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STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

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OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

October 4, 1993

Mr. Brian J.J. Choy, Director
State of Hawaii
Office of Environmental
Quality Control (OEQC)
220 South King Street, 4th Floor
Honolulu, Hawaii 96813

Dear Mr. Choy:

SUBJECT: Final Environmental Assessment for Waianae Valley
Interceptor Sewer, Waianae, Island of Oahu

Enclosed are four (4) copies of the Final Environmental Assessment (Negative Declaration) for the proposed Waianae Valley Interceptor Sewer. Based on the analysis of the conditions and impacts presented in the Final Environmental Assessment, we have concluded that the proposed project will have no significant effect on the environment. Therefore, we are filing a Negative Declaration for the proposed project.

We request that this Negative Declaration be published in the next OEQC Bulletin. A completed OEQC Bulletin Publication Form is enclosed as required.

Should you have any questions, please have your staff call Mr. Patrick K.M. Young, Land Development Division, at 586-3818.

Warmest aloha,

Handwritten signature of Hoaliku L. Drake in cursive.
Hoaliku L. Drake, Chairman
Hawaiian Homes Commission

HLD:SM:PKMY/4777B

Enclosure

cc: Belt Collins & Assoc.

1993-10-23-0A-*FEA-Waianae Valley Interceptor Sewer*

OCT 23 1993

**FINAL
ENVIRONMENTAL ASSESSMENT
FOR WAIANAE VALLEY INTERCEPTOR SEWER
WAIANAE VALLEY, OAHU, HAWAII**

PROPOSING AGENCY:

**State of Hawaii
Department of Hawaiian Home Lands**

Prepared for:

**State of Hawaii
Department of Hawaiian Home Lands**

Prepared by:

**Belt Collins & Associates
September 1993**

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CHAPTER 1
INTRODUCTION AND SUMMARY

CHAPTER 1 - INTRODUCTION AND SUMMARY

1.1 APPLICANT/PROPOSING AGENCY

Department of Hawaiian Home Lands, State of Hawaii

1.2 APPROVING AGENCY

Department of Hawaiian Home Lands, State of Hawaii

1.3 AGENCIES CONSULTED

Federal Agencies

Corps of Engineers

U.S. Department of Housing and Urban Development

State of Hawaii

Department of Health

Department of Transportation

Department of Land and Natural Resources, State Historic Preservation Office

City and County of Honolulu

Division of Wastewater Management, Department of Public Works

Board of Water Supply

Public and Quasi Public Utilities

GASCO

Hawaiian Electric Company

Hawaiian Telephone Company

Oceanic Cablevision, Inc.

Others

TMK 8-5-29:12 Property Owner

TMK 8-5-29:13 Property Owner

1.4 PROJECT OBJECTIVE AND BACKGROUND

1.4.1 OBJECTIVE

The Department of Hawaiian Home Lands (DHHL) is proposing to construct a gravity flow sewer main in the Waianae District of Oahu, Hawaii. The new main is intended to carry wastewater from the Department's Waianae Residence Lots subdivision, to an existing trunk sewer located along Farrington Highway (Figure 1-1). The proposed project was initiated in order to provide the subdivision with access to the City and County's wastewater system.

The installation of this gravity flow interceptor sewer will provide sewer service to planned residential lots in the subdivision, to existing homes in the subdivision that are currently connected to individual cesspools, and allow connection of the homeless village currently served by a temporary sewer. It will also allow for additional capacity for future developments as agreed to by the Division of Wastewater Management (DWWM), City and County of Honolulu, and DHHL.

The proposed sewer will enable Hawaiian Home Land's qualified beneficiaries to begin construction of their single-family residences on improved lots. There are approximately 4,700 qualified beneficiaries on the residential waiting list for Oahu. According to DHHL, some of the beneficiaries have been wait-listed since 1977.

The sewage needs of the first two phases of the subdivision are currently served by cesspools, but these phases will be able to connect to the proposed sewer system once the project is completed. The sewer will also be designed with adequate capacity to accommodate the flows from the homeless village located on the Alger Foundation property (TMK 8-5-3:21) and will provide adequate reserve capacity as determined by the DWWM and agreed to by DHHL.

The conversion of existing homes from individual wastewater systems to the municipal sewer system also supports the Department of Health, Hawaii Administrative Rule Chapter 11-62-06 (b) that states, "All building(s) generating wastewater and located within or near proximity of an available public sewer system as determined by the director, shall connect to the public sewer."

This gravity flow interceptor sewer will allow the homeless village to abandon their maintenance intensive inverted siphon connection. The temporary sewer connection for the homeless village currently discharges via a siphon through an 8-inch line to Lihue Street where it connects to a 12-inch line which leads to the 42-inch trunk sewer located beneath Farrington Highway.

This environmental assessment is being prepared in accordance with Chapter 343, Hawaii Revised Statutes. Because the proposed improvement is being funded in part by a Special Purpose Grant from the U. S. Department of Housing and Urban Development, it is also subject to the National Environmental Protection Act and environmental requirements of the other related laws and authorities cited in CFR Part 58.5 of the Environmental Review regulations. For actions that do not require an EIS under NEPA or local legislation, the U.S. Department of Housing and Urban Development review process is conducted after the state review process has been completed.

1.4.2 PROJECT BACKGROUND

The Hawaiian Homes Act of 1921 established a program whereby certain lands would be set aside and developed to provide residence lots for native Hawaiians. The DHHL is responsible for administering this homesteading program. In order to streamline the program and to reduce the number of qualified applicants on the waiting list for lots, DHHL instituted an accelerated awards program that allowed residential homestead lots lacking site improvements (e.g., paved roads, water, or electric power) to be awarded to qualified beneficiaries. As additional funds become available, improvements are made to the lots awarded under the accelerated program.

The installation of the interceptor sewer supports the objective of the Hawaiian Homes Act of 1921, by providing necessary infrastructure to Hawaiian Home Lands' residence lots. Additionally, by connecting existing residences that are currently served by cesspools to the municipal sewer system, the project will increase compliance with the Department of Health, Hawaii Administrative Rule Chapter 11-62-06 (b) that states "All building(s) generating wastewater and located within or near proximity of an available public sewer system as determined by the director, shall connect to the public sewer."

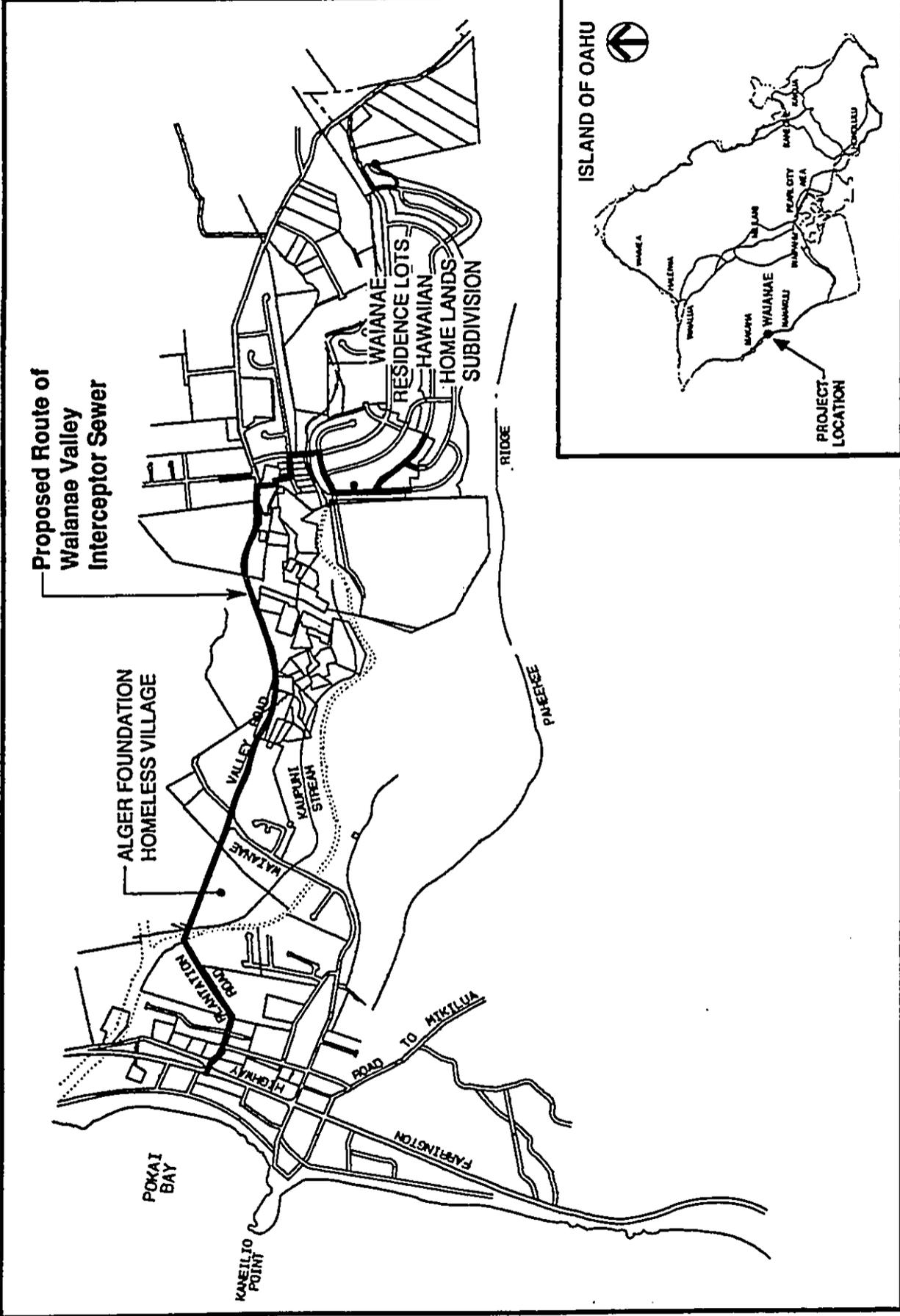


Figure 1-1
PROJECT LOCATION
 Waianae Valley Interceptor Sewer EA
 Prepared By: Belt Collins & Associates
 August 1993



1.5 PROJECT AND SITE DESCRIPTION

The proposed site is located in Waianae Valley, a small leeward community located on the southwest coast of Oahu. Waianae lies approximately 20 miles to the west of Honolulu. It is bounded by high surrounding ridges on three sides and by the shoreline to the west. Waianae is estimated to have a resident population of 8,758 (U.S. Bureau of the Census, printouts dated February 21, 1991). The Waianae Residence Lots subdivision lies approximately 1.5 miles inland from Farrington Highway, and is reached by Waianae Valley Road and Kaneaki Street (Figure 1-1). The proposed sewer is being designed to serve the entire subdivision at build-out, which will consist of approximately 715 single family residences, as well as the homeless village.

The sewer will carry wastewater from the subdivision directly to the 42 inch trunk sewer located along Farrington Highway.

1.6 SUMMARY OF POTENTIAL IMPACTS, PROPOSED MITIGATION MEASURES, AND ALTERNATIVES

1.6.1 POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

Short-term impacts of the proposed project on the existing environment due to necessary grading and excavation would include soil compaction, loss of vegetation, increased water percolation, as well as increased noise and fugitive dust during construction. The sewer's route will be primarily located in roadway right-of-ways and some traffic disruption is expected during construction. A Traffic Control Plan has been developed to address these temporary disruptions. Short-term interruptions to water service and to the drainage system in areas along the proposed route, will occur.

Long-term impacts associated with the project are increased flows to the Farrington Highway trunk sewer and the Waianae Wastewater Treatment Plant. Conversion of the homeless village from their temporary sewer to the proposed interceptor sewer is anticipated to eliminate potential maintenance problems associated with a component of a temporary sewer, the inverted siphon.

Conversion of existing residences from individual cesspools to the County wastewater system will result in a direct financial impact to the homeowners who convert from their septic tanks and connect to the proposed sewer. Although DHHL will provide the capacity and necessary stubouts for the conversions, the cost of the connection and related laterals will be borne by the owners of those residences.

1.6.2 ALTERNATIVES

Three alternatives to the project were considered: no action, connection to existing nearby sewer, and the installation of individual wastewater systems. For various reasons (see Chapter 4) they were rejected, and the installation of an interceptor sewer was the preferred alternative. Additionally, two alternative sizing configurations were considered for the proposed gravity flow interceptor sewer.

1.7 GOVERNMENT PERMITS AND APPROVALS

To proceed with the proposed project, the following permits will be acquired by the proposing agency.

Grading, Grubbing, and Trenching Permits
Department of Public Works, City and County of Honolulu

Watering/Dewatering Permit
Department of Public Works, City and County of Honolulu

NPDES (National Pollutant Discharge Elimination System) Permit - Dewatering
(If waters resulting from the dewatering are discharged into a body of water or drainage system)
Department of Health, State of Hawaii

NPDES (National Pollutant Discharge Elimination System) Permit - Construction Activities
(If construction activities are occurring on a site greater than 5 acres)
Department of Health, State of Hawaii

Sewer Connection Permit
Department of Public Works

CHAPTER 2 - PROJECT DESCRIPTION

2.1 PROJECT SITE

2.1.1 LOCATION

The proposed interceptor sewer will serve the DHHL's Waianae Residence Lots subdivision. It is located on the south-east side of the Waianae Valley at the intersection of Waianae Valley Road and Kaneaki Street, about 1.5 miles east (mauka) of Farrington Highway and the shoreline. Waianae Valley is a residential community located approximately 20 miles west of Honolulu. This valley is part of the Waianae Iki Watershed area, and its drainage needs are served by Kaupuni Stream and its major tributaries.

