 'EWA DISTRICT, O'AHU

INTRODUCTION

Field studies of the proposed offsite drainage channel and storm-water detention pond were made on 30 May 1995 to identify and stake the boundaries of any wetlands present. Prior to the field-work, the draft Environmental Assessment (EA) document, topographic maps, and grading plans were reviewed. The EA contains colored photos of the pickleweed-dominated wetland on the proposed drainage outlet and information on borings taken during the subsurface investigation.

A general walk-through of the site was first made. Soil test pits were dug in areas where the local topographic relief and plant species indicated that there might be possible wetlands; soil test pits were dug 2 ft. or deeper. Data were recorded for each of the test pits (see attached data forms). The boundaries of the wetland were flagged and staked. On 01 June 1995, the boundaries of the wetland were mapped by the survey engineer. The wetland map with hub and soil test numbers is attached.

EXHIBIT C

Char & Associates
Wetland Delineation Report

The soil on the project site is mapped as "Kfb", Kaloko clay (Foote et al. 1972). This soil type is on the hydric soil map unit list (U.S. Soil Conservation Service 1990). This soil type has small included areas that meet the criteria for hydric soils when depth to water table is less than 1.5 ft., when ponding occurs for long or very long duration, or when flooding occurs frequently for long or very long duration. These small included areas are associated with depressions and low positions near streams, ponds, and other drainageways.

In the discussion below, the plant names follow the most recent taxonomic treatment of the Hawaiian flora by Wagner et al. (1990).

RESULTS

For the purposes of this study, the wetland boundaries follow along the U.S. Fish and Wildlife Service (USFWS) chain-link fenceline near the offsite drainage project boundary. The small, shallow drainage ditch which runs along the outside of the fence is well-drained and the soils dry to friable; a dense growth of Indian pluchea shrubs (Pluchea indica) and a few scattered kiawe trees (Prosopis pallida) lines the top banks of the ditch in most places. One portion of the ditch, from Hub #1 to Hub #7, however, supports a few clumps of marsh flatsedge (Mariscus javanicus; in Reed (1988) as Cyperus javanicus), a facultative wetland indicator species. The soil test pits made in this portion of the ditch found weak mottles and a small wetland (see soil test pit data forms #1 and #5). This small section of the ditch appears to have standing water during the rainy season; duration unknown. From the topography, it also looks like it might also get some runoff from the USFWS refuge.

From Hub #7, the boundary again follows along the chain link fence to Hub #12. From Hub #12, the wetland boundary follows

inside the fence and under the kiawe trees. The vegetation on the fastland (or nonwetland) side of the boundary consists of a kiawe forest with an understory of Guinea grass (Panicum maximum) and Chinese violet (Asystasia gangetica). Pickleweed (Batis maritima), an obligate wetland indicator species, is the dominant component in the wetland area. Where the dense, tangled mats of pickleweed thin out, the soil surface is covered by mats of blue-green algae (Cyanophyta) and whitish mineral crusts.

References

Foote, D.E., E.L. Hill, S. Nakamura, and F. Stephens. 1972. Soil survey of the islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. U.S. Department of Agriculture, Soil Conservation Service, Washington, D.C.

Reed, P.B., Jr. 1988. National list of plant species that occur in wetlands: Hawaii (Region H). U.S. Fish and Wildlife Service Biological Report 88(26.13).

U.S. Soil Conservation Service. 1990. Hydric soil list for the State of Hawaii. Unpublished list, Honolulu office. May 1990.

Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and B.P. Bishop Museum Press, Honolulu. B.P. Bishop Museum Special Publication No. 83.

