DEPARTMENT OF HAWAIIAN HOME LANDS
STATE OF HAWAII

MARCH 27, 2017

ADDENDUM NO. 2

TO

PLANS, BID FORM, SPECIFICATIONS, CONTRACT AND BOND

FOR

PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS
SEWER LINES E, F, L, A, C, D AND K-3 IMPROVEMENTS

PAPAKOLEA, OAHU, HAWAII

IFB-17-HHL-010

NOTICE TO ALL PROSPECTIVE BIDDERS

This addendum is hereby made a part of the PLANS, BID FORM, SPECIFICATIONS, CONTRACT AND BOND for the PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS, PAPAKOLEA, OAHU, HAWAII, and it shall amend the said contract documents as detailed within this Addendum document.

APPROVED:
N Sakamoto
Norman Sakamoto, LDD Acting Administrator
Department of Hawaiian Home Lands

Date: March 27, 2017

Please detach, execute, and return immediately, the receipt below, to the Department of Hawaiian Home Lands, Hale Kalanianaole, 91-5420 Kapolei Parkway, Kapolei, Hawaii or transmit facsimile to (808) 620-9299 or via email to mitchell.h.kawamura@hawaii.gov.

Receipt of Addendum No. 1 for the PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS, SEWER LINES E, F, L, A, C, D AND K-3 IMPROVEMENTS, PAPAKOLEA, OAHU, HAWAII, is hereby acknowledged.

Signed_____ Title_____

Firm_____ Date_____

ADDENDUM NO. 2
March 27, 2017

TO

PLANS, BID FORM, SPECIFICATIONS, CONTRACT AND BOND

FOR

PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS
SEWER LINES E, F, L, A, C, D AND K-3 IMPROVEMENTS

PAPAKOLEA, OAHU, HAWAII

IFB-17-HHL-010

ITEM NO. 1 GEOTECHNICAL REPORT

A geotechnical report prepared by Geolabs, Inc. titled "Geotechnical Engineering Consultation, Papakolea Subdivision Sewer Improvements, Sewer Lines "E", "F", and "L", Honolulu, Oahu, Hawaii", dated March 24, 2017, is available and attached to **ADDENDUM NO 2 (March 27, 2017).**

ITEM NO. 2 BID OFFER FORM

Replace proposal schedule, pages 3-7 of the Bid Offer Form with the revised proposal schedule attached to **ADDENDUM NO 2 (March 27, 2017).**

ITEM NO. 3 STANDARD QUALIFICATION QUESTIONNAIRE FOR OFFERORS, SPO FORM-21 ("QUESTIONNAIRE")

The Questionnaire shall be due at the time of the bid opening on April 5, 2017.

ITEM NO. 4 CURED-IN-PLACE-PIPE SPECIFICATION - WORK FORCE QUALIFICATIONS DEADLINE

Delete the last sentence in Technical Section 02734- Cured-in-Place-Pipe, Section 1.04 Quality Assurance, B. Work Force Qualifications, 2,

> "Contractor shall submit documentation of meeting these requirements within 14 calendar days of contract execution."

and replace with:

> "Contractor shall submit documentation of meeting these requirements by due time of the bid opening on April 5, 2017."

ITEM NO. 5 ARCHAELOGICAL SERVICES

Assume archaeological services consist of

- archaeological monitoring for 10% of trench excavation and on-call monitoring;
- historic architectural component to document the before demolition/construction and after construction conditions of demolished/reconstructed rock walls;
- final archaeological monitoring report.

ITEM NO. 6 DRAWING MODIFICATION AND CLARIFICATIONS

Replace the following sheets with revised drawings dated **March 27, 2017**. See attached full size revised drawing attached to **Addendum No. 2**.

1. Sheet C-3 – "Construction Notes – 3 and Legend & Abbreviations."
   Revised Traffic Control Plan Notes.

2. Sheet C-12 – "Sewer Line F Plan and Profile - 3."
   Remove Grading from STA. 14+34 to 15+00.

3. Sheet C-13 – "Sewer Line F Plan and Profile – 4"
   Added callout to 8" PVC drainline crossing SL F (TMK 1-25-022:024), to remain.

4. Sheet C-15 – "Sewer Line L Plan and Profile - 2"
   a. Added Sewer Line C Profile
   b. Revised title

5. Sheet C-16 – "Sewer Line L Plan - 3"
   Sewer Line L, SMH 318811 to SMH 318765, to be rehabilitated by CIPP instead of replaced.

6. Sheet C-18 – "Sewer Line C CIPP Plans - 1 & 2"
   Clarified locations of existing curbs, striping, and signage.

7. Sheet C-19 – "Sewer Line D CIPP Plans - 1 & 2"
   Clarified locations of existing curbs, striping, and signage.

8. Sheet C-20 – "Sewer Line K-3 CIPP Plan"
   Clarified locations of existing curbs, striping, and signage.

9. Sheet C-25 – "Sections - 2 & Sewer Line L Grading Plan"
   Removed cross sections for Sta. 14+75 and Sta. 15+00. No grading in this area.

10. Sheet C-29 – "Traffic Control Plan - 1 Sewer Line A - 24-Hour"
    a. Revised traffic control plan title to clarify work hours.
    b. Added barricade description in legend.

11. Sheet C-30 – "Traffic Control Plan - 2 Sewer Line C SMH C1 to SMH 318642 - 24-Hour"
    Revised traffic control plan.

12. Sheet C-31 – "Traffic Control Plan - 3 Sewer Line C SMH 318642 to SMH 318544 - 24-Hour"
    Revised traffic control plan.

13. Sheet C-32 – "Traffic Control Plan - 4 Sewer Line C SMH 318544 to SMH 318481 - 24-Hour"
    Revised traffic control plan.

14. Sheet C-33 – "Traffic Control Plan - 5 Sewer Line C SMH 318481 to SMH 318503 - 24-Hour"
    Revised traffic control plan.

15. Sheet C-34 – "Traffic Control Plan - 6 Sewer Line D SMH 318812 to SMH 318759 - 24-Hour"
    Revised traffic control plan.

16. Sheet C-35 – "Traffic Control Plan - 7 Sewer Line D SMH 318759 to SMH 318741 - 24-Hour"
    Revised traffic control plan.

17. Sheet C-36 – "Traffic Control Plan - 8 Sewer Line D SMH 318741 to SMH 318713 - 24-Hour"
    Revised traffic control plan.

18. Sheet C-37 – "Traffic Control Plan - 9 Sewer Line K-3 - 24-Hour"
    Revised traffic control plan.

19. Sheet C-38 – "Traffic Control Plan - 10 Sewer Line L - 8:30am-3:30pm"
    Revised traffic control plan.

ITEM NO. 6 QUESTIONS AND REQUESTS FOR CLARIFICATION RECEIVED AS OF MARCH 20, 2017

Questions or requests for clarification received at the Pre-Bid Meeting and Site Inspection

1. **What party will pay for the rock wall/fill?**

   Answer: DHHL, not the residents.

2. **Is a financial balance sheet and a letter from an outside auditor acceptable to satisfy the requirements for the qualification questionnaire?**

   Answer: Yes.

3. **Please clarify which portions of construction are incidental to work.**

   Answer: Everything that would be required to complete the work and restore all existing conditions to same or better condition, in place complete, which is not specified separately in the proposal schedule.

4. **There is grading work shown on the cross section for Sta. 14+75 and Sta. 15+00 for the sewer line F on Dwg C-25, but it is not called out on the profile drawings on Dwg C-12 nor the enlarged grading plans. Please confirm if there is grading work at those stations.**

   Answer: No grading in this area.

GEOLABS, INC.
Geotechnical Engineering and Drilling Services

March 24, 2017
W.O. 6709-20

Ms. Ann Y. Miyasato
R.M. Towill Corporation
2024 North King Street, Suite 200
Honolulu, HI 96819

GEOTECHNICAL ENGINEERING CONSULTATION
PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS
SEWER LINES "E", "F" AND "L"
HONOLULU, OAHU, HAWAII

Dear **Ms. Miyasato:**

This letter report presents our geotechnical engineering findings and recommendations for the proposed sewer improvement project in the Papakolea area of Honolulu on the Island of Oahu, Hawaii. The project location and general vicinity are shown on the Project Location Map, Plate 1.

Our geotechnical findings and recommendations are based on limited site exploration including portable Dynamic Cone Penetrometer (DCP) tests and site reconnaissance. The following recommendations are subject to the limitations noted at the end of this report.

PROJECT CONSIDERATIONS

The sewer replacement project site is within the existing Department of Hawaiian Home Lands Papakolea Subdivision in the Punchbowl/Tantalus area on the Island of Oahu, Hawaii. The existing 6 and 8-inch sewer lines span across the backyard areas of the residential lots along Kaululaau Street, Tantalus Drive and a portion of Anianiku Street in the Papakolea Subdivision. This project addresses the removal and replacement by open-cut trenching method for the Sewer Lines "E", "F", and "L" only. Replacement and rehabilitation for existing Sewer Lines "A", "C", "D", and "K-3" by Cured In-Place Pipe (CIPP) method are not included in this report.

The proposed project generally consists of the removal and replacement by trenching of approximately 3,670 linear feet of existing 6 and 8-inch diameter sewer pipes. The replacement pipe will be a new 8-inch PVC pipe. The sewer replacement project includes the re-installation of existing sewer laterals and new pipeline connections to the existing manhole structures. We envision removal and relocation of existing structures, such as private retaining walls, concrete slabs, sheds, fencing and rock piles, will be necessary for

construction access in the backyard location of the planned improvements within the occupied residential lots. We anticipate that concrete jacket installation will be required where the new pipeline intersects existing structures near the property boundaries. To facilitate the work, the sewer replacement project will also require the removal of a number of existing trees along the sewer alignments.

Based on available project plans, the replacement sewer line inverts will be generally on the order of about 4 to 6 feet below the existing grade. Some sections of the planned pipe inverts extend to depths of about 8 to 10 feet below the existing ground surface at Sewer Lines “E” and “F”. In addition, fills up to 2 feet may be required in the localized areas to provide the minimum cover for the new pipes.

PURPOSE AND SCOPE

The purpose of our field exploration was to obtain an overview of the surface and subsurface conditions to develop a soil and/or rock data set to formulate geotechnical recommendations for the design of sewer improvements. In order to accomplish this, we conducted an exploration program consisting of the following tasks and efforts:

1. Review available geological information in the project vicinity and design plans.
2. Conduct a site reconnaissance to observe general surface and site access conditions.
3. Provision of testing access notification and coordination.
4. Mobilization and demobilization of a portable Dynamic Cone Penetrometer (DCP) device and two engineers to and from the project site.
5. Penetrating and testing of ten locations extending to depths of approximately 1 to 9 feet below the existing ground surface along the existing sewer alignments, using DCP equipment.
6. Coordination of the field exploration and logging of the DCP testing by our geologist and engineer.
7. Analyses of the field test data to formulate geotechnical recommendations for the project.
8. Preparation of this geotechnical engineering report summarizing our work on the project and presenting our findings and recommendations.
9. Coordination of our overall work on the project by our engineer.
10. Quality assurance of our work and client/design team consultation by our principal engineer.
11. Miscellaneous work efforts such as drafting, word processing, and clerical support.

Detailed descriptions of our field exploration methodology and the Logs of DCPs are presented in Appendix A. Photographs taken during our field exploration are presented in Appendix B.

GENERAL SITE CONDITIONS

The Papakolea subdivision sewer replacement project site resides on sloping hillside terrain in the Tantalus/Papakolea area between Pauoa, towards the west, and Makiki Heights towards the east. Ground surface elevations generally range between about +510 feet Mean Sea Level (MSL) at the eastern end of Sewer Line "F" located below Kaululaau Street and about +140 feet MSL at the southern end of existing Sewer Line "L" near the junction of Anianiku Street and Auwaiolimu Street. The overall valley hill slope is generally down toward the south and southwest above Kanaha Stream with typical overall slope inclinations ranging on the order of about one horizontal to one vertical (1H:1V) to 2H:1V slope inclination. In general, the existing sewer lines traverse across the slopes where the side slope is generally 2H:1V or flatter along the pipe alignment, with some localized steeper slope sections.

As mentioned previously, the sewer line replacement work will be conducted at the backyard area of the residential lots. The natural Kanaha Valley slope appears to have been modified by grading and subdivision development with earth cuts generally encountered at the higher elevation side of the lots and earth fills at the lower elevation side of the lots. Based on our observations, existing sewer lines "E", "F" and "L" span across the lower elevation side of the lots where fill and alluvial soil materials may be predominantly encountered.

The existing site conditions along sewer alignments "E", "F" and "L" varies between landscaped yards with retaining structures and unimproved backyard hill slopes containing dense vegetation growth and scattered large trees. We observed a number of existing retaining walls and other storage structures constructed within portions of the sewer easement. Access to the sewer lines for construction equipment appears to range from good to poor depending on the site location and the presence of existing retaining walls and dwelling structures.

In general, we observed very limited basaltic rock outcroppings contained within the existing sewer line easements. Based on our observations, we encountered primarily clayey and silty surface soils containing variable quantities of embedded rock fragments such as gravel, cobbles, construction debris and boulders along the sewer line easement surfaces. Some limited above-ground hard basaltic rock outcroppings were encountered locally adjacent to sewer line easement "E". Based on our observations, it appears that the limited basalt rock formation encountered during the initial sewer line construction had already been excavated and backfilled during placement of the original pipes within the sewer easements.

SITE RECONNAISSANCE

A site reconnaissance of existing sewer easements “E”, “F” and “L” was conducted on February 6 through 9, 2017 under fair weather conditions to observe the existing ground surface conditions along the sewer alignments. The visual reconnaissance effort was conducted in conjunction with the performance of ten (10) Dynamic Cone Penetrometer (DCP) tests at selected accessible locations along the sewer alignment, as shown on the Site Plan, Plate 2. The location of the DCP tests was selected adjacent to the existing sewer easement and is therefore believed to represent the native ground conditions adjacent to the sewer pipe trench alignments.

Because the sewer easements traverse across the slope and intersect multiple house lots and private property, our sewer alignment access for the site reconnaissance and soils (DCP) testing was limited to selected lot locations with permissible access. Our findings and interpretations pertaining to the general ground surface conditions along the sewer alignments are therefore based on the point location observations and extrapolation between the observation points.

Sewer Line “E” About Sta. 2+29 Through About Sta. 17+36

Based on our site reconnaissance at selected locations along the sewer easement, we observed widely scattered hard basaltic rock outcroppings mixed with some thin clayey soils at the ground surface between about Sta. 2+29 and about Sta. 6+75. We observed intermittent and widely scattered occurrences of hard surface rock outcropping adjacent to the sewer easement throughout this section of the alignment. In addition, we observed a section of hard basaltic ledge outcropping of about 10 feet in height adjacent to and about 5 to 10 feet upslope from the sewer easement between about Sta.17+00 and about Sta. 17+36. It should be noted that hard basaltic boulders and cobbles were observed at the ground surface and embedded in the shallow subsurface along the length of the sewer easement. The hard rock formation appears to be slightly to moderately weathered pahoehoe with limited clinker. In-situ rock formation outcropping from within the estimated limits of the trenched easement was not observed.

Based on our site reconnaissance at selected locations along the sewer easement, we observed generally stiff brown silty and clayey alluvial and fill soils between about Sta. 6+75 and about Sta. 17+36. The observed silty and clayey soils exposed at the ground surface of Sewer “E” appear to contain appreciable embedded gravel, cobbles, boulders, and some construction debris. Site conditions are also presented on the photographs in Appendix B (Plates B-1 through B-3).

Sewer Line “F” About Sta. 1+73 Through About Sta.19+24

Based on our site reconnaissance at selected locations along the sewer easement, we observed generally stiff brown silty and clayey alluvial and fill soils between about Sta. 1+73 and about Sta. 19+24. The observed silty and clayey soils exposed at the ground

surface appear to contain appreciable embedded gravel, cobbles, boulders, and some construction debris.

Based on our site reconnaissance at selected locations along the sewer alignment, we did not encounter basaltic rock outcropping within the sewer easement at Sewer Line "F". Site conditions are also illustrated on the photographs in Appendix B (Plates B-3 and B-4)

Sewer Line "L" About Sta. 0+11 Through About Sta.12+66

Based on our site reconnaissance at selected locations along the sewer easement, we observed generally stiff brown silty and clayey alluvial and fill soils between about Sta. 1+73 and about Sta. 19+24. The observed silty and clayey soils exposed at the ground surface at Sewer Line "L" appear to contain appreciable embedded gravel, cobbles, boulders, and some construction debris.

Based on our site reconnaissance at selected locations along the sewer alignment, we did not encounter basaltic rock outcropping within the sewer easement at Sewer Line "L". Site conditions are also presented on the photographs in Appendix B (Plates B-5 and B-6).

TRENCH EXCAVATION

Based on the available plans, the new sewer line inverts will be up to about 10 feet below the existing ground surface. Based on our observations, it appears that the limited basalt rock formation encountered during the initial sewer line construction had already been excavated and backfilled during placement of the original pipes within the sewer easements. It is anticipated that the surface fills and limited basalt rock formation may be excavated readily with normal excavation equipment. However, some of the excavations in the native ground will encounter dense basalt formation and will likely require chipping or the use of hoerams.

The above discussions regarding the rippability of the subsurface materials are based on our visual observation of the field data from the site reconnaissance. Contractors should be encouraged to examine the site conditions and the subsurface data to make their own reasonable and prudent interpretation.

Because limited basalt rock outcrop was observed at or near the existing ground surface during our site reconnaissance, it appears that the trench work for utility installation may potentially involve excavation in the basaltic rock formation and may require hard ripping or the use of hoerams. The contractor must exercise care to avoid over-ripping, which would disrupt the structure of the rock formation and result in a potential loss of bearing strength for footings in its vicinity.

The excavated soils should not be stockpiled closer than a horizontal distance equal to the depth of the excavation measured from the edge of the excavation in order to reduce the potential for ground movement. In addition, the excavated soils should be

stockpiled at least 10 feet away from underground utilities to reduce the potential for ground movement or subsidence, which may damage the underground utility lines.

TRENCH EXCAVATION SUPPORT

We anticipate that excavation depth up to about 10 feet below the existing ground surface will be required for the installation of the new sewer lines. Where excavations greater than 5 feet in depth are planned, temporary shoring or sloping and benching should be used unless stable rock formation is encountered.

Based on our observations, we encountered primarily clayey and silty surface soils containing variable quantities of embedded rock fragments such as gravel, cobbles, construction debris and boulders along the sewer line easement surfaces.

Based on our observation, the project site is generally underlain by primarily clayey and silty surface soils containing variable quantities of embedded rock fragments such as gravel, cobbles, construction debris and boulders along the sewer line easements. It is our opinion that the stiff clayey and silty soils may be classified as a Type C Soil profile for excavation purpose. Where space is available, an open-cut excavation may be used for the sewer system construction. A slope inclination of one and one-half horizontal to one vertical (1.5H:1V) may be used for temporary cut slopes into the stiff clayey and silty soils. Sloughing of the sides of the excavations may be experienced during construction. This should be further evaluated by a qualified geotechnical engineer during construction.

Based on the existing site conditions, we believe that temporary cut slopes for open-cut excavations may not be practical in some areas. Where open-cut excavations are not feasible, trench walls would have to be cut near-vertical requiring the use of shoring during construction.

The excavation support and shoring system used must comply with applicable safety requirements. The contractor should be solely responsible for the adequacy and safety of the shoring installation. The contractor's representative (i.e., competent person) should be on-site at all times during excavation and construction work for the opportunity to promptly observe changing or unforeseen conditions, such as high groundwater, inappropriate construction sequence or techniques, etc., which may affect the shoring stability.

It is important to install adequate shoring and to maintain it tight against the excavation walls with proper bracing during construction. The properly braced shoring is essential to reduce the potential for appreciable lateral movements of the adjacent ground into the excavation, which may result in potential settlement or distress to adjacent structures or other improvements.

It must be noted that some minor movements of the shoring system and the adjacent ground may still occur due to changes in earth stresses during excavation. Due to the complexity of the stress changes, it is difficult to accurately estimate the magnitude

of movement. The magnitude also depends greatly upon workmanship, such as how quickly and tightly the shoring and bracing supports are installed, the subsurface conditions, the size of the excavation, and the rate of excavation.

It is important to realize that the excavation shoring should be installed properly and as early as practical. The adjacent ground should be continuously monitored for cracks, dips and/or other indications of movements with instruments until the sewer line excavation is finally backfilled. It should be noted that during and after installation of the shoring system, minor settlements may be possible. Therefore, it is recommended that the contractor retains a qualified geotechnical engineer to design and evaluate the shoring system used.

