State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION
1151 Punchbowl Street, Room 221
Honolulu, Hawaii 96813

ADDENDUM NO. 1

TO

Job No. F70C616E
SAND ISLAND STATE RECREATION AREA
SEWER SYSTEM IMPROVEMENTS
PHASE 2: PUMP STATION 3 RELOCATION & FM 3 REPLACEMENT
Honolulu, Oahu, Hawaii

02/22/21

This addendum as issued shall become part of the Contract Documents for the subject project. The bid documents, plans, and specifications shall be amended as follows:

PROPOSAL

(The proposal is attached to the addendum and is available for download on the HIePRO website.)

Proposal –REPLACE in its entirety with the attached revised proposal of which is available for download on the HIePRO website.

SPECIFICATION

(Revised specifications are attached to the addendum.)

The following pages of the Solicitation Documents are revised:

1. **New Sections**: The following new attached specification sections are issued:
    a. SECTION 01020 – WORK SEQUENCE AND PHASING, 1 page
    b. SECTION 02735 – DUCTILE IRON SEWER PIPE, 4 pages
    c. SECTION 03310 – CONTROLLED LOW STRENGTH MATERIAL (CLSM), 2 pages
    d. SECTION 09800 – PROTECTIVE COATINGS, 28 pages
    e. SECTION 13440 – CONTROL STRATEGIES, 2 pages

2. **Deleted Pages**: The following previously issued specifications pages are deleted:
    a. DETAILED SPECIFICATIONS TABLE OF CONTENTS, pages i – ii
    b. SECTION 01019 – GENERAL SPECIFICATIONS, pages 01019-3 and 01019-4.
    c. SECTION 01230 – ADDITIVE BID ITEMS, page 01230-2

d. SECTION 01300 – SUBMITTALS, page 01300-1
e. SECTION 01500 – MAINTAINING THE EXISTING WASTEWATER SYSTEM, pages 01500-1 and 01500-2
f. SECTION 02444 – CHAIN LINK FENCES AND GATES, pages 02444-1 to 4
g. SECTION 02900 – PLANTING GRASS, page 02900-1
h. SECTION 11101 – SUBMERSIBLE NON-CLOG PUMPS AND EQUIPMENT AT PUMP STATION 3, pages 11101-1 to 7

3. **New Pages**: The following new attached specification pages are issued:
   a. DETAILED SPECIFICATIONS TABLE OF CONTENTS, pages i – ii
   b. SECTION 01019 – GENERAL SPECIFICATIONS, pages 01019-3 to 01019-5
   c. SECTION 01230 – ADDITIVE BID ITEMS, page 01230-2
   d. SECTION 01300 – SUBMITTALS, page 01300-1
   e. SECTION 01500 – MAINTAINING THE EXISTING WASTEWATER SYSTEM, pages 01500-1 and 01500-2
   f. SECTION 01581 – PROJECT SIGN, page 01581-3
   g. SECTION 02444 – CHAIN LINK FENCES AND GATES, pages 02444-1 to 4
   h. SECTION 02900 – PLANTING GRASS, page 02900-1
   i. SECTION 11101 – SUBMERSIBLE NON-CLOG PUMPS AND EQUIPMENT AT PUMP STATION 3, pages 11101-1 to 7

CONSTRUCTION PLANS
(Revised construction plans are attached to the addendum.)

Remove the following sheets.

1. Sheet C005, "Phasing Plan."
2. Sheet C006, "Demolition Plan"

Add the following sheets, dated **February 19, 2021**. See attached revised drawing attached to **Addendum No. 1**.

1. Sheet C005A, "Phasing Plan."
2. Sheet C006A, "Demolition Plans – 1"
3. Sheet C006B, "Demolition Plans – 2"
4. Sheet C020A, "Chain Link Fence Details"

Replace the following sheets with revised drawings dated **February 19, 2021**. See attached revised drawing attached to **Addendum No. 1**.

1. Sheet C003, "General Site Plan"
   a. Revised limits of disturbed area.

2. Sheet C004, “Erosion Control Plan”
    a. Revised limits of disturbed area.
    b. Revised compost filter socks alignment.

3. Sheet C007, “Pump Station 3 & Gravity Sewer Plan”
    a. Removed Note #2, “Contractor to provide continuous sewer service to all comfort stations”.
    b. Added callout to show new Force Main 3 is 50 ft from property line.
    c. Revised extent of gravel parking.
    d. Added dimensions for gravel parking.
    e. Removed callout “Future gravel parking (by others). See DLNR Job No. F70C616C Sand Island State Recreation Area Park Improvement – Ph V.”
    f. Added existing concrete barriers.

4. Sheet C008, “Sewer Line D Plan and Profile
    a. Revised extent of gravel parking.
    b. Removed callout “Future gravel parking (by others). See DLNR Job No. F70C616C Sand Island State Recreation Area Park Improvement – Ph V.”
    c. Revised “S8” to “SFM1-1/4.”
    d. Added existing concrete barriers

5. Sheet C010, “Force Main 3 Plan and Profile – 1.”
    a. Added callout for “Pump Station 3”
    b. Added “1-4” end cap” to true wye at Sta. 0+25.
    c. Removed callout for Construction Phase 3 and Construction Phase 2.
    d. Added callout to show new Force Main 3 is 50 ft from property line.
    e. Removed Note #1, “Contractor to provide continuous sewer service.”
    f. Removed Note #4, “If new force main alignment deviates from the exiting force main alignment, the contractor shall CLSM fill and abandon in place.”
    g. Added Note #5, “Use of dirt road shall be shared by various contractors. Contractor shall coordinate with concurrent and future projects. See sheet C005A.

6. Sheet C011, “Force Main 3 Plan and Profile – 2.”
    a. Added existing gate to existing fence line.
    b. Added stationing for Construction Phase 2 and Construction Phase 1 “STA. 5+54.57.”
    c. Added callout for Construction Phase 2 and Construction Phase 1 on profile.
    d. Removed Note #1, “Contractor to provide continuous sewer service.”
    e. Removed Note #2, “Contractor shall restore all disturbed areas back to original condition or better.”
    f. Added Note #5, “Access gate for Phase 1 shall be shared by various contractors, Contractor shall coordinate with concurrent and future projects. See sheet C005A.

g. Added Note #6, “Use of dirt road shall be shared by various contractors. Contractor shall coordinate with concurrent and future projects. See sheet C005A.
h. Added Note #7 “Contractor shall restore all disturbed area back to original condition or better for Phase 2.”
i. Added Note #8, “Contractor does not need to restore ground cover after backfilling trench for Construction Phase 1.”
j. Added Note #9, “Contractor must complete Phase 1 work by June 7, 2021.”

7. Sheet C012, “Force Main 3 Plan and Profile – 3.”
    a. Removed Note #1, “Contractor to provide continuous sewer service.”
    b. Removed Note #2, “Contractor shall restore all disturbed areas back to original condition or better.”
    c. Added Note #5, “EO area for Phase 1 to be shared by various contractors, Contractor shall coordinate with concurrent and future projects. See sheet C005A.
    d. Added Note #6, “Contractor does not need to restore ground cover after backfilling trench for Construction Phase 1.”
    e. Added Note #7 “Contractor must complete Phase 1 work by June 7, 2021.”

8. Sheet C013, “Force Main 3 Plan and Profile – 4.”
    a. Revised stationing for horizontal bend to “15+03.68”
    b. Removed Note #1, “Contractor to provide continuous sewer service.”
    c. Removed Note #2, “Contractor shall restore all disturbed areas back to original condition or better.”
    d. Removed Note #4, “Contractor to verify if any containers buildings, etc. within new FM alignment needs to be relocated and /or demolished. All cost incidental to project.”
    e. Added Note #5, “EO area for Phase 1 to be shared by various contractors, Contractor shall coordinate with concurrent and future projects. See sheet C005A.
    f. Added Note #6, “Contractor does not need to restore ground cover after backfilling trench for Construction Phase 1.”
    g. Added Note #7 “Contractor must complete Phase 1 work by June 7, 2021.”

9. Sheet C014, “Force Main 3 Plan and Profile – 5.”
    a. Revised stationing for flexible ball joint to “21+19.9±”
    b. Removed Note #1, “Contractor to provide continuous sewer service.”
    c. Removed Note #2, “Contractor shall restore all disturbed areas back to original condition or better.”
    d. Removed Note #4, “Contractor to verify if any containers buildings, etc. within new FM alignment needs to be relocated and /or demolished. All cost incidental to project.”
    e. Added Note #5, “EO area for Phase 1 to be shared by various contractors, Contractor shall coordinate with concurrent and future projects. See sheet C005A.
    f. Added Note #6, “Contractor does not need to restore ground cover after backfilling trench for Construction Phase 1.”

g. Added Note #7 “Contractor must complete Phase 1 work by June 7, 2021.”

10. Sheet C015, “Miscellaneous Detail – 1”
    a. Added “Gravel Area Detail.”

11. Sheet C016, “Sewer Details – 1”
    a. Revised “Ex. Pump Station 3 Demolition Detail.”

12. Sheet C017 “Sewer Details – 2”
    a. Added callout to “Sewer Force Main Pipe Penetration In New SMH Wall Detail.”

13. Sheet C019 “Sewer Details – 4”
    a. Added “Pump Station 3 Design Data.”
    b. Revised “Pump Station 3 Plan”

14. Sheet C020, “Sewer Details – 5”
    a. Remove “Phase 2 – SMH D1 Detail.”
    b. Revised “Phase 4 – SMH D1 Detail” to “SMH D! Detail.”

15. Sheet E-3, “Demo Electrical Site Plan”:
    a. Revised box note 3 to reference walkway restoration detail on sheet E-5.
    b. Added note to reference sheet C005A for phasing plan.

16. Sheet E-4, “New Electrical Site Plan”:
    a. Revised grinder pump electrical rating.
    b. Removed hazardous classified location box note 3.

17. Sheet E-5, “Duct Section Details”:
    a. Revised duct section A to match what is shown on new site plan.

18. Sheet E-6, “Comfort Station #6 Revised Electrical Plan”:
    a. Added electrical connection and alarm panel for grinder pump.
    b. Added new enclosed breaker for new pump station 3.
    c. Added new buckboost transformer for new grinder pump.

19. Sheet E-8, “Demolition and New One-Line Diagrams”:
    a. Added new panel schedule for panel F.
    b. Added information for alarm panel.
    c. Revised electrical rating for grinder pump.
    d. Added new buckboost transformer for new grinder pump.

QUESTIONS AND CLARIFICATIONS

1. Reference to the proposal schedule #27, 80 LF of chain link fence & gates, is this requirement for Pump Station #3 as shown in E-7 electrical plan? Please confirm.

   Answer: Yes

2. Reference to the proposal schedule #28, 4 EA removable pipe barrier, should we follow C017 details? Please confirm.

   Answer: Yes, the 4 EA removable pipe barrier shall follow details from C017.

3. Provide Geotechnical Report.

   Answer: The Geotechnical Report has been uploaded to HIePRO solicitation.

4. Is a Bypass System in Phase 1 required?

   Answer: No. SISRA sewer system is currently disabled and will remain so until completion of this project (see new Phasing Plan C005A)

5. Sections of the sewer line passes through a vegetated (Kiawe) area. What is the extent of clearing? Concrete barriers are also present in the area.

   Answer: See new Demolition Plan, drawing C006A in this addendum.

6. Is a permanent vegetative cover required? What are the specifications of the grass cover, if any?

   Answer: Cleared and grubbed area defined in the plans shall have a gravel layer for permanent erosion control cover. Phase 1 does not require ground cover restoration after trench backfill. All other disturbed areas (trench restoration, demolition of existing pump station 3, etc.) shall have grass for permanent erosion control cover.

7. Are the structures above-ground along the Sewer Line in Phase 1 be removed by others? What are the required restoration works?

   Answer: The above-ground structures within Phase 1 area will be removed by others before the start of this project. Concrete pads/footings will remain. After trench backfilling, restoration of ground or concrete pads will not be required.

8. Is it acceptable to include security services at nighttime as vandalism is observed in the area? If allowed, please include a Line Item.

Answer: S*ecurity services is optional, and the cost should be incidental to the project.*

9. Please provide a size and depth of existing special sewer manhole, preloader 2 and wet well of existing PS3.

Answer: See Sewer Manhole Abandonment detail on drawing C006B and revised Existing Pump Station 3 Detail on drawing C016 in this addendum.

10. Please provide contractor's staging area.

Answer: Staging area will be provided within the park near the project site and shall be coordinated with State Parks.

11. Drawing C006 shows "remove and replace ex. 6" and 4" ductile iron force main approx. 2200 LF.". Please advise where we need to put the cost on proposal schedule. Proposal schedule only shows 600 LF of demolition 4" force main.

Answer: See revised Proposal Schedule and new Demolition Plans -1, drawing C006A in this addendum

12. Please provide a detail for new chain link fence.

Answer: See new Drawing No. C020A in this addendum.

13. Reference Drawing C013, note 4 - Drawing does not provide any quantity of existing container. Please provide a number of containers to relocate or demolish. Also, please provide a location where containers need to move.

Answer: See response to Question #7 above.

14. Reference Drawing C013, note 4 - Please clarify existing buildings are required to demolish, relocate or build new one after installing new force main.

Answer: See response to Question #7 above

15. Reference Drawing C013, note 4 - Please provide a list and number of equipment and materials needs to be relocate during force main installation.

Answer: See response to Question #7 above

16. Please consider making an allowance item for relocation/ demolition of existing containers, buildings, materials and equipment so that all bidder can bid the same way.

Answer: See response to question #7 above

17. Regarding bid item 21 and 22, please clarify a quantity, Drawing shows 2 each check valves and ball valves in valve vault.

Answer: See revised proposal schedule in this addendum.

18. Is a building permit required for this project? If so, has DLNR began the process of obtaining the building permit?

Answer: No building permit was or has been obtained. State entities are exempt. All electrical work must be done by a State of Hawaii licensed electrician as indicated in the specifications.

19. Is a Special Management Area (SMA) Permit required for this project? If so, has DLNR began the process of obtaining the permit?

Answer: This project is exempt from SMA permit requirements.

20. Will the contractor be allowed to stockpile spoils and aggregate at the jobsite?

Answer: Yes, location to be coordinated with State Parks.

21. Will there be a construction manager assigned to the project? If so, who will be the construction manager?

Answer: DLNR will assign a staff construction manager from the Engineering Division to the project.

22. Will the contractor have access to a water source on the jobsite? If so, will the contractor have to pay for water usage & what is the rate per usage?

Answer: Water will be provided at the park. Rates shall be negotiated with State Parks.

23. Bid Item #4 – Abandon Existing Special Sewer Manhole, CLSM filled has a unit of EACH. However, the quantity section is blank. Please provide a quantity for this bid item.

Answer: See revised proposal schedule in this addendum.

24. Bid Item #16 – Transition Sewer Manhole has a depth that ranges from 6.00'-5.99'. This appears to be a type as the transition sewer manhole on the plans shows a depth of 6.59'. Please clarify.

Answer: See revised proposal schedule in this addendum.

25. Bid Item #26 – Concrete for Reaction Blocks has a quantity and unit of 2 CY. However, there are various materials that are required that are not tied to the size of the reaction block; such as structural struts, straps, and rods. Please revise the description, quantity and unit for this bid item to a "Concrete Reaction Blocks" Per Each.

Answer: See revised proposal schedule in this addendum.

26. Bid Item #49 – Miscellaneous and Testing is a vague bid item description. Please clarify a specific scope of work for this bid item.

Answer: Miscellaneous and testing is for electrical distribution system and pump controls. See revised proposal schedule in this addendum.

27. Bid Item #50 – Field Office is an allowance bid item. However, a dollar amount has not been included on the bid proposal for this item. Please include a dollar amount.

Answer: See revised proposal schedule in this addendum.

28. PVT Landfill will be closing in less than five years due to Senate Bill 2386. As such, PVT Landfill has notified its customers that there will be unforeseen increased dump fees. Should PVT Landfill increase its fees between Bid Time and Project Completion, will the contractor be reimbursed for the increase in dump fees?

Answer: Allowance line item for landfill fees added to revised proposal schedule in this addendum.

29. The HIePRO website states the projected Contract Start Date is 04/05/2021. At the Pre-Bid Meeting, Agenda Item #3 states the contractor must finish all work for Phase 1 by 06/07/2021. Typical submittal review takes 30 days for the initial review and 60 days before final approval. Will there be an expedited submittal review for this project?

Answer: The submittal review process for Phase 1 work will be expedited. It is encouraged that the awarded contractor submit submittals for Phase 1 soon after bid award is announced.

30. The HIePRO website states the projected Contract Start Date is 04/05/2021. At the Pre-Bid Meeting, Agenda Item #3 states the contractor must finish all work for Phase 1 by 06/07/2021. Is it possible for the contractor to obtain permits prior to Contract Start Date?

Answer: Yes, all required permits to start construction work for Phase 1 will be obtained by April 2021.

31. Specification Section 02270 – Temporary Soil Erosion Control section 3.1.C states the contract shall grass bare areas within 3 calendar days after completion of grading for that area. Section 3.1.C.e states the contractor shall provide temporary irrigation and maintain the grass until the landscape maintenance period has ended or until the Engineer has accepted the work. However, the existing project site does not have grass. Please clarify if grassing and grass maintenance periods are required for this project. If so, please provide plans and details associated with the grassing work.

Answer: See response to Question #6 above.

32. Specification Section 02900 – Planting Grass was included in the Project Specifications. However, there are no plans associated with grassing. Please clarify if grassing is required on this project. If so, please advise how long the maintenance period will be.

Answer: See revised Specification Sections 02900 – PLANTING GRASS in this addendum.

33. Plan Sheet 8 shows a future 3" irrigation line to be installed on the DLNR Job No. F70C616C project. This project is currently underway. Will this 3" irrigation line be installed prior to this project, Job No. F70C616E? If so, will the location of the 3 irrigation line be marked?

Answer: The location of the new 3" irrigation line being installed for Job No. F70C616C shall be confirmed and coordinated with the contractor for Job No. F70C616C.

34. Specification Section 01300 – Submittals section 1.1.B.6 calls for a submittal from Specification Section 02736 – Sewer Manhole Rehabilitation. However, the Project Specifications do not include this specification section. Please provide this specification section.

Answer: See revised Specification Section 01300 – SUBMITTALS, page 01300-1 in this addendum.

35. Bid Item #3 – Abandon Existing Preloader 2, CLSM filled contradicts with the plans. Plan Sheet 17, Detail "Ex. Pump Station 3 Demolition Detail" calls for Preloader 2 to be backfilled with general fill. Please clarify if Preloader 2 shall be backfilled with CLSM or general fill.

Answer: See revised Proposed Schedule. Preloader 2 shall be backfilled with general fill in this addendum.

36. Bid Item #4 – Abandon Existing Special Sewer Manhole, CLSM backfilled. Plan Sheet 7, Detail "Inset 1" state "See Detail Sheet C016" regarding this bid item. However, a detail has not been provided in the plans. Please provide a detail for the abandonment of this manhole.

Answer: See new drawing C006B for detail in this addendum.

37. Bid Item #6 – Demolish and Remove Existing 4" Sewer Force Main has a quantity of 600 LF. However, Plan Sheet 7, Detail "Demolition Plan", calls for 675 LF to be removed. Please clarify which quantity is correct.

Answer: See response to Question #11 above.

38. Plan Sheet 19, Detail "Concrete Ballast for Pump Station Detail" and Plan Sheet 20, Detail "Sta. 0+00, Pump Station 3 Section A-A" call for a 30" deep stabilization layer and concrete ballast. Can the shape of the concrete ballast and stabilization layer be either round or square?

Answer: Minimum counterweight of ballast should be 50,100 lbs. and shall not interfere with piping.

39. Plan Sheet 9 calls for a 6-inch gravity sewer pipe to be installed between Pump Station 3 and Preloader 3 (Station 0+00 to Station 0+14). However, there is not a bid item for this work. Please advise which bid item should include the installation of the 6-inch gravity sewer pipe.

Answer: 6" gravity sewer pipe between Pump Station 3 and Preloader 3 shall be inclusive to Preloader 3 line item. See revised proposal schedule in this addendum.

40. Plan Sheet 17, Detail "Typical Trench Detail" calls for electronic markers to be installed over the centerline of the pipe. However, the detail does not call out the spacing of the electronic markers? For example, should the electronic markers be spaced every 10 LF of pipe?

Answer: See "Typical Electronic Marker for PVC Pipe (Plan View) Detail" on drawing. C018.

41. Ex. Pump Station 3 Demolition Detail on sheet C016 notes backfill with general fill placed in 12" lifts and compacted to 90% of maximum density. Pay item 3 description states to abandon the existing preloader 2 with CLSM. Please confirm the backfill is to be CLSM.

Answer: See response to Question #35 above

42. Please confirm that station 0+00 to 0+40 is 4" HDPE SDR11 in lieu of DIP as noted on sheet C010 at station 0+40. If not please provide a bid item for DIP.

Answer: SFM3 from Sta. 0+00 to 0+40 is DIP, see revised proposal schedule in this addendum.

43. Please provide as-builts of existing 4" force main and pump station 3 in order to accurately quantify the demolition scope.

Answer: The as-built/record drawings will be uploaded to HIePRO solicitation for reference.

44. On sheet C006, Inset 1 references sheet C016 for "Abandoned Ex Special SMH Detail". Please provide this detail.

Answer: See response to item #36 above

45. Please confirm if the entire existing force main system and comfort stations are to remain operational during the entirety of construction as per noted in sheets C007 to C014.

Answer: The entire park's sewer system will remain off-line until completion of project.

46. Sheet C005, note 1 state “Contractor must complete installation and testing of Phase 1 work and be cleared out of the EO-4498 area by June 7th, 2021. No Exceptions.” However, page P-11 of the proposal states that completion of Phase 1 of the contract shall be by June 25, 2021. Please clarify when phase 1 is to be complete.

Answer: See revised proposal in this addendum. Phase 1 to be completed by June 7, 2021. Also, the completion date for Phase 1 in the last paragraph of Section Q in the Information to Bidders Section of the Specifications shall be changed to June 7, 2021.

47. Please clarify if the existing force main from station 5+00 to 21+32.83 is in conflict with the future FM-6. The current drawing set does not clearly show the alignment of the existing utility.

Answer: The new force main is to be installed in the same alignment of the existing force main, assuming it was constructed as shown in the shown in the as-builts/reference drawings. Should the existing force main deviate from the as-built alignment, contractor shall follow the azimuth distances shown on plans.

48. It appears that multiple structures and buildings will need to be moved/ demolished from station 15+00 to 21+32.83. Please confirm that all will be relocated prior to NTP.

Answer: See response to question #7 above

49. Please consider adding an allowance bid item for removal of obstructions/ structures for any items that the awarded contractor may need to remove from station 15+00 to 21+32.83.

Answer: See response to question #7 above

50. Bid Item No. 6 "Clean and CLSm fill in place existing 4" force main" has a quantity of 600LF. Sheet C006 notes that approximately 675LF of existing force main will be removed by the contractor for job No. F70C616C. Please confirm this quantity will be removed under this contract and paid for by bid item No. 6. Please update bid item No. 6 quantity to reflect this.

Answer: See response to Question # 11 above.

51. Drawing C006 identifies the approximate removal and replacement of 2200LF existing 6" & 4" DI force main. Please provide a pay item for the removal.

Answer: See response to Question # 11 above.

52. Bid item 9, 10, 11, 12 & 13 are all inclusive of bypassing. Please clarify what additional bypassing is to be included in Additive No. 1 "Sewer Bypass System and Temporary 4" Force Main".

Answer: See revised Proposal Schedule in this addendum. No sewer bypass required.

53. Please specify type of portable restrooms required for additive No. 2 Bid items 54 & 55.

Answer: Bid items #54 & #55 are for single, toilet only portable restrooms.

54. Please clarify the difference between bid item 38/46 and bid item 39/47. Please specify the location of each so they can be priced accordingly.

Answer: Items 38 and 39 refer to conductors on revised building plan. Items 46 and 47 refer to conductors shown on new site plan.

55. Per the duct schedule on sheet E-5 there is 1" Conduit; However, there is not a pay item for 1" Conduit. Please provide a pay item for 1" Conduit.

Answer: Revised items 36 and 44 from ¾"C to 1"C. Proposal schedule revised and item numbers have changed. See the revised proposal schedule in this addendum.

56. Please specify work location for bid item 44 " 750LF 3/4" Conduit, PVC SCH 40".

Answer: Bid item refers to control power feeder to new pump station 3. Item 44 revised from ¾"C to 1"C. Proposal schedule revised and item number has changed. See the revised proposal schedule in this addendum.

57. On Specification sheet 16301-4 > Part 2 - Products > 2.01 Materials > C. Ducts > Note 1. specifies all conduits to be encased in 3000psi minimum concrete. On sheet E-5, Typical Trench and Backfill Detail notes specify concrete encased ductline to be 2800psi concrete. Please confirm if 2800psi is acceptable for ductlines.

Answer: Concrete shall be 3000psi per referenced spec section.

58. Please confirm if the existing sewer pump station is in working order.

Answer: State Parks shall confirm if existing pump station 3 is in working order. However, utilizing the existing pump station 3 is no longer required for bypassing. See response to Question # 4 above.

59. Per the pre-offer conference agenda note 6 states that all comfort stations are currently closed. Please specify if they are to remain closed during construction and that Additive Bid Item 53 "Sewer Bypass System and Temp 4" Force Main" is to connect the existing system to the new system after the completion of phase 2.

Answer: See response to Question #4 and 58 above.

60. Please clarify the location of work associated with Bid Items 30, 31 and 32.

Answer: Bid Items 30, 31, 32 refers to demolition of duct to exist pump station 3, equipment connection to pump station 3, existing demolition of buck boost transformers, and enclosed circuit breaker. See revised proposal schedule in this addendum. Bid item numbers have changed.

61. Please clarify the allowance amount for bid item 51 "Field Office"

Answer: See response to Question #27 above.

62. Bid item 9 to 13 directed to include bypass system. Additive bid item 53 also indicted the sewer bypass system. Can you explain more detail where or which phase required to install this bypass system?

Answer: See response to Questions #4 & #58 above.

63. Can you verify what the duty point is for the submersible non-clog (flowrate & head)?

Answer: The pumps are rated at 210gpm @ 105 TDH.

REFERENCES
(References have been scanned and are available for download on the HIePRO website.)

1. The Pre-Offer Conference Agenda is attached.

2. "Geotechnical Engineering Exploration Sand Island State Recreation Area Sewer System Improvements, Honolulu, Oahu, Hawaii", dated January 28, 2019 by Geolabs, Incorporated shall be included as part of the solicitation documents.

3. Related drawings for Pump Station 1 wet well:

    a. Construction Drawing "Sand Island State Recreation Area Sewer System Improvements", Job No. H09C616B", May 2004. (not as-built), Page 9

b. As-Built Drawing “Park Development Phase 1 Sand Island State Park”, Job No. 46-OP-9, Dated 1975. Pages 5-7

Engineering Division

Carty S. Chang
Chief Engineer

State of Hawaii
Department of Land and Natural Resources
Engineering Division

Job No. F70C616E
Sand Island State Recreation Area Sewer Improvements
Phase 2: Pump Station 3 Relocation and Force Main 3 Replacement
Honolulu, Oahu, Hawaii

Date: February 10, 2021, 11:00 A.M.
Location: Sand Island State Recreation Area, Comfort Station #6

PRE-OFFER CONFERENCE AGENDA

1. Contractor shall coordinate their construction schedule with the Division of State Parks. Park hours are daily 7:00 A.M. to 6:45 P.M.

2. Contractor shall coordinate their construction schedule with the follow adjacent City & County of Honolulu (City) projects:
   a. Sand Island Wastewater Treatment Plant, Ocean Outfall Shoreline Revetment, Job No. W11-17; Healy Tibbitts Builders, Inc.
   b. Awa Street Wastewater Pump Station Force Main and Sewer System Improvements, Waiakamilo Road Trunk Sewer, Job No. W5-16; Frank Coluccio Construction Company, Inc.

   The contractors for these projects are using the area in Phase1 for construction access and storage.

3. Contractor must finish all work (installation, testing and cleared out of area) for Phase 1 by June 7, 2021. The City's project Sand Island WWTP Maintenance Building, Septage, and Site Improvements, Job No. W8-19 is proposed to start construction shortly after that date within the Phase 1 area. We highly suggest the Contractor be prepared to start Phase 1 work promptly in April 2021.

4. Healy Tibbitts Builders, Inc. (contractor for Sand Island Wastewater Treatment Plant, Ocean Outfall Shoreline Revetment, Job No. W11-17) shall be additionally insured under the Contractor's contract with DLNR. Their construction access/travel way is adjacent to the Phase 1 work area.

5. Contractor shall coordinate their construction schedule with the concurrent Sand Island State Recreation Area Park Improvements - Phase V, Job No. F70C616C – 57 Engineering, Inc.

6. Currently all comfort stations are closed. Once Phase 2 is completed (connecting the newly installed sewer force main from Phase 1 to the existing sewer pump station 3), the park shall open all comfort stations to park users.

7. Contractor may need to provide portable toilets if comfort stations are closed due to construction work.

8. Contractor shall provide and maintain temporary accessible routes around construction area in accordance with ADAAG 4.1.1(4).

9. The Soil Investigation Report, dated January 28, 2019, will be available for information and download from the HIePRO solicitation.

10. Contractor shall comply with all requirements of the NPDES Individual Strom Water Permit.

11. No dewatering permits were obtained as pit-to-pit discharge is expected.

12. Bidding:
    - Last day for questions submitted in HIePRO is February 15, 2021 at 2 P.M.
    - Answers posted on HIePRO on February 19, 2021 at 4 P.M and an addendum will also be posted on HIePRO with the answers.
    - Offer Due Date is February 26, 2021 at 2:00 PM on HIePRO.

13. Questions/Clarifications? Please submit your questions/clarifications on HIePRO or email to Brandon Kim at brandon.j.kim@hawaii.gov. An addendum will be issued with official responses to the questions/clarifications.

P R O P O S A L

FOR

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION
State of Hawaii

JOB NO. F70C616E
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROVEMENTS
PHASE 2: PUMP STATION 3 RELOCATION AND FORCE MAIN 3 REPLACEMENT

_____, 2021

Chief Engineer
Engineering Division
Department of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

Dear Sir:

The undersigned, having carefully examined the local conditions and all available records and information covering conditions which may affect the cost of the work to be performed, and having carefully examined the Plans and Specifications, and other contract documents, hereby proposes to furnish and pay for all materials, tools, equipment, labor and other incidental work necessary to replace existing gravity sewer pipes and sewer force mains, install a grinder pump, sewer manholes, a new pump station, and other various repair work to the existing sewer system, as required or called for in this Proposal, all according to the true intent and meaning of the Notice to Bidders, Information and Instructions to Bidders, Proposal, Detailed Specifications, Interim General Conditions, Plans, and any and all addenda for:

JOB NO. F70C616E
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROVEMENTS
PHASE 2: PUMP STATION 3 RELOCATION AND FORCE MAIN 3 REPLACEMENT

on file in the office of the Engineering Division for the TOTAL BASE BID (Items 1 to 56) of:

_____

_____Dollars ($_____)
and will fully complete all work under this contract within 540 consecutive calendar days from the date of written notice to proceed, including date of said order, said total sum being itemized on the following pages. Phase 1 of the project must be completed by June 7, 2021 as stated in the plans and specifications.

PROPOSAL

		BASE BID			
		CIVIL AND MECHANICAL WORK			
Item No.	**Quantity**	**Unit**	**Description**	**Unit Price**	**Total**
1.		LS	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 vegetative cover and permanent erosion control measure		$_____
2.		LS	Demolish and remove existing sewer pump station 3, including abandoning wetwell		$_____
3.		LS	Abandon existing preloader 2, general fill.		$_____
4.	1	EA	Abandon existing special sewer manhole, general fill.	$_____	$_____
5.	65	LF	Lin. Ft., Clean and CLSM fill in place existing 6" sewer gravity line	$_____	$_____
6.	350	LF	Lin. Ft., Clean and CLSM fill in place existing 4" sewer gravity line	$_____	$_____
7.	1,640	LF	Lin. Ft., Demolish and remove in place existing 4" and 6" force main	$_____	$_____
8.		LS	Pump Station 3, inclusive of enclosure, controls, pumps, motors, and 6" sewer line from Preloader 3, in place complete		$_____
9.		LS	Grinder pump station at Comfort Station 6, inclusive of vent line, controls, electrical connections, concrete ballast, in place complete		$_____
10.	350	LF	L.F., 8-inch gravity PVC sewer line installed by open trenching, electronic markers, backfilling, restoration, and all incidentals, in place complete.	$_____	$_____

Item No.	Quantity	Unit	Description	Unit Price	Total
11.	25	LF	L.F., 4-inch gravity PVC sewer line installed by open trenching, electronic markers, backfilling, restoration, and all incidentals, in place complete.	$_____	$_____
12.	1,840	LF	L.F., 6-inch HDPE SDR 11 (avg. inner diameter of 5.35-inch) sewer force main installed by open trenching, electronic markers, fittings, backfilling, restoration, and all incidentals, in place complete.	$_____	$_____
13.	260	LF	L.F., 4-inch HDPE SDR 11 (avg. diameter of 3.63-inch) sewer force main installed by open trenching, electronic markers, fittings, backfilling, restoration, and all incidentals, in place complete.	$_____	$_____
14.	40	LF	L.F., 4-inch Ductile Iron sewer force main installed by open trenching, electronic markers, fittings, backfilling, restoration, and all incidentals, in place complete.	$_____	$_____
15.	310	LF	L.F., 1-1/4-inch PVC sewer force main installed by open trenching, electronic markers, fittings, backfilling, restoration, and all incidentals, in place complete.	$_____	$_____
16.	1	EA	EA, Standard Sewer Manhole, 4 feet diameter, (7.00'-7.99' depth from top of cover to invert) lined, in place complete.	$_____	$_____
17.	1	EA	EA, Standard Sewer Manhole (4.00'-4.99' depth from top of cover to invert) lined, in place complete.	$_____	$_____
18.	1	EA	EA, Transition Sewer Manhole (6.00'-6.99' depth from top of cover to invert) lined, in place complete.	$_____	$_____
19.	1	EA	EA, Reconstruct existing transition sewer manhole to gravity sewer manhole and line, in place complete.	$_____	$_____
20.	1	EA	EA., Preloader 3 structure, (14.00'-14.99' depth from top of cover to bottom of preloader) lined, inclusive of 6-inch sewer connection, in place complete	$_____	$_____

Item No.	Quantity	Unit	Description	Unit Price	Total
21.	1	EA	EA., Comfort Station 6 Preloader structure with liner, (7.00'-7.99' depth from top of cover to bottom of preloader) lined, in place complete	$_____	$_____
22.	1	EA	EA., Valve Vault for Pump Station 3 (7.00'-7.99 depth from top of bottom of valve vault) lined, in place complete	$_____	$_____
23.	2	EA	EA., 316 SS Check Valve	$_____	$_____
24.	2	EA	EA., 316 SS Ball Valve	$_____	$_____
25.	3	EA	EA., Double Ball Flexible Expansion Joint	$_____	$_____
26.	1	EA	EA., Flexible Ball Joint	$_____	$_____
27.	260	SF	SF., Concrete Pad 6" thick, inclusive of reinforcement, in place complete.	$_____	$_____
28.	5	CY	CY., Concrete for reaction blocks inclusive of necessary structural struts, straps, rods, reinforcing steel and appurtenances, in place complete	$_____	$_____
29.	80	LF	LF., 4'-High Chain Link Fence, including gates	$_____	$_____
30.	4	EA	EA., Removable pipe barrier	$_____	$_____
31.	6	EA	EA., Special sign over toilet/urinal	$_____	$_____
	ELECTRICAL WORK				
32.	5	LF	L.F., Demolish Equipment Connection	$_____	$_____
33.	415	LF	L.F., Demolish Ducts	$_____	$_____
34.	30	LF	L.F., Demolish Conduits	$_____	$_____
35.	1	EA	EA., 30KVA Buck Boost Transformer	$_____	$_____
36.	1	EA	EA., 0.75KVA Buck Boost Transformer	$_____	$_____
37.	3	EA	EA., Junction Box, 8"SQ x 4"D, NEMA 4X 316SS	$_____	$_____
38.	4	EA	EA., Junction Box, 18"SQ x 4"D, NEMA 4X 316SS	$_____	$_____

Item No.	Quantity	Unit	Description	Unit Price	Total
39.	120	LF	L.F., 1"C, GRC	$_____	$_____
40.	120	LF	L.F., 2"C, GRC	$_____	$_____
41.	360	LF	L.F., Conductors, #10 AGW, RHW, interior	$_____	$_____
42.	180	LF	L.F., Conductors, #1 AGW, RHW, interior	$_____	$_____
43.	1	EA	EA., Disconnect Switch, 3P100A, NEMA 4X, 316SS, Fusible	$_____	$_____
44.	88	CY	C.Y., Excavate	$_____	$_____
45.	32	CY	C.Y., Concrete Encasement	$_____	$_____
46.	56	CY	C.Y., Backfill and Compact	$_____	$_____
47.	780	LF	L.F., 1"C, PVC SCH 40	$_____	$_____
48.	1,500	LF	L.F., 2"C, PVC SCH 40	$_____	$_____
49.	2,250	LF	L.F., Conductors, #10 AGW, RHW, exterior	$_____	$_____
50.	2,250	LF	L.F., Conductors, #1 AGW, RHW, exterior	$_____	$_____
51.	6	EA	EA., 2'x4' Handhole	$_____	$_____
52.		LS	Miscellaneous and Testing for electrical distribution systems and pump controls.		$_____
53.		LS	Project Sign, in place complete.		$_____
54.	Allowance		Land Fill Fees		$ 10,000
55.	Allowance		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. Field Office.		$ 15,000
				Subtotal Base Bid (Items 1-55)	$ _____
56.		LS	Mobilization and Demobilization (not to exceed 10% of the Subtotal Base Bid)		$_____
				TOTAL BASE BID (Items 1-56)	$_____

ADDITIVE NO. 1					
Item No.	**Quantity**	**Unit**	**Description**	**Unit Price**	**Total**
57.	6	EA	EA., Standard Portable Restroom for 14 days.	$_____	$_____
58.	3	EA	EA., Accessible Portable Restroom for 14 days.	$_____	$_____
			TOTAL SUM ADDITIVE NO. 1 (Items 57-58) $_____		

HAWAII PRODUCTS PREFERENCE AND/OR USE OF HAWAII PRODUCTS

In accordance with Act 175, SLH 2009, the Hawaii products preference is applicable to this solicitation. Bidders offering a Hawaii product ("HP") shall identify the HP in the table below.

Persons desiring to qualify their product(s) not currently on the Hawaii Product List, shall complete Form SPO-38, *Certification for Hawaii Product Preference*, and submit the completed form no later than the deadline specified in the procurement notice and solicitation. The responsibility for certification and qualification shall rest upon the person requesting the preference. One form shall be completed and submitted for each product. Form SPO-38 is available at http://hawaii.gov/spo/

For the purpose of selecting the low bid when a solicitation contains both HP and non-HP, the price offered for a HP item shall be decreased by subtracting 10% for the class I or 15% for the class II HP item(s) offered. The lowest total offer, taking the preference into consideration, shall be awarded the contract, unless the offer provides for additional award criteria. The contract amount of any contract awarded, however, shall be the amount of the price offered, exclusive of the preferences.

In the event of any change that materially alters the bidder's ability to supply the Hawaii product(s), the bidder shall immediately notify the procurement officer in writing and the parties shall enter into discussions for the purpose of revising the contract or terminating the contract for convenience.

Item No.	Pre-Approved Hawaii Product Description & Manufacturer	Class (I or II)	Quantity	Unit Measure	Unit Price	Total Price
1.						
2.						
3.						
4.						
5.						
6.						

RECYCLED PRODUCTS PREFERENCE

This project allows a 10% price preference for recycled products in accordance with HRS 103D-1005. Please indicate your selection of recycled or non-recycled product by indicating its cost FOB jobsite unloaded in the schedule below, including applicable General Excise & Use Taxes.

DESCRIPTION	RECYCLED PRODUCT COST	NONRECYCLED PRODUCT COST
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____

The bidder requesting a recycled product preference shall also complete and submit the form "CERTIFICATION OF RECYCLED CONTENT" as shown in the Interim General Conditions and provide all supporting information with this proposal. Additional information may be requested to qualify a product.

The following definitions are applicable to the CERTIFICATION OF RECYCLED CONTENT form:

"Post-consumer recovered material" means any product used by a consumer, including a business that purchases the material, that has served its intended end use, and that has been separated or diverted from the solid waste stream for the purpose of use, reuse, or recycling.

"Product" includes materials, manufactures, supplies, merchandise, goods, wares, and foodstuffs.

"Recovered material" means waste material and by-products that have been separated, diverted, or removed from the solid waste stream after a manufacturing process for the purpose of use, reuse, or recycling. Recovered material does not include those materials and by-products that are generated and normally reused on-site or within original manufacturing processes (such as mill broke, in the case of paper products).

"Recycled content" means the percentage of a product composed of recovered material, or post-consumer recovered material, or both.

"Recycled product" means a product containing recovered material, or post-consumer recovered material, or both.

The bidder agrees that preference for recycled products shall be taken into consideration to determine the low bidder in accordance with said Section and the rules promulgated, however, the award of contract will be in the amount of the bid offered exclusive any preference.

APPRENTICESHIP AGREEMENT PREFERENCE

1. If applicable to this project, any bidder seeking the preference must be a party to an apprenticeship agreement registered with the State Department of Labor and Industrial Relations (DLIR) at the time the bid is submitted for each apprenticeable trade the bidder will employ to construct the project. "Employ" means the employment of a person in an employer-employee relationship.

    a. The apprenticeship agreement shall be registered with the DLIR and conform to the requirements of Hawaii Revised Statutes Chapter 372.

    b. Subcontractors do not have to be a party to an apprenticeship agreement for the bidder to obtain preference.

    c. The bidder is not required to have apprentices in its employ at the time the bid is submitted to qualify for the preference.

2. A bidder seeking the preference must state the apprenticeable trade the bidder will employ for each trade to be employed to perform the work by submitting a completed signed original *Certification Form 1* verifying participation in an apprenticeship program registered with DLIR. "Apprenticeable trade" shall have the same meaning as "apprenticeable occupation" pursuant to Hawaii Administrative Rules (HAR) §12-30-5.

    a. The *Certification Form 1* shall be authorized by an apprenticeship sponsor listed on the DLIR list of registered apprenticeship programs. "Sponsor" means an operator of an apprenticeship program and in whose name the program is approved and registered with the DLIR pursuant to HAR §12-30-1.

    b. The authorization shall be an original signature by an authorized official of the apprenticeship sponsor.

    c. The completed signed original *Certification Form 1* for each trade must be submitted with the bid. Previous certifications shall not apply.

    d. When filling out the *Certification Form 1*, the name of Apprenticeable Trade and Apprenticeship Sponsor must be the same as recorded in the List of Construction Trades in Registered Apprenticeship Programs that is posted on the DLIR website. "Registered apprenticeship program" means a construction trade program approved by the DLIR pursuant to HAR §12-301 and §12-30-4.

    e. The *Certificate Form 1* and the List of Construction Trades in Registered Apprenticeship Programs is available on the DLIR website at: http://hawaii.gov/labor/wdd.

3. Upon receiving the *Certification Form 1*, the Procurement Officer will verify that the apprenticeship program is on the List of Construction Trades in Registered Apprenticeship Programs and that the form is signed by an authorized official of the Apprenticeship Program Sponsor. If the programs and signature are not confirmed by the DLIR, the bidder will not qualify for the preference.

4. If the bidder is certified to participate in an apprenticeship program for each trade which will be employed by the bidder for the project, a preference will be applied to decrease the bidder's bid amount by five percent (5%) for evaluation purposes.

5. Should the bidder qualify for other preferences (e.g. Hawaii Products), all applicable preferences shall be applied to the bid price.

CONTRIBUTIONS BY STATE AND COUNTY CONTRACTORS PROHIBITED

Contractors are hereby notified of the applicability of Section 11-355, HRS, which states that campaign contributions are prohibited from specified State or county government contractors during the term of the contract if the contractors are paid with funds appropriated by a legislative body.

CONDITION OF AWARD

It is understood that the award of the contract will be made on the basis of the lowest responsible Total Base Bid (Items 1 to 56) selected by the Board of Land and Natural Resources. Write the total of bid items 1 to 56 on page P-1.