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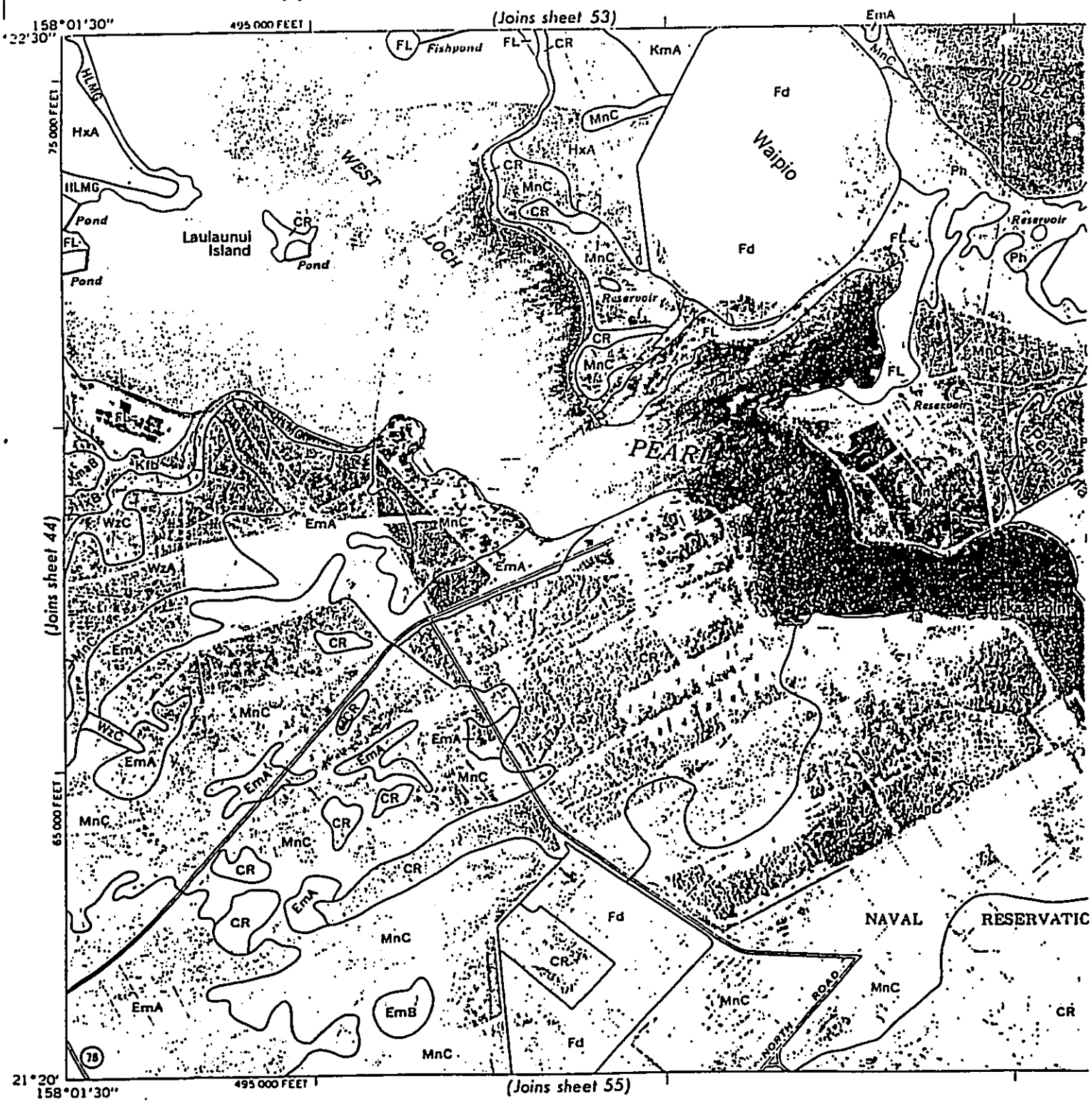
N

'Ewa by Gentry - East Project Site.

Soil type -- "Kfb", Kaloko clay, noncalcareous variant



Soil test pit #1.
(Wetland -- in ditch)

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): CHAR & ASSOCIATES
Project/Site: 'Ewa by Gentry - East State: HI Date: 30 May 1995
Applicant/Owner: County: Honolulu
Plant Community #/Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ✓ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Mariscus javanicus	FACW	Sedge	11.		
(asional) 2. Atriplex semibaccata	FACU	herb	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC ± 50%
Is the hydrophytic vegetation criterion met? Yes ✓ No ____
Rationale: Must be wet to moist at least part of the year to support this perennial species; some plants with old inflorescences.

