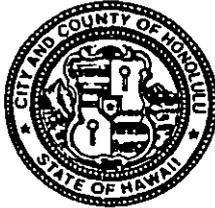


DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
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DIRECTOR

GEORGE T. TAMASHIRO, P.E.
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01 SEP 25 10:49

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

OFC. OF ENVIRONMENTAL
QUALITY CONTROL
WWDE.P 01-393

September 25, 2001

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
Department of Health
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Sewer Rehabilitation and Infiltration & Inflow Minimization Plan (6th Year),
Planning Assistance and Miscellaneous Services, SMPR3 – Magazine Street
TMK: 2-2-4 & 5, 2-4-14, 15, 16, 17, 18 & 31, Makiki, Oahu, Hawaii
Notice of Determination – Finding of No Significant Impact (FONSI)

The City and County of Honolulu (City), Department of Design and Construction (DDC) has reviewed and responded to comments related to the Draft Environmental Assessment (EA) for the subject project received during the 30-day public comment period that ended on August 7, 2001. The City DDC has determined that this project will not have a significant environmental effect, and has issued a Finding of No Significant Impact (FONSI) for this project. Please publish this notice for this project in the October 8, 2001 issue of the OEQC *The Environmental Notice*.

We have enclosed the following items for your use in this publication notice:

1. One copy of the OEQC Publication Form with project summary (project summary emailed to your office and hardcopy enclosed); and
2. Four (4) copies of the Final Environmental Assessment;

The following information is provided which supports our department's FONSI determination.

Identification Of Proposing Agency

City and County of Honolulu, Department of Design and Construction

Identification Of Accepting Authority

City and County of Honolulu, Department of Design and Construction

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Ms. Genevieve Salmonson
Page 2
September 25, 2001

Brief Description Of Proposed Action

The City Department of Design and Construction is proposing the SMPR3 – Magazine Street project. This project involves the reconstruction and rehabilitation of approximately 4,200 linear feet of existing 6-inch City trunk sewer that services a portion of the Makiki area.

The purpose of the project is to implement reconstruction and rehabilitation of the trunk sewer that will restore structural integrity and increase hydraulic capacity. These improvements should reduce the frequent maintenance that is currently required to prevent high wastewater spill occurrences in the project area.

The project will include reconstruction by pipe bursting and rehabilitation with cured-in-place pipe. Locations implementing pipe bursting will be provided a new sewer line with an increase in diameter from six inches to eight inches. Locations implementing cured-in-place pipe will be provided restored structural integrity within the existing sewer without requiring excavation.

Determination

A Finding of No Significant Impact (FONSI) determination is warranted for the SMPR3 – Magazine Street project. It is determined that the improvements planned under this project do not have a significant impact on the surrounding environment.

Reasons Supporting Determination

The reasons supporting this determination are based upon the 13 Significance Criteria listed under Title 11, Chapter 200 (Environmental Impact Statement Rules) of the State Department of Health's Administrative Rules.

1. ***Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.*** The proposed action does not involve an irrevocable commitment to loss or destruction of any natural or cultural resources. The project site has already been substantially altered from its natural condition. Any excavation done within the vicinity of Makiki Cemetery will be monitored by a qualified archaeologist per State Historic Preservation Division standards.
2. ***Curtails the range of beneficial uses of the environment.*** The proposed project is consistent with the City's General Plan and the Wastewater Branch's Design Standards, and will not curtail beneficial uses of the environment in the area. The proposed project will be compatible with the uses of the surrounding area.
3. ***Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in HRS Chapter 343, and any revisions thereof and amendments thereto, court decisions, or executive orders.*** The proposed action does not conflict

with the State's long-term environmental policies or goals and guidelines. The proposed project is consistent with the State's Land Use Plan that is in concert with all applicable policies, goals and guidelines. No long-term environmental conflicts are foreseen.

4. ***Substantially affects the economic or social welfare of the community or State.*** The proposed action will have a positive short-term economic effect on the community from construction-related activities. Revenues of approximately \$1,985,000 entering the economy during the construction phase will be the primary short-term economic benefit. Upon completion of the project, the economic climate should return to pre-existing conditions. The social welfare of the community will benefit from the improved reliability and life expectancy of the repaired sewer system.
5. ***Substantially affects public health.*** The proposed action will correct structural inadequacies in the sewer and restore full flow capacity to beyond estimated future peak wastewater flows. This action will improve environmental conditions that currently have the potential for adversely affecting public health. The short-term negative impacts associated with construction activities such as noise, dust, exhaust emissions, odor, damaged roadways, and traffic congestion will be mitigated as described in Section 6 of the Final Environmental Assessment.
6. ***Involves substantial secondary impacts, such as population changes or effects on public facilities.*** The proposed action does not have secondary impacts. The existing sewer capacity will be increased and structural integrity will be restored.
7. ***Involves a substantial degradation of environmental quality.*** The proposed action does not involve a substantial degradation of environmental quality. The existing physical qualities of the surrounding areas will be preserved.
8. ***Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.*** The proposed action, neither individually nor cumulatively, has a considerable effect upon the environment nor involves a commitment for larger actions. The existing physical qualities of the surrounding areas will be preserved.
9. ***Substantially affects a rare, threatened, or endangered species, or its habitat.*** The proposed action does not substantially affect rare, threatened, or endangered species or habitats. There are no known rare, threatened, or endangered species or habitats associated with the project site.
10. ***Detrimentially affects air or water quality or ambient noise levels.*** The proposed action does not detrimentally affect the air or water quality or ambient noise levels. Short-term impacts on air quality as well as noise levels may occur during the

Ms. Genevieve Salmonson
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September 25, 2001

construction period, but will be mitigated by normal construction practices and conformance to permit requirements. Construction activities will be regulated by project plans, specifications and City inspectors.

11. *Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.* The proposed action does not affect an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal water. The proposed project is not located in an environmentally sensitive area.
12. *Substantially affects scenic vistas and view planes identified in county or state plans or studies.* The proposed action does not affect scenic vistas and view planes identified in county or state plans and studies. The sewer line will be installed below the ground surface of established roadways.
13. *Requires substantial energy consumption.* The proposed action will not require substantial energy consumption except the energy consumed by construction equipment. Energy consuming construction equipment such as backhoes, trucks, compactors, pavers, diversion pumps, and generators could be used for these operations. After the installation is complete, the sewer line will operate by gravity and will not require any external energy.

Should you have any questions, please contact Mr. Cedric Takamoto (527-5392) or Mr. Neil Asato (523-4343) of our Wastewater Design and Engineering Division.

Very truly yours,



RAE M. LOUI, P.E.
Director

Attachment

cc: Earth Tech (attn: Travis Webster) (w/o attachment)
Cedric Takamoto (w/o attachment)
Neil Asato (w/o attachment)

2001-10-08-0A-FEA-Magazine Street

OCT - 8 2001

FILE COPY

**(Sewer Rehabilitation) and
Infiltration & Inflow Minimization Plan (6th Year),
Planning Assistance and Miscellaneous Services**

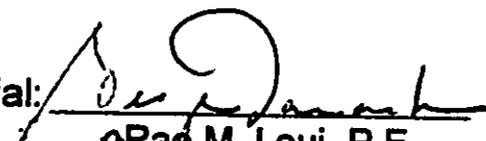
Final Environmental Assessment

**SMPR3 - Magazine Street
Makiki, Oahu, Hawaii**

Submitted pursuant to Chapter 343,
Hawaii Revised Statutes

Prepared for:
**Department of Design and Construction
City and County of Honolulu**

Responsible Official:


FOR **Rae M. Loui, P.E.**

Date: SEP 10 2001

Prepared by:
**Earth Tech, Inc.
700 Bishop St. Suite 900
Honolulu, Hawaii 96813**

September 2001

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EXECUTIVE SUMMARY

It is recommended that a Finding of No Significant Impact (FONSI) be granted for the City and County of Honolulu (City) SMPR3 – Magazine Street project that proposes to reconstruct and rehabilitate the existing 6-inch trunk sewer along portions of Magazine Street, Prospect Street, Spencer Street, Victoria Street, Thurston Avenue, and Wilder Avenue in the Makiki area. Based on the findings of this Final Environmental Assessment (EA), there should be no need to proceed with an Environmental Impact Statement (EIS) for this project.

Short-term disruptions such as noise, traffic delays, and temporary suspension of lateral service are expected during construction activities. These short-term disruptions can be mitigated through compliance with State and County guidelines. This project should have no impacts to the environment and community following completion of construction.

The proposed project is required to correct inadequacies in a portion of the City's existing sewer system as identified by the Department of Environmental Services, Collection System Maintenance Division. Reconstruction and rehabilitation using a combination of pipe bursting, in-line trenching, and cured-in-place pipe (CIPP) is recommended for approximately 4,200 linear feet (lf) of existing hydraulically and structurally deficient gravity sewer. Pipe bursting was selected over other reconstruction methods investigated due to its reduced impact to the community, and will be used for the majority of the reconstruction. In-line trenching will be used to reconstruct a 40-foot length of sewer within the pipe bursting alignment along Thurston Avenue due to sagging conditions. Portions of Spencer Street and Wilder Avenue will be rehabilitated with CIPP due to minimal ground cover and a requirement for archaeological monitoring if excavation occurs in the area. Portland cement with epoxy coating is recommended for rehabilitation of the 22 existing sewer manholes.

Reconstruction and rehabilitation of the trunk sewer and manholes will provide a structurally sound sewer system capable of transporting estimated peak wastewater flows for a 2-year, 6-hour design storm for existing conditions and for the year 2020 based on the City's INFIX ADJUSTED flow model.

This Final EA will describe the project and determine if the proposed actions will have any potential significant environmental impacts. Comments provided on the Draft EA after review by various governmental agencies, interested organizations, and individuals will be addressed in this Final EA. The Final EA will be reviewed, and after a formal comment period, the City's Department of Design and Construction will determine whether an EIS is required.

1. PROJECT SUMMARY INFORMATION

This section provides a summary of basic project information, agencies consulted, approvals, and permits required for this project.

1.1 PROJECT INFORMATION

Chapter 343, Hawaii Revised Statutes (HRS) – Environmental Assessment

Proposing and Approving Agency: Department of Design and Construction
City and County of Honolulu
Rae M. Loui, P.E., Director

Contact Person: Ardalan Nikou, P.E.

Phone Number: (808) 523-8874

Prepared by: Earth Tech, Inc.
700 Bishop Street, Suite 900
Honolulu, HI 96813

Project Name: SMPR3 – Magazine Street

Project Description: Reconstruction and rehabilitation of approximately 4,200 lf of existing 6-inch sewer on portions of Magazine Street, Prospect Street, Spencer Street, Victoria Street, Thurston Avenue, and Wilder Avenue.

Project Location: Makiki, Honolulu, Oahu, Hawaii

Tax Map Key: 2-2-4 & 5, 2-4-14, 15, 16, 17, 18 & 31

Land Area: Not Applicable

State Land Use: Urban

Land Owner: City and County of Honolulu

County Zoning: Medium-density Apartment (A-2), Residential (R-5) and General Preservation (P-2)

1.2 AGENCIES TO BE CONSULTED

State of Hawaii

- Department of Health (DOH)
 - Clean Air Branch
 - Clean Water Branch
 - Office of Hazard Evaluation and Emergency Response
 - Safe Drinking Water Branch
 - Wastewater Branch
 - Noise Control
 - Office of Environmental Quality Control
- Department of Land and Natural Resources (DLNR), Historic Preservation Division
- State Senate
- House of Representatives

City and County of Honolulu

- Department of Environmental Services
- Department of Design and Construction
- Department of Planning and Permitting
 - Civil Engineering Branch
 - Traffic Review Branch
 - Wastewater Branch
 - Subdivision Branch
- Department of Transportation Services
- Facility Maintenance Department
- Honolulu City Council
- Neighborhood Commission Office
- Police Department
- Fire Department
- Honolulu Public Transit Authority

Utilities

- Board of Water Supply
- Hawaiian Electric Company
- The Gas Company
- Verizon
- Oceanic Cable

Community Groups

- Makiki Neighborhood Board

1.3 APPROVALS AND PERMITS REQUIRED

Approvals

- State of Hawaii
 - Department of Health:
 - Wastewater Branch (for construction plan approval)
- City and County of Honolulu
 - Department of Planning and Permitting:
 - Site Development Division
 - Civil Engineering Branch (for construction plan approval)
 - Traffic Review Branch (for construction plan approval)
 - Wastewater Branch (for construction plan approval)
 - Department of Environmental Services:
 - Collection System Maintenance Division (for construction plan approval)
 - Environmental Quality Division (for construction plan approval)
- Board of Water Supply (for construction plan approval)

Permits

- State of Hawaii
 - Department of Health:
 - Clean Air Branch
 - Initial Noncovered Source Permit
 - Noise, Radiation and Indoor Air Quality Branch
 - Community Noise Permit; and
 - Community Noise Variance
- City and County of Honolulu
 - Department of Planning and Permitting:
 - Building Division
 - Building Permit for Building, Electrical, Plumbing, Sidewalk/Driveway, and Demolition Work
 - Land Use Permits Division
 - Development Plan Public Facilities Map Amendment Permit
 - Site Development Division
 - Grubbing, Grading, and Stockpiling Permit; and
 - Permit to Excavate Public Right-of-Way (Trenching)
 - Department of Transportation Services:
 - Traffic Signals & Technology Division
 - Street Usage Permits (Street Usage Permit)
 - Department of Environmental Services:
 - Water Quality Division
 - Regulatory Control Branch
 - Industrial Wastewater Discharge Permit for Temporary Users
(Precautionary permit for release of CIPP curing water into the City's sewer system)

2. PROJECT CHARACTERISTICS

This section provides a description of the location, condition and previous investigation of the existing sewer within the project limits.

2.1 PROJECT DESCRIPTION

This project proposes to reconstruct and rehabilitate approximately 4,200 lf of the existing 6-inch diameter vitrified clay pipe trunk sewer along portions of Magazine Street, Prospect Street, Spencer Street, Victoria Street, Thurston Avenue, and Wilder Avenue in Makiki (see Figure 1). This section of the City's sewer system has been identified as requiring frequent maintenance by the Department of Environmental Services (ENV) Collection System Maintenance Division (CSM) to prevent high spill occurrences.

The condition of the existing sewer was based on closed-circuit television (CCTV) inspections performed by MGD Technologies in 1997. Review of the CCTV tapes indicate locations of moderate to heavy pipe deterioration, longitudinal and lateral cracks, root penetration at joints, broken pipe segments, pipe sag, and infiltration along the existing sewer.

The condition of the existing manholes was based on findings from visual inspections performed by Earth Tech during field investigations in November 1999. Manhole inadequacies include deterioration of the chamber, infiltration, and corrosion of the covers, frames, and rungs.

The proposed project will restore the structural integrity and hydraulic capacity of the existing sewer. Work performed on the existing sewer system will not increase quantities of wastewater entering the City's sewer system. Instead, the project will reduce infiltration into the sewer system, thereby reducing the amount of wastewater entering downstream treatment facilities.

Reconstruction and rehabilitation of the trunk sewer will provide a structurally sound sewer capable of conveying estimated peak wastewater flows for a 2-year, 6-hour design storm for existing conditions and for the year 2020 based on the City's INFIX ADJUSTED flow model.

2.2 PROJECT LOCATION

The proposed project is located in the Makiki area of Honolulu, on the island of Oahu, along portions of Magazine Street, Prospect Street, Spencer Street, Victoria Street, Thurston Avenue, and Wilder Avenue as shown on Figure 1.

The first upstream end of the project at sewer manhole (SMH) SI21AJ0424 is located on Prospect Street, just to the western end of the intersection of Prospect and Magazine Streets. Wastewater flows from this manhole southward a distance of about 96 feet to SMH SI21AJ0418 located at the northwest end of Magazine Street.

The second upstream end of the project at SMH SI21AJ0421 is located east of SMH SI21AJ0424. Wastewater flows from this manhole westward a distance of about 100 feet to SMH SI21AJ0420 located at the northernmost end of Magazine Street within an easement in private property. The sewer line then turns southward for a distance of about 96 feet to SMH SI21AJ0418.

The third upstream end of the project at SMH SI21AJ0419 is located east of SMH SI21AJ0418. Wastewater flows from this manhole westward a distance of about 60 feet to SMH SI21AJ0418. Flows from SMH SI21AJ0420, SMH SI21AJ0424, and SMH SI21AJ0419 combine at SMH SI21AJ0418 and continue south through SMH SI21AJ0417 and SMH SI21AJ0416; a distance of about 590 feet to SMH SI21AJ0413 located at intersection of Magazine and Spencer Streets. From this manhole, the sewer line makes a wide turn westward on Spencer Street through SMHs SI21AJ0411 and SI21AJ0410 a distance of about 585 feet to SMH SI21AJ0408 located at the intersection of Spencer and Victoria Streets. The sewer then turns 90 degrees southward on Victoria Street, a distance of approximately 250 feet, towards one of the two downstream ends of the project at SMH SI21AJ0402.

The fourth upstream end of the project is a high point of the sewer line on Thurston Avenue at Sewer Box SI21AJ0430. From this point, the wastewater travels southwest, a distance of about 755 feet, through SMHs SI21AJ0429 and SI21AJ0428 to the downstream SMH SI21AJ0402. In the opposite direction of the sewer box, wastewater flows northeast, for a distance of about 985 feet, through SMHs SI21AJ0431 and SI21AJ0432 to SMH SI21AJ0433. SMH SI21AJ0433 is the second downstream manhole of the project and is located at the intersection of Thurston and Wilder Avenues.

The fifth upstream end of the project is at SMH SI21AJ0439, located on Spencer Street. From this manhole, the wastewater flows northeast a distance of approximately 495 feet through SMH SI21AJ0438 to SMH SI21AJ0435, located at the intersection of Spencer Street and Wilder Avenue. The sewer line then turns 90 degree on Wilder Avenue southward about 310 feet through SMH SI21AJ0434 to the downstream SMH SI21AJ0433.

Wastewater flowing through the project's sewer is eventually transported to the Sand Island Wastewater Treatment Plant (WWTP) for advanced primary treatment using dissolved air flotation and sludge treatment. The effluent is then discharged to a deep ocean outfall.

3. ALTERNATIVES CONSIDERED

It is recommended to reconstruct and rehabilitate the existing 6-inch sewer lines using a combination of pipe bursting, CIPP, and in-line trenching. Existing manholes should be reused and rehabilitated with Portland cement with an epoxy coating. This recommendation, an alternative construction method, and the 'no construction' alternative are described further in the following paragraphs.

3.1 PIPE BURSTING WITH PARTIAL CIPP REHABILITATION

A combination of pipe bursting reconstruction and CIPP rehabilitation will provide a structurally sound sewer with adequate capacity to convey peak wastewater flows during a 2-year 6-hour design storm for existing conditions and for the year 2020. Pipe bursting was selected over other reconstruction methods investigated due to its reduced impact on the surrounding community. Pipe bursting will not be used on a portion of the existing sewer between SMHs SI21AJ0439 and SI21AJ0433 because of minimal ground coverage, frequent utility crossings, and required archaeological monitoring if excavation occurs. Due to these limitations, CIPP rehabilitation will be done for this portion of the existing sewer. Although pipe diameter will be slightly reduced, adequate capacity to transport future design flows can still be maintained.

Use of pipe bursting to replace portions of the existing sewer line can increase the pipe diameter from 6 inches to 8 inches, meeting current City standards for minimal trunk sewer diameter and providing adequate hydraulic capacity for future design flows. Due to potential damage to existing utilities and the ground surface in close proximity to the bursting tool, construction operation must be monitored and any damages to the surrounding utilities or pavements repaired immediately. To prevent damage in some areas, crossing utilities may be exposed and protected from the bursting tool during the pipe installation. Other areas, specifically between SMHs SI21AJ0439 and SMH SI21AJ0433, will be rehabilitated with CIPP instead of pipe bursting. The sagging portion of sewer line along Thurston Avenue between SMH SI21AJ0430 and SMH SI21AJ0431 will be replaced by in-line trenching during pipe bursting operations. Portland cement with epoxy coating rehabilitation will restore structural integrity and provide deterioration resistance for existing manholes within the project limits. This method of manhole rehabilitation was selected over other methods due to its high durability and availability of experienced installation contractors on-island. Final site restoration will

include road resurfacing of both sides of the road within the project area. Further improvements may be required upon finalization of the Accessibility Policies for Public Rights-of-Way, prepared for the City and County of Honolulu under the requirements of the Americans with Disabilities Act of 1990 (ADA). The estimated construction cost for this alternative without ADA improvements is \$1,985,000.

3.2 PARALLEL TRENCHING WITH PARTIAL CIPP REHABILITATION

One alternative investigated and determined feasible for this project was parallel trenching with partial CIPP rehabilitation. This alternative would provide a new sewer alongside the existing sewer by parallel trenching the same portion of sewer proposed for pipe bursting in the previous alternative. CIPP rehabilitation would replace parallel trenching for a portion of the existing sewer between SMHs SI21AJ0439 and SI21AJ0433 because of frequent utility crossings and required archaeological monitoring if excavation occurs. Although this alternative includes some non-disruptive CIPP rehabilitation, the majority of the alignment would be reconstructed by parallel trenching and would be very disruptive to the surrounding community. Traffic congestion and noise would dramatically increase due to construction. In addition, the duration of construction for trenching is much longer than for the other reconstruction alternatives investigated. Nine of the existing manholes could be reused and rehabilitated, but fourteen new SMHs would be required along the new parallel sewer alignment. Due to high community impact, duration of construction and cost, this alternative was not recommended.

3.3 NO CONSTRUCTION ALTERNATIVE

The no construction alternative was investigated and determined to be not acceptable. If left unattended, the existing 6-inch trunk sewer will continue to deteriorate and ultimately fail. Pipe collapse of the failed sewer could release wastewater into the surrounding ground, possibly creating a sinkhole, or could cause wastewater to backup into the collection system, possibly creating spills. Emergency repair of the failed sewer would be costly and disruptive to the community.

4. TECHNICAL CHARACTERISTICS

This section provides a description of estimated peak wastewater flows, hydraulic analysis, and pipe bursting, CIPP, in-line trenching and manhole rehabilitation methodologies.

4.1 PEAK WASTEWATER FLOWS

The estimated peak wastewater flow is based on the City's INFIX ADJUSTED model for a 2-year, 6-hour design storm. Base flows for this model were generated by the City from basin and

population data. Estimated dry and wet weather I/I rates were generated from flow monitoring and rainfall data obtained from the December 1999 Sewer Rehabilitation and Infiltration & Inflow Minimization Plan, prepared for the City by Fukunaga and Associates, Inc.

4.2 HYDRAULIC ANALYSIS

The City's INFIX ADJUSTED flow model uses "as-built" pipe inverts and lengths to estimate the full flow capacity of the existing sewer. Results from this analysis indicate that the existing sewer alignment within the project limits has adequate full flow capacity to convey the peak flow during a 2-year, 6-hour design storm for existing conditions, but not for future conditions in the year 2020. A topographic survey conducted in October 1999 verified the "as-built" pipe inverts and lengths, supporting the accuracy of the estimated full flow sewer capacities.

Increasing the sewer diameter from 6-inch to 8-inch by pipe bursting will increase the full flow capacity of the sewer to beyond that required to convey future peak wastewater flows, and will meet current City standards for minimal trunk sewer diameter. Other portions of the sewer with adequate hydraulic capacity will be rehabilitated with CIPP to avoid conflicts with minimal ground coverage, frequent utility crossings, and requirements for archaeological monitoring associated with pipe bursting.

4.3 PIPE BURSTING

Approximately 3,400 lf of existing sewer will be reconstructed by pipe bursting. In general, pipe bursting reconstructs damaged pipelines by pulling segments of new pipe through the existing pipe from an insertion pit excavated at one end of the sewer line to be replaced. Pipe bursting is well suited for this project because it provides a new pipe along the existing sewer alignment without excessive trenching. Impacts to the community occur at locations of the insertion pits (approximately thirty feet by five feet on the surface and up to ten feet deep) and lateral reconnections (approximately five square feet on the surface and up to ten feet deep). Minor vibrations associated with pipe bursting must be monitored in areas adjacent to utilities and structures. Damage to existing utilities in close proximity to the bursting tool may occur. In these areas, the utility crossings will be exposed and the crossing utility protected from the bursting tool during the pipe installation to reduce potential for damage. A non-impact method of pipe bursting is recommended which employs a hydraulically powered winch to pull a pipe splitter device and expansion cone. This method of pipe bursting is relatively shock free and the hydraulic system minimizes noise level, making it suitable for work in residential areas.