It is understood and agreed that the Board of Land and Natural Resources reserves the right to reject any and/or all bids and waive any defects when, in the Board's opinion, such rejection or waiver will be for the best interest of the State of Hawaii.

In the event all bids exceed available funds certified by the appropriate fiscal officer, the head of the purchasing agency responsible for the procurement in question is authorized in situations where time or economic considerations preclude resolicitation of work of a reduced scope to negotiate an adjustment of the bid price, including changes in the bid requirements, with the low responsible and responsive bidder, in order to bring the bid within the amount of available funds. It is understood and agreed upon that the head of the purchasing agency may delete a portion or all of any item(s) in the proposal at the stated unit or lump sum price as necessary to stay within the available funding. The bidder is responsible to make an earnest effort to represent the actual cost of each item, including all materials, labor, equipment, overhead and profit in their bid proposal to preclude claims of anticipated profit or loss of profit because of an unbalanced bid proposal.

It is also understood that if a mutually agreeable cost for the reduced scope of work necessitated by a lack of available funds cannot be agreed upon between the bidder and the head of the purchasing agency within 14 calendar days after the bid opening, then the bid may be rejected in the best interest of the purchasing agency, and the head of the purchasing agency may negotiate in progressive order (lowest to highest) with the next lowest responsible and responsive bidder.

It is also understood and agreed that the award of the contract shall be conditioned upon funds being made available for this project and further upon the right of the Board of Land and Natural Resources to hold all bids received for a period of ninety (90) days from the date of the opening thereof, unless otherwise required by law, during which time no bid may be withdrawn.

It is also understood that Notice to Proceed may be delayed up to one (1) year after the bid opening date, and that no additional compensation will be provided for any claim for escalation or delay for issuance of Notice to Proceed on or before that date.

It is also understood and agreed that the quantities given herewith are approximate only and are subject to increase or decrease, and that the undersigned will perform all quantities of work as either increased or decreased, in accordance with the provisions of the Contract Specifications.

It is also understood and agreed that the estimated quantities shown for the items for which a UNIT PRICE is asked in this Proposal are only for the purpose of comparing on a uniform basis, bids offered for the work under this contract, and the undersigned agrees that he is satisfied with and will at no time, dispute said estimated quantities as a means of claims for anticipated profit or loss of profit, because of a difference between the quantities of the various classes of work done or the materials and equipment installed, and the said estimated quantities. On UNIT PRICE bids, payment will be made only for the actual number of units incorporated into the finished project at the contract UNIT PRICE.

After the HIePRO bid due date and time, the figures will be extended and/or totaled in accordance with the bid prices of the acceptable proposals and the totals will be compared. In the comparison of bids, words written in the proposal shall govern over figures and unit prices will govern over totals. Until

the award of the contract, however, the right will be reserved to reject any and all proposals and to waive any defects or technicalities as may be deemed best for the interest of the State.

It is also understood and agreed that liquidated damages in the amount of Two Hundred and 00/100 ($200.00) for each and every calendar day in excess thereof prior to completion of Phase 1 of the contract by June 7, 2021 shall be withheld from payments due to the Contractor.

It is also understood and agreed that liquidated damages in the amount of Five Hundred and 00/100 ($500.00) for each and every calendar day in excess thereof prior to completion of the other phases of the contract shall be withheld from payments due to the Contractor.

It is also understood and agreed that if this bid is accepted, the successful bidder must enter into and execute a contract with the Board of Land and Natural Resources and furnish a Performance and Payment Bond, as required by law. These bonds shall conform to provisions of Section 103D-324 and 325, Hawaii Revised Statutes and any law applicable hereto.

It is also understood and agreed that the successful bidder will provide all necessary labor, materials, tools, equipment, and other incidentals necessary to do all the work and furnish all the materials specified in the contract in the manner and time herein prescribed, and according to the requirements of the Engineer as therein set forth.

It is understood that by submitting this proposal, the undersigned is declaring that his firm has not been assisted or represented on this matter by an individual who has, in a State capacity, been involved in the subject matter of this contract in the past two years.

It is understood that by submitting this proposal in accordance with HAR 3-122-192, the undersigned is declaring that the price submitted is independently arrived without collusion.

It is also understood that by submitting this proposal, a Certification for Safety and Health Programs for bids in excess of $100,000 (in accordance with HRS 396-18), the undersigned certifies that his organization will have a written safety and health plan for this project that will be available and implemented by the Notice to Proceed date of this project. Details of the requirements of this plan may be obtained from the Department of Labor and Industrial Relations, Occupational, Safety and Health Division (HIOSH).

It is further understood and agreed that the successful bidder shall comply with paragraph 3.1.a "SUBCONTRACTING" of the General Provisions which requires that the contractor shall perform with his own organization and with the assistance of workmen under his immediate superintendence, work of a value not less than twenty percent (20%) of the value of all work embraced in the Contract, except that certain contract items of work, if specifically referred to in the special provisions, will be exempted from said twenty percent requirement.

Compliance with §103-310 HRS. As a condition of award all bidders shall comply with all laws governing entities doing business in the State, including Chapter 237 HRS (general excise tax); Chapter 383 HRS (employment security – unemployment insurance); Chapter 386 HRS (workers compensation); Chapter 392 HRS (temporary disability insurance); and Chapter 393 HRS (pre-paid health care), and shall produce all documents to the State (DLNR, Engineering Division) required to demonstrate compliance with these subsections. Any bidder making a false affirmation or certification under this subsection shall be suspended and may be debarred from further offerings or awards pursuant to §103D-702 HRS.

RECEIPT OF ADDENDA

The bidder also acknowledges receipt of any and all addenda issued by the Engineering Division, by recording the date of receipt of the respective addenda in the space provided below:

Addendum	Date Received	Addendum	Date Received
No. 1	_____	No. 5	_____
No. 2	_____	No. 6	_____
No. 3	_____	No. 7	_____
No. 4	_____	No. 8	_____

It is understood that failure to receive any such addendum shall not relieve the Contractor from any obligation under this Proposal as submitted.

It is also understood and agreed that if this Proposal is accepted and the undersigned should fail or neglect to contract as aforesaid, the Board may determine that the bidder has abandoned the Contract, and thereupon, forfeiture of the security accompanying his proposal shall operate and the same shall become the property of the Board.

JOINT CONTRACTORS OR SUBCONTRACTORS TO BE ENGAGED ON THIS PROJECT

The Bidder agrees that the following is a complete listing of all joint contractors or subcontractors covered under Chapter 444, Hawaii Revised Statutes (HRS), who will be engaged by the Bidder on this project to perform the required work indicated pursuant to Section 103D-302, HRS. It is the sole responsibility of the contractor to review the requirements of this Project and determine the appropriate licenses that are required to complete the Project. The Bidder certifies that the completed listing of joint contractors or subcontractors fulfills the requirements for the project and the Bidder, together with the listed subcontractors or joint contractors have all the specialty contractor's licenses to complete the work, except as provided for in HRS §103D-302(b). Failure of the Bidder to comply with this requirement may be just cause for rejection of the bid.

"A" General Engineering Contractors and "B" General Building Contractors are reminded that due to the Hawaii Supreme Court's January 28, 2002 decision in Okada Trucking Co., Ltd. v. Board of Water Supply, et al., 97 Haw. 450 (2002), they are prohibited from undertaking any work, solely or as part of a larger project, which would require the general contractor to act as a specialty contractor in any area in which the general contractor has no license. Although the "A" and "B" contractor may still bid on and act as the "prime" contractor on an "A" or "B" project (See, *HRS §*444-7 *for the definitions of an "A" and "B" project.*), respectively, the "A" and "B" contractor may only perform work in the areas in which they have the appropriate contractor's license (*An "A" or "B" contractor obtains "C" specialty contractor's licenses either on its own, or automatically under HAR § 16-77-32*). The remaining work must be performed by appropriately licensed entities.

General Engineering "A" Contractors automatically have these "C" specialty contractor's licenses: C-3, C-9, C-10, C-17, C-24, C-31a, C-32, C-35, C-37a, C-37b, C-38, C-43, C-49, C-56, C-57a, C-57b and C-61.

General Building "B" Contractors automatically have these "C" specialty contractor's licenses: C-5, C-6, C-10, C-12, C-24, C-25, C-31a, C-32a, C-42a and C-42b.

In completing the Joint Contractors or Subcontractors List, describe the specialty contractor's nature and scope of work to be performed for this project and provide the complete firm name of the joint contractor or subcontractor in the respective columns. If the Bidder is a general contractor and providing the work of the required specialty contractor, fill in the Bidder's (general contractor's) name and nature and scope of work to be performed on this project.

List only one joint contractor or subcontractor per required specialty contractor's classification, unless within the same specialty, the work of each joint contractor or subcontractor can be described so that there is no overlap in work descriptions.

If a contractor's license is required by law for the performance of the work which is called for in this bid, the bidder and all subcontractors must have the required license before the submission of the bidder's proposal in the case of a non-federal aid project, and for federal-aid projects, the bidder must have the required license prior to the award of the project and all subcontractors prior to the start of the subcontracted work.

COMPLETE FIRM NAME OF JOINT CONTRACTOR OR SUBCONTRACTOR	NATURE AND SCOPE OF WORK TO BE PERFORMED

JOINT CONTRACTORS OR SUBCONTRACTORS LIST FOR THE ADDITIVE(S):

Bidder agrees that for projects with additives(s), the Bidder, joint contractor or subcontractor listed in the completed "Joint Contractors or Subcontractors List for the Additives(s)" will perform work for the respective additives.

Additive 1

COMPLETE FIRM NAME OF JOINT CONTRACTOR OR SUBCONTRACTOR	NATURE AND SCOPE OF WORK TO BE PERFORMED

Enclosed herewith is a:

1.	Surety Bond (*1)	)	
2.	Legal Tender (*2)	)	
3.	Cashier's Check (*3)	)	
4.	Certificate of Deposit (*3)	)	in the
5.	Certified Check (*3)	)	amount
6.	Official Check (*3)	)	of
7.	Share Certificate (*3)	)	
8.	Teller's Check (*3)	)	
9.	Treasurer's Check (*3)	)	

(Cross Out Those Not Applicable)

_____

_____Dollars ($_____)

as required by law.

Respectfully submitted,

_____
Name of Company, Joint Venture
or Partnership

_____
Contractor's License No.

By _____
Signature (*4)

Title _____
Print Name _____
Date _____
Address _____
_____
Telephone No. _____
E-Mail Address _____

NOTES:

1. Surety bond underwritten by a company licensed to issue bonds in this State;

2. Legal tender; or

3. A certificate of deposit; share certificate; or cashier's, treasurer's, teller's, or official check drawn by, or a certified check accepted by, and payable on demand to the State by a bank, a savings institution, or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration.

   A. These instruments may be utilized only to a maximum of $100,000.

   B. If the required security or bond amount totals over $100,000, more than one instrument not exceeding $100,000 each and issued by different financial institutions shall be accepted.

4. Please attach to this page evidence of the authority of this officer to submit bids on behalf of the Company and also the names and residence addresses of all officers of the Company.

5. Fill in all blank spaces with information asked for or bid may be invalidated. PROPOSAL MUST BE INTACT, MISSING PAGES MAY INVALIDATE YOUR BID.

End of Proposal

DETAILED SPECIFICATIONS

TABLE OF CONTENTS

Contractor shall keep the project and surrounding area neat and free from dust nuisance. The Contractor shall clean up and remove from premises all debris accumulated from operations as necessary or as directed. See also Section 7.25 of the General Conditions.

O. Completion of Work: Upon completion of the work, the Contractor shall remove all equipment, signs and unused materials provided for the work and shall restore the project site to a neat and clean condition

P. Responsibility

1. The State will hold the Contractor liable for all the acts of Subcontractors and shall deal only with the prime Contractor in matters pertaining to other trades employed on the job. The Contractor shall be responsible for coordinating the work of all trades on the job.

2. Should the Contractor discover any discrepancy in the plans or specifications, the Contractor shall immediately notify the Engineer before proceeding any further with the work, otherwise, the Contractor will be held responsible for any cost involved in correction of work placed due to such discrepancy.

Q. Cooperation With Other Contractors: The State reserves the right at any time to contract for or otherwise perform other or additional work within the contract zone limits of this Contract. The Contractor of this project shall, to the extent ordered by the State, conduct its work so as not to interfere with or hinder the progress or completion of the work performed by other contractors.

R. Division of the Work: The Divisions and Sections into which these Specifications are divided shall not be considered an accurate or complete segregation of work by trades. This also applies to all work specified within each Section.

S. Drawings and Specifications

1. The Contractor shall not make alterations in the drawings and specifications. In the event the contractor discovers any errors or discrepancies, the Contractor shall immediately notify the Engineer in accordance with the General Conditions.

2. Where devices, or items, or parts thereof are referred to in the singular, it is intended that such reference shall apply to as many such devices, items or parts as are required to properly complete the work.

3. Specifications and drawings are prepared in abbreviated form and include incomplete sentences. Omission of words or phrases such as "the Contractor shall", "as shown on the drawings", "a", "an", and "the" are intentional. Omitted words and phrases shall be provided by inference to form complete sentences.

U. Coordination with Concurrent Projects

1. Contractor shall coordinate work with contractor of concurrent project “Sand Island State Recreational Area Sewer System Improvements Phase 1: Sewer Line A Replacement.”

2. Contractor shall coordinate work with concurrent DLNR project "Sand Island State Recreation Area Park Improvement – Phase V" (Job No. F70C616C).

3. Contractor shall Coordinate work with concurrent City and County of Honolulu Department of Environmental Services Project (Job No. W11-17) "Sand Island Wastewater Treatment Plant, Ocean Outfall Sewer Revetment."

4. Contractor shall coordinate work with concurrent City and County of Honolulu Department of Environmental Services Project (Job No. W5-16) "Awa Street Wastewater Pump Station Force main Sewer Improvements Waiakamilo Road Trunk Sewer."

5. Contractor shall coordinate with future City and County of Honolulu Department of Environmental Services Project (Job No. W8-19) in EO-4498 "Sand Island WWTP Maintenance Building, Septage, and Site Improvements (MBSSI)."

V. Required Submittals

1. Required submittals as specified in the Technical Sections of these specifications include one or more of the following: Shop drawings; color samples; material samples; technical data; schedules of materials; schedules of operations; guarantees; operating and maintenance manuals; and as-built drawings.

2. The Contractor shall make a comprehensive list of the required submittals, by Specification Section, and submit this list to the Engineer within 15 days after notice to proceed.

3. As-Built Drawings: When as-built drawings are required for submittal, the following shall apply:

   a. As-built drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be required.

   b. All deviations from alignments, elevations and dimensions which are stipulated on the plans shall be recorded in red on the as-built drawings.

   c. The following procedure shall be followed:

      1) Immediately after these changes are constructed in place, the Contractor shall record them on the field office plans.

      2) Within two (2) weeks after final inspection of the project, the Contractor shall transfer the changes marked on the field office plans onto a clean copy of the plans using a red pencil. Any deletions shall be so noted and redrawn as necessary. The Contractor shall stamp or mark the tracing "AS-BUILT", and also sign and date each drawing so marked.

3) The Contractor shall submit the as-built drawings to the Engineer for review and approval. After the Engineer approves the as-built drawings, the Contractor shall submit an electronic copy in Adobe PDF format on CD ROM.

4) Any as-built drawing which the Engineer determines does not accurately record the deviation shall be corrected by the State, and the Contractor shall be charged for the services.

END OF SECTION

SECTION 01020 – WORK SEQUENCE AND PHASING

PART 1 - GENERAL

1.01 PHASING

A. Phase 1 covers the sewer force main 3 work within the Executive Order Area (EO4498) located in Tax Map Key 1-5-041: 022. The Contractor must complete installation, testing, obtain State's acceptance, and clear out of EO04498 by June 7, 2021

B. Phase 2 work covers the clearing, grubbing and gravel cover area, installation of the new Sewer Pump Station 3, the rest of Force Main 3, rerouting of gravity sewer lines, and grinder pump station and force main for Comfort Station #6.

C. Phase 3 work covers the removal and disconnection of existing utilities no longer required.

1.02 CONTINUITY OF PARK SEWER SYSTEM

Sand Island State Recreation Area's (SISRA) sewer system is currently off-line. All comfort stations in the park are closed and will remain closed until construction is completed and accepted by the State. Bypass system will not be required.

1.03 PARTIAL FACILITY ACCEPTANCE

Due to time constraints for Phase 1, the Contractor is forewarned that the newly constructed piping and structure shall be installed complete, tested, and accepted prior to the repair of the remaining existing mechanisms.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

PART 2 – GENERAL (Not Used)

PART 3 – EXECUTION

3.1 SCHEDULE OF ADDITIVE BID ITEMS

A. Additive No 1:
1. Standard Portable Restroom for 14 days
2. Accessible Portable Restroom for 14 days

END OF SECTION

SECTION 01300 – SUBMITTALS

PART 1 - GENERAL

Submittals shall be furnished to the Engineer at least thirty (30) days prior to construction unless otherwise specified on the drawings or in the specification sections.

1.1 SUBMITTALS

A. Shop drawings shall be required for:

1. Section 01581 – Project Sign
2. Any others as called for in the plans, specifications or by the Engineer.

B. Other required submittals shall include:

1. Section 01500 – Wastewater Spill Mitigation Plan
2. Section 02220 – Excavation, Trenching, and Backfilling
3. Section 02231 – Subbase Course
4. Section 02232 – Aggregate Base Course
5. Section 02730 – Sewer System
6. Section 02732 – Sewer Line and Manhole Cleaning
7. Section 03300 – Cast-in-Place Concrete
8. Section 03310 – Controlled Low Strength Material (CLSM)
9. Section 11000 – Package Wastewater Pump Station
10. Section 11001 – Submersible Non-Clog Wastewater Pumps and Equipment at Pump Station 3
11. Section 11102 – Submersible Water Level Measuring and Transmitting System
12. Manufacturer's Data.
13. Certificates of Warranty.
14. Training, Repair, Operations and Maintenance Manual
15. Any others as called for in the plans, specifications, or by the Engineer.

SECTION 01500 – MAINTAINING THE EXISTING WASTEWATER SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

Although the existing wastewater system is currently not in operation and will not be in operation until construction is completed, the Contractor shall be responsible for any spills due to their activities or workmanship of the Contract prior to State's acceptance of the work.

1.2 RELATED SECTIONS:

Section 01410	Permits and Licenses
Section 01567	Pollution Control

1.3 SUBMITTALS

Within 30 calendar days after the Notice to Proceed date, the Contractor shall submit a Wastewater Spill Mitigation Plan for approval to the Engineer and the State Department of Health (DOH). The Wastewater Spill Mitigation Plan shall detail the procedures and provisions that the Contractor will implement to ensure uninterrupted sewage flow throughout the Project and, should a spill occur, regulatory agencies' requirements are satisfied. Any revisions to the plan requested by the above agencies prior to approval shall be the responsibility of the Contractor. No construction activities involving the existing wastewater system will be allowed until the Contractor's Wastewater Spill Mitigation Plan has been approved.

The Contractor's Wastewater Spill Mitigation Plan, at minimum, shall include:

1. Reporting requirements which conform with the current edition of Department of Health (DOH) Wastewater Branch's (telephone no. 586-4294) "Protocol for Sewage Spills" and which include immediate coordination with DOH and Division of Environmental Quality of the City Department of Environmental Services (EQ) (telephone no. 768-3279) through the Engineer. A January 2002 edition of the "Protocol for Sewage Spills" has been attached on pages 01500-3 through 01500-6 for information only. The Contractor shall obtain a current official copy of the "Protocol for Sewage Spills" from DOH.

2. Acknowledgement of the requirements of Section 01410,"Permits and Licenses".

3. Identification of potential liabilities involved with working with the wastewater system, sewage spills, reporting requirements should spills occur, and monitoring requirements of pollutant discharges into receiving waters.

1.4 GENERAL REQUIREMENTS

The Contractor shall be liable for any fines and damages relating to sewage spills or the failure to maintain normal sewage flows in the existing wastewater system. The Contractor shall be responsible for coordination of his work with the Engineer to ensure that his intended work procedures will be

compatible with the design and operation of the existing wastewater system and the new wastewater improvements being constructed under this contract.

The Contractor shall be responsible for any damages to the existing wastewater system caused by his construction activities. This includes, but is not limited to, existing sewer lines, manholes, and other improvements.

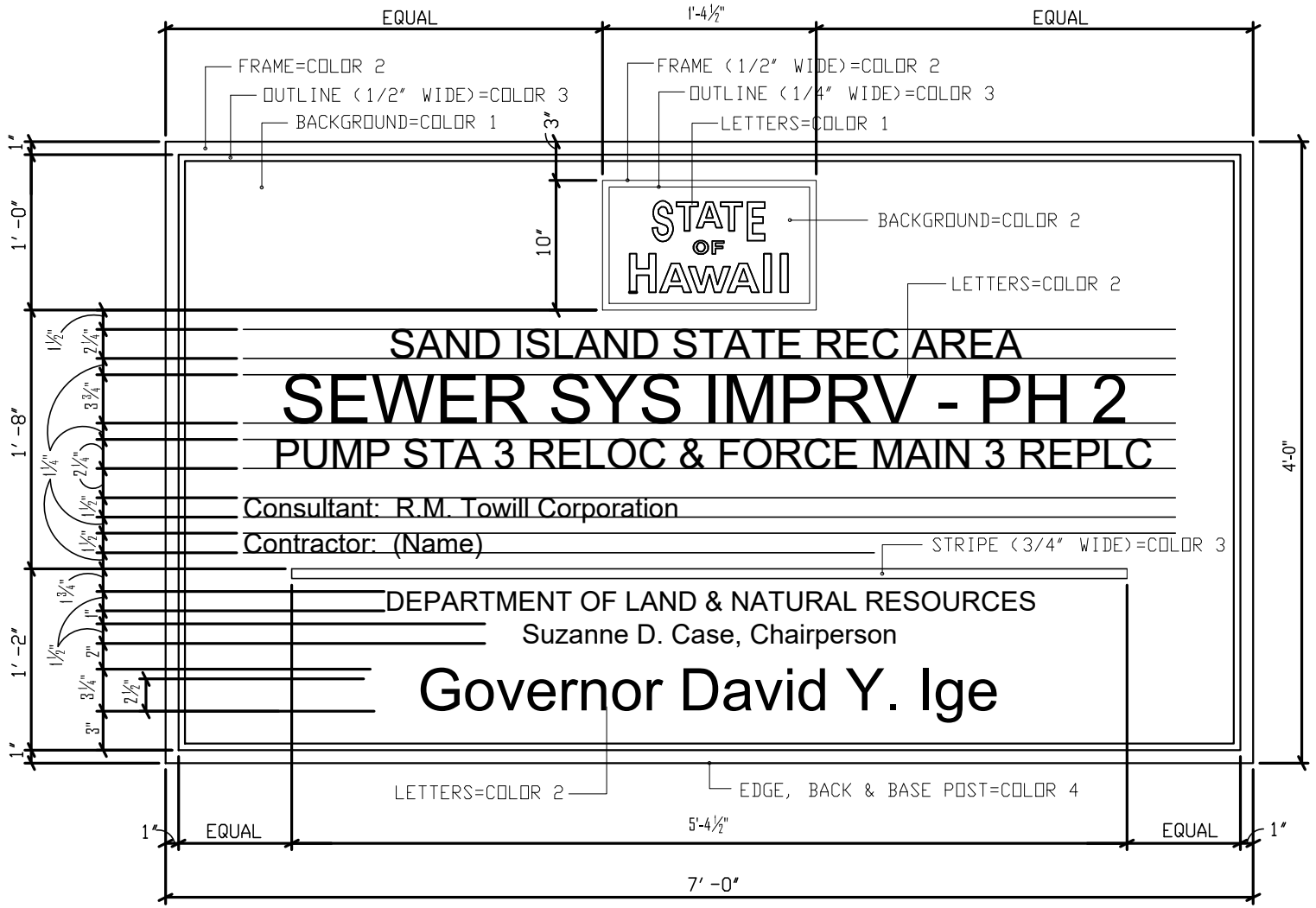
The Contractor shall be responsible for all costs to return everything back to its original condition or better. This includes, but is not limited to, restoring or replacing all materials, equipment, property, or improvements damaged or disturbed as a result of the Contractor's activities.

Protocol for Sewage Spills (Revised January 2002) follows on pages 01500-3 to 01500-6

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

Project Sign
01581-3



NOTE: Number of signs required 1

SECTION 02444 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish materials, labor and equipment necessary to install all chain link fences and gates to the limits shown and as detailed on the plan and as specified herein.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free.

B. Chain Link Fence Fabric shall be 2-inch mesh unless otherwise shown or specified, be galvanized and conform to ASTM A392, Class 1. The hot-dipped galvanized fabric shall contain not less than 1.2 ounces per sq. ft. of uncoated wire surface as determined by stripping test ASTM A90 and under the PREECE Test (ASTM A239), shall withstand 6 or more 1-minute dips before reaching the end point. All fabric shall be free from barbs, icicles or other hazardous projections resulting from galvanizing. The top and bottom of the fence fabric shall be knuckle finished.

C. Tie Wire shall be 12-gauge (9 gauge for gates) soft annealed galvanized steel wire.

D. Tension Bar shall be 1/4" thick by 3/4" wide mild steel bar for attachment of a fabric to a terminal post.

E. Stretcher Band shall be formed from steel bands at least 1/8" thick by 3/4" wide.

F. Tension Band and Brace Band shall be formed from steel bands at least 1/8” thick by 3/4" wide.

G. Tension Rod shall be a 3/8" diameter mild steel rod threaded at one end and hooked 180 degrees at the other.

H. Fittings (Note: Pressed steel fittings shall not be allowed):

1. Post Cap and Eye Top shall be of one-piece galvanized steel construction per ASTM 626 and shall attach securely onto their respective posts.

2. Coupling for top rails shall be outside sleeve type, at least 6 inches long and crimped at center.

3. Rail Ends shall be snug, one-piece fittings for top and brace rails with holes to receive 5/16" bolts for securing to rail end bands.

4. Double Rail End shall be similar to rail and except for an additional 1/2" hole to receive the hooked end of a tension rod.

I. Composition and Finish of Metal Parts: All metal parts and fittings, including tracks, gate hardware and frames, shall be of steel, malleable iron or wrought iron and shall be galvanized by the hot-dip process, after fabrication, in conformance with ASTM A153. The coating on all parts shall be continuous and smooth; that is, free from barbs, icicles or other projections. Bolts may be cadmium-plated in conformance with ASTM A165 instead.

J. Gate Hardware:

1. Hinges shall be heavy duty offset type permitting 180-degree swing using double clamping method of attachment and manufactured or forged malleable iron. All hinges shall be of appropriate size and capacity for the particular gate being supported and/or operated.

2. Unless otherwise shown or specified, padlocking provisions for walk gate shall be a fork latch assembly, and that for a drive gate shall be an industrial drop rod guide and latch assembly.

3. Padlock shall be 5-pin cylinder type with brass case and a 5/16" dia. hardened steel shackle. Padlocks shall be keyed differently but master keyed to the fence system. Two (2) master keys shall be provided.

K. Posts, Rails and Braces shall be of either standard weight, hot-dipped galvanized, welded and seamless steel pipes conforming to ASTM A120.

L. Tension Wire shall be of 7-gauge coiled spring or 6-gauge plain galvanized wire.

M. Concrete for post footings shall be Class 2500 as specified in Section CAST-IN-PLACE CONCRETE.

PART 3 - EXECUTION

3.1 INSTALLATION AND WORKMANSHIP

A. General

1. Metal fencing and gates shall be erected in strict conformance with the plans and these specifications. The gates and hardware shall provide intended freedom of operation. Posts shall be plumb and in line. Welding shall be done in accordance with latest AWS standards. However, no splicing of posts, rails or braces shall be accepted. Where changes in line occur with an angle of deflection of 30 degrees or more, the change point will be considered a corner and a corner post shall be installed thereat. End, corner, and gate posts for fences with 5-foot and wider fabric shall be braced to the nearest line post with horizontal braces and tension rods. The horizontal braces shall be spaced midway between top rail and ground and securely fastened to posts as shown on plans. Where fencing is placed along a curve with radius of 50 feet, or

less, horizontal braces (and tension rods) shall be installed between all posts in like manner. Pull posts, at maximum intervals of 300 feet, shall be braced and trusses in both directions as specified above.

2. Field Touch-Ups: Field welds shall be cleaned of flux and spatter and all damaged galvanizing removed, all hazardous projections ground off, properly prepared, and then heavily coated with self-curing inorganic zinc coating. Manufactured coatings shall be applied in strict accordance with manufacturer's printed specifications. Damage to existing painted surfaces shall be touched up.

B. Fence Posts, except as otherwise indicated or specified, shall be spaced not more than 10 feet apart. In curved fence sections having a radius of 50 feet or less, the posts shall be spaced not more than 6 feet apart. Line posts shall be set so that top of the eye tops shall be at the same height as the fence fabric.

C. Top Rails shall pass through and bear firmly on base of eye tops, form a continuous brace from end to end of each stretch of fence, and be securely fastened to terminal posts with rail ends and brace bands. Couplings for the top rails shall be installed at intervals of 24 feet maximum.

D. Chain Link Fabric shall be fastened on the side of the posts as designated and shall be mounted on the posts so that the bottom of the fabric will be no more above the finished grade than 2 inches. High points of the ground shall be excavated as necessary. The fabric shall be stretched taut and securely fastened to the posts. Ends of wire ties shall be bent back so as not to be a hazard. Between posts the top edge of the fabric shall be fastened to the top rail and the lower edge to the tension wire with tie wire of size and at spacing as called for on the plans. Tension wire shall be stretched tight and shall be installed in a straight line between posts. Tension bars extending the full height of the fence and tension bar bands shall be used for fastening fabric to end, corner, pull and gate posts. Bolted tension bar bands shall be placed at top and bottom of tension bars and spaced at 12-inch intervals. Fastenings to line posts shall be made with tie wire of size and at spacing as called for on the plans.

E. Gates shall be of size specified in plans. The corners of gate frames shall be fastened together and reinforced with malleable iron fittings or by welding as approved. Welds shall all be ground smooth. Where sizes permit, frames shall be galvanized after fabrication, otherwise all welds shall be finished as specified for touching up abrasions and field welds. All drive gate frames for fences 4 feet and higher and walk gate frames for 6-foot high fences shall be cross-trussed with tension rods welded to frame at hooked end. Fabric specified for the fence shall be attached to the sides of the gate frame with full-height tension bars and tension bar bands at top, bottom and 12 inches o.c. along tension bars with 9-gauge tie wires shall be placed along the top and bottom of the gate at corners and 6 inches o.c. in between. The gates shall be hung by at least two hinges. For the drive gates, latches of the crop rod type shall be provided and shall be of the full gate height, arranged to engage the gate catch. For walk gates, a forked latch may be provided. Catch for the drop rod shall be galvanized pipe and set in concrete. Gate hold-backs shall be positioned to secure and support the free end

of the gate in full open position and/or as shall be accessible from both sides of the gates.

F. Tack-weld the chain link fabric to the fence posts and top rails. Tack-weld to fence posts at mid-height. Tack-weld to top rails at 5-foot intervals.

3.2 FINAL CLEAN-UP

A. All exposed metal surfaces shall be clean and free of cement. All surplus earth resulting from metal fencing work that is not used in the grading work shall be cleaned up and disposed of off-site. All debris resulting from work of this section shall be removed from the site.

END OF SECTION

SECTION 02735 - DUCTILE IRON SEWER PIPE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope: This section shall supplement Section 20 of the STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. The Contractor shall furnish, lay, join, and test all ductile iron sewer pipe and appurtenant materials as indicated on the drawings and as herein specified.

B. Type: Ductile iron sewer pipe shall be Class 53 for flanged pipe (non-buried) unless otherwise indicated on the plans with ceramic epoxy interior lining as specified herein. All buried pipe shall be wrapped with polyethylene tape.

C. All pipes, fittings, and valves shall be manufactured in the USA.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. American National Standards Institute, Inc. (ANSI)

ANSI A21.50	Thickness Design of Ductile-Iron Pipe
ANSI A21.51	Ductile-Iron Pipe Centrifugally Cast in Metal or Sand Lined Molds for Water or Other Liquids

B. American Society for Testing and Materials (ASTM)

ASTM C 105	Polyethylene Encasement of Ductile-Iron Pipe Systems
ASTM C 110	Ductile Iron and Gray Iron Fittings, 3 in. through 48 in. for Water and Other Liquids.
ASTM C 150	Thickness Design of Ductile-Iron Pipe
ASTM C 151	Ductile Iron Pipe, Centrifugally Cast, for Water or Other Liquids
ASTM D 16	Terminology Relating to Paint, Varnish, Lacquer and related products

C. American Water Works Association (AWWA)

AWWA C105	Polyethylene Encasement for Gray and Ductile Cast-Iron Piping or Water and Other Liquids
AWWA C600	Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances

1.3 QUALITY ASSURANCE

Submit manufacturers' certificates of conformance or compliance for the materials which are specified to conform to publications referenced under PART 2 PRODUCTS.

All tests required by each applicable referenced publications shall have been performed, whether specified in that publication to be mandatory or otherwise. For tests which are not specified in the referenced publications to be performed at definite intervals during manufacture, the tests shall have been performed within 3 years of the date of submittal of certificates on the same type, class, grade, and size of material as is being provided for the project.

1.4 SUBMITTALS

Submittals shall comply with the requirements as specified in Section 01300, "Submittals."

PART 2 – PRODUCTS

2.1 DUCTILE IRON SEWER PIPE

All ductile iron sewer pipe shall be designed in accordance with ANSI A21.50 and shall be manufactured in accordance with the ANSI A21.51. Joints shall be push-on, mechanical joint, and flanged.

2.2 EXTERIOR COATING

The outside of pipe shall be coated with bituminous coating at the factory in accordance with ANSI A21.51 for ductile iron sewer pipe.

2.3 INTERIOR LINING

Interior lining for pressure and gravity ductile iron pipe, fittings and special castings shall be of a ceramic epoxy material. Coating material shall be suitable for sewer service.

A. Surface Preparation: All ductile iron piping shall be delivered to the application facility without any other type of lining on the interior surface. All surfaces to be lined shall be cleaned to a minimum near-white finish (SSPC-2-10) as applied to ductile iron pipe and fittings. All surfaces to be lined shall be completely free of moisture, dust, grease or any other deleterious substances, at the time the lining is applied.

B. Thickness: The lining thickness shall be 40 mils (0.040 inch) nominal. Thickness measurements using Type 1 magnetic thickness gauge shall be made in accordance with the SSPC-PA2 specifications as applied to ductile iron pipe and fittings. A letter certifying the thickness of the coating shall be provided by Applicator.

C. Lining Material: The material shall be an amine cured epoxy containing at least 20% by volume of ceramic quartz pigment. The material shall be PROTECTO 401, by U.S. Pipe or equal.

D. Application: The lining shall be applied by a competent firm with a successful history of applying lining to the interior of ductile iron pipe and fittings. The firm shall have at least 5 years of experience with the application of ceramic epoxy material. The firm shall submit written information on past projects and a letter from the liner manufacturer authorizing the firm to use their product. The letter shall state that the manufacturer will be held jointly responsible with the firm for any such defects.

E. Joints: Pipe joints shall be coated (10 mils) using a manufactured approved joint compound. The joint compound shall be applied by brush to ensure coverage. The joint compound shall also be used for touch-up or repair in accordance with the manufacturer=s recommendations.

F. Inspection: The interior lining of all pipe and fittings shall be tested for pinholes with a nondestructive 2,500 volt test. Any defects found shall be repaired prior to shipment.

Each pipe joint and fitting shall be marked with the date of application of the lining system along with its numerical sequence of application on that date and records maintained by the applicator of his work.

The pipe or fitting manufacturer must supply a certificate attesting to the fact that the applicator met the requirements of this specification.

G. Repairs: Repairs and touch-up shall be performed in accordance with the lining manufacturer=s recommended repair and touch-up procedures. All damage coating and field cut ends shall be repaired and sealed prior to installation using the joint compound. Contractor shall submit manufacturer=s procedures for review and approval.

PART 3 – EXECUTION

3.1 INSPECTION, HANDLING AND STORAGE

Pipe shall be inspected, handled, and stored in accordance with AWWA C600. Do not damage interior ceramic epoxy coating. Pipe with damaged coating shall be rejected. Approval of materials to be given only by the Engineer.

3.2 INSTALLING PIPE

No defective pipe shall be laid or placed in the trench, and any piece discovered to be defective after having been laid or placed shall be removed and replaced by a sound and satisfactory piece. Piping shall be installed in accordance with AWWA C600. Each pipe shall be cleared of all debris and dirt before being laid and shall be kept clean until accepted in the completed work. Pipe and fittings shall be laid accurately to the lines and grades indicated on the drawings or required.

Care shall be taken to ensure a good alignment both horizontally and vertically. Each pipe shall have a firm bearing along its entire length.

3.3 TEMPORARY PLUGS

At all times when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight plugs or by other approved means. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed.

3.4 POLYETHYLENE ENCASEMENT

The polyethylene shall be manufactured of virgin polyethylene material. It shall have a minimum thickness of 8 mils and be in tube form. The polyethylene wrap shall conform to AWWA Standard C105 and installed using Method A or B. All valves and fittings shall be double wrapped for a minimum polyethylene thickness of 16 mils.

3.5 PIPING SUPPORT

The Contractor shall furnish and install all supports necessary to hold the piping and appurtenances in a firm substantial manner at the lines and grades indicated on the drawings or specified.

3.6 LEAKAGE TEST

Prior to the leakage test, the piping shall be thoroughly cleaned of all dirt, dust, oil, grease and other foreign material. This work shall be done with care to avoid damage to linings and coatings. Leakage tests shall be performed as specified in the STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. The force main header, exposed, and underground piping shall be tested with water at 150 psi for a duration of 120 minutes.

END OF SECTION

SECTION 02900 - PLANTING GRASS

PART 1 - GENERAL

1.1 SUMMARY

Furnish all materials, labor and equipment required to accomplish the planting of grass as indicated on the drawings and specified herein.

1.2 STANDARD SPECIFICATIONS

The following specifications shall be made a part of this section:

“Standard Specifications for Public Works Construction," September 1986, Departments of Public Works County of Kauai, City and County of Honolulu, County of Maui, County of Hawaii of the State of Hawaii, hereinafter referred to as the "Standard Specifications."

PART 2 - PRODUCTS

2.1 MATERIALS

Materials for planting grass shall be in accordance with the following sections of the Standard Specifications as revised, except as amended on the drawings and/or in the specifications herewith:

Planting Trees, Shrubs, Ground Cover and Grass	Section 51

PART 3 - EXECUTION

3.1 LOCATION

Grass shall be installed on all soil surfaces exposed from trenching operations and demolition and/or abandonment of existing sewer utilities., except for force main installed in Phase 1 and cleared and grubbed area covered by gravel layer.

3.2 PLANTING

The Contractor shall have the option of planting grass by seeding, sprigging or hydromulching. Grass shall be planted in accordance with the sections of the Standard Specifications noted hereinbefore.

END OF SECTION

SECTION 03310 – CONTROLLED LOW STRENGTH MATERIAL (CLSM)

PART 1 - GENERAL

1.1 DESCRIPTION

This work shall consist of furnishing, placing and spreading controlled low strength material (CLSM) to fill in any voids encountered under the sidewalks and between the existing retaining wall and caissons, and anywhere else indicated on the drawings. The contractor shall be responsible for the CLSM mix design. This work shall also include installation of geotextile fabric where needed or as directed by the Officer-in-Charge to prevent the CLSM from flowing out of the voids.

1.2 SUBMITTALS

A. Mix design, manufacturer's certification that all materials meet the standards stated herein and that required factory tests have been successfully performed, list of specialized equipment to be used for mixing and placement, and mill certificates for all cement.

B. Manufacturer's certification of CLSM and include unconfined 28-day compressive strength test data for each mixture used. Test data shall be current, having been obtained within one year of proposed use.

C. Written proof of manufacturer's approval of applicator.

D. Lab tests on field samples for compressive strength and in place Unit Weight.

PART 2 - PRODUCTS

2.01 MATERIALS

CLSM shall include mixture of portland cement, aggregate, and water. Provide flowable CLSM with aggregate in suspension. Proportion CLSM to produce the following:

A. Uniform, flowable mixture that is self-leveling when placed.

B. 28-day compressive strength between 50 psi to 150 psi.

C. All materials shall conform to Section 39 - Portland Cement Concrete, Department of Public Works, City and County of Honolulu, Standard Specifications for Public Works Construction, September 1986. Aggregate shall stay in suspension in the CLSM to the extent required for proper flow.

PART 3 – EXECUTION

Place the CLSM to the designated fill line or as specified by the Engineer without vibration or other means of compaction. Provide sufficient mixing capacity to allow the CLSM to be placed without interruption.

Place the CLSM by chute, pumping, or other methods acceptable by the Engineer.

END OF SECTION

DIVISION 9 – FINISHES

SECTION 09800 - PROTECTIVE COATINGS

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies protective coatings of exterior, interior, submerged mechanical and electrical equipment, piping and structures, except as noted, and all new and existing work damaged by work under this project.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. American Society for Testing and Materials (ASTM)

1.	ASTM G8-96	Cathodic Disbonding of Pipeline Coatings
2.	ASTM G95-07	Cathodic Disbondment Test of Pipeline Coating (Attached Cell Method)
3.	ASTM G26	Xerion – Arc Light and Water Exposure for Non-Metals
4.	ASTM D6386	Standard Practice for Preparation of Galvanized Iron and Steel

B. Code of Federal Regulations (CFR)

1.	29 CFR 1910.1000	(2006) Air Contaminants
2.	29 CFR 1910.1001	Asbestos
3.	29 CFR 1910.1025	(2006) Lead
4.	29 CFR 1915.35	(2006) Painting

C. Federal Specifications (FS)

1.	FS TT-P-28	(Rev. G) Paint, Aluminum, Heat Resisting (1200 Degrees F)

D. Federal Standards (Fed-Std)

1.	FED-STD-313	(Rev. D) Material safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities.
2.	FED-STD-595	(Rev. B) Color Used in Government Procurement

E. Military Specifications (MIL)

1.	DOD-P-15328	(Rev. D) (Am.1) Primer (Wash), Pretreatment

		(Formula No. 117 for Metals) (Metric)
2.	MIL-P-24441	(Rev. C) (Supp. 1) Paint, Epoxy-Polyamide
3.	MIL-C-46168D	High solids aliphatic polyurethane, Type IV.

F. The Society for Protective Coatings (SSPC)

1.	SSPC PA 1	(2004) Shop, Field, and Maintenance Painting
2.	SSPC PA Guide 10	(2008) Guide to Safety and Health Requirements for Industrial Painting Projects
3.	SSPC Paint 20	(2002) Zinc-Rich Primers (Type I, "Inorganic" and Type II, "Organic")
4.	SSPC SP 1	(2004) Solvent Cleaning
5.	SSPC SP 2	(2004) Hand Tool Cleaning
6.	SSPC SP 3	(2004) Power Tool Cleaning
7.	SSPC SP 5	(2007) White Metal Blast Cleaning
8.	SSPC SP 6	(2007) Commercial Blast Cleaning
9.	SSPC SP 7	(2007) Brush-off. Blast Cleaning
10.	SSPC SP 10	(2007) Near-White Blast Cleaning
11.	SSPC SP 11	(2007) Power tool Cleaning to Bare Metal with a 1 Mil Profile
12.	SSPC SP 12	(2002) High and Ultrahigh Pressure Water Jetting
13.	SSPC SP 13	(2003) surface preparation of Concrete
14.	SSPC Guide 12	(2004) Guide for Illumination of Industrial Painting Project
15.	SSPC VIS 1	(2002) Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning

G. National Association Of Pipe Fabricators

1.	NAPF-500-03	Surface Preparation Standard

H. NACE International (NACE)

1.	NACE 6D-173	“A Manual for Painter Safety.”

2.	NACE 6G-164	"Surface Preparation Abrasives for Industrial maintenance Painting."
3.	NACE TPC2	Coating and Lining for Immersion Service: Chapter 1 Safety, Chapter 2 Surface preparation, Chapter 3 Curing, and Chapter 4 Inspection.
4.	NACE 6F-163	"Surface Preparation of Steel of Concrete Tank interiors."
5.	NACE RP0892-92	Standard Recommended Practice, Lining over Concrete in Immersion Service.
6.	NACE RP0288-88	Standard Recommended practice, Inspection of Linings on Steel and Concrete.
7.	NACE RP0188	Standard Recommended Practice, Discontinuity (Holiday) Testing of Protective Coatings.