SOILS

Series/phase: K f b (Kaloko clay) Subgroup:[2]
Is the soil on the hydric soils list? Yes ✓ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ✓ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ✓ No ____ Gleyed? Yes ____ No ✓
Matrix Color: Very dark gray Mottle Colors: Weak red to reddish-brown
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ✓ No ____
Rationale: Yes, but weak mottles at about 1½ to 2 ft. down; soil dean, no smells.

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth: ____
Is the soil saturated? Yes ____ No ✓
Depth to free-standing water in pit/soil probe hole: None (no standing water at 2.5 ft. down)
List other field evidence of surface inundation or soil saturation.
light to slight mineral crust on surface, but no blue-green algae crust.
Is the wetland hydrology criterion met? Yes ± ✓ No ____
Rationale: Yes, but weak, Soil is moist + sticky -- forms wet ball. + sticks strongly to shovel blade.

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ✓ No ____
Rationale for jurisdictional decision: Yes, but soil + hydrology weak. Appears to be seasonally ponded / saturated.

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil test pit #2
(fastland -- outside of ditch)

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): CHAR & ASSOCIATES
Project/Site: 'Ewa by Gentry - East State: HI Date: 30 May 1995
Applicant/Owner: County: Honolulu
Plant Community #/Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ✓ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Sesuvium portulacastrum	FAC	herb	11.		
2. Prosopis pallida	FACU-	tree	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or (FAC) 90%
Is the hydrophytic vegetation criterion met? Yes ✓ No ____
Rationale: (Note: Prosopis (Kiawe) healthy, no dieback; many roots at all horizons in test pit)

SOILS

Series/phase: ? (does not fit Kfb well) Subgroup:[2]
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ✓
Is the soil a Histosol? Yes ____ No ✓ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ✓ Gleyed? Yes ____ No ✓
Matrix Color: dark reddish brown Mottle Colors:
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ____ No ✓
Rationale: Clean, no smells; forms loose crumbly ball, not sticky.

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth:
Is the soil saturated? Yes ____ No ✓
Depth to free-standing water in pit/soil probe hole: None (2 ft. down)
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ____ No ✓
Rationale: No free standing water in pit or moist + sticky soil.

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ✓
Rationale for jurisdictional decision: Soil and hydrology criteria lacking. Sesuvium is a FAC indicator species — 50/50% chance of wetland.

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil test pit #2
(fastland -- in ditch)

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): CHAR & ASSOCIATES Date: 30 May 1995
Project/Site: Kuia by Gentry - East State: HI County: Honolulu
Applicant/Owner: _____ Plant Community #/Name: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ✓ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Bati's maritima	OBL	shrub	11.		
2.			12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 20% (crest barren soil)
Is the hydrophytic vegetation criterion met? Yes ____ No ✓
Rationale: < 50% cover of wetland indicator species

SOILS

Series/phase: ? (does not fit Kfb well) Subgroup:[2] _____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ✓
Is the soil a Histosol? Yes ____ No ✓ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ✓ Gleyed? Yes ____ No ✓
Matrix Color: dark reddish brown Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes ____ No ✓
Rationale: clean, no smells; forms loose crumbly ball at 2ft. down, soil platy, not sticky.

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth: _____
Is the soil saturated? Yes ____ No ✓
Depth to free-standing water in pit/soil probe hole: None (2 ft. down)
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ____ No ✓
Rationale: No free standing water. No signs of mineral crusts or watermarks in this part of ditch.

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ✓
Rationale for jurisdictional decision: All three criteria absent.