Prior to pipe bursting, traffic control will be set up around the insertion pit and the exposed laterals. The segment of sewer main to be rehabilitated will be cleaned and inspected with CCTV. The segment will then be isolated from the main collection system with a temporary diversion. Backup pumps and generators will be kept onsite as a safety precaution. Diversion lines will require protection at traffic crossings and driveways. Protection usually consists of line placement in shallow trenches and steel plate covers.

With wastewater flows diverted around the segment of sewer to be reconstructed, pipe bursting operations can begin. Once inserted, the expanding head breaks the existing pipe, and pushes it into the surrounding pipe bedding, making way for the new replacement pipe. High Density Polyethylene (HDPE) pipe is typically used for the replacement pipe. After the replacement main is in place, the existing exposed laterals are reconstructed to reconnect them to the main. The production rate of pipe bursting is approximately 300 lf per day plus construction time for insertion pits (approximately one week per pit) and lateral reconnections (approximately ½ to one day per lateral). An overview of the pipe bursting procedure is provided on Figure 2. The overall project alignment is provided on Figure 3, and plan and profile drawings of the project alignment are provided in Appendix A for reference.

Socioeconomic Characteristics

The estimated construction cost for the pipe bursting portion of the project is \$1,525,000. Pipe bursting contractors are available on-island, and project revenues will be returned to the local economy. Short-term community disruptions from the project include traffic delays, noise associated with trenching and other construction activities, and temporary suspension of lateral service. Disruption to the community will be minimized with detours, noise monitoring, temporary diversions, and public notification of projected project activities. Normal working hours for pipe bursting operations will be between 8:30 a.m. and 3:30 p.m., Monday through Friday. However, both day and night work will be required to maintain temporary diversion operations.

Environmental Characteristics

Excavation activities associated with insertion pits and lateral reconnections during pipe bursting will have temporary impacts on the environment. Operation of construction and excavation equipment will temporarily affect dust, noise and exhaust emission levels. Need for construction dewatering is not expected based on depth of groundwater. Temporary diversion operations will require monitoring to assure proper containment of wastewater flows and to reduce the risk for

spills. Some short-term increase in odors may result during connection to existing sewer lines and during temporary diversion operations. Environmental impacts caused by the project will be mitigated by complying with applicable Federal, State and County standards and guidelines (see Section 6).

4.4 IN-LINE TRENCHING

Approximately 40 lf of existing sewer will be reconstructed by in-line trenching. Located within the pipe bursting alignment (shown on Figure 3), this portion of the sewer is sagging and must be completely removed before it is replaced. Construction and temporary diversion operations will coincide with the pipe bursting occurring between SMHs SI21AJ0430 and SMH SI21AJ0431. The insertion pit required for pipe busting will be extended to span the entire 40-foot sag location. The existing exposed pipe and bedding material will be removed and new bedding material will be compacted in place. New pipe will be burst to the upstream and downstream manholes, and finally, the two portions will be connected within the trench with a coupling. The topographic survey indicates that existing sewer laterals and other utilities are not located in close proximity to the trench replacement portion of sewer.

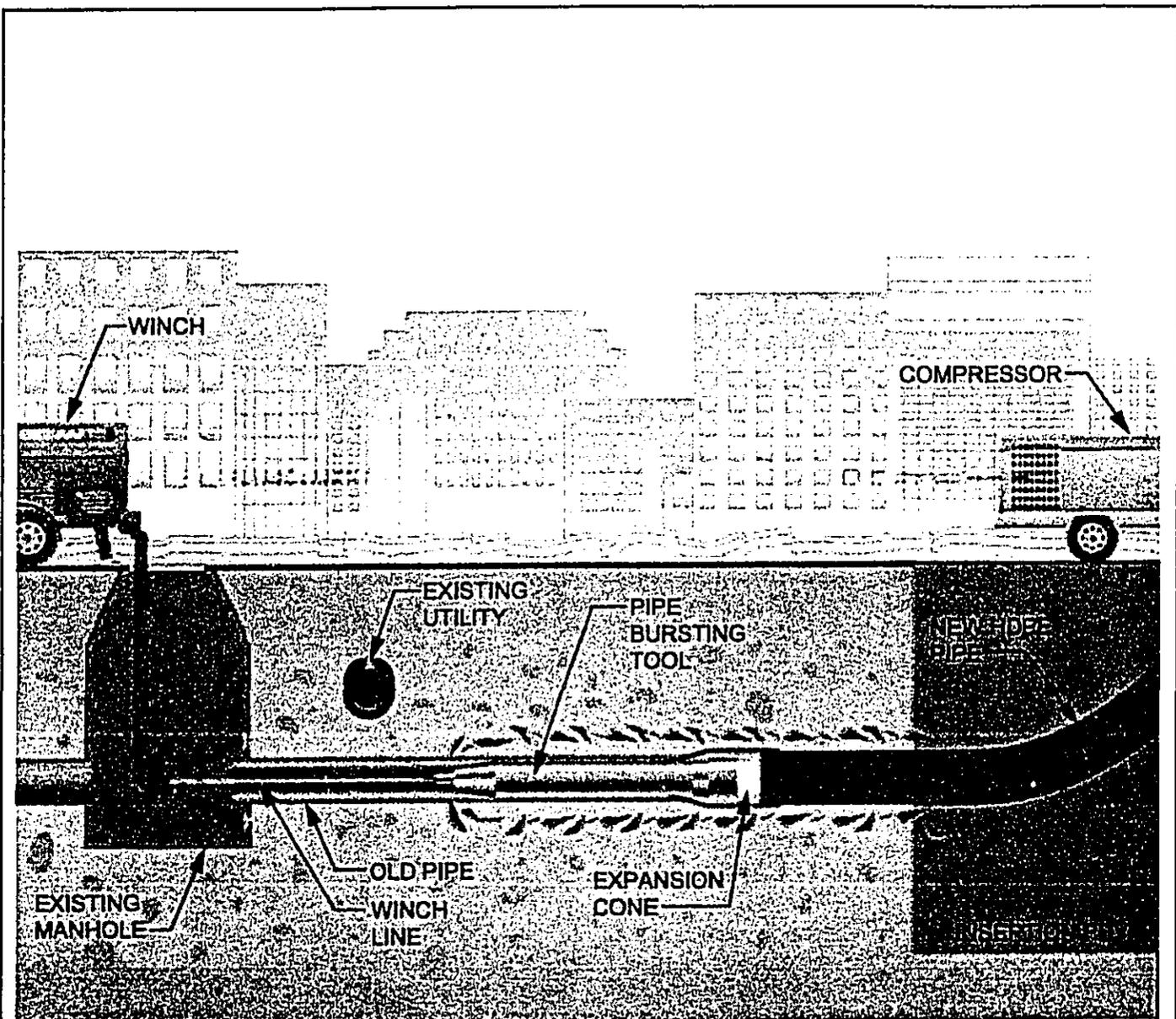
Socioeconomic Characteristics

The estimated construction cost for the small portion of in-line trenching is \$20,000. This cost has been included in the previous estimate for pipe bursting because a single contractor will most likely do the required in-line trenching during the pipe busting operations. Trenching contractors are available on-island, and project revenues will be returned to the local economy. Short-term community disruptions from the project include traffic delays, noise associated with trenching and other construction activities, and temporary suspension of lateral service.

Disruption to the community will be minimized with detours, noise monitoring, temporary diversions, and public notification of projected project activities. Normal working hours for in-line trenching operations will be between 8:30 a.m. and 3:30 p.m., Monday through Friday. However, both day and night work will be required to maintain temporary diversion operations.

Environmental Characteristics

Excavation activities associated with in-line trenching will have temporary impacts on the environment. Operation of construction and excavation equipment will temporarily affect dust, noise and exhaust emission levels. Need for construction dewatering is not expected based on depth of



Filename: L:\Work\CADD\Projects\DWG\DWG\311-Magazine Street\Main\Figures\Fig2 Pipe Bursting Overview.dwg 28 Mar 2001 RPS

FIGURE 2
OVERVIEW OF PIPE BURSTING
SMPR3 - Magazine Street

Wastewater Design and
 Engineering Division

Date: 03/28/2001

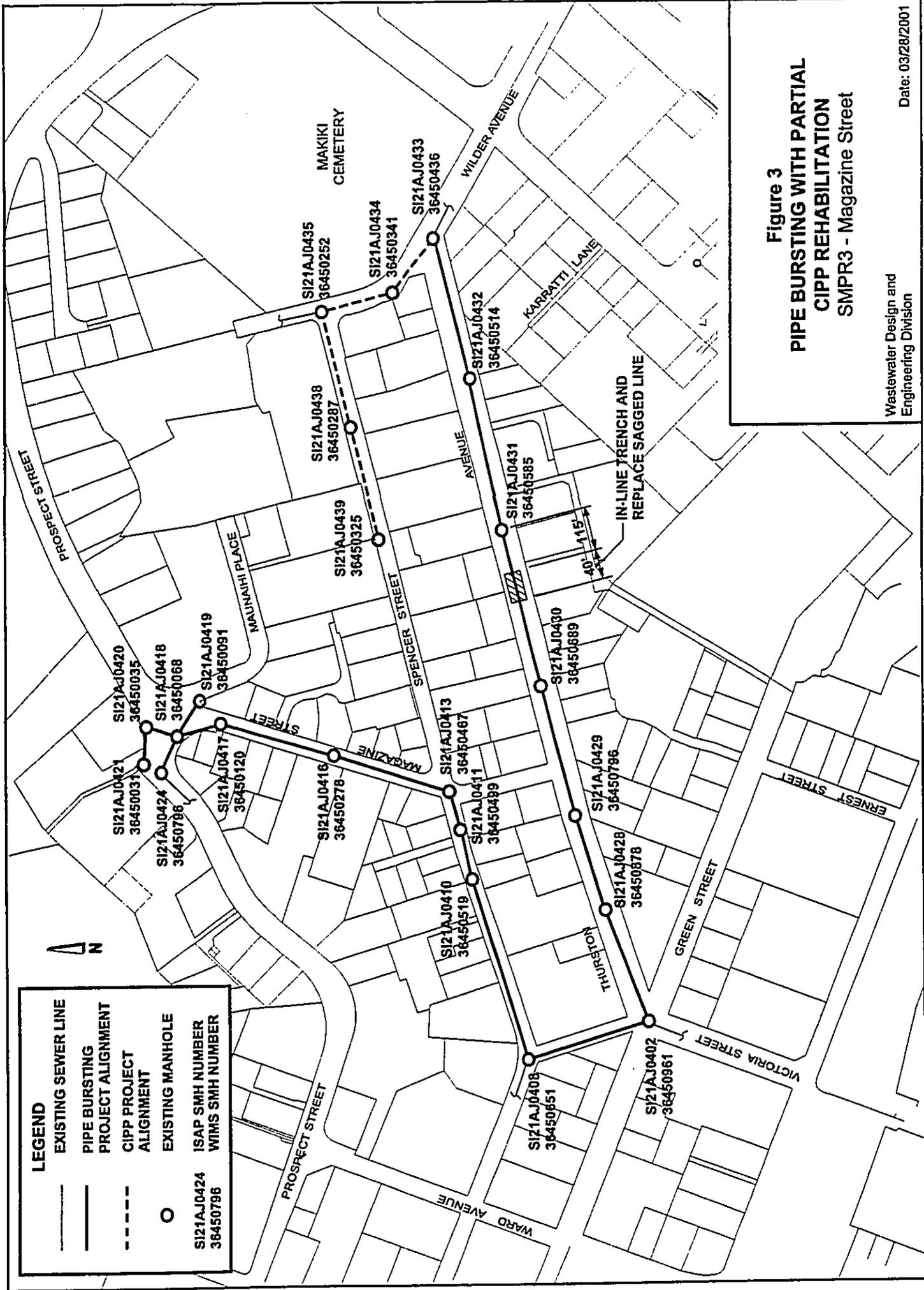


Figure 3
PIPE BURSTING WITH PARTIAL
CIPP REHABILITATION
SMPR3 - Magazine Street

Wastewater Design and
 Engineering Division

Date: 03/28/2001

groundwater. Temporary diversion operations will require monitoring to assure proper containment of wastewater flows and to reduce the risk for spills. Some short-term increase in odors may result during temporary diversion operations. Environmental impacts caused by the project will be mitigated by complying with applicable Federal, State and County standards and guidelines (see Section 6).

4.5 CIPP REHABILITATION

Due to minimal ground cover and required archaeological monitoring during excavation, approximately 800 lf of existing sewer will be rehabilitated with CIPP instead of being reconstructed by pipe bursting. Installation of CIPP is relatively quick, efficient, and less disruptive to the surrounding community than other rehabilitation methods because installation occurs at existing manholes without trenching. Prior to installing CIPP, traffic control will be set up around the staging area and the segment of sewer to be rehabilitated will be cleaned and inspected with CCTV.

The segment will then be isolated from the main collection system with a temporary diversion. Backup pumps and generators will be kept onsite as a safety precaution. Diversion lines will require protection at traffic crossings and driveways. Protection usually consists of line placement in shallow trenches and steel plate covers.

With wastewater flows diverted around the segment of sewer to be rehabilitated, installation of the CIPP liner can begin. A flexible liner impregnated with a liquid thermosetting resin will be installed into the existing pipe via an existing manhole. Fluid pressure will be used to push the liner through the existing sewer pipe, usually from an upstream manhole to a downstream manhole. Once in place, the water within the inverted lining will be circulated through a truck mounted boiler on the ground surface, increasing the temperature and curing the resin. The newly cured pipe will be capable of supporting all of the loads that were once supported by the existing pipe. When the water within the cured pipe has cooled, the ends will be cut to release the water downstream at a controlled rate into the existing sewer system. Finally, a remote controlled cutting device will be used to reinstate the laterals by cutting out dimples identified by CCTV inspection. Sections of CIPP are usually installed, cured and cooled within 24 hours. Draining, end cutting, lateral reinstatement, and final demobilization can take up to eight hours. An overview of CIPP installation is provided on Figure 4. The overall project alignment is provided on Figure 3, and plan and profile drawings of the project alignment are provided in Appendix A for reference.

Socioeconomic Characteristics

The estimated construction cost of the CIPP portion of the project is \$440,000. CIPP contractors are available on-island, and project revenues will be returned to the local economy. Short-term community disruptions from the project include noise, traffic delays, and temporary suspension of lateral service.

Disruption to the community will be minimized with detours, noise monitoring, temporary diversions, and public notification of projected project activities. Both day and night work will be required due to temporary diversion operations and CIPP installation and curing operations.

Environmental Characteristics

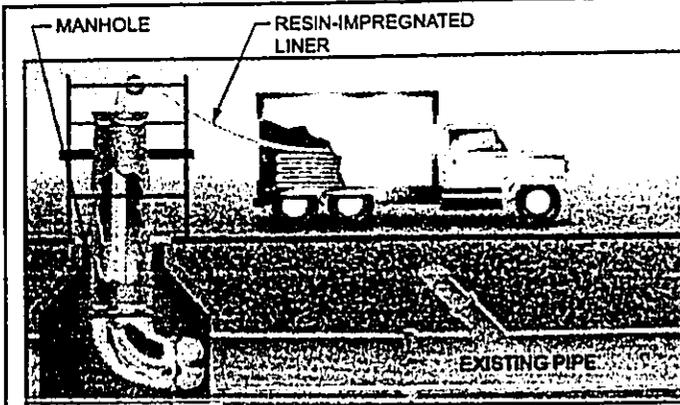
CIPP rehabilitation will have few environmental impacts. Temporary diversion operations will require monitoring to assure proper containment of wastewater flows and to reduce the risk for spills. Operation of installation equipment will temporarily increase noise levels and could increase exhaust emission levels. Environmental impacts caused by the project will be mitigated by complying with applicable Federal, State and County standards and guidelines (see Section 6).

4.6 MANHOLE REHABILITATION

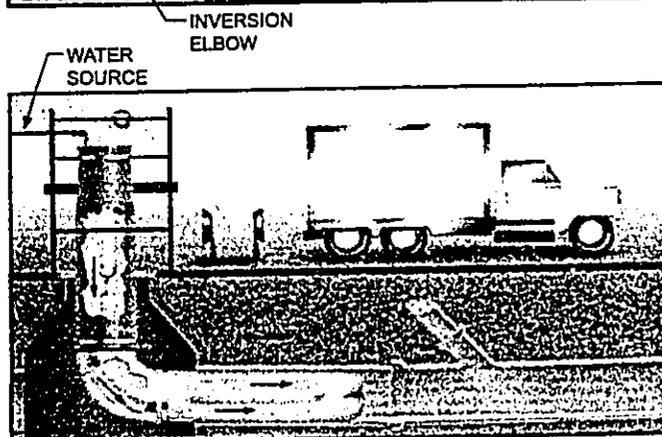
Approximately 22 existing manholes, or 150 vertical feet (vf) of manhole, will be rehabilitated with Portland cement with epoxy coating. Prior to Portland cement application, the manhole will be prepared by pressure washing to remove dirt, grease, loose aggregate, and other surface contaminants. Cracks and holes with active infiltration will be plugged with a hydrophilic polyurethane resin. Once all infiltration has been stopped, the Portland cement will be hand troweled or mechanically sprayed in 1/4-inch layers until a total thickness of 3/4-inch is reached. Epoxy will be applied to the cured cement surface to provide resistance to deterioration. The epoxy should be blended with synthetic reinforcing fibers and be hand troweled or mechanically sprayed in layers until a thickness of approximately 60 mils is reached. Locations and top and invert elevations of the existing manholes to be rehabilitated are provided on the plan and profile drawings in Appendix A for reference.

5. DESCRIPTION OF AFFECTED ENVIRONMENT

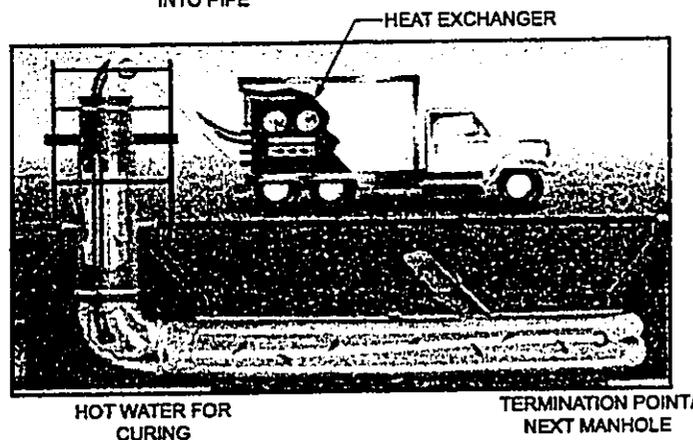
This section provides a description of the affected environment including topography, geotechnical characteristics, climate, land use, flora and fauna, historic sites and archeological resources, flood hazard, and special management areas.



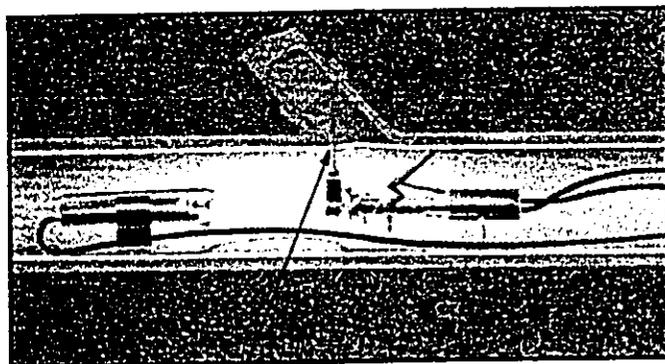
STAGE ONE
RESIN-IMPREGNATED, FLEXIBLE LINER MATERIAL IS INSTALLED IN THE EXISTING PIPE, THROUGH EITHER A MANHOLE OR OTHER ACCESS POINT. THE LINER MATERIAL IS THEN CUFFED BACK AND BANDED TO AN INVERSION ELBOW, CREATING A CLOSED SYSTEM THAT ALLOWS THE WATER INVERSION PROCESS TO TAKE PLACE.



STAGE TWO
WATER FROM NEARBY HYDRANTS (OR OTHER CONVENIENT SOURCES) IS USED TO INVERT THE LINER MATERIAL. THE FORCE OF THE WATER TURNS THE RESIN-IMPREGNATED TUBE INSIDE OUT AND INTO THE PIPE BEING REHABILITATED. AS THE TUBE TRAVELS THROUGH THE PIPE, WATER IS CONTINUALLY ADDED TO MAINTAIN A CONSTANT PRESSURE, KEEPING THE TUBE PRESSED TIGHTLY AGAINST THE WALLS OF THE OLD PIPE. NO DRAGGING, TEARING, OR ABRASION OCCURS AS THE TUBE GENTLY INVERTS OVER PIPELINE IRREGULARITIES.



STAGE THREE
AFTER THE LINER MATERIAL REACHES THE TERMINATION POINT, THE WATER IN THE LINE IS CIRCULATED THROUGH A HEAT EXCHANGER, WHERE IT IS HEATED AND RETURNED TO THE TUBE. THE HOT WATER INITIATES THE CURE OF THE THERMOSETTING RESIN, CAUSING IT TO HARDEN INTO A STRUCTURALLY SOUND, JOINTLESS "PIPE-WITHIN-A-PIPE."



STAGE FOUR
ONCE THE CIPP COMPOSITE HAS HARDENED AND COOLED, THE WATER PRESSURE IS RELEASED AND THE ENDS ARE TRIMMED. SERVICE CONNECTIONS ARE REINSTATED INTERNALLY WITH A REMOTE CONTROLLED CUTTING DEVICE. THE NEWLY INSTALLED PIPE IS READY FOR IMMEDIATE USE.

FIGURE 4
OVERVIEW OF CIPP INSTALLATION
SMPR3 - Magazine Street

5.1 TOPOGRAPHY

A topographic survey of the existing project location was performed by Control Point Surveying, Inc. on October 21, 1999. The topography of the project site is generally sloping with grades of about twelve percent or less. Elevations along the project alignment range from 93 to 193 feet above mean sea level. The sewer alignment is generally under asphalt roadway surfaces. Portions of the alignment along Prospect Street and along the eastern end of Spencer Street are under grassed shoulders, concrete curbs and gutters, concrete and asphalt sidewalks, and concrete driveway aprons. Two short sections of the sewer lines near SMH SI21AJ0420 are in an easement in private property (TMK: 2-2-05).

5.2 GEOTECHNICAL CHARACTERISTICS

The project site is located on the southern flank of Punchbowl Hill. According to the Geotechnical Engineering Exploration, Punchbowl Hill is a tuff cone near the center of Honolulu built against the end of a spur of the Koolau Range. The tuff is mostly palagonitized vitric ash and lapilli with scattered fragments of coral limestone. The field exploration of the site indicated presence of medium-dense to dense cinders, stiff weathered tuff, and dense volcanic tuff at the invert elevations. Groundwater was not encountered in the borings.

5.3 CLIMATE

The project site has a mild subtropical climate. The average annual temperature for the project area is 76 degrees Fahrenheit, and ranges from the lower-seventies during the months of January through March to the lower-eighties during the months of July through September. The mean annual rainfall averages 38 inches. Heavy rain usually occurs between the months of November through April.

5.4 LAND USE

The land along the proposed sewer alignment is zoned for medium density apartments. Construction activities on the sewer, located within the roadway, may affect property access.

5.5 FLORA AND FAUNA

No known endangered species of flora or fauna live within the roadway project site. This project should have little or minimal impact on wildlife due to the high degree of existing development in the area.

5.6 HISTORIC SITES AND ARCHAEOLOGICAL RESOURCES

The Department of Land and Natural Resources, State Historical Preservation Division has identified Makiki Cemetery as a significant historical site within the project limits. Any excavation done within the vicinity of the cemetery will require surveying to determine the most likely extents of any burials, and monitoring by a qualified archaeologist. If historic sites are found, the archaeologist shall gather sufficient information to evaluate their significance and submit his findings to the State Historic Preservation Division.

If any archaeological resources are encountered in other locations within the project limits during construction, the Contractor shall contact a qualified archaeologist to monitor construction. A mitigation plan may need to be developed if any historic sites are encountered.

5.7 FLOOD HAZARD AND SPECIAL MANAGEMENT AREA

The Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM), Panel 120, shows the project area within Zone X, an area determined to be outside of the 500-year flood plain.

The City and County of Honolulu Subdivision Branch's Special Management Area (SMA) Map 1, Primary Urban Center, indicates that the project area lies outside of the SMA boundary.

The FIRM and SMA boundary maps for the project area are included in Appendix B for reference.

6. POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

This section summarizes foreseeable short-term and long-term project impacts and recommends potential mitigation measures. Some State and County regulations are referenced as guidelines for baseline environmental project conditions.