1.3 SUBMITTALS

A. Submittals for the work shall be in accordance with applicable paragraph of Section 01330 and the following:

1. Submit manufacturer's literature describing products to be provided, giving manufacturer's name, product name, and product line number for each material.

2. Submit technical data sheets for each coating, giving descriptive data, curing times, mixing, thinning, and application requirements.

a. Provide material analysis, including vehicle type and percentage by weight and by volume of vehicle, resin and pigment.

3. Submit manufacturer's installation procedures which shall be basis for accepting or rejecting actual installation procedures.

4. Submit manufacturers' material safety data sheet for coatings, solvents, and other potentially hazardous material, as defined in FED-STD-313.

5. Submit asbestos-free, lead-free, zinc-chromate-free, strontium-chromate-free, cadmium-free, and mercury-free paint certificate.

B. Applicator's Qualifications

1. Applicator shall be trained in application techniques and procedures of coating materials and shall demonstrate a minimum of 5 years successful experience in such application.

C. Evidence of Acceptable Variation

1. If a product proposed for use does not conform to requirements of the referenced specification, submit for approval to the Engineer, evidence

that the proposed product is either equal to or better than the product specified. The submittal shall include the following:

a. Identification of the proposed substitute
b. Reason why the substitution is necessary
c. A comparative analysis of the specified product and the proposed substitute, including vehicular type and percentage by weight and by volume of vehicle resin and pigment.
d. The differences between the specified product and the proposed substitute
e. Other information necessary for an accurate comparison of the proposed substitute and the specified product.

D. Weatherometer Testing: Submit test report conforming to ASTM G26 prior to application.

E. Coating Condition Assessment Qualifications: Submit qualification and experience of the coating condition assessment personnel and company. Minimum qualifications for test personnel shall be 5 years. Inspection personnel shall be under the direct supervision of a Registered Professional Corrosion Engineer or a Corrosion Specialist certified by the National Association of Corrosion Engineers (NACE).

F. Coating Monitoring: Submit a report signed by a NACE certified, Corrosion Specialist, or equal, indicating whether the coating process was performed according to specifications, any problems encountered, and work performed, for the following coating characteristics:

1. Surface Preparation

2. Dry Film Thickness

3. Holiday Testing

4. Pull Test, Per ASTM 4541-02

G. Requirements: For each type of coating, or other product furnished submit a certificate from the manufacturer stating that the product conforms to requirements of the referenced specification.

H. Color Samples: Submit three (3) samples of each coating and color selected, showing bare, prepared surface and each successive coat minimum 8 x 10 inches. Identify product name and color number on each sample.

1.4 WARRANTY

A. The Contractor shall provide written warranty that the work performed under this section conforms to the contract requirements and is free of any defect of material or workmanship performed by the Contractor. Such warranty shall continue for a period of two (2) years from the project acceptance date during which period the Contractor shall remedy at his own expense any such failure to conform or any such defect.

B. The Contractor shall warrant a mildew free surface for a period of one year from the project acceptance date. Should mildew formation occur on surfaces painted under this project within the one year, the Contractor shall clean such surfaces at his own expense.

C. The State shall notify the Contractor in writing within a reasonable time after discovery of any failure or defect.

D. Should the Contractor fail to remedy any failure or defect described in Paragraph A. above within 10 working days after receipt of notice thereof, the State shall have the right to repair or otherwise remedy such failure or damage at the Contractor's expense.

1.5 QUALITY ASSURANCE

A. Unit Responsibility:
   1. The Contractor shall assign unit responsibility to a single manufacturer or items standard with compatibility and coordination.

B. Paint and coatings shall be the standard product of manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory service for at least 5 years prior to bid opening specializing in manufacture of high performance coatings with a minimum of 10 years experience.

C. In any case, the Engineer shall be sole and final judge of the quality of any proposed substitution to that of the specified type.

D. Where the Contractor proposes the employ airless spraying, the applicator(s) shall have completed an approved "Spray Applicator Certification Program" conducted by the Painting Industry of Hawaii.

1.6 REGULATORY REQUIREMENTS

In addition to requirements specified elsewhere for environmental protection, provide coating materials that confirm to the restrictions of the State Department of Health.

A. Lead Content: Do not use coatings having a lead content over 0.06 percent by weight of nonvolatile content.

B. Chromate Content: Do not use coatings containing zinc-chromate or strontium-chromate.

C. Asbestos Content: Materials shall not contain asbestos.

D. Mercury Content: Materials shall not contain mercury or mercury compounds.

E. Silica: Abrasive blast media shall not contain free crystalline silica.

F. Cadmium Content: Materials shall not contain cadmium.

G. Human Carcinogens: Materials shall not contain ACGIH 0100Doc and ACGIH 0100Doc confirmed human carcinogens (A1) or suspected human carcinogens (A2).

H. Conform to applicable codes and ordinances for flame, fuel, smoke, and volatile organic compound (VOC) ratings requirements for finishes at time of application.

1.7 DELIVERY AND STORAGE

All protective coatings shall be in sealed containers that legibly show the contract specification number, designation name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name and address of manufacturer. Pigmented paints shall be furnished in containers not larger than 5 gallons. Paints and thinners shall be stored in accordance with the manufacturer's written directions, and as a minimum, stored off the ground, under cover, with sufficient ventilation to prevent the buildup of flammable vapors, and at temperatures between 40 to 95 degrees F. Do not store paint, polyurethane, varnish, or wood stain products with materials that have a high capacity to adsorb VOC emissions. Do not store paint, polyurethane, varnish, or wood stain products in occupied spaces.

1.8 SAFETY METHODS

Apply coating materials using safety methods and equipment in accordance with the following:

A. Safety methods used During Coating Application: Comply with the requirements of SSPC Guide 3 and NACE 6D-173.

B. Toxic Materials: To protect personnel from overexposure to toxic materials, conform to the most stringent guidance of:

1. Use impermeable gloves, chemical goggles or faceshield, and other recommended protective clothing and equipment to avoid exposure of skin, eyes, and respiratory system. Conduct work in a manner to minimize exposure of building occupants and the general public.

2. The appropriate OSHA standard in 29 CFR 1910.1025 for surface preparation on painted surfaces containing lead, zinc-chromate, strontium-chromate, asbestos, or other toxic ingredients.

3. Work shall comply with applicable Federal, State, and local laws and regulations, and with the ACCIDENT PREVENTION PLAN, including the Activity Hazard analysis as specified in Section 01 35 29 SAFETY AND OCCUPATIONAL; HEALTH REQUIREMENTS in Appendix A of EM 385-1-1.

4. 29 CFR 1910.1000.

5. Threshold Limit Values (R) of the American Conference of Governmental industrial Hygienists (ACGIH 0100Doc).

6. The applicable manufacturer's Material Safety Data Sheets (MSDS).

1.9 ENVIRONMENTAL CONDITIONS

A. Exterior Coatings: During painting, and for a period of at least 8 hours after the paint has been applied, the temperature of the surfaces to be painted, the painted surfaces, and the atmosphere in contact shall be maintained at or above 10 degrees F above the dew point. Do not apply coating to surfaces during foggy or rainy weather, or under the following surface temperature conditions:

1. Less than 10 degrees F above the dew point;

2. During damp weather, when the temperature of the surface to be coated is within 10 degrees F of the dew point, the surfaces shall be heated to prevent moisture condensation there on. Bare metal surfaces, except those which may be warped by heat, may be dehydrated by flame-heating devices immediately prior to paint application.

3. Relative humidity shall be no higher than 85 percent.

4. For exterior spray application, wind velocity shall be less than 15 mph (25 kph).

5. Atmosphere shall be relatively free of airborne dust.

B. Interior Coatings: Apply coatings when surfaces to be painted are dry and the following surface temperatures can be maintained:

1. Between 65 and 95 degrees F during the application of enamels and varnishes;

2. Between 50 and 95 degrees F during the application of other coatings.

1.10 COLOR SELECTION

Colors of finish coats shall be as indicated or specified in Appendix A. Manufacturers' names and color identification are used for the purpose of color identification only. Named products are acceptable for use only if they conform to specified requirements. Products of other manufacturers are acceptable if the approximate colors indicate and the product conforms to specified requirements.

Tint each coat progressively darker to enable confirmation of the number of coats.

1.11 LOCATION AND SURFACE TYPE TO BE PAINTED

A. Painting Included: Where a space or surface is indicated to be painted, include the following unless indicated otherwise.

1. All new equipment, piping, conduit and ductwork; and existing equipment, piping, conduit and ductwork damaged during performance of work.

2. Surfaces behind portable objects and surface mounted articles readily detachable by removal of fasteners, such as screws and bolts.

3. New factory finished surfaces that require identification or color coding and factory finished surfaces that are damaged during performance of the

work.

4. Exposed and buried piping, conduit, and ductwork: Bolt and bolt holes in flanges (such as those used with the couplings or wafer type valves where holes and bolts as finally installed will be exposed to weather or moisture) shall be coated prior to assembly to prevent rusting of the unprotected metal.

5. Existing coated surfaces that are damaged during performance of the work.

6. Includes new surfaces, existing uncoated surfaces and existing coated surfaces of the buildings and appurtenances as indicated and existing coated surfaces made bare by cleaning operations. Where a space or surface is indicated to be painted, include the following items, unless indicated otherwise.

   a. Exposed columns, girders, beams, joists, and metal deck; and
   b. Other contiguous surfaces.

7. Repaint or retouch shop-coated metal work, after delivery and installation, with specified paint to maintain the integrity of the film.

8. Supports, hangers, air grilles, and registers: hangers and supports shall be coated, except for the final coat, prior to installation. Except for those to be filled with grout, the underside of each equipment base and support shall be coated with at least two coats of primer specified prior to setting the equipment in place.

9. Miscellaneous metalwork and insulation coverings.

10. All sunlight exposed new PVC and FRP equipment, structures, piping, conduits, and supports, except FRP grating and overlay.

11. All PVC and FRP piping, ductwork and electrical conduits.

12. New concrete surfaces in contact with wastewater liquid and gases as specified in Section 09820, unless indicated otherwise.

13. Modified existing concrete surfaces in contact with wastewater liquid and gases as specified in Section 09811, unless indicated otherwise.

14. Interior and exterior concrete and masonry surfaces as specified in Section 09900, unless indicated otherwise.

B. Painting Excluded: Do not coat the following unless indicated otherwise.

1. Surfaces concealed and made inaccessible by panelboards, fixed ductwork, machinery, and equipment fixed in place.

2. Surfaces in concealed spaces. Concealed spaces are defined as enclosed spaces above suspended ceilings, furred spaces, attic spaces, crawl spaces, elevator shafts and chases.

3. Steel to be embedded in concrete.

4. Hardware, fittings, and other factory finished items.

5. Anodized aluminum.

6. Stainless steel grade 316.

7. FRP grating and overlay.

8. New zinc-coated, aluminum, and copper surfaces under insulation.

9. New aluminum jacket on piping.

10. New Interior ferrous piping under insulation.

1.12 CODES

A. Codes:
The Contractor shall comply with the State OSHL (Occupational Safety and Health Law) and all pollution control regulations of the State Department of Health.

B. Protection:

1. Persons:

a. The Contractor shall take all necessary precautions to protect public pedestrians, including tenants from injury.
b. The Contractor shall provide, exert and maintain safety barricades around scaffolds, hoists, and wherever Contractor's operations create hazardous conditions in order to properly protect the public tenants

2. Completed Work: The Contractor shall provide all necessary protection for wet paint surfaces.

3. Protective Covering and Enclosures: The Contractor shall provide and install protective covering over furniture, equipment, floor, and other areas that are not scheduled for treatment. Protective covering shall be clean sanitary drop cloth or plastic sheets. Paint applied to surfaces not scheduled for treatment shall be completely removed and surfaces shall be returned to their original condition. Where paint application will be performed by use of airless spraying, the Contractor shall ensure that protective enclosures are erected to prevent the escape of overspray from work area.

4. Safeguarding of Property: The Contractor shall take whatever steps may be necessary to safeguard his work and also the property of the State and other individuals in the vicinity of his work area during the execution of this Contract. He shall be responsible for and make good on any and all damages and for losses to work or property caused by his or his employee's negligence. Where the damaged property cannot be cleaned and restored to its original condition (i.e. prior to being damaged) it shall

be replaced with a new product of equal quality. No proration or use of "used" products will be permitted.

a. The Contractor shall assume that cars will not be temporarily relocated from parking areas during spray painting work.

b. Paint overspray shall not carry more than 5 l.f. beyond the building eave line nor within 10 l.f. of pedestrians or property and surfaces not scheduled to be painted. Spray painting shall immediately cease when overspray carries beyond these specified limits and will not continue until overspray and damages caused by the overspray have been corrected.

c. The Contractor shall be assessed $300.00 or the insurance claim, whichever is higher, for each incidence of property or personal damage caused by overspray until such time that a satisfactory settlement has been agreed upon by the damaged party and corrective action has been completed. All corrective action shall be settled within 24 hours from the time the damage is discovered. Should the Contractor fail to take corrective action in a timely and expeditious manner, the Engineer shall contact the Contractor's Insurance company to seek resolution on the matter.

5. Fire Safety: The Contractor shall direct his employees not to smoke in the vicinity and exercise precautions against fire at all times. Waste rags, plastic (polyester sheets), empty cans, etc. shall be removed from the site at the end of each day.

C. Storage Area for Materials:

1. No paint material, empty cans, paint brushes, and rollers may be stored in the building(s). They shall be stored in separate storage facilities away from the building(s).

2. The Contractor may furnish a job site storage facility. Such facility shall comply with the requirements of the local Fire Department. The storage area shall be kept clean and the facility shall be locked when not in use or when no visual supervision is possible.

D. Sequence of Operations:

The sequence of operations shall divide the surfaces into work areas and present a schedule for:

1. Surface preparation and spot prime.

2. Prime coat.

3. First finish coat.

4. Second finish coat.

PART 2 - PRODUCTS

2.1 MATERIALS

Conform to the specifications and standards referenced in PART 3. Acceptable painting

manufacturer shall be Tnemec, Carboline, PPG Protective & Marine Coatings, or approved equal.

A. Fungus and Algae Control: A standard commercial mildewcide shall be added to all paints and finishes during the manufacturing process for the particular paint. The fungicide shall be incorporated into the paint in a quantity so that the paint meets the fungus resistance test specified for exterior and interior paints, respectively.

B. Inorganic and organic zinc coatings shall conform to SSPC Paint 20. Inorganic and organic zinc coatings shall be self-curing.

C. High build epoxy shall have a minimum volume solids of 60 percent and a volatile organic content (VOC) of no more than 2.5 pounds per gallon (unthinned) as supplied. The coating shall be self priming over blasted steel and certified by its manufacturer for immersion service over steel or concrete for wastewater treatment service. Application over concrete require an epoxy surface as recommended by the coatings manufacturer and these specifications. Application conditions of the coating shall conform to manufacturer's recommendations. Epoxy coating shall be provided from the same manufacturer as the inorganic zinc coating.

D. High performance, aliphatic acrylic polyurethane (AAP) coatings shall provided in accordance with the manufacturer's recommendations. Maximum VOC allowable shall be 1.9 pounds per gallon (un-thinned). Application conditions of the coating shall conform to manufacturer's recommendations. The coating shall be of industrial grade and of the same manufacturer as the high build epoxy coating and the inorganic zinc coating.

E. Polyamine epoxy shall have a versatile, thick film, 100% solids and abrasion resistant coating specifically designed for wastewater immersion and fume environments. It shall provide low permeation to H_2S gas, protect against microbiologically induced corrosion and provide chemical resistance to severe wastewater environments.

F. Enamel coatings shall be the alkyd-resin base type, semi-gloss, with a carbon black pigment.

G. Silicone aluminum coatings shall conform to FS TT-P-28. Silicone aluminum shall have a minimum temperature resistance of 1000 degrees F for continuous service and a resistance of 1200 degrees F of excursion temperatures. Primer shall have temperature resistance of at least 750 degrees F of continuous exposure.

PART 3 - EXECUTION

3.1 PROTECTION OF AREAS AND SPACES

Prior to surface preparation and coating applications, remove, mask, or otherwise protect, hardware, hardware accessories, machined surfaces, radiator covers, plates, lighting fixtures, public and private property, and other such items not to be coated that are in contact with surfaces to be coated. Contractor shall be responsible for any damage to State or privately owned vehicles. Extreme caution should be taken to minimize any

occurrences of over spray. Items which have been coated shall not be handled, worked on, or otherwise disturbed, until the paint is completely dry and hard. Following completion of painting, workmen skilled in the trades involved shall reinstall removed items. Restore surfaces contaminated by coating materials, to original condition and repair damaged items.

A. Surface Condition: Surfaces shall be clean, dry to the touch, and free from frost and moisture; remove grease, oil, wax, lacquer, paint, defective backstop, or other foreign matter that would prevent or impair adhesion. Where adequate grooves have not been provided, clean out to a depth of ½ inch and grind to a minimum width of ¼ inch without damage to adjoining work. Grinding shall not be required to metal surfaces.

B. Backstops: In joints more than ½ inch deep install glass fiber roving or neoprene, butyl, polyurethane, or polyethylene foams free of oil or other staining elements as recommended by sealant manufacturer. Backstop material shall be compatible with sealant. Do not use oakum and other types of absorptive materials as backstops.

C. Primer and Bond Breaker: Install the type recommended by the sealant manufacturer.

D. Ambient Temperature: Between 38 degrees F and 95 degrees F when applying sealant.

E. Exterior Sealant: For joints in vertical surfaces, provide ASTM C920, Type S or M, Grade NS, Class 25, use NT. For joints in horizontal surfaces, provide ASTM C920, Type S or M, Grade P, Class 25, Use T. Color(s) shall be selected by the Engineer. Apply the sealant in accordance with the manufacturer's printed instructions. Force sealant into joints with sufficient pressure to fill the joints solidly. Sealant shall be uniformly smooth and free of wrinkles.

F. Cleaning: Immediately remove fresh sealant from adjacent areas using a solvent recommended by the sealant manufacturer. Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean condition. Allow sealant time to cure, in accordance with manufacturer's recommendations, prior to coating.

3.2 SURFACE PREPARATION

Remove dirt, splinters, loose particles, grease, oil, disintegrated coatings, and other substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. Oil and grease shall be removed before mechanical cleaning is started. Where mechanical cleaning is accomplished by blast cleaning, the abrasive used shall be washed, graded and free of contaminants which might interfere with the adhesion of the coating. Contractor shall demonstrate that the shop coating or existing coating is compatible with the field coating by applying small test patches on specified paints over shop and existing coatings. If the shop or existing coating is not compatible with the field coat (it lifts or ripples), the shop or existing coating shall be reprimed with a primer compatible with both the shop or existing coating and the field applied paint. The primer shall be as recommended by the manufacturer of the field applied paints.

A. Existing Coating Surfaces with No Defects: Before application of coatings, perform the following on surfaces covered by soundly-adhered coatings, defined as those which cannot be removed with a putty knife:

1. Test existing finishes for lead before sanding, scraping, or removing. If lead is present, refer to paragraph Toxic Materials.

2. Wipe previously painted surfaces to receive solvent-based coatings clean with a clean, dry cloth saturated with mineral spirits, ASTM D235. Allow surface to dry. Wiping shall immediately precede the application of the first coat of any coating, unless specified otherwise.

3. Sand existing enamel and other glossy surfaces to remove gloss. Brush, and wipe clean with a dry cloth.

4. The requirements specified are minimum. Comply also with the application instructions of the paint manufacturer.

5. Previously painted surfaces specified to be repainted or damaged during construction shall be thoroughly cleaned of all grease, dirt, dust or other foreign matter.

6. Blistering, cracking, flaking and peeling or other deteriorated coatings shall be removed.

7. Chalk shall be removed so that when tested in accordance with ASTM D4214, the chalk resistance rating is no less than 8.

8. Slick surfaces shall be roughened. Damaged areas such as, but not limited to, nail holes, cracks, chips, and spalls shall be repaired with suitable material to match adjacent undamaged areas.

9. Edges of chipped paint shall be feather edged and sanded smooth.

10. Rusty metal surfaces shall be cleaned as per SSPC requirements. Solvent, mechanical, or chemical cleaning methods shall be used to provide surfaces suitable for painting.

11. New, proposed coatings shall be compatible with existing coatings.

B. Existing Coated Surfaces with Minor Defects: Sand, spackle, and treat minor defects to render them smooth. Minor defects are defined as scratches, nicks, cracks, gouges, spalls, alligatoring, chalking, and irregularities due to partial peeling of previous coatings. Remove chalking by sanding or blasting so that when tested in accordance with ASTM D 4214, the chalk rating is not less than 8.

C. Removal of Existing Coatings: Remove existing coatings from the following surfaces:

1. Surfaces containing large areas of minor defects;

2. Surfaces containing more than 20 percent peeling area; and

3. Surfaces designated by the Engineer, such as surfaces where rust shows through existing coatings.

3.3 PREPARATION OF METAL SURFACES

A. Existing and New Ferrous Surfaces (Except Surfaces with Lead-Containing Paint):

1. Shop-Coated Surfaces and small Areas that Contain Rust, Mill Scale and Other Foreign Substances: Solvent clean or detergent wash in accordance with SSPC SP 1 to remove oil and grease. Where shop coat is missing or damaged, clean according to SSPC SP 2, SSPC SP 3, or SSPC SP 6 or SSPC SP10. Brush-off blast remaining surface in accordance with SSPC SP 7; Water jetting to SSPC SP 12 WJ-4 may be used to remove loose coating and other loose materials. Use inhibitor as recommended by coating manufacture to prevent premature rusting. Shop coated ferrous surfaces shall be protected from corrosion by treating and touching up corroded areas immediately upon detection.

2. Surfaces with More Than 20 percent Rust, Mill Scale, and Other Foreign Substances: Clean entire surface in accordance with SSPC SP 6 / SSPC SP 12 WJ-3, SSPC SP; 10 / SSPC SP 12 WJ-2.

3. Non-Immersed and Exterior Exposed Steel Surfaces: Prepare in accordance with SSPC SP 6/NACE No. 3.

4. Submerged Steel: All steel to be used in immersion service shall be prepared in accordance with SSPC SP 10/NACE No. 2, to achieve a surface profile of 1.5 mils anchor pattern.

5. Immersed/Hydrogen Sulfide Environments: Prepare in accordance with SSPC SP 5 / NACE No. 1, to achieve a surface profile of 3.0 mils anchor profile.

6. Note Metal Surfaces: Metal surfaces shall be prepared in accordance with SSPC SP 10.

B. Final Ferrous Surface Condition: Cleaned surface shall be similar to photographs in SSPC VIS 1 as follows:

Degree of Cleaning	Adherent Mill Scale	Rusting Mill Scale	Rusted	Pitted & Rusted
Brush-of Blast Cleaning, SSPC SP 7	(1)	B Sp 7	C Sp 7	D Sp 7
Commercial Blast Cleaning, SSPC SP 6	(1)	B Sp 6	C Sp 6	D Sp 6
Near-White Blast Cleaning, SSPC SP 10	A Sp 10	B Sp 10	C Sp 10	D Sp 10
White Metal Blast Cleaning, SSPC SP 5	A Sp 5	B Sp 5	C Sp 5	D Sp 5

Note: (1) No photograph is available or recommended for comparison.

For tool cleaned surfaces, the requirements are stated in SSPC SP 2 and SSPC SP 3. As a visual reference, cleaned surfaces shall be similar to photographs in SSPC VIS 3.

For waterjet cleaned surfaces, the requirements are stated in SSPC SP 12.l As a visual reference, cleaned surfaces shall be similar to photographs in SSPC VIS 4.

C. Galvanized Surfaces

1. New or Existing Galvanized Surfaces with Only Dirt and Zinc Oxidation Products: Clean with solvent, steam, or non-alkaline detergent solution in accordance with SSPC SP 1. If the galvanized metal has been passivated or stabilized, the coating shall be completely removed by brush-off abrasive blast. New galvanized steel to be coated shall not be "passivated" or "stabilized." If the absence of hexavalent stain inhibitors is not documented, test as described in ASTM D 2092, Appendix X2, and remove by one of the methods described therein.

2. Galvanized with Slight Coating Deterioration or with Little or No Rusting: Water jetting to SSPC 12 WJ3 to remove loose coating from surfaces with less than 20 percent coating deterioration and no blistering, peeling, or cracking. Use inhibitor as recommended by the coating manufacturer to prevent rusting.

3. Immersed Galvanized Surfaces: Abrasive brush blast clean SP7, uniformly etching the galvanized or aluminum surface without damaging the surface.

4. Galvanized with Severe Deteriorated Coating or Severe Rusting: Water jet to SSPC SP 12 WJ3 degree of cleanliness. Spot abrasive blast rusted areas as described for steel in (SSPC SP 6) and water jet to (SSPC SP 12) WJ3 to remove existing coating. The depth shall be no greater than 1.5 mils.

D. Aluminum, Aluminum Alloy, Lead Copper, and Other Non-Ferrous Surfaces

1. Surface Cleaning: Solvent clean in accordance with SSPC SP 1 and wash with a mild detergent to remove dirt and water soluble contaminates. Abrasive blast all metal surfaces in accordance with SSPC SP 10.

2. Pretreatment: Apply DOD-P-15328 as a pretreatment (0.3-0.5 mil DFT).

3. Terne-Coated Metal Surfaces: Solvent clean surfaces with mineral spirits, ASTM D235. Wipe dry with clean, dry cloths.

4. Existing Surfaces with a Bituminous or Mastic-Type Coating: Remove chalk, mildew, and other loose material by washing with a solution of ½ cup trisodium phosphate, ¼ cup household detergent, one quart 5 percent sodium hypochlorite solution and 3 quarts of warm water.

3.4 PREPARATION OF PLASTIC AND FRP SURFACES

Remove all dirt, dust, grease, oil or other materials which would be detrimental to proper bond using water and a nonabrasive detergent suitable for use on PVC and FRP surfaces. PVC and FRP piping shall be sanded with heavy grit sandpaper to remove all sheen and provide a roughened surface. Surfaces shall be thoroughly dried before application of coatings.

3.5 PREPARATION FOR CONCRETE AND CEMENTITIOUS SURFACE

A. Concrete and Masonry

1. Curing: Concrete, stucco and masonry surfaces shall be allowed to cure at least 30 calendar days before painting, except concrete slab on grade, which shall be allowed to cure 90 calendar days before painting.

2. Surface Cleaning: Remove the following deleterious substances.

   a. Dirt, Chalking, Grease and Oil: Wash new and existing uncoated surfaces with a solution composed of 2 cup trisodium phosphate, 1/4 cup household detergent, and 4 quarts of warm water. Then rinse thoroughly with fresh water. Wash existing coated surfaces with a suitable detergent and rinse thoroughly. For large areas, water blasting may be used.
   b. Fungus and Mold: Wash new, existing coated, and existing uncoated surfaces with a solution composed of 2 cup trisodium phosphate, 1/4 cup household detergent, 1 quart 5 percent sodium hypochlorite solution and 3 quarts of warm water. Rinse thoroughly with fresh water.
   c. Glaze and Loose Particles: Remove by wire brushing.
   d. Efflorescence: Remove by scraping or wire brushing followed by washing with a 5 to 10 percent by weight aqueous solution of hydrochloric (muriatic) acid. Do not allow acid to remain on the surface for more than five minutes before rinsing with fresh water. Do not acid clean more than 4 square feet of surface, per workman, at one time.

3. New concrete surfaces shall be allowed to age for at least 28 days and allowed to dry to the moisture content recommended by the coating manufacturer.

4. Where specified to be painted, new and existing concrete surfaces in contact with wastewater liquid and gases shall be sandblasted to provide a uniform, "sandpaper" like finish. Surfaces shall be free of grease, oil, water and other contaminants. Active water leaks or seepage from existing concrete or masonry surfaces shall be sealed in accordance with paragraph 2.01.L.

5. Cosmetic Repair of Minor Defects: Repair or fill mortar joints and minor defects, including but not limited to spalls, in accordance with manufacturer’s recommendations and prior to coating applications.

6. Allowable Moisture Content: Latex coatings may be applied to damp

surfaces, but not to surfaces with droplets of water. Do not apply epoxies to damp vertical surfaces as determined by ASTM D4263 or horizontal surfaces that exceed 3 lbs of moisture per 1000 square feet in 24 hours as determined by ASTM F1869. In all cases follow manufacturers recommendations. Allow surfaces to cure a minimum of 30 calendar days before painting.

3.6 APPLICATION

A. Coating Application: Apply coating materials in accordance with SSPC PA 1. SSPC PA 1 methods are applicable to all substrates, except as modified herein. Thoroughly work coating materials into joints, crevices, and open spaces. Touch up damaged coatings before applying subsequent coats. Interior areas shall be broom clean and dust free before and during the application of coating material. Spray areas made inaccessible to brushing by items such as ducts and other equipment. Painting of equipment and piping systems shall be done prior to installation of insulation.

1. Drying Time: Allow time between coats, as recommended by the coating manufacturer, to permit thorough drying but not to present topcoat adhesion problems. Provide each coat in specified condition to receive the next coat.

2. Primers, and Intermediate Coats: Do not allow primers or intermediate coats to dry more than 30 calendar days, or longer than recommended by the manufacture, before applying subsequent coats. Follow manufacturer's recommendations for surface preparation if primers or intermediate coats are allowed to dry longer than recommended by manufacturer's of subsequent coatings. Each coat shall cover the surface of the preceding coat or surface completely. When two or more coats are required, alternate coats shall contain sufficient compatible color additive to act as indicator of coverage, or the alternate coats shall be of contrasting colors. Color additives shall not contain any lead, or any lead compound which may be destroyed or affected by hydrogen sulfide or any other corrosive gas.

3. Finished Surfaces: Provide finished surfaces free from runs, drops, ridges, waves, laps, brush marks, and variations in colors.

4. Paint, when applied, shall be approximately the same temperature as that of the surface on which it is applied. Each coat of paint shall be applied event and sharply cut to line. Care shall be exercised to avoid overspraying or spattering paint on surfaces not to be coated. Glass, hardware, floors, roofs, and other adjacent areas and installations shall be protected by taping, drop cloths, or other suitable measures.

5. Paint, when applied, shall provide a satisfactory film and smooth even surface, and glossy undercoats shall be lightly sanded to provide a surface suitable for the proper application and adhesion of subsequent coats. Paints shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings consisting of two or more components shall be mixed in accordance with the manufacturer's instructions.

6. Electrical, instrumentation, and mechanical equipment, on which the manufacturer's coating is acceptable, shall be touch-up primed and painted with two coats of the specified coating system to match the color scheduled. This does not apply to electrical and instrumentation equipment specified in other sections.

7. Paint shall not be applied to a surface until it has been prepared as specified. The primer or first coat shall be applied by brush to ferrous surfaces which are not blast-cleaned. All coats for blast-cleaned ferrous surfaces and subsequent coats for nonblast-cleaned ferrous surfaces may be either brush or spray applied. After the prime coat is dry, suction spots shall be touched up before succeeding coats are applied. Unless otherwise specified, coats for concrete and masonry shall be brushed or rolled.

8. Thermosetting Paints: Topcoats over thermosetting paints (epoxies and urethanes) should be applied within the overcoating window recommended by the manufacturer.

9. Floors For nonslip surfacing on level floors, as the intermediate coat is applied, cover wet surface completely with almandite garnet, Grit No. 36, with maximum passing U.S. Standard Sieve No. 40 less than 0.5 percent. When the coating is dry, use a soft bristle broom to sweep up excess grit, which may be reused, and vacuum up remaining residue before application of the topcoat. For nonslip surfacing on ramps, provide MPI 77 with non-skid additive, applied by roller in accordance with manufacturer's instructions.

B. Equipment: Apply coatings with approved brushes, approved rollers, or approved spray equipment, unless specified otherwise. The Contractor's equipment shall be designed for application of the materials specified. Compressors shall have suitable traps and filters to remove water and oils from the air. Spray equipment shall be equipped with mechanical agitators, pressure gages, and pressure regulators, and spray nozzles of the proper sizes.

C. Mixing and Thinning of Paints: Reduce paints to proper consistency by adding fresh paint, except when thinning is mandatory to suit surface, temperature, weather conditions, application methods, or for the type of paint being used. Obtain written permission from the Engineer to use thinners. The written permission shall include quantities and types of thinners to use.

When thinning is allowed, paints shall be thinned immediately prior to application with not more than 1 pint of suitable thinner per gallon. The use of thinner shall not relieve the Contractor from obtaining complete hiding, full film thickness, or required gloss. Thinning shall not cause the paint to exceed limits on volatile organic compounds. Paints of different manufacturers shall not be mixed.

D. Two-Component Systems: Two-component systems shall be mixed in accordance with manufacturer's instructions. Any thinning of the first coat to ensure proper penetration and sealing shall be as recommended by the manufacturer for each type of substrate.

E. Coating Systems

1. Systems by Substrates: Apply coatings that conform to the respective specifications listed in the following Tables:

   Table I Exterior Metal Surfaces

   Table II Interior Metal Surfaces
   Interior shall be defined as being completely enclosed by four walls, a ceiling, and a floor with door access. Exterior shall be defined as having one or more, open or partially open, wall or ceiling. Exterior shall also be defined as being exposed to the weather, or in contact with wastewater liquid and gases.

   Table III Mechanical & Electrical Systems Surfaces: Interior and Exterior

2. Minimum Dry Film Thickness (DFT): Apply paints, primers, varnishes, enamels, undercoats, and other coatings to a minimum dry film thickness of 1.5 mil each coat unless specified otherwise in the Tables. Coating Thickness where specified, refers to the minimum dry film thickness. The surface area covered per gallon of paint for various types of surfaces shall not exceed those recommended by the manufacturer. The first coat on metal surfaces refers to the first full paint coat and not to conditioning of other pretreatment applications. Coatings shall be applied to the thickness specified, and in accordance with these specifications. Unless otherwise specified, no less than two coats shall be applied. In testing for continuity of coating about welds, projections (such as bolts and nuts), and crevices, the Engineer will determine the minimum conductivity for smooth areas of like coating where the dry mil thickness has been accepted. This conductivity shall then be taken as the minimum required for these rough or irregular areas. Pinholes and holidays shall be repainted to the required coverage.

3. Coatings for Surfaces Not Specified Otherwise: Coat surfaces which have not been specified, the same as surfaces having similar conditions of exposure.

4. Existing Surfaces Damaged During Performance of the Work, Including New Patches In Existing Surfaces: Coat surfaces with the following:

   a. One coat of primer.
   b. One coat of undercoat or intermediate coat
   c. One top coat to match adjacent surfaces.

5. Existing Coated Surfaces to be Painted: Apply coatings conforming to the respective specifications listed in the Tables herein, except that pretreatments, sealers, and fillers need not be provided on surfaces where existing coatings are soundly adhered and in good condition. Do not omit undercoats or primers.

3.7 COATING SYSTEMS FOR METAL

A. Primer: Apply specified ferrous metal primer on the same day that surface is cleaned. If flash rusting occurs, reclean the surface prior to application of primer. Except as otherwise specified, prime coats may be shop or field applied.

1. Inaccessible Surfaces: Prior to erection, use two coats of the specified primer on metal surfaces that will be inaccessible after erection.

2. Shop-primed Surfaces: Shop applied epoxy primer shall be compatible with the specified coating system and shall be applied at the minimum dry film thickness recommended by the manufacturer. Product data sheets identifying the shop primer used shall be provided to the on-site finish coat applicator. Damaged and poorly applied shop coatings that do not meet the requirements of this section shall be removed and surfaces recoated. Touch up exposed substrates of satisfactory primer coatings to protect from rusting prior to applying field coatings.

3. Surface Previously Coated with Epoxy or Urethane: Recoat following manufacturer's direction.

4. Pipes and Tubing: The semitransparent film applied to pipes and tubing at the mill is not to be considered a shop coat. Apply specified ferrous metal primer prior to application of subsequent coats.

5. Exposed Nails, Screws, Fasteners, and Miscellaneous Ferrous Surfaces. On surfaces to be coated with water thinned coatings, spot prime exposed nails and other ferrous metal with HB epoxy.

B. Apply coatings of Tables I, II, and III. "DFT" means dry film thickness in mils.

3.8 INSPECTION AND ACCEPTANCE

A. Dry Film Thickness: Verify mil thickness by use of a suitable wet film gauge. Use a Tooke or other dry film gauge to test for total dry film thickness.

B. Holiday Testing: After the installation is complete, all surfaces covered with lining or coating, shall be tested by the Contractor in the presence of the Engineer with an acceptable electrical holiday or flow detector with the instruments to be set between 15,000 and 20,000 volts. All coated or lined surfaces shall be pinhole free. All pinholes shall be repaired in accordance with manufacturer's recommendations.

C. Pull Test Per ASTM 4541-02: Contractor shall be responsible for all damages to personal property if adequate precautions from overspray are not taken.

3.9 CLEANUP

A. Installation of Removed Items: After completion of final paint coat, removed items shall be reinstalled.

B. During the progress of the work, all debris, empty crates, waste, drippings, etc., shall be removed by the Contractor and the grounds about the areas to be painted shall be left clean and orderly at the end of each work day.

C. Upon completion of the work, staging, scaffolding, containers and all other debris shall be removed from the site. All paint, shellac, oil or stains splashed or spilled upon adjacent surfaces not requiring treatment (hardware, fixture, floor) shall be removed and the entire job left clean and acceptable.

Table I

EXTERIOR METAL SURFACES

A. New and Existing Steel That Has Been Blast-Cleaned (Up to SSPC SP 10):

Primer:	Zinc,Modified Aromatic Polyurethane	2.5-3.5 DFT
Intermediate Coat	High Build Epoxy	5.0-7.0 DFT
Top Coat:	AAP	2.0-4.0 DFT

B. Existing Steel That Has Been Spot-Blasted (Up to SSPC SP 6):

Primer:	Zinc,Modified Aromatic Polyurethane	2.5-3.5DFT
Intermediate Coat	High Build Epoxy	5.0-7.0 DFT
Top Coat:	AAP	2.0-4.0 DFT

C. Cast Iron, Ductile Iron, Non-Galvanized, Non-Ferrous Surfaces, Steel, New and Existing, in Contact with Wastewater Liquid and Gases, That Has Been Blasted to SSPC SP 5:

Primer:	N/A	
Intermediate Coat	N/A	
Top Coat:	Epoxy, Polyamide	30-40 DFT

D. New Galvanized Surfaces:

Primer:	Epoxy, Polyamide	2.0-3.0 DFT
Intermediate Coat	N/A	
Top Coat:	AAP	2.0-4.0 DFT

E. Galvanized Surfaces With Slight Coating Deterioration; Little or No Rusting:

Primer:	Epoxy, Polyamide	2.0-3.0 DFT
Intermediate Coat	N/A	
Top Coat:	AAP	2.0-4.0 DFT

F. Galvanized Surfaces with Deteriorated Coating or Severely Rusting:

Primer:	Epoxy, Polyamide	2.0-3.0 DFT
Intermediate Coat	N/A	
Top Coat:	AAP	2.0-4.0 DFT

G. Aluminum, Aluminum Alloy Copper, Other Non-Galvanized, and Non-Ferrous Surfaces

Primer:	Epoxy, Polyamide	2.0-3.0 DFT
Intermediate Coat	N/A	
Top Coat:	AAP	2.0-4.0 DFT

TABLE II

INTERIOR METAL SURFACES

A. All steel:		
Primer:	High Build Epoxy	3.0-5.0 DFT
Intermediate Coat	N/A	
Top Coat:	High Build Epoxy	3.0-5.0 DFT
B. Copper, Other Non-Galvanized, and Non-Ferrous Surfaces		
Primer:	Epoxy, Polyamide	2.0-3.0 DFT
Intermediate Coat	N/A	
Top Coat:	High Build Epoxy	3.0-5.0 DFT

TABLE III

MECHANICAL & ELECTRICAL SYSTEMS SURFACES: INTERIOR AND EXTERIOR

1. Mechanical, Electrical, and Miscellaneous Metal Items, Except New Prefinished Equipment: prefinishing of new mechanical and electrical equipment is specified in the section covering the particular items. Paint ductile iron, stainless steel and copper piping systems.

   A. Equipment and Metal Appurtenances:

      Same coating system as used for coating metal in same space.

   B. Structural Steel for cranes, hoists, and gantry crane

Primer:	Modified Aromatic Polyurethane	2.5-3.5 DFT
Intermediate Coat:	High Build Epoxy	5.0-7.0 DFT
Top Coat:	AAP	2.0-4.0 DFT

   C. New Exposed Metal Piping, Supports, and Conduits:

      Same coating as used for coating metal in same space

   D. New Plastic, FRP, and Flexible Conduit, Piping and ductwork:

Primer:	High Build Epoxy	2.0-3.0 DFT
Top Coat:	AAP	2.0-4.0 DFT

2. Hot Metal Surfaces

   Surfaces Subject to Temperature of 120 to 400 Degrees F:

Primer:	Silicone Aluminum	0.7-1.5 DFT
Intermediate Coat:	N/A	
Top Coat:	Silicone Aluminum	0.7-1.5 DFT

3. All Sunlight Exposed High Build Epoxy Coatings

Primer:	Modified Aromatic Polyurethane	2.5-3.5 DFT
Intermediate Coat:	High Build Epoxy	5.0-7.0 DFT
Top Coat:	AAP	2.0-4.0 DFT

APPENDIX A

Revised (9/16/97)

PAINT COLOR STANDARDS

The following paint colors shall be used throughout all Wastewater Plants and Pumping Stations. Alternate colors are listed for certain systems. The use of colors containing heavy metals e.g., Safety Yellow, Safety Orange etc. shall be avoided in areas subject to concentrations of hydrogen sulfide fumes. Alternate color shades and tints shall be used for such exposures.