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil test pit #4
(fastland--in ditch)

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): CHAR & ASSOCIATES Date: 30 May 1995
Project/Site: Ewa by Gentry - East State: HI County: Honolulu
Applicant/Owner: Plant Community #/Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ✓ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Pluchea indica	FAC	shrub	11.		
2. (primarily on bank alongside ditch)			12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC ✓ <50% (largely barren)
Is the hydrophytic vegetation criterion met? Yes ____ No ✓
Rationale: less than 50% cover of wetland indicator (FAC) species

SOILS

Series/phase: ? (brownish yellow (at surface); dark red below) Subgroup:[2]
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ✓
Is the soil a Histosol? Yes ____ No ✓ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ✓ Gleyed? Yes ____ No ✓
Matrix Color: Mottle Colors:
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ____ No ✓
Rationale: Well-drained -- dry, friable to crumbly; no smells.

HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth:
Is the soil saturated? Yes ____ No ✓
Depth to free-standing water in pit/soil probe hole: None (2 ft. down)
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ____ No ✓
Rationale: No free-standing water; soil not moist & sticky.
No signs of mineral crust or watermarks in ditch.

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ✓
Rationale for jurisdictional decision: All three criteria absent.

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil test pit #5
(On boundary wetland/fastland---in ditch)

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): CHAR & ASSOCIATES
Project/Site: Kuia bay Gentry - East State: HI Date: 30 May 1995
Applicant/Owner: County: Honolulu
Plant Community #/Name:
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ✓ No ____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No ✓ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Bats ormatima	OBL	Shrub	11.		
2. Marisous javanicus	FACW	sedge	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC ± 50%
Is the hydrophytic vegetation criterion met? Yes ✓ No ____
Rationale: Yes centage of OBL/FACW species

SOILS

Series/phase: Kfb Subgroup:[2]
Is the soil on the hydric soils list? Yes ✓ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ✓ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ✓ Gleyed? Yes ____ No ✓
Matrix Color: dark gray Mottle Colors: very weak reddish-brown
Other hydric soil indicators:
Is the hydric soil criterion met? Yes ±✓ No ____
Rationale: Yes, but very weak mottles at 1½ to 2 ft. down. (Soil not as sticky & moist as in test pit # 1)