2.1.2 PROPOSED ROUTE

The proposed sewer line route will commence from the intersection of Plantation Valley Road and Farrington Highway and continue along Waianae Valley Road to Kaneaki, and then Kepauala Street. The sewer then connects to the subdivision's sewer system east of the intersection of Kaneaki Street and Waianae Valley Road (see Figure 2-1).

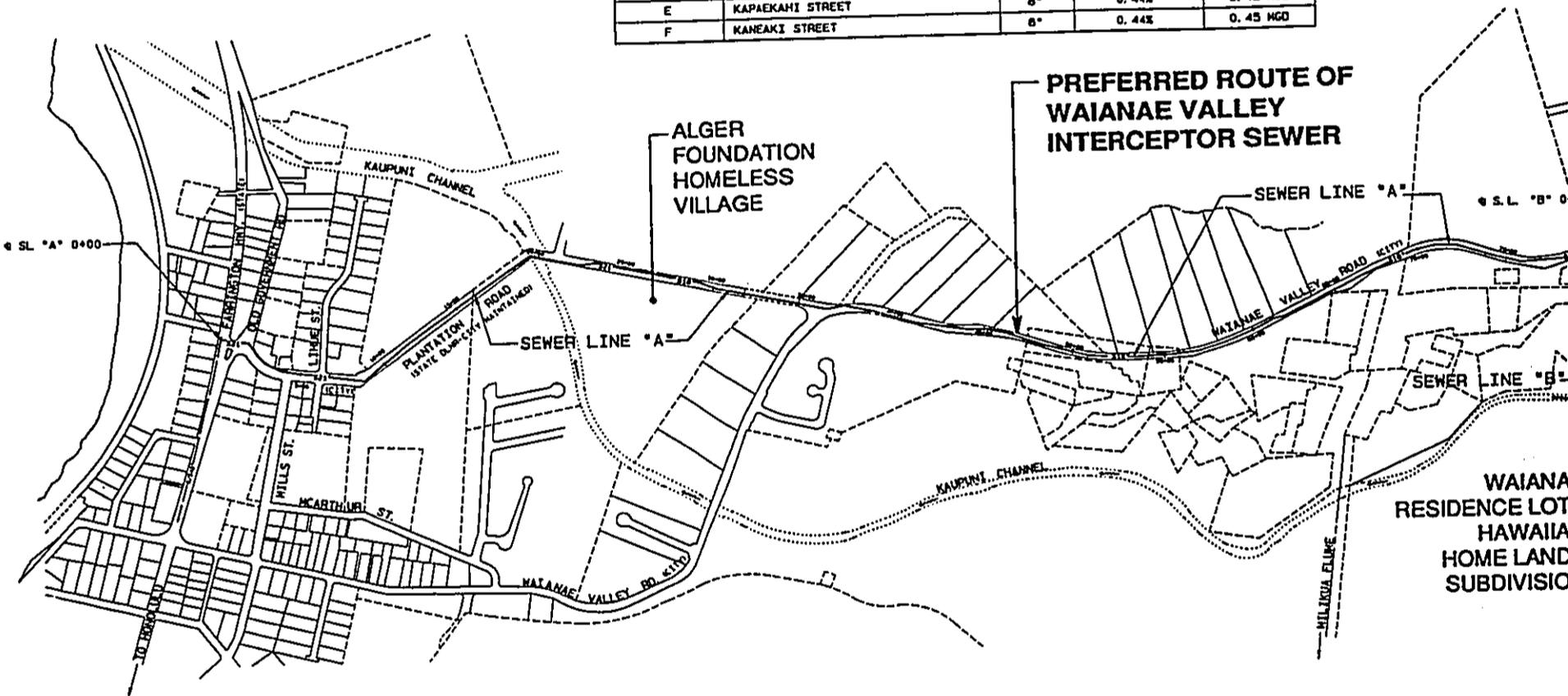
Approximately 91 percent of the sewer will be installed under road right-of-ways. Therefore, the sewer will cross Kaupuni stream in two locations. The first crossing occurs along Waianae Valley Road approximately 2,500 feet inland and will be installed by boring under the channelized concrete bed. The route then continues along Waianae Valley Road to about 400 feet before its intersection with Kaneaki Street. The sewer then proceeds southeast, along an easement across TMK 8-5-29:12 and TMK 8-5-29:13, for approximately 270 feet and veers northeast, along a 130 foot easement across TMK 8-5-29:19 (which belongs to DHHL) terminating at Kaneaki Street, about 400 feet southeast of its intersection with Waianae Valley Road. Approximately 300 feet further, the sewer will cross Kaupuni stream again, this time suspended under an existing bridge. The sewer continues along Kaneaki Street until its intersection with Kepauala Street, at which point it follows the northwest portion of Kepauala Street to the intersection with Kaneilio Street. The subdivision's collector system will connect to the interceptor sewer in a variety of locations within the subdivision.

EXISTING FARRINGTON HIGHWAY SEWER MAIN

SIZE OF PIPE = 42"
 SLOPE = 0.08%
 CAPACITY = 16.36 MGD
 PEAK FLOW = 4.78 MGD

REFERENCE: "ISLAND WIDE SEWER ADEQUACY PROJECT (WAIANAE),
 KNOCK ASSOCIATES, INC., JULY 1988.

SEWER LINE	LOCATION	SIZE	MIN SLOPE	CAPACITY				
A	PLANTATION ROAD (FARRINGTON HIGHWAY TO ALGER CONNECTION)	21"	0.20%	4.58 MGD				
A	PLANTATION ROAD AND WAIANAE VALLEY ROAD (FROM ALGER CONNECTION)	18"	0.20%	2.63 MGD				
B	WAIANAE VALLEY ROAD, KANEAKI STREET, KEPAUALA STREET	15"	0.20%	1.62 MGD				
B	KANEILIO STREET	8"	0.44%	0.45 MGD				
C	KANEILIO PLACE	8"	0.44%	0.45 MGD				
D	KAMAILEUNU STREET	8"	0.44%	0.45 MGD				
E	KAPAKAHI STREET	8"	0.44%	F	KANEAKI STREET	8"	0.44%	0.45 MGD
F	KANEAKI STREET	8"	0.44%	0.45 MGD				



0 400 800 1600
 SCALE IN FEET

2.2 INTERCEPTOR SEWER DESCRIPTION

DHHL is proposing to construct an interceptor sewer to service its subdivision. This 715-lot subdivision is being developed in phases. Unit 1 and Unit 2A-1 phases have already been completed and consist of 272 single-family residences. DHHL has immediate plans to develop Unit 2A-2, which consists of an additional 121 lots. The remainder of the subdivision has the potential to accommodate approximately 320 additional residential lots.

The proposed sewer is designed to flow at approximately 85-90 percent of capacity and accommodate the flows generated by the DHHL subdivision, the homeless village located on the Alger Foundation property (TMK 8-5-3:21), and additional future development on this property. In addition, it would provide reserve capacity, as determined by and agreed to by DHHL and the Department of Wastewater Management (DWWM), to accommodate future growth in the area.

Figure 2.1 shows the proposed route and line sizes of the interceptor sewer, the location of the homeless village, and the DHHL subdivision. Appendix A contains design flow, velocity, and capacity data of the components of the interceptor sewer. Appendix B shows preliminary plans and profiles for the proposed lines.

Because the nearby wastewater collection system does not have sufficient capacity to accommodate the subdivision's requirements, the proposed sewer will carry the flows directly to the 42-inch trunk line beneath Farrington Highway. The proposed interceptor sewer will begin with a 21-inch diameter reinforced concrete pipe connected to the 42-inch trunkline at the intersection of Farrington Highway and Plantation Road. After the first crossing of Kaupuni Channel, the sewer diameter will drop to 18 inches. Before the intersection of Piliuka Place and Waianae Valley Road the pipe size will be reduced further to 15 inches. After the intersection of Kepauala and Kaneilio Streets, the proposed pipe diameter will drop to 8 inches. A number of other manholes in the subdivision will also have connections to other 8-inch lines (Figure 2-1).

Of the several sizing alternatives that were considered discussed in Chapter 4, this alternative was preferred because it provided the least expensive configuration with sufficient capacity to meet the design requirements.

In total, the proposed interceptor sewer line will consist of 8,100 feet from the junction of Farrington Highway and Plantation Road to the subdivision, and an additional 4,250 feet of sewer line located within the subdivision. Depths to invert may vary from 5 to 18 feet, while invert depths below groundwater may vary from 0 to 10 feet or more.

2.3 LAND OWNERSHIP

Since the majority of the proposed route is along existing road rights-of-way, the sewer will be installed in property already owned by the City and County of Honolulu. However, easements will be required to permit the sewer to traverse approximately 270 linear feet (excluding TMK 8-5-29:19 which belongs to DHHL) of privately owned property. DHHL has agreed to provide a licensing agreement or easement for the sewers located within the subdivision to the DWWM; this will enable DWWM to properly maintain the lines.

2.4 LAND USE DESIGNATIONS AND CONTROLS

The route is located along existing roadways which traverse two state land use districts, Urban and Agriculture. The County zoning along the route includes B-2 Community Business District, R-5 Residential District, P-2 General Preservation District, A-2 Medium Density Apartment District, and AG-2 General Agricultural District. The installation of the proposed sewer would not conflict with any of the land use designations, as sewers are a permitted use in all areas.

2.5 PROPOSED CONSTRUCTION ACTIVITIES

The project activities will include the following:

- Grubbing and Grading
- Trenching
- Installing appropriate bedding and piping
- Sawcutting pavement as necessary
- Backfilling
- Restoring pavement
- Installing manholes
- Relocating utilities as necessary

2.6 PROJECT SCHEDULE AND COST

DHHL estimates that this proposed interceptor sewer project will cost approximately \$4,000,000. In addition, owners of existing property in the subdivision who connect to the sewer will do so by installing laterals at their expense. Depending on the location of the residence in relation to the proposed sewer line, these costs are estimated to be between \$5,000 to \$10,000 per home.

DHHL has applied for federal funds from an appropriation earmarked for the Department and administered by the Department of Housing and Urban Development's Community Development Block Grant (CDBG) program. These grants total \$2.386 million appropriated over two fiscal years: \$1.220 million in FY '89 and \$1.166 million in FY '90.

The schedule for the project is as follows:

Design	4 months
Construction bid documents preparation and funding	2 months
Construction	14 months

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CHAPTER 3
EXISTING CONDITIONS, POTENTIAL IMPACTS
AND
PROPOSED MITIGATION MEASURES

CHAPTER 3 - EXISTING CONDITIONS, POTENTIAL IMPACTS, AND PROPOSED MITIGATION MEASURES

3.1 PHYSICAL ENVIRONMENT

3.1.1 TOPOGRAPHY

The proposed route traverses gently sloping terrain. The slope varies from 3 to 10 percent. Paheehee Ridge is approximately 500 feet from the eastern boundary of the subdivision and provides a natural boundary to the valley.

Impacts

Short-term impacts to the topography are expected during construction due to trenching and excavation. However, once the sewer is installed below grade no impact to the surrounding topography will remain.

Mitigation

No mitigative measures are required.

3.1.2 GEOLOGY AND SOILS

The upland area of the valley is characterized by steep slopes, rock outcrops, and deeply incised drainages. Parent rock is of volcanic origin and comprised of basic basalt. The soil mantle is typically moderately deep to shallow, extremely stony, and permeable. Alluvial fans below the upland areas are characterized by areas of extremely stony, black clay soils. The clays have properties of marked swelling and shrinkage. Consequently, when these soils are saturated, the water intake is very slow and runoff is high. There are a few small areas of medium textured, deep, permeable soils. Surface runoff is moderate in these locations, and the erosion potential is high. The flat plains in the lower elevations, where the subdivision is located, are characterized by low sand dunes near the sea with deep deposits of permeable alluvium between the dunes and the alluvial fans.

Hawaii Geotechnical Group, Inc., prepared a soil exploration report (February 1993) in conjunction with this project. According to the report, the soils in the makai area include layers of dense silty sand with coral gravel and shells with sandy silt layers (ML Soils) and underlain by loose silty sand (SP and SM Soils). As the route proceeds towards the valley, the upper layer of soil changes to a stiff clay (CL, CH soils). When the route enters the subdivision, the upper layer of soil is classified as stiff clays (CH soil) underlain by boulders or dense brown silty sand (SM soil). There is evidence of gravel and sand in areas previously excavated and filled during installation of other utility conduits. Water was noted at about

7- to 12-foot depths in the borings located in the lower portion of the route and extending through the first stream crossing.