SEWER LINE BEDDING

New underground sewer lines will generally consist of 8-inch diameter PVC pipes. We anticipate most of the trenches for the utility lines will be excavated in the existing fill materials, basalt rock fragments, and/or other construction debris.

In general, granular bedding consisting of 6 inches of open-graded gravel (ASTM C33, No. 67 gradation) should be provided below the pipes for uniform bearing support. Free-draining granular materials, such as open-graded gravel (ASTM C33, No. 67 gradation), should be used for the initial trench backfill up to about 12 inches above the pipes. It is critical to use this free-draining material to reduce the potential for formation of voids below the haunches of pipes and to provide adequate support for the sides of the pipes. Improper backfill material around the pipes and improper placement of the backfill could result in backfill settlement and pipe damage.

SEWER LINE TRENCH BACKFILL

The upper portion of the trench backfill from the level 12 inches above the pipes to the top of the subgrade or finished grade should consist of on-site soils (with a maximum particle size of 6 inches) or select granular fill material. The backfill should be moisture-conditioned to above the optimum moisture, placed in about 8-inch level loose lifts, and mechanically compacted to at least 90 percent relative compaction. Where trenches are located in paved areas, the upper 3 feet of the trench backfill below the pavement finished grade should be compacted to no less than 95 percent relative compaction. Compaction should be accomplished by sheepsfoot rollers, vibratory rollers, or other types of acceptable compaction equipment.

Geolabs should perform observations and soil density tests during backfilling to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction is less than required, additional compactive effort should be applied with adjustment of moisture content as necessary, to obtain the specified compaction.

DESIGN REVIEW

Preliminary and final drawings and specifications for the proposed sewer improvement project should be forwarded to Geolabs for review and written comments prior to solicitation for construction bids. This review is necessary to evaluate conformance of the plans and specifications with the intent of the earthwork recommendations provided herein. If this review is not made, Geolabs cannot be responsible for misinterpretation of our recommendations.

SERVICES DURING CONSTRUCTION

Geolabs should be retained to provide geotechnical engineering services during construction of the project. The critical items of construction monitoring that require "Special Inspections" include observation of trench backfill placement and compaction.

In addition, a Geolabs representative should monitor other aspects of the earthwork construction to observe compliance with the intent of the design concepts, specifications, or recommendations and to expedite suggestions for design changes that may be required in the event that subsurface conditions differ from those anticipated at the time this report was prepared. The recommendations provided herein are contingent upon such observations.

If the actual exposed subsurface conditions encountered during construction are different from those assumed or considered in this report, then appropriate design modifications should be made.

LIMITATIONS

The analyses and recommendations submitted herein are based, in part, upon information obtained from the site reconnaissance and the portable DCP testing at the selected locations. Variations of the subsurface conditions between and beyond the selected locations may occur, and the nature and extent of these variations may not become evident until construction is underway. If variations then appear evident, it will be necessary to re-evaluate the recommendations provided herein.

The selected testing locations indicated herein are approximate, having been taped from visible features at the project site shown on the site plans transmitted by R.M. Towill Corporation in February 2017. The physical locations of the testing should be considered accurate only to the degree implied by the methods used.

Water level data from the testing were measured at the times shown in the text herein. These data have been reviewed and interpretations made in the formulation of this report. We did not encounter groundwater in our testing at the time of our field exploration. However, it must be noted that fluctuation may occur due to variation rainfall, temperature, and other factors.

This report has been prepared for the exclusive use of R.M. Towill Corporation, their client, Department of Hawaiian Home Lands, and their consultants, for specific application to the design of the proposed Papakolea Subdivision Sewer Improvements project (as described herein), located in Honolulu on the Island of Oahu in accordance with generally accepted geotechnical engineering principles and practices. No warranty is expressed or implied.

This report has been prepared solely for the purpose of assisting the engineers in the design of the project. Therefore, this report may not contain sufficient data, or the proper information, to serve as a basis for construction cost estimates. A contractor wishing to bid on this project is urged to retain a competent geotechnical engineer to assist in the interpretation of this report and/or in the performance of additional site-specific exploration for bid estimating purposes.

The owner/client should be aware that unanticipated soil and/or rock conditions are commonly encountered. Unforeseen subsurface conditions, such as soft deposits, hard layers, cavities, or perched groundwater, may occur in localized areas and may require additional probing or corrections in the field (which may result in construction delays) to attain a properly constructed project. Therefore, a sufficient contingency fund is recommended to accommodate these possible extra costs.

This geotechnical engineering exploration conducted at the project site was not intended to investigate the potential for presence of hazardous materials existing at the site. It should be noted that the equipment, techniques, and personnel used to conduct a geo-environmental exploration differ substantially from those applied in geotechnical engineering.

Closure

We appreciate the opportunity to be of service to you on this project. If you have questions or need additional information, please contact our office.

Respectfully submitted,

GEOLABS, INC.

By _____
John Y.L. Chen, P.E.
Vice President

JOHN Y.L. CHEN
LICENSED PROFESSIONAL ENGINEER
No. 10029-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.

_____ 4-30-18
SIGNATURE EXPIRATION DATE
OF THE LICENSE

JC:mj

Attachments: **PLATES**
Project Location Map, Plate 1
Overall Site Plan, Plate 2

APPENDIX A
Dynamic Cone Penetrometer Tests, Page A-1
Logs of DCP, Plates A-1 thru A-10

APPENDIX B
Photographs, Plates B-1 thru B-6

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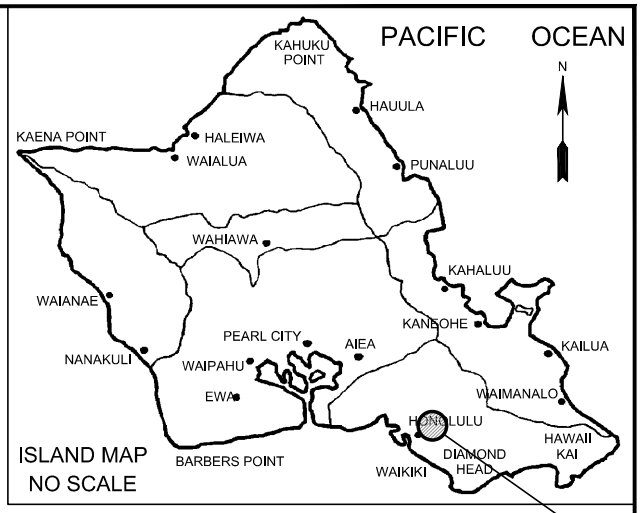
PLATES



GENERAL PROJECT LOCATION »

PROJECT LOCATION »

PROJECT LOCATION MAP

PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS
SEWER LINES "E", "F" AND "L"
HONOLULU, OAHU, HAWAII

2000 1000 0 2000 FT.

GRAPHIC SCALE

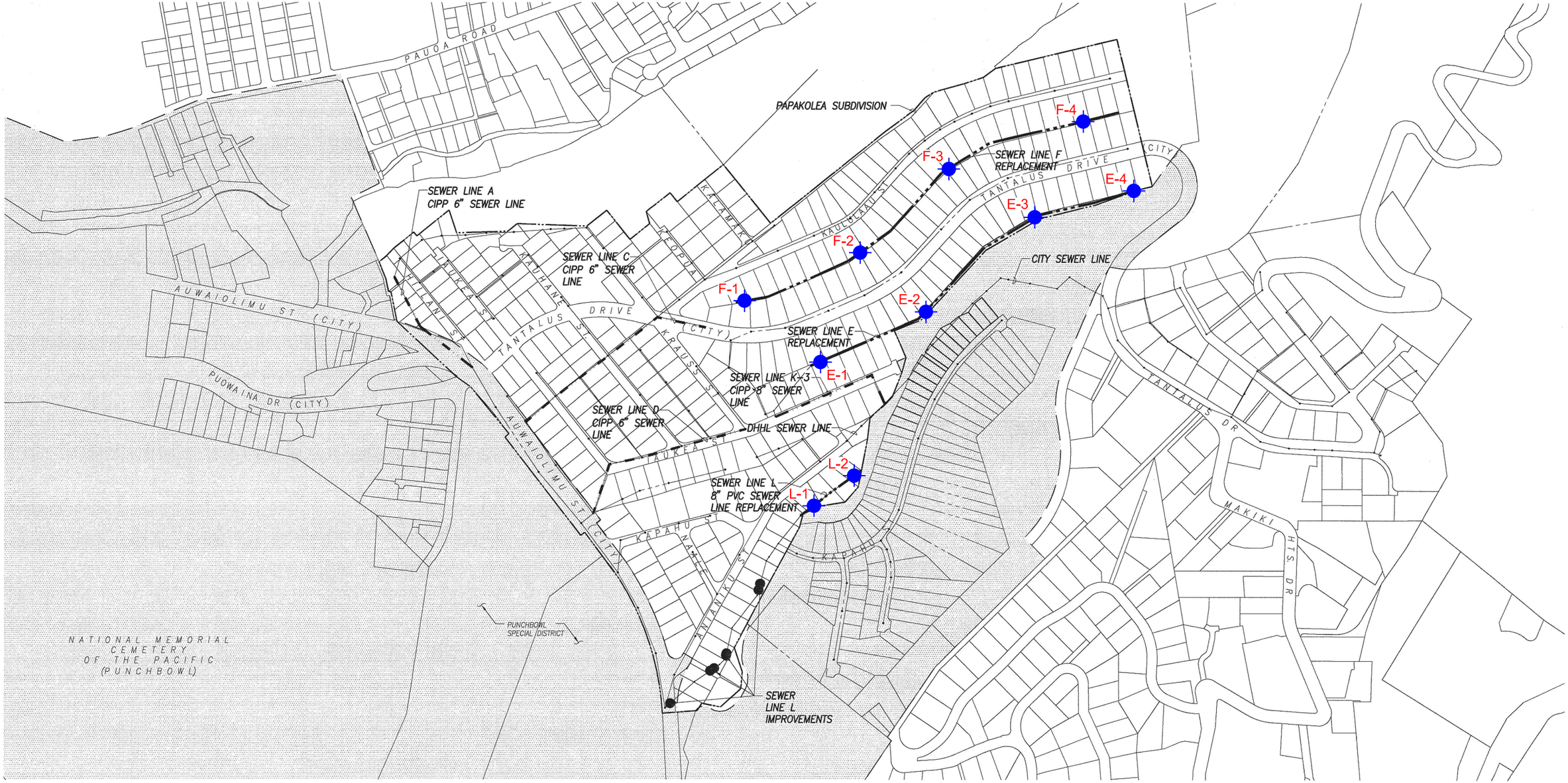
N

REFERENCE: MAP CREATED WITH TOPO!® ©2010 NATIONAL GEOGRAPHIC; ©2007 TELE ATLAS, REL. 1/2007.

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
FEBRUARY 2017	HYC	1
SCALE	W.O.	
1" = 2,000'	6709-20	

CAD User: HENRY File Last Updated: February 14, 2017 10:34:21am Plot Date: February 14, 2017 - 3:55:36pm
File: C:\Users\henry\Documents\Drawing3.dwg\PLM
Plotter: DWG To PDF-GEO.pc3 Plotstyle: GEO-No-Dithering-Blue-Boring.ctb



LEGEND:

SEWER LINE REPLACEMENT BY TRENCHING

SEWER LINE IMPROVEMENT BY CIPP

F-1 APPROXIMATE DYNAMIC CONE PENETRATION (DCP) TEST LOCATION AND IDENTIFICATION

REFERENCE: GENERAL PLAN DATED JANUARY 3, 2017
BY R. M. TOWILL CORPORATION.

0 200 400 800 1200 FT.

GRAPHIC SCALE

N

SITE PLAN

PAPAKOLEA SUBDIVISION SEWER IMPROVMENTS
SEWER LINES "E", "F" AND "L"
HONOLULU, OAHU, HAWAII

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
FEBRUARY 2017	HYC	2
SCALE	W.O.	
1" = 400'	6709-20	

APPENDIX A

A P P E N D I X A

Dynamic Cone Penetrometer Tests

The subsurface conditions at the project site were explored by Dynamic Cone Penetrometer (DCP) testing at ten locations, designated as E-1 through E-4, F-1 through F-4, and L-1 and L-2, extending to depths of about 1 to 9 feet below the existing ground surface. The approximate DCP locations are shown on the Site Plan, Plate 2.

Portable Dynamic Cone Penetrometer (DCP) was used for probing by driving an 8-mm diameter 60° steel cone tip with an 8-kg hammer falling 575-mm in vertical height. The blow counts were recorded per penetration and converted to standard penetration resistance (SPT, ASTM D1586) using correlation between Penetration Index (PI) and SPT, developed by Sowers and Hedges and later Livneh and Ishai. Both PI and SPT blow counts are shown on the Logs of DCP at the appropriate depths, presented on the Logs of DCP, Plates A-1 through A-10.

GEOLABS, INC. Geotechnical Engineering	PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS HONOLULU, OAHU, HAWAII	Log of DCP **E-1**

No. of Blows	Penetration Reading (mm)	Depth of Penetration (mm)	Depth of Penetration (inches)	Elevation of Penetration (feet MSL)	Penetration Index (mm/blow)	Correlated SPT Index (mm/blow)	SPT Blow Count (blow/foot)
0	0	-	-		-	-	-
1	53	53.0	2.1		53.0	22.1	14
1	167	167.0	6.6		114.0	31.9	10
1	221	221.0	8.7		54.0	22.3	14
1	263	263.0	10.4		42.0	19.8	15
1	287	287.0	11.3		24.0	15.2	20
1	297	297.0	11.7		10.0	10.0	30
1	304	304.0	12.0		7.0	8.4	36
1	309	309.0	12.2		5.0	7.2	42
1	313	313.0	12.3		4.0	6.5	47
1	318	318.0	12.5		5.0	7.2	42
1	323	323.0	12.7		5.0	7.2	42
1	326	326.0	12.8		3.0	5.6	54
1	329	329.0	13.0		3.0	5.6	54
1	334	334.0	13.1		5.0	7.2	42
1	336	336.0	13.2		2.0	4.6	66
1	342	342.0	13.5		6.0	7.8	39
1	345	345.0	13.6		3.0	5.6	54

Date Started:	2/7/2017	Water Level:	N/A	Plate
Date Completed:	2/7/2017			
Logged By:	SC/NK	Probing Equipment:	DCP H-4219	
Total Depth:	1.13 feet	Size of Cone Tip:	8 mm dia. with 60° cone	A-1
Work Order:	6709-20	Driving Energy:	8 kg weight 575 mm drop	

GEOLABS, INC. Geotechnical Engineering	PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS HONOLULU, OAHU, HAWAII	Log of DCP **E-2**

No. of Blows	Penetration Reading	Depth of Penetration (mm)	Depth of Penetration (inches)	Elevation of Penetration (feet MSL)	Penetration Index (mm/blow)	Correlated SPT Index (mm/blow)	SPT Blow Count (blow/foot)
0	138	-	-		-	-	-
10	545	407.0	16.0		40.7	19.5	16
10	679	541.0	21.3		13.4	11.5	27
10	746	608.0	23.9		6.7	8.3	37
10	803	665.0	26.2		5.7	7.6	40
10	833	695.0	27.4		3.0	5.6	54
10	846	708.0	27.9		1.3	3.8	81
10	867	729.0	28.7		2.1	4.8	64
10	895	757.0	29.8		2.8	5.5	56
10	924	786.0	30.9		2.9	5.5	55
10	952	814.0	32.0		2.8	5.5	56
10	985	847.0	33.3		3.3	5.9	52
10	1016	878.0	34.6		3.1	5.7	53
10	1045	907.0	35.7		2.9	5.5	55
10	1064	926.0	36.5		1.9	4.5	67
10	1089	951.0	37.4		2.5	5.2	59
10	1118	980.0	38.6		2.9	5.5	55
10	1152	1014.0	39.9		3.4	6.0	51
10	1186	1048.0	41.3		3.4	6.0	51
10	1222	1084.0	42.7		3.6	6.1	50
10	1263	1125.0	44.3		4.1	6.5	47
10	1301	1163.0	45.8		3.8	6.3	48
10	1350	1212.0	47.7		4.9	7.1	43
10	1374	1236.0	48.7		2.4	5.1	60
10	1391	1253.0	49.3		1.7	4.3	71
10	1405	1267.0	49.9		1.4	3.9	78
10	1411	1273.0	50.1		0.6	2.6	117

Date Started:	2/8/2017	Water Level:	N/A	Plate
Date Completed:	2/8/2017			
Logged By:	SC/HB	Probing Equipment:	DCP H-4219	
Total Depth:	4.18 feet	Size of Cone Tip:	8 mm dia. with 60° cone	A-2
Work Order:	6709-20	Driving Energy:	8 kg weight 575 mm drop	

GEOLABS, INC. Geotechnical Engineering	PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS HONOLULU, OAHU, HAWAII	Log of DCP **E-3**

No. of Blows	Penetration Reading	Depth of Penetration (mm)	Depth of Penetration (inches)	Elevation of Penetration (feet MSL)	Penetration Index (mm/blow)	Correlated SPT Index (mm/blow)	SPT Blow Count (blow/foot)
0	280	-	-		-	-	-
1	392	112.0	4.4		112.0	31.6	10
1	491	211.0	8.2		99.0	29.8	10
1	589	309.0	12.1		98.0	29.7	10
1	635	355.0	13.9		46.0	20.7	15
1	712	432.0	16.9		77.0	26.5	12
1	762	482.0	18.8		50.0	21.5	14
1	805	525.0	20.5		43.0	20.0	15
1	811	531.0	20.7		6.0	7.8	39
1	814	534.0	20.9		3.0	5.6	54
1	818	538.0	21.0		4.0	6.5	47
1	822	542.0	21.2		4.0	6.5	47
1	824	544.0	21.3		2.0	4.6	66
1	827	547.0	21.4		3.0	5.6	54
2	830	550.0	21.5		1.5	4.0	75
1	834	554.0	21.6		4.0	6.5	47
1	837	557.0	21.8		3.0	5.6	54
1	840	560.0	21.9		3.0	5.6	54
1	872	592.0	23.1		32.0	17.4	18
1	918	638.0	24.9		46.0	20.7	15
1	944	664.0	25.9		26.0	15.8	19
1	947	667.0	26.1		3.0	5.6	54

Date Started:	2/8/2017	Water Level:	N/A	Plate
Date Completed:	2/8/2017			
Logged By:	SC/HB	Probing Equipment:	DCP H-4219	
Total Depth:	2.19 feet	Size of Cone Tip:	8 mm dia. with 60° cone	A-3
Work Order:	6709-20	Driving Energy:	8 kg weight 575 mm drop	

GEOLABS, INC. Geotechnical Engineering	PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS HONOLULU, OAHU, HAWAII	Log of DCP **E-4**

No. of Blows	Penetration Reading	Depth of Penetration (mm)	Depth of Penetration (inches)	Elevation of Penetration (feet MSL)	Penetration Index (mm/blow)	Correlated SPT Index (mm/blow)	SPT Blow Count (blow/foot)
0	173	-	-		-	-	-
1	238	65.0	2.6		65.0	24.4	12
1	302	129.0	5.1		64.0	24.2	13
1	381	208.0	8.2		79.0	26.8	11
1	463	290.0	11.4		82.0	27.3	11
1	547	374.0	14.7		84.0	27.6	11
1	606	433.0	17.0		59.0	23.3	13
1	652	479.0	18.9		46.0	20.7	15
1	681	508.0	20.0		29.0	16.6	18
1	694	521.0	20.5		13.0	11.3	27
1	715	542.0	21.3		21.0	14.2	21
1	740	567.0	22.3		25.0	15.5	20
1	744	571.0	22.5		4.0	6.5	47
1	747	574.0	22.6		3.0	5.6	54
1	753	580.0	22.8		6.0	7.8	39
1	755	582.0	22.9		2.0	4.6	66
1	759	586.0	23.1		4.0	6.5	47
1	761	588.0	23.1		2.0	4.6	66
1	762	589.0	23.2		1.0	3.3	91
1	764	591.0	23.3		2.0	4.6	66
1	765	592.0	23.3		1.0	3.3	91
1	768	595.0	23.4		3.0	5.6	54
1	770	597.0	23.5		2.0	4.6	66
7	782	609.0	24.0		1.7	4.3	71
10	815	642.0	25.3		3.3	5.9	52
10	844	671.0	26.4		2.9	5.5	55
10	895	722.0	28.4		5.1	7.3	42
10	950	777.0	30.6		5.5	7.5	41
10	963	790.0	31.1		1.3	3.8	81
10	976	803.0	31.6		1.3	3.8	81