6.1 IMPACTS DURING CONSTRUCTION

1. The project is expected to take six to eight months to complete. Periodic noise from construction equipment such as excavators, trucks, compactors, pumps, generators, and pavers will disrupt residents near the project site. Pipe bursting and in-line trenching will require a continuous construction effort that may affect noise levels for extended periods. These disruptions will be controlled with sound attenuating or abatement measures to reduce noise levels to below which the general population will be at risk. Restricting operational hours of the noisiest equipment will also minimize disruption to the adjoining community. Anticipated night work will require a

noise variance. The Contractor shall observe and comply with Public Health Regulations Title 11, Chapter 42 regarding noise control for Oahu.

2. The Contractor shall keep the project area and surrounding area free from dust nuisance with measures such as water sprinkling, and limiting the area being worked on at any one time. The work shall be in conformance with the Air Pollution Control Standards and Regulations of the Department of Health. The Contractor shall be responsible for proper maintenance of all construction equipment and vehicles to minimize pollutant exhaust emissions.
3. Traffic passing through the project site will be disrupted while vehicles are diverted around staging areas and open trenches. Parking will be restricted on both sides of the street where applicable during construction to maintain existing traffic patterns. Traffic control by police officers and/or trained construction flagmen will moderate traffic flow.
4. Residences along the project alignment will be affected by the construction activities associated with the project. Access to residences will be maintained during the project. Residences may be inconvenienced in terms of driveway access and other road frontage usage, like mail service, when construction is directly fronting their lots.
5. Utility service for water, gas, wastewater, electricity, and telephone may be disrupted during construction activities. The Contractor shall protect all existing utilities within the project area during construction.
6. Whenever necessary, the Contractor shall properly sheet and brace excavations to make them safe and secure from possible slides, cave-ins and settlement. The sheet pilings shall extend sufficiently deep to stabilize excavated trench walls. Existing adjacent improvements and structures shall be properly supported with beams, struts or underpinning to fully protect them from damage.
7. The Contractor shall be responsible for coordinating surveying and monitoring by a qualified archaeologist of any excavation done within the vicinity of Makiki Cemetery. If historic sites are found, the archaeologist shall gather sufficient information to evaluate their significance and submit his findings to the State Historic Preservation Division. If any archaeological resources are encountered in other locations within the project limits during construction, the Contractor

shall contact a qualified archaeologist to monitor construction. A mitigation plan may need to be developed if any historic sites are encountered.

8. The Contractor shall be responsible for properly disposing of spoils generated from construction activities. Solid and liquid spoils shall be separated on-site prior to disposal. Solids can be disposed of at Waimanalo Gulch Sanitary Landfill after they are tested and characterized as non-hazardous materials, and liquids can be discharged for drying into a safe open area in accordance with applicable State and County requirements.
9. The Contractor shall be responsible for properly disposing of hot water used during the CIPP curing process. Water used during the pipe rehabilitation process shall be disposed of into the sewer system in an environmentally safe manner in accordance with applicable State and County requirements.

6.2 LONG-TERM IMPACTS

The long-term impacts of this project are positive to the surrounding community. The project will provide a structurally sound and hydraulically adequate sewer to service the community. There are no long-term negative impacts associated with the implementation of this project.

7. FUNDING

Pipe bursting with partial CIPP rehabilitation, estimated at \$1,985,000, has been identified as the most feasible and favored construction method for this project. The City and County of Honolulu will use Capital Improvement Program funding to pay for this project. The project will not require direct assessments from the residents being served by these improvements.

8. DETERMINATION AND FINDINGS

This Final Environmental Assessment is part of the first phase of the environmental review process that meets the requirements of HRS Chapter 343. After completing an assessment of the potential environmental effects of the proposed project and consulting with government agencies and interested parties, the proposing agency does not anticipate any significant impacts. This document supports a Finding of No Significant Impact (FONSI) based the following negative responses to HAR 11-200-12 significance criteria:

1. *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.*
The proposed action does not involve an irrevocable commitment to loss or destruction of any

natural or cultural resources. The project site has already been substantially altered from its natural condition. Any excavation done within the vicinity of Makiki Cemetery will be monitored by a qualified archaeologist per State Historic Preservation Division standards.

2. *Curtails the range of beneficial uses of the environment.* The proposed project is consistent with the City's General Plan and the Wastewater Branch's Design Standards, and will not curtail beneficial uses of the environment in the area. The proposed project will be compatible with the uses of the surrounding area.
3. *Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in HRS Chapter 343, and any revisions thereof and amendments thereto, court decisions, or executive orders.* The proposed action does not conflict with the State's long-term environmental policies or goals and guidelines. The proposed project is consistent with the State's Land Use Plan that is in concert with all applicable policies, goals and guidelines. No long-term environmental conflicts are foreseen.
4. *Substantially affects the economic or social welfare of the community or State.* The proposed action will have a positive short-term economic effect on the community from construction-related activities. Revenues of approximately \$1,985,000 entering the economy during the construction phase will be the primary short-term economic benefit. Upon completion of the project, the economic climate should return to pre-existing conditions. The social welfare of the community will benefit from the improved reliability and life expectancy of the repaired sewer system.
5. *Substantially affects public health.* The proposed action will correct structural inadequacies in the sewer and restore full flow capacity to beyond estimated future peak wastewater flows. This action will improve environmental conditions that currently have the potential for adversely affecting public health. The short-term negative impacts associated with construction activities such as noise, dust, exhaust emissions, odor, damaged roadways, and traffic congestion will be mitigated as described in Section 6.
6. *Involves substantial secondary impacts, such as population changes or effects on public facilities.* The proposed action does not have secondary impacts. The existing sewer capacity will be increased and structural integrity will be restored.

7. *Involves a substantial degradation of environmental quality.* The proposed action does not involve a substantial degradation of environmental quality. The existing physical qualities of the surrounding areas will be preserved.
8. *Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.* The proposed action, neither individually nor cumulatively, has a considerable effect upon the environment nor involves a commitment for larger actions. The existing physical qualities of the surrounding areas will be preserved.
9. *Substantially affects a rare, threatened, or endangered species, or its habitat.* The proposed action does not substantially affect rare, threatened, or endangered species or habitats. There are no known rare, threatened, or endangered species or habitats associated with the project site.
10. *Detrimentially affects air or water quality or ambient noise levels.* The proposed action does not detrimentally affect the air or water quality or ambient noise levels. Short-term impacts on air quality as well as noise levels may occur during the construction period, but will be mitigated by normal construction practices and conformance to permit requirements. Construction activities will be regulated by project plans, specifications and City inspectors.
11. *Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.* The proposed action does not affect an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal water. The proposed project is not located in an environmentally sensitive area.
12. *Substantially affects scenic vistas and viewplanes identified in county or state plans or studies.* The proposed action does not affect scenic vistas and view planes identified in county or state plans and studies. The sewer line will be installed below the ground surface of established roadways.
13. *Requires substantial energy consumption.* The proposed action will require substantial energy consumption by construction equipment. Energy consuming construction equipment such as backhoes, trucks, compactors, pavers, diversion pumps, and generators could be used for these operations. After the installation is complete, the sewer line will operate by gravity and will not require any external energy.

9. REFERENCES

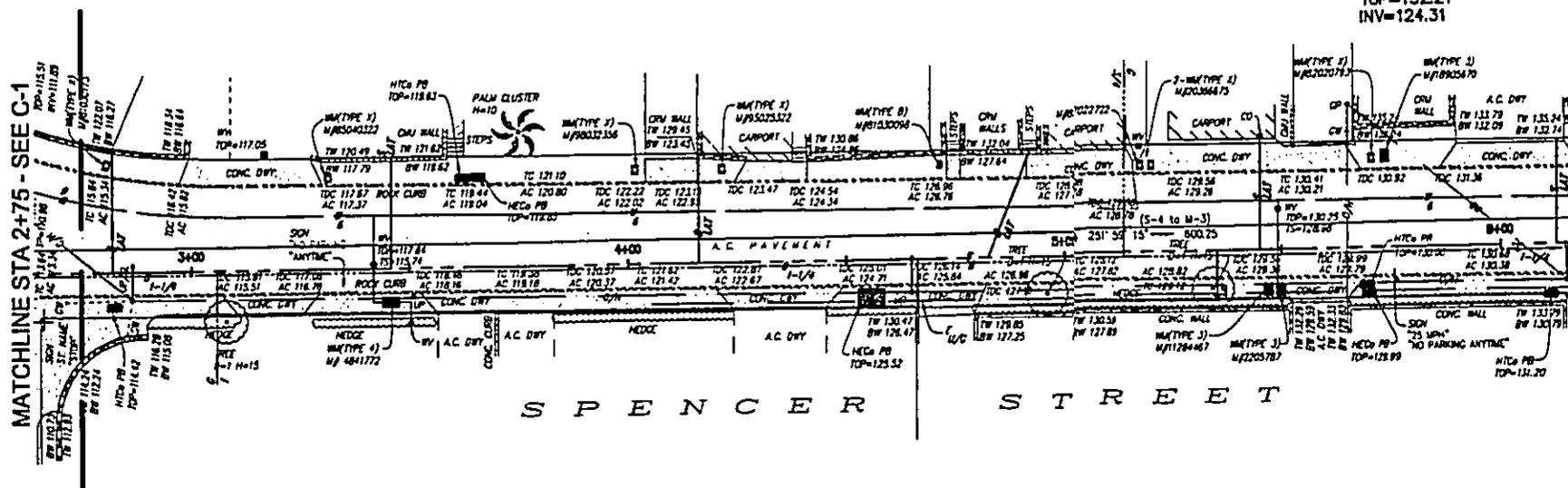
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APPENDICES

APPENDIX A
PIPE BURSTING WITH
PARTIAL CIPP REHABILITATION
PLAN AND PROFILE

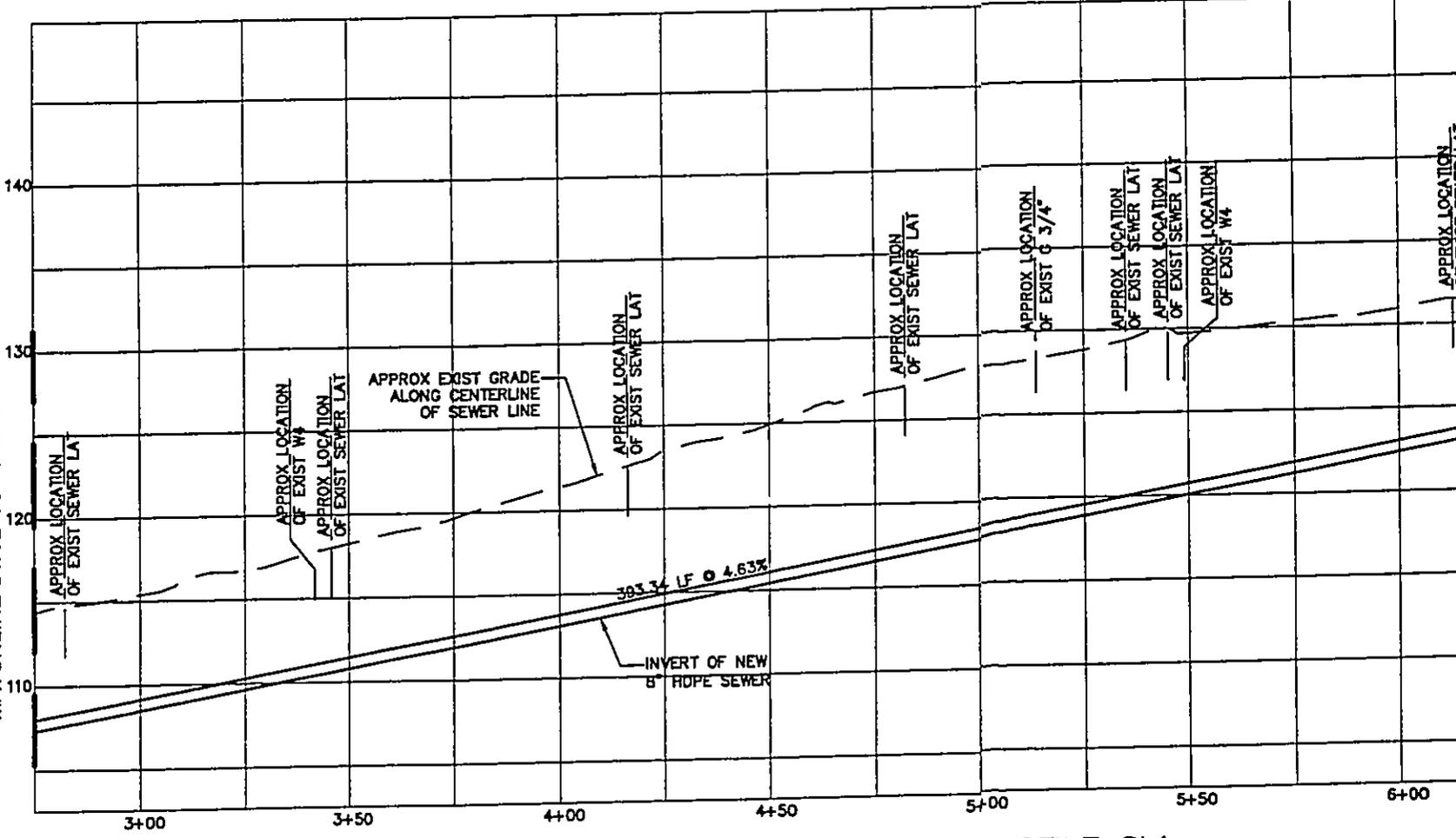
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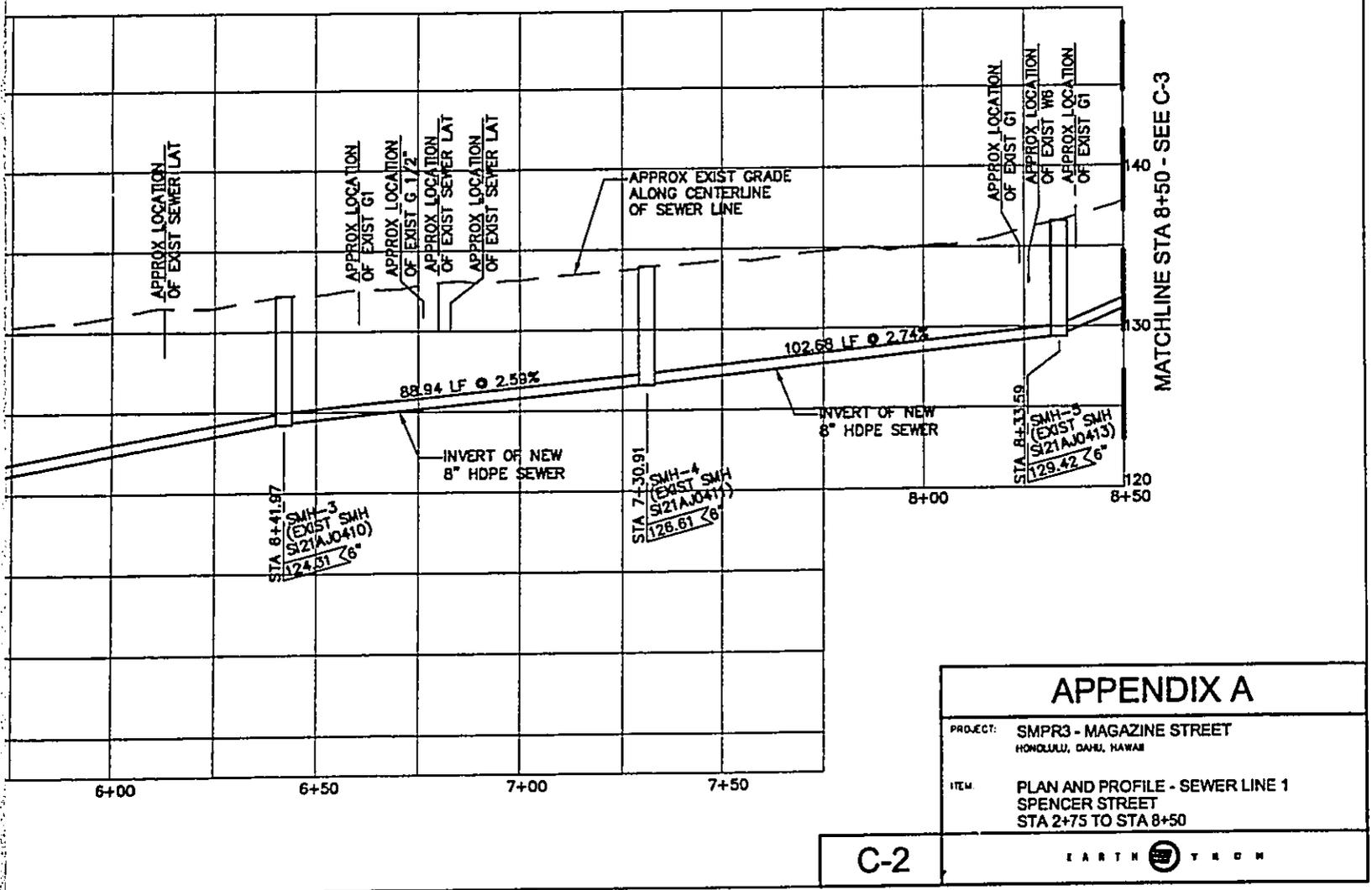
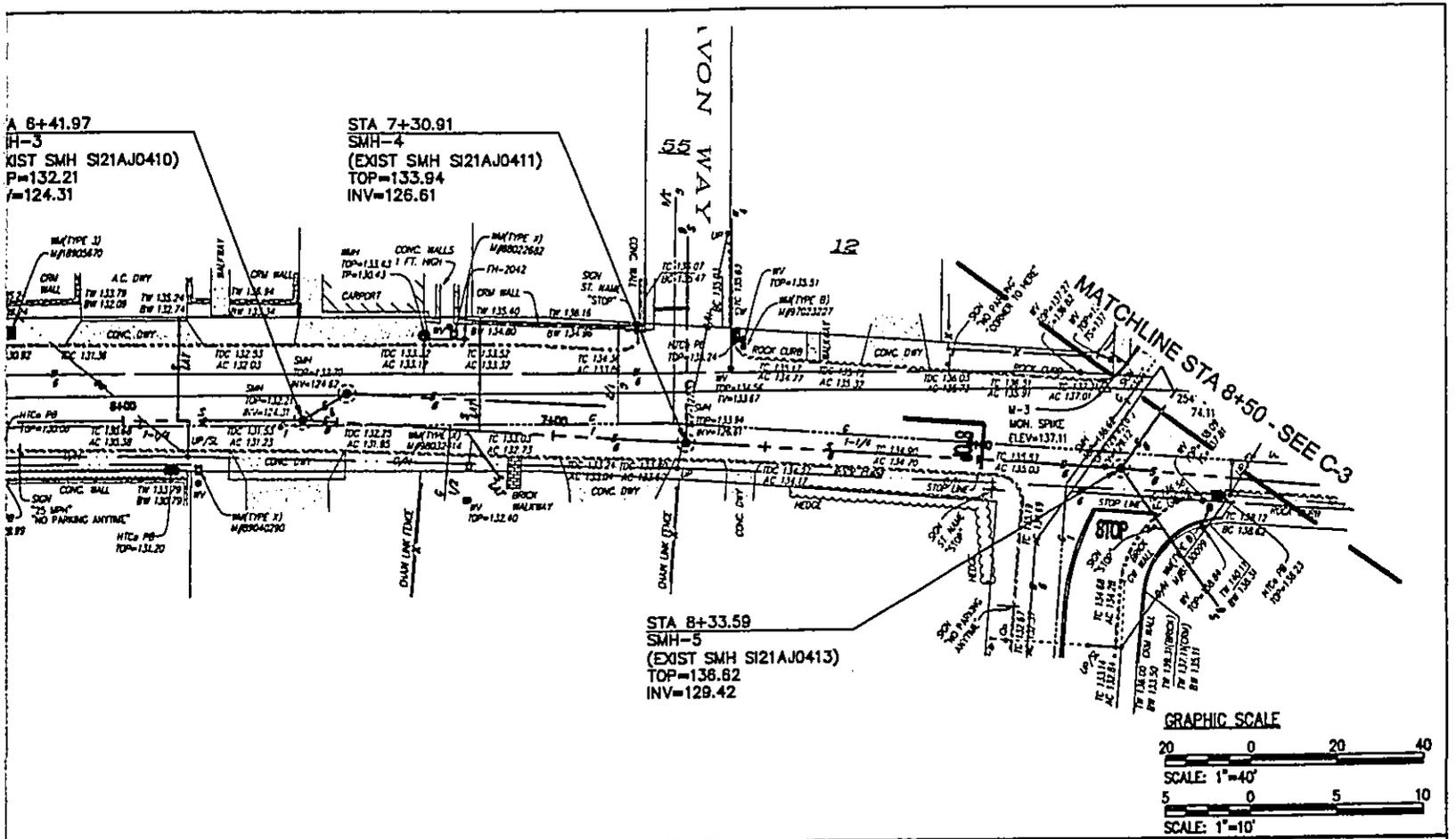