Impacts

Approximately 91 percent of the proposed route will be beneath existing roadways installed at depths varying from 10 to 20 feet below existing ground. Since existing utility conduits are located anywhere from 2 to 10 feet below ground, previously undisturbed soils will be excavated during the installation and replaced with fill material as necessary. In addition, a portion of the line will lie below mean sea level, dewatering will be required during the installation.

Short-term impacts associated with construction activities will include excavation of previously disturbed as well as undisturbed soils, and the use of fill material.

No long-term impacts to existing soils are anticipated.

Mitigation

No mitigation will be required.

3.1.3 CLIMATE

The climate is typical of leeward areas that lie near the northern limit of the tropics. Ordinarily high tropical temperatures are reduced by cool ocean currents. The Waianae coast experiences primarily northeasterly and easterly winds which move on average one half mile per hour. The average monthly temperature in Waianae ranges from 72 degrees F. in the coolest month to 79 degrees F. in the warmest month (State of Hawaii Data Book, 1990). Waianae is considered a dry area with arid summers. The mean annual rainfall in Waianae is 20 inches, most of which occurs during a few winter Kona storms (Atlas of Hawaii, 1973), which is generally a result of a southerly winds.

3.1.4 AIR QUALITY

Primarily exposed to the north-east tradewinds off the ocean, the project site generally enjoys good air quality. Air quality standards applicable to the area are set by the State Department of Health and the U.S. Environmental Protection Agency. DOH standards are generally set at a more stringent level than national standards. There are no air monitoring stations in the vicinity of the project site from which data can be gathered.

Impacts

Short-term impacts to ambient air quality along the route of the project may be affected during construction. Fugitive dust emissions will arise from trenching and backfilling within the project site. There will also be short-term indirect impact due to vehicle emissions from slow moving construction equipment traveling to and from the project area and a temporary increase in local traffic caused by commuting construction workers. All of these impacts are expected to be minimal. No long-term impacts are expected.

Mitigation

In keeping with State Department of Health and City and County rules, adequate dust control measures will be employed during construction to minimize airborne particulates. Although minimum fugitive dust is expected due to the cohesive nature of the clay loam soils in those areas where trenching is required, water sprinkling will be used to mitigate its impact. Additional mitigative measures to control dust will include the use of steel plates to cover cuts in paved areas and minimizing the time the cuts are open. In addition, the site contractor will be required to control fugitive dust in compliance with Paragraph 11-60-5 Fugitive Dust, Chapter 60, Air Pollution Control, Title 11, Administrative Rules, State of Hawaii. Since there are no emitters or sources of pollution in this semi rural area, it is unlikely that air quality standards would be exceeded due to impacts related to construction activities. The above described measures are considered adequate to mitigate impacts resulting from the construction activities.

3.1.5 NOISE

Noise levels along the route are typical of suburban neighborhoods with the exception of the intersection of Plantation Road and Farrington Highway, which is subject to traffic noise.

Impacts

Construction activities along the route will create a temporary increase in noise levels. Sources of this noise will include heavy construction vehicles and power equipment necessary for construction. Some of the increased vehicular traffic will be due to the removal of a minor amount of excavated material (approximately 17,022 cubic yards) during the grading and trenching phases of the project. This material will be transported to a nearby landfill.

No long-term impacts on noise levels are anticipated.

Mitigation

To mitigate the short-term noise impacts due to construction, construction activities will be limited to day time hours. In addition, appropriate vehicle maintenance and mufflers will be employed by the contractor. Construction work impacting city streets is only permitted during 8:30 am to 3:30 pm unless otherwise allowed by DTS (Department of Transportation). For state highways, all lanes shall be open during peak hours which are 6-8 am, 3-6 pm, and off-work hours unless otherwise permitted. These actions are considered adequate to offset the impact of increased traffic noise during construction.

3.1.6 GROUNDWATER

Potable water on Oahu is derived from two sources, a fresh water aquifer created by a basal, lens-shaped body of groundwater floating on denser salt water and high level aquifers caused by rainwater impounded in dikes. During the installation of the sewer, groundwater will be encountered along approximately the first 2,000 feet of the route.

Impacts

The proposed project will require that some work be done below the water table. This occurs in the first part of the proposed route. Dewatering will be used during this phase, and those waters will be used for dust control.

The long-term impacts to groundwater as a result of this project will be positive. This is because homes currently served by cesspools will be able to connect to the City's wastewater system. This will eliminate the negative effect of leaching fields on groundwater.

Mitigation

Appropriate dewatering techniques as described in the soils exploration report prepared by Hawaii Geotechnical Group, Inc. (February 1993) will be employed by the contractor. No other mitigative measures are proposed at this time.

3.1.7 SURFACE WATER AND DRAINAGE

Kaupuni Channel provides the major drainageway for the valley. This stream extends into the valley and has intermittent flows depending on the precipitation. The lower portion of the stream has been channelized, and during the summer months is often dry. In 1984, annual maximum flows in the upper portion of the stream (2.8 miles northeast of the junction of Waianae Valley Road and Farrington Highway) were estimated at 50 ft³/second. The proposed sewer will cross this channel in two locations. The first crossing will occur in the channelized area of the stream approximately one-third of a mile from the intersection of Farrington Highway and Plantation Valley Road. The second crossing will occur approximately 1.2 miles from the previously mentioned intersection, just prior to the

subdivision it is designed to serve. In order not to disturb the intermittent flows or the stream bed, the sewer will bore under the bed of the stream at the first crossing and will hang underneath the existing bridge at the second crossings.

Impacts

Over the long-term, the project is not expected to increase the potential for erosion or sedimentation over the long run, since approximately 91 percent (approx. 10,720 linear feet) of the sewer will be installed beneath existing roadway, and the remaining will be below grade as well. However, impacts related to construction activities such as trenching and installation of the sewer interceptor may subject some exposed soil to surface runoff.

In addition, some segments of the drainage system will need to be rerouted and relocated, while some existing drainage lines will be abandoned due to installation of the proposed sewer.

Mitigation

To minimize potential erosion and sedimentation during construction activities, trenching will be conducted in compliance with existing County erosion control ordinances. During those construction phases where drainage systems need to be relocated, temporary bypasses will be used whenever necessary.

3.2 NATURAL HAZARDS

3.2.1 FLOODING

According to the National Flood Insurance Program Flood Insurance Rate Map (FIRM) prepared by the U.S. Army Corps of Engineers, the proposed route lies entirely in Zone D, an area in which flood hazards are undetermined (Federal Emergency Management Agency, 1987). The residential areas along the route include drainage systems composed of gutters and curbs feeding Kaupuni Channel. DHHL's subdivision will also include a similar system. In the 1960's, as part of the Waianae Iki watershed work plan, improvements were made to Kaupuni stream to lessen the probability of floodwater damage associated with heavy winter storms. Since that time no significant flood damage as a result of winter storms has been recorded.

Impacts

The project will not be subject to damage as a result of flooding since it will be installed below ground primarily under paved areas. The project will not increase the likelihood of flooding since it will be installed below grade.

Mitigation

Mitigation measures are considered unnecessary. Adequate drainage capacity still exists in the channel and will accommodate the subdivision that the sewer is designed to serve.

3.2.2 TSUNAMIS

According to the FIRM maps, none of the route is located in areas with coastal floods with velocity hazard occur (Zone V or VE).

Impacts

The installation of the proposed interceptor will not change the delineation of the areas that area likely to be affected by tsunamis, since it will be installed below grade.

Mitigation

Because there is no likelihood this project will be affected by tsunamis, nor cause a change in the delineation of areas designated as Zone V or VE, no mitigation measures area required.

3.2.3 EARTHQUAKES

Earthquake risk in the project's subdivision is minimal. The island of Oahu is classified as a Seismic Zone 2 area, in which damage would be minor in the event of an earthquake (Uniform Building Code, 1979).

Impacts

Tremors resulting from possible earthquakes are not expected to cause damage which might result from a shearing effect if the project was located across a fault line.

Mitigation

Since earthquakes are unlikely to produce negative impacts to the proposed interceptor, no special mitigation measures are required. Additionally, all work on the project will be done in accordance with The Uniform Building Code, 1979, which provides guidelines for construction to mitigate earthquake damage to infrastructure and buildings.

3.3 BIOLOGICAL RESOURCES

3.3.1 FLORA

The alignment of the proposed route follows existing roadway rights-of-way and, as such, will be displacing pavement or revegetated areas during construction. Approximately 91 percent of the proposed sewer will be located beneath existing roadway pavement. The

portion of the sewer that traverses private property is covered with a variety of weeds and grasses, generally introduced species typically associated with filled lands and urban development, as well as some trees (Banyan, Mango, and Norfolk Pine) and scrub brush. Characteristic plants found in this low lying arid area include kiawe trees (Prosopis pallida), koa haole (Leucocephala leucaena), finger and pili grass (Atlas of Hawaii, 1973).

Impacts

Short-term impacts include the loss of second growth vegetation due to grubbing and grading activities. However, since most of the sewer will lie beneath paved roadways or related shoulders, no impacts to endangered or threatened species are expected.

Mitigation

Where appropriate, the contractor will be required to replant disturbed areas. No additional mitigation measures are warranted.

3.3.2 FAUNA

Fauna observed along the route include domestic dogs and cats. Exotic bird species typical of urban areas are also present. The project site does not provide an important habitat for any endangered species and no Federal or State listed or candidate threatened or endangered bird species are known to inhabit the project's route.

Impacts

The impacts on faunal populations due to the below grade installation of an interceptor sewer is considered insignificant due to the existing developed nature of the proposed route and the absence of any recorded endangered species in the vicinity.

Mitigation

No mitigation measures are proposed.

3.5 ARCHAEOLOGY

The proposed sewer route is below grade and follows existing roadway right-of-ways that serve typical suburban neighborhoods. In the area where the route departs from the roadway alignment, it crosses residential lots.

Impacts

Since 91 percent of the sewer will be installed between 5 and 20 feet below grade and below existing pavement in areas which were previously disturbed during installation of other underground utility conduits, it is unlikely that any site of historical or archeological significance will be encountered. In the area where the route departs from the roadway, and

crosses private property via a 400 linear foot easement (upper portion of the route), it is also unlikely that any sites of historic or archeological significance remain since those lots are fully developed and therefore have experienced significant alteration.

Dr. T. Stell Newman, formerly Director of Archaeology with the Division of State Parks, Department of Land and Natural Resources, conducted a visual field inspection for the master plan site (subdivision) in 1975. He concluded that certain rock piles on the subdivision site were of no historical or archaeological significance, and the furrowing terrain of the site indicated that it had once been cultivated with sugar cane. This agricultural activity reduces the possibility that sites of historic or archaeological significance, if at one time present, have been preserved.

Mitigation

In the event that archaeological features are uncovered during the installation of the sewer, DHHL has an agreement with the State Historic Preservation Office (SHPO) to monitor excavations so any features found receive proper treatment.

3.6 SOCIOECONOMIC ENVIRONMENT

According to the Department of Hawaiian Home Lands, Planning Office, the project is expected to cost approximately \$4 million. Construction will take approximately fourteen months.

Impacts

The project will generate employment during the construction phase, as well as income for those to businesses that supply materials for the project's planning, design, and construction.

As a result of the installation of the sewer, each subdivision resident will be financially responsible for installing the necessary lateral to connect to the sewer system. This may impose a hardship on them depending on their disposable income level and the installation cost. Installation costs will dependent on the location of the residence with respect to the sewer system.

Mitigation

No mitigation measures are proposed at this time.

3.7 INFRASTRUCTURE

Impacts to public utilities directly related to the increase in population of the subdivision are addressed in both the Draft and Final EIS prepared and accepted in 1975 as well as the

Environmental Assessment and Negative Declaration prepared for the Waianae Residence Lots, Unit 2A - 2.

3.7.1 TRAFFIC

The project not affect traffic circulation except during the construction phase.

Impacts

Traffic will be affected during installation of the sewer within road right-of-ways. Slow moving construction equipment may obstruct the normal flow of traffic.

Once the sewer is installed, no impacts directly attributable to this project is anticipated.

Mitigation

A Traffic Plan has been developed to mitigate the short-term impacts of the project on local traffic. It has received verbal approval from the Department of Transportation Services. The plan calls for notification of temporary disruption of circulation in the daily papers, and posting of construction warning signs. Although portions of the road will be blocked temporarily, two-way traffic will be maintained throughout the project. All activities involving obstruction to roadways will be conducted between 8:30 a.m. and 3:30 p.m. so as not to impact traffic during peak hours.

3.7.2 ELECTRIC

Electrical power for the Waianae community is supplied via Hawaiian Electric Company via 12 kilovolt overhead distribution lines that run along Farrington Highway. Distribution lines to the subdivision are located in ducts below grade.

Impacts

No impacts directly attributable to the proposed sewer are expected.

Mitigation

No mitigative measures are required.

3.7.3 TELEPHONE

Hawaiian Telephone company provides service to Waianae through a switching station located along Farrington Highway. The lines providing service to the subdivision are collocated with HECO's below grade transmission lines along Waianae Valley Road extending to the subdivision.

Impacts

No short- or long-term impacts directly attributable to the proposed sewer are expected.

Mitigation

No mitigative measures are required.

3.7.4 CABLE T.V.

Cable TV service is supplied by Oceanic Cablevision via overhead lines that are collocated with the power distribution lines.