Date Started:	2/8/2017	Water Level:	N/A	Plate
Date Completed:	2/8/2017			
Logged By:	SC/HB	Probing Equipment:	DCP H-4219	
Total Depth:	2.63 feet	Size of Cone Tip:	8 mm dia. with 60° cone	A-4
Work Order:	6709-20	Driving Energy:	8 kg weight 575 mm drop	

GEOLABS, INC. Geotechnical Engineering	PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS HONOLULU, OAHU, HAWAII	Log of DCP **F-1**

No. of Blows	Penetration Reading (inches)	Depth of Penetration (mm)	Depth of Penetration (inches)	Elevation of Penetration (feet MSL)	Penetration Index (mm/blow)	Correlated SPT Index (mm/blow)	SPT Blow Count (blow/foot)
0	5.1875	-	-		-	-	-
10	17.625	315.9	12.4		31.6	17.3	18
10	20.75	395.3	15.6		7.9	9.0	34
10	26.75	547.7	21.6		15.2	12.2	25
10	35	757.2	29.8		21.0	14.2	21
5	39.375	868.4	34.2		22.2	14.6	21
10	46.4375	1047.8	41.3		17.9	13.2	23
8	47.875	1084.3	42.7		4.6	6.9	44
12	48.875	1109.7	43.7		2.1	4.8	64
22	49.875	1135.1	44.7		1.2	3.6	85
18	50.875	1160.5	45.7		1.4	3.9	78
18	51.875	1185.9	46.7		1.4	3.9	78
20	52.875	1211.3	47.7		1.3	3.7	82
23	53.875	1236.7	48.7		1.1	3.5	87
25	54.875	1262.1	49.7		1.0	3.4	91
22	55.875	1287.5	50.7		1.2	3.6	85
27	56.875	1312.9	51.7		0.9	3.2	94
44	57.875	1338.3	52.7		0.6	2.6	119

Date Started:	2/7/2017	Water Level:	N/A	Plate
Date Completed:	2/7/2017			
Logged By:	SC/NK	Probing Equipment:	DCP H-4219	
Total Depth:	4.39 feet	Size of Cone Tip:	8 mm dia. with 60° cone	A-5
Work Order:	6709-20	Driving Energy:	8 kg weight 575 mm drop	

GEOLABS, INC. Geotechnical Engineering	PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS HONOLULU, OAHU, HAWAII	Log of DCP **F-2**

No. of Blows	Penetration Reading	Depth of Penetration (mm)	Depth of Penetration (inches)	Elevation of Penetration (feet MSL)	Penetration Index (mm/blow)	Correlated SPT Index (mm/blow)	SPT Blow Count (blow/foot)
0	140	-	-		-	-	-
1	210	70.0	2.8		70.0	25.3	12
1	273	133.0	5.2		63.0	24.0	13
1	302	162.0	6.4		29.0	16.6	18
1	322	182.0	7.2		20.0	13.9	22
1	341	201.0	7.9		19.0	13.6	22
1	353	213.0	8.4		12.0	10.9	28
1	367	227.0	8.9		14.0	11.7	26
1	391	251.0	9.9		24.0	15.2	20
1	422	282.0	11.1		31.0	17.1	18
1	453	313.0	12.3		31.0	17.1	18
1	479	339.0	13.3		26.0	15.8	19
1	507	367.0	14.4		28.0	16.3	19
1	544	404.0	15.9		37.0	18.7	16
1	560	420.0	16.5		16.0	12.5	24
1	563	423.0	16.7		3.0	5.6	54
1	564	424.0	16.7		1.0	3.3	91
1	567	427.0	16.8		3.0	5.6	54
1	568	428.0	16.9		1.0	3.3	91
1	570	430.0	16.9		2.0	4.6	66
8	580	440.0	17.3		1.3	3.7	82
6	590	450.0	17.7		1.7	4.3	72
9	600	460.0	18.1		1.1	3.5	87
7	610	470.0	18.5		1.4	4.0	77
8	620	480.0	18.9		1.3	3.7	82
6	630	490.0	19.3		1.7	4.3	72
7	640	500.0	19.7		1.4	4.0	77
5	650	510.0	20.1		2.0	4.6	66
6	660	520.0	20.5		1.7	4.3	72
3	670	530.0	20.9		3.3	5.9	51

Date Started:	2/7/2017	Water Level:	N/A	Plate
Date Completed:	2/7/2017			
Logged By:	SC/NK	Probing Equipment:	DCP H-4219	
Total Depth:	1.74 feet	Size of Cone Tip:	8 mm dia. with 60° cone	A-6
Work Order:	6709-20	Driving Energy:	8 kg weight 575 mm drop	

GEOLABS, INC. Geotechnical Engineering	PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS HONOLULU, OAHU, HAWAII	Log of DCP **F-3**

No. of Blows	Penetration Reading	Depth of Penetration (mm)	Depth of Penetration (inches)	Elevation of Penetration (feet MSL)	Penetration Index (mm/blow)	Correlated SPT Index (mm/blow)	SPT Blow Count (blow/foot)
0	105	-	-		-	-	-
10	365	260.0	10.2		26.0	15.8	19
10	617	512.0	20.2		25.2	15.5	20
11	946	841.0	33.1		29.9	16.9	18
10	1269	1164.0	45.8		32.3	17.5	17
10	1465	1360.0	53.5		19.6	13.8	22
10	1710	1605.0	63.2		24.5	15.3	20
5	1870	1765.0	69.5		32.0	17.4	18
10	2053	1948.0	76.7		18.3	13.3	23
13	2199	2094.0	82.4		11.2	10.6	29
10	2240	2135.0	84.1		4.1	6.5	47
10	2277	2172.0	85.5		3.7	6.2	49
10	2322	2217.0	87.3		4.5	6.8	45
10	2379	2274.0	89.5		5.7	7.6	40
10	2445	2340.0	92.1		6.6	8.2	37
10	2503	2398.0	94.4		5.8	7.7	40
10	2556	2451.0	96.5		5.3	7.4	41
10	2604	2499.0	98.4		4.8	7.0	43
10	2644	2539.0	100.0		4.0	6.5	47
10	2657	2552.0	100.5		1.3	3.8	81
10	2674	2569.0	101.1		1.7	4.3	71
10	2704	2599.0	102.3		3.0	5.6	54
10	2729	2624.0	103.3		2.5	5.2	59
10	2760	2655.0	104.5		3.1	5.7	53
10	2769	2664.0	104.9		0.9	3.2	96
10	2771	2666.0	105.0		0.2	1.5	197

Date Started:	2/7/2017	Water Level:	N/A	Plate
Date Completed:	2/7/2017			
Logged By:	SC/NK	Probing Equipment:	DCP H-4219	
Total Depth:	8.75 feet	Size of Cone Tip:	8 mm dia. with 60° cone	A-7
Work Order:	6709-20	Driving Energy:	8 kg weight 575 mm drop	

GEOLABS, INC. Geotechnical Engineering	PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS HONOLULU, OAHU, HAWAII	Log of DCP **F-4**

No. of Blows	Penetration Reading	Depth of Penetration (mm)	Depth of Penetration (inches)	Elevation of Penetration (feet MSL)	Penetration Index (mm/blow)	Correlated SPT Index (mm/blow)	SPT Blow Count (blow/foot)
0	181	-	-		-	-	-
1	227	46.0	1.8		46.0	20.7	15
1	259	78.0	3.1		32.0	17.4	18
1	299	118.0	4.6		40.0	19.4	16
1	337	156.0	6.1		38.0	18.9	16
1	363	182.0	7.2		26.0	15.8	19
1	391	210.0	8.3		28.0	16.3	19
1	413	232.0	9.1		22.0	14.6	21
1	437	256.0	10.1		24.0	15.2	20
1	463	282.0	11.1		26.0	15.8	19
1	494	313.0	12.3		31.0	17.1	18
1	525	344.0	13.5		31.0	17.1	18
1	555	374.0	14.7		30.0	16.9	18
1	584	403.0	15.9		29.0	16.6	18
1	614	433.0	17.0		30.0	16.9	18
1	645	464.0	18.3		31.0	17.1	18
1	681	500.0	19.7		36.0	18.4	17
1	722	541.0	21.3		41.0	19.6	16
1	775	594.0	23.4		53.0	22.1	14
1	826	645.0	25.4		51.0	21.7	14
1	870	689.0	27.1		44.0	20.3	15
1	908	727.0	28.6		38.0	18.9	16
1	935	754.0	29.7		27.0	16.1	19
1	944	763.0	30.0		9.0	9.5	32
1	951	770.0	30.3		7.0	8.4	36
1	953	772.0	30.4		2.0	4.6	66
1	958	777.0	30.6		5.0	7.2	42
1	960	779.0	30.7		2.0	4.6	66
1	962	781.0	30.7		2.0	4.6	66
1	964	783.0	30.8		2.0	4.6	66
1	965	784.0	30.9		1.0	3.3	91
1	967	786.0	30.9		2.0	4.6	66
1	969	788.0	31.0		2.0	4.6	66
10	982	801.0	31.5		1.3	3.8	81
10	989	808.0	31.8		0.7	2.8	108

Date Started:	2/7/2017	Water Level:	N/A	Plate
Date Completed:	2/7/2017			
Logged By:	SC/NK	Probing Equipment:	DCP H-4219	
Total Depth:	2.65 feet	Size of Cone Tip:	8 mm dia. with 60° cone	A-8
Work Order:	6709-20	Driving Energy:	8 kg weight 575 mm drop	

GEOLABS, INC. Geotechnical Engineering	PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS HONOLULU, OAHU, HAWAII	Log of DCP **L-1**

No. of Blows	Penetration Reading	Depth of Penetration (mm)	Depth of Penetration (inches)	Elevation of Penetration (feet MSL)	Penetration Index (mm/blow)	Correlated SPT Index (mm/blow)	SPT Blow Count (blow/foot)
0	117	-	-		-	-	-
1	172	55.0	2.2		55.0	22.5	14
1	233	116.0	4.6		61.0	23.7	13
1	283	166.0	6.5		50.0	21.5	14
1	325	208.0	8.2		42.0	19.8	15
1	377	260.0	10.2		52.0	21.9	14
1	453	336.0	13.2		76.0	26.3	12
1	514	397.0	15.6		61.0	23.7	13
1	581	464.0	18.3		67.0	24.8	12
1	640	523.0	20.6		59.0	23.3	13
1	682	565.0	22.2		42.0	19.8	15
1	717	600.0	23.6		35.0	18.2	17
1	754	637.0	25.1		37.0	18.7	16
1	790	673.0	26.5		36.0	18.4	17
1	822	705.0	27.8		32.0	17.4	18
1	855	738.0	29.1		33.0	17.7	17
1	888	771.0	30.4		33.0	17.7	17
1	909	792.0	31.2		21.0	14.2	21
5	964	847.0	33.3		11.0	10.5	29
5	1014	897.0	35.3		10.0	10.0	30
5	1119	1002.0	39.4		21.0	14.2	21
5	1222	1105.0	43.5		20.6	14.1	22
5	1308	1191.0	46.9		17.2	12.9	24
5	1358	1241.0	48.9		10.0	10.0	30
5	1385	1268.0	49.9		5.4	7.5	41
5	1405	1288.0	50.7		4.0	6.5	47
5	1441	1324.0	52.1		7.2	8.6	36
5	1500	1383.0	54.4		11.8	10.8	28
5	1556	1439.0	56.7		11.2	10.6	29
5	1600	1483.0	58.4		8.8	9.4	32
5	1629	1512.0	59.5		5.8	7.7	40
10	1675	1558.0	61.3		4.6	6.9	44
10	1686	1569.0	61.8		1.1	3.5	87

Date Started:	2/9/2017	Water Level:	N/A	Plate
Date Completed:	2/9/2017			
Logged By:	SC/HB	Probing Equipment:	DCP H-4219	
Total Depth:	5.15 feet	Size of Cone Tip:	8 mm dia. with 60° cone	A-9
Work Order:	6709-20	Driving Energy:	8 kg weight 575 mm drop	

GEOLABS, INC. Geotechnical Engineering	PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS HONOLULU, OAHU, HAWAII	Log of DCP **L-2**

No. of Blows	Penetration Reading	Depth of Penetration (mm)	Depth of Penetration (inches)	Elevation of Penetration (feet MSL)	Penetration Index (mm/blow)	Correlated SPT Index (mm/blow)	SPT Blow Count (blow/foot)
0	127	-	-		-	-	-
10	453	326.0	12.8		32.6	17.6	17
10	869	742.0	29.2		41.6	19.7	15
1	918	791.0	31.1		49.0	21.3	14
1	964	837.0	33.0		46.0	20.7	15
1	1010	883.0	34.8		46.0	20.7	15
10	1166	1039.0	40.9		15.6	12.4	25
9	1456	1329.0	52.3		32.2	17.5	17
10	1609	1482.0	58.3		15.3	12.2	25
10	1721	1594.0	62.8		11.2	10.6	29
10	1809	1682.0	66.2		8.8	9.4	32
10	1844	1717.0	67.6		3.5	6.1	50
10	1912	1785.0	70.3		6.8	8.3	37
10	1989	1862.0	73.3		7.7	8.8	35
10	2024	1897.0	74.7		3.5	6.1	50
10	2052	1925.0	75.8		2.8	5.5	56
10	2110	1983.0	78.1		5.8	7.7	40
5	2120	1993.0	78.5		2.0	4.6	66
3	2122	1995.0	78.5		0.7	2.8	111

Date Started:	2/8/2017	Water Level:	N/A	Plate
Date Completed:	2/9/2017			
Logged By:	SC/HB	Probing Equipment:	DCP H-4219	
Total Depth:	6.55 feet	Size of Cone Tip:	8 mm dia. with 60° cone	A-10
Work Order:	6709-20	Driving Energy:	8 kg weight 575 mm drop	

APPENDIX B

Photograph No. 1:
DCP Test location E-1 at backyard of TMK: 1-2-4-040: 025. Note the ground surface soil exposure along the existing pipe alignment in the center of the photograph. (dscn1927)

Photograph No. 2:
Vicinity of DCP Test location E-1 at backyard of TMK: 1-2-4-040: 025. Note the ground surface rock formation exposures below the existing pipe alignment. The pipe alignment is near the fence line at the top of the photo. (dscn1930)

Photograph No. 3:
Vicinity of DCP Test location E-1 at backyard of TMK: 1-2-4-040: 025. Note the ground surface rock formation exposures above the existing pipe alignment. The existing sewer alignment is in front of the chain link fence shown. (dscn1929)

Photograph No. 4:
DCP Test location E-2 at backyard of TMK: 1-2-4-039: 021. Note the existing ground surface soil exposure with appreciable basaltic cobbles and some boulders at the ground surface. Visible signs of surface rock formation outcropping was not observed. (dscn1931)

Photograph No. 5: Vicinity of DCP Test location E-2 at backyard of TMK: 1-2-4-039: 021. Note the existing manhole structure and ground surface soils and boulders along the existing pipe alignment. (dscn1932)

Photograph No. 6: DCP Test location E-3 at backyard of TMK: 1-2-4-039: 011. Note the existing ground surface soil exposure with limited surface boulders at the ground surface. (dscn1933)

Photograph No. 7: Vicinity of DCP Test location E-3 at backyard of TMK: 1-2-4-039: 011. Note the typical clayey ground surface soil exposure with widely scattered embedded boulders. (dscn1935)

Photograph No. 8: DCP Test location E-4 at backyard of TMK: 1-2-4-039: 004. Note the dense vegetation growth and an existing hard rock ledge of about 10 feet in height directly behind the DCP test location. The DCP test was conducted on a stream bank terrace adjacent to the channel and an existing manhole structure. (dscn1939)

Photograph No. 9: DCP Test location E-4 at backyard of TMK: 1-2-4-039: 004. Note the ground surface clay soil condition at the test location. (dscn1938)

Photograph No. 10: DCP Test location F-1 at backyard of TMK: 1-2-5-021: 020. Note the ground surface clay soil condition at the test location. (dscn1916)

Photograph No. 11: Vicinity of DCP Test location F-1 at backyard of TMK: 1-2-5-021: 020. Note the existing low height retaining walls indicating possible fill conditions. (dscn1915)

Photograph No. 12: DCP Test location F-2 at backyard of TMK: 1-2-5-021: 028. Note the retaining structures for grade separation along the pipe alignment. (dscn1920)

Photograph No. 13: Vicinity of DCP Test location F-2 at backyard of TMK: 1-2-5-021: 028. Note the low height retaining wall indicating possible fill condition. (dscn1919)

Photograph No. 14: DCP Test location F-3 at backyard of TMK: 1-2-5-022: 017. Note the ground surface clay soil condition at the test location. (dscn1922)

Photograph No. 15: Vicinity of DCP Test location F-3 at backyard of TMK: 1-2-5-022: 017. Note the existing exposed PVC sewer pipe at the ground surface. (dscn1921)

Photograph No. 16: DCP Test location F-4 at backyard of TMK: 1-2-5-022: 027. Note the ground surface clay soil condition at the test location and dense vegetation growth. (dscn1925)

Photograph No. 17: DCP Test location L-1 at backyard of TMK: 1-2-4-042: 033. Note the existing manhole structure near the DCP test location. Note the lack of existing visible surface boulders. (dscn1943)

Photograph No. 18: Vicinity of DCP Test location L-1 at backyard of TMK: 1-2-4-042: 033. Note the ground surface clay soil condition at the test location. (dscn1944)

Photograph No. 19: DCP Test location L-2 at backyard of TMK: 1-2-4-042: 030. (dscn1942)

Photograph No. 20: Vicinity of DCP Test location L-2 at backyard of TMK: 1-2-4-042: 030. Note the lack of existing visible surface boulders. (dscn1940)

Photograph No. 21: Existing site condition at TMK: 1-2-4-042: 046 where a segment of existing pipe is planned for replacement by trenching. Note the ground surface soil condition with embedded hard basaltic boulders and surface boulder stockpiles. View is towards the northeast from the existing backyard manhole location. (dscn1949)

Photograph No. 22: Existing site condition at TMK: 1-2-4-042: 040 (vacant lot) where a pipe segment will be replaced by trenching. Note the existing mango tree at the right side of the photo where the top of a stream bank is located. (dscn1953)

Item No.	No. of Units	Description	Unit Price	Unit Total
1.	L.S.	Mobilization Lump Sum		$ _____
2.	L.S.	Temporary Erosion Control, including installing and maintaining all temporary erosion control measures as specified in the construction plans, and removing all measures upon full establishment of permanent vergetative cover and permanent erosion control measure Lump Sum		$ _____
3.	L.S.	Archaelogical services,including monitoring and final report. Lump Sum		$ _____
4.	16	Ea., Demolish and remove existing brick SMH Each	$ _____	$ _____
5.	39	Ea., Tree Removal Each	$ _____	$ _____
6.	205	Lin. Ft., Demolish and remove existing chain link fence. Per Lin. Ft.	$ _____	$ _____
7.	2	Lin. Ft., Demolish and restore 1 to 2 foot high rock pile, in place complete Per Lin. Ft.	$ _____	$ _____
8.	80	Lin. Ft., Relocate existing 1 to 2.99-foot high rock wall. Per Lin. Ft.	$ _____	$ _____
9.	32	Lin. Ft., Demolish and restore 1 to 2.99-foot high rock wall, in place complete Per Lin. Ft.	$ _____	$ _____

Item No.	No. of Units	Description	Unit Price	Unit Total
10.	4	Lin. Ft., Demolish and restore 4 to 4.99-foot high rock wall, in place complete Per Lin. Ft.	$ _____	$ _____
11.	4	Lin. Ft., Demolish and restore 1 to 2.99-foot high rock wall with 4-foot high chain link fence, in place complete Per Lin. Ft.	$ _____	$ _____
12.	2	Lin. Ft., Demolish and restore 3 to 3.99-foot high rock wall with 4-foot high chain link fence, in place complete Per Lin. Ft.	$ _____	$ _____
13.	2	Lin. Ft., Demolish and restore 3 to 3.99-foot high rock wall with 6-foot high chain link fence, in place complete Per Lin. Ft.	$ _____	$ _____
14.	2	Lin. Ft., Demolish and restore 4 to 4.99-foot high rock wall with 4-foot high chain link fence, in place complete Per Lin. Ft.	$ _____	$ _____
15.	1	Ea., Demolish and remove drain inlet. Plug drainline. Each	$ _____	$ _____
16.	L.S.	Relocate existing concrete pad (approx. 10-ft by 6-ft), in place complete. (TMK:1-2-4-040: 029) Lump Sum		$ _____
17.	L.S.	Relocate existing shed, in place complete. (TMK: 1-2-5-022: 020) Lump Sum		$ _____
18.	L.S.	Relocate existing shed, in place complete. (TMK: 1-2-5-021: 024) Lump Sum		$ _____