1. Electric piping conduits and connections: (Conduits which run along the building exterior shall match the building color)	1. ANSI SAFETY ORANGE (5401) 2. _____
2. Chlorine equip. and piping systems.	1. ANSI SAFETY YELLOW (5625) 2. _____
3. Chlorine cylinder.	1. ALUMINUM (7018) 2. _____
4. Caustic soda tank.	1. ANSI SAFETY WHITE (1864) 2. _____
5. Potable water lines.	1. ANSI SAFETY BLUE (5150) 2. _____
6. Non-potable fresh water; seal water systems; hydro-pneumatic systems, etc.	1. LIGHT GRAY (C705) WITH 6" WIDE BLUE BANDS AT APPROX. 3' INTERVALS 2. _____
7. Air compressors and piping; incinerator blowers and fans; aeration blowers and piping systems.	1. ANSI SAFETY GREEN (5575) 2. _____
8. Exposed drain piping and storm drain piping systems.	1. BLACK (C900) 2. _____
9. Sludge methane gas equip. and piping; propane gas lines; digester tank equip.; sludge heater equip.; waste gas burner equip., etc.	1. ANSI SAFETY RED (5525) 2. _____
10. Propane storage tanks.	1. ANSI SAFETY WHITE (1864) 2. _____
11. Diesel fuel oil lines and associated equip.	1. ANSI SAFETY WHITE (1864) 2. _____
12. Sludge/scum pumps and piping systems; grinders; screenings and grit	1. ANSI SAFETY BROWN (2284) 2. _____

ejectors; cyclone degritters and other associated sludge handling equip.	
13. Dewatering equip. and piping systems; centrifuges, cake conveyors, grit classifiers, multi-roll presses, etc.	1. LIGHT GRAY (C705) 2. _____
14. Reclaimed water systems including piping, fittings, pumps, valves, and other appurtenances.	1. ANSI SAFETY PURPLE 5575) w/ white on green pipe markers (specifying "RECLAIMED WATER") w/arrows 2. _____
15. Polymer equip. and piping systems.	1. ANSI SAFETY PURPLE 5575) w/ black on yellow pipe markers (specifying "POLYMER") w/arrows 2. _____
16. Overhead crane and hoist; removable safety rails and chains and other	1. ANSI SAFETY YELLOW (5625) 2. _____
17. Steam lines and boilers and associated equip.; incinerators and associated ALUMINUMequip.	1. HI-TEMP. SILVER (7018) 2. _____
18. Air-conditioning and ventilation ducts; air-conditioning equip., ventilation fans and other associated ventilation equip.	1. TO BLEND WITH INTERIOR AND EXTERIOR COLORS AS APPROPRIATE 2. _____
19. Float tubes, venturies, grating platforms, metal stairways, fixed railings etc.	1. LIGHT GRAY (C705) 2. _____
20. EFFLUENT pumps and piping systems; effluent pressurized water supply systems; and other associated effluent water systems.	1. LIGHT GRAY (C705) 2. _____
21. MCC's switch gear cabinets, transformers distribution panels and associated equip.:	1. Std. Equip. Mfr. Colors 2. LIGHT GRAY (C705) 3. _____
22. Raw sewage pumps, piping systems and other associated raw sewage handling equip.	1. LIGHT GRAY (C705) 2. _____
23. Influent bar screens, screenings and grit conveyors, effluent traveling screens, comminutors, flowminutors, etc.	1. LIGHT GRAY (C705) 2. _____

24. Odor control-tanks, air blowers, ducts piping and associated equip.:	1. ANSI SAFETY WHITE (1864) 2. AQUA (0123) 3. _____
25. Wastewater plant and pumping station masonry buildings interior walls ceilings, columns and associated masonry:	1. OFF WHITE (1898) 2. _____
26. Wastewater plant and pumping stations interior trim to be 4 feet from floor levels and 4 inch wide.	1. BUFF (0233) 2. _____
27. All WW plants and pumping stations masonry floors and steps:	1. TILE RED (0542) 2. _____
28. Exceptions to EXTERIOR colors will be used to blend with surrounding environment (buildings, structures, landscaping)	1. COLOR TO SUIT 2. _____
29. Exceptions to exterior TRIM colors will be used to blend with surrounding environment	1. COLOR TO SUIT 2. _____
30. WW Plant and pumping stations exterior masonry building surfaces.	1. ALMOND TAN (0895) 2. LIGHT GREEN (5384) 3. _____
31. WW Plant and pumping stations exterior masonry building trim .	1. BUFF (0233) 2. DARK GREEN (3346) 3. RICH BROWN
32. Clarifier tanks, channels, wetwells, basins, chambers - steel and equip. non-immersion exposure.	1. LIGHT GRAY (C705) 2. _____
33. Clarifier tanks, channels, wetwells, basins, chambers - steel and equip. immersion exposure.	1. BLACK (C900) 2. MEDIUM GRAY (C703) 3. _____
34. Clarifier tanks, channels, wetwells, basins, chambers - masonry immersion exposure.	1. BLACK (C900) 2. MEDIUM GRAY (C703) 3. _____
35. Clarifier tanks, channels, wetwells, basins, chambers - masonry non-immersion exposure.	1. ALMOND TAN (0895) 2. LIGHT GREEN (5384) 3. NATURAL-UNPAINTED 4. _____
36. Structural steel supports, framing,	1. LIGHT GRAY (C705)

foundations, etc.	2. _____
37. Emergency standby generator and engine pump drives.	1. Std. Equip. Mfr. Colors 2. LIGHT GRAY (C705) 3. _____
38. Portable engine driver equip. and accessories/attachments.	Use same colors as the specific applications or services noted above
39. Building and grounds keeping equip.	1. Std. Equip. Mfr. Colors 2. _____
40. Construction equip.; bobcats front-end loaders, trailers, etc.	1. Std. Equip. Mfr. Colors 2. _____
41. County vehicles; trucks, vans, sedans, etc.	1. ANSI SAFETY WHITE (1864) 2. _____

END OF SECTION

2.3 CABLE ENTRY SEAL

A. The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of a single cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be separated by a stator lead sealing gland or terminal board, which shall isolate the interior from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered acceptable.

2.4 MOTOR

A. The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31.The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable. The motor shall be designed for continuous duty handling pumped media of 40°C (104°F) and capable of no less than 30 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum. Thermal switches set to open at 125°C (260°F) shall be embedded in the stator end coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The junction chamber containing the terminal board, shall be hermetically sealed from the motor by an elastomer compression seal. Connection between the cable conductors and stator leads shall be made with threaded compression type binding posts permanently affixed to a terminal board. The motor and the pump shall be produced by the same manufacturer.

The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C. A performance chart shall be provided upon request showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no-load characteristics.

The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.

2.5 BEARINGS

A. The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated. The upper bearing shall be a single deep groove ball bearing. The lower bearing shall be a two row angular contact bearing to compensate for axial thrust and radial forces. Single row lower bearings are not acceptable. The minimum L_{10} bearing life shall be 50,000 hours at any usable portion of the pump curve.

2.6 MECHANICAL SEALS

A. Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in a lubricant reservoir that hydro-dynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating, corrosion and abrasion resistant tungsten-carbide ring. The upper, secondary seal unit, located between the lubricant chamber and the motor housing, shall contain one stationary and one positively driven rotating, corrosion and abrasion resistant tungsten-carbide seal ring.

Each seal interface shall be held in contact by its own spring system. The seals shall require neither maintenance nor adjustment nor depend on direction of rotation for sealing. The position of both mechanical seals shall depend on the shaft. Mounting of the lower mechanical seal on the impeller hub will not be acceptable. For special applications, other seal face materials shall be available.

The following seal types shall not be considered acceptable or equal to the dual independent seal specified: shaft seals without positively driven rotating members, or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces. No system requiring a pressure differential to offset pressure and to effect sealing shall be used.

Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication. The motor shall be able to operate dry without damage while pumping under load.

Where a seal cavity is present in the seal chamber, the area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.

Seal lubricant shall be non-hazardous.

2.7 PUMP SHAFT

A. Pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. Couplings shall not be acceptable. The shaft shall be stainless steel – ASTM A479 S43100-T.

B. If a shaft material of lower quality than stainless steel – ASTM A479 S43100-T is used, a shaft sleeve of stainless steel – ASTM A479 S43100-T is used to protect the shaft material. However, shaft sleeves only protect the shaft around the lower mechanical seal. No protection is provided in the oil housing and above. Therefore, the use of stainless steel sleeves will not be considered equal to stainless steel shafts.

2.8 IMPELLER (ADAPTIVE)

A. The impeller shall be of Hard-Iron™ (ASTM A-532 (Alloy III A) 25% chrome cast iron), dynamically balanced, semi-open, multi-vane, back-swept, non-clog design. The impeller vane leading edges shall be mechanically self-cleaned upon each rotation as they pass across a spiral groove located on a replaceable insert ring.

B. The impeller shall have vanes hardened to Rc 45 and shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in waste water. The screw shape of the impeller inlet shall provide an inducing effect for the handling of sludge and rag-laden wastewater. The impeller shall be capable of momentarily moving axially upwards a distance of 15mm/0.6-in. to allow larger debris to pass through and immediately return to normal operating position.

2.9 VOLUTE / SUCTION COVER

A. The pump volute shall be a single piece grey cast iron, ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified. The volute shall have a replaceable suction cover insert ring in which are cast spiral-shaped, sharp-edged groove(s). The spiral groove(s) shall provide trash release pathways and sharp edge(s) across which each impeller vane leading edge shall cross during rotation so to remain unobstructed. The insert ring shall be cast of Hard-Iron™ (ASTM A-532 (Alloy III A) 25% chrome cast iron) and provide effective sealing between the multi-vane semi-open impeller and the volute housing.

2.10 PROTECTION

A. All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. The thermal switches shall open at 125°C (260°F), stop the motor and activate an alarm.

B. A leakage sensor shall be available as an option to detect water in the stator chamber. The Float Leakage Sensor (FLS) is a small float switch used to detect the presence of water in the stator chamber. When activated, the FLS will stop the motor and send an alarm both local and/or remote. USE OF VOLTAGE SENSITIVE SOLID STATE SENSORS AND TRIP TEMPERATURE ABOVE 125°C (260°F) SHALL NOT BE ALLOWED.

C. The thermal switches and FLS shall be connected to a Mini CAS (Control and Status) monitoring unit. The Mini CAS shall be designed to be mounted in any control panel.

2.11 LIFTING SYSTEM

A. Provide a lifting device equal to the Flygt “Grip Eye” system. This system, which shall be capable of lifting the pump and motor, shall consist of a stainless steel cable connected to a stainless steel chain attached to the pump. The lifting device shall be constructed of wrought alloy steel.

2.12 GUIDE RAILS

A. Guide rails shall be attached to the automatic discharge connection at their lower end and to an upper bar bracket at their upper end. Intermediate guide rail bar supports shall be provided as required to insure a rigid installation. The guide rail bars shall not support any of the pump weight.

2.13 LEVEL FLOAT SWITCHES

A. High-high level shall be monitored by a float switch. The float switches shall consist of a mechanically activated SPDT micro switch encased in a polypropylene float. Mercury activated switches shall not be allowed. The interrupting capacity of the switch shall be 250VAC 10A resistive load, 250VAC 3A inductive load, or 30VDC 5A. The plastic components shall be screwed or welded together. Plastic casings joined by adhesives shall not be allowed. The cable shall consist of 3 conductors in a PVC sheath. The float switch shall operate in media temperatures of 0 to +60 degrees C, and in media densities of 0.65 to 1.5 g/cm3. The float switch shall be ENM-10 by Xylem Flygt, or Engineer approved equal.

2.14 LEVEL TRANSMITTER

A. The level transmitter shall be a MJK Model 3400 Hydrostatic Level Transmitter, or Engineer approved equal.

B. All materials shall be supplied by one manufacturer to ensure consistent fit and system-wide functioning.

C. Furnishing, installing, and calibrating level measuring equipment including, but not limited to, pressure-type water level transmitter, mounting hardware, signal wiring at locations shown on the drawings, labor, equipment, materials, supervision and incidentals necessary for a complete and properly functioning level measurement system, shall be in accordance with Section 11102 “Submersible Water Level Measuring and Transmitting System”.

2.15 PUMP CONTROL PANEL

A. The level transmitter shall be MJK Model 704 System Package 1, or Engineer approved equal.

B. All materials shall be supplied by one manufacturer to ensure consistent fit and system-wide functioning.

C. Furnishing, installing, and calibrating water level measuring and pump control equipment including, but not limited to, hydrostatic-type level sensor, pump controller, mounting hardware, signal wiring at locations shown on the drawings, labor, equipment, materials supervision and incidentals necessary for a complete and properly functioning level measurement and pump control system, shall be in accordance with Section 11103 "Water Level Pump Control System".

PART 3 – EXECUTION

3.1 INSTALLATION

A. Each pump shall be aligned, connected, and installed in accordance with manufacturer's recommendations.

B. After completion of installation each pumping unit shall be field tested to demonstrate compliance with the performance requirements as specified in accordance to Section 01660, "Installation, Testing and Commissioning".

PART 4 – OPERATION AND MAINTENANCE

A. Operation and maintenance shall be in accordance with manufacturer's recommendations.

END OF SECTION

DIVISION 13 – SPECIAL CONSTRUCTION

SECTION 13440 – CONTROL STRATEGIES

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies control strategies for Pump Station 3 at the Sand Island State Recreational Area (SISRA). The pump station is designed to pump sewage from the SISRA to the City and County of Honolulu's sewer manhole located along Sand Island Parkway near the Sand Island Parkway wastewater pump station.

1.2 PUMP STATION CONTROL STRATEGIES

A. Related Equipment:

1. Pump chamber level transmitter

2. High high level float

B. Control Strategy: The pump station shall operate by level in the wet well.

1. A Hand-Off-Auto (HOA) switch shall be provided for each pump in the field to determine the modes of operation.

2. When the "HOA" switch is in "H" position, the pump shall be operable. The pump will run regardless of the float switch or level transducer. It will stop only if manually stopped and or an overload trip or motor thermal cutoff condition has occurred.

3. In "OFF" position, the pumps will not run.

4. In "AUTO" position, the pump sequence shall alternate pump operation during each call to run to equalize run times.

5. The control panel shall turn on its alarm beacon and horn, and send a signal to a dry contact closure to transmit wireless/cellular communication to the facility operator. SISRA caretaker, and State Park's point of contact for the following situations:

   a. Motor "Overload"
   b. Over (high) temperature
   c. Seal fail Alarm
   d. Level transmitter trip
   e. High high level float alarm
   f. High level alarm
   g. Low level float alarm

C. Control panel functions:

1. Manual Control: Pumps shall be capable of remote Start/Stop when the selector switch is in the “Auto” position.

2. Automatic Control:

   a. The pumps will alternate operation as Pump 1 during each call to run. This is done to equalize run times and ensure both pumps are exercised regularly.
   b. When the wet well level rises above the preset level PUMP 1 ON, Pump 1 shall be commanded ON. If the wet well level drops below the preset level PUMP 1 OFF, the Pump 1 shall be commanded OFF.
   c. When the wet well level rises above the preset level Pump 2 ON, both pumps shall be commanded ON. If the wet well level drops below the preset level Pump 2 OFF, the Pump 2 shall be commanded OFF and Pump 1 shall continue to pump until the wet well level reached the PUMP 1 OFF.
   d. If the wet well level rises above the high level both pumps will start and both pumps will remain ON until the level drops below the backup LOW LEVEL float switch.
   e. If the wet well level drops below the LOW LEVEL float switch, both pumps will stop.
   f. If the wet well level rises above the LOW LEVEL float switch, both pumps will remain inactive until the level rises above the corresponding pump’s ON set point.

3. Alarm Levels

   a. If the level rises above the HIGH-HIGH LEVEL float switch
   b. If the level rises above the HIGH level set point
   c. If the level drops below the back up LOW LEVEL float switch

4. Emergency Power Control:

   a. Manual reset shall not be required after each utility or emergency power switchover.
   b. Only one pump shall operate during emergency power conditions.
   c. In HAND, one pump shall operate during emergency power conditions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION


TRUE NORTH
SCALE: 1"=200'
HONOLULU HARBOR
FLOOD ZONE "AE" FLOOD ELEV.: 5
TMK 1-5-041:200 (STATE OF HAWAII DOT HARBORS DIVISION)
TMK 1-5-041:042 (UNITED STATES COAST GUARD)
FLOOD ZONE "X"
STA. "MEDIAN" ELEV.=10.03
STA. "SI-3" ELEV.=7.53
SAND ISLAND PARKWAY (STATE-CITY MAINT.)
B-1 FOR BORING LOG SEE SHT. C019
STA. "SHOWER" ELEV.=9.78
SAND ISLAND WASTEWATER TREATMENT PLANT TMK (1)1-5-041:005 (STATE OF HAWAII E03939-CITY AND COUNTY OF HONOLULU)
SAND ISLAND TREATMENT CENTER
TMK 1-5-041:022 (STATE OF HAWAII E04170-DOT HARBORS)
FLOOD ZONE "AE" FLOOD ELEVATION: 8
HOOKELA PLACE (STATE-CITY MAINT.)
MAKEPONO ST. (STATE-CITY MAINT.)
ULUPONO ST. (STATE-CITY MAINT.)
MIKOLE STREET (STATE-CITY MAINT.)
STA. "TC" ELEV.=8.10
LIMITS OF DISTURBED AREA
SAND ISLAND STATE PARK TMK 1-5-041:006 (STATE OF HAWAII)
B-2 FOR BORING LOG SEE SHT. C019
FLOOD ZONE "AE" FLOOD ELEVATION: 7
RELOC. SEWER PUMP STATION 3 (SEE SHT. C007 FOR DET.)
STA. "ANGLE" ELEV.=8.69
B-3 FOR BORING LOG SEE SHT. C019
EX. 40' EASEMENT IN FAVOR OF CITY AND COUNTY OF HONOLULU (AMFM #1 AND #2)
EX. 45' EASEMENT IN FAVOR OF CITY AND COUNTY OF HONOLULU (AMFM #3 AND #4)
EX. 25' EASEMENT IN FAVOR OF CITY AND COUNTY OF HONOLULU (AMFM #1)
EX. COMFORT STATION #1
TMK 1-5-041:022 (STATE OF HAWAII E04498-CITY & COUNTY OF HONOLULU)
STA. "KIAWE" ELEV.=6.34
SEWER LINE D EXTENSION TO RELOCATED PUMP STATION 3 (SEE SHT C008 FOR PLAN AND PROF.)
SEWER LINE A
SEWER LINE C
EX. COMFORT STATION #3
PROPOSED FORCE MAIN 3 (SEE SHTS C010 TO C014 FOR PLAN AND PROFILE)
EX. SEWER PUMP STATION 3
EX. COMFORT STATION #4
EX. COMFORT STATION #5
SAND ISLAND STATE RECREATION AREA TMK: (1)1-5-041:006
STA. "PARKING" ELEV.=5.82
SEWER LINE D
SEWER LINE B
EX. COMFORT STATION #2
FLOOD ZONE "AE" FLOOD ELEV.: 8
FLOOD ZONE "AE" FLOOD ELEV.: 9
TMK 1-5-041:022 (STATE OF HAWAII EO-4492 DLNR STATE PARKS)
STA. "CO" ELEV.=6.81
GRAVEL PARKING
SAND ISLAND STATE RECREATION AREA ℄
EX. 30' EASEMENT IN FAVOR OF CITY AND COUNTY OF HONOLULU (SAND ISLAND 84" OUTFALL)
FLOOD ZONE "AE" FLOOD ELEVATION: 8
EX. COMFORT STATION #6
EX. SEWER PUMP STATION #2
EX. SEWER PUMP STATION #1
EX. 25' EASEMENT IN FAVOR OF CITY AND COUNTY OF HONOLULU (AMFM #2)
SEWER LINE CS6 (SEE SHT C009 FOR PLAN AND PROFILE)
PACIFIC OCEAN
FLOOD ZONE "AE" FLOOD ELEVATION: 9
EX. 36" ARMY GRAVITY SEWER OUTFALL (ABND)
EX. 30' EASEMENT IN FAVOR OF CITY AND COUNTY OF HONOLULU (72" SAND ISLAND OUTFALL BYPASS)
84" SAND ISLAND OUTFALL
72" SAND ISLAND OUTFALL BYPASS
LEGEND :
PROPERTY LINE
EX SEWER LINE (W/ FLOW DIRECTION)
PROPOSED FORCE MAIN (W/ FLOW DIR.)
PROPOSED SEWER LINE (W/ FLOW DIR.)
LIMITS OF DISTURBED AREA
FLOOD ZONES
SPECIAL MANAGEMENT AREA (SMA)
GENERAL SITE PLAN
SCALE: 1"=200'
GRAPHIC SCALE:
1" = 200' 200' 100' 0 200' 400'
1 | ADDENDUM NO. 1: REVISED LIMITS OF DISTURBED AREA. | 1 of 25 | 2/19/2021
REVISION NO. | SYM. | DESCRIPTION | SHT./OF | DATE | APPROVED
R. M. TOWILL CORPORATION
Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii
GENERAL SITE PLAN
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.
APRIL 30, 2020 LIC. EXP. DATE
DESIGNED: AM/JB
DRAWN: SF
CHECKED:
APPROVED:
SUBMITTED:
DATE:
SCALE:
DRAWING NO. C003
JOB NO. F70C616E
SHEET NO. 4 OF 30 SHEETS

EROSION CONTROL PLAN

SCALE: 1" = 100'

GRAPHIC SCALE: 1" = 200' — 200' 100' 0 200' 400'

NOTES:

1) SEE SHT. C014 FOR BMP AND EROSION CONTROL NOTES.

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: REVISED LIMITS OF DISTURBED AREA.	2 of 25	2/19/2021	

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

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SIGNATURE — APRIL 30, 2020 LIC. EXP. DATE

"OBSERVATION OF CONSTRUCTION" IS DEFINED IN CHAPTER 16-115, HAWAII ADMINISTRATIVE RULES ENTITLED "PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS."

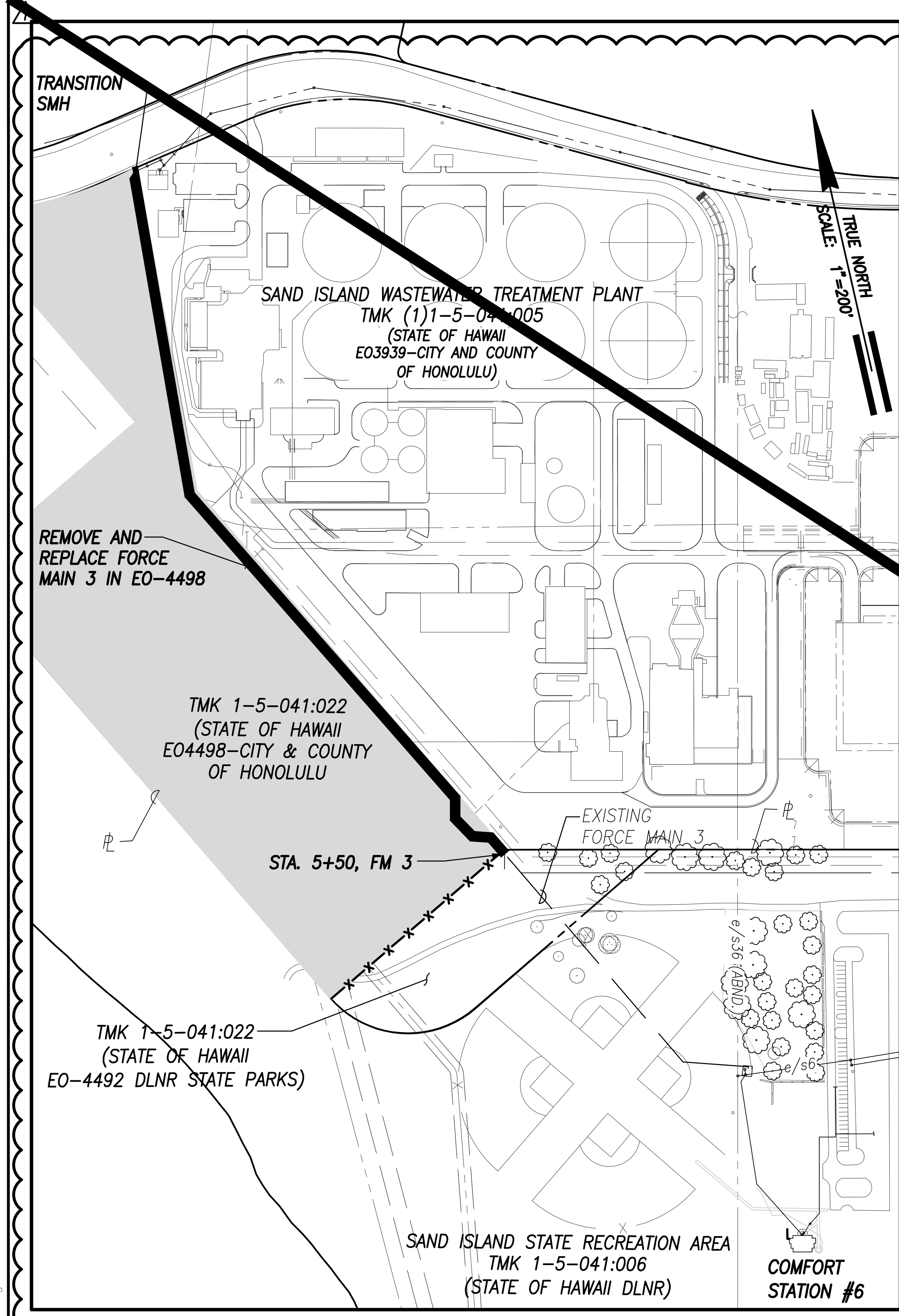
Planning – Engineering – Environmental Services – Photogrammetry – Surveying – Construction Management
R. M. TOWILL CORPORATION
808 842 1133 2024 North King Street Suite 200 Honolulu Hawaii 96819-3494

Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

EROSION CONTROL PLAN – 1

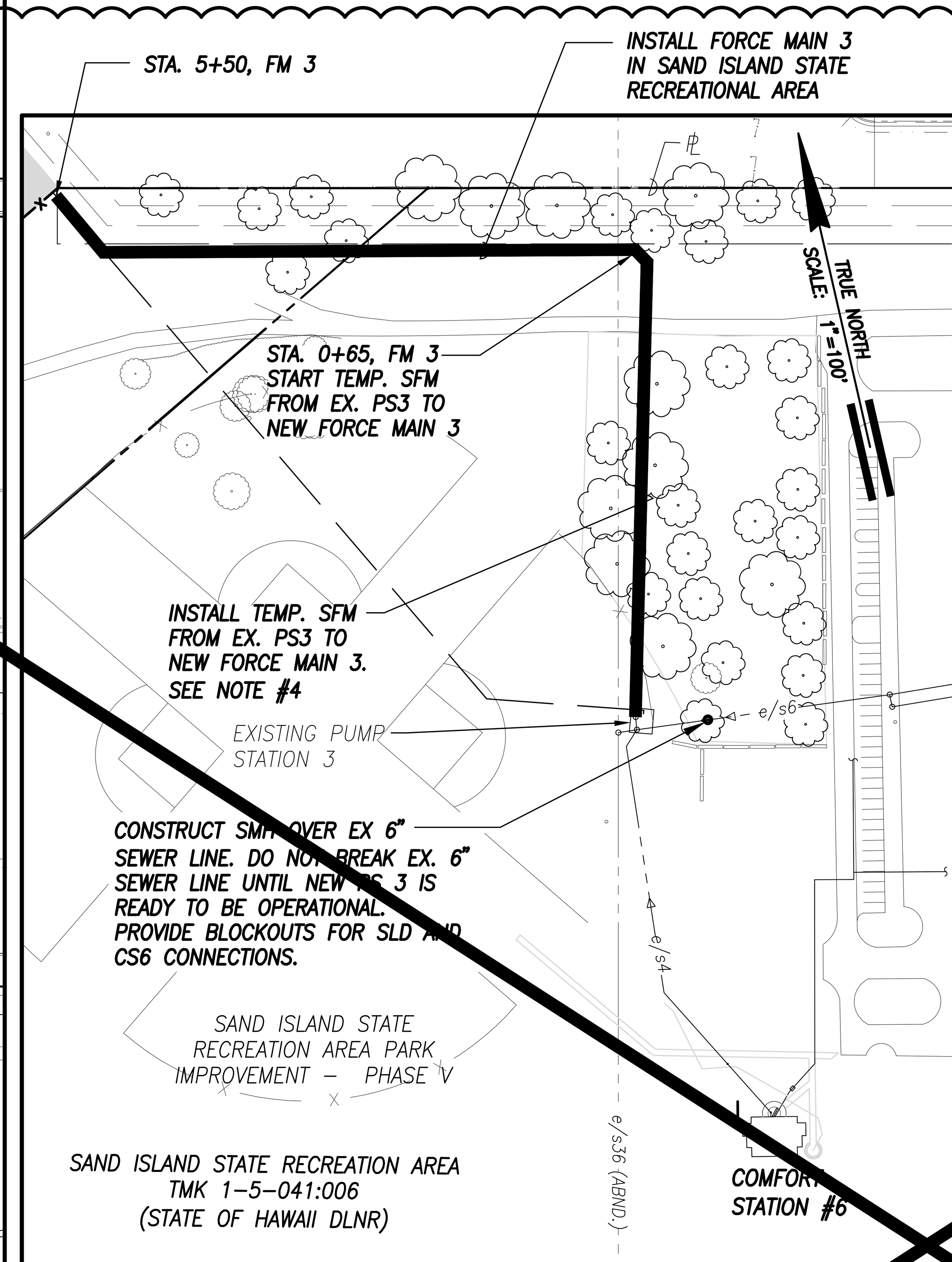
DESIGNED: AM/JB	SUBMITTED:
DRAWN: JB	DATE:
CHECKED:	SCALE:
APPROVED:	DRAWING NO. C004

JOB NO. F70C616E SHEET NO. 5 OF 30 SHEETS



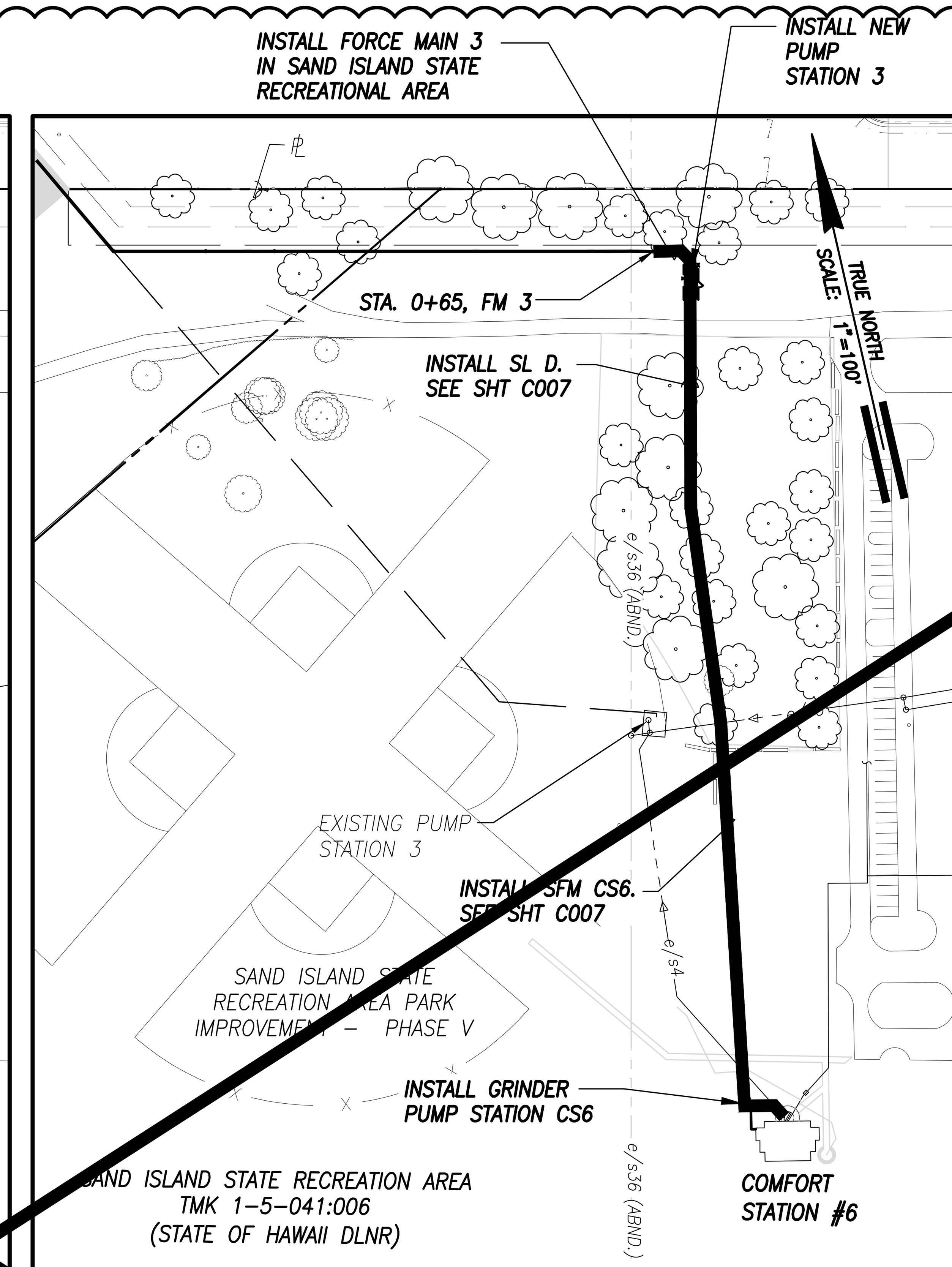
PHASE 1 – FM 3 IN EO AREA

SCALE: 1" = 200'



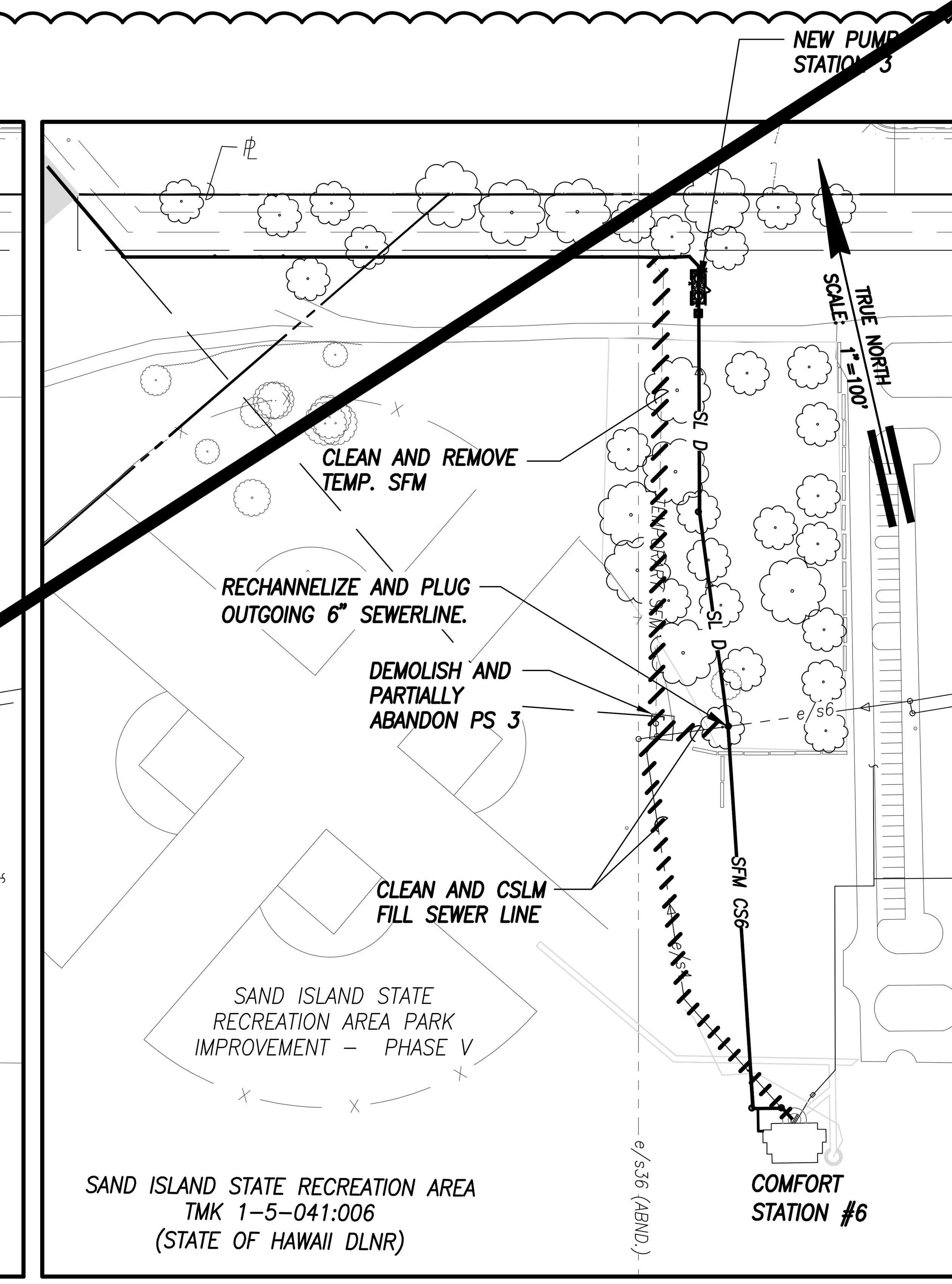
PHASE 2 – FM 3 AND TEMPORARY SFM

SCALE: 1" = 100'



PHASE 3 – SL D AND SFM CS6

SCALE: 1" = 100'



PHASE 4 – DEMO TEMP SFM AND EX PS 3

SCALE: 1" = 100'

SUPERCEDED
SEE DWG C005A DATED 2/19/2021

LEGEND:

— - — - —	PROPERTY LINE
—x—x—x—	FENCE LINE
————	EX FORCE MAIN
— — — —	EX SEWER LINE
(shaded)	EXECUTIVE ORDER AREA (EO-4498)

NOTES:

1) CONTRACTOR MUST COMPLETE INSTALLATION AND TESTING OF PHASE 1 WORK AND BE CLEARED OUT OF THE EO-4498 AREA BY JUNE 7, 2021. NO EXCEPTIONS.

2) CONTRACTOR SHALL COORDINATE WITH FUTURE CITY AND COUNTY OF HONOLULU DEPARTMENT OF ENVIRONMENTAL SERVICES PROJECT (JOB NO. W8-19) IN EO-4498 "SAND ISLAND WWTP MAINTENANCE BUILDING, SEPTAGE, AND SITE IMPROVEMENTS (MBSSI)." CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO CONSTRUCTION.

3) CONTRACTOR SHALL COORDINATE WORK WITH CONCURRENT DLNR PROJECT "SAND ISLAND STATE RECREATION AREA PARK IMPROVEMENT – PHASE V", JOB NO. F70C616C. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO CONSTRUCTION.

4) AFTER PHASE 2 IS COMPLETED AND ACCEPTED BY DLNR, THE EXISTING PUMP STATION 3 WILL BECOME OPERATIONAL UTILIZING NEWLY INSTALLED PORTION OF SFM. DLNR WILL BE RESPONSIBLE FOR THE OPERATION OF THE EXISTING PUMP STATION 3.

RECOMMENDED SEWER REHAB PHASING:

PHASE 1 – CONSTRUCT TRANSITION SEWER MANHOLE AND PROPOSED FORCE MAIN 3 WITHIN EO-4498 (STA. 5+50 TO STA. 21+32.83, APPROX 1580 LF)

PHASE 2 – CONSTRUCT FORCE MAIN 3 (STA. 0+65 TO STA. 5+50, APPROX 490 LF) AND CONSTRUCT UNDERGROUND AND ABOVEGROUND TEMPORARY BYPASS PIPING AND INSTALL TEMPORARY SEWER LINE TO EXISTING PUMP STATION 3 (APPROX 390 LF). CONSTRUCT NEW SMH D1 OVER EX. 6" SEWER LINE.

PHASE 3 – CONSTRUCT REMAINING FORCE MAIN 3, PUMP STATION 3, VALVE VAULT, AND PRELOADER 3. CONSTRUCT SEWER LINE D, SMH D2, SFM CS6, GRINDER PUMP STATION CS6, AND CS6 PRELOADER.

PHASE 4 – RECHANNELIZE AND PLUG OUTGOING EX. 6" SEWER LINE AT SMH D1. CLEAN AND REMOVE TEMPORARY FORCEMAIN.

GRAPHIC SCALE:

1" = 100': 100' 50' 0 100' 200'

1" = 200': 200' 100' 0 200' 400'

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: REMOVE SHEET.	3 of 25	2/19/2021	

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

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SIGNATURE — APRIL 30, 2020 LIC. EXP. DATE

"OBSERVATION OF CONSTRUCTION" IS DEFINED IN CHAPTER 16-115, HAWAII ADMINISTRATIVE RULES ENTITLED "PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS."