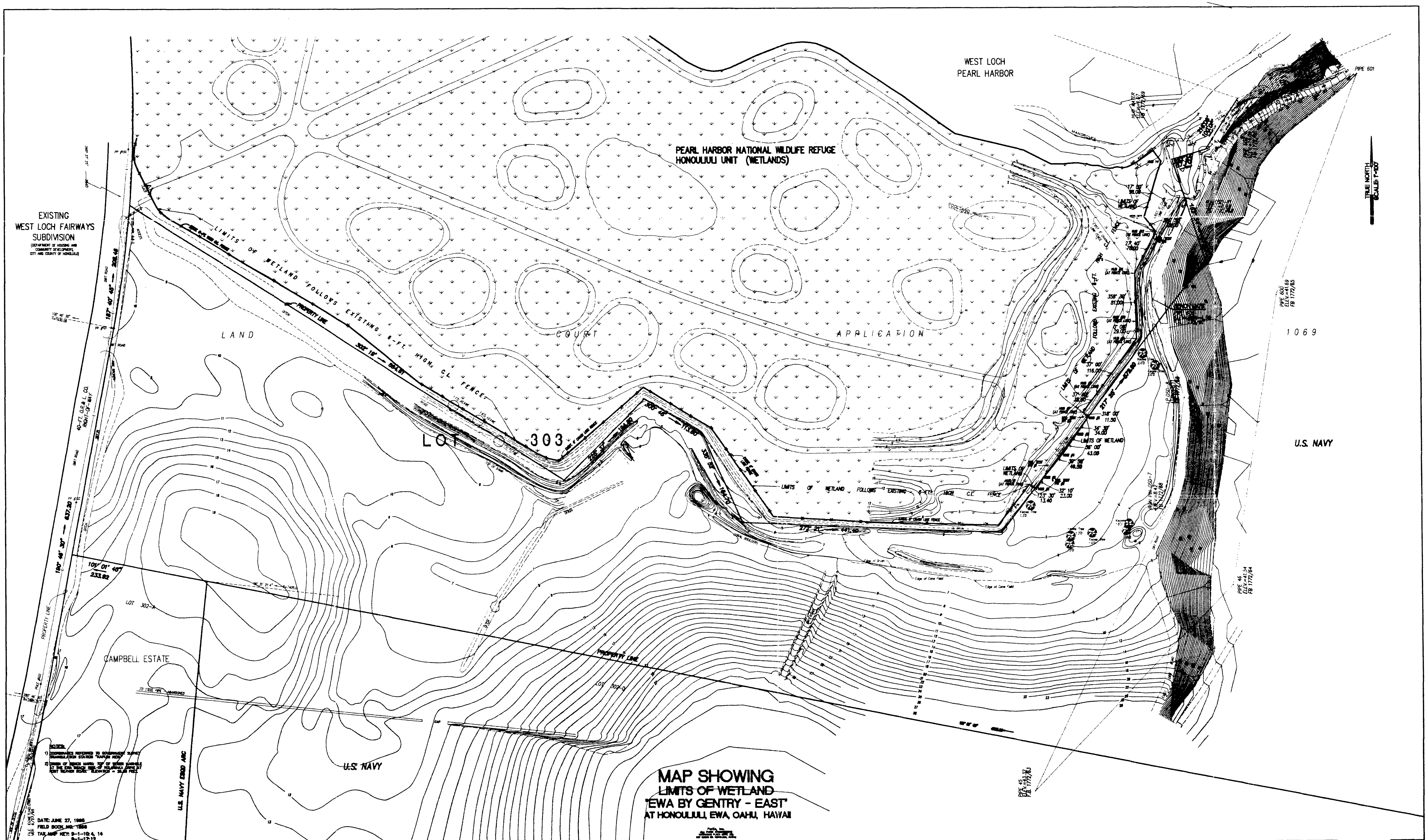
HYDROLOGY

Is the ground surface inundated? Yes ____ No ✓ Surface water depth: ____
Is the soil saturated? Yes ____ No ✓
Depth to free-standing water in pit/soil probe hole: None (2 ft. down)
List other field evidence of surface inundation or soil saturation.
faint mineral crust on surface
Is the wetland hydrology criterion met? Yes ____ No ✓
Rationale: Soil moist but not saturated.

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ____ ± Marginal, but include boundary.
Rationale for jurisdictional decision: in wetland

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."


MAP SHOWING
LIMITS OF WETLAND
"EWA BY GENTRY - EAST"
AT HONOULIULI, EWA, OAHU, HAWAII
PEARL HARBOR NATIONAL WILDLIFE REFUGE
HONOULIULI UNIT (WETLANDS)
WEST LOCH
PEARL HARBOR
EXISTING
WEST LOCH FAIRWAYS
SUBDIVISION
LAND COURT APPLICATION 1069
LOT 303
LIMITS OF WETLAND FOLLOWS EXISTING 6-FT. HIGH C.L. FENCE
PROPERTY LINE
LOT 302-A
CAMPBELL ESTATE
U.S. NAVY
U.S. NAVY EDGD ARC
TRUE NORTH
PIPE 601
PIPE 600
ELEV.=41.69
FB 1772/85
PIPE 46
ELEV.=41.54
FB 1772/64
Edge of Cane Field
NOTES:
DATE: JUNE 27, 1996
TAX MAP KEY: 9-1-10: 4, 14
9-1-17: 12

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT
P. O. BOX 373
HONOLULU, HAWAII 96809

March 31, 1995

Mr. Fred Rodriguez
Environmental Communications
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Draft Environmental Assessment: Ewa by Gentry-East Offsite Drainage Plan, Ewa (West Loch), Oahu, TMK: 9-1-10

Thank you for submitting your plans and master drainage plan for the subject project.

We have reviewed the plans, and after further elaboration with Mr. Ron Uemura (Vice President of Engineering at Gentry Hawaii, Ltd.) we have determined that the detention basin would not fall under our dam safety rules.

Should you have any questions, please call Mr. Sterling Yong at 587-0248.

Sincerely,

MANABU TAGOMORI
Manager-Chief Engineer

SY:lk
c: Ron Uemura

APR 4 1995

EXHIBIT D