Item No.	No. of Units	Description	Unit Price	Unit Total
19.	14	L.F., 6-inch PVC sewer line installed by open trenching in unpaved easement, inclusive of bypassing, and all incidentals, in place complete. Per Lin. Ft.	$ _____	$ _____
20.	3,375	L.F., 8-inch PVC sewer line installed by open trenching in unpaved easement, inclusive of bypassing, and all incidentals, in place complete. Per Lin. Ft.	$ _____	$ _____
21.	16	L.F., 8-inch PVC sewer line installed by open trenching in roadway, inclusive of bypassing, and all incidentals in place complete. Per Lin. Ft.	$ _____	$ _____
22.	52	Ea., Sewer lateral re-connection, in place complete. Each	$ _____	$ _____
23.	255	Lin. Ft., Reinforced concrete jacket, in place complete. Per Lin. Ft.	$ _____	$ _____
24.	6	Ea., Epoxy line sewer manholes, including cleaning, preparation, removal of rungs, repair of cracks, and all incidentals, in place complete. Each	$ _____	$ _____
25.	340	Cu.Yd., Additional fill for 2' minimum cover with erosion control mat and hydromulch, in place complete. Per Cu. Yd.	$ _____	$ _____

Item No.	No. of Units	Description	Unit Price	Unit Total
26.	95	Lin. Ft., 4'-high Chain Link Fence, in place complete. Per Lin. Ft.	$ _____	$ _____
27.	80	Lin. Ft., 5'-high Chain Link Fence, in place complete. Per Lin. Ft.	$ _____	$ _____
28.	30	Lin. Ft., 6'-high Chain Link Fence, in place complete. Per Lin. Ft.	$ _____	$ _____
29.	2	Ea., Boulder Removal, including protection of existing utilities and structures. Each	$ _____	$ _____
30.	1	EA, Standard Sewer Manhole (3.00'-3.99' depth from top of cover to invert), in place complete. Each	$ _____	$ _____
31.	12	EA, Standard Sewer Manhole (4.00'-4.99' depth from top of cover to invert), in place complete. Each	$ _____	$ _____
32.	2	EA, Standard Sewer Manhole (5.00'-5.99' depth from top of cover to invert), in place complete. Each	$ _____	$ _____

Item No.	No. of Units	Description	Unit Price	Unit Total
33.	1	EA, Standard Sewer Manhole (6.00'-6.99' depth from top of cover to invert), in place complete. Each	$ _____	$ _____
34.	1	EA, Standard Sewer Manhole (8.00'-8.99' depth from top of cover to invert), in place complete. Each	$ _____	$ _____
35.	2,120	6" Cured-in-place-pipe, inclusive of mobilization, CIPP, pre and post CCTV inspection, cleaning and preparation, reconnection of laterals, testing, traffic control and bypass, and all incidentals, in place complete. Per Lin. Ft.	$ _____	$ _____
36.	845	8" Cured-in-place-pipe, inclusive of mobilization, CIPP, pre and post CCTV inspection, cleaning and preparation, reconnection of laterals, testing, traffic control and bypass, and all incidentals, in place complete. Per Lin. Ft.	$ _____	$ _____
37.	Allow.	300 Lin. Ft. of 6-inch or 8-inch CIPP Preliner, in place complete. Allowance, Per Lin Ft.	$ _____	$ _____
38.	Allow.	50 Lin. Ft. of 6-inch or 8-inch Spot Repair Allowance, Per Lin Ft.	$ _____	$ _____

Item No.	No. of Units	Description	Unit Price	Unit Total
39.	L.S.	Traffic Control, inclusive of all traffic control devices, off-duty police officers, and all incidentals required to complete the work. Lump Sum		$ _____
40.	L.S.	Project Sign Lump Sum		$ _____
41.	L.S.	Field Office, shall be full compensation for furnishing materials, labor, tools, equipment, and incidentals necessary to construct the field office, in place complete, as required. Lump Sum		$ _____

TOTAL SUM BID = _____

_____Dollars ($_____).

The prices herein for the above items shall include all materials, labor, tools, equipment, machinery and all incidentals necessary, inclusive of general excise tax to install or to construct these items in place complete and in accordance with the plans and specifications contained in this IFB.

The CONTRACTOR shall complete all work as specified or indicated in the Contract Documents on or before nine hundred (900) calendar days after receiving written Notice to Proceed, subject to extensions, as may be granted.

TRAFFIC NOTES FOR WORK ON CITY & COUNTY STREETS

1. A PERMIT SHALL BE OBTAINED FROM THE DEPARTMENT OF TRANSPORTATION SERVICES BEFORE WORK ON ANY PORTION OF A PUBLIC STREET OR HIGHWAY MAY BEGIN. CONSTRUCTION TRAFFIC CONTROL PLANS APPROVED BY THE DEPARTMENT OF TRANSPORTATION SERVICES AND/OR THE DEPARTMENT OF PLANNING AND PERMITTING MUST BE PROVIDED WHEN APPLYING FOR THE PERMIT.
2. THE CONTRACTOR SHALL PROVIDE, INSTALL, AND MAINTAIN ALL NECESSARY SIGNS AND OTHER PROTECTIVE FACILITIES, WHICH SHALL CONFORM WITH THE "HAWAII ADMINISTRATION RULES GOVERNING THE USE OF TRAFFIC CONTROL DEVICES AT WORK SITES ON OR ADJACENT TO PUBLIC STREETS AND HIGHWAYS" ADOPTED BY THE DIRECTOR OF TRANSPORTATION, AND THE CURRENT U.S. FEDERAL HIGHWAYS ADMINISTRATION'S "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, PART VI–TRAFFIC CONTROLS FOR STREET AND HIGHWAY CONSTRUCTION AND MAINTENANCE OPERATIONS."
3. WORK ON ANY CITY STREET AREA MAY BE PERFORMED ONLY BETWEEN THE HOURS OF 8:30 A.M. TO 3:30 P.M., MONDAY THROUGH FRIDAY, UNLESS OTHERWISE PERMITTED BY THE DEPARTMENT OF TRANSPORTATION SERVICE.
4. DURING WORKING HOURS, THE CONTRACTOR SHALL PROVIDE FOR THROUGH TRAFFIC. DURING NON–WORKING HOURS, ALL TRENCHES SHALL BE COVERED WITH A SAFE NON–SKID BRIDGING MATERIAL AND ALL LANES SHALL BE OPEN TO TRAFFIC.
5. AS REQUIRED BY THE DEPARTMENT OF TRANSPORTATION SERVICES, THE CONTRACTOR SHALL PROVIDE OFF–DUTY POLICE OFFICERS TO CONTROL THE FLOW OF TRAFFIC.
6. WHERE PEDESTRIAN WALKWAYS EXIST, THEY SHALL BE MAINTAINED IN PASSABLE CONDITION, OR OTHER FACILITIES FOR PEDESTRIANS SHALL BE PROVIDED. PASSAGE BETWEEN WALKWAYS AT INTERSECTIONS SHALL LIKEWISE BE PROVIDED.
7. DRIVEWAYS SHALL BE KEPT OPEN UNLESS THE OWNERS OF THE PROPERTY USING THESE RIGHTS–OF–WAY ARE OTHERWISE PROVIDED FOR SATISFACTORILY.
8. CONTRACTOR SHALL REFERENCE TO THE APPROVAL OF THE DEPARTMENT OF TRANSPORTATION SERVICES AND THE DEPARTMENT OF PLANNING AND PERMITTING, ALL EXISTING TRAFFIC SIGNS, POSTS AND PAVEMENT MARKINGS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR SHALL REPLACE OR REPAIR ALL TRAFFIC SIGNS, POSTS AND PAVEMENT MARKINGS DISTURBED BY HIS ACTIVITIES.
9. THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PLANNING AND PERMITTING AT 768–8084 ONE (1) WEEK PRIOR TO ANY WORK TO BE DONE ON SIGNS, POSTS AND PAVEMENT MARKINGS.
10. NO EQUIPMENT SHALL BE STORED WITHIN STREET RIGHTS–OF–WAY EXCEPT AT LOCATIONS DESIGNATED IN WRITING AND APPROVED BY THE DEPARTMENT OF TRANSPORTATION SERVICES.
11. DHHL SHALL ENSURE THAT THE CONTRACTOR INSTALLS THE CONSTRUCTION TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THE MUTCD AND THE HAWAII ADMINISTRATION RULES AS SPECIFIED IN TRAFFIC NOTE #2.

TRAFFIC CONTROL PLAN NOTES

1. THE PERMITTEE SHALL MAKE MINOR ADJUSTMENTS AT INTERSECTIONS, DRIVEWAYS, BRIDGES, STRUCTURES, ETC., TO FIT FIELD CONDITIONS.
2. CONES OR DELINEATORS SHALL BE EXTENDED TO A POINT WHERE THEY ARE VISIBLE TO APPROACHING TRAFFIC.
3. TRAFFIC CONTROL DEVICES SHALL BE INSTALLED SUCH THAT THE SIGN OR DEVICE FARTHEST FROM THE WORK AREA IS PLACED FIRST. THE OTHERS SHALL THEN BE PLACED PROGRESSIVELY TOWARD THE WORK AREA.
4. REGULATORY AND WARNING SIGNS WITHIN THE CONSTRUCTION ZONE THAT ARE IN CONFLICT WITH THE TRAFFIC CONTROL PLANS SHALL BE REMOVED OR COVERED.
5. FLAGGERS AND/OR POLICE OFFICERS SHALL BE IN SIGHT OF EACH OTHER OR IN DIRECT COMMUNICATION AT ALL TIMES.
6. WHEN REQUIRED BY THE ISSUING OFFICE, THE PERMITTEE SHALL INSTALL A FLASHING ARROW SIGNAL AS SHOWN ON THE TRAFFIC CONTROL PLANS.
7. ALL TRAFFIC LANES SHALL BE A MINIMUM OF 10 FEET WIDE.
8. ALL CONSTRUCTION WARNING SIGNS SHALL BE PROMPTLY REMOVED OR COVERED WHENEVER THE MESSAGE IS NOT APPLICABLE OR NOT IN USE.
9. THE BACKS OF ALL SIGNS USED FOR TRAFFIC CONTROL SHALL BE APPROPRIATELY COVERED TO PRECLUDE THE DISPLAY OF INAPPLICABLE SIGN MESSAGES (I.E., WHEN SIGNS HAVE MESSAGES ON BOTH FACES).
10. LANE CLOSURE SHALL BE LIMITED ONLY TO THE EXTENT OF ACCOMPLISHING EACH DAY'S WORK. AS SOON AS EACH DAY'S WORK IS COMPLETED, THE PERMITTEE SHALL REMOVE ALL TRAFFIC CONTROL DEVICES NO LONGER NEEDED TO PERMIT FREE AND SAFE PASSAGE OF PUBLIC TRAFFIC. REMOVAL SHALL BE IN THE REVERSE ORDER OF INSTALLATION. EXISTING FADED OR OBLITERATED PAVEMENT MARKINGS THAT ARE NECESSARY FOR SAFE TRAFFIC FLOW IN THE CONSTRUCTION AREA SHALL BE REPLACED WITH TEMPORARY OR PERMANENT MARKINGS BEFORE OPENING THE ROADWAY TO PUBLIC TRAFFIC EACH DAY.
11. PERMANENT PAVEMENT MARKINGS AND TRAFFIC SIGNS SHALL BE REPLACED UPON COMPLETION OF EACH PHASE OF WORK.
12. CONES AND DELINEATORS SHALL BE SPACED AT A MAXIMUM DISTANCE OF 20 FEET APART. A MINIMUM OF SIX CHANNELIZING DEVICES SHALL BE USED FOR EACH TAPER LENGTH.
13. DRIVEWAYS SHALL BE KEPT OPEN UNLESS THE OWNERS OF THE PROPERTY USING THE RIGHT–OF–WAY ARE OTHERWISE PROVIDED FOR SATISFACTORILY. FURTHER, THE PERMITTEE SHALL CONTROL TRAFFIC GOING IN AND OUT OF DRIVEWAYS.
14. BUFFER AND TAPER AREA ON APPROACH TO ANY WORK AREA SHALL BE KEPT CLEAR OF VEHICLES AND EQUIPMENT.
15. A HIGH LEVEL WARNING DEVICE (FLAG TREE) SHALL BE INSTALLED ON APPROACH TO ALL WORK AREAS.
16. "NO PARKING" SIGNS SHALL BE POSTED WITHIN ANY WORK AREA AND FOR THE BUFFER AND TAPER AREAS APPROACHING THE WORK AREA.
17. WORK ON ANY CITY STREET AREA MAY BE PERFORMED ONLY BETWEEN THE HOURS OF 8:30 A.M. TO 3:30 P.M., MONDAY THROUGH FRIDAY, UNLESS OTHERWISE PERMITTED BY THE DEPARTMENT OF TRANSPORTATION SERVICES AS NOTED ON THE PLANS.
18. TRAFFIC CONTROL PLANS APPROVED FOR 24–HOUR WORK ON CITY STREET AREAS ARE NOTED ON THE PLANS.
19. FOR 24–HOUR ROAD CLOSURE, THE CONTRACTOR SHALL BE PRESENT AND ACTIVELY WORKING AT ALL TIMES ON THE CLOSED ROAD OR SECTION OF ROAD. NON–COMPLIANCE WILL RESULT IN THE IMMEDIATE REVOCATION OF THE STREET USAGE PERMIT. DDC WILL CAUSE ALL CONSTRUCTION ACTIVITIES TO CEASE. CONTRACTOR MAY APPLY FOR A NEW STREET USAGE PERMIT ONLY AFTER MEETING WITH THE DTS AND DDC. THERE WILL BE NO EXTENSION OF CONTRACT TIME OR COMPENSATION GRANTED DUE TO DELAYS IN THE APPLICATION AND THE OBTAINING OF A NEW STREET USAGE PERMIT.

△1

ABBREVIATIONS

APPROX	APPROXIMATE
BB	BOTTOM OF BANK
BLK	BLOCK
BMP	BEST MANAGEMENT PRACTICES
BW	BOTTOM OF WALL
CIPP	CURED IN PLACE PIPE
CLF	CHAIN LINKED FENCE
℄	CENTER LINE
C&C / CITY	CITY AND COUNTY OF HONOLULU
CO	CLEAN OUT
CONC	CONCRETE
CY	CUBIC YARD
D/DIA	DIAMETER
DET	DETAIL
DHHL	DEPARTMENT OF HAWAIIAN HOME LANDS
DPP	DEPARTMENT OF PLANNING AND PERMITTING
DPW	DEPARTMENT OF PUBLIC WORKS
EX	EXISTING
fps	FEET PER SECOND
FT	FEET
H	HEIGHT
I.D.	INNER DIAMETER
INV	INVERT
LF	LINEAR FEET
MAINT	MAINTAINED
mgd	MILLION GALLONS PER DAY
MIN	MINIMUM
N	MANNING'S N
OC	ON CENTER
PL	PROPERTY LINE
PERF	PERFORATED
PVC	POLYVINYL CHLORIDE
Qa	AVAILABLE FLOW
Qr	REQUIRED FLOW
S	SLOPE / SEWER / SPREAD
SHT	SHEET
SL	SLOPE / SEWER LINE
SMH	SEWER MANHOLE
STA	STATION
T	TOP
TB	TOP OF BANK
TP	TOP OF PIPE
TW	TOP OF WALL
TYP	TYPICAL
Va	AVAILABLE VELOCITY
Vr	REQUIRED VELOCITY

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, D.P.P. DATE

ENGINEER	AM/JB/SM
DRAFTSMAN	SF
CHECKED BY	AM/JN

REVISION	DATE	BRIEF	BY	APPROVED
△				
△1	3/27/17	ADD 2: REV. TCP NOTE	AM	DHHL

ANN Y.M. MIYASATO LICENSED PROFESSIONAL ENGINEER No. 11253-C HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. "OBSERVATION OF CONSTRUCTION" IS DEFINED IN CHAPTER 16–115, HAWAII ADMINISTRATIVE RULES ENTITLED "PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS".

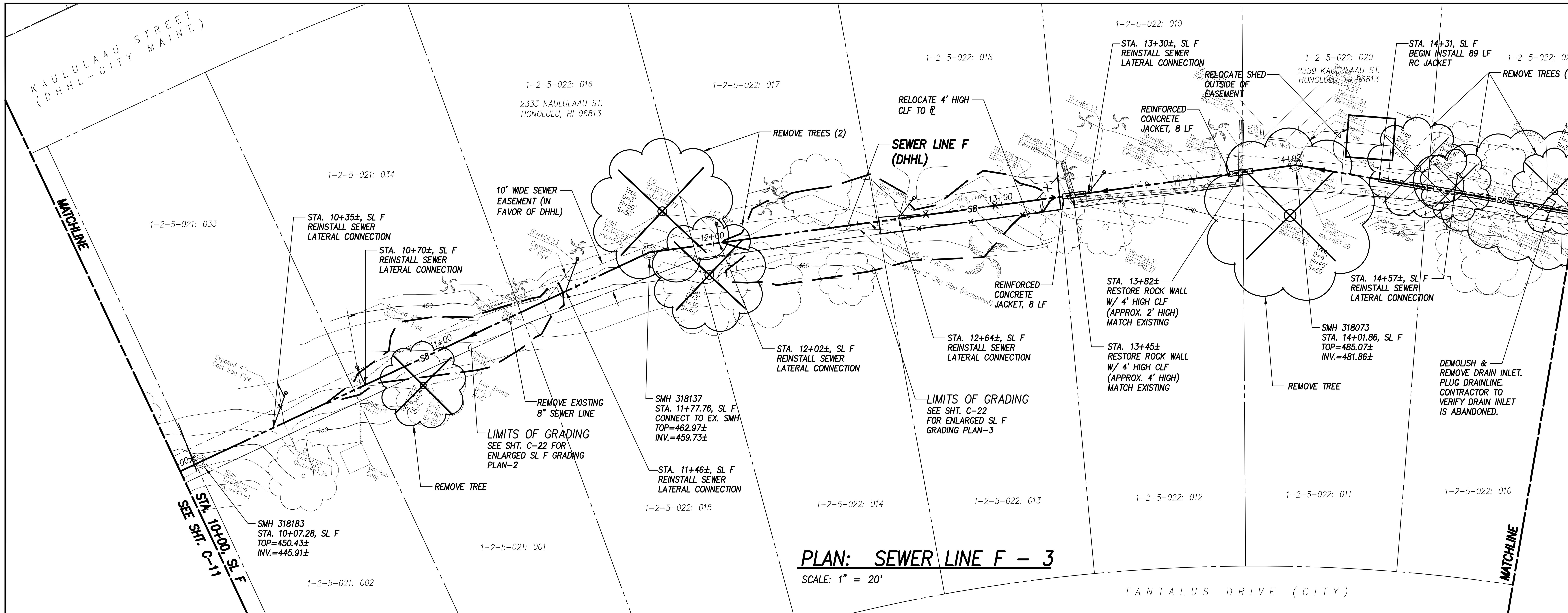
SIGNATURE | Apr 2018 LIC. EXP.

Planning – Engineering – Environmental Services – Photogrammetry – Surveying – Construction Management
R. M. TOWILL CORPORATION
808 842 1133 2024 North King Street Suite 200 Honolulu Hawaii 96819–3494

Department of Hawaiian Home Lands
PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS
SEWER LINES E, F, L, A, C, D, AND K–3
Papakolea, Honolulu, Oahu, Hawaii

CONSTRUCTION NOTES – 3 AND LEGEND & ABBREVIATIONS

FILE	POCKET	FOLDER	NO.