Impacts

No short- or long-term impacts directly attributable to the proposed sewer are expected.

Mitigation

No mitigative measures are required.

3.7.5 SOLID WASTE DISPOSAL

Solid waste is collected by private contractor and taken to the City and County of Honolulu landfill at Waimanalo Gulch.

Impacts

No impacts attributable to the proposed sewer are expected.

Mitigation

No mitigative measures are required.

3.7.6 WASTEWATER TREATMENT

Wastewater from Waianae Valley is treated at the Waianae Wastewater Treatment Plant. According to the Islandwide Sewer Adequacy Report (Kwock and Associates, Inc.; 1988), the expansion completed in 1989 was designed to process an average of 5.2 mgd on average and have a capacity of 13.80 mgd. All wastewater from the project is transmitted to the Waianae Wastewater Treatment Plant through collection system in the subdivision, connecting to the 42-inch trunk line along Farrington Highway. According to the Island Wide Sewer Adequacy Project (Kwock Associates, Inc. 1988), the 42 inch sewer trunk line beneath Farrington Highway was operating at 26.3 percent of its design capacity. According to a recent inquiry, the Waianae Wastewater Treatment plant was operating at 2.9 mgd, well below its design capacity 13.80 mgd.

Impacts

The impacts of the project will be an increase in wastewater flows. Flows at build-out of the subdivision (715 residences) are expected to increase in the trunk line by 9 percent, 7 of which would be directly attributable to the subdivision. It is expected that the Waianae Wastewater Treatment Plant will receive an additional 1.63 mgd from both the subdivision at build-out and the Alger Foundation Homeless Village.

DWWM has approved a sewer (Chapter 6) connection for 437 additional residences (121 residences proposed in Phase Unit 2A-2, and the remaining are existing homes that will be converted to the municipal system), indicating that the collection and treatment systems have adequate capacity to accommodate the increase.

Mitigation

Since the collection system and the Waianae Wastewater Treatment plant have additional capacity at this time, no mitigative measures are necessary.

3.7.7 POTABLE WATER

Potable water is supplied to the subdivision via the City and County's distribution system. Pipes are located below road right-of-ways.

Impacts

Some of the water distribution system beneath Waianae Valley road will need to be relocated during sewer installation resulting in temporary interruption of service to the surrounding neighborhood.

No long-term impacts are expected as a direct result of this project.

Mitigation

Service interruptions will be kept to a minimum and will not last more than 6 hours on a given workday. Notification procedures prescribed by the Board of Water Supply will be followed by the Contractor.

3.8 SUMMARY OF POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

3.8.1 TEMPORARY IMPACTS

Short-term impacts of the project associated with construction activities include:

- Increased noise from construction equipment and related construction activities.
- Fugitive dust caused by grading and trenching work.
- Possible erosion from exposed soil during trenching.
- Negative impact to the flow of traffic due to slow moving construction vehicles and construction on roadways.
- Temporary interruptions to the water supply and drainage systems in area surrounding construction activities.

Proposed Mitigation

- Construction operations will be required to conform with the State Department of Health regulations concerning noise, vehicle emissions, and toilet facilities.
- Construction would be limited to daylight hours to minimize noise impacts.
- The erosion potential would be minimized by minimizing the soil exposed at any given time, and through proper grading techniques.
- Fugitive dust would be controlled by regular water sprinkling of exposed areas. Exposed areas that were previously vegetated, will be replanted as soon as possible.
- The contractor will be required to implement the Traffic Plan approved by the Department of Transportation Services. The plan includes provision for traffic control and rerouting, and requires the use of police to direct traffic in disturbed areas. In addition the plan requires that no obstruction to the normal flow of traffic be in place during peak traffic hours (i.e. traffic pattern alterations should occur only after 8:30 and before 3:30 p.m.)

3.8.2 LONG-TERM IMPACTS

Long-term impacts associated with the project include:

- Increased flows to the Waianae Wastewater Treatment Plant
- Increased flows through the wastewater collection system
- *Positive impact on groundwater quality by allowing the connection of existing homes, currently served by cesspools, to the municipal wastewater system.*
- Financial impact to existing residents who will convert to the municipal wastewater system.

Proposed Mitigation

No mitigative measures are proposed to offset the long-term impacts of increase flows since the collection and treatment system have adequate capacity to handle them. No other mitigative measures are proposed at this time.

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CHAPTER 4
ALTERNATIVES

CHAPTER 4 - ALTERNATIVES

Three alternatives to the project have been considered: no action, connection to existing nearby sewer, and installation of individual wastewater systems. Additionally, three alternative sizing configurations were considered for the proposed interceptor sewer.

4.1 NO ACTION

The "no action scenario" would delay the process of awarding improved residence lots to qualified beneficiaries on the Hawaiian Home Lands residential wait list. This alternative would negatively impact qualified beneficiaries and would be contrary to the policy of accelerating awards, recommended by the State and Federal Task Force in 1983.

4.2 CONNECTION TO NEARBY COLLECTION SYSTEM

This alternative consisted of installing a sewer connection to a nearby existing sewer rather than directly to the 42 inch trunk sewer located along Farrington Highway. It was considered an interim solution since the nearby collection system is almost at capacity and would not be able to handle the projected wastewater flow from the subdivision at buildout. This alternative was rejected because the project would eventually be necessary and the costs associated with the construction at a later date would be higher.

4.3 INDIVIDUAL WASTEWATER SYSTEM ALTERNATIVE

This alternative would provide individual wastewater systems to the residence lots in the subdivision. However, it was considered contrary to the Department of Health, Hawaii Administrative Rule Chapter 11-62-06 (b) that states, "All building(s) generating wastewater and located within or near proximity of an available public sewer system as determined by the director, shall connect to the public sewer."

4.4 PROPOSED INTERCEPTOR SEWER SIZING CONFIGURATIONS

4.4.1 18" AND 15" SIZING ALTERNATIVE

This alternative called for an 18-inch diameter line from Farrington Highway up to the Homeless Village, a 15-inch diameter line up to Kepaula and Kaneilio Street intersection, and 8-inch diameter pipes throughout the remaining portion of the subdivision.

This configuration was discarded because although it would accommodate the subdivision flow requirements, it would not allow for sufficient reserve capacity as required by DWWM and agreed to by DHHL.

4.4.2 18" AND 21" SIZING ALTERNATIVE 1

This configuration called for 21-inch diameter pipes from Farrington Highway up to the backlotting onto private property (upper portion of proposed route). The diameter of the pipes would then be reduced to 18 inches until the intersection of Kaneilio and Kepaula Street intersection. As per the previous alternative, pipes within the rest of the subdivision would be 8 inches in diameter.

Although this configuration provided the greatest capacity to accommodate future growth, it was also determined to be the most costly and, as such, was rejected.

CHAPTER 5 - DETERMINATION

The proposed project will have no significant impacts on the environment and an Environmental Impact Statement is not required. In accordance with the provisions of contained in Chapter 343, Hawaii Revised Statutes, and Title 11, Chapter 200, Administrative Rules of the State of Hawaii, Department of Health, a Negative Declaration is determined based on the following:

1. The impacts associated with construction activities are short-term and can be mitigated.
2. The proposed action will not to cause any adverse long-term impact to flora or fauna.
3. The proposed action will support planned development on Hawaiian Home Lands.
4. This project has a positive long-term impact on groundwater quality in that it allows existing residences in the subdivision to convert from their existing cesspools to the municipal wastewater system.
5. By providing access to the public sewer system, the proposed action supports the Department of Health, Hawaii Administrative Rule Chapter 11-62-06 (b) that states "All buildings(s) generating wastewater and located within or near proximity of an available public sewer system as determined by the director, shall connect to the public sewer".
6. The proposed action enables the awarding of improved residence lots to qualified beneficiaries on the DHHL Oahu Residential wait-list.
7. No known natural or cultural resource will be destroyed or lost as a result of the proposed project.
8. Since the proposed project will be installed below grade, it will not curtail the range of beneficial uses of the environment.
9. The proposed project does not affect an environmentally sensitive area.

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CHAPTER 6 |
AGENCY COMMENTS

CHAPTER 6 - AGENCY COMMENTS

JOHN WAIHEE
GOVERNOR
STATE OF HAWAII



HOALIKU L. DRAKE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1879
HONOLULU, HAWAII 96805

August 13, 1995

The Honorable Keith W. Ahue, Chairperson
Board of Land and Natural Resources
c/o 33 South King Street, 6th Floor
Honolulu, Hawaii 96813

Attn: Mr. Don Hibbard, Historic Preservation Administrator:

Subject: Project Name: Waianae Valley Interceptor Sewer
Tax Map Keys: 1st Div., 8-5-1, 8-5-3:6, 8-5-4, 8-5-10,
8-5-19, 8-5-29:12, 13 & 19, 8-5-30:126, 8-5-31
Historic Preservation Compliance
Community Development Block Grant (CDBG) Program

Based on review of the Hawaii and National Registers of Historic Places, the State's historic sites inventory, and records from previous field work conducted by archaeologists in 1975, it has been determined that the subject project activity will have "no effect" on any historic property.

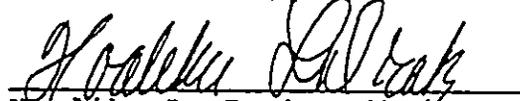
However, if during construction, cultural remains such as burials, artifacts, or structures are discovered, the contractor will be required to immediately notify both the contracting office at 586-3815 and the State Historic Preservation Division at 587-0047.

This letter confirms efforts by the Department of Hawaiian Home Lands (DHHL) to comply with Section 106 of the National Historic Preservation Act of 1966, as amended, and the State Historic Preservation Program authorized under Hawaii Revised Statutes Chapter 6E.

Upon concurrence by the State Historic Preservation Officer, please return a copy of this letter to the DHHL.

Warmest aloha,

Concur:


Hoaliku L. Drake, Chairman
Hawaiian Homes Commission


Keith W. Ahue, Chairperson
Board of Land & Natural Resources
State Historic Preservation Officer

HLD: BH: JC/2994L

DEPARTMENT OF WASTEWATER MANAGEMENT

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

RECEIVED

1993 JUL 15 AM 11:17

FRANK F. FASI
MAYOR



KENNETH M. RAPPOLT
DIRECTOR

FELIX B. LIMTIACO
DEPUTY DIRECTOR

WPP 93-272

July 13, 1993

Mr. Alan Kato
Belt Collins & Associates
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Dear Mr. Kato:

Subject: Waianae Valley Interceptor Sewer Master Plan,
Dated June 12, 1993

We approve your master plan for the proposed Waianae Valley interceptor sewer dated June 12, 1993. However, this statement shall not be construed as confirmation of sewage capacity reservation. Sewage capacity reservation is contingent on submittal and approval of a "Sewer Connection Application" form.

If there are any questions, please feel free to contact Earl Ng of the Planning Section at 523-4653.

Very truly yours,

KENNETH M. RAPPOLT, P.E.
Director

_____	Bell, J.	_____
_____	Hirata, P.	_____
_____	Vierra, J.	_____
_____	Agona, L.	_____
_____	Walkabenstein, P.	_____
_____	Nagai, K.	_____
_____	Chee, H.	_____
_____	Cunningham, B.	_____
_____	Hayashi, G.	_____
_____	Iida, E.	_____
_____	Ishii, R.	_____
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_____	Kato, A.	_____
_____	Lee, L.	_____
_____	Iku, R.	_____
_____	Mannings, C.	_____
_____	Miler, D.	_____
_____	Miyahara, E.	_____
_____	Nagasawa, T.	_____
_____	Pavoni, C.	_____
_____	Takayasu, G.	_____
_____	Yokota, A.	_____
_____	Zukowski, M.	_____
Job No		_____

DIVISION OF WASTEWATER MANAGEMENT
City and County of Honolulu

C.P. 11 98/10
RECEIVED
DIV. WWM

APPLICATION FOR SEWER CONNECTION
(Allow at least three weeks for processing of application)

PUBLIC SERVICE
SECTION

PART A - TO BE FILLED BY APPLICANT
DEPT OF HAWAIIAN HOME LANDS

1. Project Name: WAIANA VALLEY INTERCEPTOR SEWER
2. Address or Location: WAIANA VALLEY, WAIANA, OAHU, HAWAII
3. Tax Map Key: 8-5-10, 01, 03, 12, 19, 21, 22, 29, 30, 31, 32, 33. See attached for parcel numbers.
4. Type Development: PD-H Cluster Subdiv.
Apt. Other:
5. Total No. of Units 437 (Give breakdown below) R. Liu
Studio 1 Bdrm. 2 Bdrm. 3 Bdrm. 437
4 Bdrm. Other:
6. Sewer Connection Work Desired: (Give length, size, depth, etc.)
LOCATION OF CONNECTION TO EXISTING 42" SEWER ON FARRINGTON HWY IS AT PLANTATION ROAD. CONNECTING SEWER CONSISTS OF 2500'-18" PIPE, 8200'-15" PIPE AND 2000'-8" PIPE. DEPTHS RANGE FROM 23' TO 5'.
7. Approximate Date Connection is Required: SUMMER 1993
8. Number and Type of Existing Structures on Property: 121 HOMES ARE TO BE CONSTRUCTED (WAIANA RESIDENCE LOTS UNIT 2A-2) 268 HOMES EXISTING (UNIT 1 AND 2S-1)
(Check One: Structures to Remain To be Demolished)
9. Remarks: EXISTING HOMES ARE PRESENTLY USING CESSPOOLS. OF THE 437 UNITS, 309 ARE OF THE SUBDIVISIONS BELONGING TO THE DEPARTMENT OF HAWAIIAN HOME LANDS AND 48 BELONG TO THE PRIVATE OWNERS ALONG THE WAIANA VALLEY ROAD SEWER ROUTE. ATTACHED MAPS ARE PER YOUR REQUEST.
10. Information provided By:
Name: ROUEN LIU Date: SEPT. 18, 1992
Firm: BELT COLLINS & ASSOCIATES Phone: 521-5361
Address: 680 ALA MOANA BLVD., FIRST FLOOR HONOLULU 96813
Street City Zip Code

PART B - TO BE FILLED BY DIVISION OF WASTEWATER MANAGEMENT

1. Present Zoning: _____ General Plan: _____
2. Sewers: Adequate Inadequate Not Available
Other: _____
3. Charges: Yes No
a. Sewer Assessment Rate Area sq. ft.... \$ _____
b. Sewer Connection \$ _____
c. Total Estimated Charge \$ _____
4. Remarks: *Wastewater system facility charge shall apply. To be
5. Application:
Approved: A. Saavedra, Jr. Date 10/1/92
(Valid for two Year After Date of Approval)
Not Approved: _____ Date _____

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CHAPTER 7 |
REFERENCES

CHAPTER 7 - REFERENCES

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APPENDIX A

The following tables were excerpted from the Master Sewer Plan of the Proposed Waianae Valley Interceptor Sewer prepared by Belt Collins & Associates.