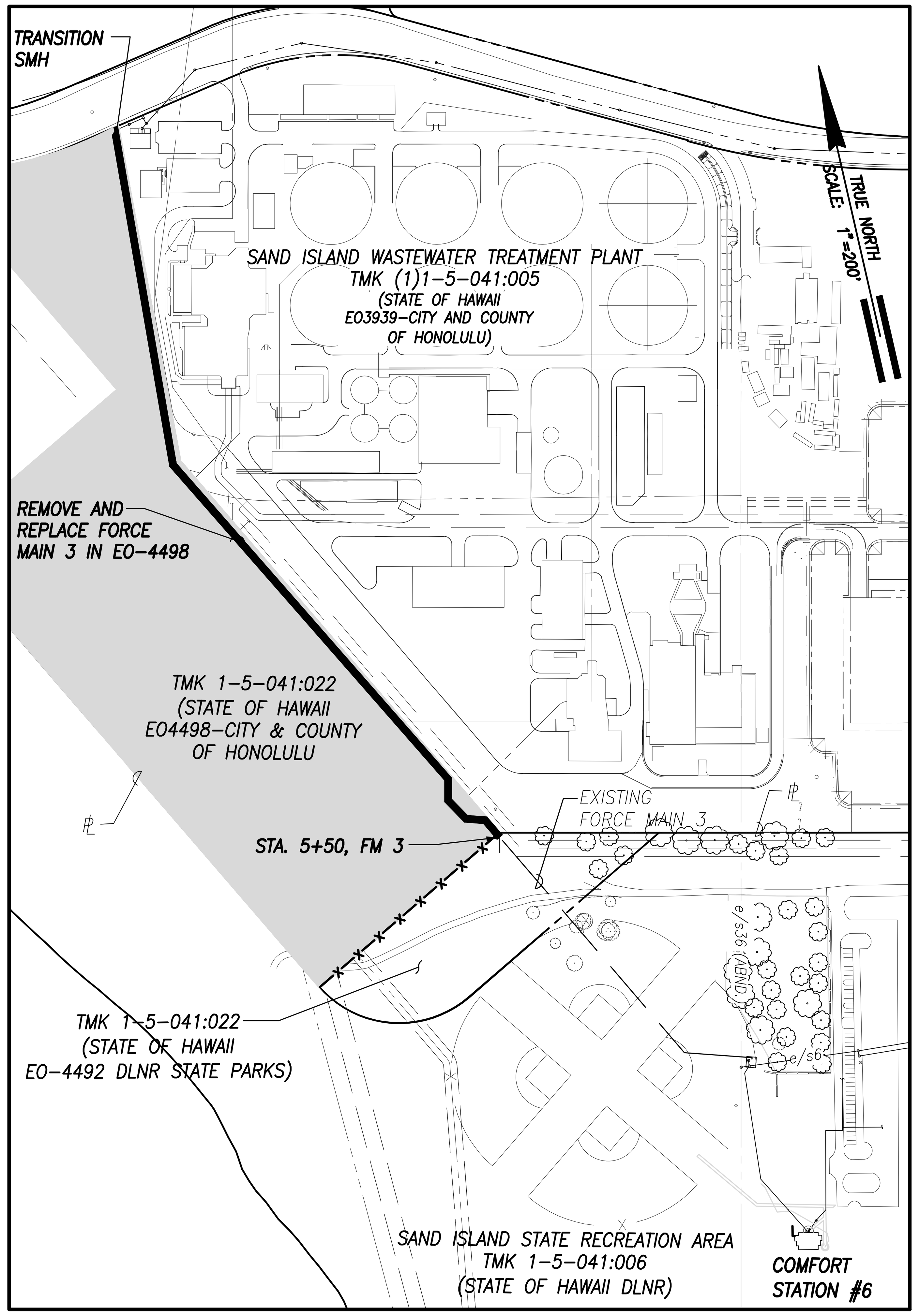
Planning – Engineering – Environmental Services – Photogrammetry – Surveying – Construction Management
R. M. TOWILL CORPORATION
808 842 1133 2024 North King Street Suite 200 Honolulu Hawaii 96819-3494

Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 1 PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

PHASING PLAN

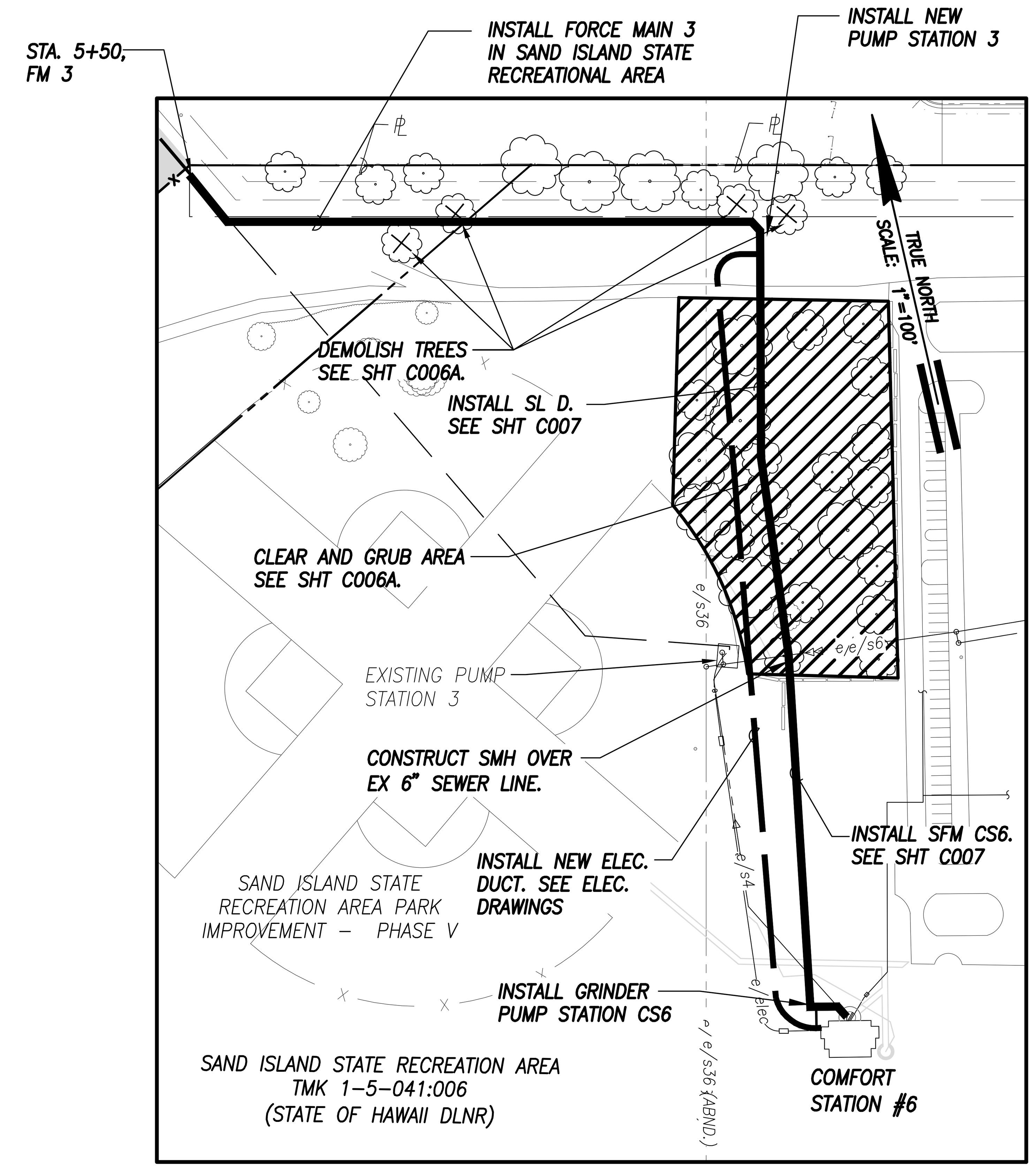
DESIGNED:	AM	SUBMITTED:	
DRAWN:	AT	DATE:	
CHECKED:		SCALE:	
APPROVED:		DRAWING NO.	C005

JOB NO. F70C616E SHEET NO. 6 OF 30 SHEETS



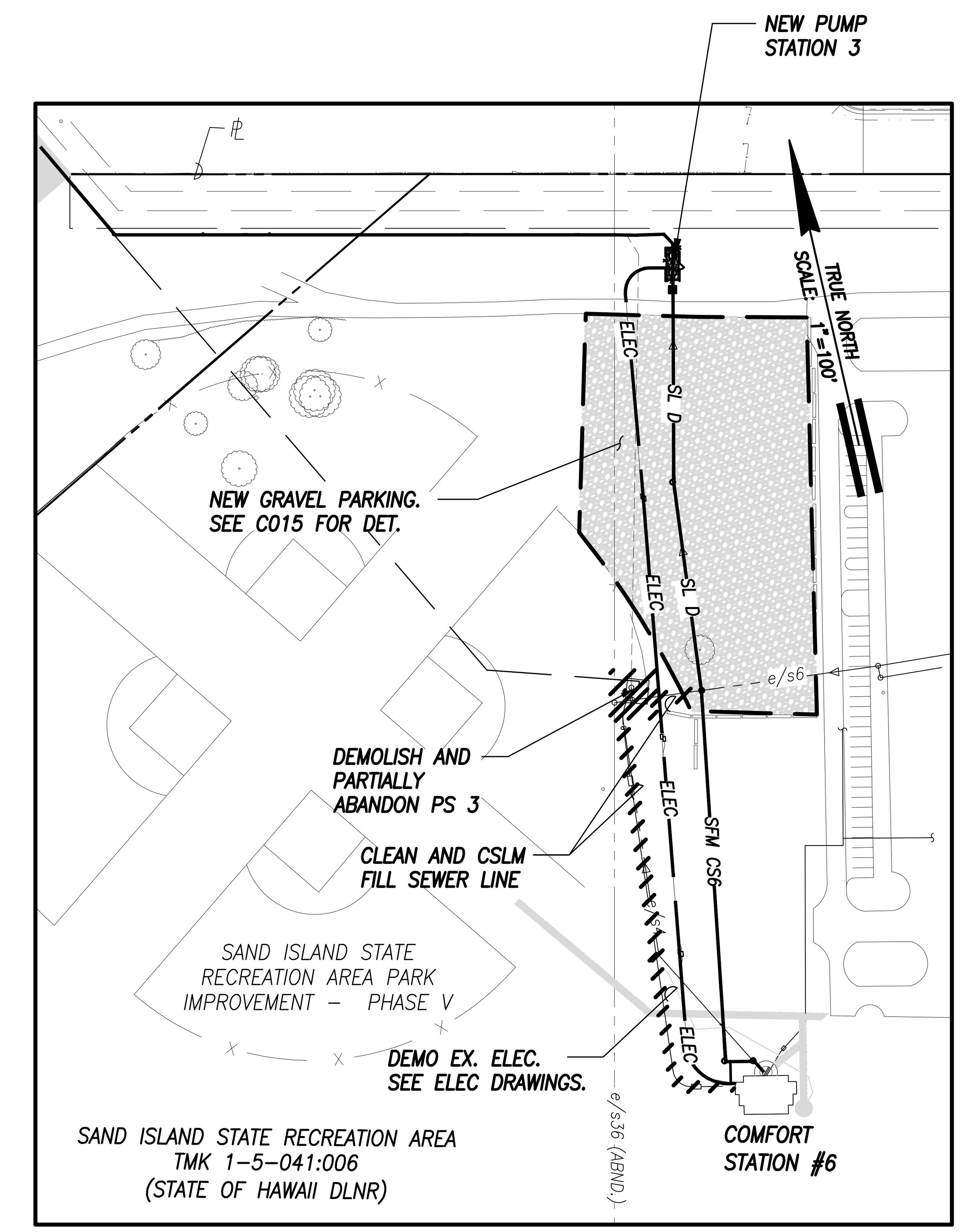
PHASE 1 – FM 3 IN EO AREA

SCALE: 1" = 200'



PHASE 2 – SL D AND SFM CS6

SCALE: 1" = 100'



PHASE 3 – DEMO SFM AND EX PS 3

SCALE: 1" = 100'

NOTES:

1) CONTRACTOR MUST COMPLETE PHASE 1 WORK, INCLUDING INSTALLATION AND TESTING OBTAIN ACCEPTANCE FRO STATE. AND CLEAR OUT OF THE EO-4498 AREA BY JUNE 7, 2021. NO EXCEPTIONS. CONTRACTOR DOES NOT NEED TO RESTORE GROUND COVER AFTER BACKFILLING TRENCH IN EO AREA.

2) CONTRACTOR SHALL COORDINATE WITH FUTURE CITY AND COUNTY OF HONOLULU DEPARTMENT OF ENVIRONMENTAL SERVICES PROJECT (JOB NO. W8-19) IN EO-4498 "SAND ISLAND WWTP MAINTENANCE BUILDING, SEPTAGE, AND SITE IMPROVEMENTS (MBSSI)." CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO CONSTRUCTION.

3) CONTRACTOR SHALL COORDINATE WORK WITH CONCURRENT CITY AND COUNTY OF HONOLULU ENVIRONMENTAL SERVICES PROJECT (JOB NO. W11-17) "SAND ISLAND WASTEWATER TREATMENT PLANT, OCEAN OUTFALL SEWER REVETMENT"

4) CONTRACTOR SHALL COORDINATE WITH CONCURRENT CITY AND COUNTY OF HONOLULU DEPARTMENT OF ENVIRONMENTAL SERVICES PROJECT (JOB NO. W5-16) "AWA STREET WASTEWATER PUMP STATION FORCEMAIN AND SEWER IMPROVEMENTS WAIAKAMILO ROAD TRUNK SEWER"

5) CONTRACTOR SHALL COORDINATE WORK WITH CONCURRENT DLNR PROJECT "SAND ISLAND STATE RECREATION AREA PARK IMPROVEMENT – PHASE V", JOB NO. F70C616C. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO CONSTRUCTION.

6) FOR COMPLETE ELECTRICAL LAYOUT, SEE ELECTRICAL DRAWINGS.

RECOMMENDED SEWER REHAB PHASING:

PHASE 1 – CONSTRUCT TRANSITION SEWER MANHOLE AND PROPOSED FORCE MAIN 3 WITHIN EO-4498 (STA. 5+50 TO STA. 21+32.83, APPROX 1580 LF)

PHASE 2 – CONSTRUCT REMAINING FORCE MAIN 3, PUMP STATION 3, VALVE VAULT, AND PRELOADER 3. CONSTRUCT SEWER LINE D, NEW SMH D1 OVER EX. 6" SEWER LINE, DMH D2, SFM CS6, GRINDER PUMP STATION CS6, AND CS6 PRELOADER. CLEAR AND GRUB AREA AND DEMOLISH TREES.

PHASE 4 – DEMOLISH AND PARTIALLY REMOVE PS 3 AND DEMOLISH EXISTING PUMP STATION 3 FEEDER, UNDERGROUND DUCT, AND HAND HOLES AFTER NEW PUMP STATION IS OPERATIONAL.

LEGEND:

- PROPERTY LINE
- FENCE LINE
- EX FORCE MAIN
- EX SEWER LINE
- EXECUTIVE ORDER AREA (EO-4498)
- NEW WORK
- NEW ELECTRICAL WORK
- DEMO WORK
- CLEAR AND GRUB AND GRAVEL

GRAPHIC SCALE:

1" = 100': 100' 50' 0 100' 200'

1" = 200': 200' 100' 0 200' 400'

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: REPLACE C005	4 of 25	2/19/2021	

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

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SIGNATURE — APRIL 30, 2020 LIC. EXP. DATE

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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 Land and Natural Resources

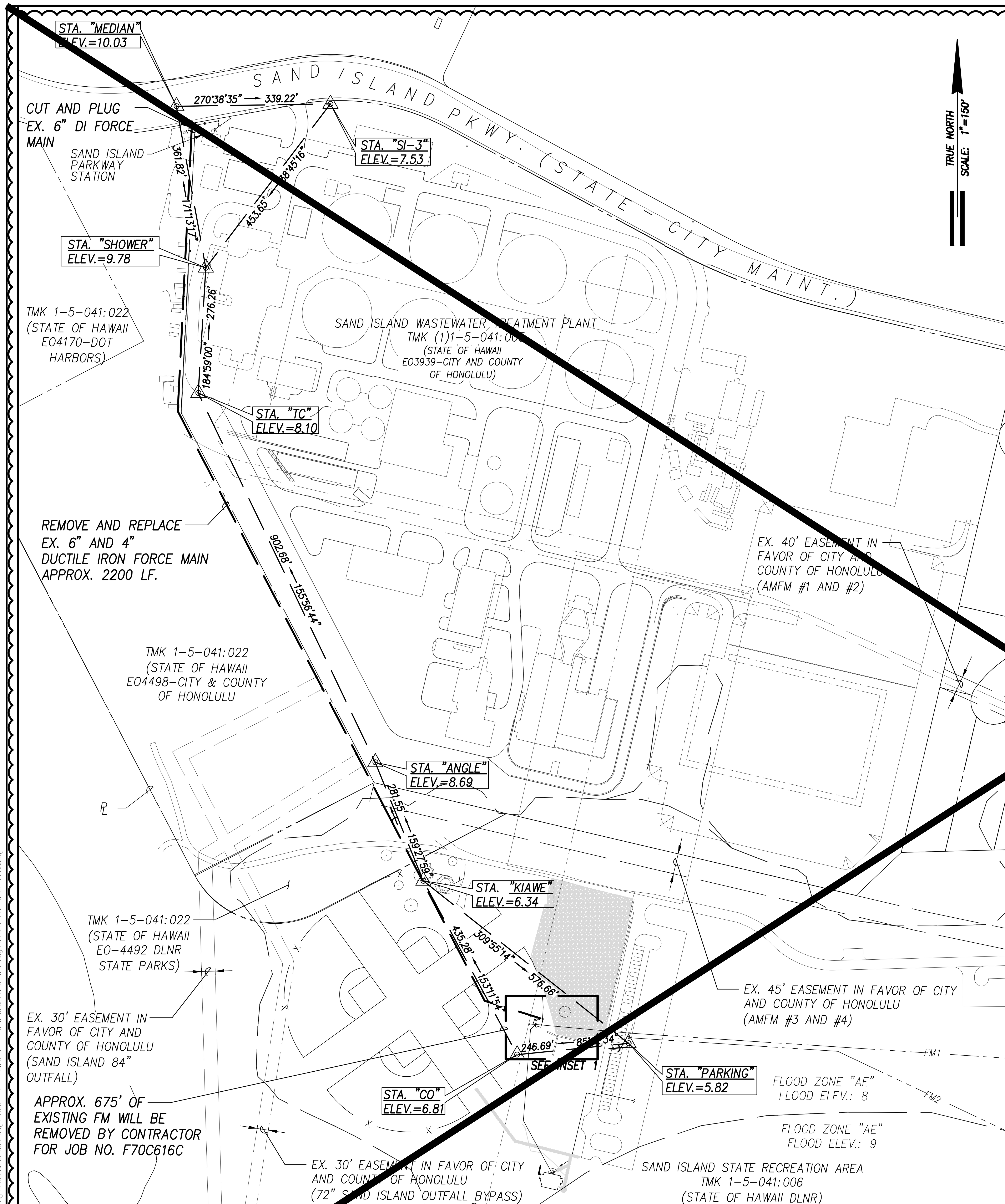
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV

PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT

Sand Island, Honolulu, Oahu, Hawaii

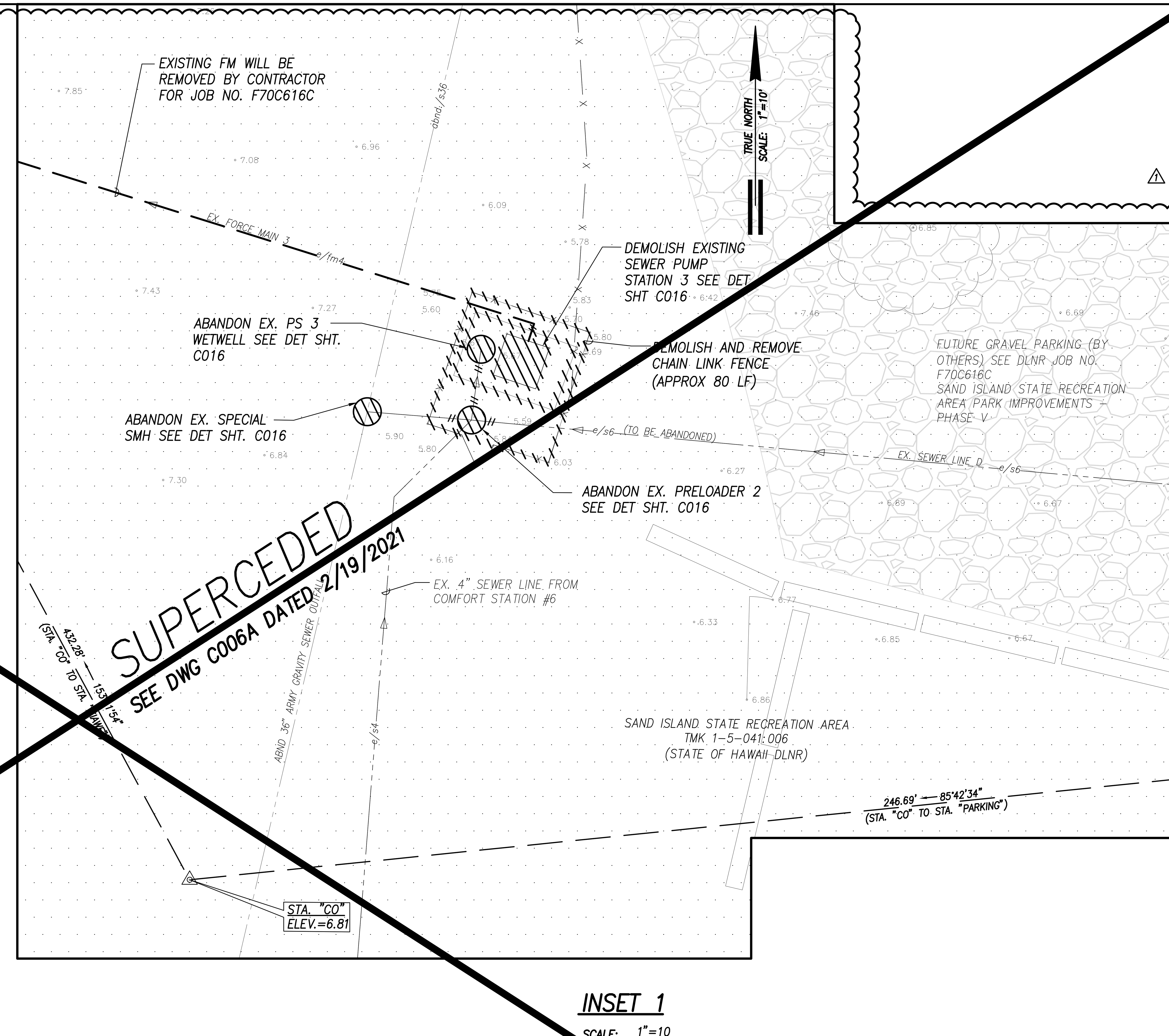
PHASING PLAN

DESIGNED: AM	SUBMITTED:
DRAWN: AT	DATE:
CHECKED:	SCALE:
APPROVED:	DRAWING NO. C005A



DEMOLITION PLAN

SCALE: 1"=150'



INSET 1

SCALE: 1"=10

LEGEND:

———	PROPERTY LINE
-e/fm4-	EX. FORCE MAIN (W/ SIZE & FLOW DIRECTION)
-e/s6-	EX. SEWER LINE (W/ SIZE & FLOW DIRECTION)
—FM4—	PROPOSED FORCE MAIN (W/ SIZE & FLOW DIR.)
———	PROPOSED SEWER LINE (W/ SIZE & FLOW DIR.)
▭	SPECIAL MANAGEMENT AREA (SMA)

GRAPHIC SCALE:

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

1" = 150': 150' 75' 0 150' 300'

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	⚠	ADDENDUM NO. 1: REMOVE SHEET.	5 of 25	2/19/2021	

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SIGNATURE — APRIL 30, 2020 — LIC. EXP. DATE

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Department of Land and Natural Resources

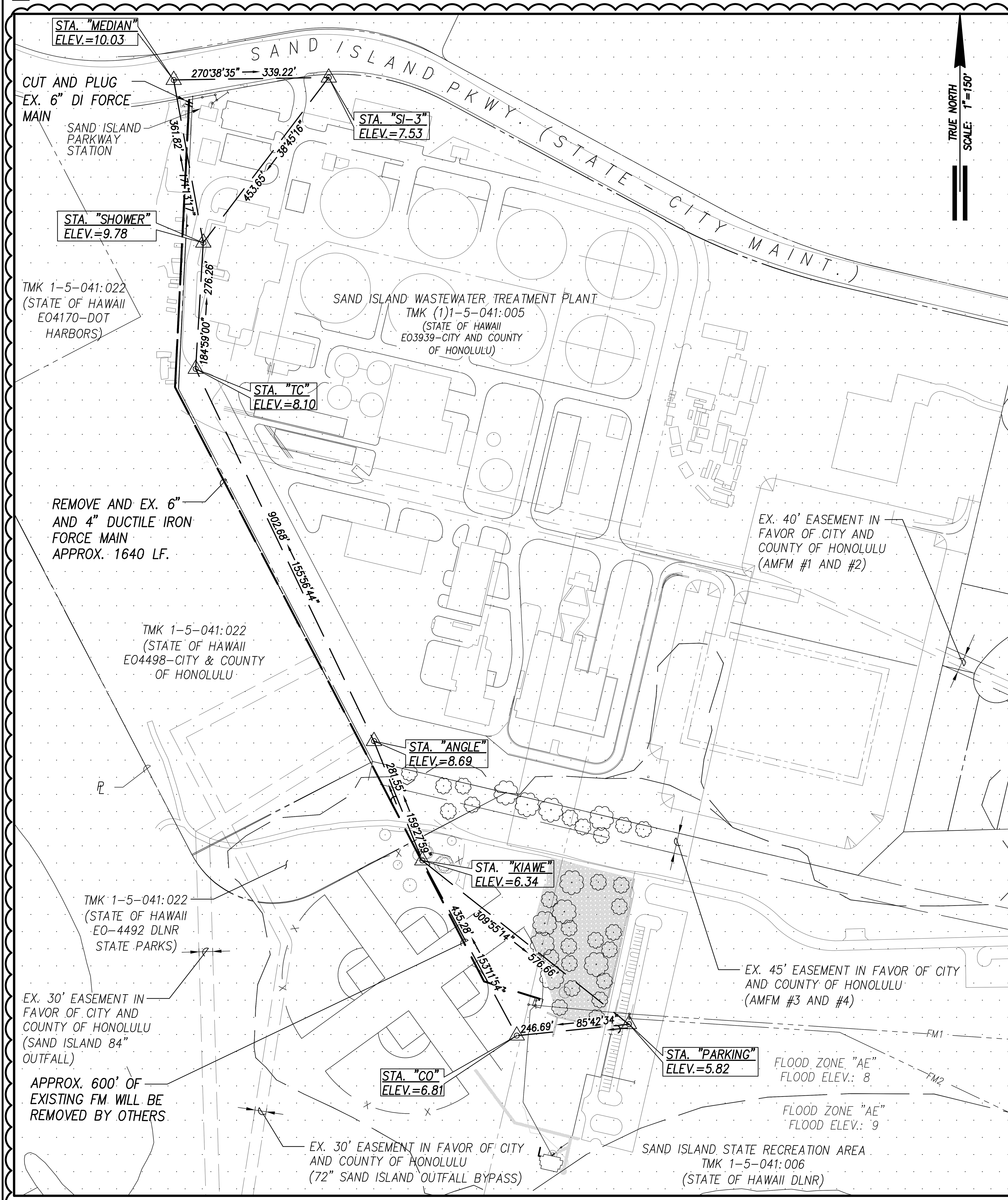
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV PHASE 1 PS 3 RELOCATION & FM 3 REPLACEMENT

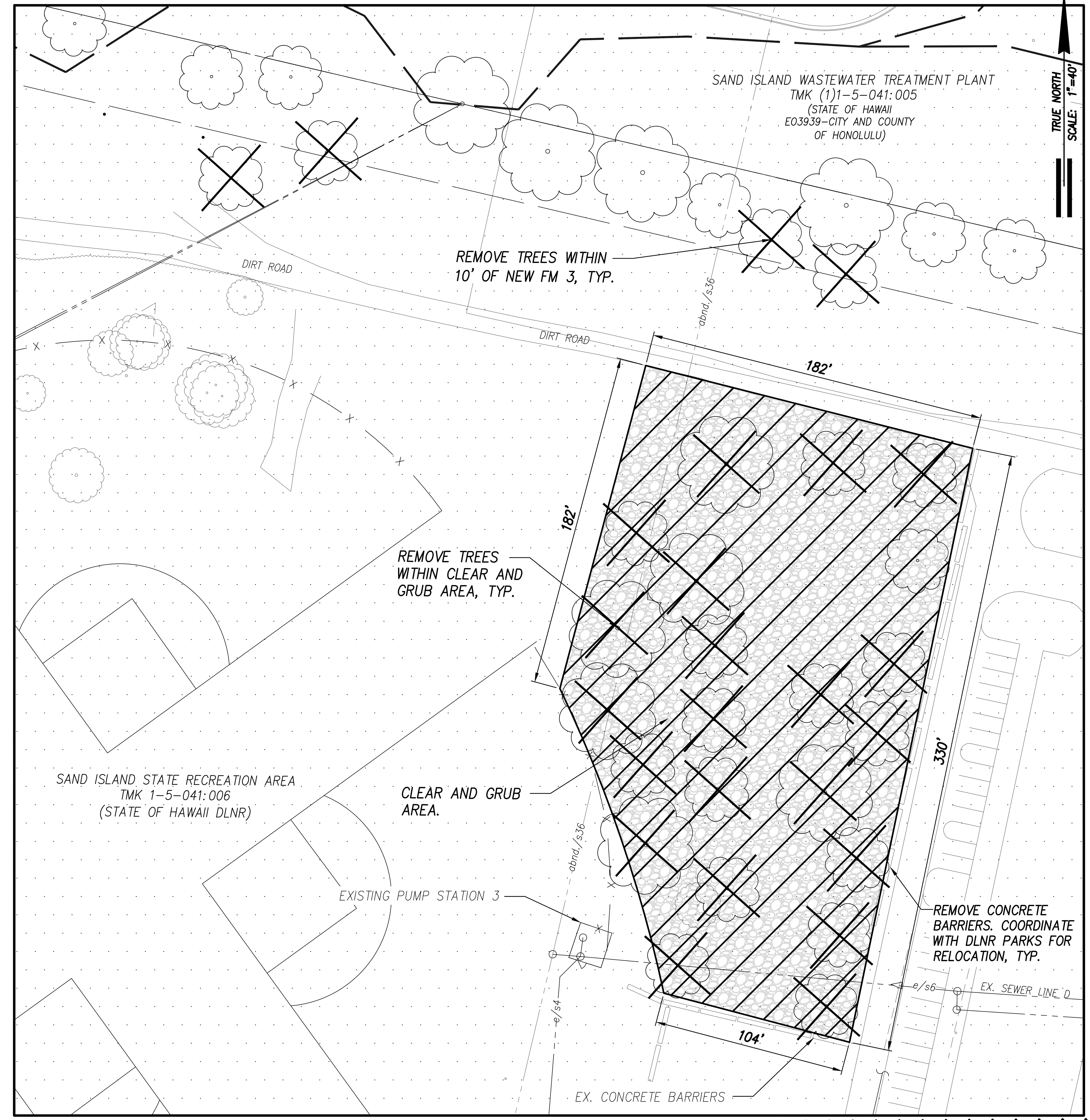
Sand Island, Honolulu, Oahu, Hawaii

DEMOLITION PLAN

DESIGNED:	AM/JB	SUBMITTED:	
DRAWN:	SF	DATE:	
CHECKED:		SCALE:	
APPROVED:		DRAWING NO.	C006

JOB NO. F70C616E SHEET NO. 7 OF 30 SHEETS





PHASE 1 DEMOLITION PLAN

SCALE: 1"=150'

PHASE 2 DEMOLITION PLAN

SCALE: 1"=40'

NOTE

1) TREE SHOWN IS BASED ON AERIAL IMAGE, AND IS ONLY AN ESTIMATE.

GRAPHIC SCALE:

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

1" = 150': 150' 75' 0 150' 300'

LEGEND:

— · —	PROPERTY LINE
—e/fm4—	EX. FORCE MAIN (W/ SIZE & FLOW DIRECTION)
—e/s6—	EX. SEWER LINE (W/ SIZE & FLOW DIRECTION)
—FM4—	PROPOSED FORCE MAIN (W/ SIZE & FLOW DIR.)
—S6—	PROPOSED SEWER LINE (W/ SIZE & FLOW DIR.)
(shaded)	SPECIAL MANAGEMENT AREA (SMA)
(hatched)	CLEAR AND GRUB

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	⚠	ADDENDUM NO. 1: REPLACE C006	6 of 25	2/19/2021	

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SIGNATURE APRIL 30, 2020 LIC. EXP. DATE

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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 Land and Natural Resources

SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV

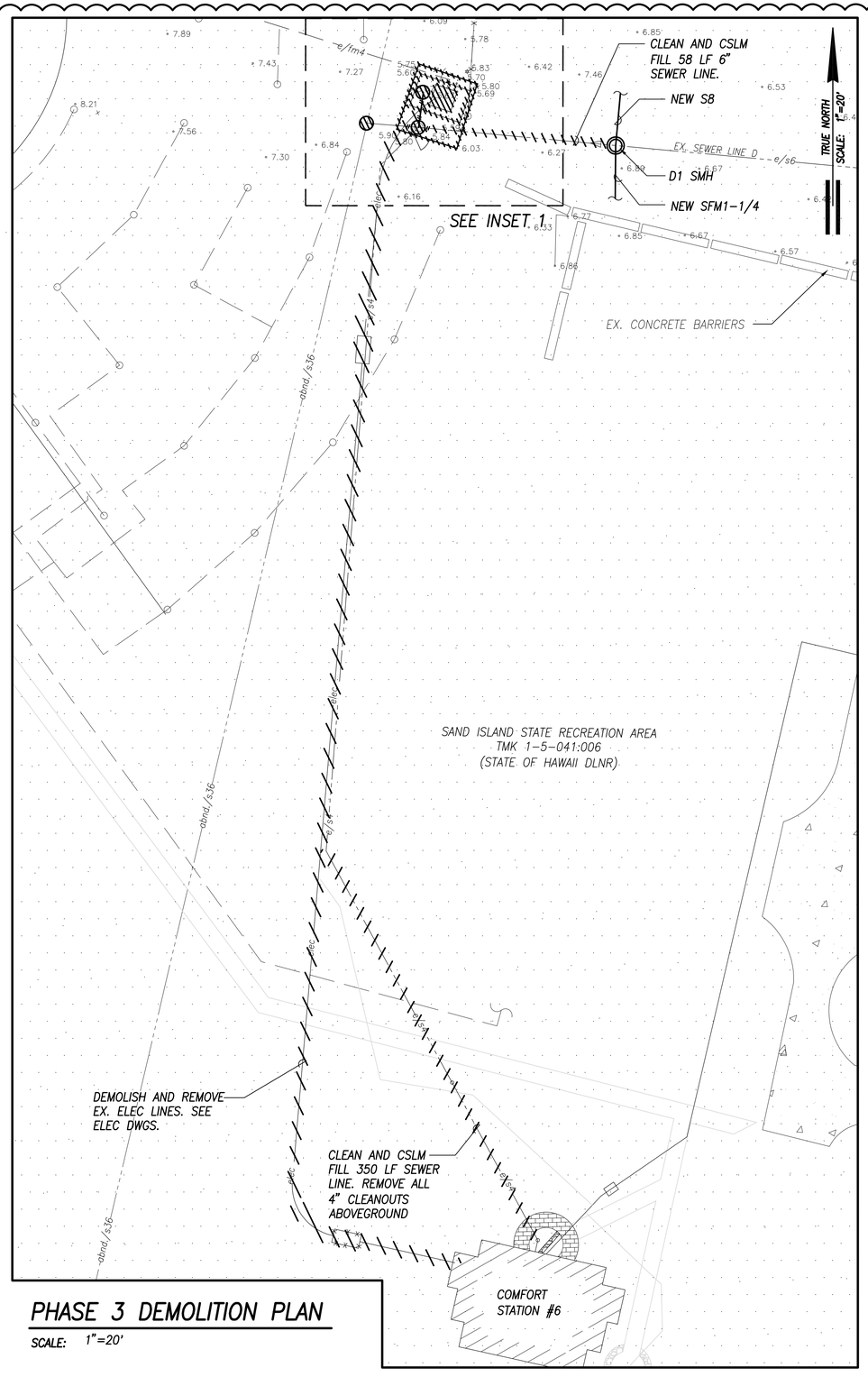
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT

Sand Island, Honolulu, Oahu, Hawaii

DEMOLITION PLANS – 1

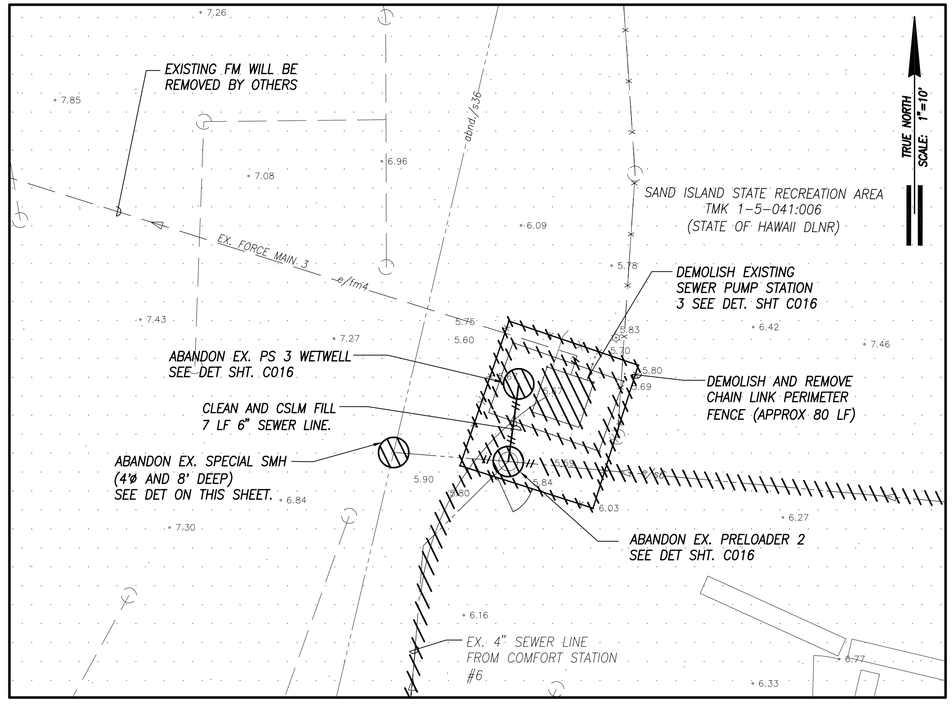
DESIGNED:	AM/JB	SUBMITTED:	
DRAWN:	SF	DATE:	
CHECKED:		SCALE:	
APPROVED:		DRAWING NO.	C006A

JOB NO. F70C616E SHEET NO. 7A OF 30 SHEETS



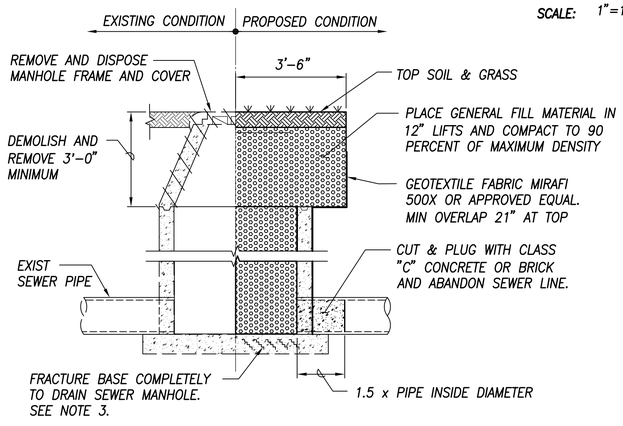
PHASE 3 DEMOLITION PLAN

SCALE: 1"=20'



INSET 1

SCALE: 1"=10



NOTES:

1. REMOVE AND DISPOSE SEWER MANHOLE FRAME AND COVER.
2. DEMOLISH AND REMOVE THE TOP THREE FEET OF THE SEWER MANHOLE.
3. PRIOR TO FRACTURING THE BASE, THE CONTRACTOR SHALL THROUGHLY CLEAN AND DRAIN THE MANHOLE AND NOT PERMIT ANY SEWAGE FROM ADJACENT PIPE SECTIONS FROM ENTERING THE MANHOLE, TO INSURE NO SEWAGE SPILLS INTO THE UNDERLYING SOIL. THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO FRACTURING THE BASE, TO INSURE ALL PREPATORY WORK HAS BEEN PERFORMED SATISFACTORILY.
4. FILL SEWER MANHOLE WITH CRUSHED ROCK FILL MATERIAL BY PLACING MATERIAL IN HORIZONTAL LIFTS NOT EXCEEDING 12 INCHES IN THICKNESS AND COMPACTING EACH LIFT TO 90 PERCENT OF ITS MAXIMUM DENSITY. THE TOP OF THE COMPACTED FILL SHALL MATCH THE GRADE OF THE SURROUNDING AREA LESS THE THICKNESS OF THE TOP SOIL.

SEWER MANHOLE ABANDONMENT DETAIL

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

NOTES:

1) FOR COMPLETE ELECTRICAL DEMOLITION PLAN, SEE ELECTRICAL DRAWING.

LEGEND:

- PROPERTY LINE
- FENCE LINE
- EX FORCE MAIN
- EX SEWER LINE
- DEMO WORK

GRAPHIC SCALE:

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

1" = 20' 20' 10' 0 20' 40'

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: NEW SHEET	7 of 25	2/19/2021	

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.

SIGNATURE APRIL 30, 2020 LIC. EXP. DATE

"OBSERVATION OF CONSTRUCTION" IS DEFINED IN CHAPTER 16-115, HAWAII ADMINISTRATIVE RULES ENTITLED "PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS."

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 Land and Natural Resources

SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

DEMOLITION PLANS – 2

DESIGNED:	AM/JB	SUBMITTED:	
DRAWN:	SF	DATE:	
CHECKED:		SCALE:	
APPROVED:		DRAWING NO.	C006B

LEGEND:

- PROPERTY LINE
- EXISTING EASEMENT
- e/fm4- EX. FORCE MAIN (W/ FLOW DIR. AND SIZE)
- FM4- PROPOSED FORCE MAIN (W/ DIR. AND SIZE)
- e/s6- EX. GRAVITY SEWER LINE (W/ DIR. AND SIZE)
- S8- PROPOSED GRAVITY SEWER LINE (W/ DIR. & SIZE)
- NEW SEWER MANHOLE
- EX. SEWER MANHOLE
- SPECIAL MANAGEMENT AREA (SMA – 1)
- GRAVEL PARKING

45' WIDE SEWER EASEMENT IN FAVOR OF CITY AND COUNTY OF HONOLULU

194°39'15" 11.00'

VALVE VAULT

RELOCATED PUMP STATION 3

149°43'29" 10.00'

50' WIDE

194°41'53" 14.00'

PRELOADER 3

SAND ISLAND STATE RECREATION AREA
TMK: (1)1-5-041:006

330'

AC PAVEMENT

390.95' – 168°04'42"
(STA. "PARKING" TO PUMP STATION 3)

SEWER LINE D EXTENSION
FOR PROFILE SEE SHT. C008

GRAVEL PARKING

EX SPECIAL SMH A

EX. SPECIAL SMH 1

STA. "PARKING"
ELEV.=5.82

TRUE NORTH
SCALE: 1"=30'

SL D

FUTURE PARKING STALLS (BY OTHERS) SEE DLNR JOB NO. F70C616C

SAND ISLAND STATE RECREATION AREA

SAND ISLAND WASTEWATER TREATMENT PLANT
TMK (1)1-5-041:005
(STATE OF HAWAII
EO3939-CITY AND COUNTY
OF HONOLULU)

DIRT ROAD

FORCE MAIN 3
SEE PLAN AND PROFILE
SHTS. C010 TO C014

1+00 (SMH D2 TO PRELOADER 3) 160.25' – 194°43'29"

SMH D2

2+00 175.00' – 186°48'19" (SMH D1 TO SMH D2)

(ABANDONED 36" ARMY GRAVITY SEWER OUTFALL)

SL D, STA. 3+49.27

3+00

CUT AND PLUG (TYP.)

SMH D1

EX PUMP STATION 3
FOR DEMOLITION SEE DET. SHT. C016

EX CONC. BARRIERS

285°12'34" – 246.69'
(STA. "CO" TO STA. "PARKING")

SFM 1-1/4

1+00

11°10'42" – 309.00'
(SMH D1 TO CS6 PS)

2+00

SEWER FORCE MAIN CS6
FOR PROFILE SEE SHT C009

SAND ISLAND STATE RECREATION AREA
TMK: (1)1-5-041:006

576.66' – 129°59'51"
(STA. "PARKING" TO STA. "KIAWE")

116.10' – 235°39'49"
(STA. "CO" TO SMH D1)

EXISTING PUMP STATION 3 WETWELL

EXISTING FORCE MAIN 3 (TO BE ABND.)

TO BE ABND.

STA. "CO"
ELEV.=6.81

EX. 4" FROM COMFORT STATION 6

PRELOADER CS6

S4

V2

COMFORT STATION #6

CS6 GRINDER PS

SAND ISLAND STATE RECREATION AREA ℄

3+00

FM4

365.00' – 104°43'29"

4+00

104°43'29" 18.60'

74.31' – 104°43'29"

5+00

STA. "KIAWE"
ELEV.=6.34

435.28' – 153°11'54"
(STA. "CO" TO STA. "KIAWE")

TMK 1-5-041:022
(STATE OF HAWAII
EO-4492 DLNR STATE PARKS)

FUTURE SOFTBALL FIELDS AND IRRIG. PIPING (BY OTHERS) SEE DLNR JOB NO. F70C616C

NOTES:

1) CONTRACTOR SHALL COORDINATE WORK WITH FUTURE DLNR PROJECT "SAND ISLAND STATE RECREATION AREA PARK IMPROVEMENT – PHASE V", JOB NO. F70C616C. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO CONSTRUCTION.

2) ~~CONTRACTOR TO PROVIDE CONTINUOUS SEWER SERVICE TO ALL COMFORT STATIONS.~~

3) CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS BACK TO ORIGINAL CONDITION OR BETTER.

PUMP STATION 3 & GRAVITY SEWER LOCATION PLAN

SCALE: 1"=30'

GRAPHIC SCALE:
1" = 30' 30' 15' 0 30' 60'

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: REVISE PARKING GRAVEL, REVISE NOTES, ADD CALLOUTS.	8 of 25	2/19/2021	

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

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SIGNATURE — APRIL 30, 2020 LIC. EXP. DATE

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Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

PUMP STATION 3 & GRAVITY SEWER PLAN

DESIGNED:	AM/JB	SUBMITTED:	
DRAWN:	SF	DATE:	
CHECKED:		SCALE:	
APPROVED:		DRAWING NO.	C007

JOB NO. F70C616E SHEET NO. 8 OF 30 SHEETS

Thu, 18 Feb 2021 - 8:17pm
K:\aw\02948 02 Sand Island Park Sewer Eng Phase 2\Drawings\Construction Dgn\400 - 1 - Phase 2 - PS 3 and FM 3 New Alignment\8 PS 3 Site Mapping

SAND ISLAND WASTEWATER TREATMENT PLANT
TMK (1)1-5-041:005
(STATE OF HAWAII EO3939-CITY AND COUNTY OF HONOLULU)

45' WIDE SEWER EASEMENT IN FAVOR OF CITY AND COUNTY OF HONOLULU

CONSTRUCTION PHASE 3

CONSTRUCTION PHASE 2

AM/FM3

AM/FM4

e/l m60

VALVE VAULT SEE PLAN AND PROFILE SHT C010

PUMP STATION 3 WETWELL
STA. 0+00, SL D
SEE SHT. C019 FOR DET.
TOP=8.00±
INV. (OUT)=2.71
INV. (IN)=-2.56
SUMP=-8.15

PRELOADER 3
STA. 0+14, SL D
SEE SHT. C019 FOR DET.
TOP=8.22±
INV. (IN)=-2.79
INV. (OUT)=-2.56
SUMP=-6.06

1ut/1rr3

SAND ISLAND STATE RECREATION AREA
TMK: (1)1-5-041:006

FUTURE PARKING STALLS (BY OTHERS) SEE DLNR JOB NO. F70C616C

AC PAVEMENT

EX. SPECIAL SMH 1
INV.=2.5 (EX. S6)
=2.2 (EX FM 4)
=2.0 (EX. FM 4)
(PER AS-BUILT DWG)

EX SPECIAL SMH A
INV.=2.0 (EX FM 4)
(PER AS-BUILT DWG)

TRUE NORTH
SCALE: 1"=20'

S8

160.25' — 194°43'29"
(SMH D2 TO PRELOADER 3)

DIRT ROAD

GRAVEL PARKING

FUTURE GRAVEL PARKING (BY OTHERS) SEE DLNR JOB NO. F70C616C SAND ISLAND STATE RECREATION AREA PARK IMPROVEMENT — PH V

EX SEWER LINE D
EX SPCL SMH1 TO EX PS3 PRELOADER SMH)
206.31'
96°48'19"

EX SEWER LINE D
(EX SPCL SMH1 TO SMH D1)
148.35'
96°48'19"

(STA. "CO" TO STA. "PARKING")
85°12'34" — 246.69'

SMH D1
STA. 3+49.27, SL D
=STA. 0+00, SL CS-6
TOP=6.43±
INV.=1.44
CONTRACTOR TO VERIFY INVERT
SEE DET ON SHT C020

SEWER LINE CS6 FOR PROFILE SEE SHT C009

SMH D2
STA. 1+74.27, SL D
TOP=6.91±
INV.=-0.31
CONTRACTOR TO VERIFY GROUND ELEVATION

175.00' — 186°48'19"
(SMH D1 TO SMH D2)

CUT AND PLUG (TYP.)