KAULULAAU STREET
(DHHL-CITY MAINT.)
SEWER LINE F
(DHHL)
REMOVE TREES (2)
10' WIDE SEWER EASEMENT (IN FAVOR OF DHHL)
STA. 10+35±, SL F
REINSTALL SEWER LATERAL CONNECTION
STA. 10+70±, SL F
REINSTALL SEWER LATERAL CONNECTION
REMOVE EXISTING 8" SEWER LINE
LIMITS OF GRADING
SEE SHT. C-22 FOR ENLARGED SL F GRADING PLAN-2
REMOVE TREE
SMH 318183
STA. 10+07.28, SL F
TOP=450.43±
INV.=445.91±
SMH 318137
STA. 11+77.76, SL F
CONNECT TO EX. SMH
TOP=462.97±
INV.=459.73±
STA. 11+46±, SL F
REINSTALL SEWER LATERAL CONNECTION
STA. 12+02±, SL F
REINSTALL SEWER LATERAL CONNECTION
RELOCATE 4' HIGH CLF TO ℄
REINFORCED CONCRETE JACKET, 8 LF
STA. 12+64±, SL F
REINSTALL SEWER LATERAL CONNECTION
LIMITS OF GRADING
SEE SHT. C-22 FOR ENLARGED SL F GRADING PLAN-3
STA. 13+30±, SL F
REINSTALL SEWER LATERAL CONNECTION
RELOCATE SHED OUTSIDE OF EASEMENT
REINFORCED CONCRETE JACKET, 8 LF
STA. 13+82±
RESTORE ROCK WALL W/ 4' HIGH CLF (APPROX. 2' HIGH) MATCH EXISTING
STA. 13+45±
RESTORE ROCK WALL W/ 4' HIGH CLF (APPROX. 4' HIGH) MATCH EXISTING
STA. 14+31, SL F
BEGIN INSTALL 89 LF RC JACKET
REMOVE TREES (3)
STA. 14+57±, SL F
REINSTALL SEWER LATERAL CONNECTION
SMH 318073
STA. 14+01.86, SL F
TOP=485.07±
INV.=481.86±
REMOVE TREE
DEMOLISH & REMOVE DRAIN INLET. PLUG DRAINLINE. CONTRACTOR TO VERIFY DRAIN INLET IS ABANDONED.
2333 KAULULAAU ST.
HONOLULU, HI 96813
2359 KAULULAAU ST.
HONOLULU, HI 96813
1-2-5-021: 033
1-2-5-021: 034
1-2-5-021: 001
1-2-5-021: 002
1-2-5-022: 016
1-2-5-022: 017
1-2-5-022: 018
1-2-5-022: 019
1-2-5-022: 020
1-2-5-022: 021
1-2-5-022: 015
1-2-5-022: 014
1-2-5-022: 013
1-2-5-022: 012
1-2-5-022: 011
1-2-5-022: 010
MATCHLINE
STA. 10+00, SL F
SEE SHT. C-11
STA. 15+00, SL F
SEE SHT. C-13
TANTALUS DRIVE (CITY)
TRUE NORTH
SCALE: 1"=20'

PLAN: SEWER LINE F – 3

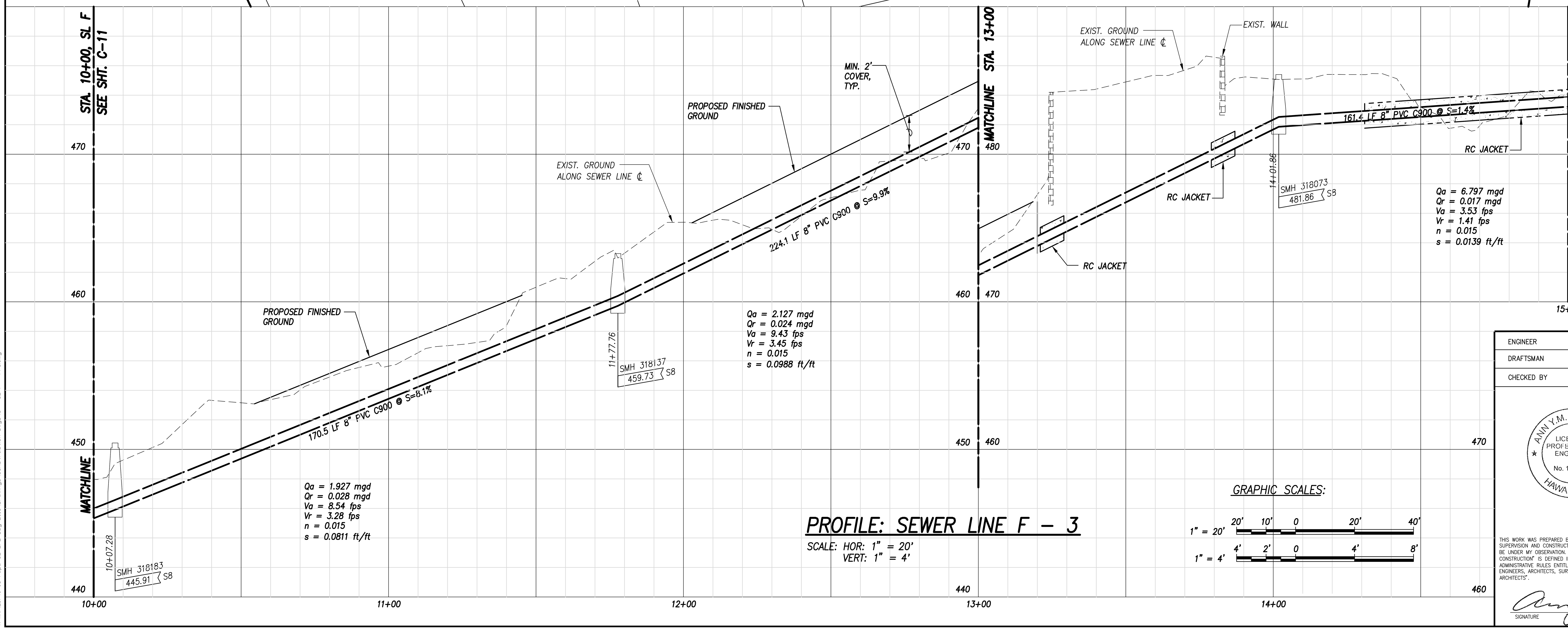
SCALE: 1" = 20'

LEGEND:

——·——	PROPERTY LINE
– – – –	EX. SEWER EASEMENT
—— ——	LIMITS OF GRADING
—◄—S6—	SEWER LINE (W/ SIZE & FLOW DIRECTION)
–◄–e/s6–	EX SEWER LINE (W/ SIZE & FLOW DIRECTION)
●	NEW SMH
◎	EX. SMH
✕	TREE TO BE REMOVED

APPROVED:

CHIEF, CIVIL ENGINEERING BRANCH, D.P.P. DATE


STA. 10+00, SL F
SEE SHT. C-11
MATCHLINE
STA. 13+00
STA. 15+00, SL F
SEE SHT. C-13
PROPOSED FINISHED GROUND
EXIST. GROUND ALONG SEWER LINE ℄
MIN. 2' COVER, TYP.
170.5 LF 8" PVC C900 @ S=8.1%
224.1 LF 8" PVC C900 @ S=9.9%
161.4 LF 8" PVC C900 @ S=1.3%
Qa = 1.927 mgd
Qr = 0.028 mgd
Va = 8.54 fps
Vr = 3.28 fps
n = 0.015
s = 0.0811 ft/ft
Qa = 2.127 mgd
Qr = 0.024 mgd
Va = 9.43 fps
Vr = 3.45 fps
n = 0.015
s = 0.0988 ft/ft
Qa = 6.797 mgd
Qr = 0.017 mgd
Va = 3.53 fps
Vr = 1.41 fps
n = 0.015
s = 0.0139 ft/ft
10+07.28
SMH 318183
445.91 S8
11+77.76
SMH 318137
459.73 S8
14+01.86
SMH 318073
481.86 S8
EXIST. WALL
RC JACKET
10+00
11+00
12+00
13+00
14+00
15+00
440
450
460
470
480

PROFILE: SEWER LINE F – 3

SCALE: HOR: 1" = 20'
VERT: 1" = 4'

GRAPHIC SCALES:
1" = 20' — 20' 10' 0 20' 40'
1" = 4' — 4' 2' 0 4' 8'

NOTES:

1) CONTRACTOR TO PROVIDE CONTINUOUS SEWER SERVICE TO ALL RESIDENTS.
2) CONTRACTOR TO PROVIDE CONNECTION TO ALL EXIST LATERALS TO NEW SEWER LINE.
3) CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS BACK TO ORIGINAL CONDITION OR BETTER.
4) ADDITIONAL WORK REQUIRED TO COMPLY WITH ALL CITY STANDARDS SHALL BE DONE IN A SEPARATE DHHL PROJECT PRIOR TO TURNING THE SEWER LINE OVER TO THE CITY.
5) FOR SEWER LATERAL CONNECTION DETAIL, SEE SHT. C-26.
6) FOR LIMITS OF DISTURBED AREA, SEE SHT. C-22.

ENGINEER	AM
DRAFTSMAN	SF
CHECKED BY	AM/JN

REVISION	DATE	BRIEF	BY	APPROVED
△				
⚠	3/27/17	ADD 2: REMOVE GRADING	AM	DHHL

ANN Y.M. MIYASATO
LICENSED PROFESSIONAL ENGINEER
No. 11253-C
HAWAII, U.S.A.

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SIGNATURE — LIC. EXP. Apr 2018

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Planning – Engineering – Environmental Services – Photogrammetry – Surveying – Construction Management
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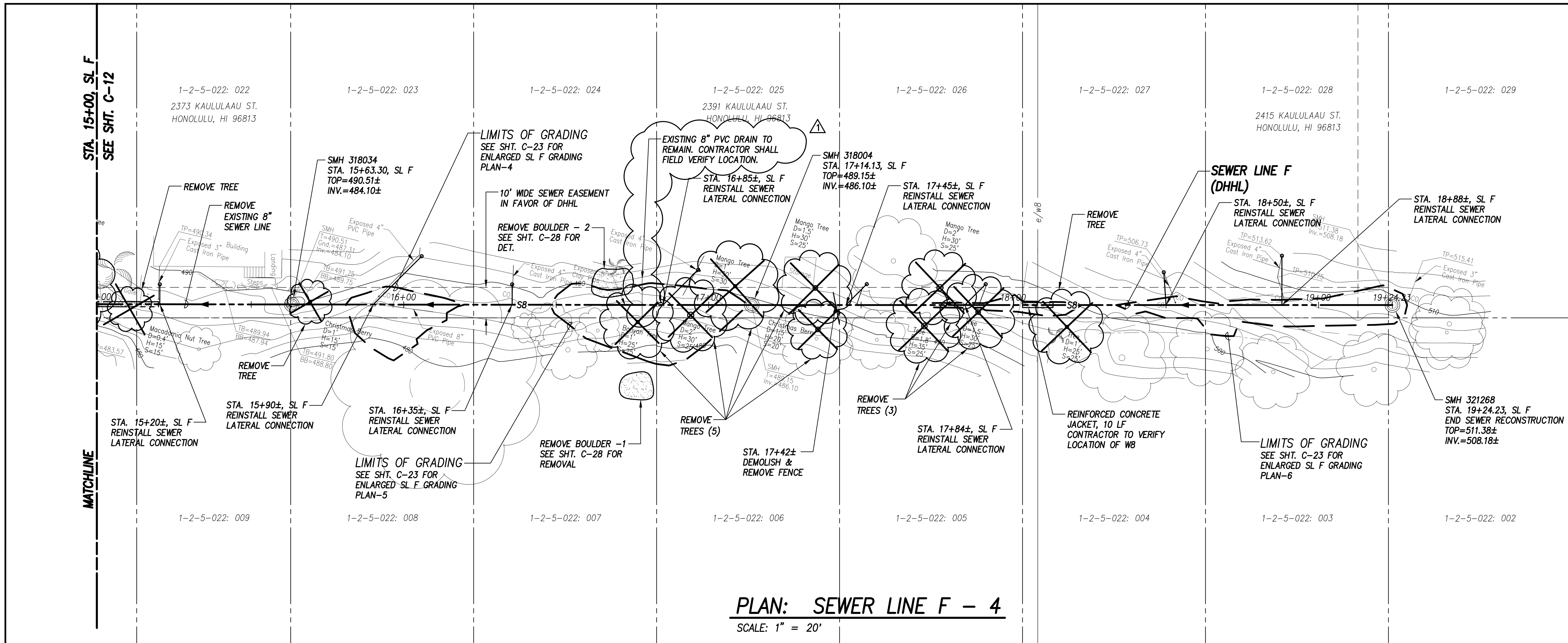
Department of Hawaiian Home Lands
PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS
SEWER LINES E, F, L, A, C, D, AND K-3
Papakolea, Honolulu, Oahu, Hawaii

SEWER LINE F
PLAN & PROFILE – 3

FILE	POCKET	FOLDER	NO.



PLAN: SEWER LINE F – 4

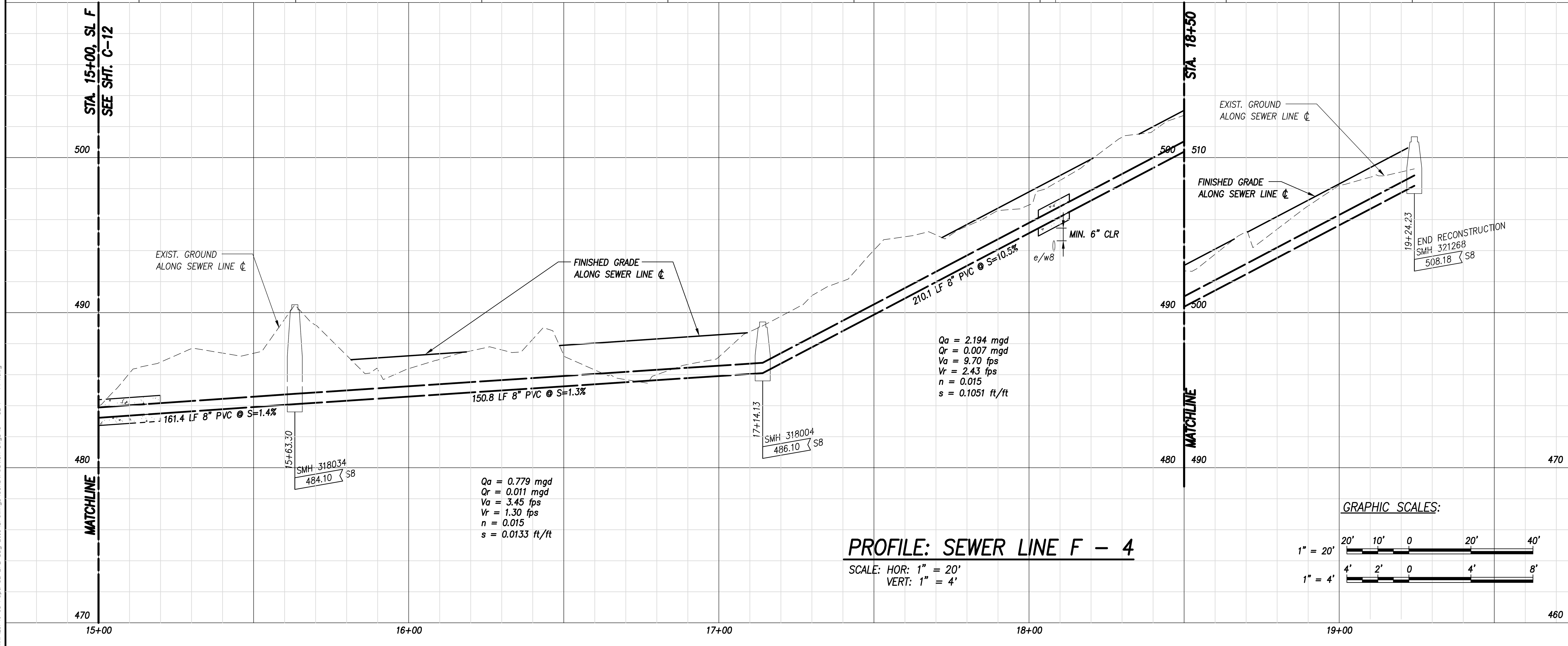
SCALE: 1" = 20'

LEGEND:

- PROPERTY LINE
- LIMITS OF GRADING
- SEWER LINE (W/ SIZE & FLOW DIRECTION)
- EX SEWER LINE (W/ SIZE & FLOW DIRECTION)
- NEW SMH
- EX. SMH
- TREE TO BE REMOVED

APPROVED:

CHIEF, CIVIL ENGINEERING BRANCH, D.P.P. DATE



PROFILE: SEWER LINE F – 4

SCALE: HOR: 1" = 20'
VERT: 1" = 4'

NOTES:

1) CONTRACTOR TO PROVIDE CONTINUOUS SEWER SERVICE TO ALL RESIDENTS.
2) CONTRACTOR TO PROVIDE CONNECTION TO ALL EXIST LATERALS TO NEW SEWER LINE.
3) CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS BACK TO ORIGINAL CONDITION OR BETTER.
4) ADDITIONAL WORK REQUIRED TO COMPLY WITH ALL CITY STANDARDS SHALL BE DONE IN A SEPARATE DHHL PROJECT PRIOR TO TURNING THE SEWER LINE OVER TO THE CITY.
5) FOR SEWER LATERAL CONNECTION DETAIL, SEE SHT C-26.
6) FOR LIMITS OF DISTURBED AREA, SEE SHT. C-22.

GRAPHIC SCALES:

1" = 20' : 20' 10' 0 20' 40'
1" = 4' : 4' 2' 0 4' 8'

ENGINEER	AM				
DRAFTSMAN	SF	1	3/27/17	ADD 2: ADDED CALLOUT	AM / DHHL
CHECKED BY	AM / JN	REVISION	DATE	BRIEF	BY / APPROVED

ANN Y.M. MIYASATO, LICENSED PROFESSIONAL ENGINEER, No. 11253-C, HAWAII, U.S.A.

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Department of Hawaiian Home Lands

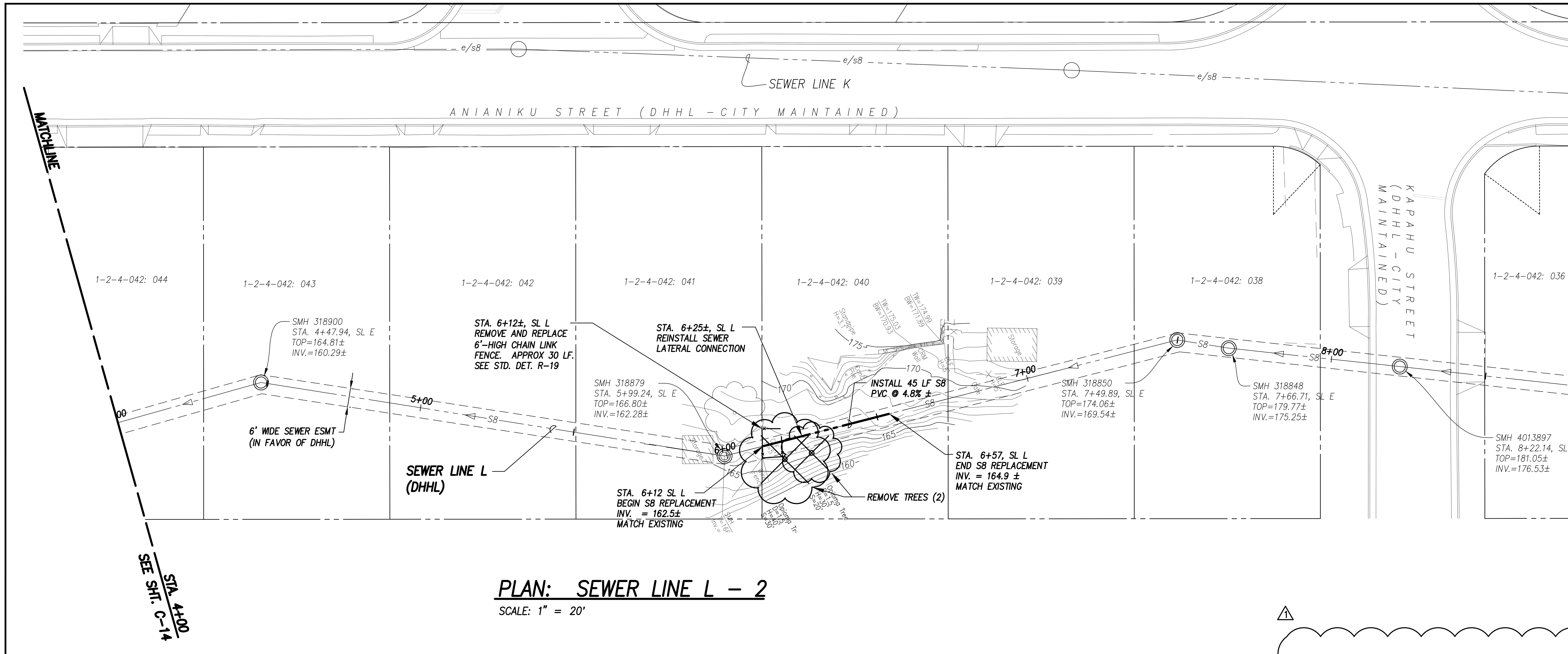
PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS

SEWER LINES E, F, L, A, C, D, AND K-3

Papakolea, Honolulu, Oahu, Hawaii

SEWER LINE F
PLAN & PROFILE – 4

FILE	POCKET	FOLDER	NO.