SEWER DESIGN SUMMARY

The attached spreadsheets summarize the design flows, line sizes and minimum slopes required to convey the sewage from the area. The sewer lines and manholes shown within the DHHL subdivision are for planning purposes only, modifications may be required as the actual construction plans are developed. Refer to Figure 2-1, Preliminary Site Layout Plan for locations of all sewer lines and roads.

KEY TO SPREADSHEETS

The headings used in the attached spreadsheets are as defined below:

DIAMETER	The inside diameter of the sewer line, in inches.
MINIMUM SLOPE	The minimum slope of the sewer line required to convey the design flow, in feet per foot.
N	Manning's roughness coefficient based on sewer pipe material.
FULL FLOW	The capacity of the sewer when flowing full, in millions of gallons per day.
DESIGN FLOW	The design peak flow rate of the sewer, in millions of gallons per day.
FULL VELOCITY	The velocity in the sewer line when flowing full, in feet per second.
DESIGN VELOCITY	The velocity in the sewer line when flowing at design peak flow rate, in feet per second.

COMPUTATION OF SANITARY SEWAGE FLOW										
WAIAANAE VALLEY INTERCEPTOR SEWER										
WAIAANAE										
JUNE 12, 1993										
1 OF 4										
SEWER LINE	DIAMETER (INCHES)	MINIMUM SLOPE (FT/FT)	N	FULL FLOW (MGD)	DESIGN FLOW (MGD)	FULL VELOCITY (FPS)	DESIGN VELOCITY (FPS)			
"A" - Plantation Road (Farrington Highway to Alger Connection)	21	0.0020	0.013	4.578	--	2.95	--			
"A" - Plantation Road and Waianae Valley Road (from Alger Connection)	18	0.0020	0.015	2.630	--	2.30	--			
"B" - Waianae Valley Road	15	0.0020	0.015	1.618	--	2.04	--			
"B" - Branch "P"	15	0.0020	0.015	1.618	1.273	2.04	2.26			
"B" - Road "P"	15	0.0020	0.015	1.618	1.258	2.04	2.25			
"B" - Road "A" (Kaneaki St)	15	0.0020	0.015	1.618	1.069	2.04	2.18			
"B" - Road "B" (Kepauala St)	15	0.0020	0.015	1.618	0.446	2.04	1.74			
"B" - Road "E" (Kanelio St)	8	0.0044	0.015	0.450	0.345	2.00	2.19			
"C" - Road "F" (Kanelio Pl)	8	0.0044	0.015	0.450	0.006	2.00	0.71			
"D" - Road "G" (Kamaileunu St)	8	0.0044	0.015	0.450	0.244	2.00	2.03			
"E" - Road "H" (Kapaekahi St)	8	0.0044	0.015	0.450	0.119	2.00	1.67			
"F" - Road "A" (Kaneaki St)	8	0.0044	0.015	0.450	0.025	2.00	1.08			

NOTES:

Sewer Line along Plantation Road and Waianae Valley Road designed based upon agreement between Department of Hawaiian Home Lands and Division of Wastewater Management.
Sewer Line designed with excess capacity for future developments along the route.

COMPUTATION OF SANITARY SEWAGE FLOW									
SEWER: WAIANAЕ VALLEY INTERCEPTOR SEWER									
DISTRICT: WAIANAЕ									
DATE: JUNE 12, 1993									
PAGE: 2 OF 4									
SEWER LINE	DIAMETER (INCHES)	MINIMUM SLOPE (FT/FT)	N	FULL FLOW (MGD)	DESIGN FLOW (MGD)	FULL VELOCITY (FPS)	DESIGN VELOCITY (FPS)		
Road "A" (Kaneaki Street) - Road "B" (Kepauala St) to Road "I" (Punanaula St)	8	0.0085	0.015	0.624	0.630	2.77	3.16		
Road "A" (Kaneaki Street) - Road "I" (Punanaula St) to Road "J" (Koolina St)	8	0.0075	0.015	0.586	0.583	2.60	2.97		
Road "A" (Kaneaki Street) - Road "J" (Koolina St) to Road "Q" (Puhinalo Pl)	8	0.0065	0.015	0.545	0.524	2.42	2.76		
Road "A" (Kaneaki Street) - Road "Q" (Puhinalo Pl) to Road "R" (Halapoe Pl)	8	0.0060	0.015	0.524	0.500	2.33	2.65		
Road "A" (Kaneaki Street) - Road "R" (Halapoe Pl) to Road "H" (Kapaekahi St)	8	0.0050	0.015	0.478	0.471	2.12	2.54		
Road "A" (Kaneaki Street) - Road "H" (Kapaekahi St) to end	8	0.0044	0.015	0.450	0.304	2.00	2.14		

COMPUTATION OF SANITARY SEWAGE FLOW									
SEWER:	WAIANAЕ VALLEY INTERCEPTOR SEWER								
DISTRICT:	WAIANAЕ								
DATE:	JUNE 12, 1993								
PAGE:	3 OF 4								
SEWER LINE	DIAMETER (INCHES)	MINIMUM SLOPE (FT/FT)	N	FULL FLOW (MGD)	DESIGN FLOW (MGD)	FULL VELOCITY (FPS)	DESIGN VELOCITY (FPS)		
Road "C" (Kepauala Place)	8	0.0044	0.015	0.450	0.138	2.00	1.74		
Road "D" (Kumaipo Street)	8	0.0044	0.015	0.450	0.083	2.00	1.52		
Road "I" (Punanaula Street)	8	0.0044	0.015	0.450	0.012	2.00	0.88		
Road "J" (Koolina Street)	8	0.0044	0.015	0.450	0.064	2.00	1.41		
- Road "A" (Kaneaki St) to Road "H" (Kapaekahi St)									
Road "J" (Koolina Street)	8	0.0044	0.015	0.450	0.078	2.00	1.49		
- Road "H" (Kapaekahi St) to Road "K"									
Road "K"	8	0.0044	0.015	0.450	0.048	2.00	1.27		
- Road "H" (Kapaekahi St) to Road "S"									
Road "K"	8	0.0044	0.015	0.450	0.107	2.00	1.64		
- Road "A" (Kaneaki St) to Road "S"									
Road "L"	8	0.0044	0.015	0.450	0.192	2.00	1.92		
Road "M"	8	0.0044	0.015	0.450	0.017	2.00	0.99		
Road "N"	8	0.0044	0.015	0.450	0.024	2.00	1.08		
Road "O"	8	0.0044	0.015	0.450	0.037	2.00	1.22		
Road "P"	8	0.0044	0.015	0.450	0.009	2.00	0.71		
Branch "Q"	8	0.0044	0.015	0.450	0.103	2.00	1.62		
Road "Q"	8	0.0044	0.015	0.450	0.006	2.00	0.71		
Road "R" (Halapoe Place)	8	0.0044	0.015	0.450	0.017	2.00	0.99		

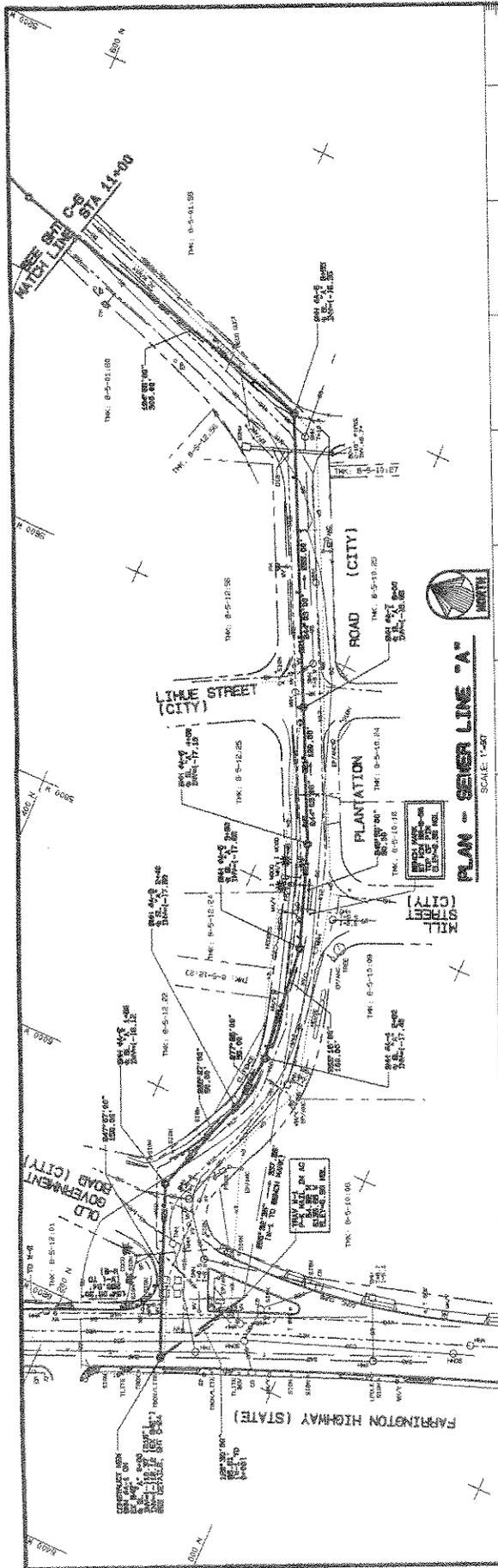
COMPUTATION OF SANITARY SEWAGE FLOW									
SEWER:	WAIANA VALLEY INTERCEPTOR SEWER								
DISTRICT:	WAIANA								
DATE:	JUNE 12, 1993								
PAGE:	4 OF 4								
SEWER LINE	DIAMETER (INCHES)	MINIMUM SLOPE (FT/FT)	N	FULL FLOW (MGD)	DESIGN FLOW (MGD)	FULL VELOCITY (FPS)	DESIGN VELOCITY (FPS)		
Road "S"	8	0.0044	0.015	0.450	0.031	2.00	1.15		
- Road "J" (Koolina St) to Road "K"									
Road "S"	8	0.0044	0.015	0.450	0.049	2.00	1.33		
- from Road "K"									
Road "S"	8	0.0044	0.015	0.450	0.030	2.00	1.15		
- from Road "A" (Kaneaki St)									
Road "T"	8	0.0044	0.015	0.450	0.018	2.00	0.99		
- from Road "S"									
Road "T"	8	0.0044	0.015	0.450	0.023	2.00	1.08		
- from Road "K"									
Branch "U"	8	0.0044	0.015	0.450	0.052	2.00	1.33		