1+00 SFM1-1/4 -S8-

FORCE MAIN 3
SEE PLAN AND PROFILE SHTS. C010 TO C014

1+00

FM4

e/36 (ABND.)

(ABANDONED 36" ARMY GRAVITY SEWER OUTFALL)

FUTURE IRRIG. LINE. (BY OTHERS) SEE DLNR JOB NO. F70C616C

e/s36 (ABND.)

e/s6 TO BE (ABND.)

PLAN: SEWER LINE D

SCALE: 1" = 20'

EXIST. GROUND ALONG SEWER LINE ℄

MIN. 3' COVER, TYP.

0+14 PRELOADER 3
-2.31 S8 (IN)
-2.56 S6 (OUT)
-6.06 SUMP

START CONSTRUCTION PUMP STATION 3 WETWELL
S6 (IN) -2.56
S3 (OUT) -2.71
SUMP -8.15
0+00

160.25 LF 8" PVC @ S=1.25%

1+74.27 SMH D2 -0.31 S8

175.0 LF 8" PVC @ S=1.00%

3+88.23 SMH D1
1.44 S1-1/4 (IN)
1.44 S8 (OUT)
1.44 e/s6 (IN)

PROPOSED S8
Qa = 0.881 mgd
Qr = 0.144 mgd
Va = 3.87 fps
Vr = 2.93 fps
n = 0.013
s = 0.0125 ft/ft

PROPOSED S8
Qa = 0.789 mgd
Qr = 0.144 mgd
Va = 3.46 fps
Vr = 2.65 fps
n = 0.013
s = 0.01 ft/ft

0 -10 -20

0+00 1+00 2+00 3+00 4+00 5+00 6+00

PROFILE: SEWER LINE D

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

GRAPHIC SCALES:

HOR: 1"=20' 1" = 20' 20' 10' 0 20' 40'

VERT: 1"=4' 1" = 4' 4' 2' 0 4' 8'

NOTES:

1) CONTRACTOR SHALL COORINDATE WORK WITH FUTURE DLNR PROJECT "SAND ISLAND STATE RECREATION AREA PARK IMPROVEMENT — PHASE V", JOB NO. F70C616C. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO CONSTRUCTION.

2) CONTRACTOR TO PROVIDE CONTINUOUS SEWER SERVICE TO ALL COMFORT STATIONS.

3) CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS BACK TO ORIGINAL CONDITION OR BETTER.

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: REVISE GRAVEL PARKING, REVISE CALLOUTS	9 of 25	2/19/2021	

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

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SIGNATURE — APRIL 30, 2020 LIC. EXP. DATE

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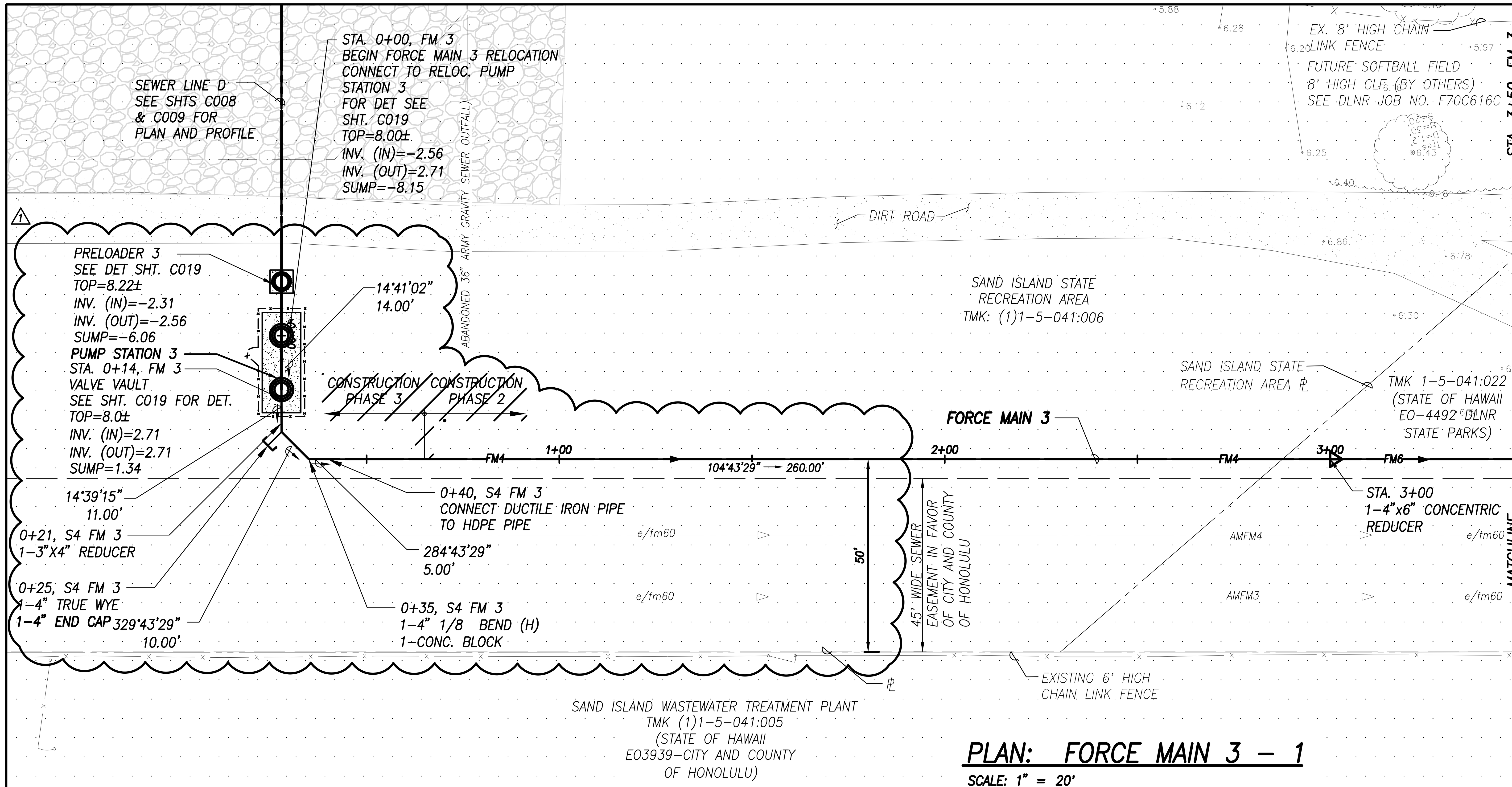
Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

SEWER LINE D
PLAN AND PROFILE

DESIGNED:	AM/JB/AT	SUBMITTED:	
DRAWN:	JB/AT/SF	DATE:	
CHECKED:	AM	SCALE:	H: 1"=20', V: 1"=4'
APPROVED:		DRAWING NO.	C008

JOB NO. F70C616E SHEET NO. 9 OF 30 SHEETS

Thu, 18 Feb 2021 - 2:07pm
K:\w\2548 02 Sand Island Park Sewer Proj Phase 2\Drawings\Construction Dwgs\ASB - 1 - Phase 2 - PS 3 and FM 3 New Alignment\SS SEWER LINE D PLAN AND PROFILE_revcover.dwg



PLAN: FORCE MAIN 3 - 1

SCALE: 1" = 20'

TRUE NORTH
SCALE: 1"=20'

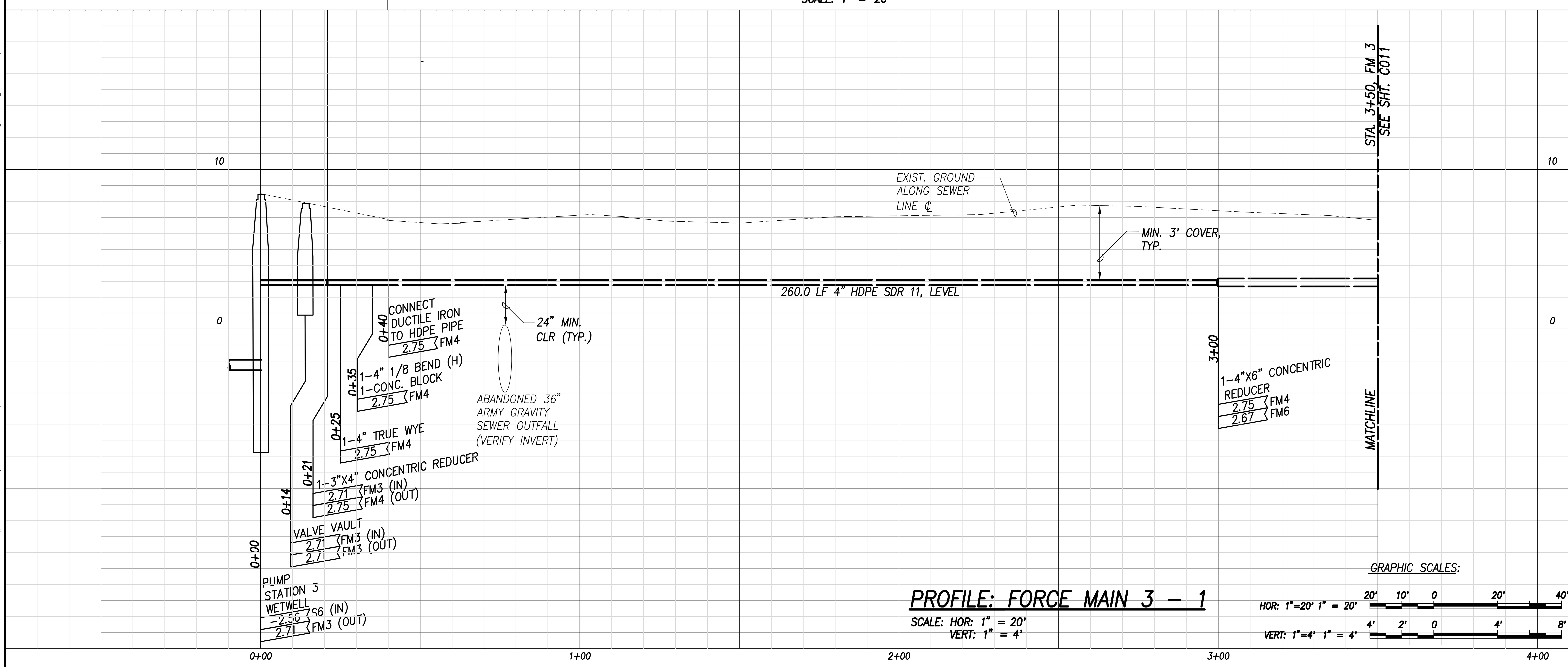
5) USE OF DIRT ROAD SHALL SHARED BY VARIOUS CONTRACTORS. CONTRACTOR SHALL COORDINATE WITH CONCURRENT AND FUTURE PROJECTS. SEE SHT C005A.

NOTE:

1) ~~CONTRACTOR TO PROVIDE CONTINUOUS SEWER SERVICE.~~
2) CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS BACK TO ORIGINAL CONDITION OR BETTER.
3) FOR LIMITS OF DISTURBED AREA SEE SHT. C004.
4) ~~IF THE NEW FORCE MAIN ALIGNMENT DEVIATES FROM THE EXISTING FORCE MAIN ALIGNMENT, THE CONTRACTOR SHALL CLSM FILL AND ABANDON IN PLACE.~~

LEGEND :

- PROPERTY LINE
- EXISTING EASEMENT
- e/fm4 EX. SEWER LINE (W/ TYPE, DIR., AND SIZE)
- FM4 PROPOSED SEWER LINE (W/ TYPE, DIR. AND SIZE)
- NEW SEWER MANHOLE
- EX. SEWER MANHOLE
- SPECIAL MANAGEMENT AREA (SMA)



PROFILE: FORCE MAIN 3 - 1

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

GRAPHIC SCALES:

HOR: 1"=20' 1" = 20' — 20' 10' 0 20' 40'

VERT: 1"=4' 1" = 4' — 4' 2' 0 4' 8'

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	⚠	ADDENDUM NO. 1: REVISED CALLOUTS AND NOTES.	10 of 25	2/19/2021	

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

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SIGNATURE — APRIL 30, 2020 LIC. EXP. DATE

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Planning – Engineering – Environmental Services – Photogrammetry – Surveying – Construction Management

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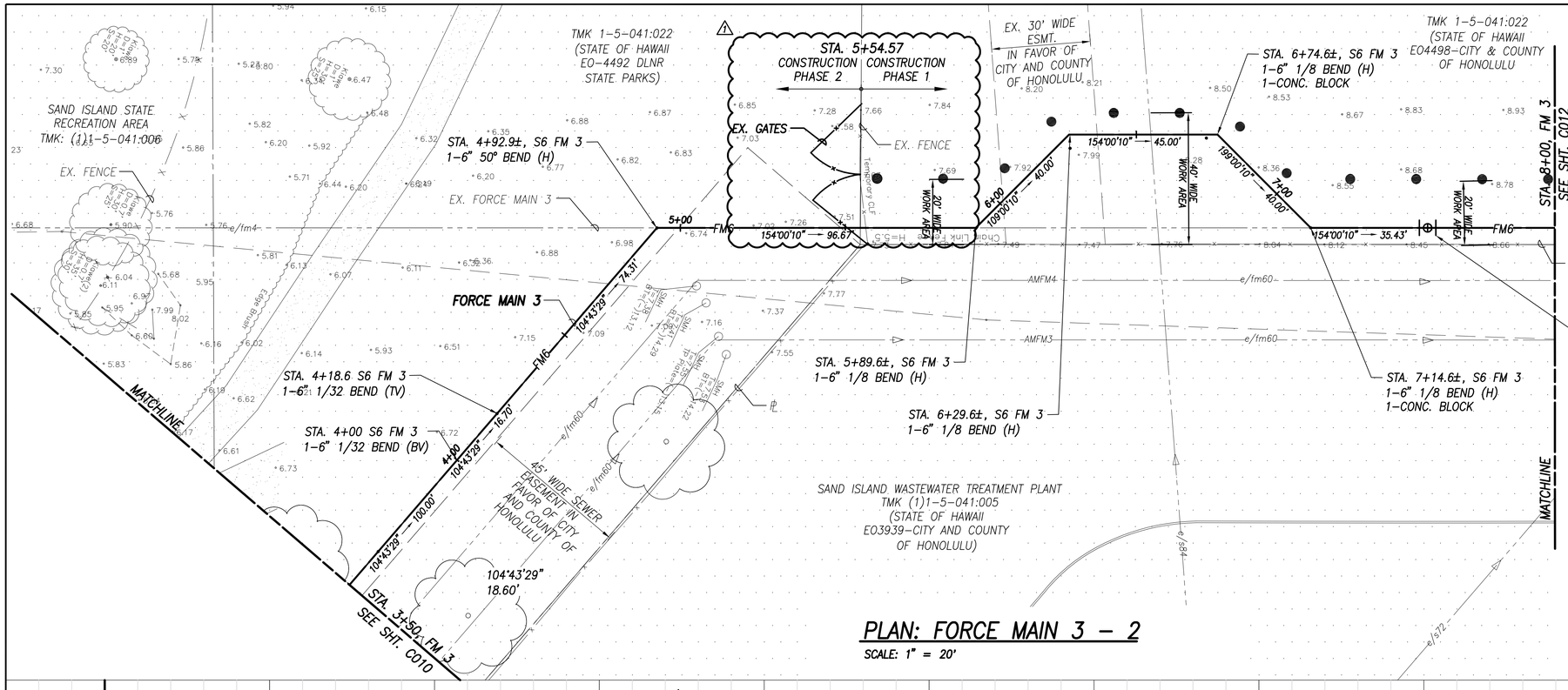
Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

FORCE MAIN 3 PLAN AND PROFILE - 1

DESIGNED:	AT	SUBMITTED:	
DRAWN:	SF	DATE:	
CHECKED:	AM	SCALE:	
APPROVED:		DRAWING NO.	C010

JOB NO. F70C616E SHEET NO. 11 OF 30 SHEETS



PLAN: FORCE MAIN 3 – 2

SCALE: 1" = 20'

NOTE:

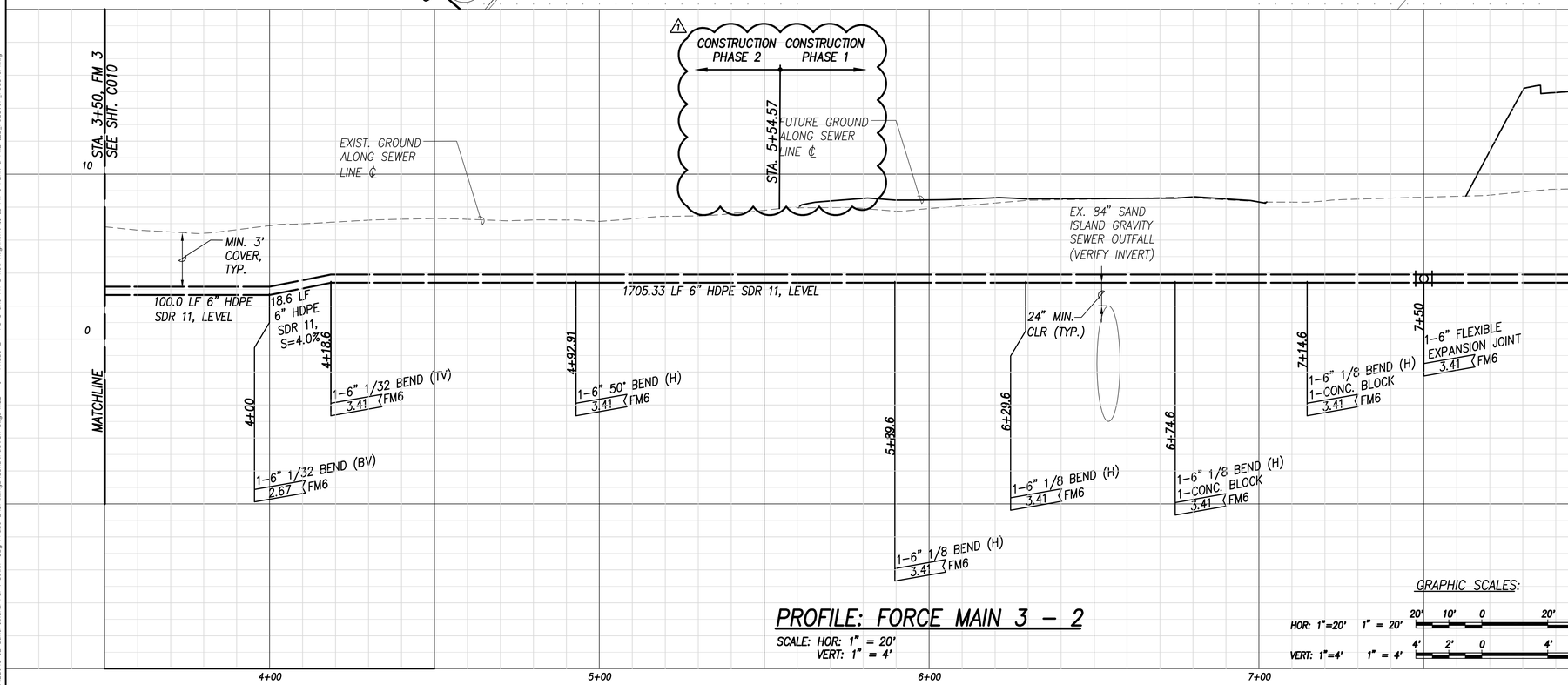
1) ~~CONTRACTOR TO PROVIDE CONTINUOUS SEWER SERVICE.~~
2) ~~CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS BACK TO ORIGINAL CONDITION OR BETTER.~~
3) FOR LIMITS OF DISTURBED AREA SEE SHT. C004.
4) IF THE NEW FORCE MAIN ALIGNMENT DEVIATES FROM THE EXISTING FORCE MAIN ALIGNMENT, THE CONTRACTOR SHALL CLSM FILL AND ABANDON IN PLACE.

LEGEND:

- PROPERTY LINE
- EXISTING EASEMENT
- e/fm4 EX. SEWER LINE (W/ TYPE, DIR., AND SIZE)
- FM4 PROPOSED SEWER LINE (W/ TYPE, DIR. AND SIZE)
- NEW SEWER MANHOLE
- EX. SEWER MANHOLE
- SPECIAL MANAGEMENT AREA (SMA)
- EXPANSION JOINT
- CONES OR BARRIER FOR WORK AREA

NOTES (CONT.):

5) ACCESS GATE FOR PHASE 1 SHALL BE SHARED BY VARIOUS CONTRACTORS. CONTRACTOR SHALL COORDINATE WITH CONCURRENT AND FUTURE PROJECTS. SEE SHT C005A.
6) USE OF DIRT ROAD SHALL BE SHARED BY VARIOUS CONTRACTORS. CONTRACTOR SHALL COORDINATE WITH CONCURRENT AND FUTURE PROJECTS. SEE SHT C005A.
7) CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS BACK TO ORIGINAL CONDITION OR BETTER FOR CONSTRUCTION PHASE 2.
8) CONTRACTOR DOES NOT NEED TO RESTORE GROUND COVER AFTER BACKFILLING TRENCH FOR CONSTRUCTION PHASE 1.
9) CONTRACTOR MUST COMPLETE PHASE 1 WORK BY JUNE 7, 2021.



PROFILE: FORCE MAIN 3 – 2

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

GRAPHIC SCALES:

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

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: REVISED NOTES.	11 of 25	2/19/2021	

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

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SIGNATURE APRIL 30, 2020 LIC. EXP. DATE

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Planning – Engineering – Environmental Services – Photogrammetry – Surveying – Construction Management
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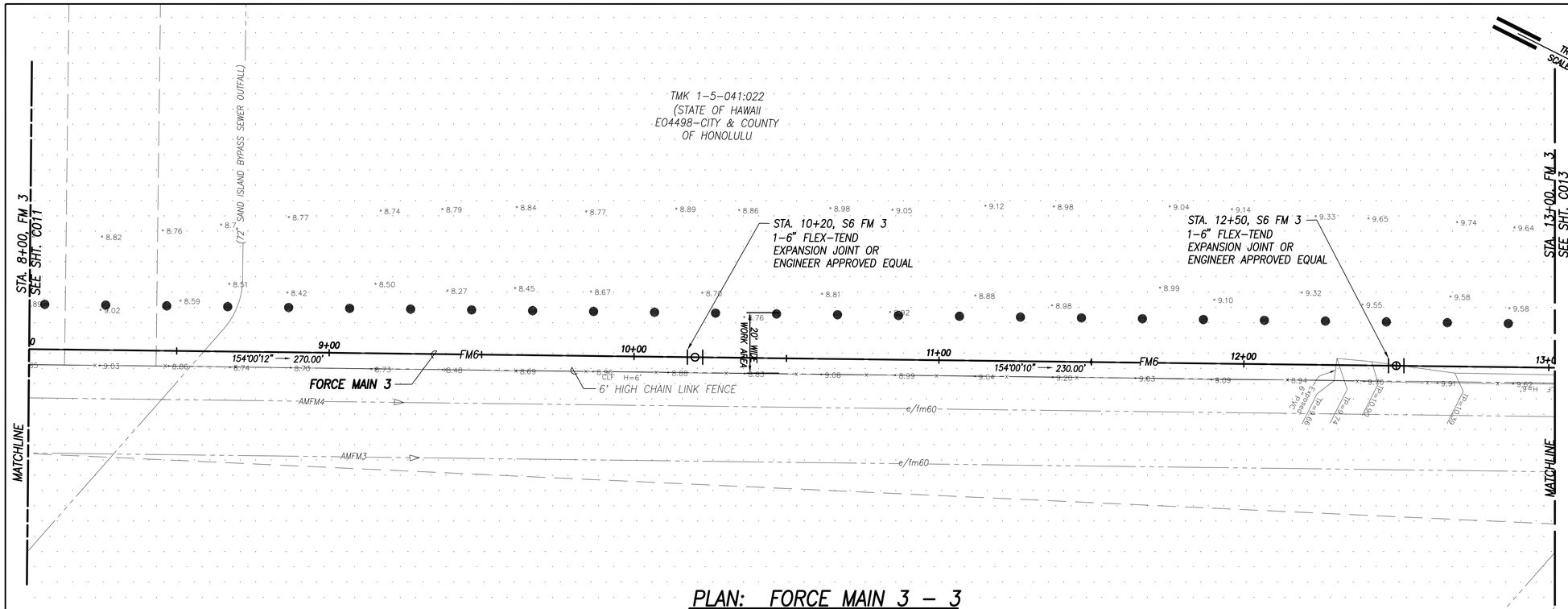
Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

FORCE MAIN 3 PLAN AND PROFILE – 2

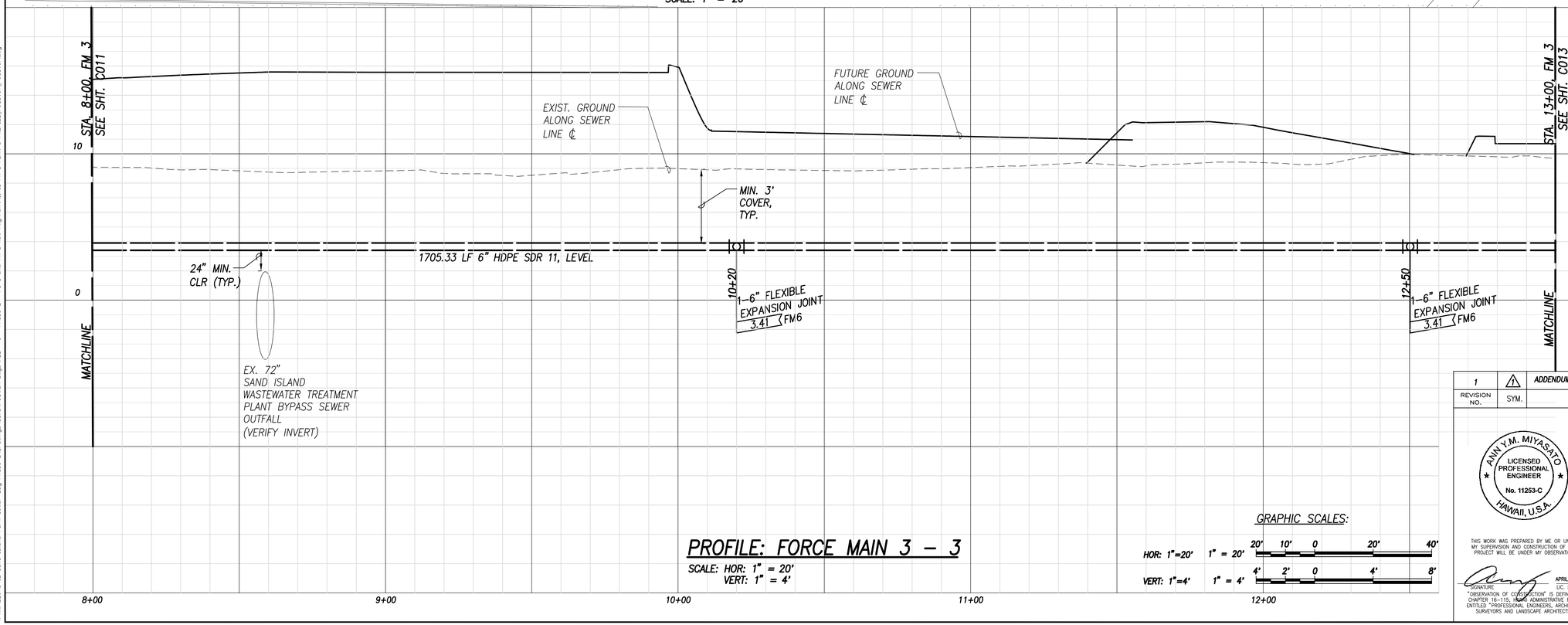
DESIGNED:	AM/JB	SUBMITTED:	
DRAWN:	SF	DATE:	
CHECKED:		SCALE:	
APPROVED:		DRAWING NO.	C011

JOB NO. F70C616E SHEET NO. 12 OF 30 SHEETS



PLAN: FORCE MAIN 3 – 3

SCALE: 1" = 20'



PROFILE: FORCE MAIN 3 – 3

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

GRAPHIC SCALES:

HOR: 1"=20' 1" = 20' 20' 10' 0 20' 40'

VERT: 1"=4' 1" = 4' 4' 2' 0 4' 8'

NOTE:

1) ~~CONTRACTOR TO PROVIDE CONTINUOUS SEWER SERVICE.~~
2) ~~CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS BACK TO ORIGINAL CONDITION OR BETTER.~~
3) FOR LIMITS OF DISTURBED AREA SEE SHT. C004.
4) IF THE NEW FORCE MAIN ALIGNMENT DEVIATES FROM THE EXISTING FORCE MAIN ALIGNMENT, THE CONTRACTOR SHALL CLSM FILL AND ABANDON IN PLACE.

LEGEND:

- PROPERTY LINE
- EXISTING EASEMENT
- e/fm4 EX. SEWER LINE (W/ TYPE, DIR., AND SIZE)
- FM4 PROPOSED SEWER LINE (W/ TYPE, DIR. AND SIZE)
- NEW SEWER MANHOLE
- EX. SEWER MANHOLE
- SPECIAL MANAGEMENT AREA (SMA)
- EXPANSION JOINT
- CONE OR BARRIER FOR WORK AREA

NOTES (CONT.):

5) EO AREA FOR PHASE 1 IS TO BE SHARED BY VARIOUS CONTRACTORS. CONTRACTOR SHALL COORDINATE WITH CONCURRENT AND FUTURE PROJECTS. SEE SHT C005A
6) CONTRACTOR DOES NOT NEED TO RESTORE GROUND COVER AFTER BACKFILLING TRENCH FOR CONSTRUCTION PHASE 1.
7) CONTRACTOR MUST COMPLETE PHASE 1 WORK BY JUNE 7, 2021.

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	⚠	ADDENDUM NO. 1: REVISED NOTES.	12 of 25	2/19/2021	

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

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SIGNATURE APRIL 30, 2020 LIC. EXP. DATE

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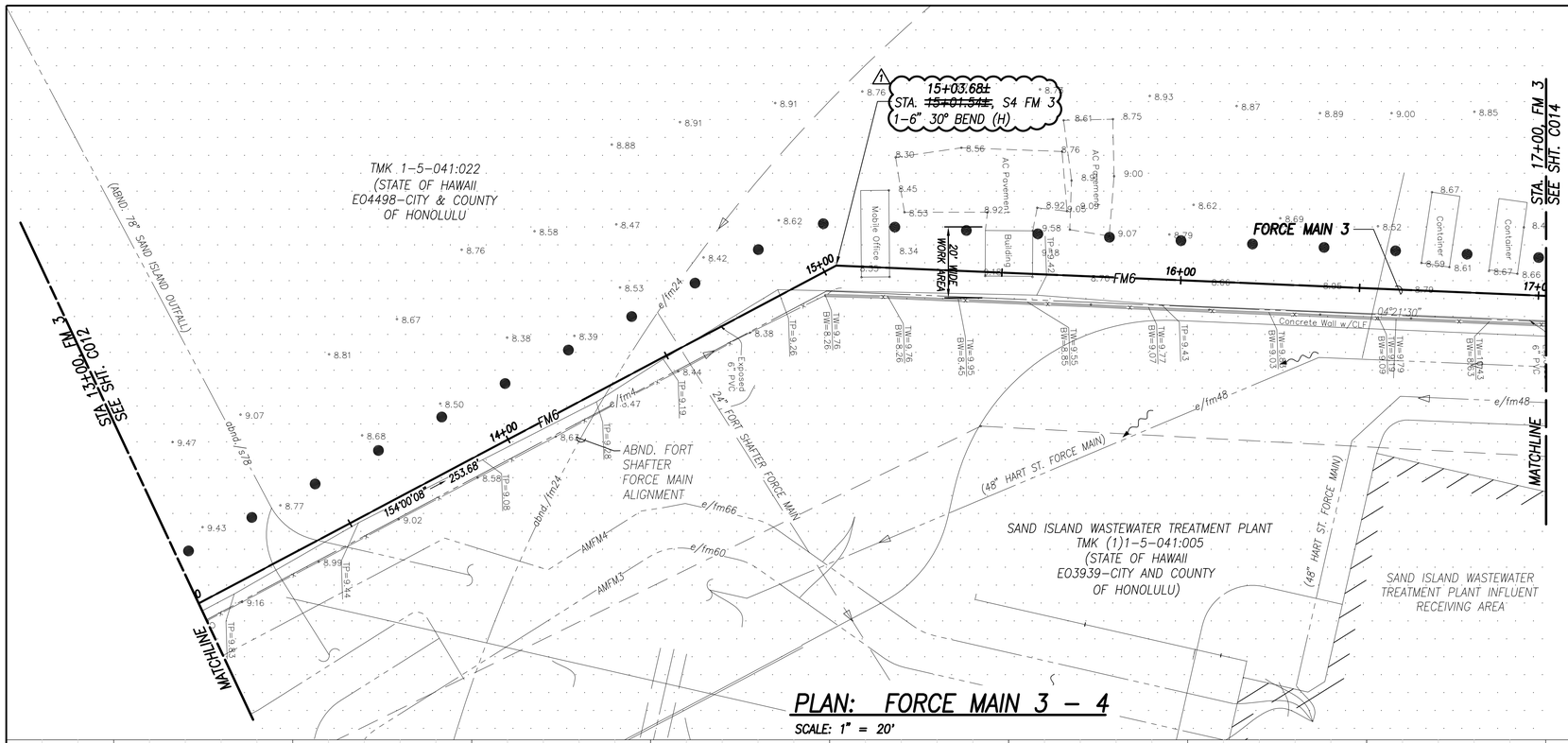
Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

FORCE MAIN 3
PLAN AND PROFILE – 3

DESIGNED: AM/JB	SUBMITTED:
DRAWN: SF	DATE:
CHECKED:	SCALE:
APPROVED:	DRAWING NO. C012

JOB NO. F70C616E SHEET NO. 13 OF 30 SHEETS



PLAN: FORCE MAIN 3 – 4

SCALE: 1" = 20'

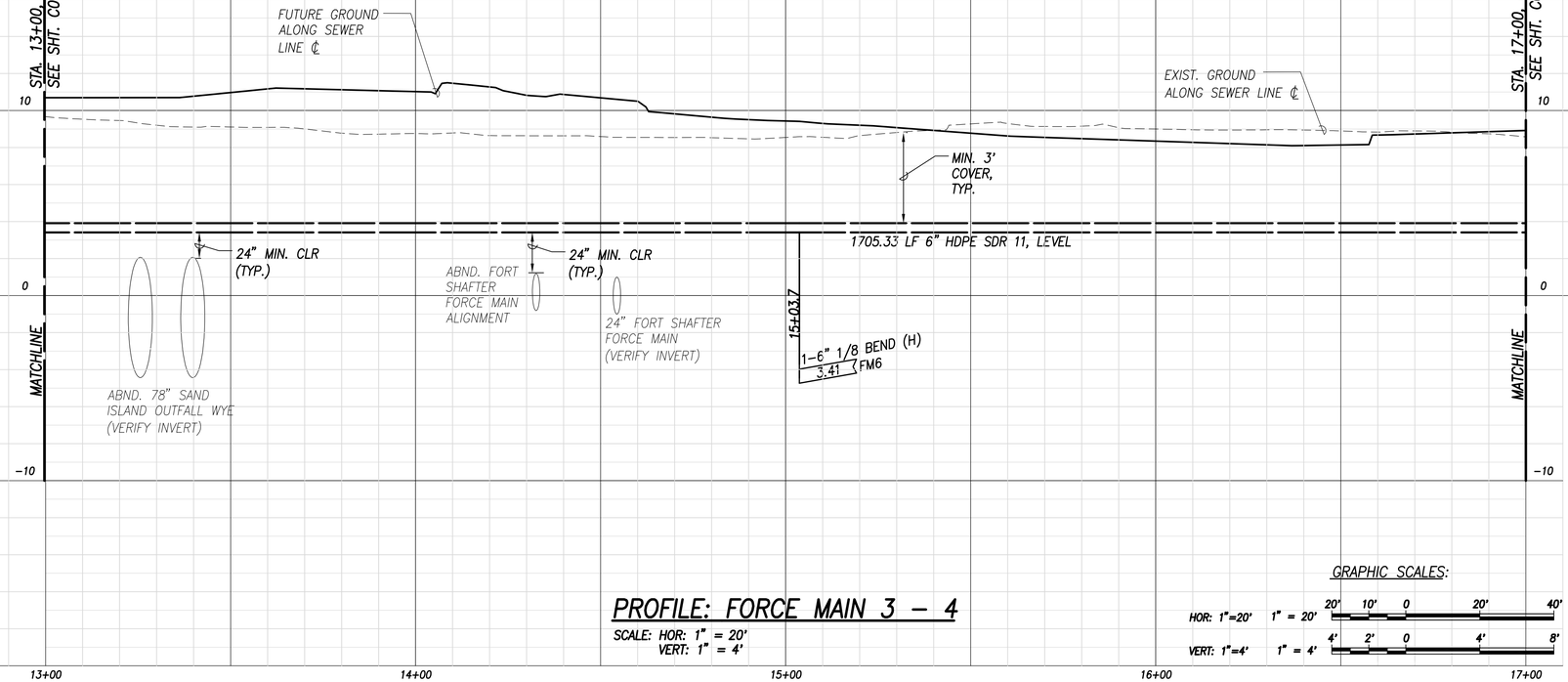
TRUE NORTH
SCALE: 1"=20'

NOTE:

1) ~~CONTRACTOR TO PROVIDE CONTINUOUS SEWER SERVICE.~~
2) ~~CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS BACK TO ORIGINAL CONDITION OR BETTER.~~
3) FOR LIMITS OF DISTURBED AREA SEE SHT. C004.
4) ~~CONTRACTOR TO VERIFY IF ANY CONTAINERS, BUILDINGS, ETC. WITH IN NEW FM ALIGNMENT NEEDS TO BE RELOCATED AND/OR DEMOLISHED. ALL COST INCIDENTAL TO PROJECT.~~
4) IF THE NEW FORCE MAIN ALIGNMENT DEVIATES FROM THE EXISTING FORCE MAIN ALIGNMENT, THE CONTRACTOR SHALL CLSM FILL AND ABANDON IN PLACE.

LEGEND:

- PROPERTY LINE
- EXISTING EASEMENT
- e/fm4 — EX. SEWER LINE (W/ TYPE, DIR., AND SIZE)
- FM4 — PROPOSED SEWER LINE (W/ TYPE, DIR. AND SIZE)
- NEW SEWER MANHOLE
- EX. SEWER MANHOLE
- SPECIAL MANAGEMENT AREA (SMA)
- CONE OR BARRIER FOR WORK AREA



PROFILE: FORCE MAIN 3 – 4

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

GRAPHIC SCALES:

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

NOTES (CONT.):

5) EO AREA FOR PHASE 1 IS TO BE SHARED BY VARIOUS CONTRACTORS. CONTRACTOR SHALL COORDINATE WITH CONCURRENT AND FUTURE PROJECTS. SEE SHT C005A.
6) CONTRACTOR DOES NOT NEED TO RESTORE GROUND COVER AFTER BACKFILLING TRENCH FOR CONSTRUCTION PHASE 1.
7) CONTRACTOR MUST COMPLETE PHASE 1 WORK BY JUNE 7, 2021.

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: REVISED STATION AND NOTES.	13 of 25	2/19/2021	

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.

SIGNATURE APRIL 30, 2020 LIC. EXP. DATE
"OBSERVATION OF CONSTRUCTION" IS DEFINED IN CHAPTER 16-115, HAR ADMINISTRATIVE RULES, ENTITLED "PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS."

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

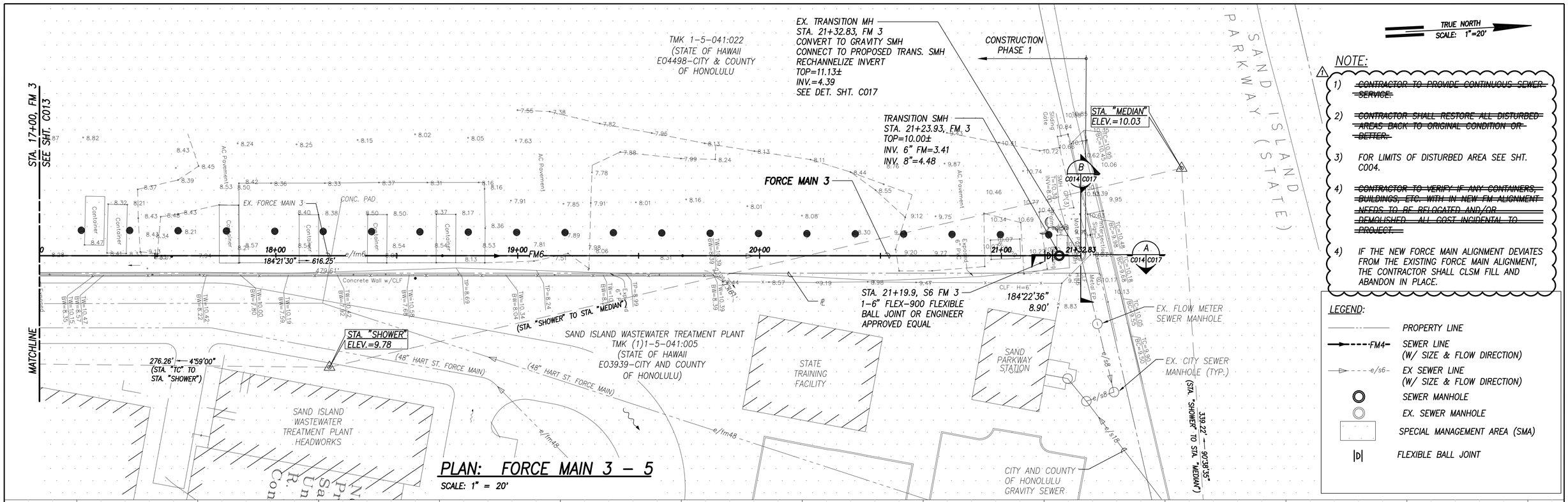
Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

FORCE MAIN 3
PLAN AND PROFILE – 4

DESIGNED:	AM/JB	SUBMITTED:	
DRAWN:	SF	DATE:	
CHECKED:		SCALE:	
APPROVED:		DRAWING NO.	C013

JOB NO. F70C616E SHEET NO. 14 OF 30 SHEETS

Fri, 19 Feb 2021 - 8:54am
P:\Towill\Sand Island Park Sewer Dsg Phase 2\Drawings\Construction Dwgs\ASD - 1 - Phase 2 - PS 3 and FM 3 New Alignment\11-15 FM 3 PLAN & PROFILE_recover_r.recover.dwg



PLAN: FORCE MAIN 3 – 5

SCALE: 1" = 20'

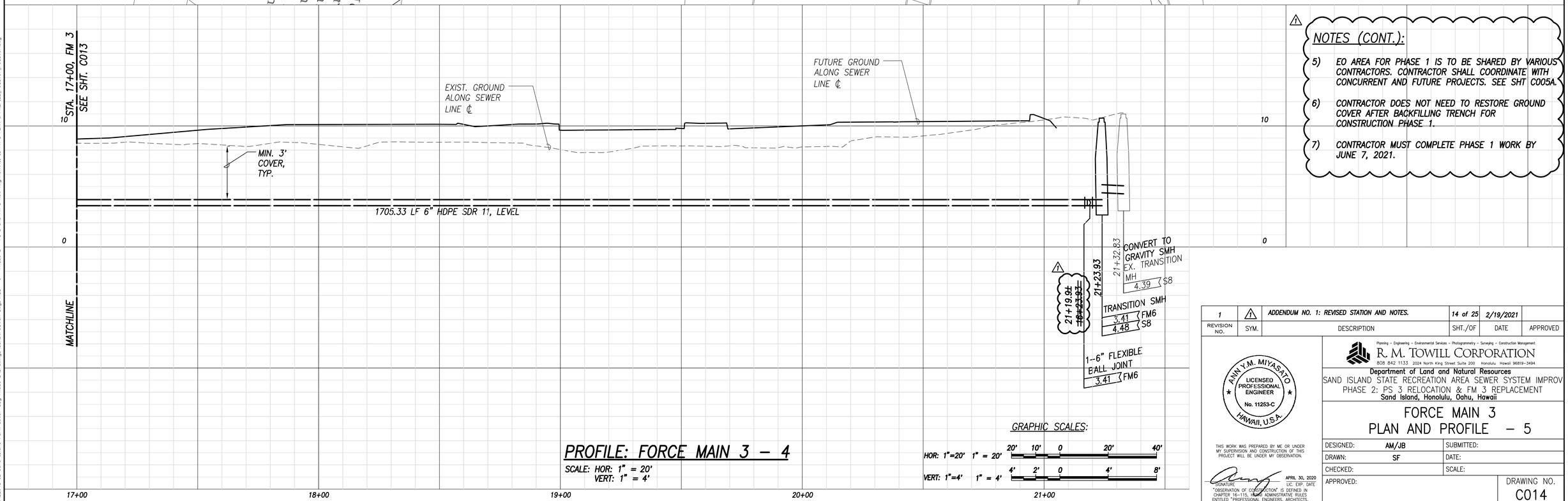
TRUE NORTH
SCALE: 1"=20'

NOTE:

1) ~~CONTRACTOR TO PROVIDE CONTINUOUS SEWER SERVICE.~~
2) ~~CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS BACK TO ORIGINAL CONDITION OR BETTER.~~
3) FOR LIMITS OF DISTURBED AREA SEE SHT. C004.
4) ~~CONTRACTOR TO VERIFY IF ANY CONTAINERS, BUILDINGS, ETC. WITH IN NEW FM ALIGNMENT NEEDS TO BE RELOCATED AND/OR DEMOLISHED. ALL COST INCIDENTAL TO PROJECT.~~
4) IF THE NEW FORCE MAIN ALIGNMENT DEVIATES FROM THE EXISTING FORCE MAIN ALIGNMENT, THE CONTRACTOR SHALL CLSM FILL AND ABANDON IN PLACE.