PLAN: SEWER LINE L – 2

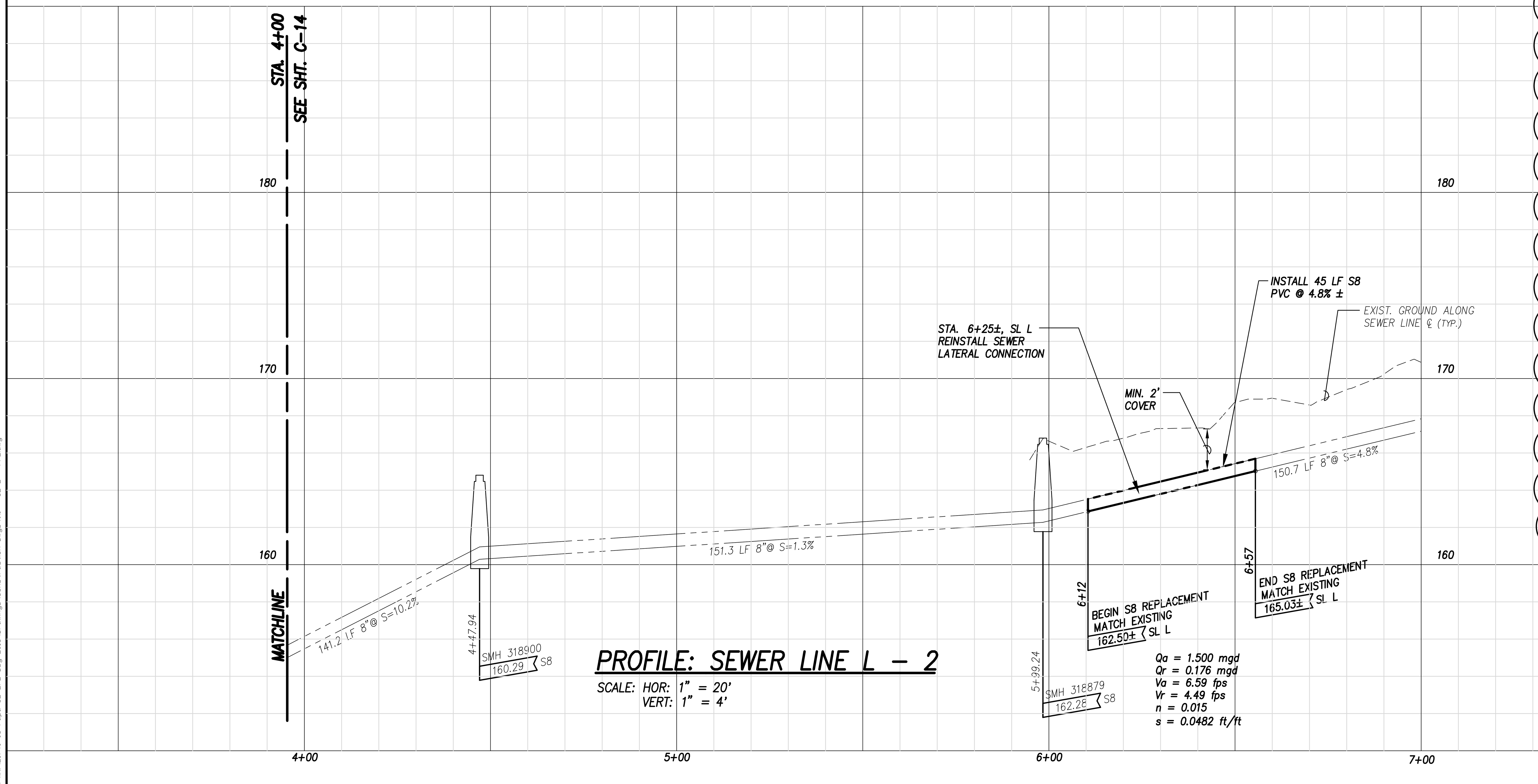
SCALE: 1" = 20'

NOTE:

1) CONTRACTOR TO PROVIDE CONTINUOUS SEWER SERVICE TO ALL RESIDENTS.
2) CONTRACTOR TO PROVIDE CONNECTION TO ALL EXISTING SEWER LATERALS
3) CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS BACK TO ORIGINAL CONDITION OR BETTER.
4) ALL CONSTRUCTION EQUIPMENT AND WORK ACTIVITIES WILL BE STAGED UPSLOPE FROM THE TOP OF THE STREAM BANK. NO EQUIPMENT OPERATIONS OR WORK ACTIVITIES SHALL OCCUR WITHIN THE STREAM CHANNEL.
5) FOR SEWER LATERAL CONNECTION DETAIL, SEE SHT C-26.
6) FOR LIMITS OF DISTURBED AREA, SEE SHT. C-25.

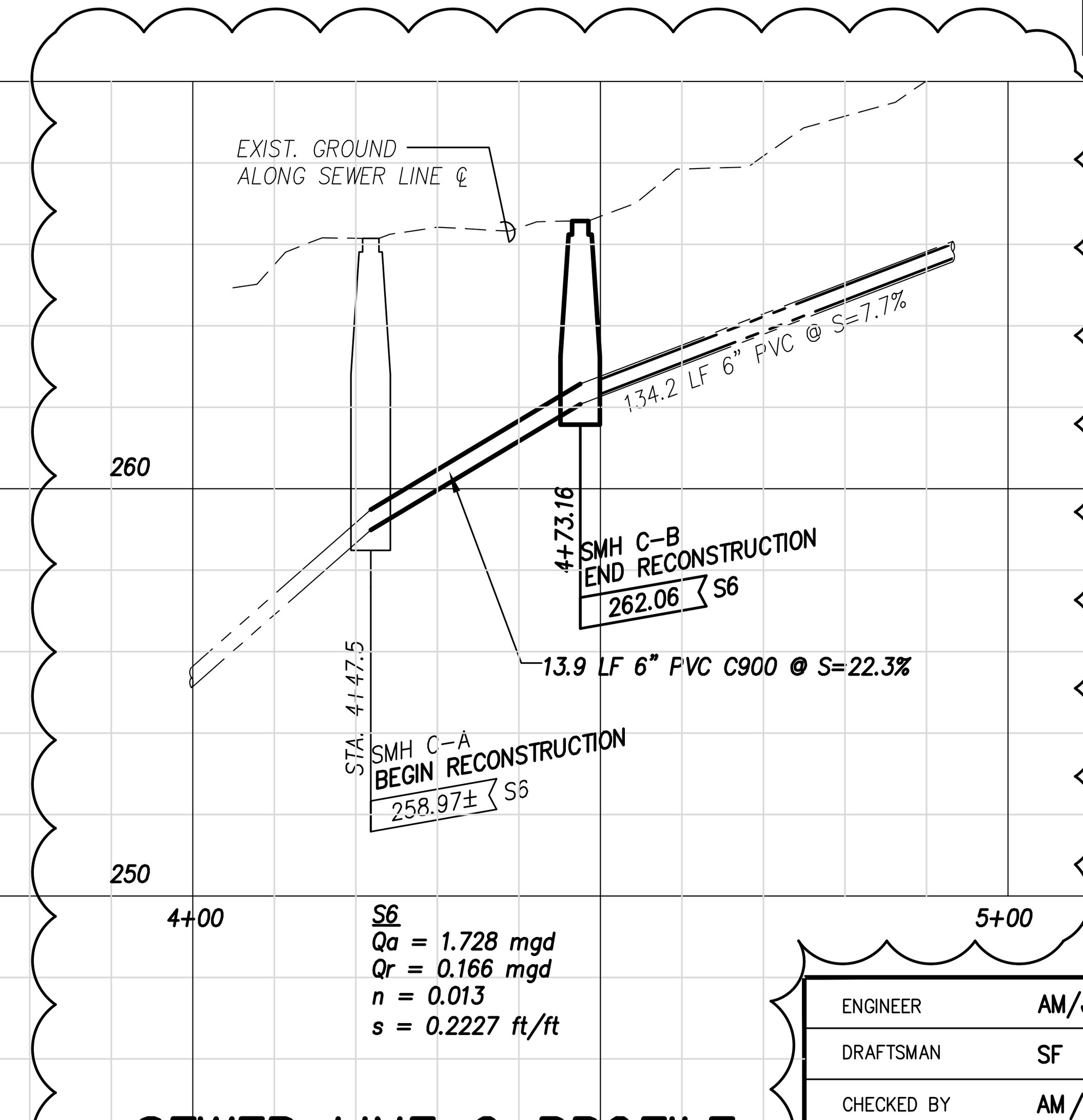
LEGEND:

- PROPERTY LINE
- EX. SEWER EASEMENT
- SEWER LINE TO BE REPLACED
- EX SEWER LINE (W/ SIZE & FLOW DIRECTION)
- NEW SMH
- EX. SMH
- TREE TO BE REMOVED



PROFILE: SEWER LINE L – 2

SCALE: HOR: 1" = 20'
VERT: 1" = 4'



SEWER LINE C PROFILE

SCALE: HOR: 1" = 20'
VERT: 1" = 4'

GRAPHIC SCALES:

1" = 20': 20' 10' 0 20' 40'
1" = 4': 4' 2' 0 4' 8'

ENGINEER	AM/JB
DRAFTSMAN	SF
CHECKED BY	AM/JN

REVISION	DATE	BRIEF	BY	APPROVED
1	3/27/17	ADD 2: SL C PROFILE, REVISE TITLE	AM	DHHL

ANN Y.M. MIYASATO LICENSED PROFESSIONAL ENGINEER No. 11253-C HAWAII, U.S.A.

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Department of Hawaiian Home Lands

PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS

SEWER LINES E, F, L, A, C, D, AND K-3

Papakolea, Honolulu, Oahu, Hawaii

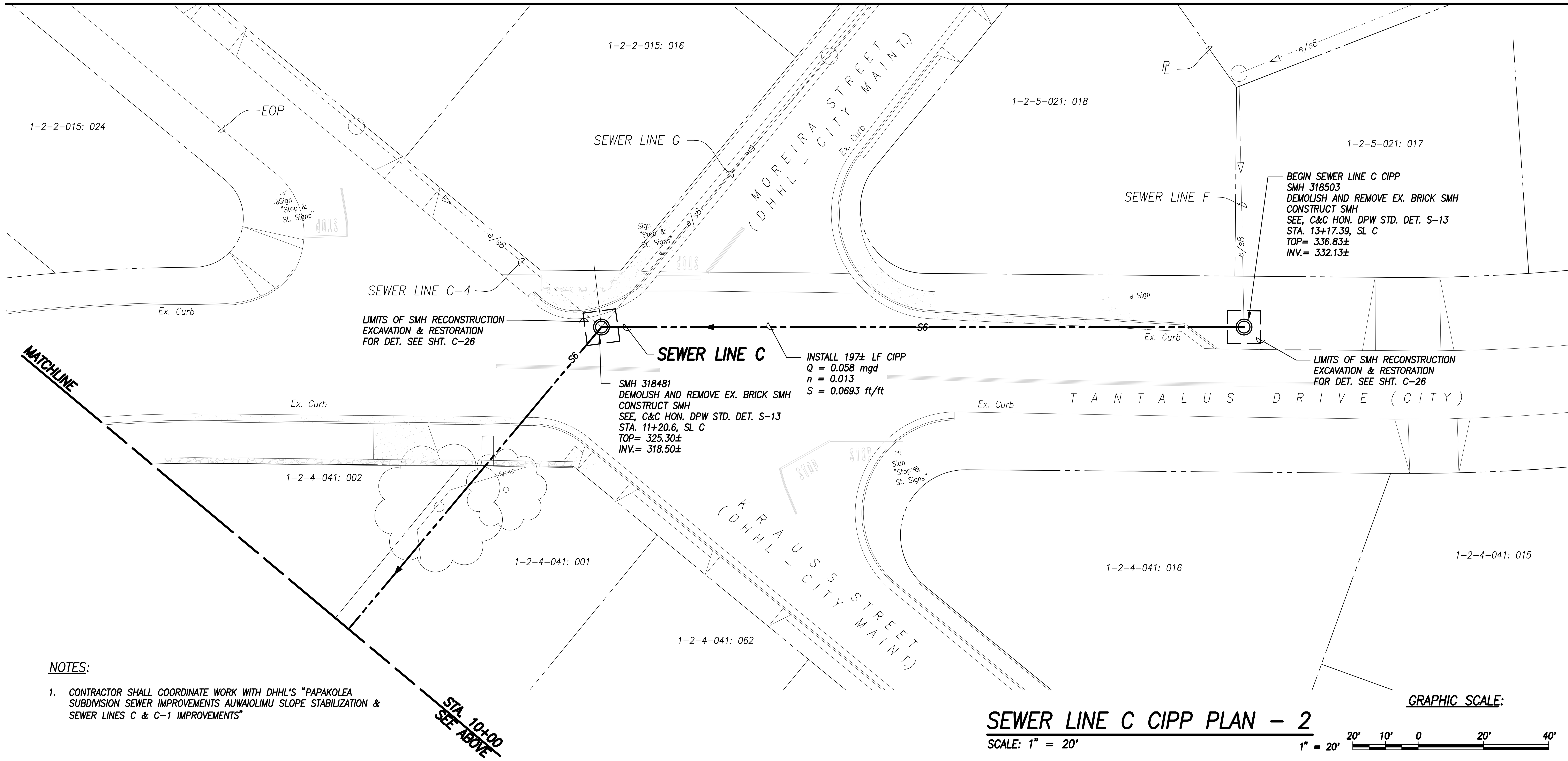
SEWER LINE L
PLAN AND PROFILE – 2
& SEWER LINE C PROFILE

C-15 SHEET 16 OF 39 SHEETS

FILE	POCKET	FOLDER	NO.

SEWER LINE C CIPP PLAN – 1

SCALE: 1" = 20'



LEGEND:

- PROPERTY LINE
- SEWER LINE (W/ SIZE & FLOW DIRECTION)
- EX SEWER LINE (W/ SIZE & FLOW DIR.)
- NEW SMH
- EX. SMH

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, DPP — DATE

NOTES:

1. CONTRACTOR SHALL COORDINATE WORK WITH DHHL'S "PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS AUWAIOLIMU SLOPE STABILIZATION & SEWER LINES C & C-1 IMPROVEMENTS"

SEWER LINE C CIPP PLAN – 2

SCALE: 1" = 20'

GRAPHIC SCALE: 20' 10' 0 20' 40' — 1" = 20'

ENGINEER	JB
DRAFTSMAN	SF
CHECKED BY	AM

REVISION	DATE	BRIEF	BY	APPROVED
1	3/27/17	ADD 2: NEW SHEET	AM	DHHL

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Department of Hawaiian Home Lands

PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS

SEWER LINES E, F, L, A, C, D, AND K-3

Papakolea, Honolulu, Oahu, Hawaii

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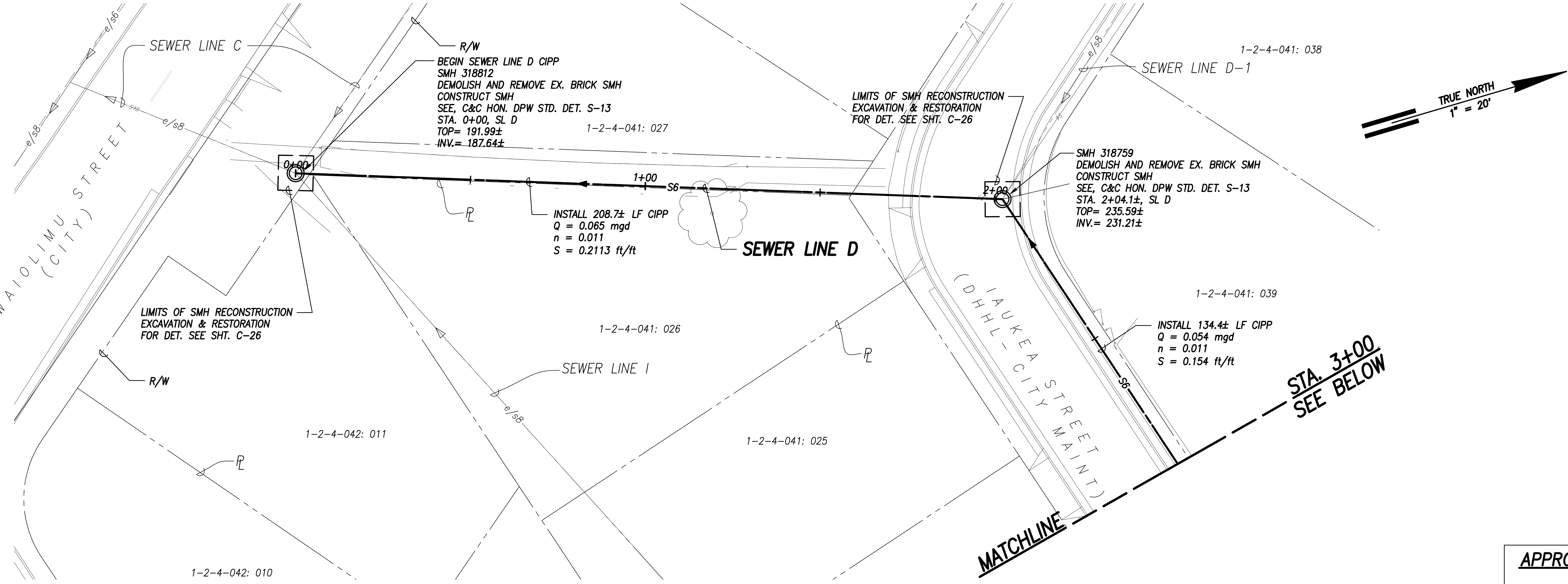
SEWER LINE C CIPP PLAN – 1 & 2

FILE	POCKET	FOLDER	NO.