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

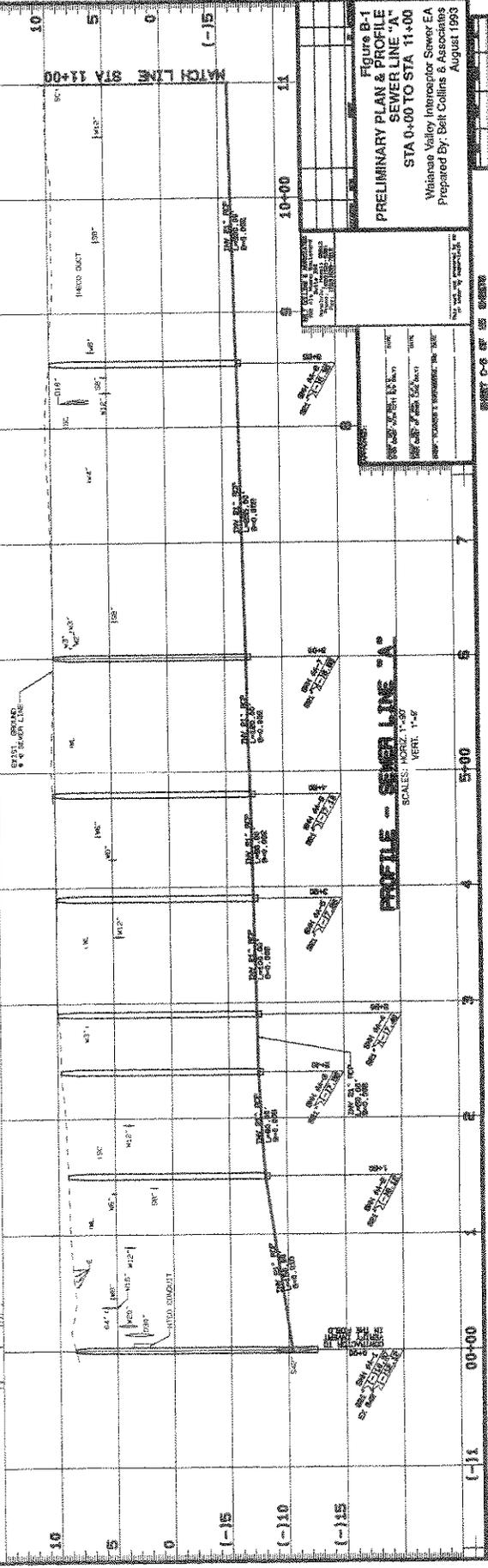
APPENDIX B |

APPENDIX B

PRELIMINARY PLAN & PROFILE OF PROPOSED INTERCEPTOR SEWER



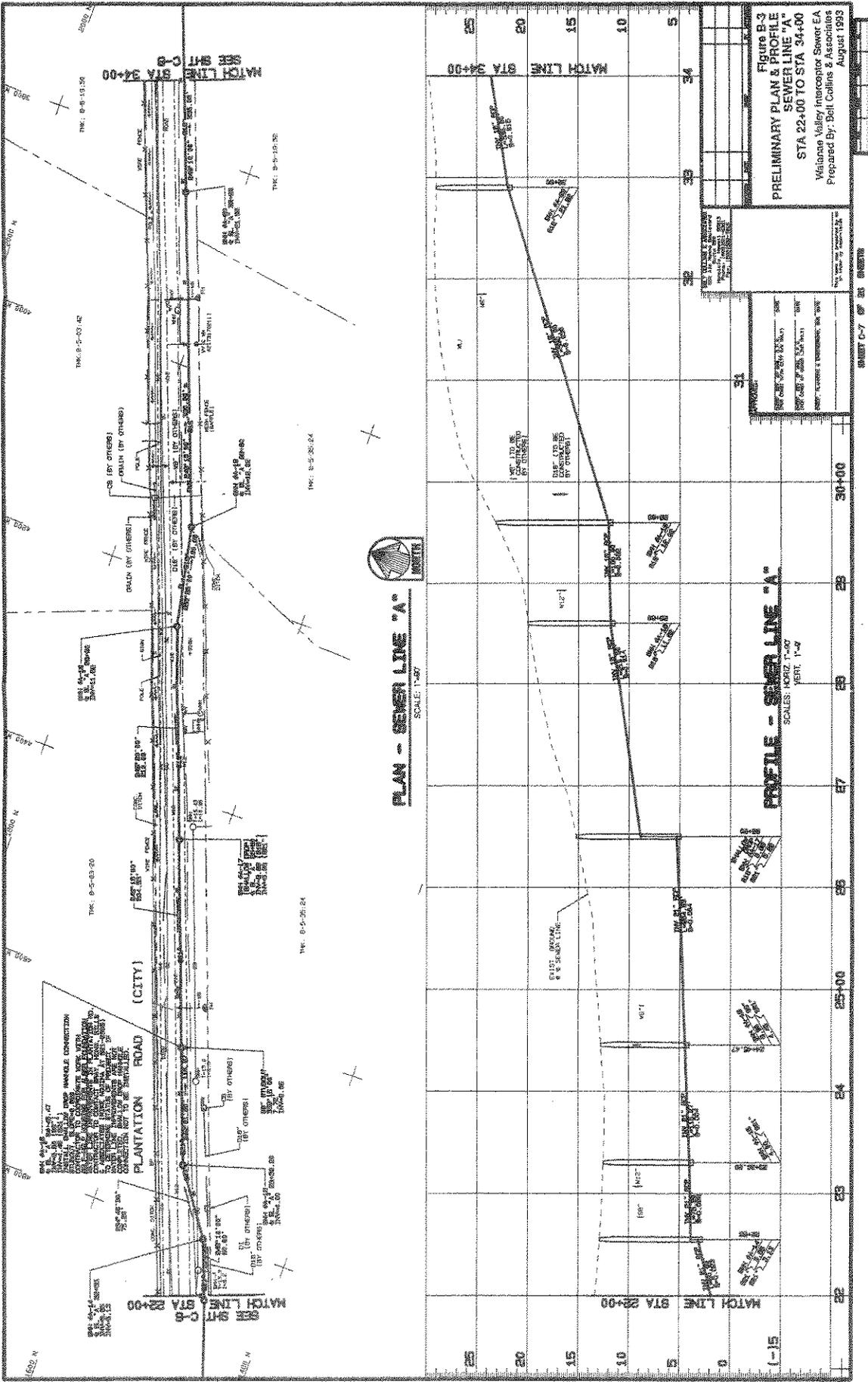
PLAN - SEWER LINE "A"
SCALE: 1"=50'

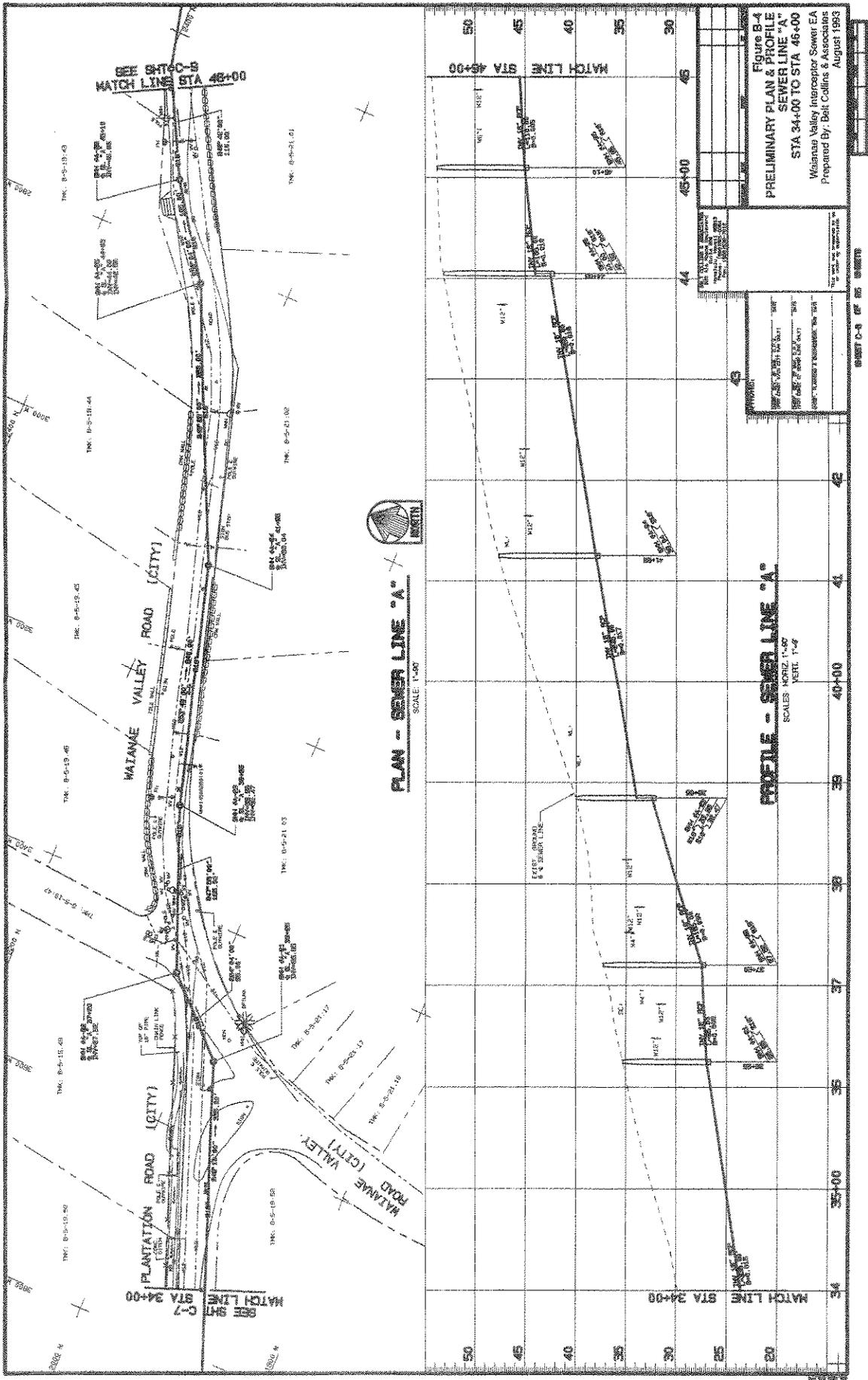


PROFILE - SEWER LINE "A"
SCALE: HORIZ. 1"=50' VERT. 1"=5'

Figure B1
**PRELIMINARY PLAN & PROFILE
 SEWER LINE "A"**
 STA 0+00 TO STA 11+00
 Waianae Valley Interceptor Sewer EA
 Prepared by: Belt Collins & Associates
 August 1983

SHEET C-6 OF 25 SHEETS





SEWER MATCH LINE STA 46+00

SEWER MATCH LINE STA 34+00

PLANTATION ROAD (CITY)

WAIANAЕ VALLEY ROAD (CITY)

PLAN - SEWER LINE "A"

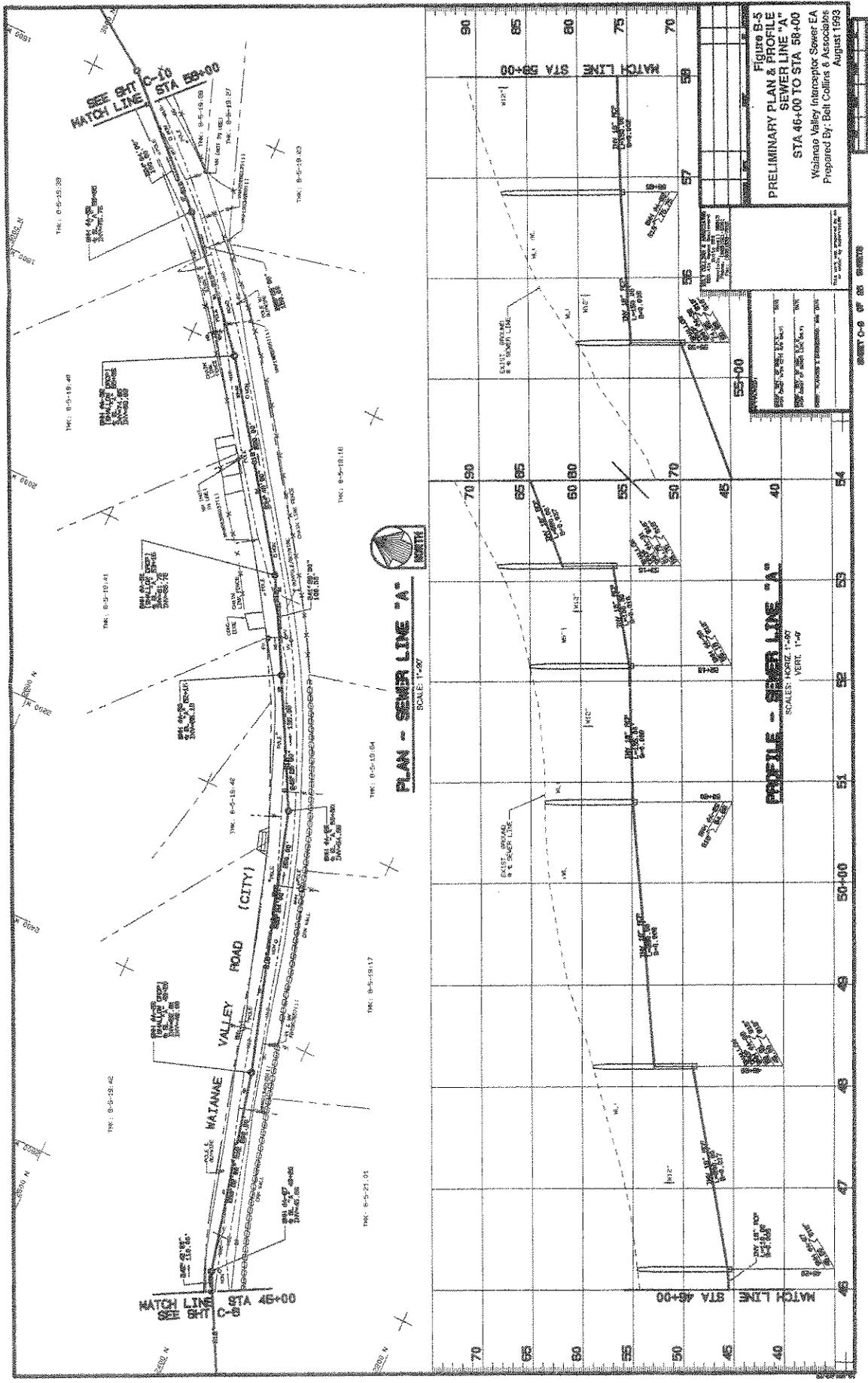
SCALE: 1"=50'