LEGEND:

- PROPERTY LINE
- FM4 — SEWER LINE (W/ SIZE & FLOW DIRECTION)
- e/s6 — EX SEWER LINE (W/ SIZE & FLOW DIRECTION)
- SEWER MANHOLE
- EX. SEWER MANHOLE
- SPECIAL MANAGEMENT AREA (SMA)
- |D| FLEXIBLE BALL JOINT



PROFILE: FORCE MAIN 3 – 4

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

NOTES (CONT.):

5) EO AREA FOR PHASE 1 IS TO BE SHARED BY VARIOUS CONTRACTORS. CONTRACTOR SHALL COORDINATE WITH CONCURRENT AND FUTURE PROJECTS. SEE SHT C005A.
6) CONTRACTOR DOES NOT NEED TO RESTORE GROUND COVER AFTER BACKFILLING TRENCH FOR CONSTRUCTION PHASE 1.
7) CONTRACTOR MUST COMPLETE PHASE 1 WORK BY JUNE 7, 2021.

GRAPHIC SCALES:

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

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: REVISED STATION AND NOTES.	14 of 25	2/19/2021	

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Department of Land and Natural Resources
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PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

FORCE MAIN 3
PLAN AND PROFILE – 5

DESIGNED:	AM/JB	SUBMITTED:	
DRAWN:	SF	DATE:	
CHECKED:		SCALE:	
APPROVED:		DRAWING NO.	C014

JOB NO. F70C616E

SHEET NO. 15 OF 30 SHEETS

Fri, 19 Feb 2021 - 8:55am
K:\Jobs\70C616E Sand Island Park Sewer Dsg Phase 2\Drawings\Construction Dwgs\ADD - 1 - Phase 2 - PS 3 and FM 3 New Alignment\11-15 FM 3 PLAN & PROFILE_recover.dwg

BMP NOTES:

TEMPORARY EROSION CONTROL MEASURES:

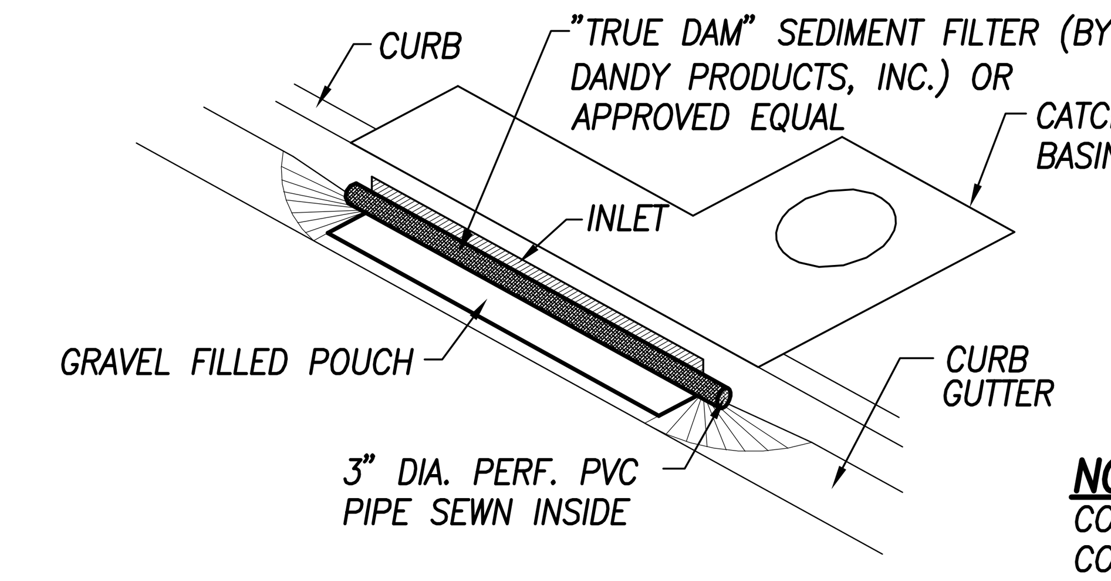
1. PRIOR TO GROUND DISTUBANCE, TEMPORARY EROSION CONTROL MEASURES, SUCH AS COMPOST FILTER SOCK SHALL BE INSTALLED.
2. OPENING AND CLEARING OF LAND SHALL BE PERFORMED INCREMENTALLY TO MINIMIZE EROSION POTENTIAL.
3. WHEN CLEARED OR GRUBBED AREAS ARE NOT TO BE GRADED OR DISTURBED FOR 30 DAYS OR MORE, SEED, PLANT, OR HYDROSEED TEMPORARY VEGETATION, UNLESS REMAINING NATURAL VEGETATION PROVIDES ADEQUATE PROTECTION.
4. BIOSOCK COMPOST FILTER SOCK SHALL BE USED AT LOCATIONS SPECIFIED ON PLANS OR DESIGNATED BY THE CONSTRUCTION MANAGER.
5. SILT WHICH HAS ACCUMULATED ALONG THE FILTER SOCK SHALL BE REMOVED AND DISPOSED OF ON A BI-WEEKLY BASIS.
6. ALL SLOPES AND EXPOSED AREAS SHALL BE SODDED OR PLANTED AS SOON AS FINAL GRADES HAVE BEEN ESTABLISHED. PLANTING SHALL NOT BE DELAYED UNTIL ALL GROUND DISTURBING WORK HAS BEEN COMPLETED. GRADING TO FINAL GRADE SHALL BE CONTINUOUS, AND ANY AREA WITHIN WHICH WORK HAS BEEN INTERRUPTED OR DELAYED SHALL BE PLANTED.
7. TEMPORARY EROSION CONTROLS SHALL NOT BE REMOVED BEFORE PERMANENT EROSION CONTROLS ARE IN-PLACE AND ESTABLISHED.

NOTES FOR ENVIRONMENTAL PROTECTION

1. THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL PROVIDE EFFECTIVE MEASURES FOR THE CONTROL OF FUGITIVE DUST EMISSIONS FROM THE PROJECT AND SURROUNDING AREAS CAUSED BY HIS OPERATIONS. THESE MEASURES SHALL MEET THE REQUIREMENTS OF STATE ADMINISTRATIVE RULES, DEPARTMENT OF HEALTH, AIR POLLUTION CONTROL (11-60.1)
2. ALL GRADING OPERATIONS SHALL BE PERFORMED IN CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE GRADING ORDINANCE TO PREVENT VIOLATION OF THE STATE ADMINISTRATIVE RULES, DEPARTMENT OF HEALTH, WATER POLLUTION CONTROL AND WATER QUALITY STANDARDS. (11-54, 11-55) DUE TO EROSION AND RUN OFF TO STATE WATERS.
3. GRUB MATERIAL, DEMOLITION WASTES, AND CONSTRUCTION WASTES SHALL BE DISPOSED OF AT AN AUTHORIZED SITE HAVING A DEPARTMENT OF HEALTH SOLID WASTE MANAGEMENT PERMIT. OPEN BURNING IS PROHIBITED. THE CONTRACTOR SHALL INFORM THE COUNTY ENGINEER OF THE LOCATION OF THE DISPOSAL SITES. THE DISPOSAL SITE MUST ALSO FULFILL THE REQUIREMENTS OF THE GRADING ORDINANCES.
4. ALL EXCESS MATERIAL SHALL BE REMOVED FROM THE PROJECT SITE.
5. THE PROJECT SITE SHALL BE KEPT DAMP WITH WATER FOR SEVEN (7) DAYS A WEEK. AT THE END OF EACH DAY, THE SITE SHALL BE SUFFICIENTLY DAMPENED SO THAT THE SITE WILL REMAIN MOISTENED DURING THE NIGHT.
6. THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS SO THAT EXCAVATION, EMBANKMENT AND IMPORTED MATERIAL SHALL BE DAMPENED WITH WATER DURING THE GRADING OPERATION.

COMPOST FILTER SOCK NOTES:

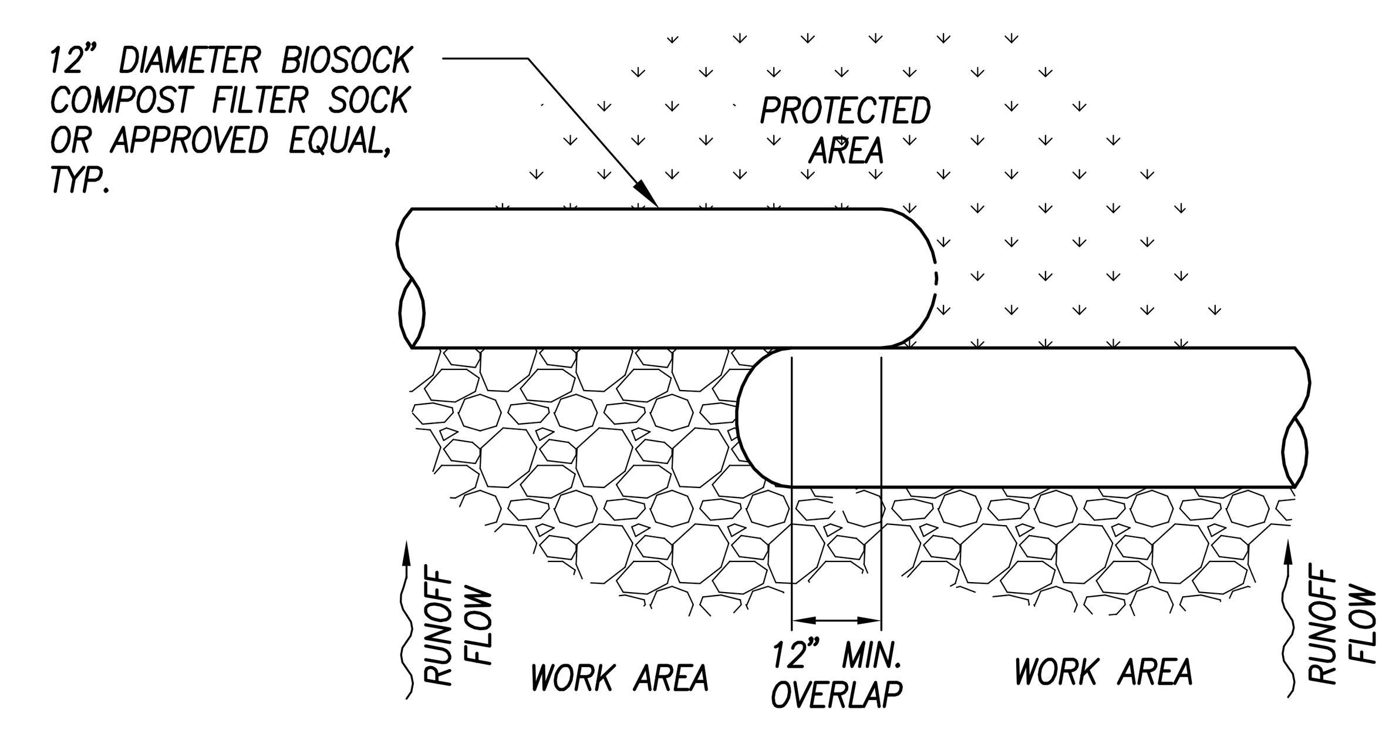
1. COMPOST FILTER SOCK SHALL UTILIZE AN OUTER LAYER OF FILTRATION MESH, AND AN INNER LAYER OF CONTAINMENT NETTING. ALL LAYERS SHALL COLLECTIVELY ENCLOSE THE COMPOST FILTRATION MEDIA. COMPOST FILTER SOCK SHALL BE INSTALLED AS 12" NOMINAL DIAMETERS AS INDICATED ON THE PROJECT DRAWINGS, OR AS SPECIFIED BY THE PROJECT ENGINEER. COMPOST FILTER SOCKS SHALL BE BIOSOCK AS MANUFACTURED BY ENVIROTECH BIOSOLUTIONS, OR APPROVED EQUAL.
2. COMPOST FILTER SOCKS SHALL BE INSTALLED ONSITE USING A COMMERCIAL PNEUMATIC BARK BLOWER. ALTERNATIVELY, COMPOST FILTER SOCKS CAN BE PRE-FABRICATED OFFSITE IN PRE-DETERMINED LENGTHS AND THEN INSTALLED ONSITE. COMPOST FILTER SOCKS SHALL BE PLACED IN THE AREAS SHOWN ON THE PROJECT DRAWINGS OR AS DESIGNATED BY THE PROJECT ENGINEER.
3. WHERE MULTIPLE SECTIONS OF COMPOST FILTER SOCKS ARE REQUIRED TO FORM A CONTINUOUS RUN, THE SECTIONS SHALL BE INSTALLED ACCORDING TO THE ATTACHED DETAILED SPECIFICATIONS FOR PERIMETER PROTECTION AND SHALL HAVE A MINIMUM OVERLAP OF 6 INCHES.
4. INSPECT COMPOST FILTER SOCKS WHEN RAIN IS FORECAST, FOLLOWING RAINFALL EVENTS, AND DAILY DURING PROLONGED RAINFALL. REPAIR, MODIFY, OR SUPPLEMENT COMPOST FILTER SOCK INSTALLATIONS AS NEEDED OR AS REQUIRED BY THE PROJECT ENGINEER.
5. MAINTAIN COMPOST FILTER SOCKS TO PROVIDE ADEQUATE SEDIMENT HOLDING CAPACITY. SEDIMENT SHOULD BE REMOVED WHEN THE SEDIMENT ACCUMULATION REACHES THREE QUARTERS (3/4) OF THE BARRIER HEIGHT. REMOVED SEDIMENT SHOULD BE INCORPORATED IN THE PROJECT AT LOCATIONS DESIGNATED BY THE PROJECT ENGINEER OR DISPOSED OF PROPERLY.
6. UPON COMPLETION OF THE PROJECT AND AFTER PERMANENT BMPS SUCH AS GRASSING HAVE BEEN ESTABLISHED, THE COMPOST FILTER SOCK'S MESH AND NETTING SHALL BE REMOVED FROM THE PROJECT SITE AND DISPOSED OF PROPERLY.

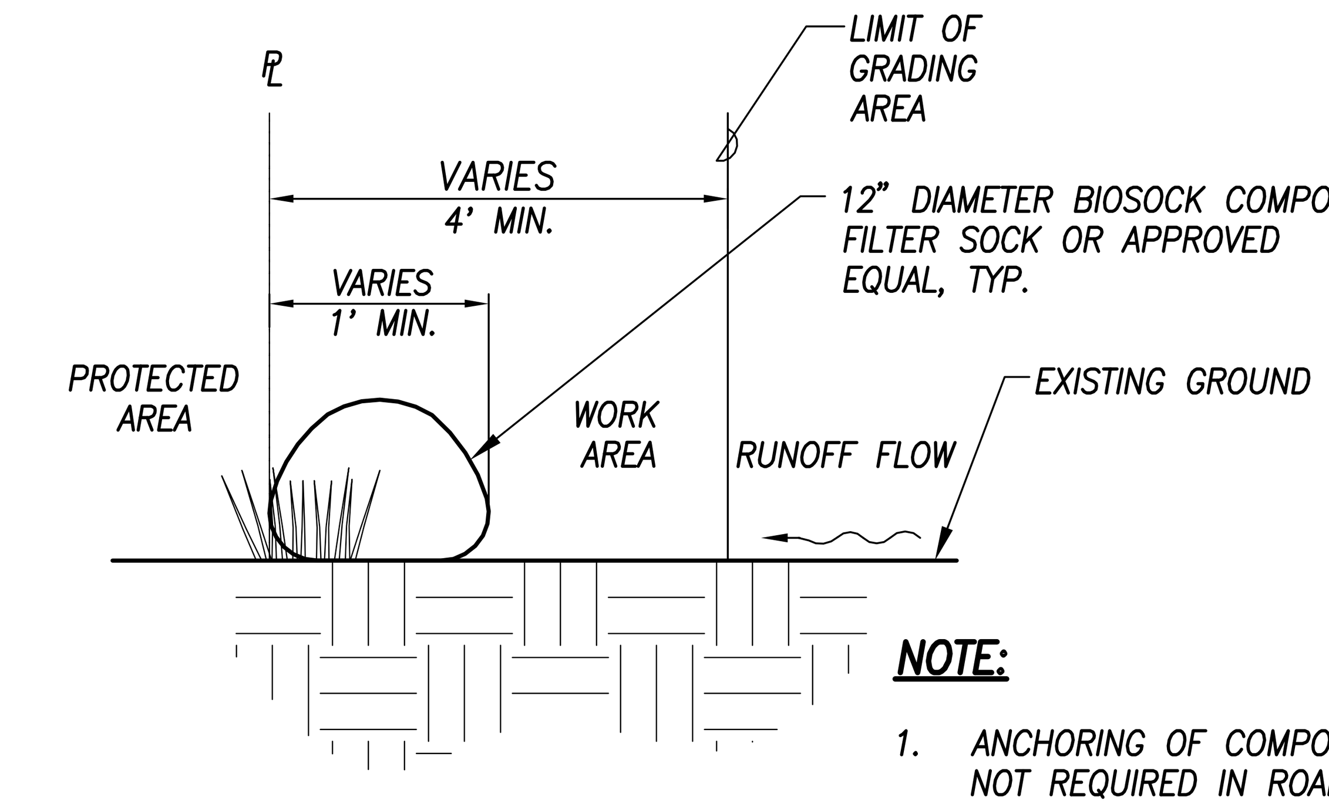


NOTE:
CONTRACTOR TO REMOVE SEDIMENT CONTROL FILTER IN THE EVENT OF AN ABOVE AVERAGE RAINFALL AND REPLACE THE FILTER AFTER THE STORM HAS PASSED.

INLET PROTECTION AT CATCH BASIN

NOT TO SCALE



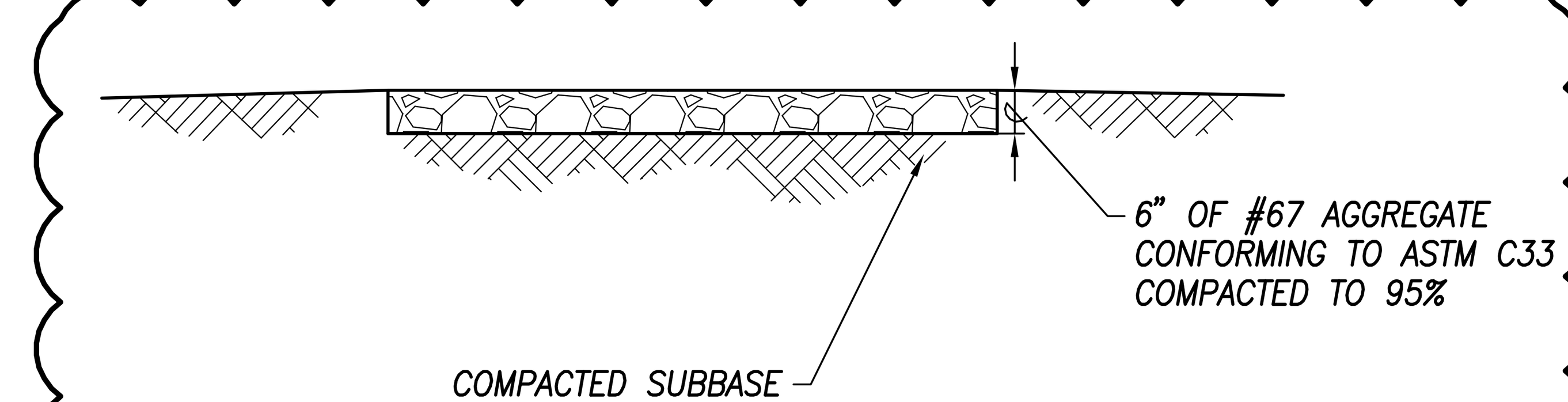


NOTE:

1. ANCHORING OF COMPOST FILTER SOCKS IS NOT REQUIRED IN ROADWAYS OR ON SLOPES LESS THAN 25%.
2. COMPOST SHALL NOT CONTAIN BIOSOLIDS AND SHOULD BE CONSISTENT WITH EPA GUIDELINES.

BIOSOCK COMPOST FILTER SOCK (12" DIA.)

NOT TO SCALE



GRAVEL AREA DETAIL

NOT TO SCALE

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: ADD DETAIL.	15 of 25	2/19/2021	

ANN Y.M. MIYASATO
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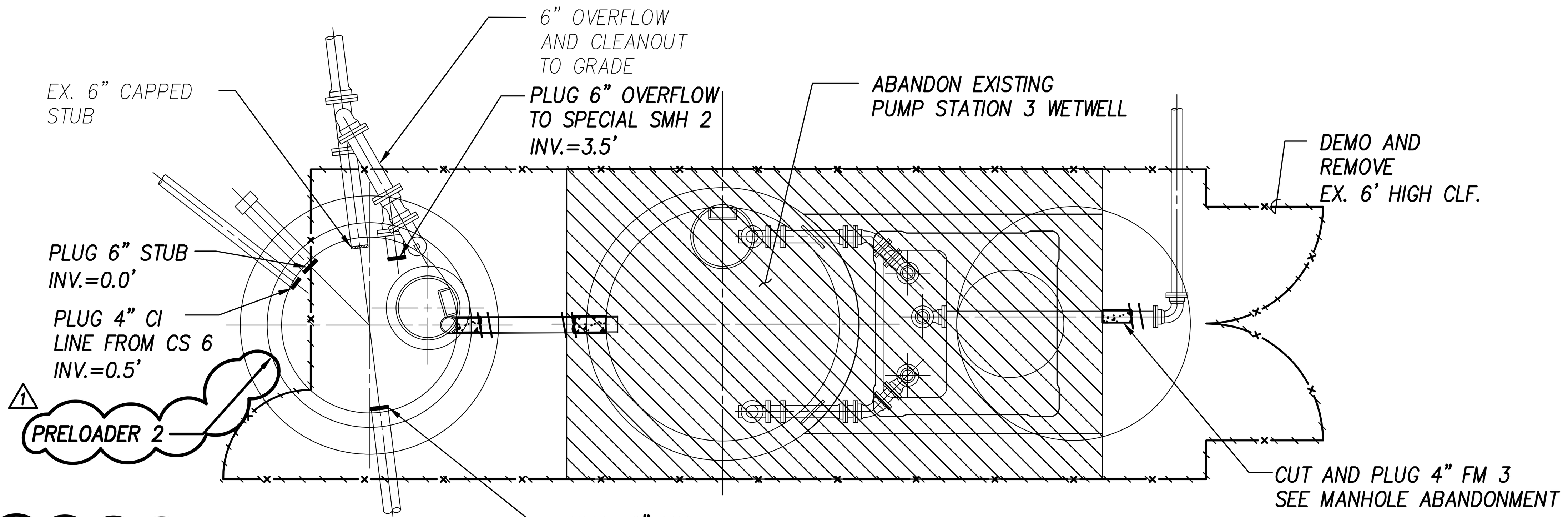
808 842 1133 2024 North King Street Suite 200 Honolulu Hawaii 96819-3494

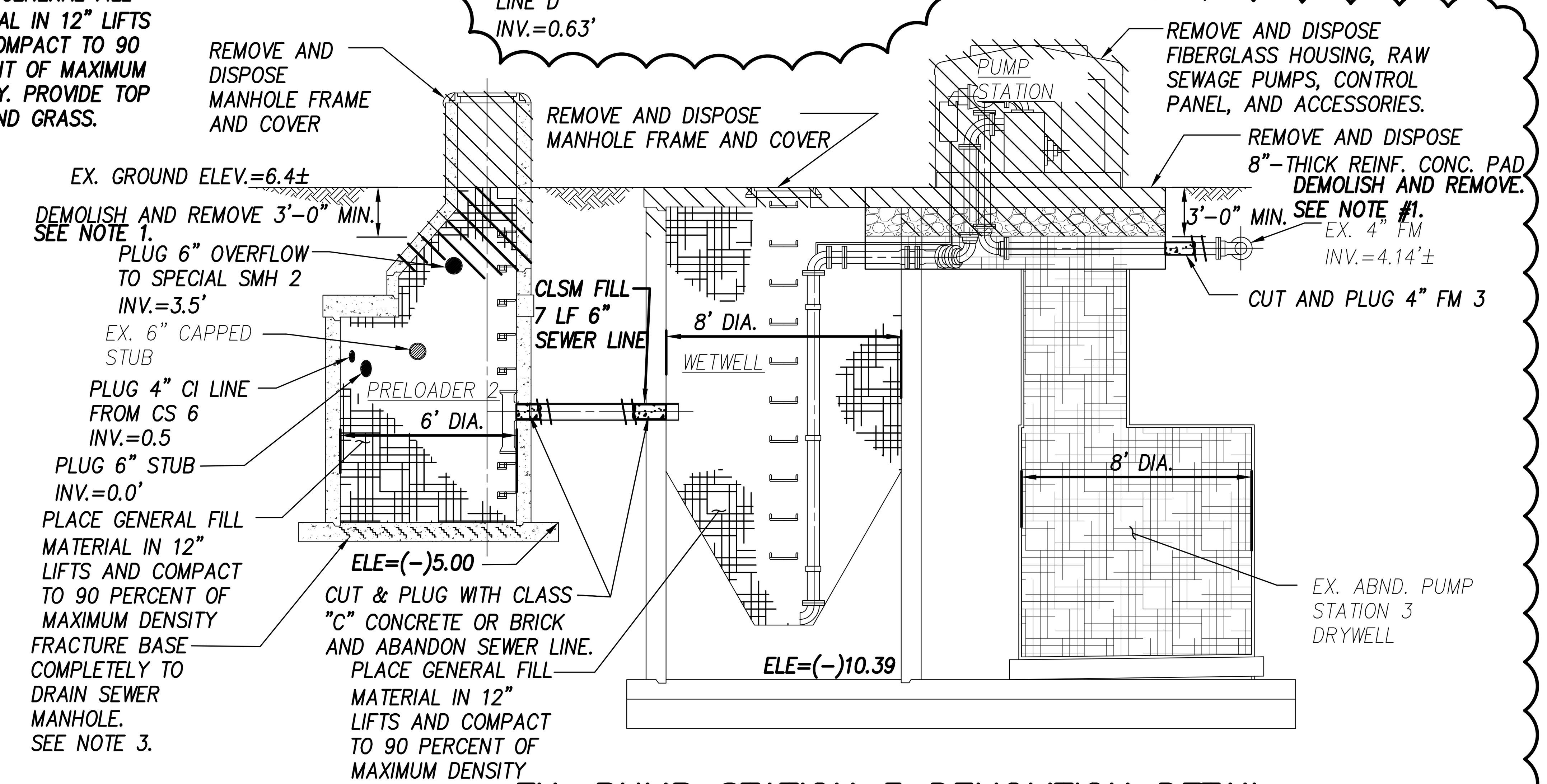
Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

MISCELLANEOUS DETAILS – 1

DESIGNED:	AM/JB	SUBMITTED:	
DRAWN:	SF	DATE:	
CHECKED:		SCALE:	
APPROVED:		DRAWING NO.	C015

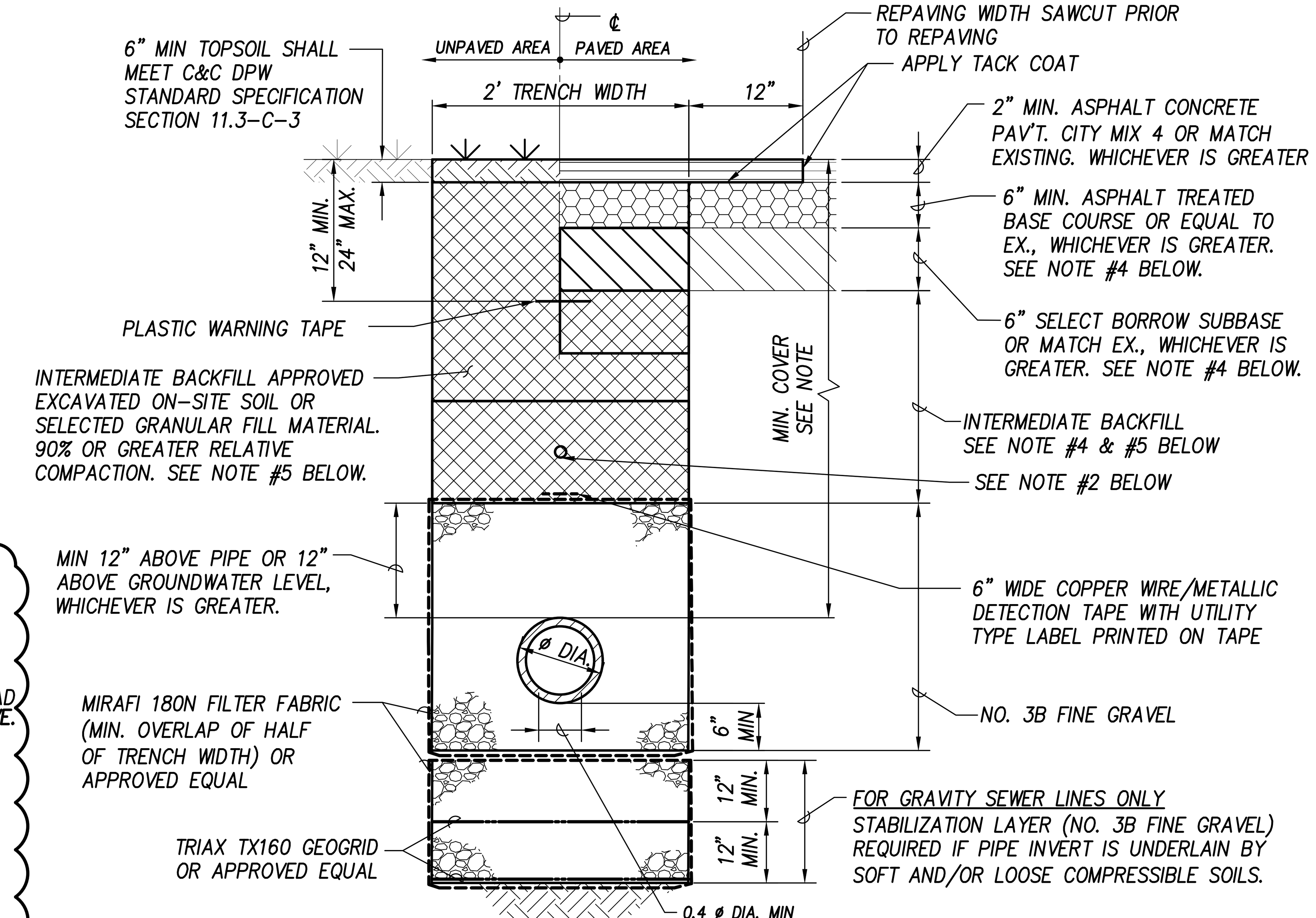


NOTES:
1. PLACE GENERAL FILL MATERIAL IN 12" LIFTS AND COMPACT TO 90 PERCENT OF MAXIMUM DENSITY. PROVIDE TOP SOIL AND GRASS.



EX. PUMP STATION 3 DEMOLITION DETAIL

NOT TO SCALE



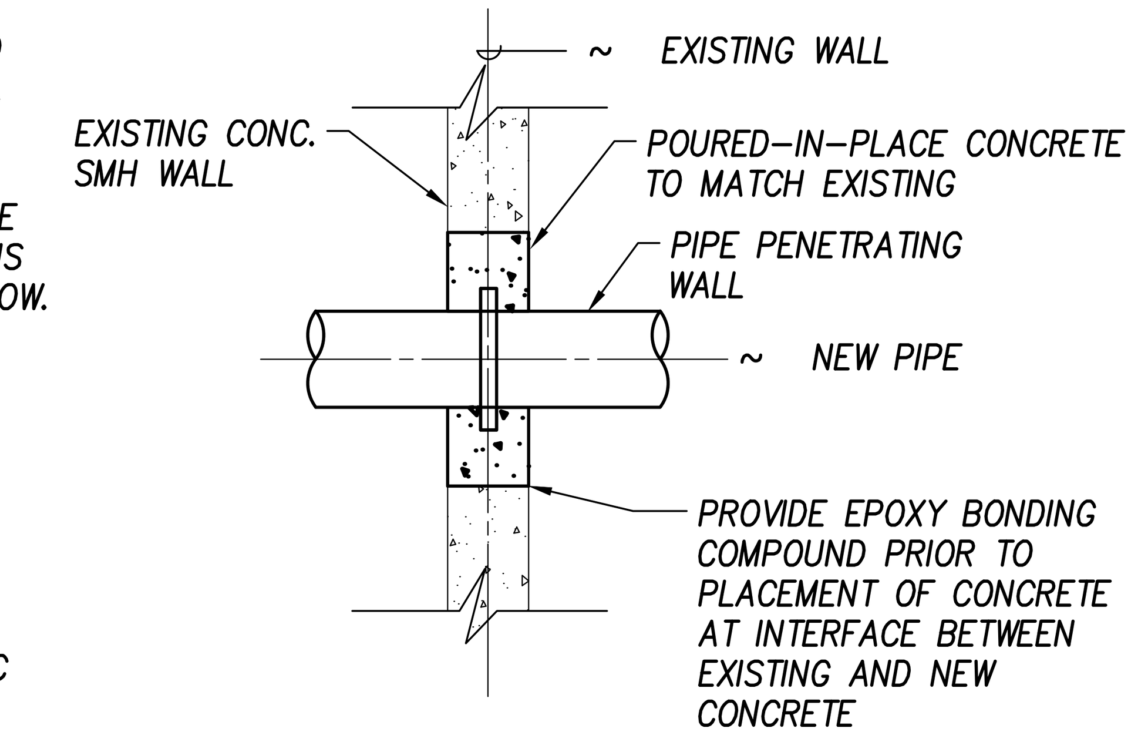
NOTES:

1. PAVEMENT STRUCTURE SHALL BE EQUAL OR BETTER THAN EXISTING PAVEMENT IN THICKNESS AND QUALITY.
2. FOR PVC PIPE, INSTALL ELECTRONIC MARKER OVER CENTERLINE OF PIPE AT A MINIMUM DEPTH OF 2 FEET AND A MAXIMUM DEPTH OF 3 FEET FROM FINISHED GRADE. INSTALL ELECTRONIC MARKER AT A MINIMUM CLEARANCE OF 6-INCHES, WHERE POSSIBLE. INSTALL MARKERS ON OR ABOVE CONCRETE JACKETS.
3. FOR GRASS AREAS, PROVIDE 6" LAYER OF TOPSOIL OR MATCH EXISTING, WHICHEVER IS GREATER, AND RE-GRASS TO MATCH EXIST.
4. UPPER 3-FT OF TRENCH BACKFILL BELOW PAVEMENT GRADE SHOULD BE COMPACTED TO AT LEAST 95% RELATIVE COMPACTION.
5. BACKFILL SHOULD BE MOISTURE-CONDITIONED TO ABOVE THE OPTIMUM MOISTURE CONTENT, PLACED IN MAXIMUM 8-IN HORIZONTAL LOOSE LIFTS, AND MECHANICALLY COMPACTED.
6. TYPICAL MINIMUM COVER:

SEWER PIPE	36"
VENT PIPE	18"

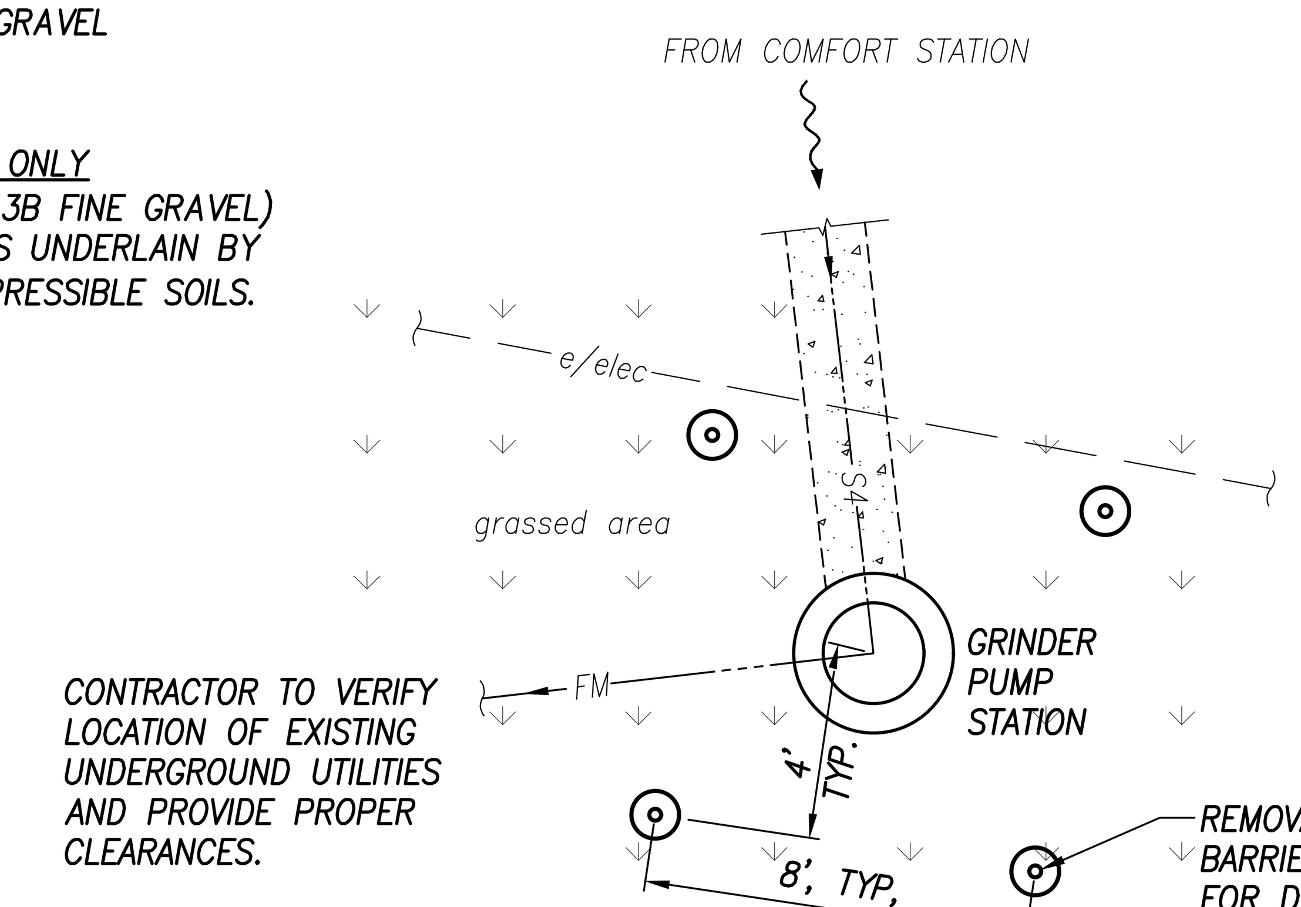
TYPICAL TRENCH DETAIL

NOT TO SCALE



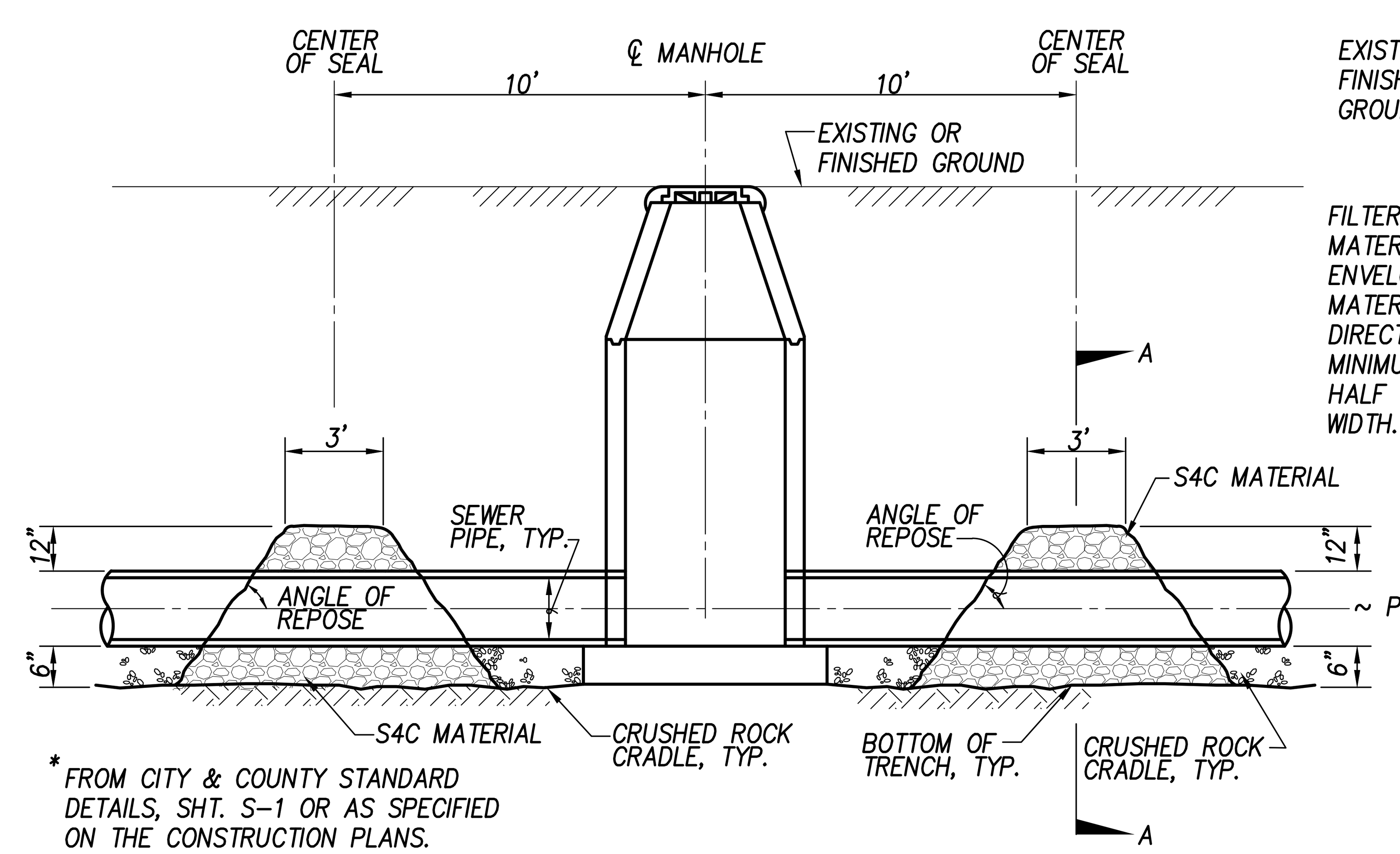
PIPE PENETRATION DETAIL

NOT TO SCALE



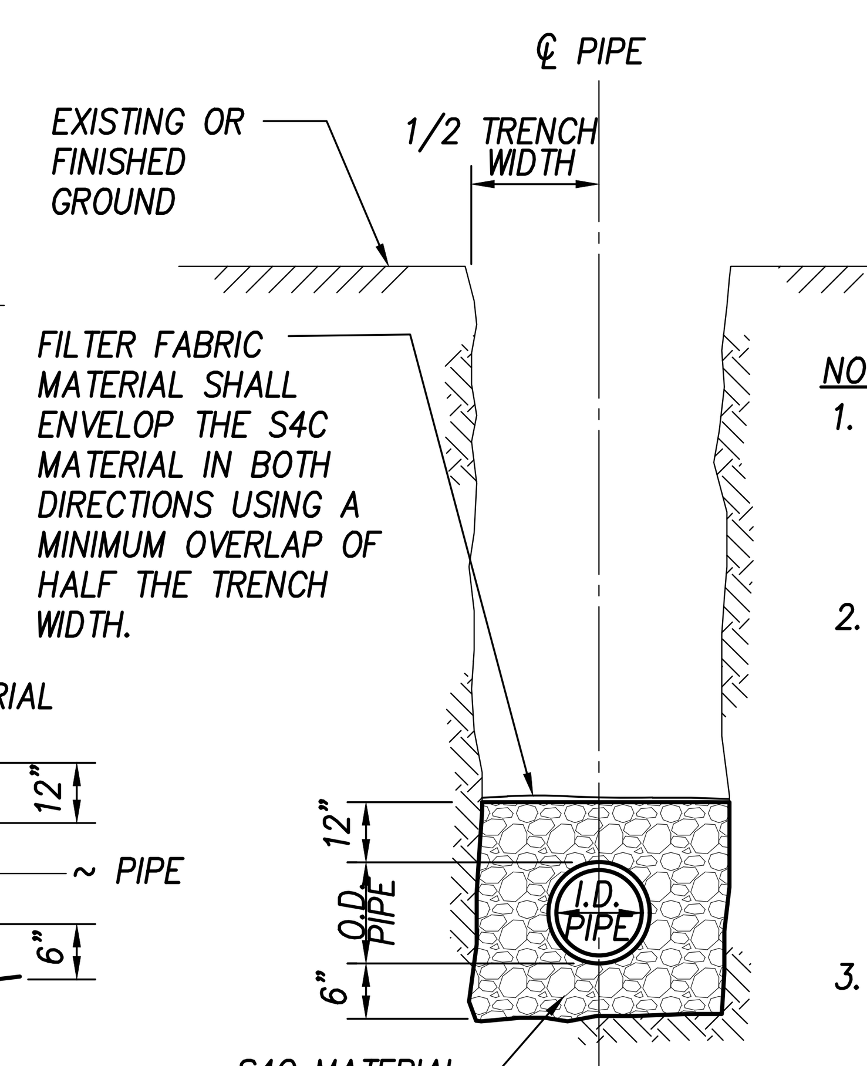
REMOVABLE PIPE BARRIER INSTALLATION LAYOUT

NOT TO SCALE



*FROM CITY & COUNTY STANDARD DETAILS, SHT. S-1 OR AS SPECIFIED ON THE CONSTRUCTION PLANS.