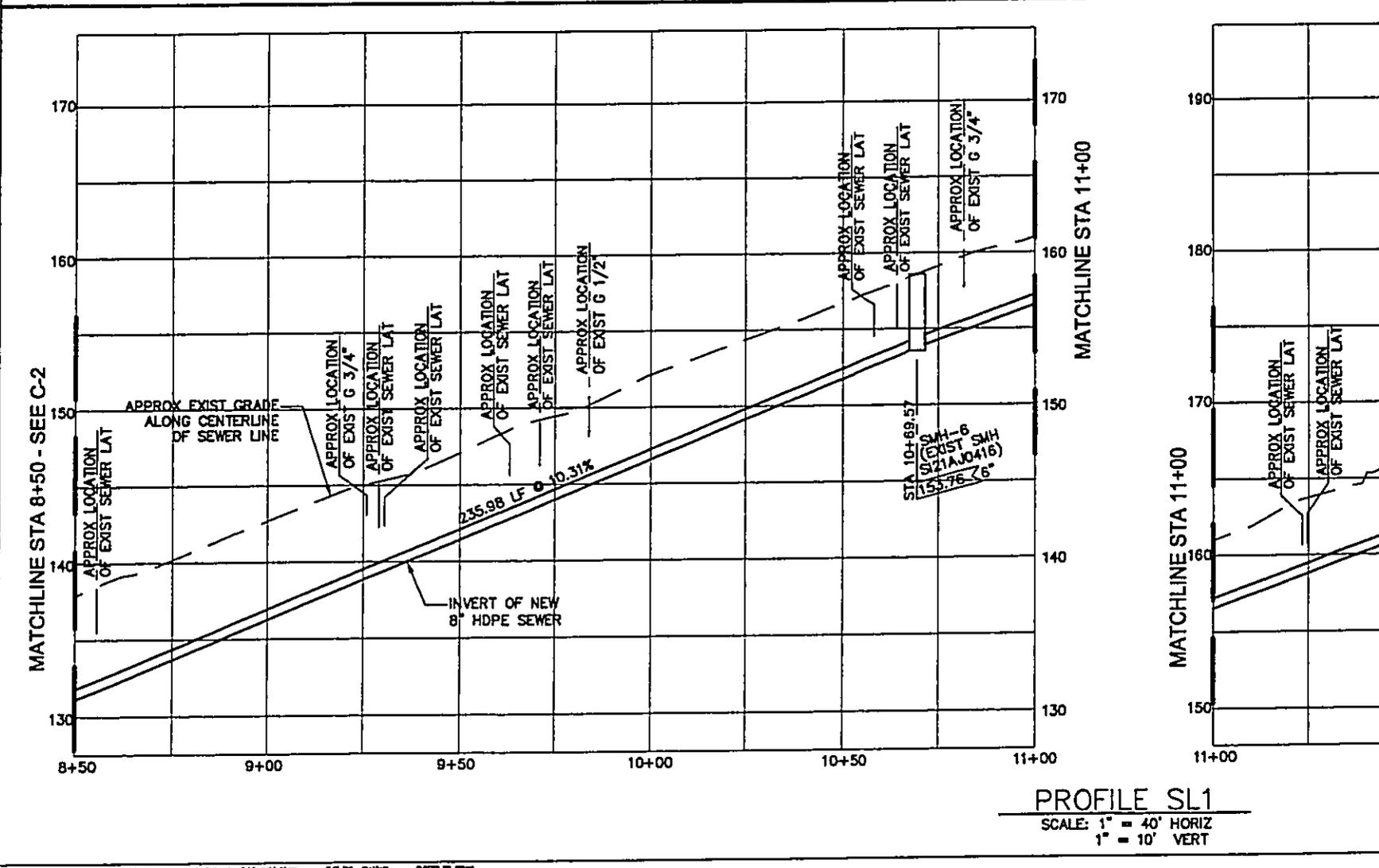
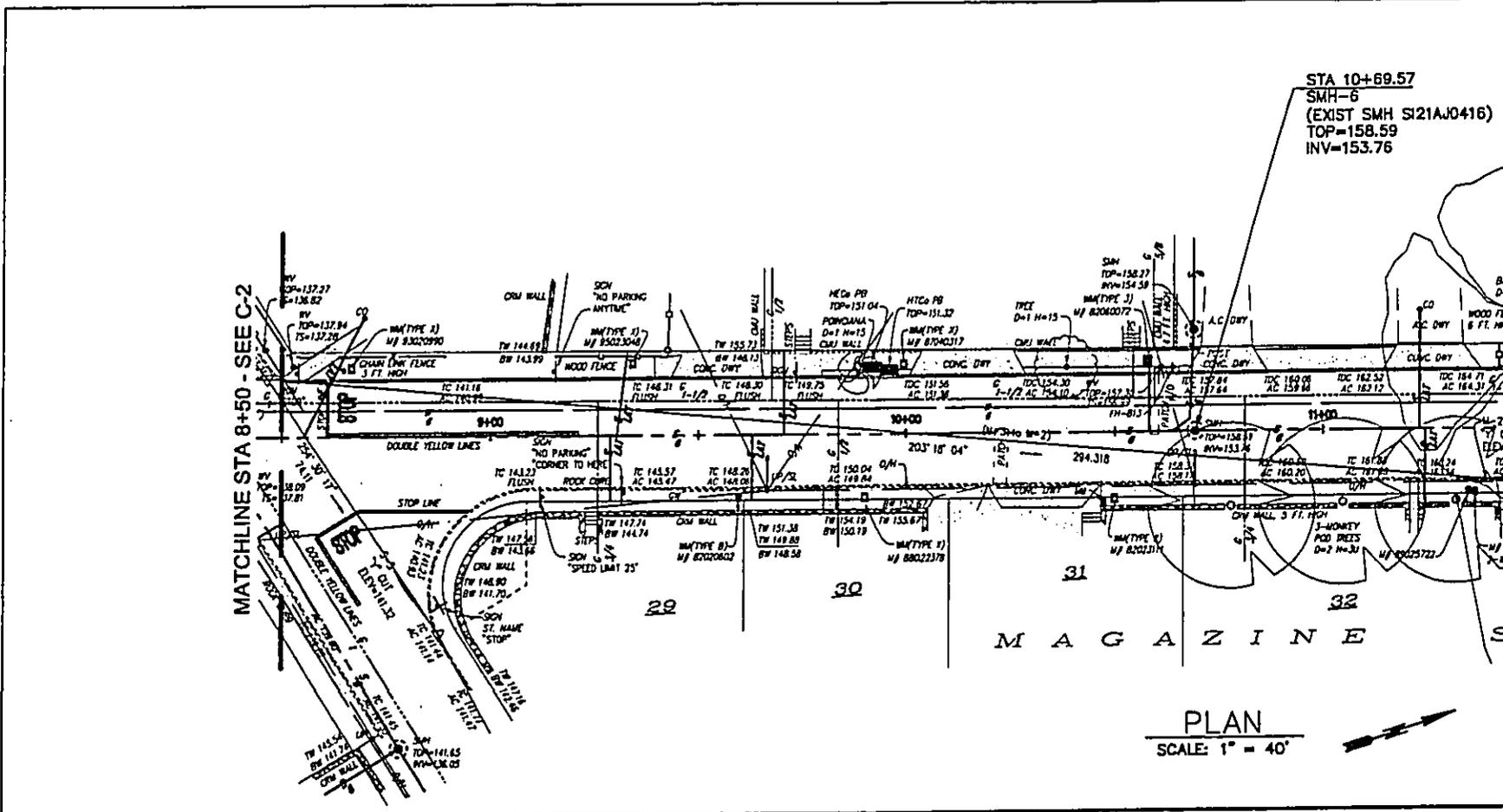
PLAN
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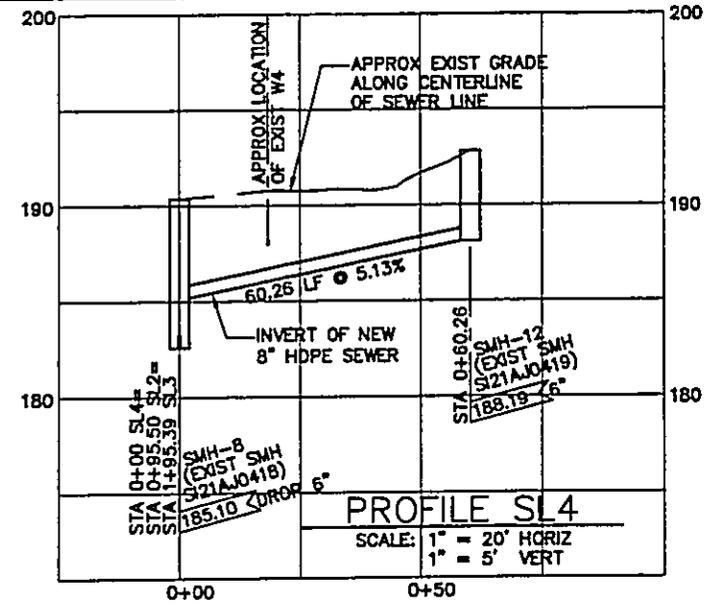
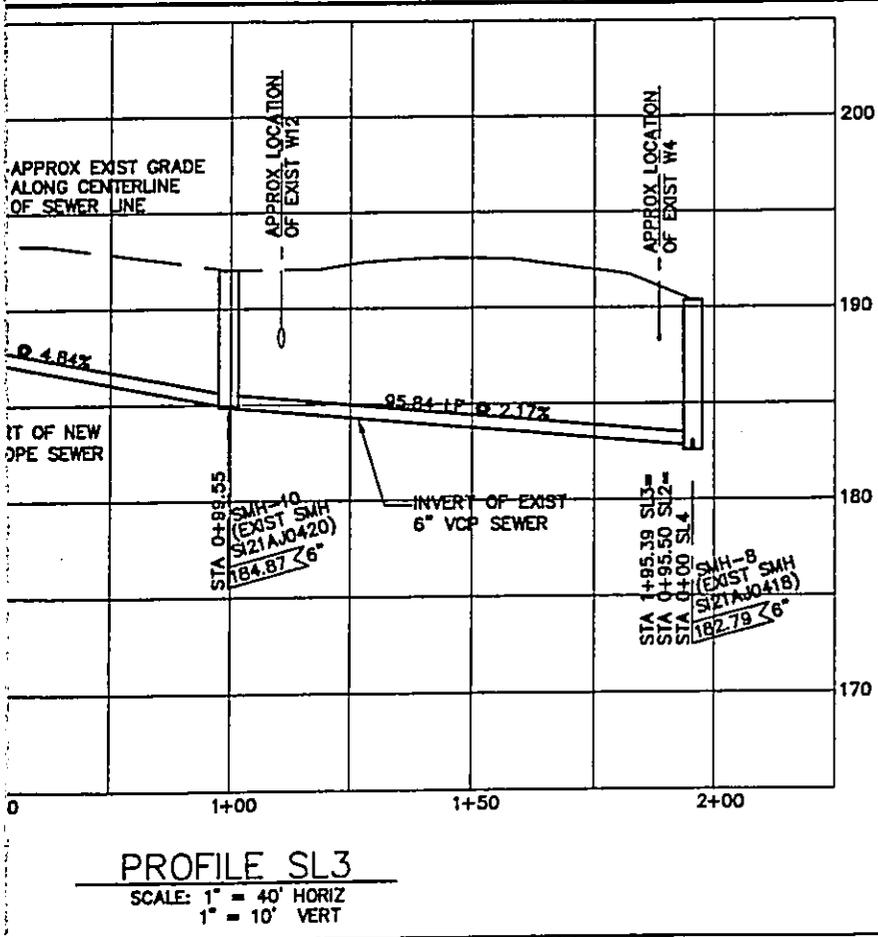
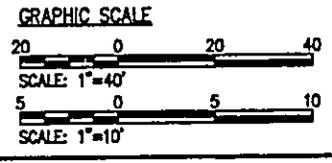
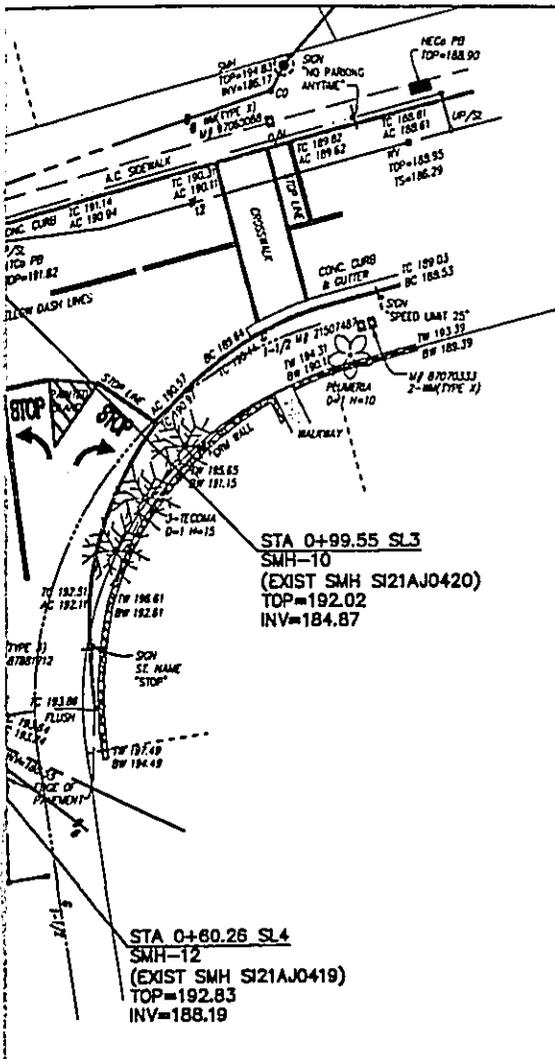
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PROFILE SL1
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1" = 10' VERT







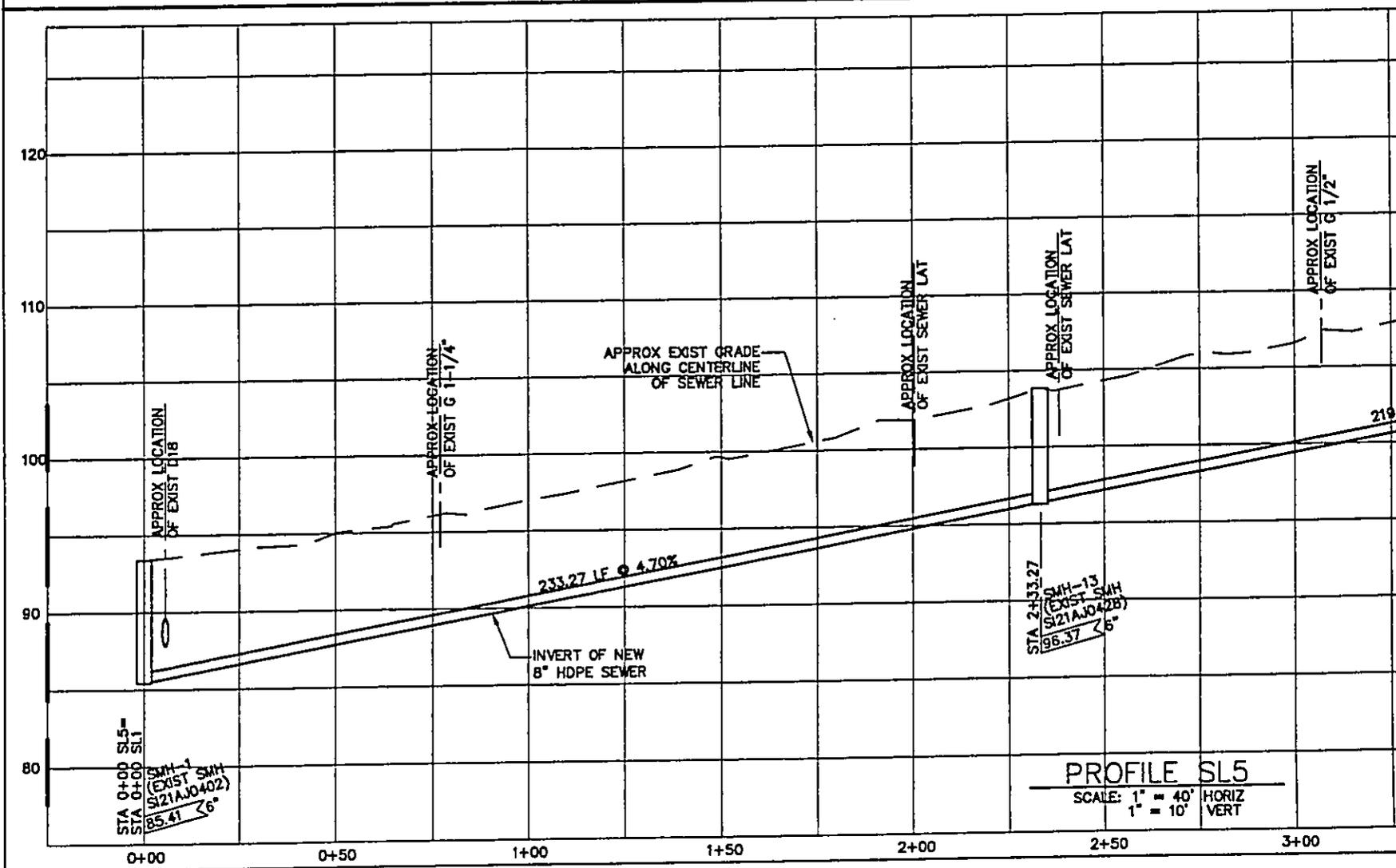
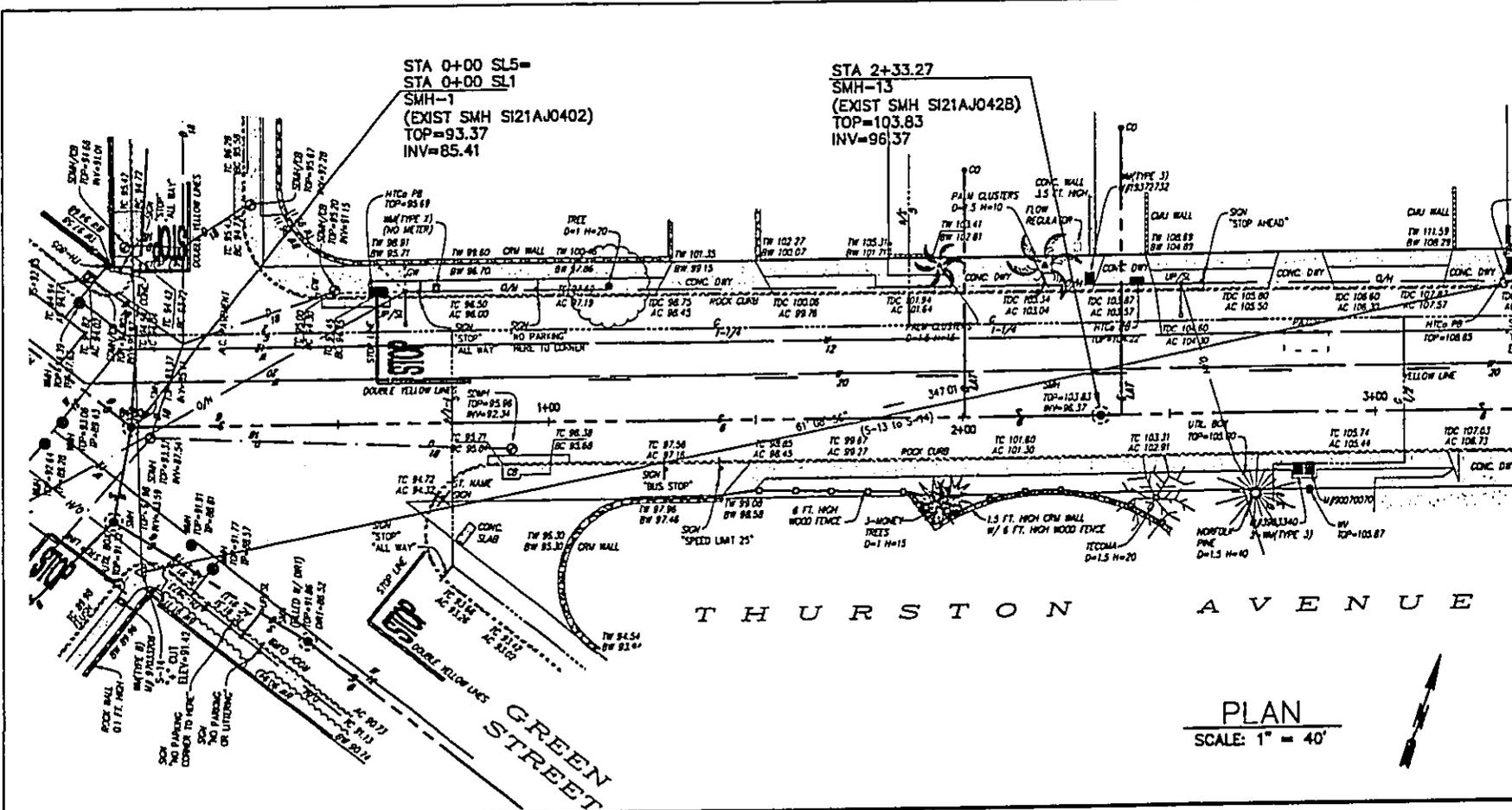
APPENDIX A

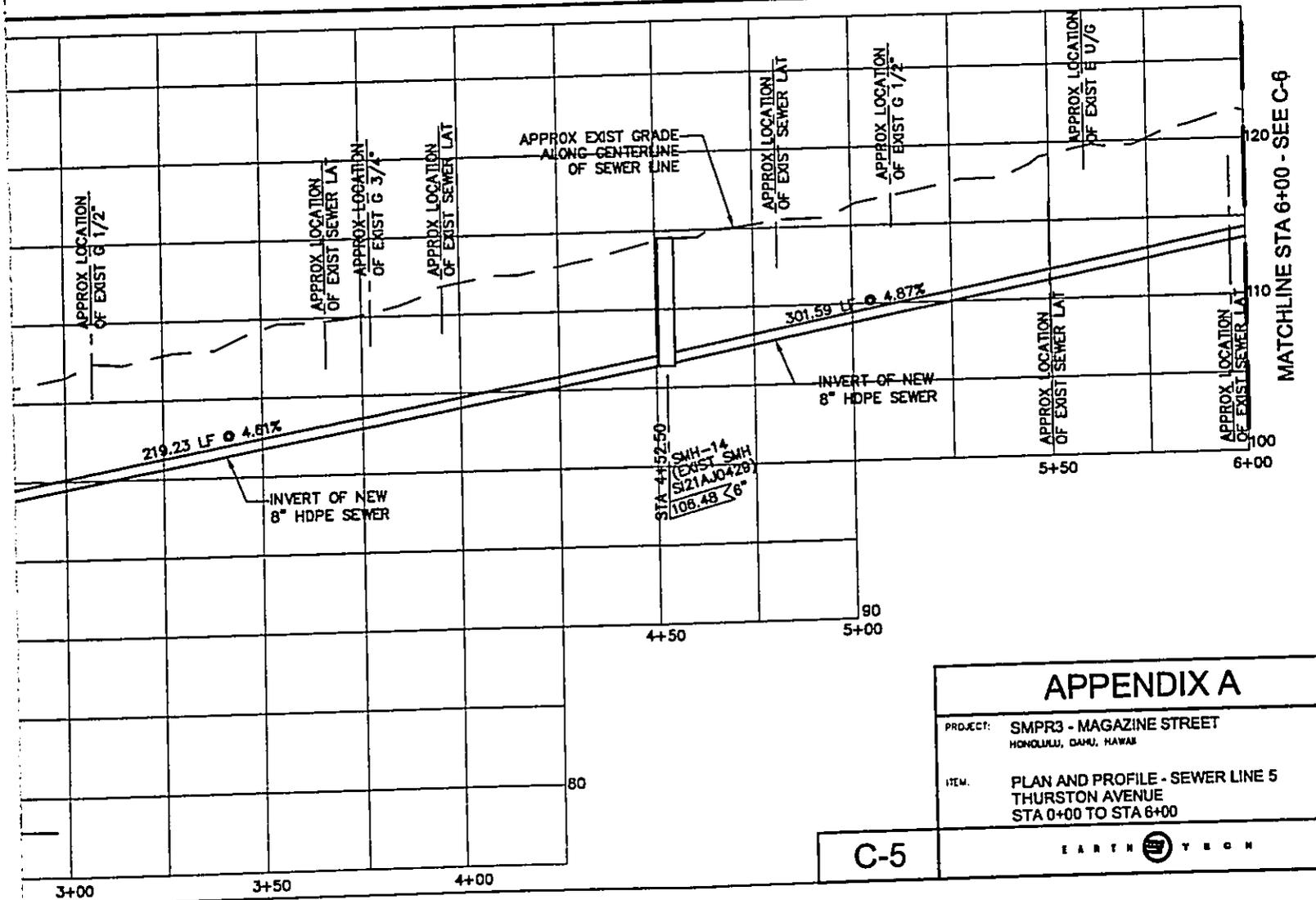
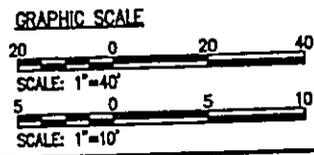
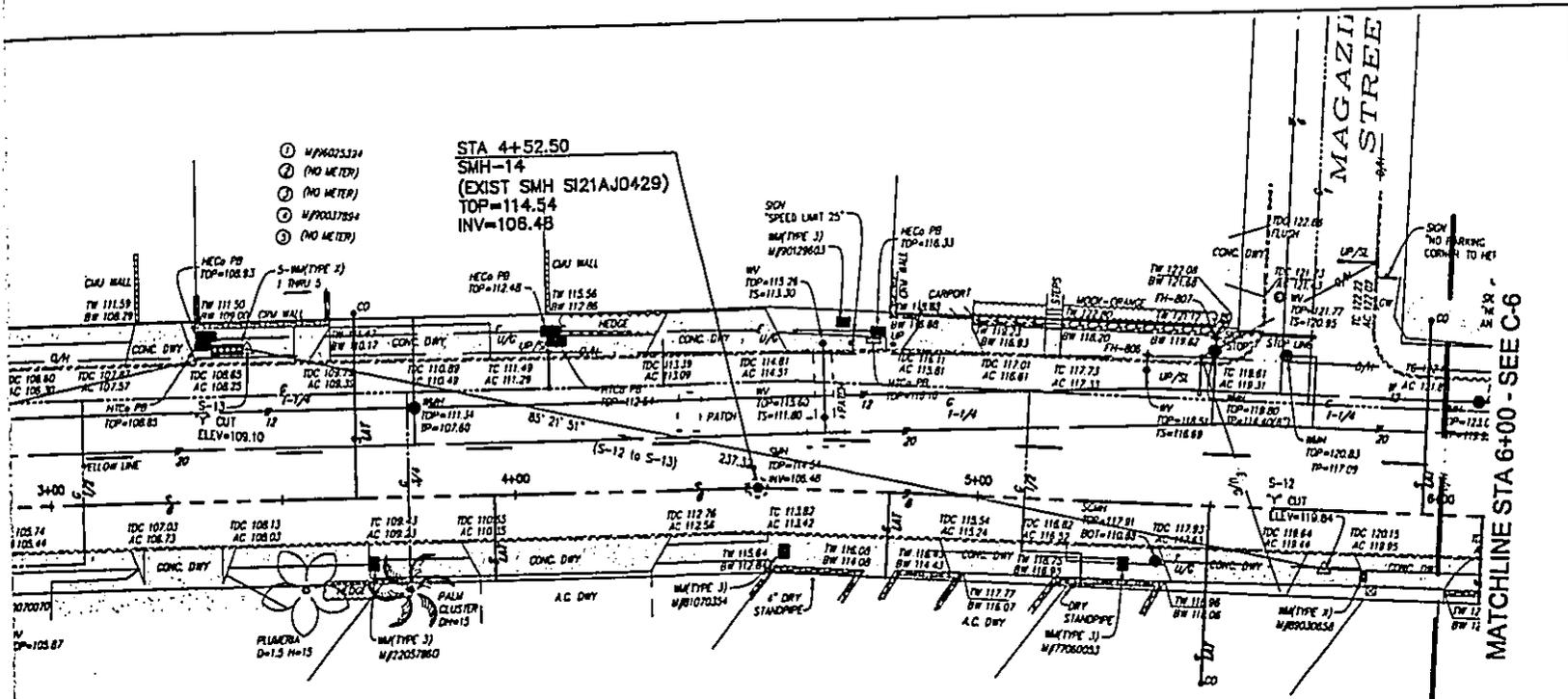
PROJECT: SMPR3 - MAGAZINE STREET
 HONOLULU, OAHU, HAWAII