PROFILE - SEWER LINE "A"

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

Figure B-4
**PRELIMINARY PLAN & PROFILE
 SEWER LINE "A"**
 STA 34+00 TO STA 46+00
 Waiānae Valley Interceptor Sewer EA
 Prepared By: Belt Collins & Associates
 August 1983

SHEET C-8 OF 85 SHEETS



SEE SHEET C-10
MATCH LINE STA 58+00

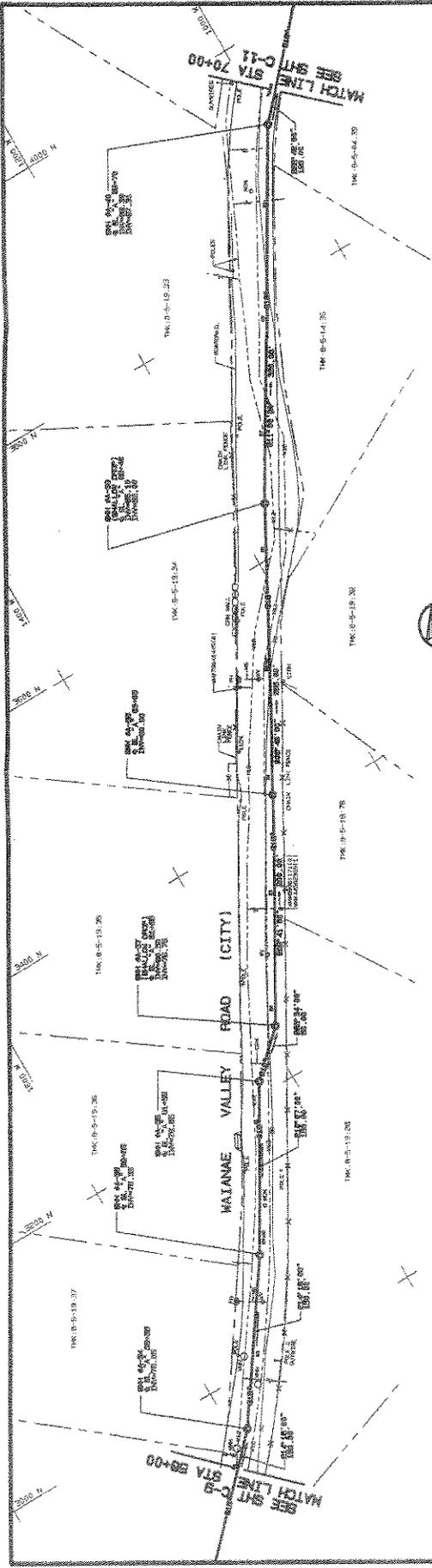
MATCH LINE STA 46+00
SEE SHEET C-10

PLAN - SEWER LINE "A"
SCALE: 1" = 40'

PROFILE - SEWER LINE "A"
SCALE: HORIZ. 1" = 40'
VERT. 1" = 5'

Figure B-5
PRELIMINARY PLAN & PROFILE
SEWER LINE "A"
STA 46+00 TO STA 58+00
Waijane Valley Interceptor Sewer EA
Prepared By: Bell Collins & Associates
August 1993

SHEET C-9 OF 20 SHEETS



PLAN - SEWER LINE "A"
SCALE: 1"=40'

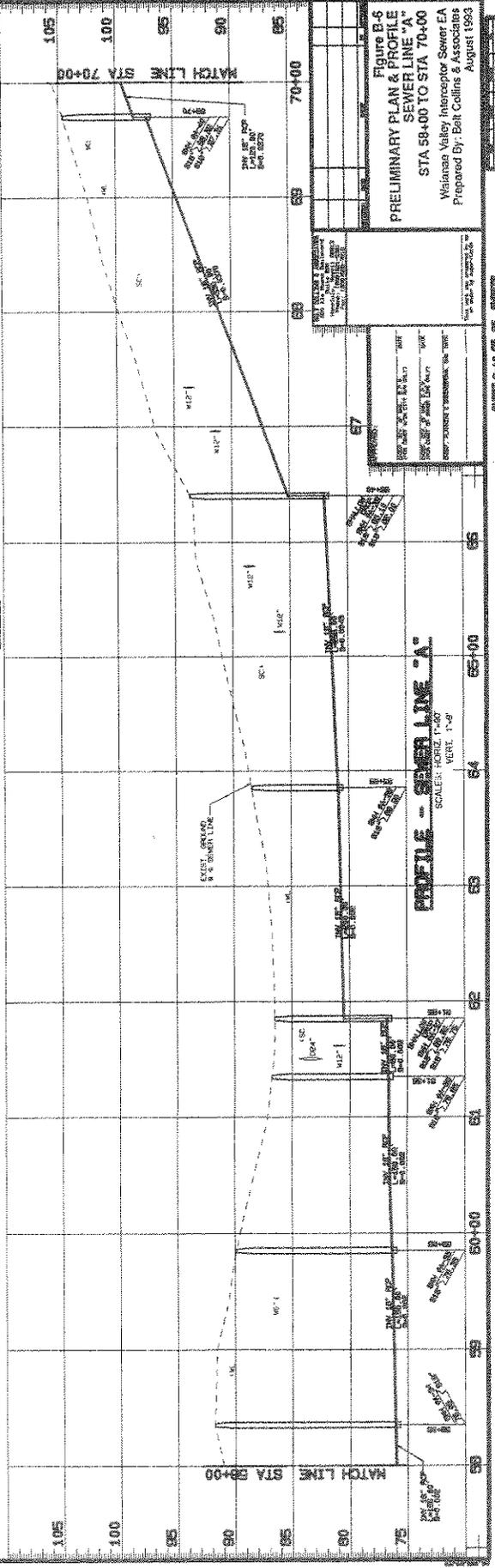
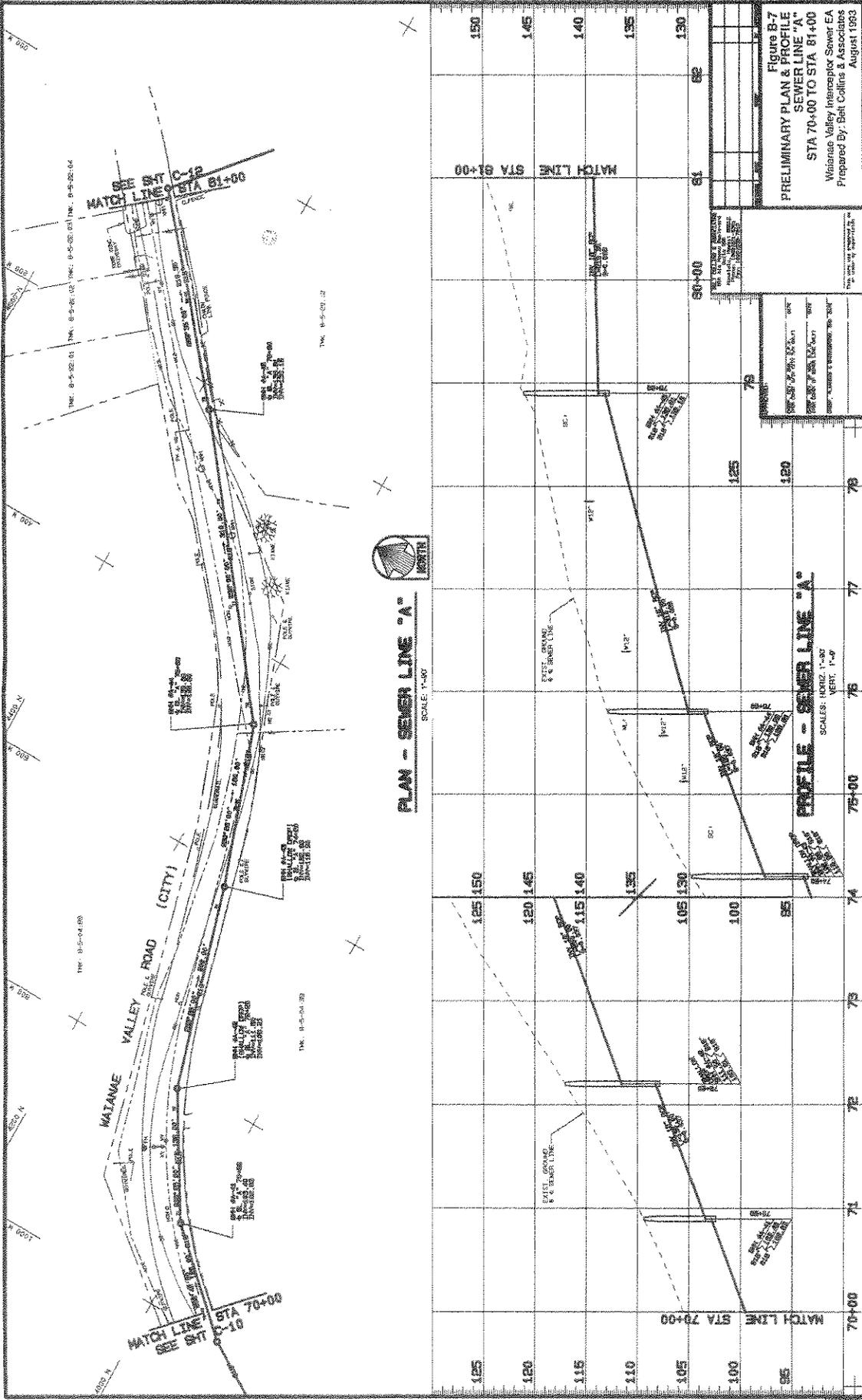


Figure B-5
PRELIMINARY PLAN & PROFILE
SEWER LINE "A"
STA 58+00 TO STA 70+00
Waltona Valley Interceptor Sewer EA
Prepared By: Belt Collins & Associates
August 1983

SHEET C-10 OF 25 SHEETS



SEE SHT C-12
MATCH LINE STA 81+00

MATCH LINE STA 70+00
SEE SHT C-10

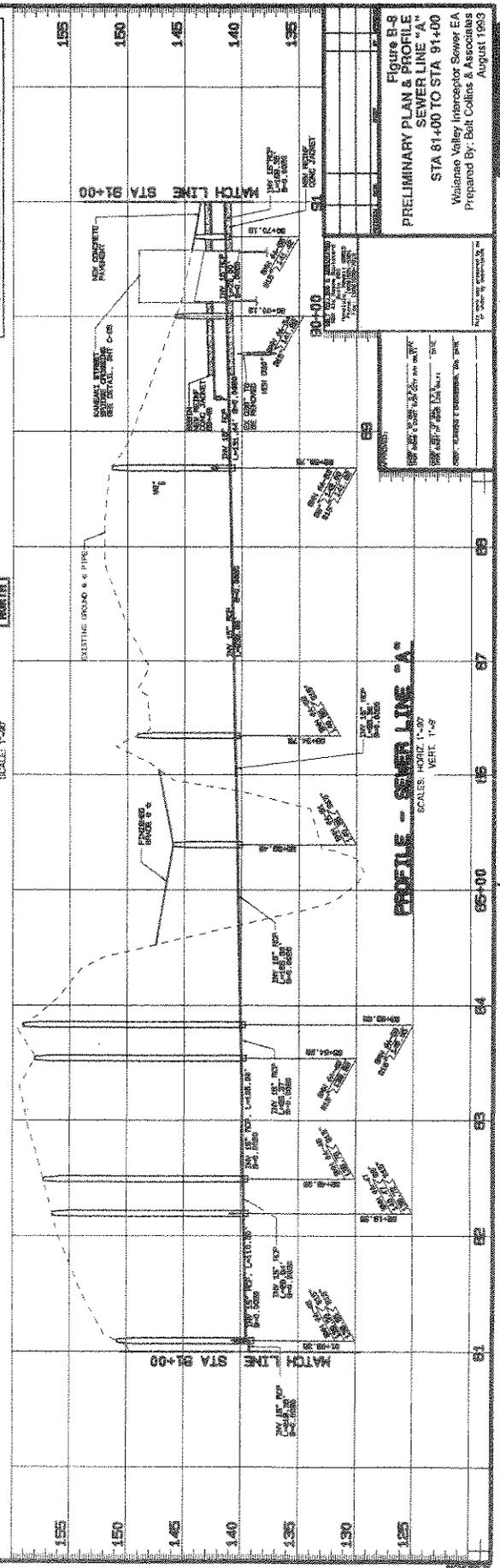
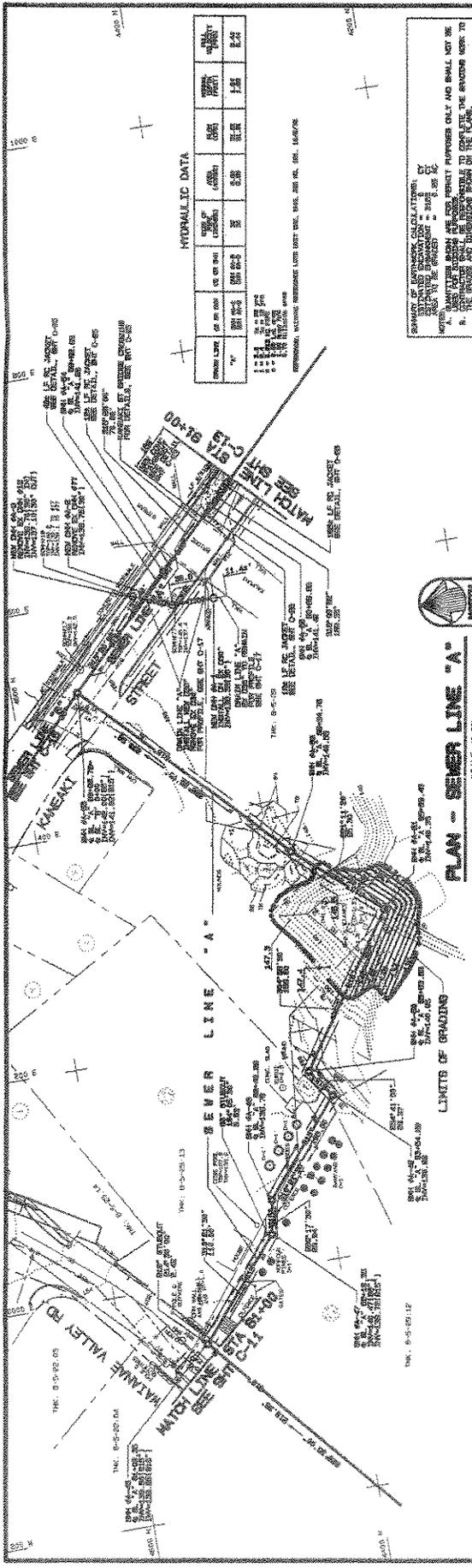