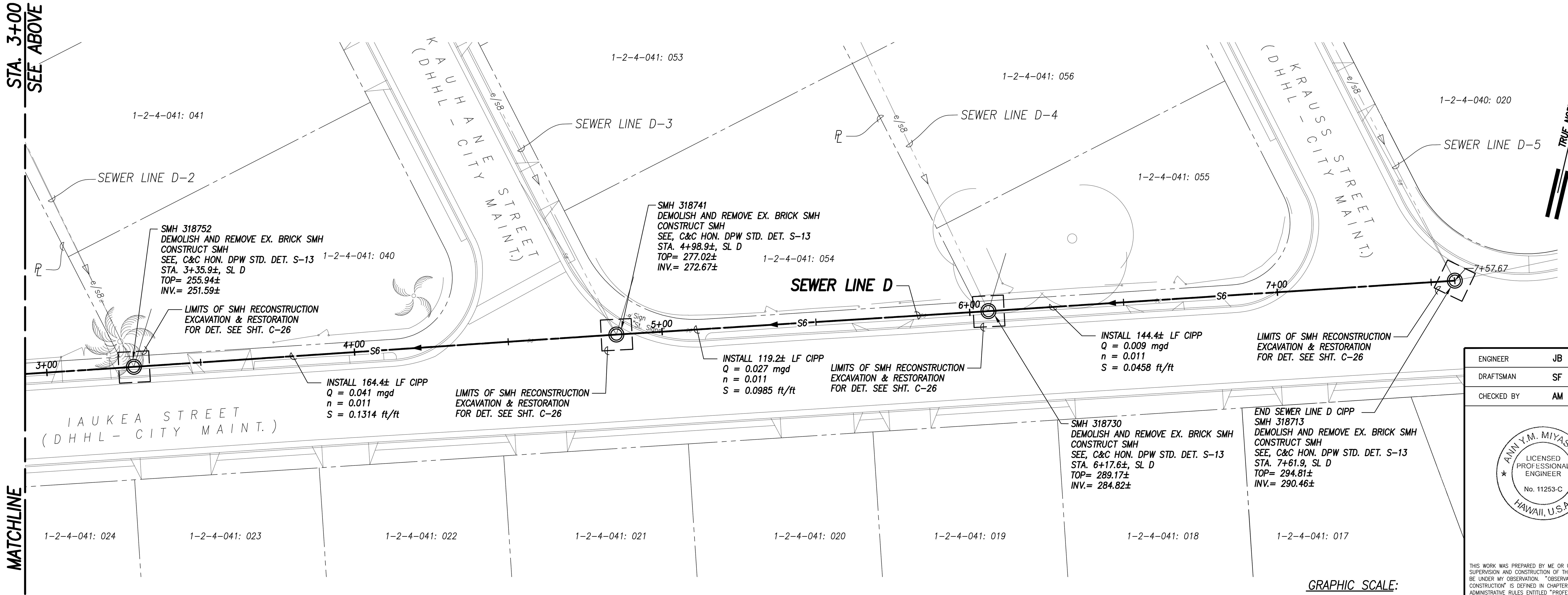


SEWER LINE D CIPP PLAN – 1

SCALE: 1" = 20'

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, D.P.P. DATE



SEWER LINE D CIPP PLAN – 2

SCALE: 1" = 20'

LEGEND:

- PROPERTY LINE
- SEWER LINE (W/ SIZE & FLOW DIRECTION)
- EX SEWER LINE (W/ SIZE & FLOW DIR.)
- NEW SMH
- EX. SMH

NOTES:

1. CONTRACTOR TO PROVIDE CONTINUOUS SEWER SERVICE TO ALL RESIDENTS.
2. CONTRACTOR SHALL COORDINATE WORK WITH DHHL'S "PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS AUWAIOLIMU SLOPE STABILIZATION & SEWER LINES C & C-1 IMPROVEMENTS"

GRAPHIC SCALE:

1" = 20' — 20' 10' 0 20' 40'

ENGINEER	JB
DRAFTSMAN	SF
CHECKED BY	AM

REVISION	DATE	BRIEF	BY	APPROVED
1	3/27/17	ADD 2: NEW SHEET	AM	DHHL

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Department of Hawaiian Home Lands

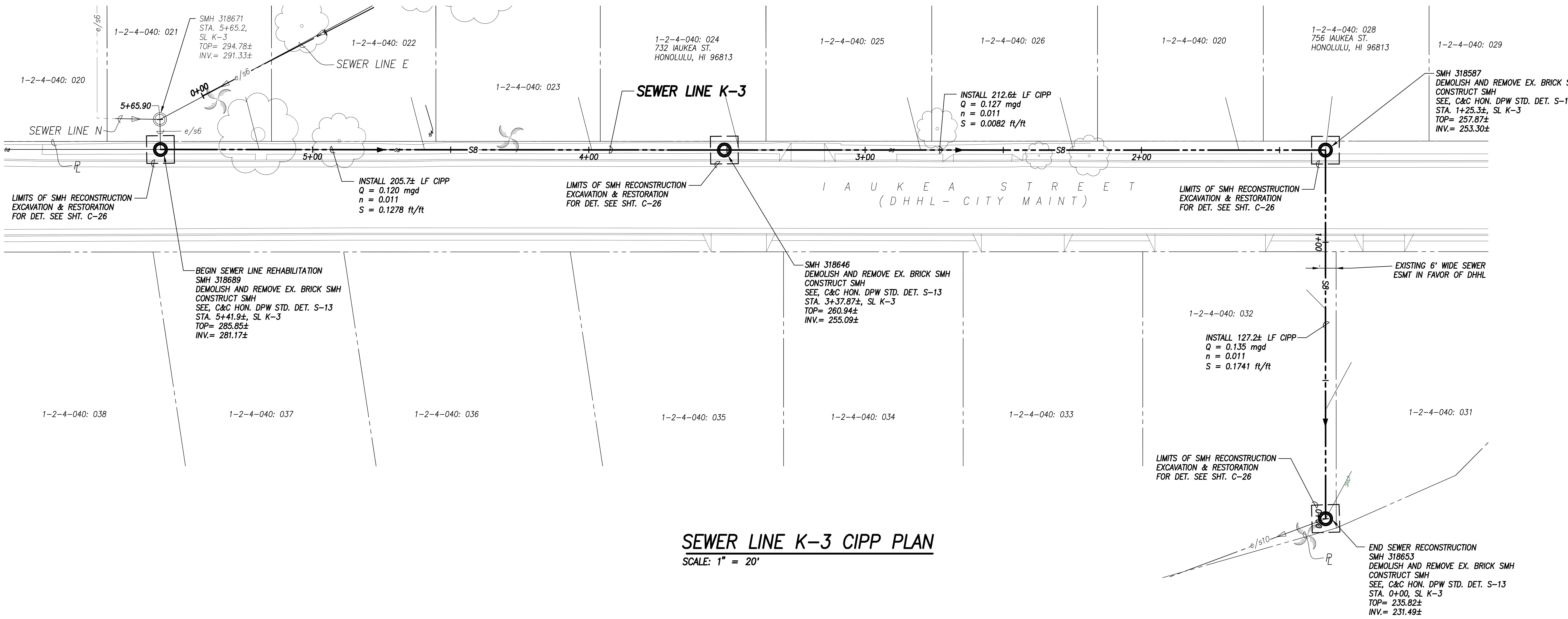
PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS

SEWER LINES E, F, L, A, C, D, AND K-3

Papakolea, Honolulu, Oahu, Hawaii

SEWER LINE D CIPP PLAN – 1 & 2

FILE	POCKET	FOLDER	NO.



SEWER LINE K-3 CIPP PLAN

SCALE: 1" = 20'

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, D.P.P. — DATE

LEGEND:

—·—·—	PROPERTY LINE
◄---S6—	SEWER LINE (W/ SIZE & FLOW DIRECTION)
—◄——	EX SEWER LINE (W/ SIZE & FLOW DIR.)
◎	NEW SMH
◎	EX. SMH

NOTES:

1. CONTRACTOR TO PROVIDE CONTINUOUS SEWER SERVICE TO ALL RESIDENTS.
2. CONTRACTOR SHALL COORDINATE WORK WITH DHHL'S "PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS AUWAIOLIMU SLOPE STABILIZATION & SEWER LINES C & C-1 IMPROVEMENTS"

GRAPHIC SCALE:

1" = 20' — 20' 10' 0 20' 40'

ENGINEER	JB
DRAFTSMAN	SF
CHECKED BY	AM

REVISION	DATE	BRIEF	BY	APPROVED
1	3/27/17	ADD 2: NEW SHEET	AM	DHHL

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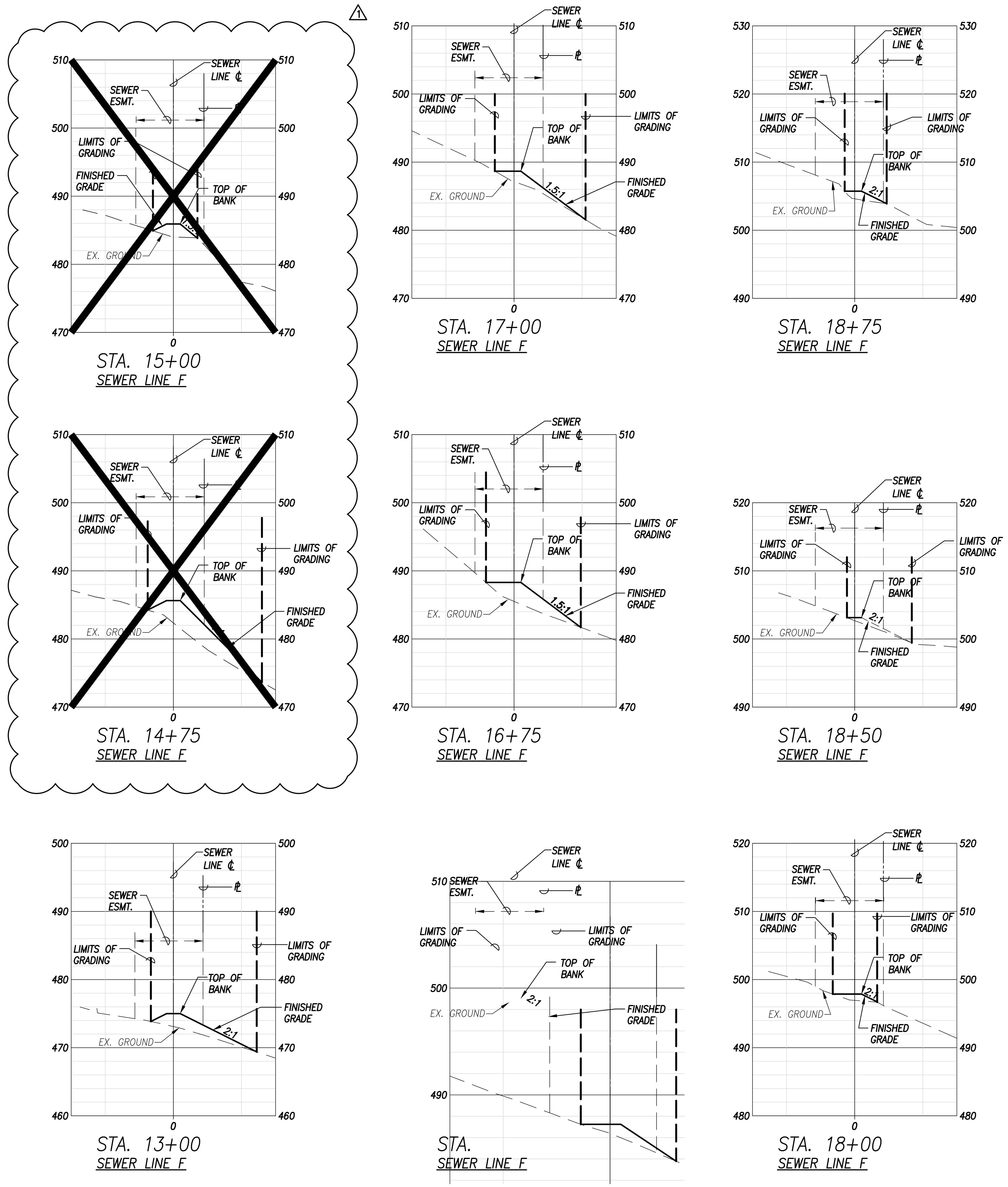
PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS

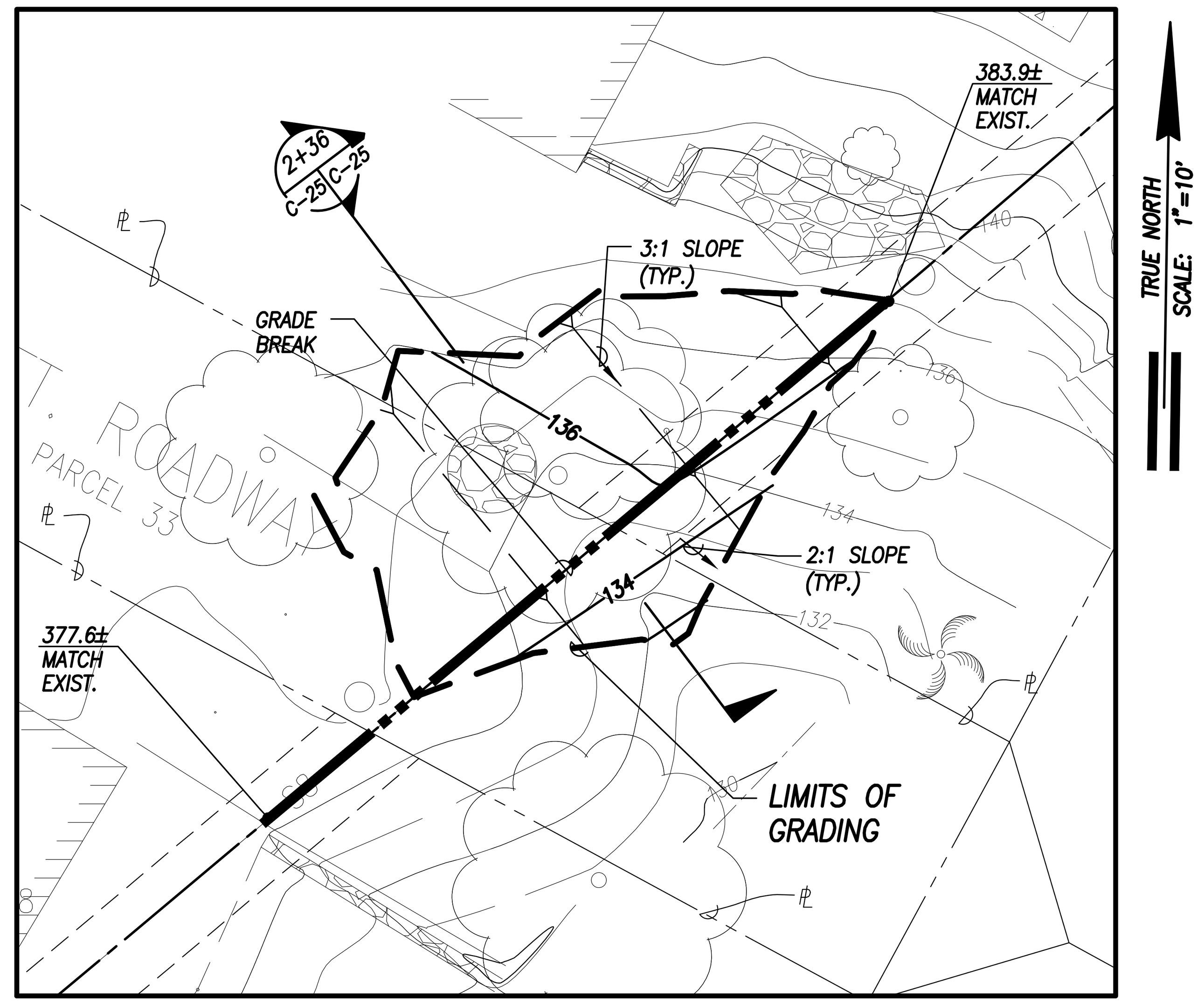
SEWER LINES E, F, L, A, C, D, AND K-3

Papakolea, Honolulu, Oahu, Hawaii

SEWER LINE K-3 CIPP PLAN

FILE	POCKET	FOLDER	NO.



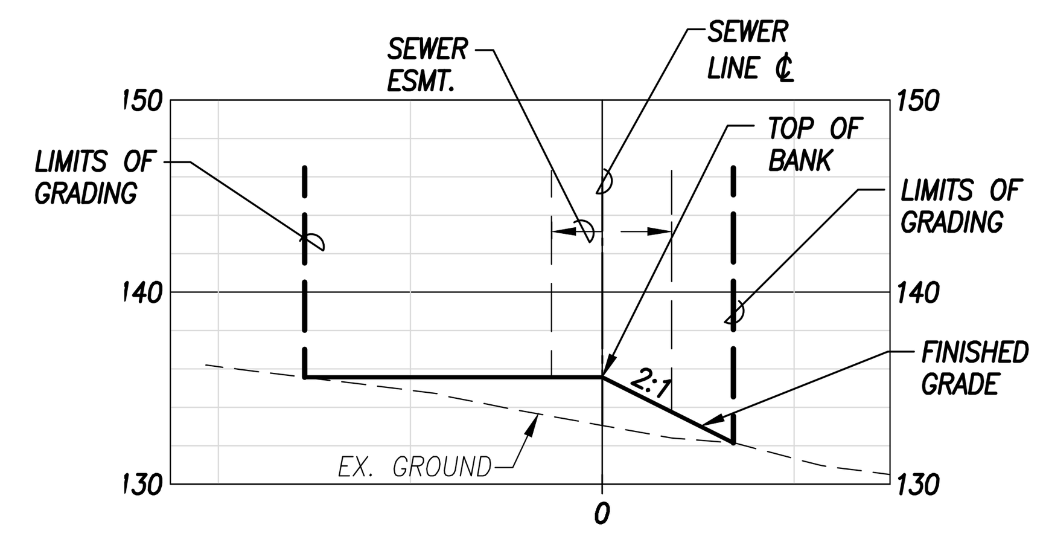


SEWER LINE L GRADING PLAN

SCALE: 1" = 10'

LEGEND

- EXIST. CONTOUR
- EXIST. SPOT ELEVATION
- FINISHED SPOT ELEVATION
- LIMITS OF GRADING AND DISTURBED AREA
- EASEMENT
- PROPERTY LINE



APPROVED:

CHIEF, CIVIL ENGINEERING BRANCH, D.P.P. DATE

GRAPHIC SCALE:

1" = 10' 10' 5' 0 10' 20'

ENGINEER	AM/SM
DRAFTSMAN	SF
CHECKED BY	AM/JN

REVISION	DATE	BRIEF	BY	APPROVED
2	3/27/17	ADD 2: REMOVE SECTIONS	AM	DHHL

ANN Y.M. MIYASATO
LICENSED PROFESSIONAL ENGINEER
No. 11253-C
HAWAII, U.S.A.

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Department of Hawaiian Home Lands
PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS
SEWER LINES E, F, L, A, C, D, AND K-3
Papakolea, Honolulu, Oahu, Hawaii

SECTIONS – 2 & SEWER LINE L GRADING PLAN

FILE	POCKET	FOLDER	NO.

TRAFFIC CONTROL PLAN – 1 SEWER LINE "A" SMH 318567 TO SMH 318502 (24-HOUR)

SCALE: 1" = 40'

LEGEND

- • • • DELINEATORS / CONES
- SIGN
- WORK AREA
- DIRECTION OF TRAFFIC FLOW
- WATER FILLABLE BARRICADE WITH LOW INTENSITY STEADY BURN LIGHTS
- ⊗ POLICE OFFICER

NOTE:

1. CONTRACTOR SHALL PROVIDE TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) COMPLIANT WITH THE CURRENT AMERICANS WITH DISABILITIES ACT (ADA).
2. CONTRACTOR SHALL PROVIDE AN ADA COMPLIANT TEMPORARY CURB RAMP TO TRANSITION PEDESTRIANS FROM SIDEWALK TO TPAR. TEMPORARY CURB RAMP SHALL CONFORM TO ADA STANDARDS IN REGARDS, BUT NOT LIMITED, TO WIDTH, LENGTH, SLOPE, SURFACE MATERIAL, DETECTABLE EDGING, ETC.
3. BUFFER AND TAPER AREA ON APPROACH TO ANY WORK AREA SHALL BE KEPT CLEAR OF VEHICLES AND EQUIPMENT.

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, DPP DATE

GRAPHIC SCALE:

1" = 40' 40' 20' 0 40' 80'

ENGINEER	AM/JB
DRAFTSMAN	SF
CHECKED BY	AM

REVISION	DATE	BRIEF	BY	APPROVED
1	3/27/17	ADD 2: TITLE AND LEGEND	AM	DHHL

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Department of Hawaiian Home Lands

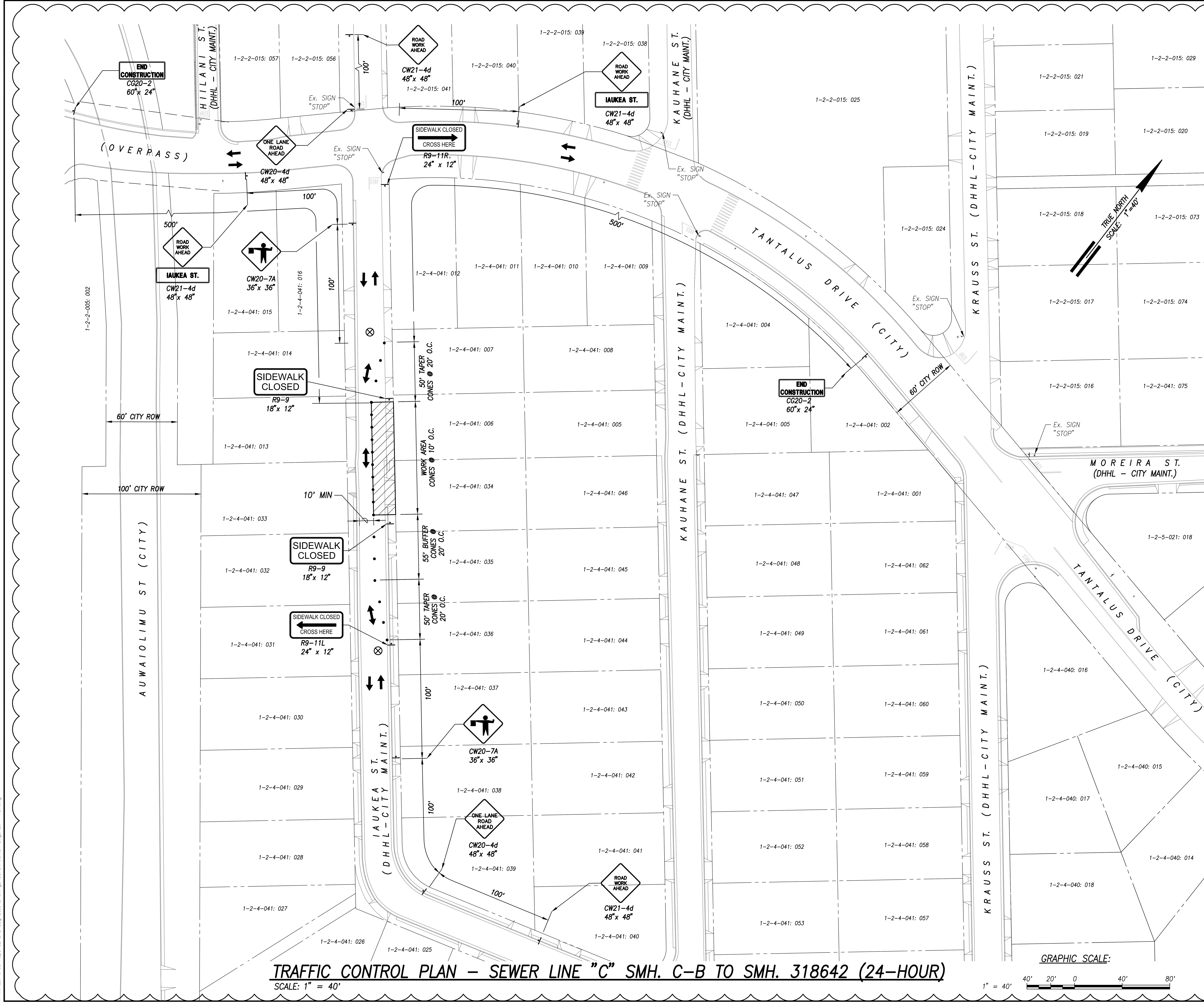
PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS

SEWER LINES E, F, L, A, C, D, AND K-3

Papakolea, Honolulu, Oahu, Hawaii

TRAFFIC CONTROL PLAN – 1
SEWER LINE "A"
SMH 318567 TO SMH 318502
(24-HOUR)

FILE	POCKET	FOLDER	NO.