ITEM: PLAN AND PROFILE -
 SEWER LINES 2, 3 & 4
 MAGAZINE & PROSPECT ST INTERSECTION

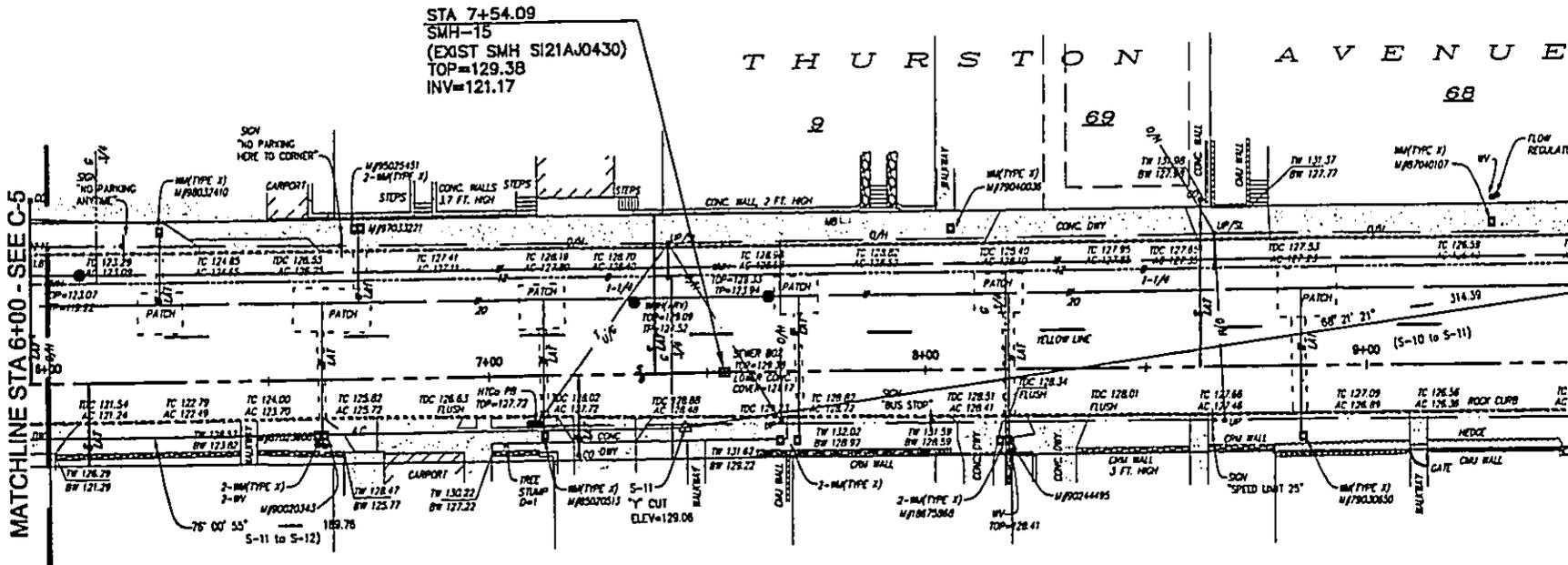
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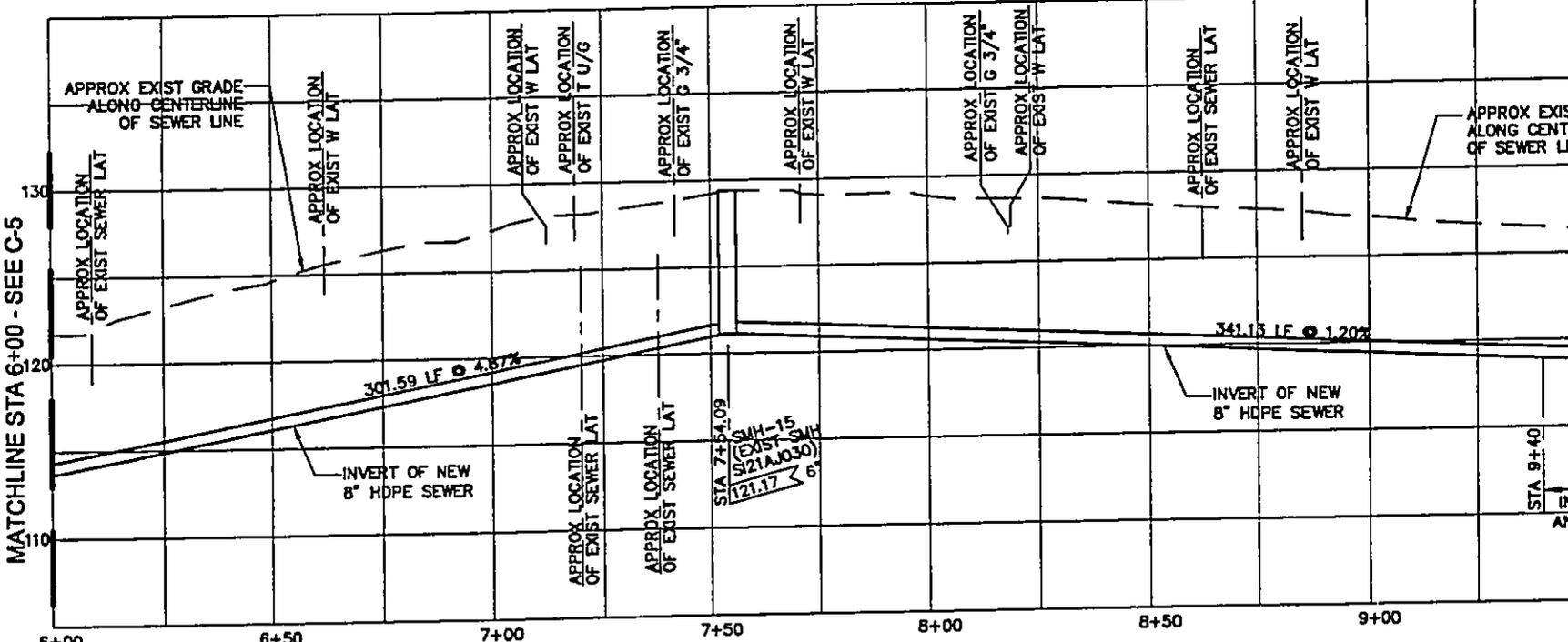




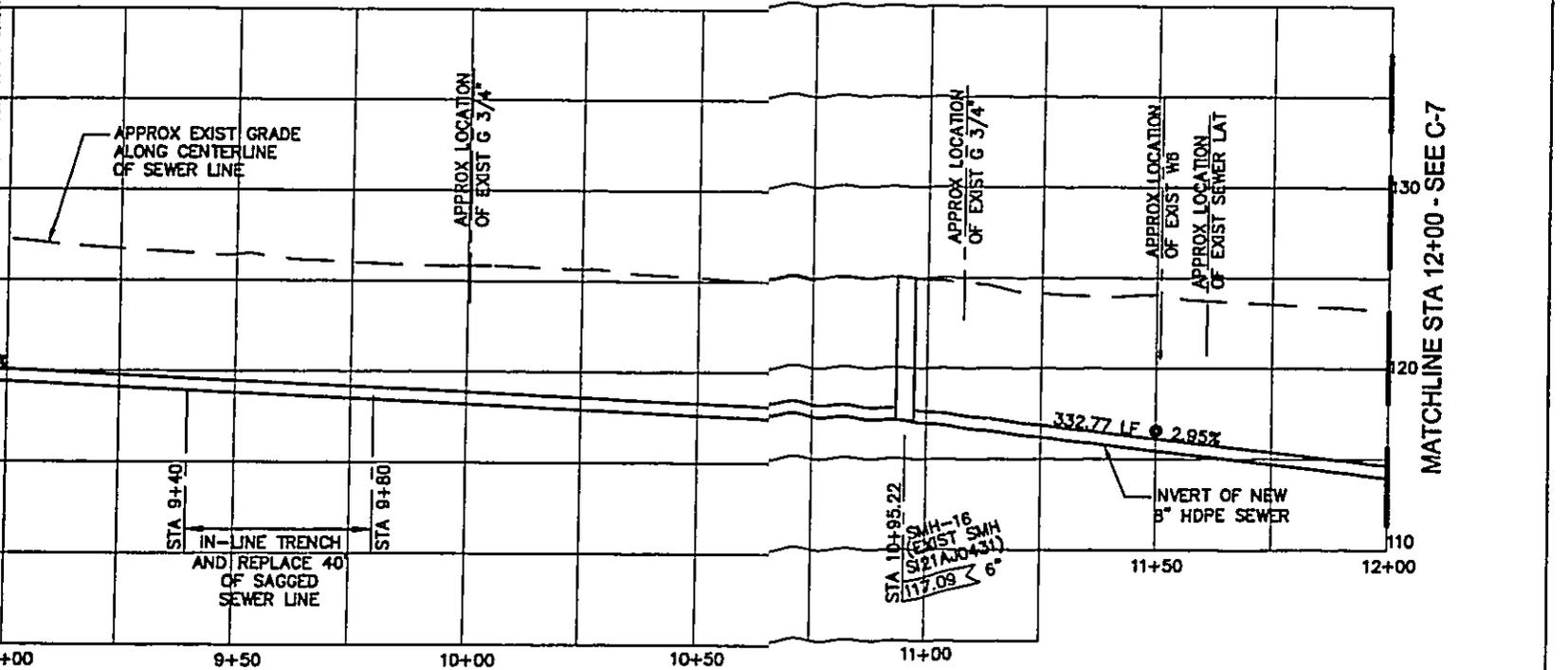
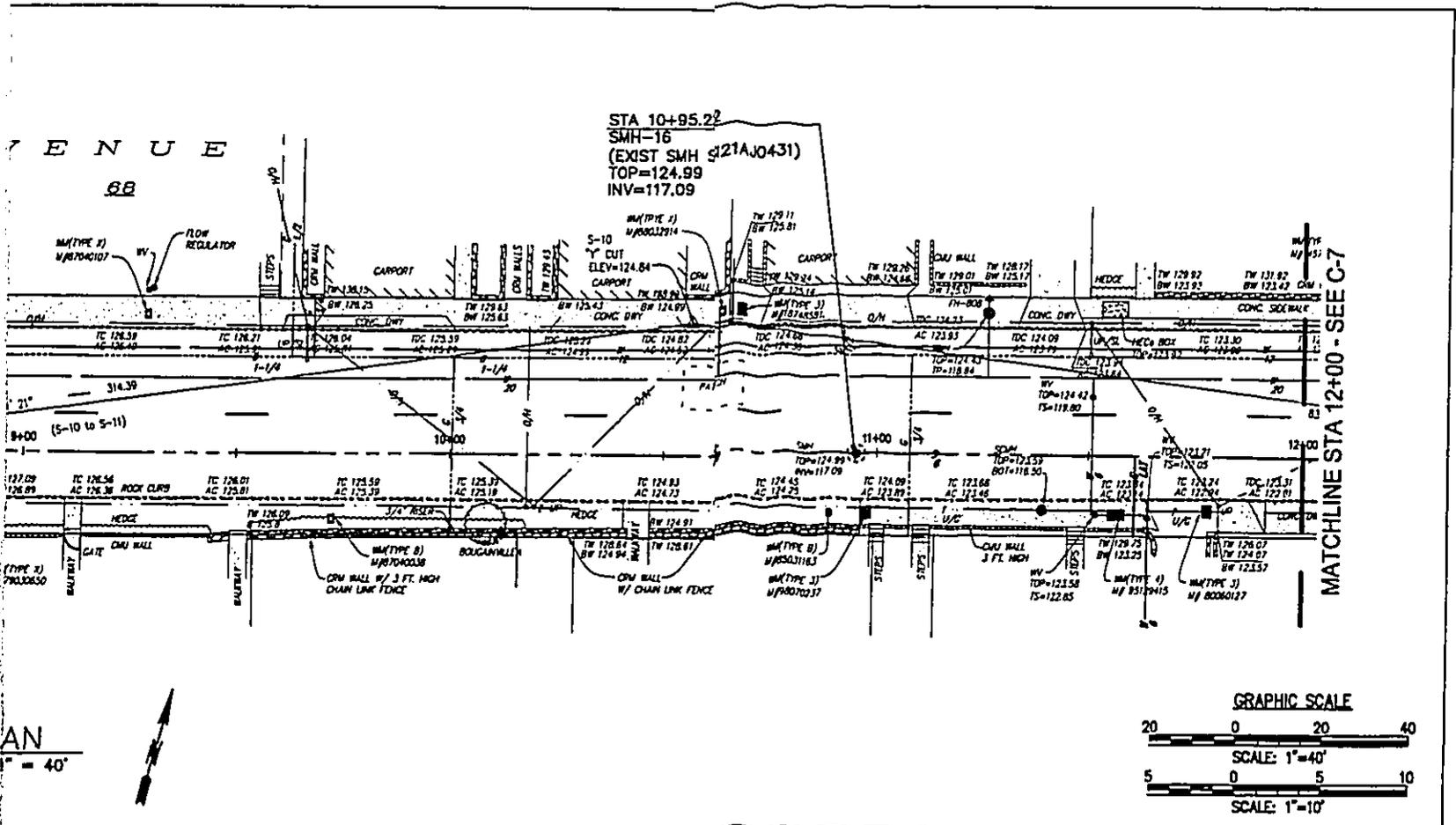
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ITEM:	PLAN AND PROFILE - SEWER LINE 5 THURSTON AVENUE STA 0+00 TO STA 6+00
C-5	EARTH TECH



PLAN
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PROFILE SL5
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1" = 10' VERT

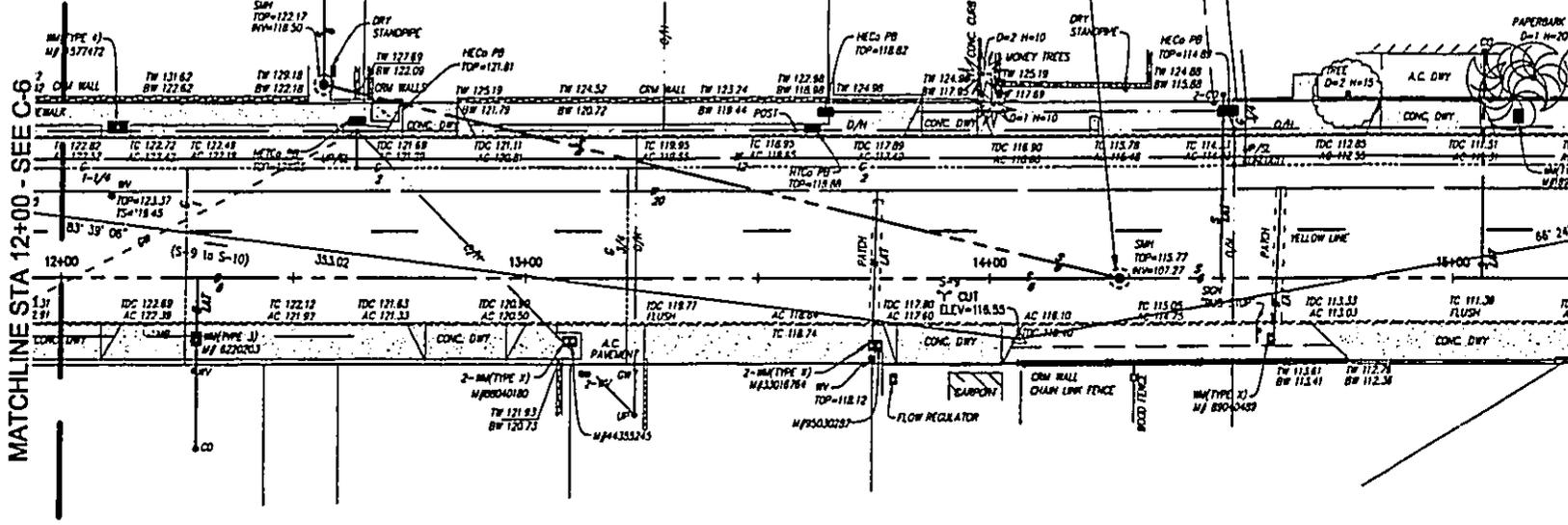


SL5
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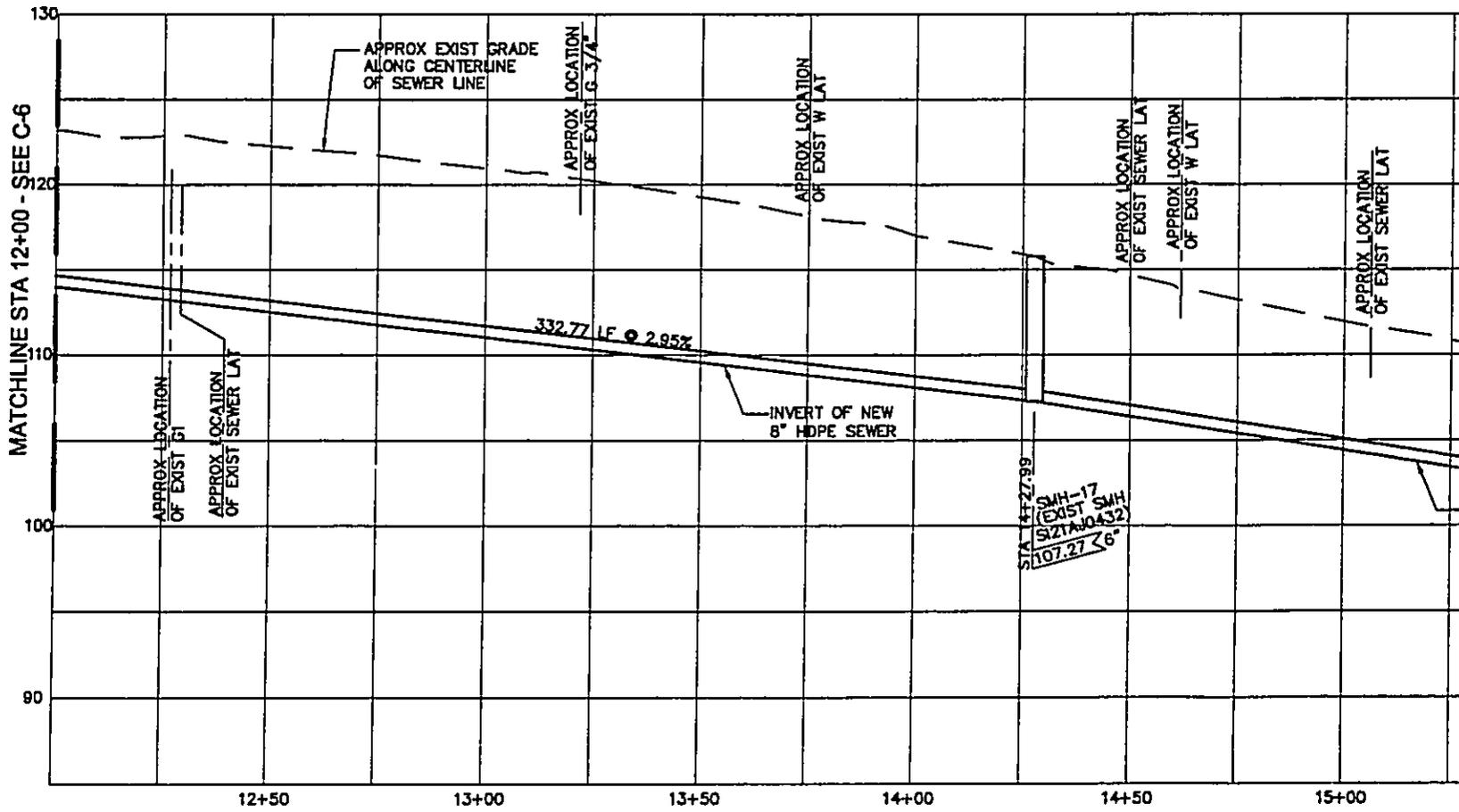
APPENDIX A	
PROJECT:	SMPR3 - MAGAZINE STREET HONOLULU, OAHU, HAWAII
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C-6	EARTH TECH