PLAN - SEWER LINE "A"
SCALE: 1"=40'

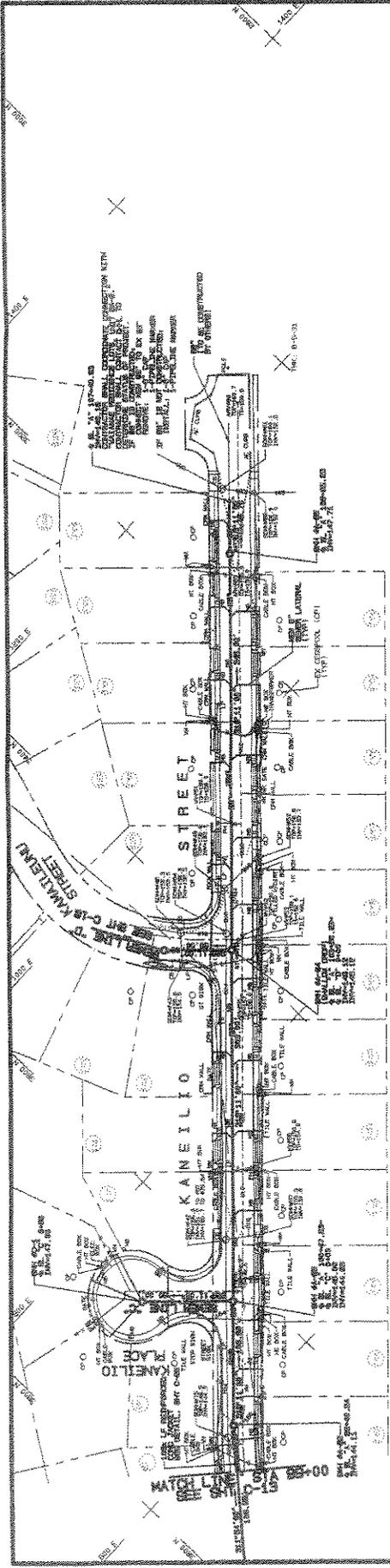
Figure B-7
**PRELIMINARY PLAN & PROFILE
SEWER LINE "A"**
Sta 70+00 TO STA 81+00
Wisconsin Valley Interceptor Sewer EA
Prepared By: Bati Collins & Associates
August 1983

PROFILE - SEWER LINE "A"
SCALE: HORIZ. 1"=30'
VERT. 1"=4'

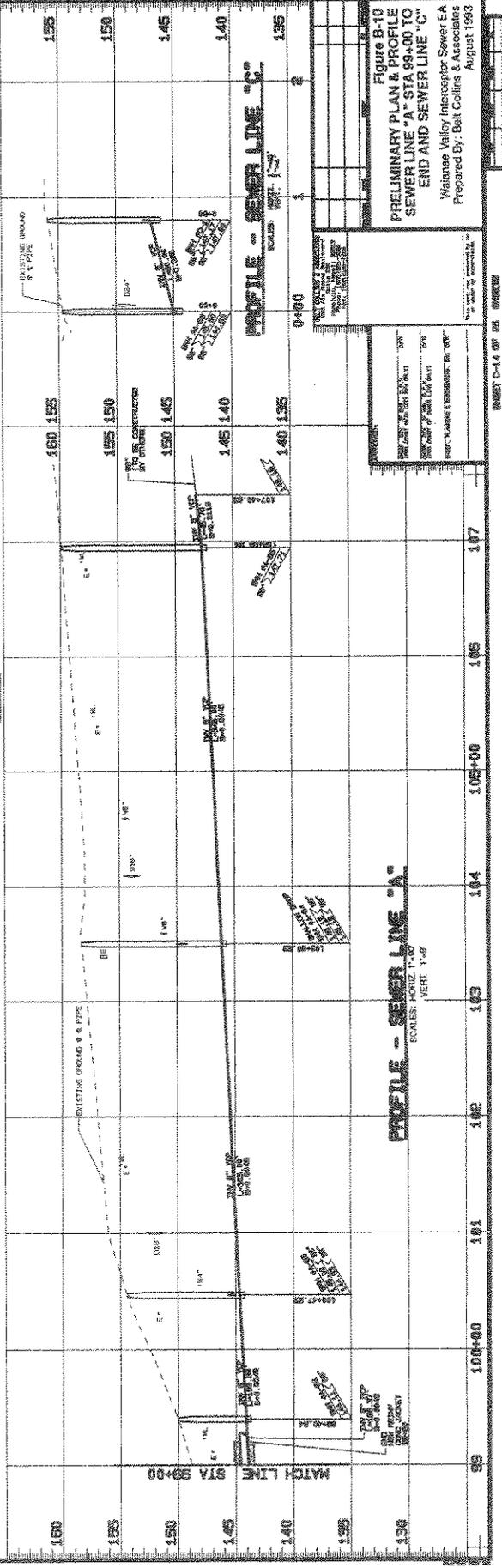
Sheet C-11 of 25 Sheets



Sheet C-42 of 53 sheets



PLAN - SEWER LINES "A" & "C"
 SCALE: 1"=50'



PROFILE - SEWER LINE "A"
 SCALES: HORIZ. 1"=50'
 VERT. 1"=5'

PROFILE - SEWER LINE "C"
 SCALES: HORIZ. 1"=50'
 VERT. 1"=5'

FIGURE B-10
PRELIMINARY PLAN & PROFILE
SEWER LINE "A" STA 99+00 TO
END AND SEWER LINE "C"
 Waianae Valley Interceptor Sewer EA
 Prepared By: Belt Collins & Associates
 August 1983

SHEET C-14 OF 25

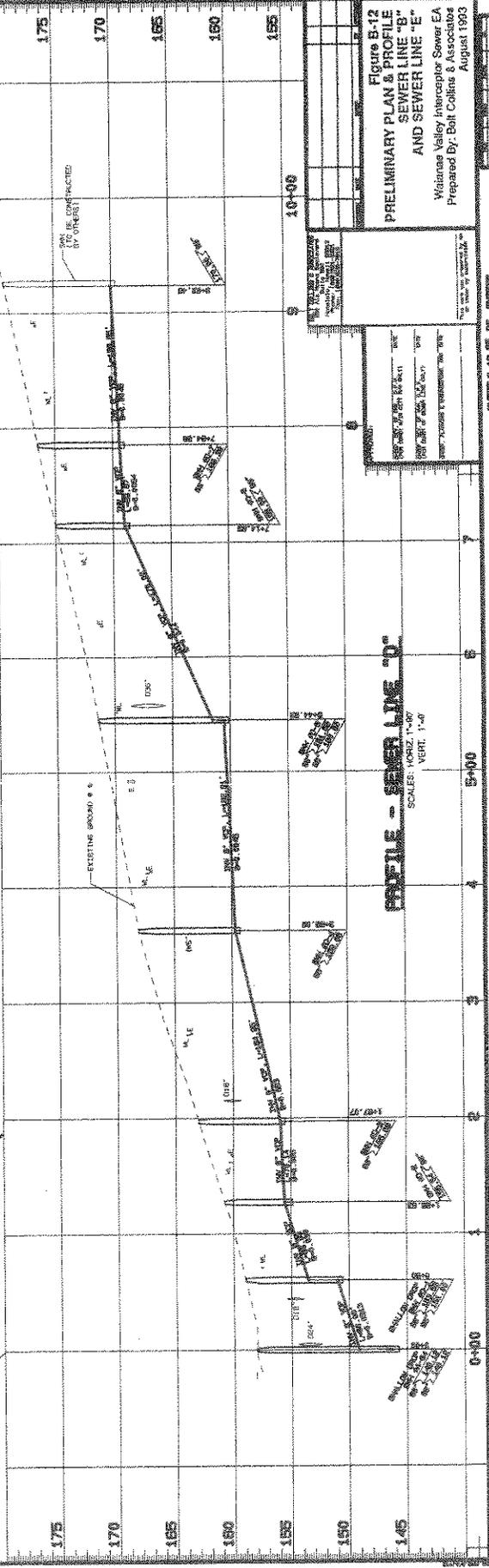
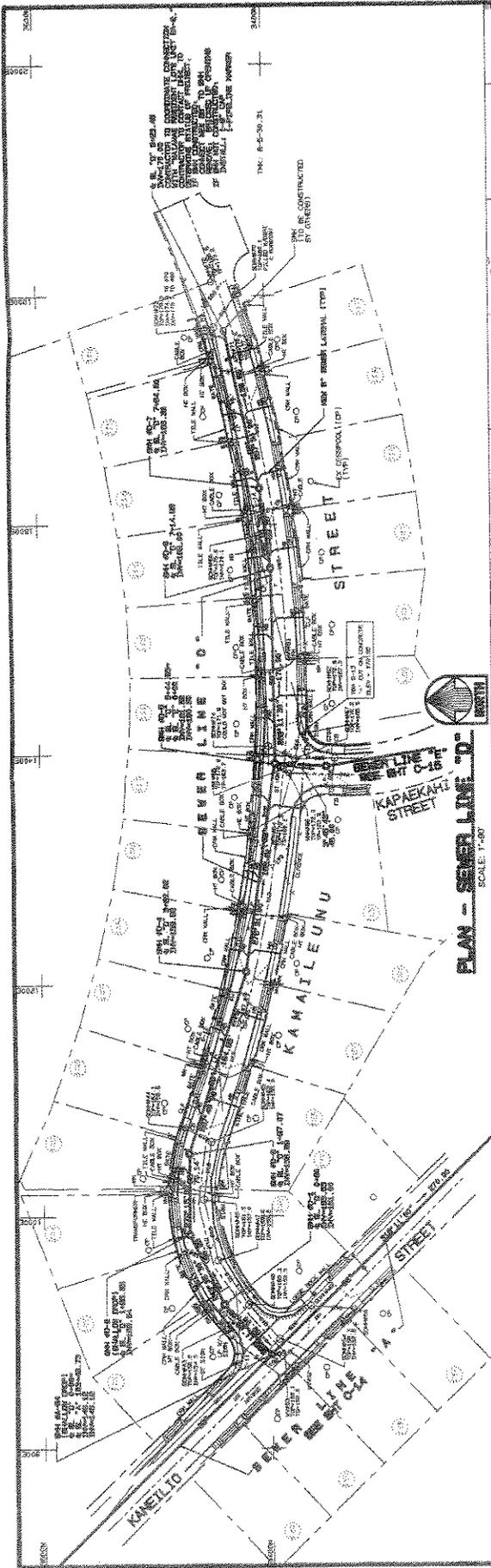


Figure B-12
PRELIMINARY PLAN & PROFILE
SEWER LINE "B"
AND SEWER LINE "E"
 Waianae Valley Interceptor Sewer EA
 Prepared By: Bolt Collins & Associates
 August 1993

SEE SHEET C-15 OF 25 SHEETS

SEE SHEET C-16 OF 25 SHEETS