NOTE:

1. DRIVEWAYS SHALL BE KEPT OPEN UNLESS THE OWNERS OF THE PROPERTY USING THE RIGHT-OF-WAY ARE OTHERWISE PROVIDED FOR SATISFACTORILY. FURTHER, THE PERMITTEE SHALL CONTROL TRAFFIC GOING IN AND OUT OF DRIVEWAYS.

LEGEND

• • •	DELINEATORS / CONES
┤	SIGN
▨	WORK AREA
→	DIRECTION OF TRAFFIC FLOW
⊗	POLICE OFFICER

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, DPP — DATE

ENGINEER	AM/JB
DRAFTSMAN	SF
CHECKED BY	AM

REVISION	DATE	BRIEF	BY	APPROVED
1	3/27/17	ADD 2: NEW SHEET	AM	DHHL

ANN Y.M. MIYASATO — LICENSED PROFESSIONAL ENGINEER — No. 11253-C — HAWAII, U.S.A.

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Department of Hawaiian Home Lands

PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS

SEWER LINES E, F, L, A, C, D, AND K-3

Papakolea, Honolulu, Oahu, Hawaii

TRAFFIC CONTROL PLAN – 2 SEWER LINE "C" SMH. C1 TO SMH. 318642 (24-HOUR)

FILE	POCKET	FOLDER	NO.

TRAFFIC CONTROL PLAN – SEWER LINE "C" SMH. 318642 TO SMH. 318544 (24-HOUR)

SCALE: 1" = 40'

NOTE:

1. DRIVEWAYS SHALL BE KEPT OPEN UNLESS THE OWNERS OF THE PROPERTY USING THE RIGHT-OF-WAY ARE OTHERWISE PROVIDED FOR SATISFACTORILY. FURTHER, THE PERMITTEE SHALL CONTROL TRAFFIC GOING IN AND OUT OF DRIVEWAYS.

LEGEND

Symbol	Description
• • •	DELINEATORS / CONES
⊣	SIGN
(hatched)	WORK AREA
→	DIRECTION OF TRAFFIC FLOW
⊗	POLICE OFFICER

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, DPP — DATE

ENGINEER	AM/JB
DRAFTSMAN	SF
CHECKED BY	AM

REVISION	DATE	BRIEF	BY	APPROVED
1	3/27/17	ADD 2: NEW SHEET	AM	DHHL

ANN Y.M. MIYASATO — LICENSED PROFESSIONAL ENGINEER — No. 11253-C — HAWAII, U.S.A.

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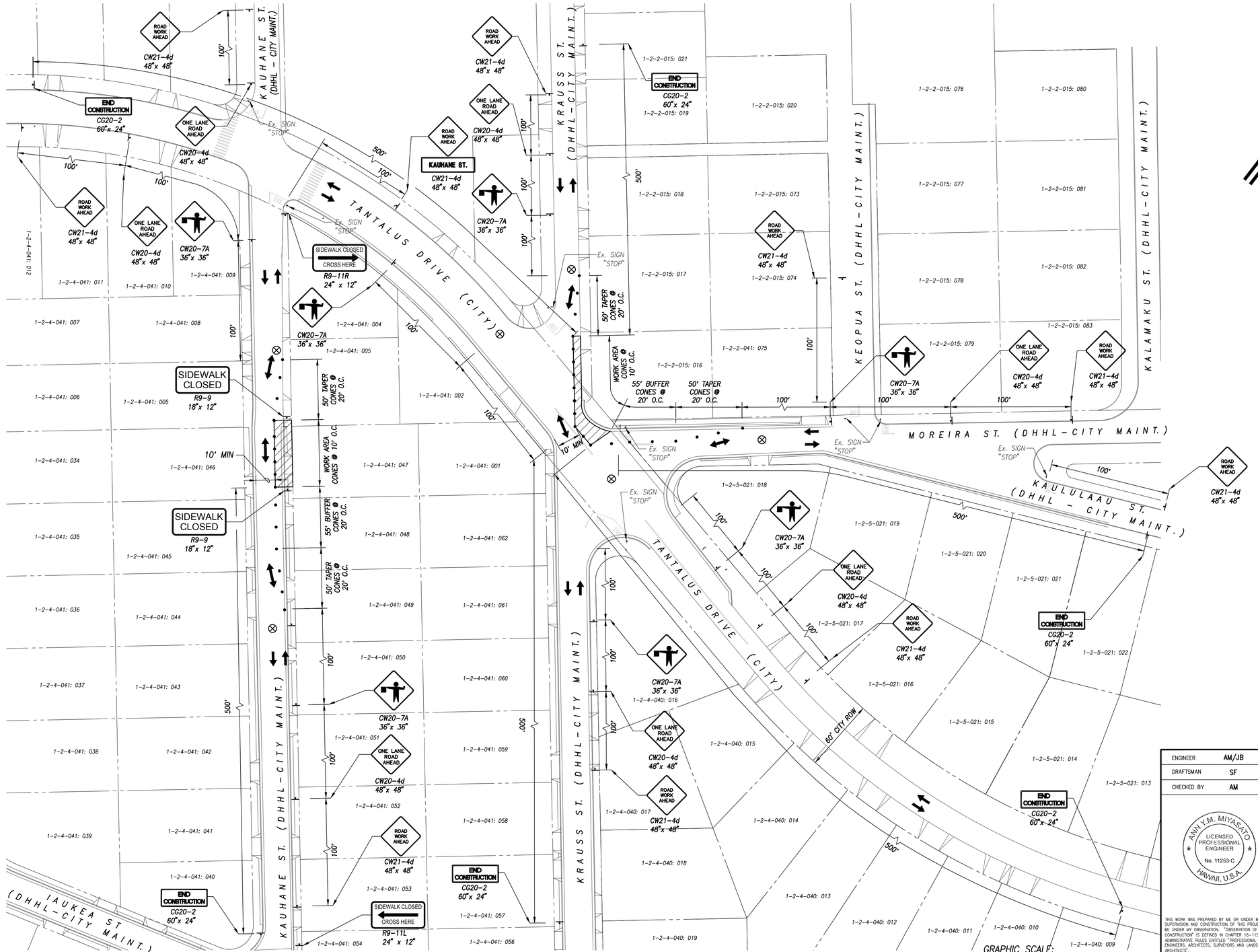
Department of Hawaiian Home Lands
PAPAKOLEA SUBDIVISION SEWER IMPROVEMENTS
SEWER LINES E, F, L, A, C, D, AND K-3
Papakolea, Honolulu, Oahu, Hawaii

TRAFFIC CONTROL PLAN – 3
SEWER LINE "C"
SMH. 318642 TO SMH. 318544
(24-HOUR)



TRAFFIC CONTROL PLAN – SEWER LINE "C" SMH. 318544 TO SMH. 318481 (24-HOUR)

SCALE: 1" = 40'

NOTE:

1. DRIVEWAYS SHALL BE KEPT OPEN UNLESS THE OWNERS OF THE PROPERTY USING THE RIGHT-OF-WAY ARE OTHERWISE PROVIDED FOR SATISFACTORILY. FURTHER, THE PERMITTEE SHALL CONTROL TRAFFIC GOING IN AND OUT OF DRIVEWAYS.

LEGEND

- DELINEATORS / CONES
- SIGN
- WORK AREA
- DIRECTION OF TRAFFIC FLOW
- POLICE OFFICER

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, DPP — DATE

GRAPHIC SCALE: 1" = 40' (40' 20' 0 40' 80')

ENGINEER	AM/JB
DRAFTSMAN	SF
CHECKED BY	AM

REVISION	DATE	BRIEF	BY	DHHL APPROVED
1	3/27/17	ADD 2: NEW SHEET	AM	

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SEWER LINES E, F, L, A, C, D, AND K-3

Papakolea, Honolulu, Oahu, Hawaii

TRAFFIC CONTROL PLAN – 4
SEWER LINE "C"
SMH. 318544 TO SMH. 318481
(24-HOUR)

ANN Y.M. MIYASATO
LICENSED PROFESSIONAL ENGINEER
No. 11253-C
HAWAII, U.S.A.

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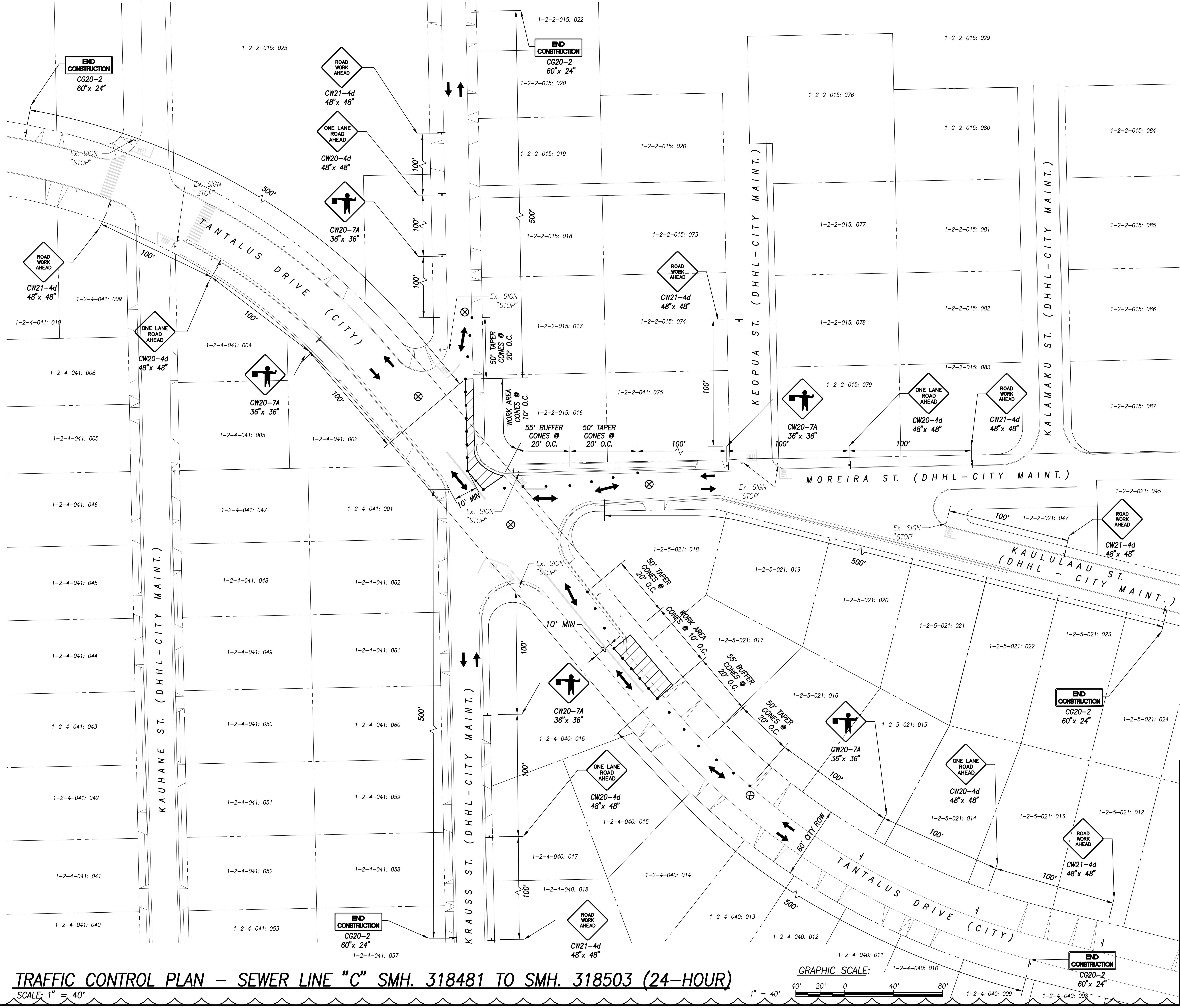
FILE	POCKET	FOLDER	NO.

Fri, 24 Mar 2017 - 8:42pm
K:\w\13746 06 Papa St ETL Eng 2016\Drawings\Construction Plans\03 - TCP.dwg



TRAFFIC CONTROL PLAN – SEWER LINE "C" SMH. 318481 TO SMH. 318503 (24-HOUR)

SCALE: 1" = 40'

GRAPHIC SCALE:

1" = 40' 40' 20' 0 40' 80'

NOTE:

1. DRIVEWAYS SHALL BE KEPT OPEN UNLESS THE OWNERS OF THE PROPERTY USING THE RIGHT-OF-WAY ARE OTHERWISE PROVIDED FOR SATISFACTORILY. FURTHER, THE PERMITTEE SHALL CONTROL TRAFFIC GOING IN AND OUT OF DRIVEWAYS.

LEGEND

Symbol	Description
• • •	DELINEATORS / CONES
⊣	SIGN
▨	WORK AREA
→	DIRECTION OF TRAFFIC FLOW
⊗	POLICE OFFICER

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, DPP   DATE

ENGINEER	AM/JB
DRAFTSMAN	SF
CHECKED BY	AM

REVISION	DATE	BRIEF	BY	APPROVED
1	3/27/17	ADD 2: NEW SHEET	AM	DHHL

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SEWER LINES E, F, L, A, C, D, AND K-3

Papakolea, Honolulu, Oahu, Hawaii

TRAFFIC CONTROL PLAN – 5
SEWER LINE "C"
SMH. 318481 TO SMH. 318503
(24-HOUR)

FILE	POCKET	FOLDER	NO.

NOTE:

1. DRIVEWAYS SHALL BE KEPT OPEN UNLESS THE OWNERS OF THE PROPERTY USING THE RIGHT-OF-WAY ARE OTHERWISE PROVIDED FOR SATISFACTORILY. FURTHER, THE PERMITTEE SHALL CONTROL TRAFFIC GOING IN AND OUT OF DRIVEWAYS.

LEGEND

Symbol	Meaning
• • •	DELINEATORS / CONES
┤	SIGN
▨	WORK AREA
→	DIRECTION OF TRAFFIC FLOW
⊗	POLICE OFFICER

TRAFFIC CONTROL PLAN – SEWER LINE "D" SMH. 318812 TO SMH. 318759 (24-HOUR)

SCALE: 1" = 40'

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, DPP — DATE

GRAPHIC SCALE:

1" = 40' — 40' 20' 0 40' 80'

ENGINEER	AM/JB
DRAFTSMAN	SF
CHECKED BY	AM

REVISION	DATE	BRIEF	BY	APPROVED
1	3/27/17	ADD 2: NEW SHEET	AM	DHHL

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SEWER LINES E, F, L, A, C, D, AND K-3

Papakolea, Honolulu, Oahu, Hawaii

TRAFFIC CONTROL PLAN – 6
SEWER LINE "D"
SMH. 318812 TO SMH. 318759
(24-HOUR)

FILE	POCKET	FOLDER	NO.

TRAFFIC CONTROL PLAN – SEWER LINE "D" – SMH. 318759 TO SMH. 318741 (24-HOUR)

SCALE: 1" = 40'

NOTE:

1. DRIVEWAYS SHALL BE KEPT OPEN UNLESS THE OWNERS OF THE PROPERTY USING THE RIGHT-OF-WAY ARE OTHERWISE PROVIDED FOR SATISFACTORILY. FURTHER, THE PERMITTEE SHALL CONTROL TRAFFIC GOING IN AND OUT OF DRIVEWAYS.

LEGEND

• • •	DELINEATORS / CONES
┤	SIGN
▨	WORK AREA
→	DIRECTION OF TRAFFIC FLOW
⊗	POLICE OFFICER

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, DPP   DATE

GRAPHIC SCALE:

1" = 40'   40' 20' 0 40' 80'

ENGINEER	AM/JB
DRAFTSMAN	SF
CHECKED BY	AM

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REVISION	DATE	BRIEF	BY	APPROVED
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SEWER LINES E, F, L, A, C, D, AND K-3

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TRAFFIC CONTROL PLAN – 7
SEWER LINE "D"
SMH. 318759 TO SMH. 318741
(24-HOUR)

FILE	POCKET	FOLDER	NO.

TRAFFIC CONTROL PLAN – SEWER LINE "D" SMH. 318741 TO SMH. 318713 (24–HOUR)

SCALE: 1" = 40'

NOTE:

1. DRIVEWAYS SHALL BE KEPT OPEN UNLESS THE OWNERS OF THE PROPERTY USING THE RIGHT-OF-WAY ARE OTHERWISE PROVIDED FOR SATISFACTORILY. FURTHER, THE PERMITTEE SHALL CONTROL TRAFFIC GOING IN AND OUT OF DRIVEWAYS.

LEGEND

Symbol	Description
• • •	DELINEATORS / CONES
┤	SIGN
▨	WORK AREA
→	DIRECTION OF TRAFFIC FLOW
⊗	POLICE OFFICER

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, DPP — DATE

GRAPHIC SCALE:

1" = 40' — 40' 20' 0 40' 80'

ENGINEER	AM/JB
DRAFTSMAN	SF
CHECKED BY	AM

REVISION	DATE	BRIEF	BY	APPROVED
1	3/27/17	ADD 2: NEW SHEET	AM	DHHL

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TRAFFIC CONTROL PLAN – 8
SEWER LINE "D"
SMH. 318741 TO SMH. 318713
(24–HOUR)

FILE | POCKET | FOLDER | NO.

NOTE:

1. DRIVEWAYS SHALL BE KEPT OPEN UNLESS THE OWNERS OF THE PROPERTY USING THE RIGHT-OF-WAY ARE OTHERWISE PROVIDED FOR SATISFACTORILY. FURTHER, THE PERMITTEE SHALL CONTROL TRAFFIC GOING IN AND OUT OF DRIVEWAYS.

TRAFFIC CONTROL PLAN – SEWER LINE "K-3" (24-HOUR)

SCALE: 1" = 40'

LEGEND

• • •	DELINEATORS / CONES
┤	SIGN
▨	WORK AREA
→	DIRECTION OF TRAFFIC FLOW
⊗	POLICE OFFICER

APPROVED:

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GRAPHIC SCALE:

1" = 40' — 40' 20' 0 40' 80'

ENGINEER	AM/JB
DRAFTSMAN	SF
CHECKED BY	AM

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REVISION	DATE	BRIEF	BY	APPROVED
△				
△	3/27/17	ADD 2: NEW SHEET	AM	DHHL

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TRAFFIC CONTROL PLAN – 9
SEWER LINE "K-3"
(24-HOUR)

FILE	POCKET	FOLDER	NO.

TRAFFIC CONTROL PLAN – SEWER LINE "L" (8:30AM–3:30PM)

SCALE: 1" = 40'

LEGEND

• • •	DELINEATORS / CONES
┤	SIGN
▨	WORK AREA
→	DIRECTION OF TRAFFIC FLOW
⊗	POLICE OFFICER

APPROVED:

CHIEF, TRAFFIC REVIEW BRANCH, DPP — DATE

GRAPHIC SCALE:

1" = 40' — 40' 20' 0 40' 80'

ENGINEER	AM/JB
DRAFTSMAN	SF
CHECKED BY	AM

REVISION	DATE	BRIEF	BY	APPROVED
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TRAFFIC CONTROL PLAN – 10
SEWER LINE "L"
(8:30AM – 3:30PM)

FILE	POCKET	FOLDER	NO.