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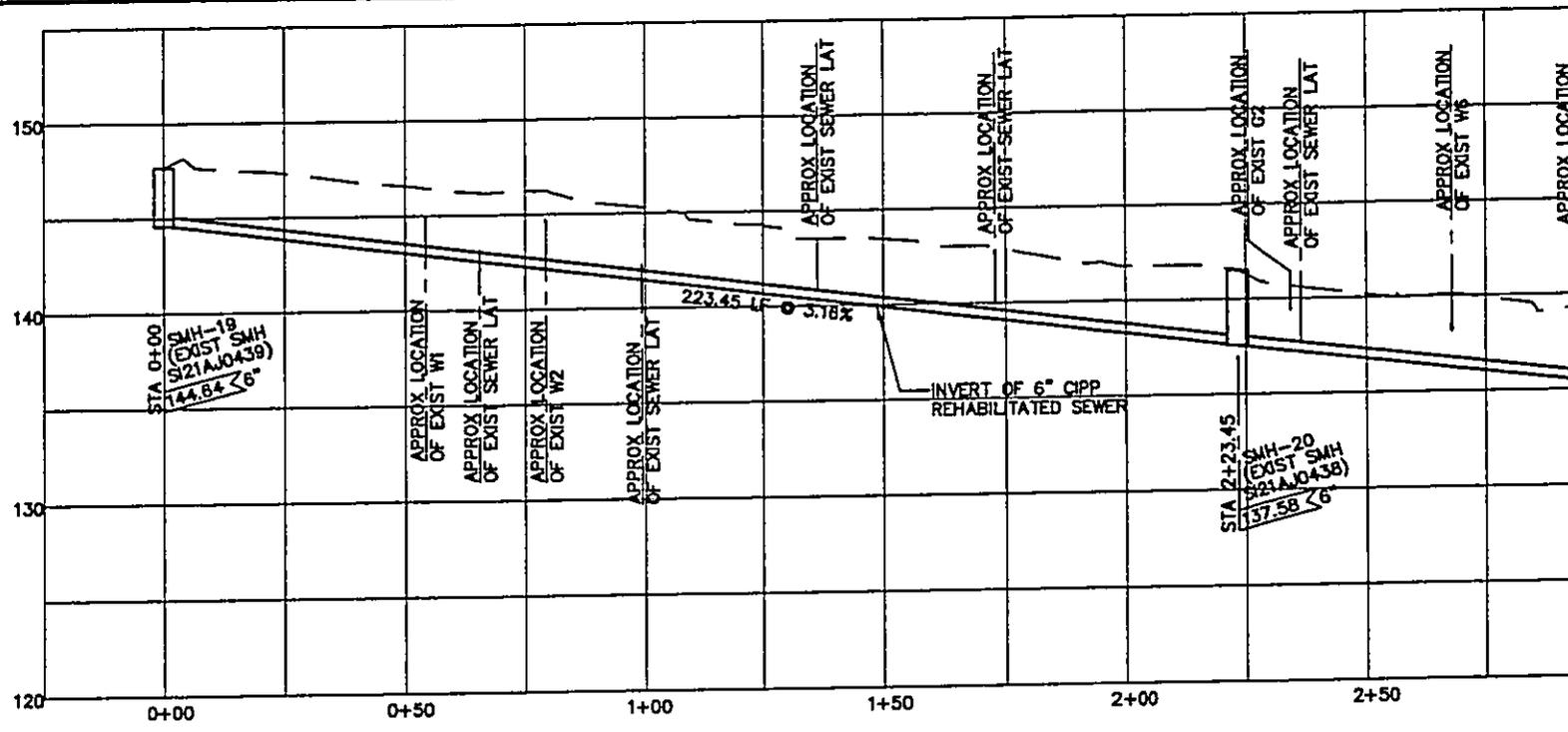
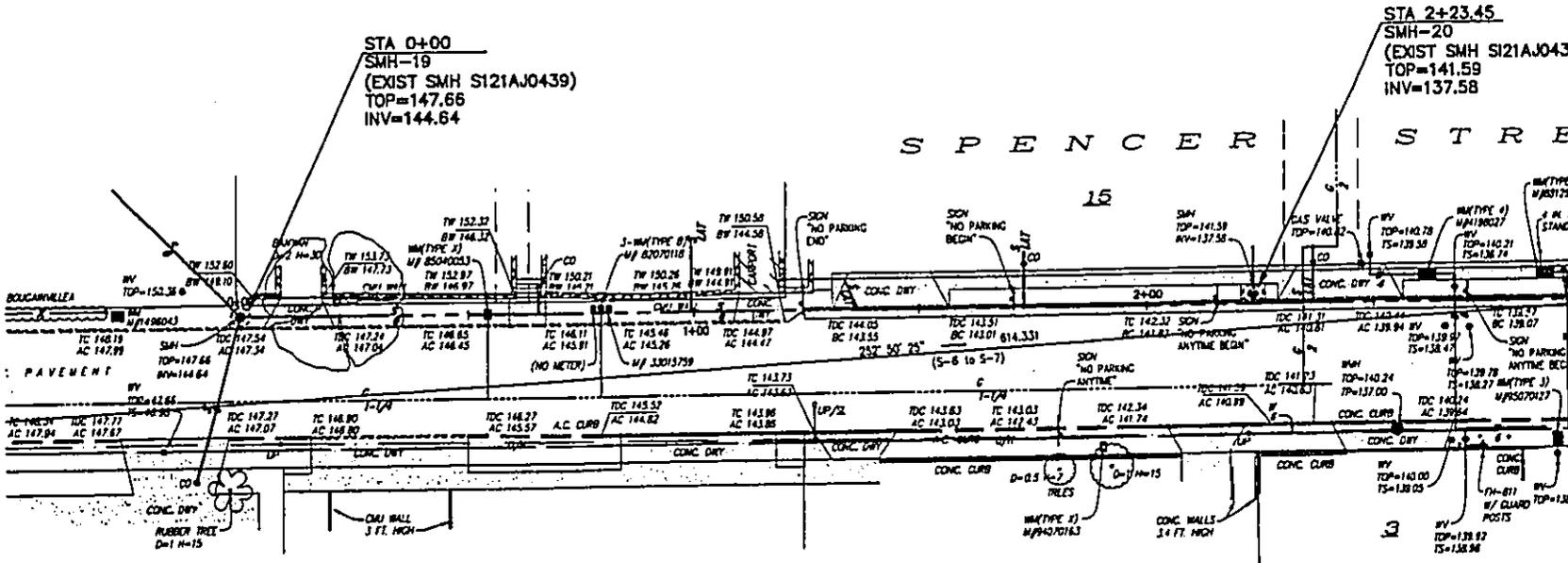
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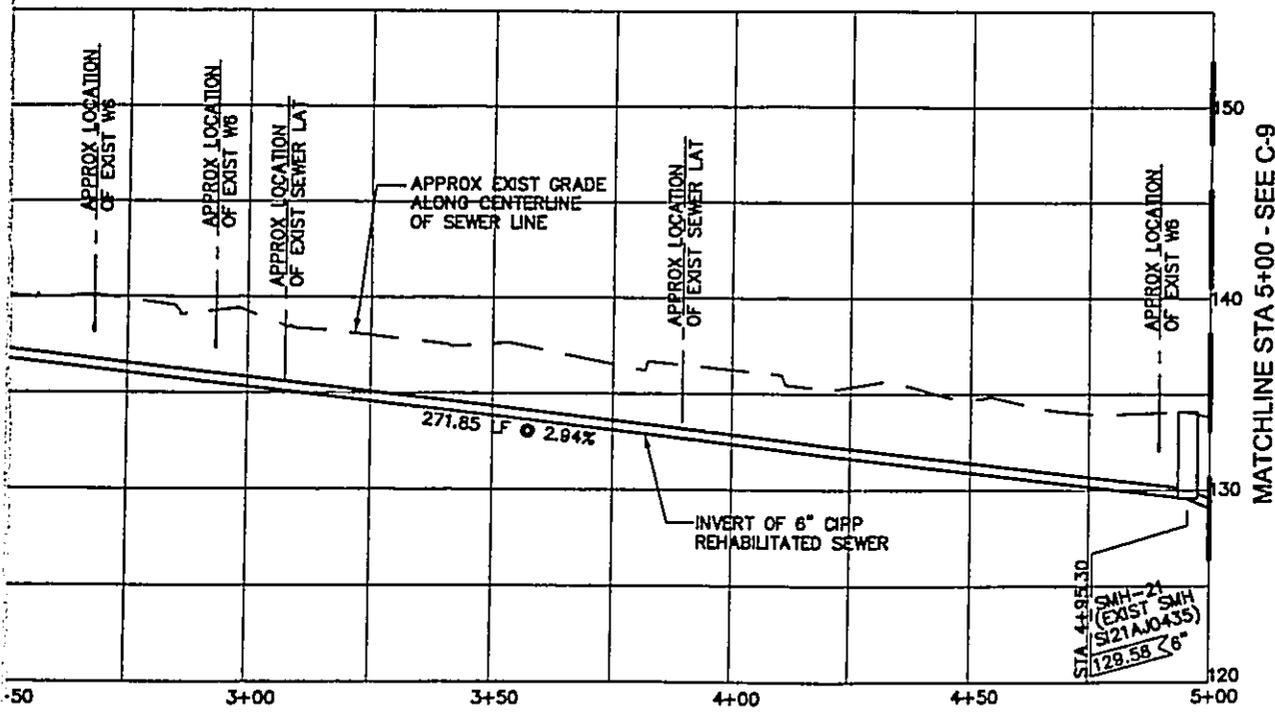
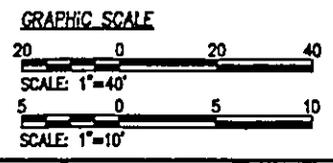
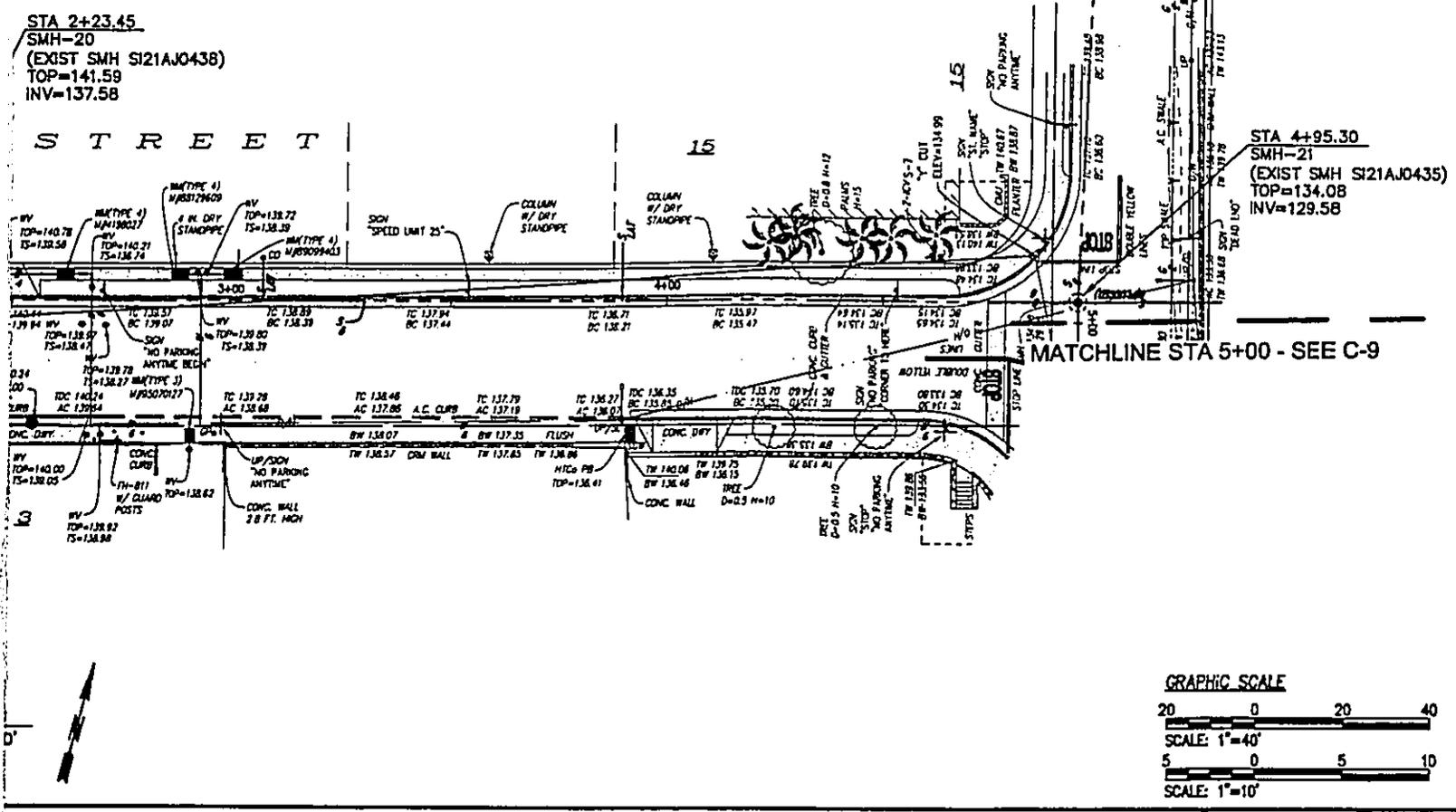


PLAN
SCALE: 1" = 40'



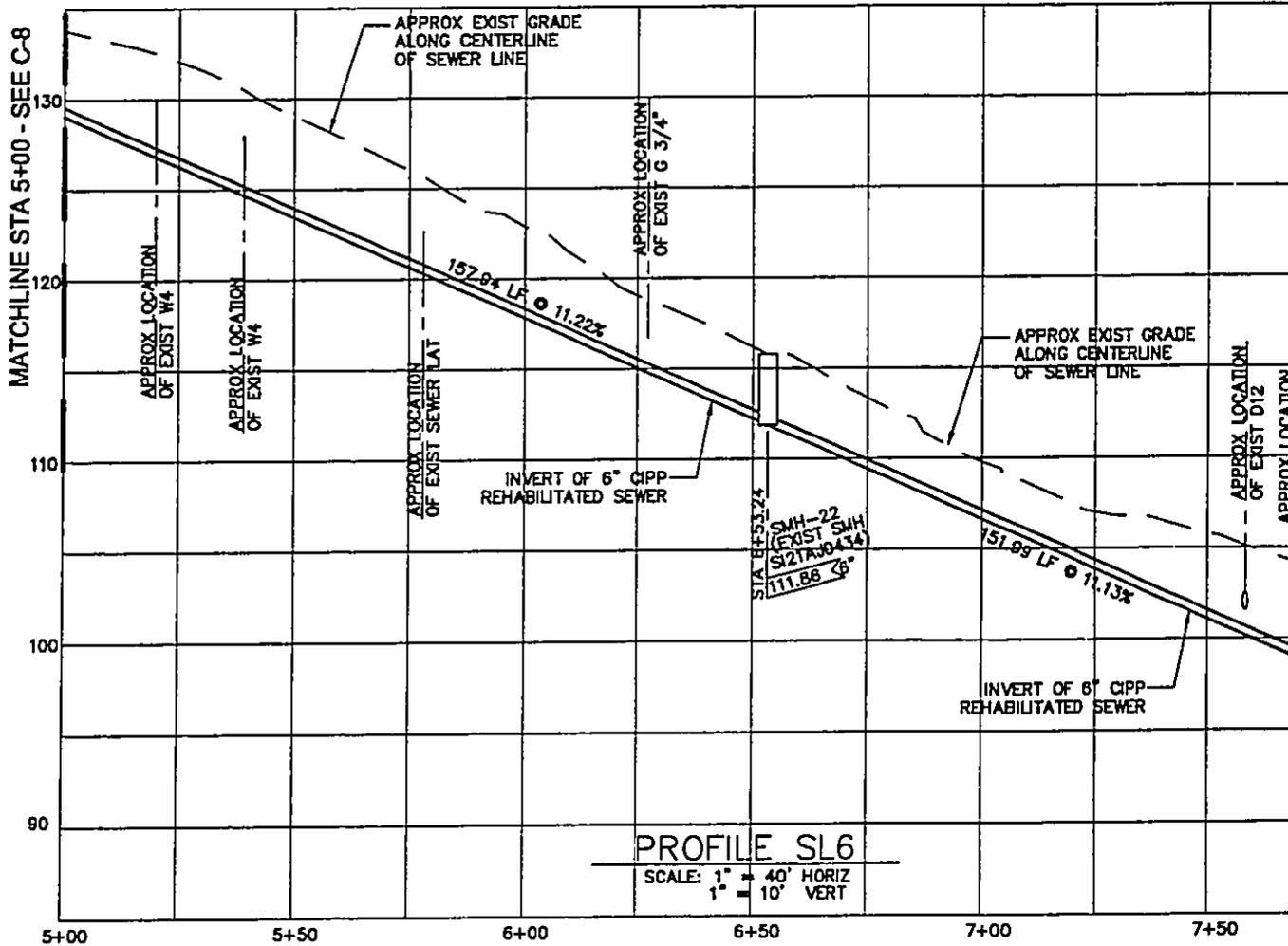
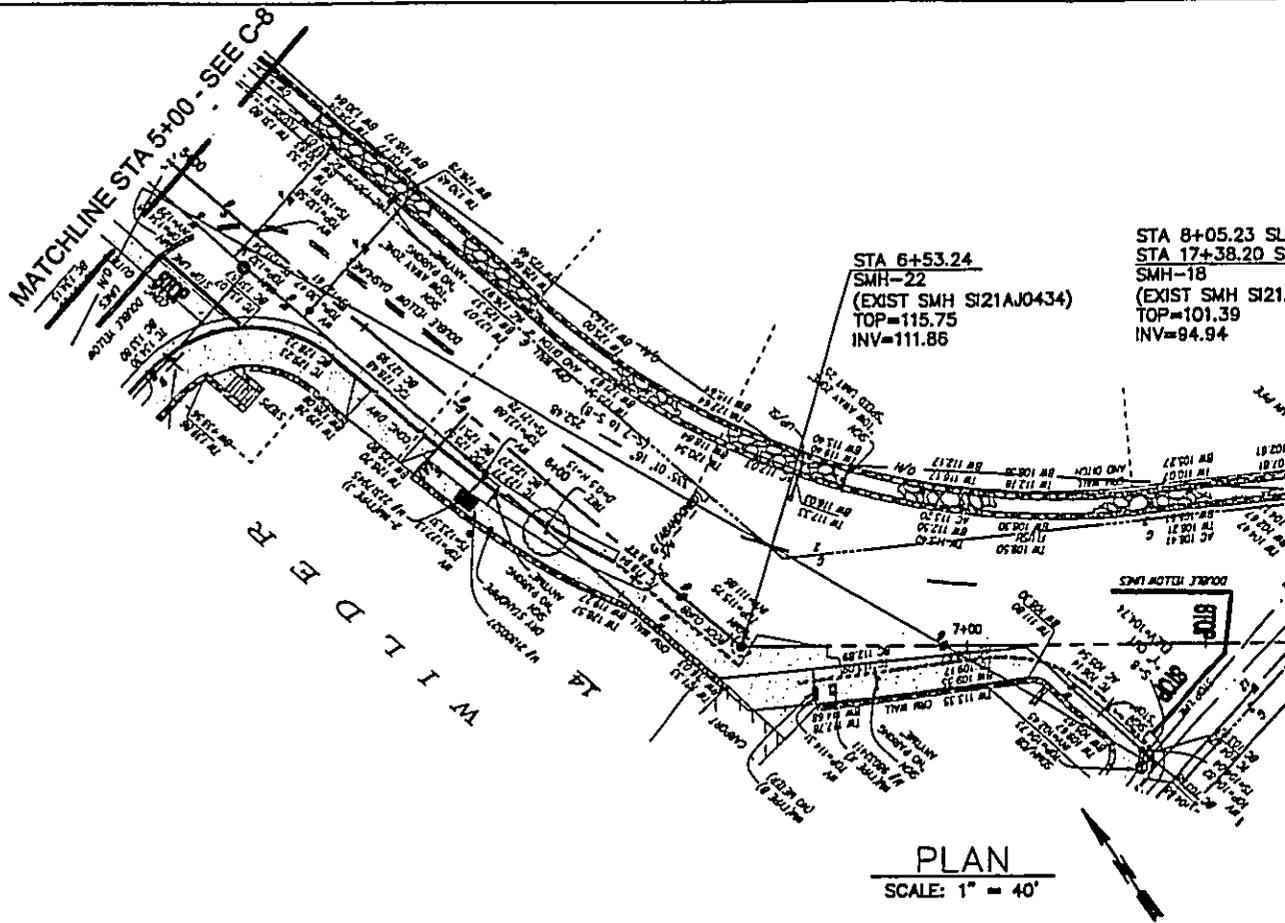
PROFILE SL5
SCALE: 1" = 40' HORIZ
1" = 10' VERT

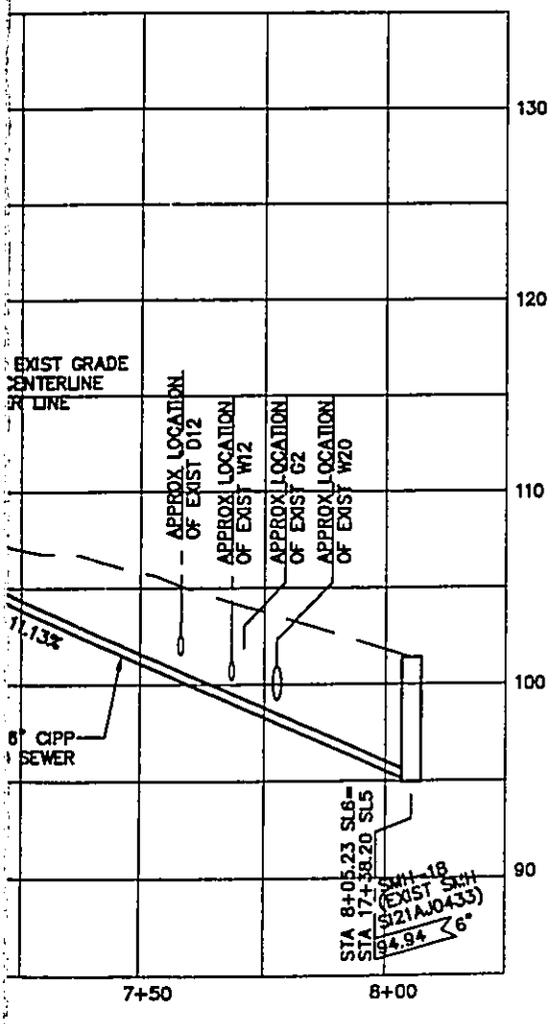
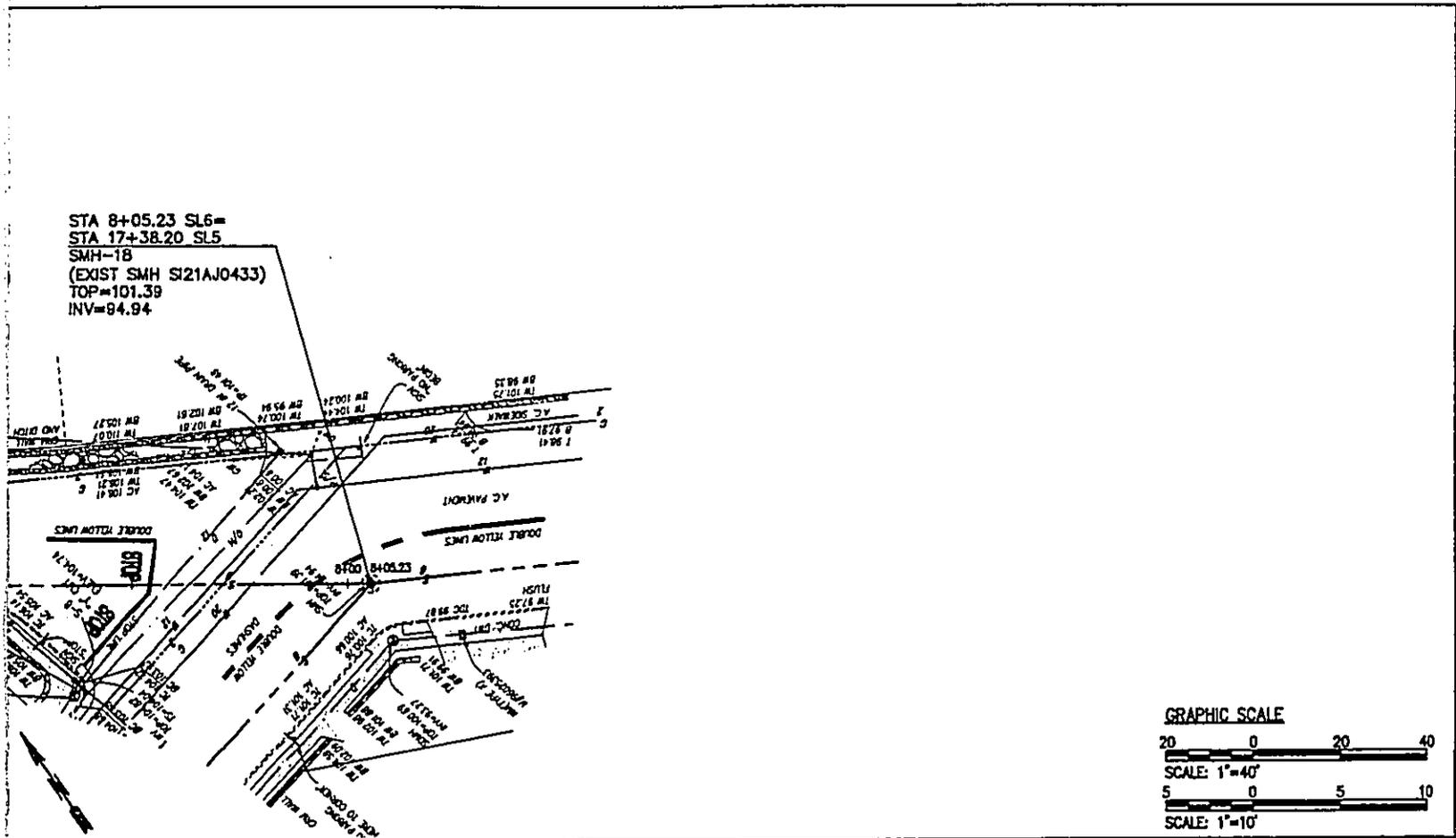




6
RIZ
RT

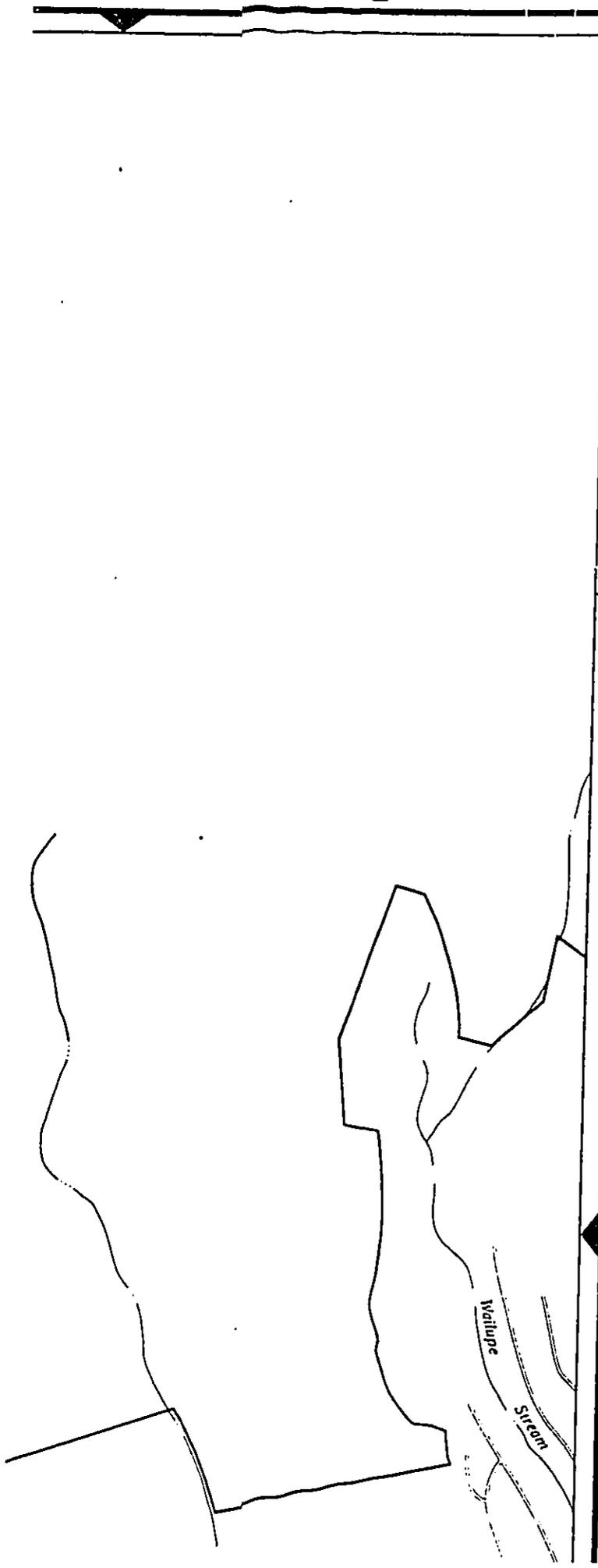
APPENDIX A	
PROJECT:	SMPR3 - MAGAZINE STREET HONOLULU, OAHU, HAWAII
ITEM:	PLAN AND PROFILE - SEWER LINE 6 SPENCER STREET STA 0+00 TO STA 5+00
C-8	EARTH TECH





APPENDIX A	
PROJECT:	SMPR3 - MAGAZINE STREET HONOLULU, OAHU, HAWAII
ITEM:	PLAN AND PROFILE - SEWER LINE 6 WILDER AVENUE STA 5+00 TO STA 8+05.23
C-9	EARTH  TECH

APPENDIX B
FLOOD INSURANCE RATE MAP
AND SPECIAL MANAGEMENT AREA
BOUNDARY MAP



LEGEND



SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- ZONE A** No base flood elevations determined.
- ZONE AE** Base flood elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- ZONE AD** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE A99** To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
- ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.



FLOODWAY AREAS IN ZONE AE



OTHER FLOOD AREAS

- ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.



OTHER AREAS

- ZONE X** Areas determined to be outside 500-year flood plain.
- ZONE D** Areas in which flood hazards are undetermined.



Flood Boundary



Floodway Boundary



Zone D Boundary

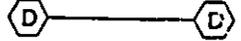


Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.



513

Base Flood Elevation Line; Elevation in Feet*



Cross Section Line

(EL 987)

Base Flood Elevation in Feet Where Uniform Within Zone*

RM7X

Elevation Reference Mark

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for flood insurance and flood plain management purposes; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside Special Flood Hazard Areas.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

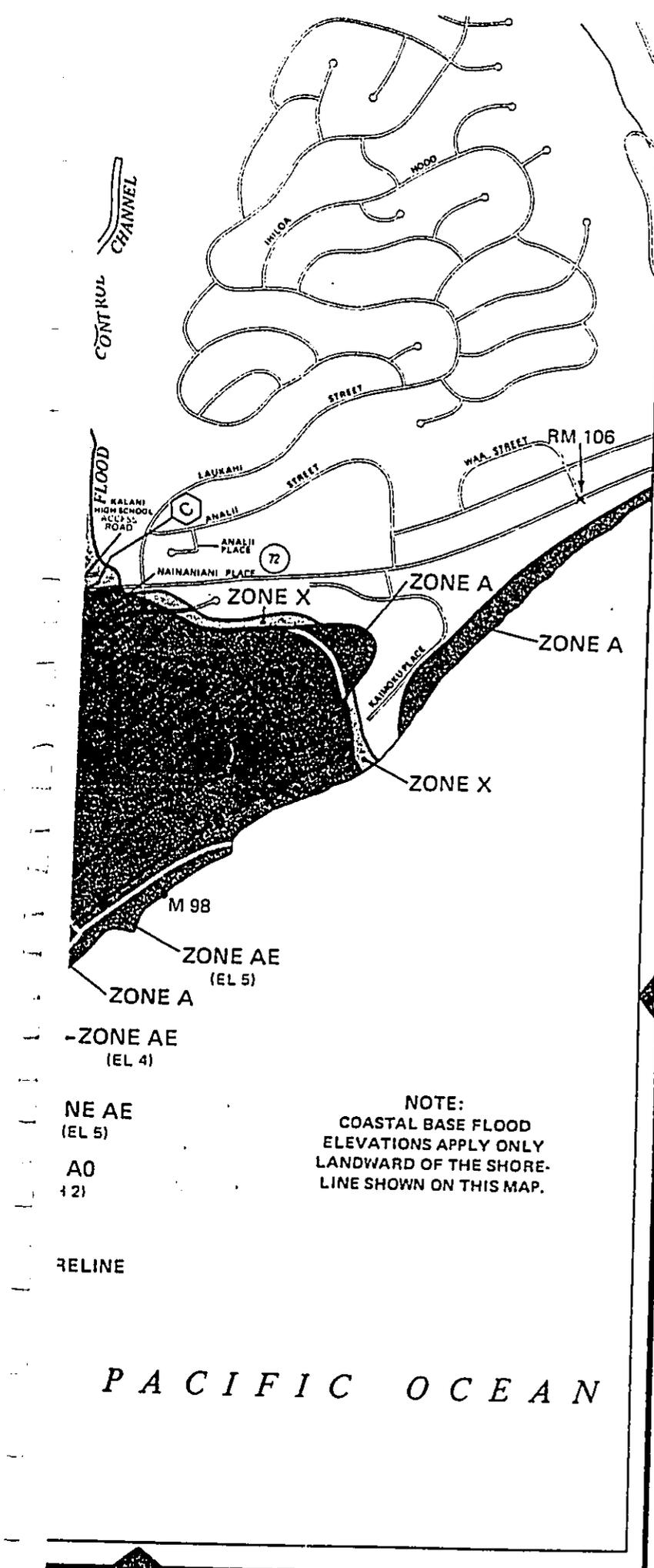
Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

Coastal base flood elevations apply only landward of the shoreline.

Elevation reference marks are described in the Flood Insurance Study Report.

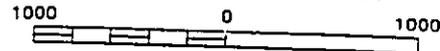
DOCUMENT CAPTURED AS RECEIVED



To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.



APPROXIMATE SCALE IN FEET

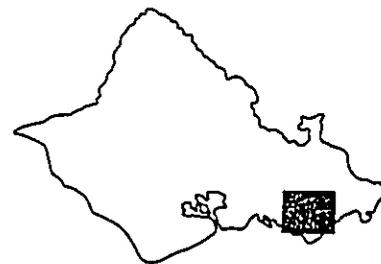


NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY AND COUNTY OF HONOLULU, HAWAII

PANEL 120 OF 135
(SEE MAP INDEX FOR PANELS NOT PRINTED)



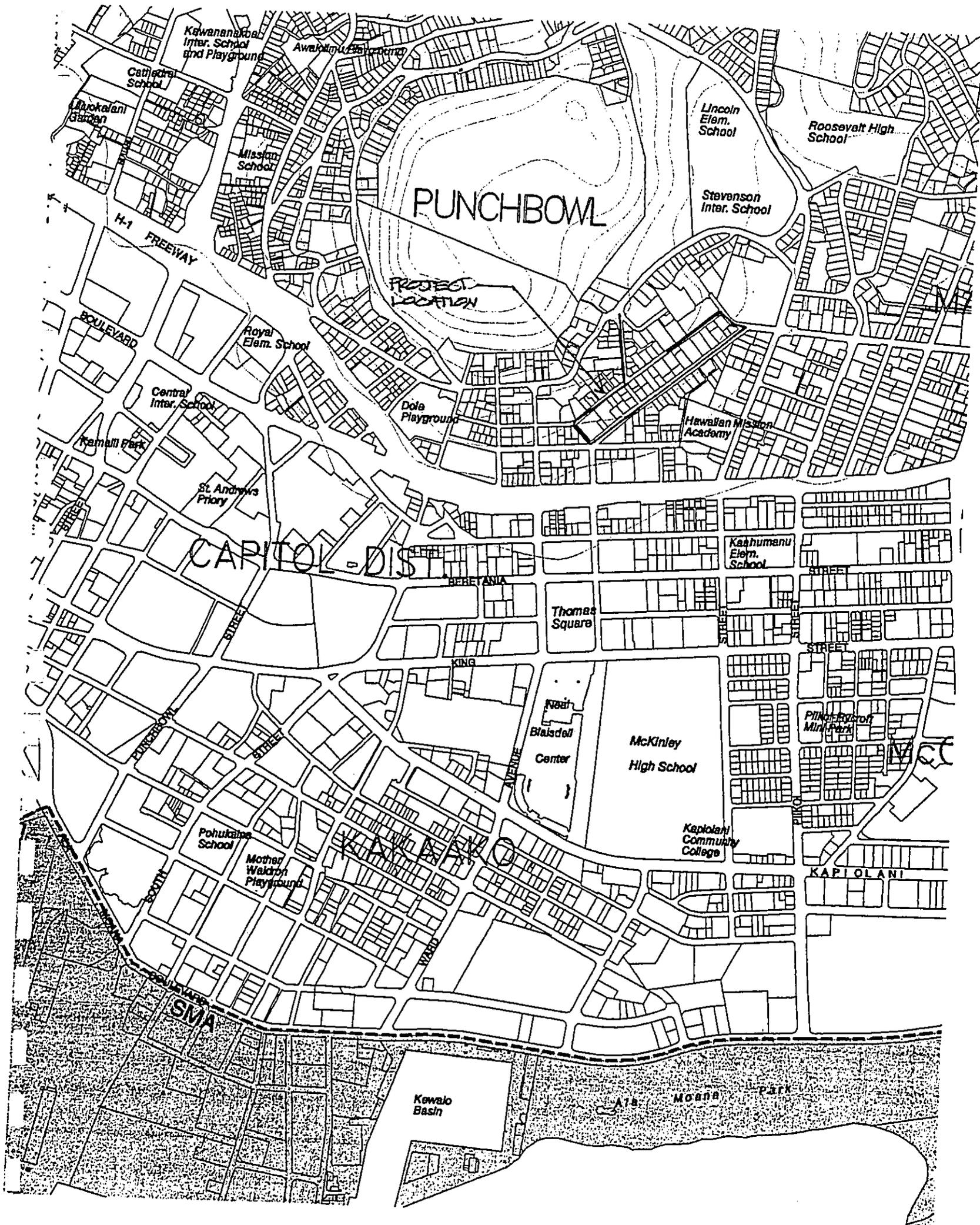
PANEL LOCATION

COMMUNITY-PANEL NUMBER
150001 0120 C

MAP REVISED:
SEPTEMBER 4, 1987



Federal Emergency Management Agency

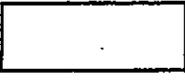
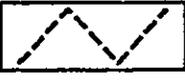
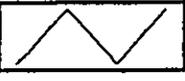
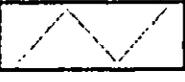


7/22/85 12:45 PM

SPECIAL MANAGEMENT AREA

EWA

LEGEND

-  SPECIAL MANAGEMENT AREAS
-  NOT IN SMA
-  SMA BOUNDARY LINE
-  DP BOUNDARY LINE
-  PARCELS
-  COUNTOUR LINES

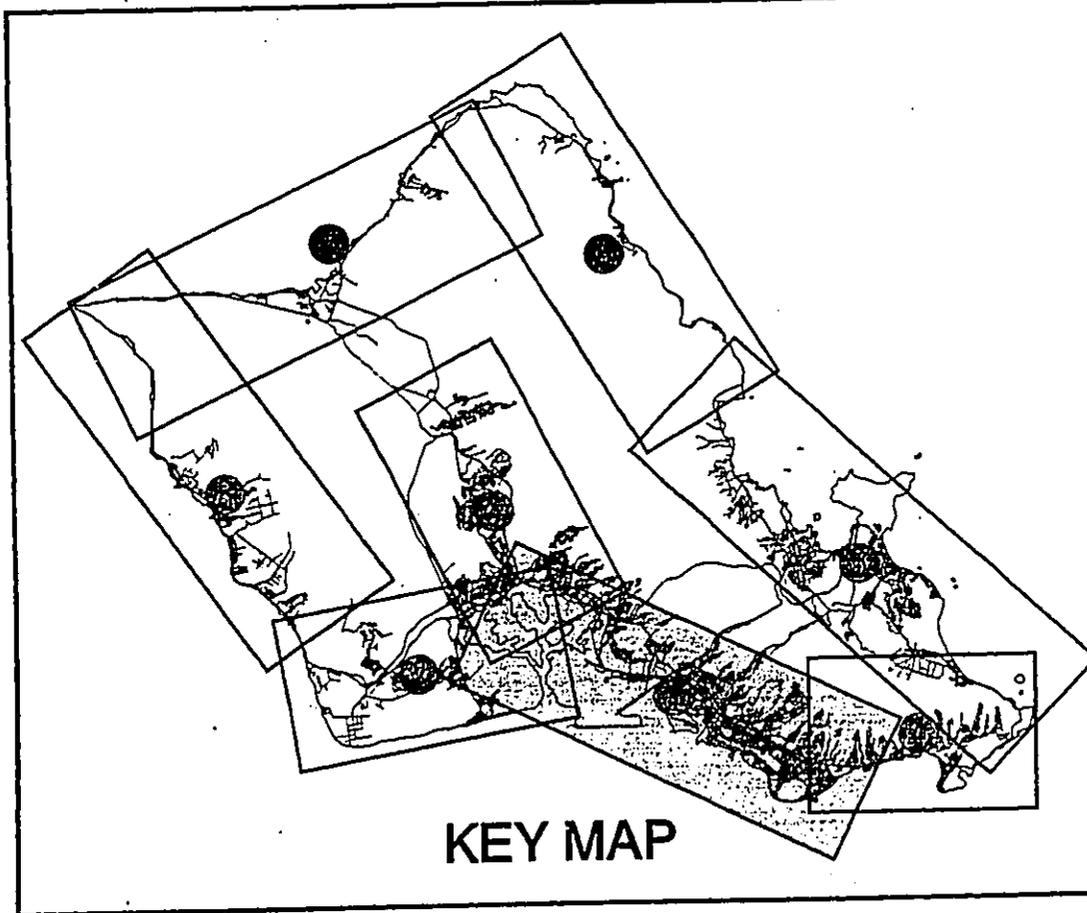
Notes:

The SMA includes:

1. Those lands on the island of Oahu which lie between the shoreline and the SMA boundary line.
2. The islands within three (3) miles offshore of Oahu, including but not limited to those shown on the SMA maps.

ORD. NO. 85-105 DATE: DEC. 2, 1985





- KEY AREAS**
- 1 PRIMARY URBAN CENTER
 - 2 EWA
 - 3 CENTRAL OAHU
 - 4 EAST HONOLULU
 - 5 KOOLAUPOKO
 - 6 KOOLAULOA
 - 7 NORTH SHORE
 - 8 WAIANAE

Date Plotted: 07/03/96

APPENDIX C
RESPONSE TO COMMENTS –
DRAFT ENVIRONMENTAL ASSESSMENT

SMPR3 - Magazine Street
 Response to Comments for
 Draft Environmental Assessment

Department of Design and Construction			
SMPR3 - Magazine Street			
Response to Comments - Draft Environmental Assessment			
Reviewer	Location	Description	Action
OEQC	General	Please carefully review the letters received from the State Historic Preservation Division and incorporate their comments in the impact and mitigation sections of the environmental assessment.	Complied.
Department of Transportation	General	Thank you for requesting our review of the proposed sewer rehabilitation project's draft environmental assessment. The proposed project will not impact our State highway facilities.	Noted.
Honolulu Police Department	General	We do not object to this proposal. However, we are concerned about the traffic congestion that will result at the intersection of Prospect Street, Magazine Street, and Mauaihi Place. Since Prospect Street is a major artery to Ward Avenue, we would like to support item 3 of Section 6.1, Impacts During Construction (page 25) of the document.	Noted.
Oceanic Cable	General	Oceanic Cable has no comments at this time.	Noted.
DDC, Design Branch	General	Will ADA improvements be required?	ADA improvements may be required upon finalization of the Accessibility Policies for Public Rights-of-Way, prepared for the City and County of Honolulu under the requirements of the Americans with Disabilities Act of 1990 (ADA).
DDC, Design Branch	General	What City Agency is responsible for the City's new road resurfacing requirements? Check how this will affect the project.	Our understanding of the Managing Director's current policy is for the Department of Design and Construction (DDC) to resurface any roadways that are excavated as part of a DDC project. Road resurfacing added to project scope and costs.
DDC, Design Branch	General	DPP needs to check if the project will be impacted (by ADA improvements and resurfacing requirements).	Noted.

Reviewer	Location	Description	Action
DDC, Design Branch	General	If ADA improvements and resurfacing are required, determine the extent and scope of the improvements and resurfacing. Project impacts may need to be increased in the EA.	Road resurfacing confirmed and added. Scope of ADA improvements required pending finalization of the Accessibility Policies for Public Rights-of-Way.
DDC, Design Branch	2	Was the Department of Health (DOH), Wastewater Branch consulted for the EA?	Yes, text revised.
DDC, Design Branch	2	Were State legislators consulted for the EA?	Yes, text revised.
DDC, Design Branch	2	Was the Department of Environmental Services consulted for the EA?	Yes, as noted.
DDC, Design Branch	2	Change "GTE Hawaiian Telephone" to "Verizon".	Complied.
DDC, Design Branch	3	Check on potential approvals required by the Department of Environmental Services.	Complied. Text revised.
DDC, Design Branch	10	In the first sentence of the fourth paragraph, discuss the size of the insertion pits and their depths.	Complied.
DDC, Design Branch	11	In the fourth sentence of the first paragraph, discuss the size of the lateral trenching and their depths.	Complied.
DDC, Design Branch	11	In the first paragraph, what is the production rate for lateral work? What is the total number of laterals involved?	Lateral production rate is approximately 1/2 to one day per lateral. Approximately 40 laterals are within the pipe bursting portion and will require reconnection.
DDC, Design Branch	11	In the second paragraph, discuss maintaining sewer service.	Complied.
DDC, Design Branch	12	In the first paragraph, if replacement pipe is to be HDPE to match the pipe used for bursting, how will the connections be made? By in-trench butt fusion? Do contractors have equipment? Can both ends be fused? Repair coupling may be required on one end. Electrofusion couplings have not been approved for use, thus far, for HDPE.	The connection will most likely be made with a Femco coupling, available to and used by local contractors.

Reviewer	Location	Description	Action
DDC, Design Branch	19	Can CIPP installation handle the slopes involved? Will the tube be able to withstand the hydraulic pressures?	Yes, CIPP installation using water as the curing agent can be done in pipes with grades greater than 11 percent. If this installation proves difficult, steam and hot air can be used as an alternate curing fluid.
DDC, Design Branch	19	In the last sentence of the fourth paragraph, could resin odors also be considered a short-term disruption?	While resin odors are a possibility, they will not be strong enough to require temporary air quality permitting and are not expected to pose a significant disruption to the community.
DDC, Design Branch	19	In the fourth paragraph, discuss the temporary provisions to be provided (bypass pumping) during the "temporary suspension of lateral service".	Complied.
DDC, Design Branch	20	In the second paragraph, will odors pose an environmental impact?	Odors are not expected to pose an environmental impact.
DDC, Design Branch	20	In the second paragraph, discuss the possibility of night work.	Provided in the Socioeconomic Characteristics portion of this section (previous paragraph).
DDC, Design Branch	20	In the sixth sentence of the third paragraph, include hand troweled epoxy coating as well.	Complied.
DDC, Design Branch	24	In the sixth paragraph, discuss the requirement of a noise variance should night work be required. A public hearing will be required.	Complied. Text revised.
DDC, Design Branch	25	In paragraphs two and three with respect to "inconvenienced" and "disrupted", the General Conditions of construction contracts specify that satisfactory measures must be provided to ensure continuous service.	Noted.
DDC, Design Branch	25	In the fifth paragraph, would "proper characterization" include identifying pollutants? Better specify the type of characterization required for lay readers.	Complied.
DDC, Design Branch	26	Does the funding specified in the first paragraph for the pipe bursting with partial CIPP rehabilitation include provisions for the in-line replacement portion?	Yes.
DDC, Design Branch	27	Would "conformance to permit requirements" also be a short-term impact mitigation measure in addition to the "normal construction practices" specified in the last paragraph?	Yes, text revised.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
WEB SITE ADDRESS: www.cc.honolulu.hi.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR
GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR

WWDE.P 01-403

October 3, 2001

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
Department of Health
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

**Subject: Sewer Rehabilitation and Infiltration & Inflow Minimization Plan (6th Year),
Planning Assistance and Miscellaneous Services, SMPR3 – Magazine Street
TMK: 2-2-4 & 5, 2-4-14, 15, 16, 17, 18 & 31, Makiki, Oahu, Hawaii
Draft Environmental Assessment – Response to Comments**

The City and County of Honolulu, Department of Design and Construction (DDC) has reviewed your comments related to the Draft Environmental Assessment (EA) for the subject project and submit the following response:

DDC has reviewed the letters received from the State Historic Preservation Division and incorporated their comments into the "Potential Impacts and Proposed Mitigation Measures" section of the Final Environmental Assessment.

Should you have any questions, please contact Mr. Cedric Takamoto (527-5392) or Mr. Neil Asato (523-4343) of our Wastewater Design and Engineering Division.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Rae M. Loui".

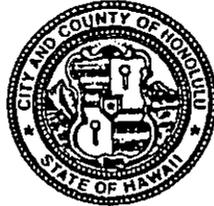
for RAE M. LOUI, P.E.
Director

CT:jy

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4564 • Fax: (808) 523-4567
Web site: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



RAE M. LOUI, P.E.
DIRECTOR

GEORGE T. TAMASHIRO, P.E.
DEPUTY DIRECTOR

ERIC G. CRISPIN, AIA
ASSISTANT DIRECTOR
WWDE.P 01-404

October 3, 2001

MEMORANDUM

TO: MR. LEE D. DONOHUE, CHIEF
HONOLULU POLICE DEPARTMENT

FROM: RAE M. LOUI, P.E., DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION *Rae M. Loui*

SUBJECT: SEWER REHABILITATION AND INFILTRATION & INFLOW
MINIMIZATION PLAN (6th YEAR), PLANNING ASSISTANCE AND
MISCELLANEOUS SERVICES, SMPR3 - MAGAZINE STREET
TMK: 2-2-4 & 5, 2-4-14, 15, 16, 17, 18 & 31, MAKIKI, OAHU, HAWAII
DRAFT ENVIRONMENTAL ASSESSMENT - RESPONSE TO COMMENTS

The City and County of Honolulu, Department of Design and Construction (DDC) has reviewed your comments related to the Draft Environmental Assessment (EA) for the subject project and submit the following response:

DDC acknowledges your concern for traffic congestion that could occur due to project activities, and appreciates your offer to support traffic control activities during the subject project.

Should you have any questions, please contact Mr. Cedric Takamoto (527-5392) or Mr. Neil Asato (523-4343) of our Wastewater Design and Engineering Division.

cc: OEQC

, CT:jy -

APPENDIX D
AGENCY COMMENTS ON
DRAFT ENVIRONMENTAL ASSESSMENT

BENJAMIN J. CAYETANO
GOVERNOR



GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4188

July 30, 2001

Ms. Rae M. Loui, Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawai'i 96813

Dear Ms. Loui:

Subject: Draft Environmental Assessment for the SMPR3 - Magazine Street Sewer Rehabilitation Project, Oahu

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

1. Please carefully review the letters received from the State Historic Preservation Division and incorporate their comments in the impact and mitigation sections of the environmental assessment.

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

Sincerely,

A handwritten signature in cursive script that reads "Genevieve Salmonson".

Genevieve Salmonson
Director

c: Earth Tech, Inc.

W-16-2001 11:18 FROM WASTEWATER MGMT P&SC/E&C TO

95238950 P.02

01-1541

BENJAMIN J. CAYETANO
GOVERNOR



BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
JADINE Y. URASAKI

RECEIVED

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097
AUG 14 2001

'01 AUG 16 09:09

DESIGN & CONSTRUCTION
DIVISION

IN REPLY REFER TO:
HWY-PS
2.3736

Ms. Rae M. Loui *RL*
Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 2nd Floor
Honolulu, Hawaii 96813

Dear Ms. Loui:

Subject: Draft Environmental Assessment, Sewer Rehabilitation, SMPR3-Magazine Street,
Makiki, TMK:2-2-4- & 5, 2-2-14 to 18 & 31

Thank you for requesting our review of the proposed sewer rehabilitation project's draft environmental assessment.

The proposed project will not impact our State highway facilities.

If there are any questions regarding our comment, please contact Ronald Tsuzuki, Head Planning Engineer, Highways Division, at 587-1830.

Very truly yours,

Brian K. Minaii
BRIAN K. MINAAI
Director of Transportation

01-1472 WDS

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111

http://www.honolulu.gov
www.co.honolulu,hi.us

JEREMY HARRIS
MAYOR

01 AUG 10 AS 09

LEE D. DONOHUE
CHIEF



DESIGN & CONSTRUCTION
DIV OF INFRASTRUCTURE
DESIGN & CONSTRUCTION

MICHAEL CARVALHO
ROBERT AU
DEPUTY CHIEFS

OUR REFERENCE CS-DL

August 8, 2001

TO: RAE M. LOUI, P.E., DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

FROM: LEE D. DONOHUE, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

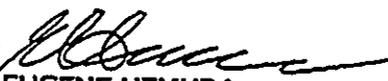
SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) REVIEW
SMR3 MAGAZINE STREET
TMK 2-2-4 AND 5, 2-2-14, 15, 16, 17, 18 AND 31

Thank you for the opportunity to review and comment on the subject project.

We do not object to this proposal. However, we are concerned about the traffic congestion that will result at the intersection of Prospect Street, Magazine Street, and Maunaihi Place. Since Prospect Street is a major artery to Ward Avenue, we would like to support item 3 of section 6.1, Impacts During Construction (page 25) of the document.

If there are any questions, please call Carol Sodetani of the Support Services Bureau at 529-3658.

LEE D. DONOHUE
Chief of Police

By 
EUGENE UEMURA
Assistant Chief of Police
Support Services Bureau

Serving and Protecting with Aloha



200 Akamainui Street • Miiilani, Hawaii 96789-3999 • Telephone: (808) 625-2100

July 19, 2001

'01 JUL 23 11:15

Ms. Rae M. Loui, P.E.
Director
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

DESIGN & CONSTRUCTION
DIVISION

RECEIVED
DEPT OF DESIGN & CONSTRUCTION
C & C OF HONOLULU
01 JUL 20 PM 1:28

Dear Ms. Loui:

Subject: SMPR3 – Magazine Street
TMK 2-2-4 & 5, 2-2-14, 15, 16, 17, 18, & 31
Draft Environmental Assessment (EA) Review

Thank you for the opportunity to review and comment on the proposed sewer rehabilitation project.

Oceanic Cable has no comments at this time. Please call Randy Makizuru, Area Engineer, at 625-8346 if you have any questions.

Sincerely,

Alvin Park
Alvin Park
Supervising Engineer

Cc: Randy Makizuru
Office File

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00701-2001 10-12 ENVIRONMENTAL

01 JUL 31 10:17 AM
LHO 5

RECEIVED

01 JUL 31 08:53

DESIGN & CONSTRUCTION
DIV OF THE
DESIGN

WWDE.CS 01-081

July 31, 2001

MEMORANDUM

TO: MR. JAY K. HAMAI
PLANNING BRANCH

VIA: MR. JAMES K. HONKE, CHIEF *James*

FROM: GUY INOUE *Guy Inoue*
DESIGN BRANCH

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR SMPR3 -
MAGAZINE STREET, TMK: 2-2-4 & 5, 2-2-14 thru 18 & 31.

Per your memorandum dated July 13, 2001, we return the attached Draft Environmental Assessment (EA). Our comments have been annotated in the attached Draft EA. Please return these check sets when subsequent submittals are forwarded for our review and approval.

Should you have any questions, please contact Alan Distajo at extension 4963 or Lynn Kurashima at extension 6707.

Attachments (2)

DOCUMENT CAPTURED AS RECEIVED

**Sewer Rehabilitation and
Infiltration & Inflow Minimization Plan (6th Year),
Planning Assistance and Miscellaneous Services**

Draft Environmental Assessment

**SMPR3 - Magazine Street
Makiki, Oahu, Hawaii**

**Submitted pursuant to Chapter 343,
Hawaii Revised Statutes**

**Prepared for:
Department of Design and Construction
City and County of Honolulu**

Responsible Official: _____
Rae M. Loui, P.E.

Date: _____

**Prepared by:
Earth Tech, Inc.
700 Bishop St. Suite 900
Honolulu, Hawaii 96813**

April 2001



1.2 AGENCIES TO BE CONSULTED

State of Hawaii

- Department of Health (DOH)
 - Clean Air Branch
 - Clean Water Branch
 - Office of Hazard Evaluation and Emergency Response
 - Safe Drinking Water Branch
 - Noise Control
 - Office of Environmental Quality Control
 - Department of Land and Natural Resources (DLNR), Historic Preservation Division
- state legislators?
- ← Wastewater Branch?

City and County of Honolulu

- Department of Environmental Services
- Department of Design and Construction
- Department of Planning and Permitting
 - Civil Engineering Branch
 - Traffic Review Branch
 - Wastewater Branch
 - Subdivision Branch
- Department of Transportation Services
- Facility Maintenance Department
- Council Member Andy Mirikitani
- Neighborhood Commission Office
- Police Department
- Fire Department
- Honolulu Public Transit Authority

ENV?

Utilities

- Board of Water Supply
- Hawaiian Electric Company
- The Gas Company
- Verizon
- ~~STE Hawaiian Telephone~~
- Oceanic Cable

Community Groups

- Makiki Neighborhood Board

Planning -
Need to check if project will be impacted. If so, determine extent and scope of ADA and resurfacing improvements to be req'd.

} ADA improvements?
City Agency responsible for City's new road resurfacing requirements? Check how this will affect project.

2

project impacts may need to be increased in EA.

1.3 APPROVALS AND PERMITS REQUIRED**Approvals**

- State of Hawaii
 - Department of Health:
 - Wastewater Branch (for construction plan approval)
- City and County of Honolulu
 - Department of Planning and Permitting:
 - Site Development Division
 - Civil Engineering Branch (for construction plan approval)
 - Traffic Review Branch (for construction plan approval)
 - Wastewater Branch (for construction plan approval)

ENV**Permits**

- State of Hawaii
 - Department of Health:
 - Clean Air Branch
 - Initial Noncovered Source Permit
 - Noise, Radiation and Indoor Air Quality Branch
 - Community Noise Permit; and
 - Community Noise Variance
- City and County of Honolulu
 - Department of Planning and Permitting:
 - Building Division
 - Building Permit for Building, Electrical, Plumbing, Sidewalk/Driveway, and Demolition Work
 - Land Use Permits Division
 - Development Plan Public Facilities Map Amendment Permit
 - Site Development Division
 - Grubbing, Grading, and Stockpiling Permit; and
 - Permit to Excavate Public Right-of-Way (Trenching)
 - Department of Transportation Services:
 - Traffic Signals & Technology Division
 - Street Usage Permits (Street Usage Permit)
 - Department of Environmental Services:
 - Water Quality Division
 - Regulatory Control Branch
 - Industrial Wastewater Discharge Permit for Temporary Users
(Precautionary permit for release of CIPP curing water into the City's sewer system)

4.2 HYDRAULIC ANALYSIS

The City's INFIX ADJUSTED flow model uses "as-built" pipe inverts and lengths to estimate the full flow capacity of the existing sewer. Results from this analysis indicate that the existing sewer alignment within the project limits has adequate full flow capacity to convey the peak flow during a 2-year, 6-hour design storm for existing conditions, but not for future conditions in the year 2020. A topographic survey conducted in October 1999 verified the "as-built" pipe inverts and lengths, supporting the accuracy of the estimated full flow sewer capacities.

Increasing the sewer diameter from 6-inch to 8-inch by pipe bursting will increase the full flow capacity of the sewer to beyond that required to convey future peak wastewater flows, and will meet current City standards for minimal trunk sewer diameter. Other portions of the sewer with adequate hydraulic capacity will be rehabilitated with CIPP to avoid conflicts with minimal ground coverage, frequent utility crossings, and requirements for archaeological monitoring associated with pipe bursting.

4.3 PIPE BURSTING

Approximately 3,400 lf of existing sewer will be reconstructed by pipe bursting. In general, pipe bursting reconstructs damaged pipelines by pulling segments of new pipe through the existing pipe from an insertion pit excavated at one end of the sewer line to be replaced. Pipe bursting is well suited for this project because it provides a new pipe along the existing sewer alignment without excessive trenching. Impacts to the community occur at locations of the insertion pits and lateral reconnections. Minor vibrations associated with pipe bursting must be monitored in areas adjacent to utilities and structures. Damage to existing utilities in close proximity to the bursting tool may occur. In these areas, the utility crossings will be exposed and the crossing utility protected from the bursting tool during the pipe installation to reduce potential for damage. A non-impact method of pipe bursting is recommended which employs a hydraulically powered winch to pull a pipe splitter device and expansion cone. This method of pipe bursting is relatively shock free and the hydraulic system minimizes noise level, making it suitable for work in the residential areas.

discuss size of pits, depths

Prior to pipe bursting, traffic control will be set up around the insertion pit and the segment of sewer to be rehabilitated will be cleaned and inspected with CCTV. The segment will then be isolated from the main collection system with a temporary diversion. Backup pumps and generators will be kept onsite as a safety precaution. Diversion lines will require protection at traffic crossings and driveways. Protection usually consists of line placement in shallow trenches and steel plate covers.

discuss
size of
trench
req'd,
dep ths

With wastewater flows diverted around the segment of sewer to be reconstructed, pipe bursting operations can begin. Once inserted, the expanding head breaks the existing pipe, and pushes it into the surrounding pipe bedding, making way for the new replacement pipe. High Density Polyethylene (HDPE) pipe is typically used for the replacement pipe. Existing laterals connected to the old pipe will usually be damaged by the expanding head, and will require reconstruction and reconnection by trenching. The production rate of pipe bursting is approximately 300 lf per day plus construction time for insertion pits (approximately one week per pit). An overview of the pipe bursting procedure is provided on Figure 2. The overall project alignment is provided on Figure 3, and plan and profile drawings of the project alignment are provided in Appendix A for reference.

Production rate for lateral work? Total laterals involved?

Socioeconomic Characteristics

The estimated construction cost for the pipe bursting portion of the project is \$1,210,000. Pipe bursting contractors are available on-island, and project revenues will be returned to the local economy. Short-term community disruptions from the project include traffic delays, noise associated with trenching and other construction activities, and temporary suspension of lateral service. Disruption to the community will be minimized with detours, noise monitoring, and public notification of projected project activities. Normal working hours for pipe bursting operations will be between 8:30 a.m. and 3:30 p.m., Monday through Friday. However, both day and night work will be required to maintain temporary diversion operations.

discuss maintaining sewer service

Environmental Characteristics

Excavation activities associated with insertion pits and lateral reconnections during pipe bursting will have temporary impacts on the environment. Operation of construction and excavation equipment will temporarily affect dust, noise and exhaust emission levels. Need for construction dewatering is not expected based on depth of groundwater. Temporary diversion operations will require monitoring to assure proper containment of wastewater flows and to reduce the risk for spills. Some short-term increase in odors may result during connection to existing sewer lines and during temporary diversion operations. Environmental impacts caused by the project will be mitigated by complying with applicable Federal, State and County standards and guidelines (see Section 6).

4.4 IN-LINE TRENCHING

Approximately 40 lf of existing sewer will be reconstructed by in-line trenching. Located within the pipe bursting alignment (shown on Figure 3), this portion of the sewer is sagging and must be

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replacement pipe is to be installed. How will the connections be made. By in-trench butt fusion? Do contractors have equipment? Can both ends be fused? Repair (see below) replaced by trenching because pipe bursting cannot correct pipe sags or offsets in existing sewers. In-line trenching will provide a new sewer in the same location as the existing deteriorated pipe. The procedure will require a work corridor for the entire 40-foot length of new sewer and will be disruptive to traffic and surrounding residences. Construction and temporary diversion operations will coincide with the pipe bursting occurring between SMHs S121AJ0430 and SMH S121AJ0431. Once the replacement pipe is installed, both of the ends will be connected to the newly pipe burst sewer. The topographic survey indicates that existing sewer laterals and other utilities are not located in close proximity to the trench replacement portion of sewer. The production rate of parallel trenching for replacement pipe is approximately 80 lf per day. A photograph of in-line trenching is provided on Figure 4. The overall project alignment is provided on Figure 3, and plan and profile drawings of the project alignment are provided in Appendix A for reference.

Socioeconomic Characteristics

The estimated construction cost for the small portion in-line trenching is \$20,000. This cost has been included in the previous estimate for pipe bursting because a single contractor will most likely do the required in-line trenching during the pipe bursting operations. Trenching contractors are available on-island, and project revenues will be returned to the local economy. Short-term community disruptions from the project include traffic delays, noise associated with trenching and other construction activities, and temporary suspension of lateral service.

Disruption to the community will be minimized with detours, noise monitoring, and public notification of projected project activities. Normal working hours for in-line trenching operations will be between 8:30 a.m. and 3:30 p.m., Monday through Friday. However, both day and night work will be required to maintain temporary diversion operations.

Environmental Characteristics

Excavation activities associated with in-line trenching will have temporary impacts on the environment. Operation of construction and excavation equipment will temporarily affect dust, noise and exhaust emission levels. Need for construction dewatering is not expected based on depth of groundwater. Temporary diversion operations will require monitoring to assure proper containment of wastewater flows and to reduce the risk for spills. Some short-term increase in odors may result during connection to the newly pipe burst sewer and during temporary diversion operations. Environmental impacts caused by the project will be mitigated by complying with applicable Federal, State and County standards and guidelines (see Section 6).

coupling may be rigid on 12 one end. Electrofusion couplings have not been approved for use, thus far, for HDPE.

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EMRI IN TECHNICAL
Can CIPP installation handle the slopes involved?
withstand the hydraulic pressures?

4.5 CIPP REHABILITATION

Due to minimal ground cover and required archaeological monitoring during excavation, approximately 800 lf of existing sewer will be rehabilitated with CIPP instead of being reconstructed by pipe bursting. Installation of CIPP is relatively quick, efficient, and less disruptive to the surrounding community than other rehabilitation methods because installation occurs at existing manholes without trenching. Prior to installing CIPP, traffic control will be set up around the staging area and the segment of sewer to be rehabilitated will be cleaned and inspected with CCTV.

The segment will then be isolated from the main collection system with a temporary diversion. Backup pumps and generators will be kept onsite as a safety precaution. Diversion lines will require protection at traffic crossings and driveways. Protection usually consists of line placement in shallow trenches and steel plate covers.

With wastewater flows diverted around the segment of sewer to be rehabilitated, installation of the CIPP liner can begin. A flexible liner impregnated with a liquid thermosetting resin will be installed into the existing pipe via an existing manhole. Fluid pressure will be used to push the liner through the existing sewer pipe, usually from an upstream manhole to a downstream manhole. Once in place, the water within the inverted lining will be circulated through a truck mounted boiler on the ground surface, increasing the temperature and curing the resin. The newly cured pipe will be capable of supporting all of the loads that were once supported by the existing pipe. When the water within the cured pipe has cooled, the ends will be cut to release the water downstream at a controlled rate into the existing sewer system. Finally, a remote controlled cutting device will be used to reinstate the laterals by cutting out dimples identified by CCTV inspection. Sections of CIPP are usually installed, cured and cooled within 24 hours. Draining, end cutting, lateral reinstatement, and final demobilization can take up to eight hours. An overview of CIPP installation is provided on Figure 5. The overall project alignment is provided on Figure 3, and plan and profile drawings of the project alignment are provided in Appendix A for reference.

Socioeconomic Characteristics

The estimated construction cost of the CIPP portion of the project is \$300,000. CIPP contractors are available on-island, and project revenues will be returned to the local economy. Short-term community disruptions from the project include noise, traffic delays, and temporary suspension of lateral service.

↳ discuss temporary provisions to be

↳ resin odors?

provided (bypass pumping)

Disruption to the community will be minimized with detours, noise monitoring, and public notification of projected project activities. Both day and night work will be required due to temporary diversion operations and CIPP installation and curing operations.

Environmental Characteristics

odors?

CIPP rehabilitation will have few environmental impacts. Temporary diversion operations will require monitoring to assure proper containment of wastewater flows and to reduce the risk for spills. Operation of installation equipment will temporarily increase noise levels and could increase exhaust emission levels. Environmental impacts caused by the project will be mitigated by complying with applicable Federal, State and County standards and guidelines (see Section 6).

Discuss possible night work

4.6 MANHOLE REHABILITATION

Approximately 22 existing manholes, or 150 vertical feet (vf) of manhole, will be rehabilitated with Portland cement with epoxy coating. Prior to Portland cement application, the manhole will be prepared by pressure washing to remove dirt, grease, loose aggregate, and other surface contaminants. Cracks and holes with active infiltration will be plugged with a hydrophilic polyurethane resin. Once all infiltration has been stopped, the Portland cement will be hand troweled or mechanically sprayed in 1/4-inch layers until a total thickness of 3/4-inch is reached. Epoxy will be applied to the cured cement surface to provide resistance to deterioration. The epoxy should be blended with synthetic reinforcing fibers and sprayed in layers until a thickness of approximately 60 mils is reached. Locations and top and invert elevations of the existing manholes to be rehabilitated are provided on the plan and profile drawings in Appendix A for reference.

include hand troweled epoxy coating as well

5. DESCRIPTION OF AFFECTED ENVIRONMENT

This section provides a description of the affected environment including topography, geotechnical characteristics, climate, land use, flora and fauna, historic sites and archeological resources, flood hazard, and special management areas.

5.1 TOPOGRAPHY

A topographic survey of the existing project location was performed by Control Point Surveying, Inc. on October 21, 1999. The topography of the project site is generally sloping with grades of about twelve percent or less. Elevations along the project alignment range from 93 to 193 feet above mean sea level. The sewer alignment is generally under asphalt roadway surfaces. Portions of the alignment along Prospect Street and along the eastern end of Spencer Street are under grassed

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If any archaeological resources are encountered in other locations within the project limits during construction, the Contractor shall contact a qualified archaeologist to monitor construction. A mitigation plan may need to be developed if any historic sites are encountered.

5.7 FLOOD HAZARD AND SPECIAL MANAGEMENT AREA

The Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM), Panel 120, shows the project area within Zone X, an area determined to be outside of the 500-year flood plain.

The City and County of Honolulu Subdivision Branch's Special Management Area (SMA) Map 1, Primary Urban Center, indicates that the project area lies outside of the SMA boundary.

The FIRM and SMA boundary maps for the project area are included in Appendix B for reference.

6. POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

This section summarizes foreseeable short-term and long-term project impacts and recommends potential mitigation measures. Some State and County regulations are referenced as guidelines for baseline environmental project conditions.

6.1 IMPACTS DURING CONSTRUCTION

1. The project is expected to take six to eight months to complete. Periodic noise from construction equipment such as excavators, trucks, compactors, pumps, generators, and pavers will disrupt residents near the project site. Pipe bursting and in-line trenching for replacement pipe will require a continuous construction effort that may affect noise levels for extended periods. These disruptions will be controlled with sound attenuating or abatement measures to reduce noise levels to below which the general population will be at risk. Restricting operational hours of the noisiest equipment will also minimize the disruptions to the adjoining community. The Contractor shall observe and comply with Public Health Regulations Title 11, Chapter 42 regarding noise control for Oahu. *Discuss noise variance should night work be req'd. Public hearing req'd.*
2. The Contractor shall keep the project area and surrounding area free from dust nuisance with measures such as water sprinkling, and limiting the area being worked on at any one time. The work shall be in conformance with the Air Pollution Control Standards and Regulations of the Department of Health. The Contractor shall be responsible for proper maintenance of all construction equipment and vehicles to minimize pollutant exhaust emissions.

3. Traffic passing through the project site will be disrupted while vehicles are diverted around staging areas and open trenches. Parking will be restricted on both sides of the street where applicable during construction to maintain existing traffic patterns. Traffic control by police officers and/or trained construction flagmen will moderate traffic flow.
4. Residences along the project alignment will be affected by the construction activities associated with the project. Access to residences will be maintained during the project. Residences may be inconvenienced in terms of driveway access and other road frontage usage, like mail service, when construction is directly fronting their lots. ← See Gen. Conditions of Construction Contracts - satisfactory measures must be provided to ensure continuous service.
5. Utility service for water, gas, wastewater, electricity, and telephone may be disrupted during construction activities. The Contractor shall protect all existing utilities within the project area during construction.
6. Whenever necessary, the Contractor shall properly sheet and brace excavations to make them safe and secure from possible slides, cave-ins and settlement. The sheet pilings shall extend sufficiently deep to stabilize excavated trench walls. Existing adjacent improvements and structures shall be properly supported with beams, struts or underpinning to fully protect them from damage.
7. The Contractor shall be responsible for properly disposing of spoils generated from construction activities. Solid and liquid spoils shall be separated on-site prior to disposal. Solids can be disposed of at Waimanalo Gulch Sanitary Landfill after proper characterization and liquids can be discharged for drying into a safe open area in accordance with applicable State and County requirements. for pollutants? specify for lay readers
8. The Contractor shall be responsible for properly disposing of hot water used during the CIPP curing process. Water used during the pipe rehabilitation process shall be disposed of into the sewer system in an environmentally safe manner in accordance with applicable State and County requirements.

6.2 LONG-TERM IMPACTS

The long-term impacts of this project are positive to the surrounding community. The project will provide a structurally sound and hydraulically adequate sewer to service the community. There are no long-term negative impacts associated with the implementation of this project.

7. FUNDING

in-line replacement portion?

Pipe bursting with partial CIPP rehabilitation, estimated at \$1,510,000, has been identified as the most feasible and favored construction method for this project. The City and County of Honolulu will use Capital Improvement Program funding to pay for this project. The project will not require direct assessments from the residents being served by these improvements.

8. DETERMINATION AND FINDINGS

This Draft Environmental Assessment is part of the first phase of the environmental review process that meets the requirements of HRS Chapter 343. After completing an assessment of the potential environmental effects of the proposed project and consulting with government agencies and interested parties, the proposing agency does not anticipate any significant impacts. This document supports a Finding of No Significant Impact (FONSI) based the following negative responses to HAR 11-200-12 significance criteria:

1. *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.* The proposed action does not involve an irrevocable commitment to loss or destruction of any natural or cultural resources. The project site has already been substantially altered from its natural condition. Any excavation done within the vicinity of Makiki Cemetery will be monitored by a qualified archaeologist per State Historic Preservation Division standards.
2. *Curtails the range of beneficial uses of the environment.* The proposed project is consistent with the City's General Plan and the Wastewater Branch's Design Standards, and will not curtail beneficial uses of the environment in the area. The proposed project will be compatible with the uses of the surrounding area.
3. *Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in HRS Chapter 343, and any revisions thereof and amendments thereto, court decisions, or executive orders.* The proposed action does not conflict with the State's long-term environmental policies or goals and guidelines. The proposed project is consistent with the State's Land Use Plan that is in concert with all applicable policies, goals and guidelines. No long-term environmental conflicts are foreseen.
4. *Substantially affects the economic or social welfare of the community or State.* The proposed action will have a positive short-term economic effect on the community from construction-

related activities. Revenues of approximately \$1,510,000 entering the economy during the construction phase will be the primary short-term economic benefit. Upon completion of the project, the economic climate should return to pre-existing conditions. The social welfare of the community will benefit from the improved reliability and life expectancy of the repaired sewer system.

5. *Substantially affects public health.* The proposed action will correct structural inadequacies in the sewer and restore full flow capacity to beyond estimated future peak wastewater flows. This action will improve environmental conditions that currently have the potential for adversely affecting public health. The short-term negative impacts associated with construction activities such as noise, dust, exhaust emissions, odor, damaged roadways, and traffic congestion will be mitigated as described in Section 6.
6. *Involves substantial secondary impacts, such as population changes or effects on public facilities.* The proposed action does not have secondary impacts. The existing sewer capacity will be increased and structural integrity will be restored.
7. *Involves a substantial degradation of environmental quality.* The proposed action does not involve a substantial degradation of environmental quality. The existing physical qualities of the surrounding areas will be preserved.
8. *Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.* The proposed action, neither individually nor cumulatively, has a considerable effect upon the environment nor involves a commitment for larger actions. The existing physical qualities of the surrounding areas will be preserved.
9. *Substantially affects a rare, threatened, or endangered species, or its habitat.* The proposed action does not substantially affect rare, threatened, or endangered species or habitats. There are no known rare, threatened, or endangered species or habitats associated with the project site.
10. *Detrimentially affects air or water quality or ambient noise levels.* The proposed action does not detrimentally affect the air or water quality or ambient noise levels. Short-term impacts on air quality as well as noise levels may occur during the construction period, but will be mitigated by normal construction practices and will be regulated by project plans, specifications and City inspectors.
conformance to permit requirements, too?