ELEVATION

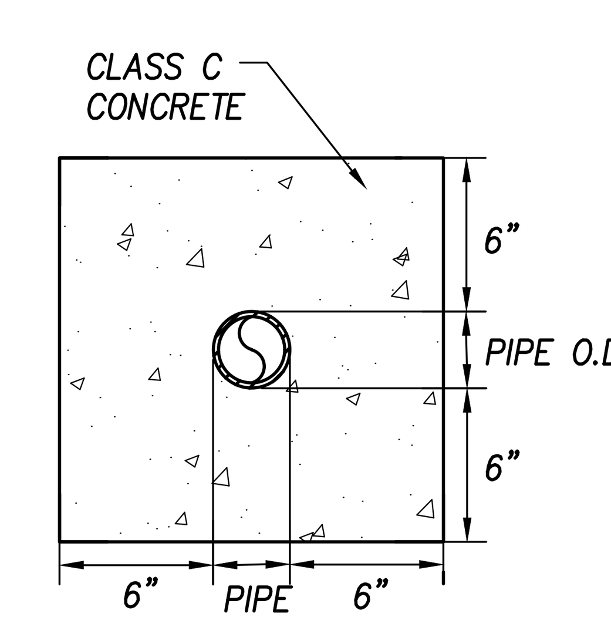


SECTION A-A

NOTES:
1. SEALS SHALL BE PLACED 10 FT. UPSTREAM AND DOWNSTREAM FROM EACH MANHOLE.
2. THE CONTRACTOR SHALL COMPACT S4C MATERIAL BY POUNDING AND DRAINING. UPON DRAINING, A VIBRATORY MACHINE SHALL BE USED UNTIL NO VISIBLE EVIDENCE OF FURTHER CONSOLIDATION EXISTS.
3. THE ENGINEER MAY ADJUST SEAL LOCATIONS AND DIMENSIONS AS REQUIRED.
4. SEALS SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE CONSIDERED INCIDENTAL TO CRUSHED ROCK CRADLE.

SEWER LINE SEAL AT MANHOLE (FOR PVC)

NOT TO SCALE



CONCRETE JACKET NOTES:
1. FOR EXISTING PVC PIPES, PROVIDE SANDED SURFACE 2' IN LENGTH AT EACH END PRIOR TO INSTALLING CONCRETE JACKET PER STANDARD SPECIFICATIONS. DEFLECTION COUPLING OR BELL NOT REQUIRED AT ENDS

PLAIN CONCRETE JACKET

NOT TO SCALE

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: REVISED DETAIL.	16 of 25	2/19/2021	

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

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Department of Land and Natural Resources
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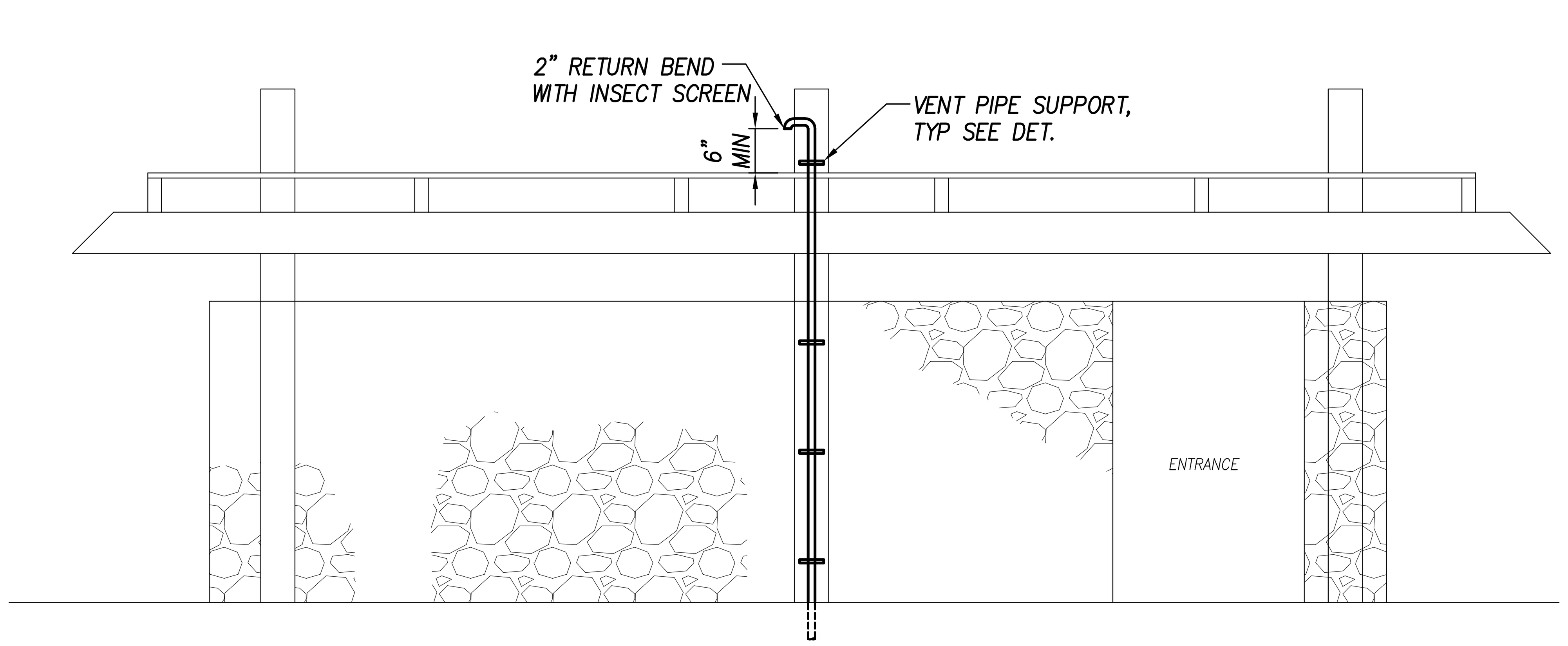
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

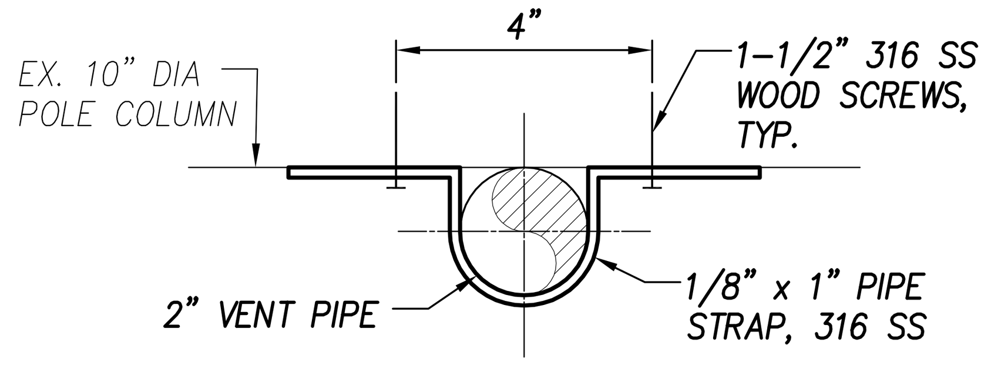
SEWER DETAILS – 1

DESIGNED:	AM/JB	SUBMITTED:	
DRAWN:	SF	DATE:	
CHECKED:		SCALE:	
APPROVED:		DRAWING NO.	C016

JOB NO. F70C616E SHEET NO. 17 OF 30 SHEETS

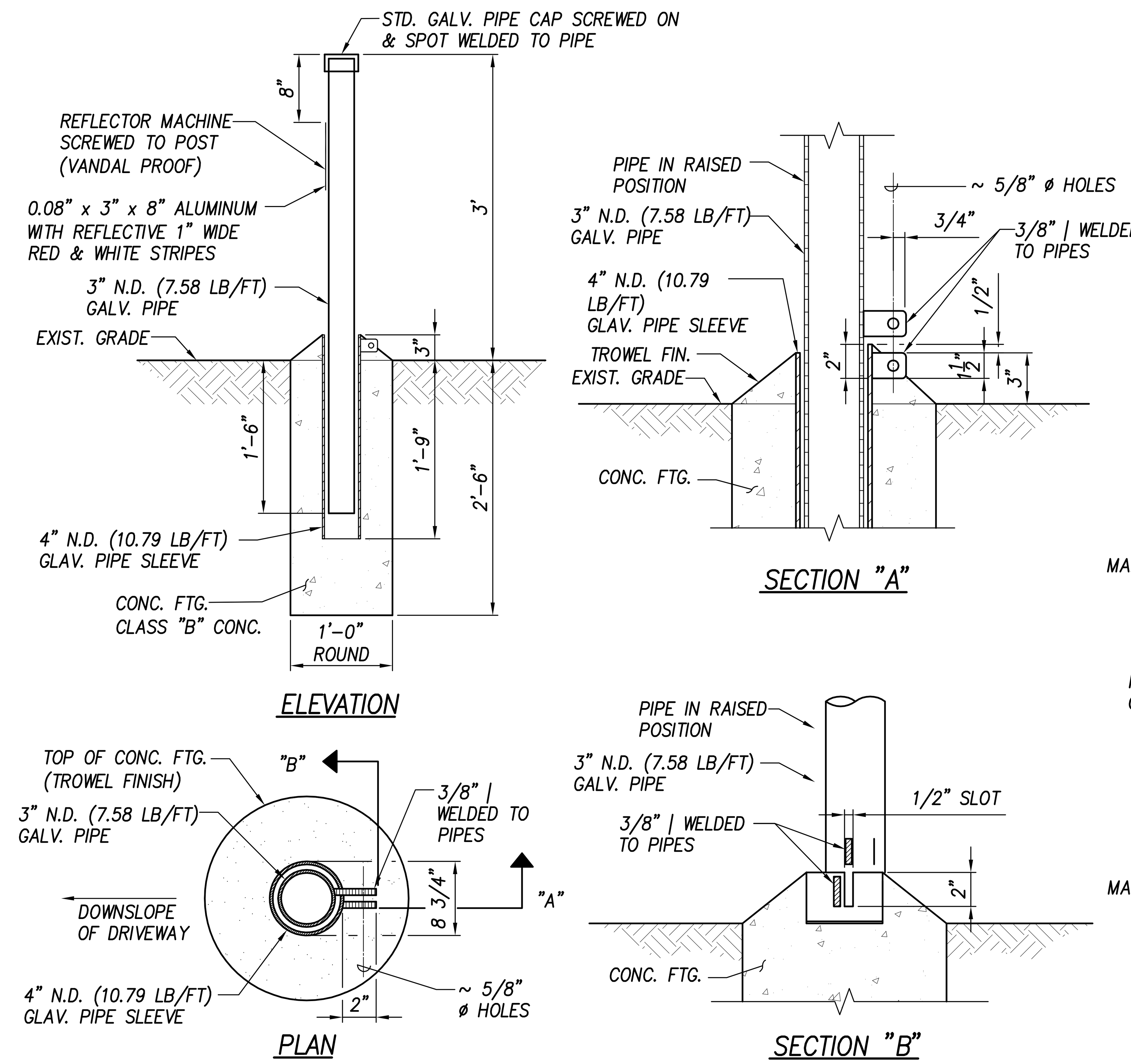


VENT DETAIL
NOT TO SCALE



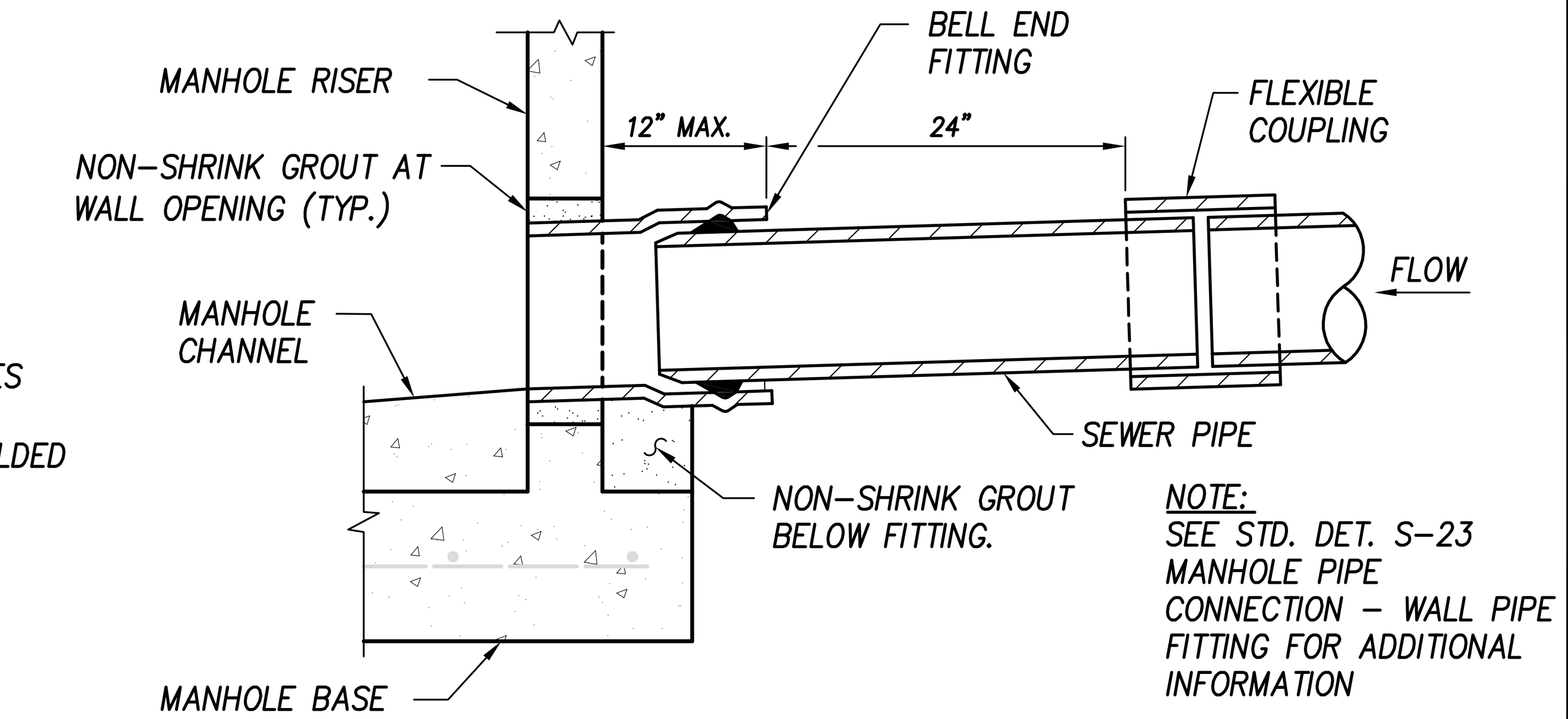
NOTE:
1. PAINT ABOVEGROUND VENT PIPING IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION, TO MATCH EXISTING BUILDING.
2. ABOVE GROUND VENT PIPE TO BE UV-INHIBITED PVC PIPE

VENT PIPE SUPPORT DETAIL
NOT TO SCALE



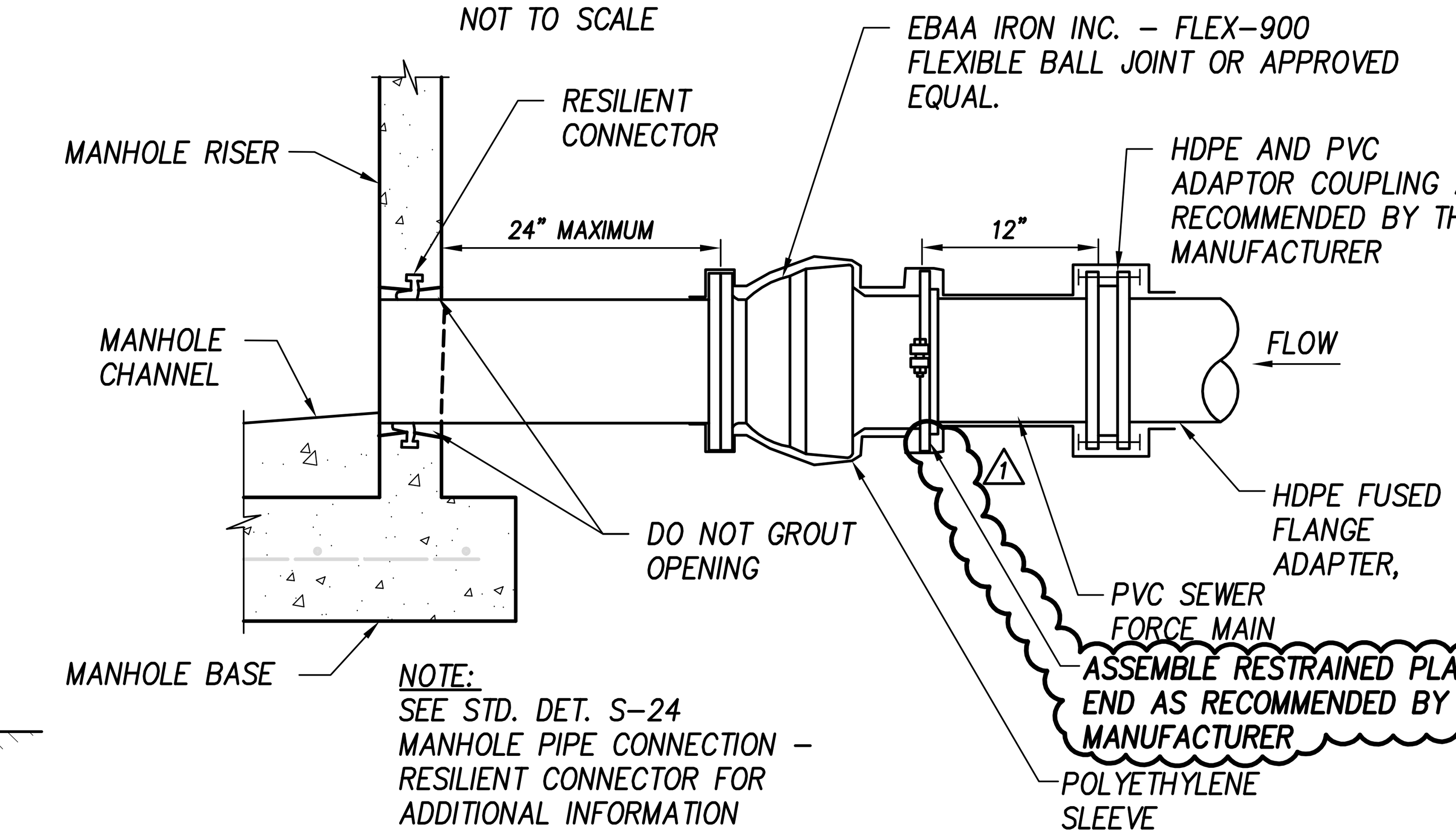
NOTE:
CONTRACTOR SHALL PROVIDE LOCK AND KEY FOR ALL PIPE BARRIERS

REMOVABLE PIPE BARRIER DETAIL
NOT TO SCALE



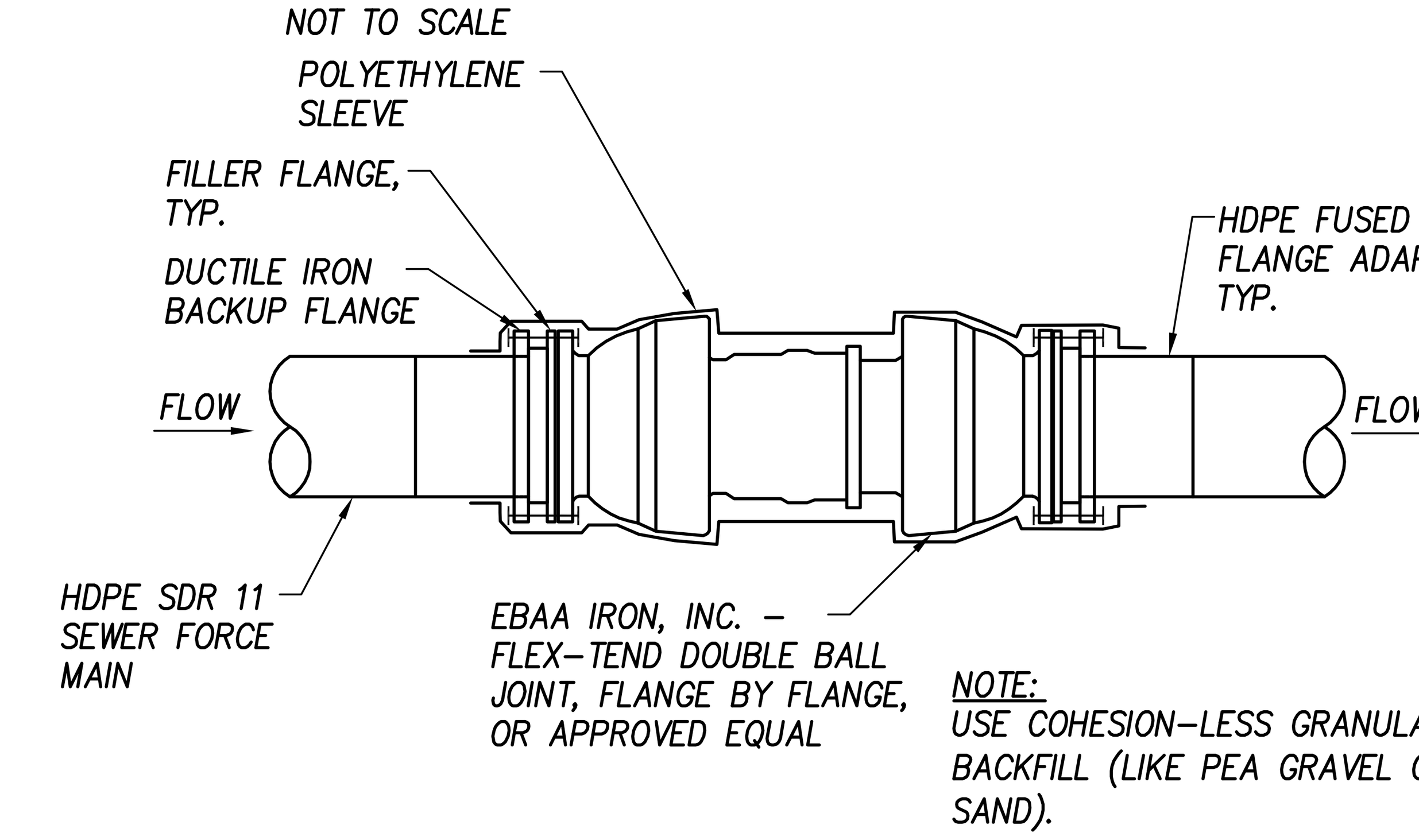
NOTE:
SEE STD. DET. S-23 MANHOLE PIPE CONNECTION - WALL PIPE FITTING FOR ADDITIONAL INFORMATION

GRAVITY SEWER PIPE PENETRATION IN NEW SMH WALL DETAIL
NOT TO SCALE



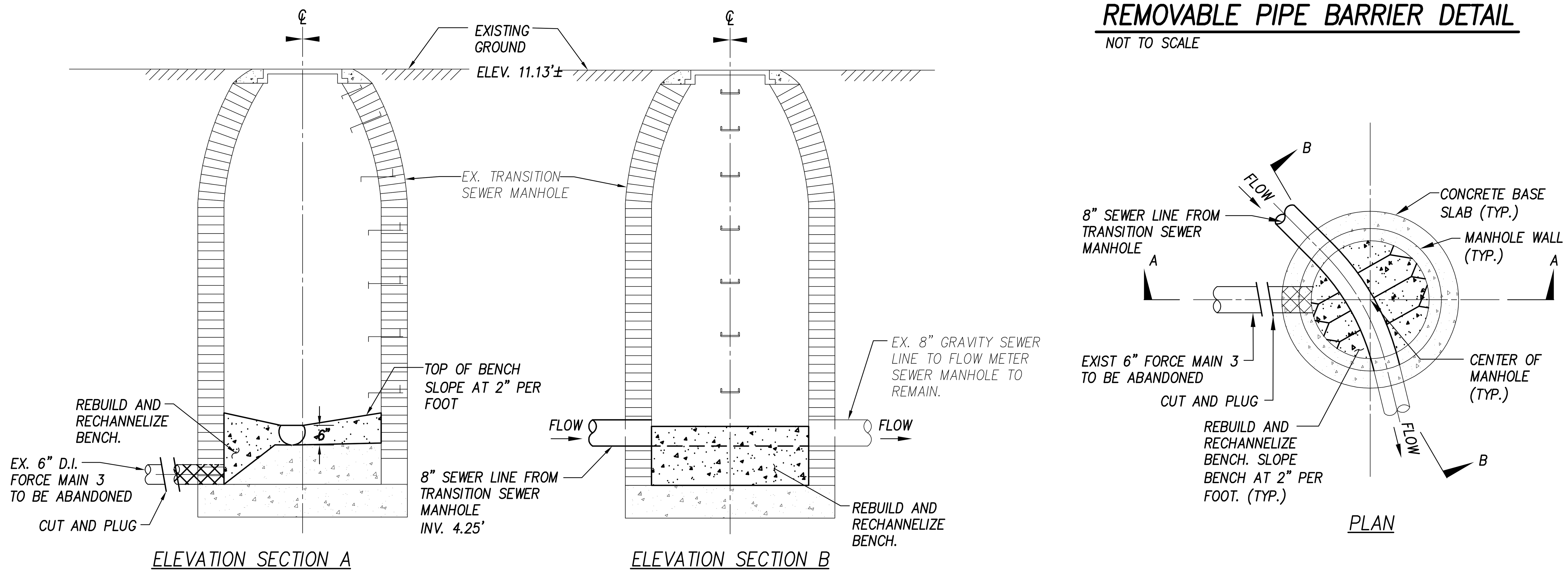
NOTE:
SEE STD. DET. S-24 MANHOLE PIPE CONNECTION - RESILIENT CONNECTOR FOR ADDITIONAL INFORMATION

SEWER FORCE MAIN PIPE PENETRATION IN NEW SMH WALL DETAIL
NOT TO SCALE



NOTE:
USE COHESION-LESS GRANULAR BACKFILL (LIKE PEA GRAVEL OR SAND).

FLEXIBLE EXPANSION JOINT CONNECTION
NOT TO SCALE



RECHANNELIZATION OF EX. TRANSITION SEWER MANHOLE DETAIL
NOT TO SCALE

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	⚠	ADDENDUM NO. 1: ADD CALLOUT.	17 of 25	2/19/2021	

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

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SIGNATURE — APRIL 30, 2020 LIC. EXP. DATE

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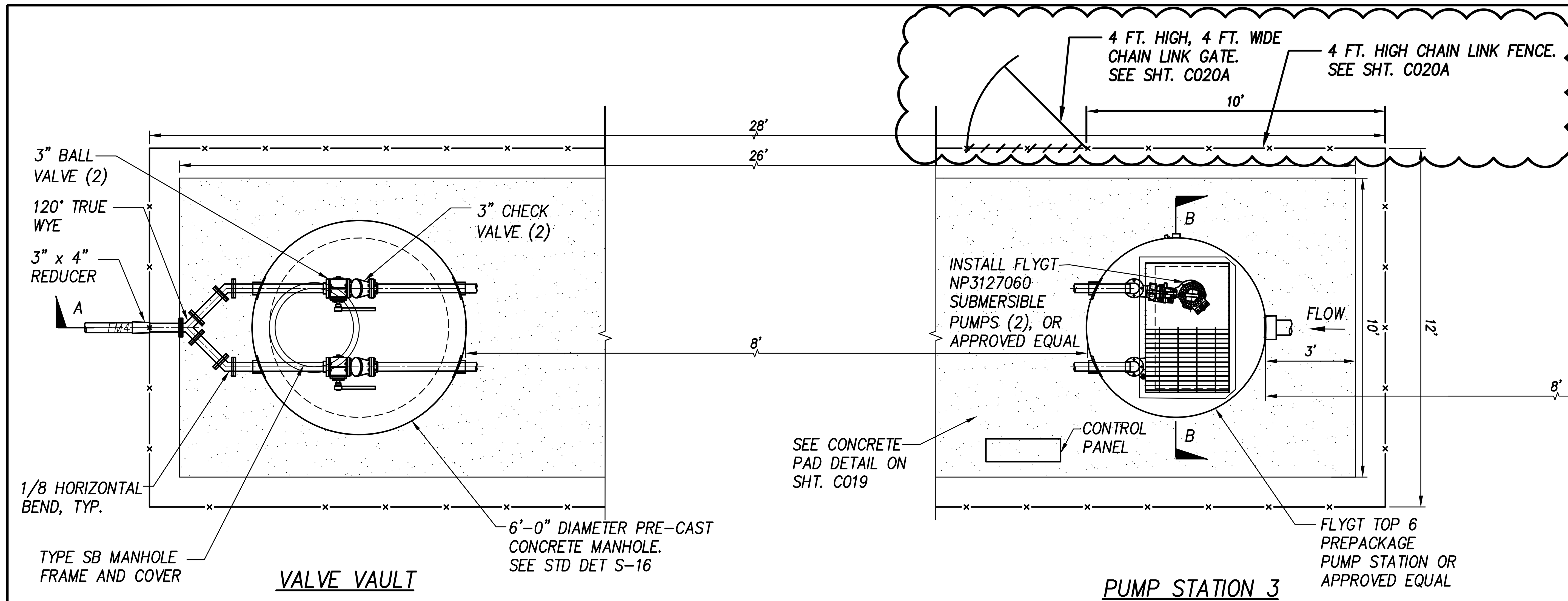
R. M. TOWILL CORPORATION
808 842 1133 2024 North King Street Suite 200 Honolulu Hawaii 96819-3494

Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

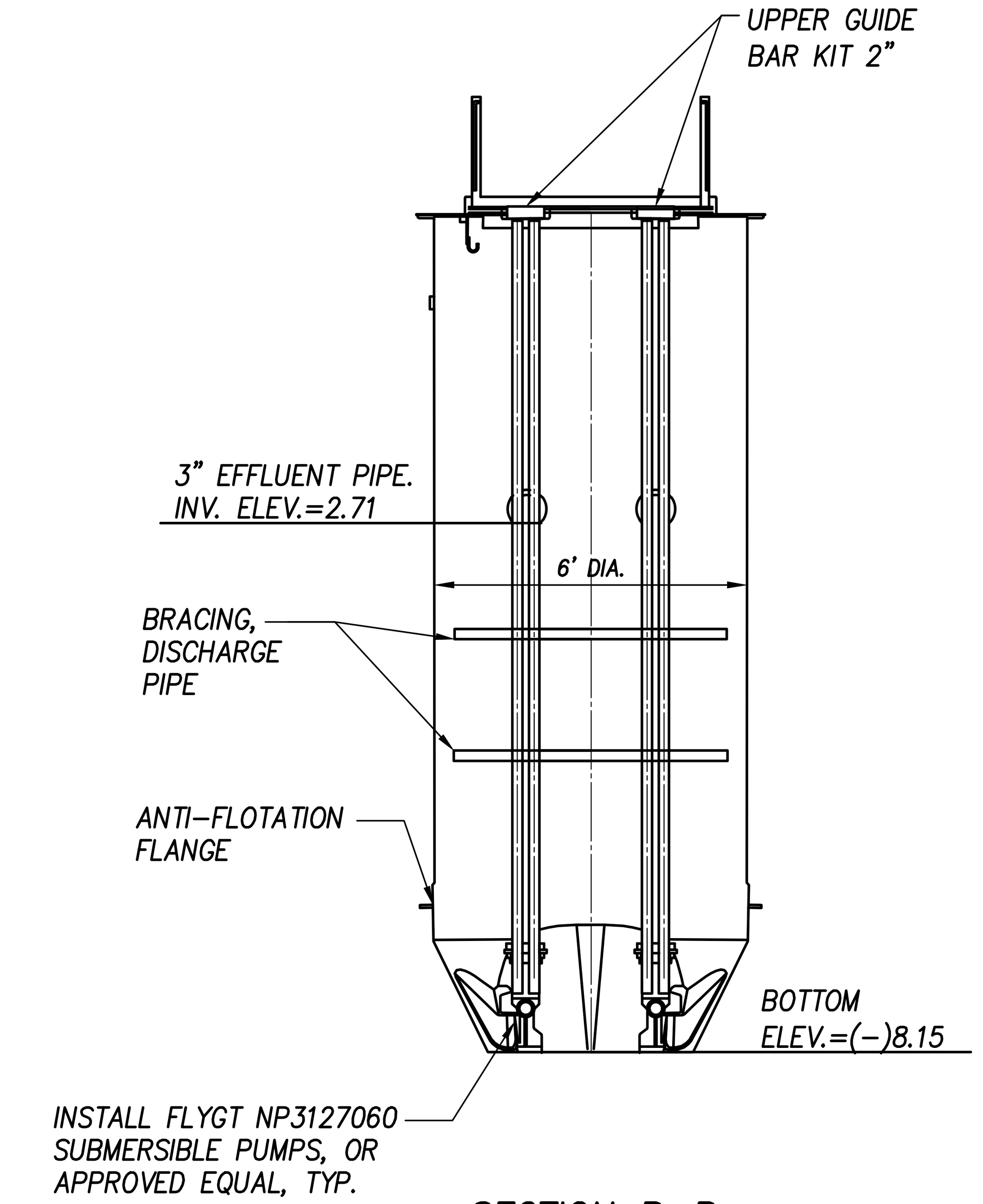
SEWER DETAILS - 2

DESIGNED: AM/JB	SUBMITTED:
DRAWN: SF	DATE:
CHECKED:	SCALE:
APPROVED:	DRAWING NO. C017

JOB NO. F70C616E SHEET NO. 18 OF 30 SHEETS



PLAN



SECTION B-B

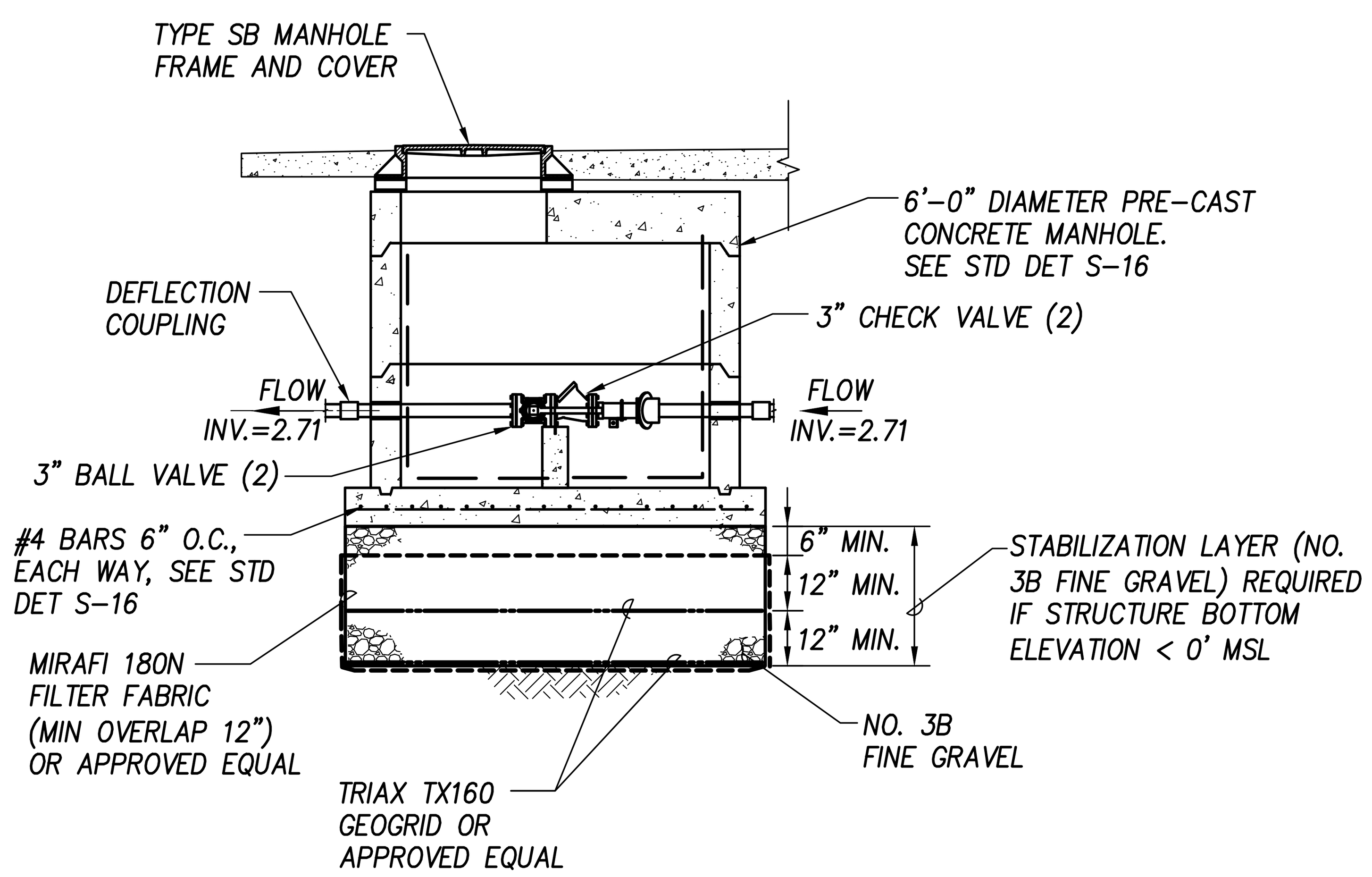
SEWER PUMP STATION 3 DETAIL

SCALE: 1" = 3'

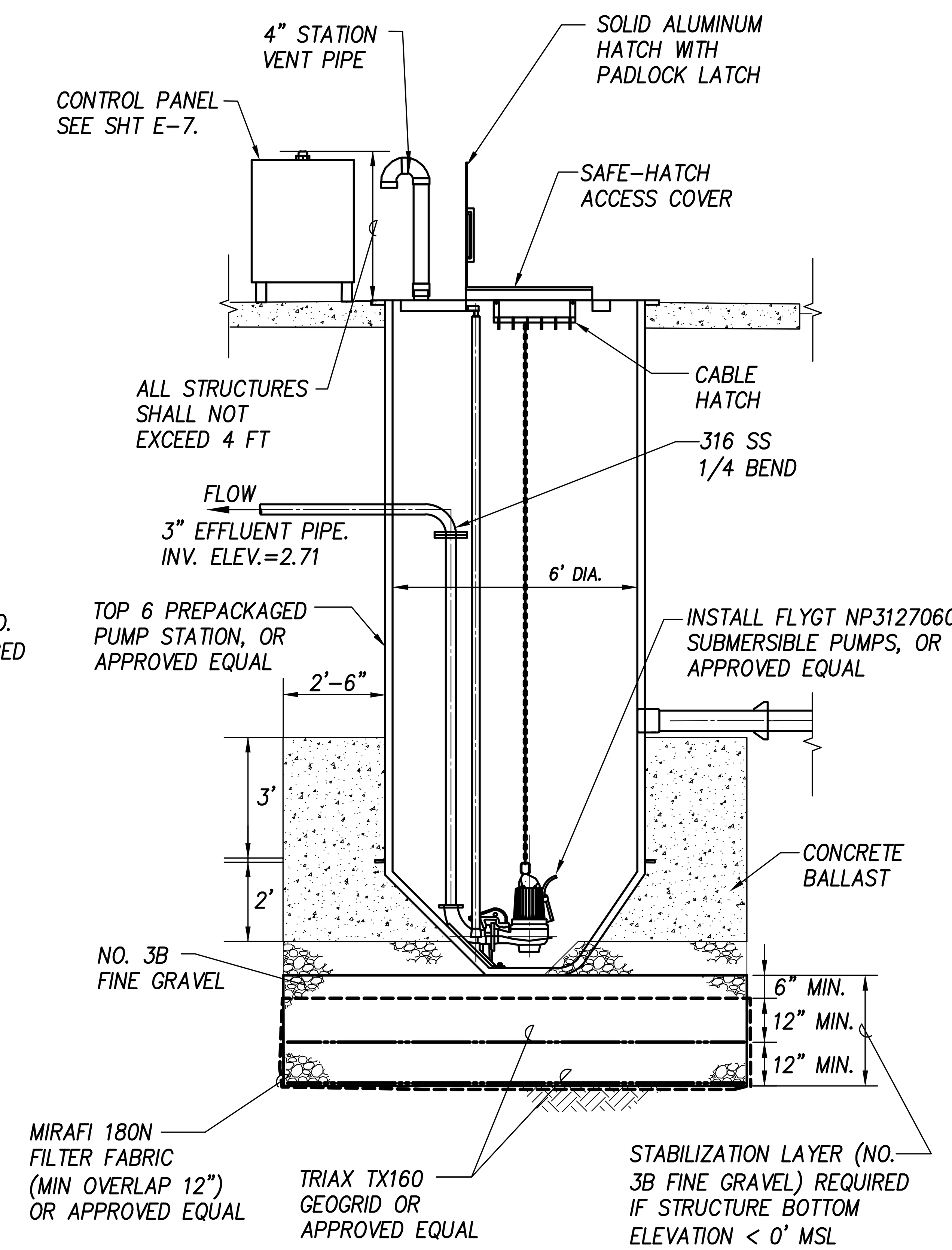
PUMP STATION 3 ELEVATIONS			
PUMP STATION	PRELOADER	PS 3	VALVE VAULT
TOP GRADE	8.22	8.00	8±
DISCHARGE	-2.31	2.71	2.71
INLET INV.	-2.56	-2.56	2.71
ALARM	---	---	---
ON	---	---	---
OFF	---	---	---
BOTTOM	-6.06	-8.15	1.34
DEPTH	14.28	16.15	6.66

NOTE:

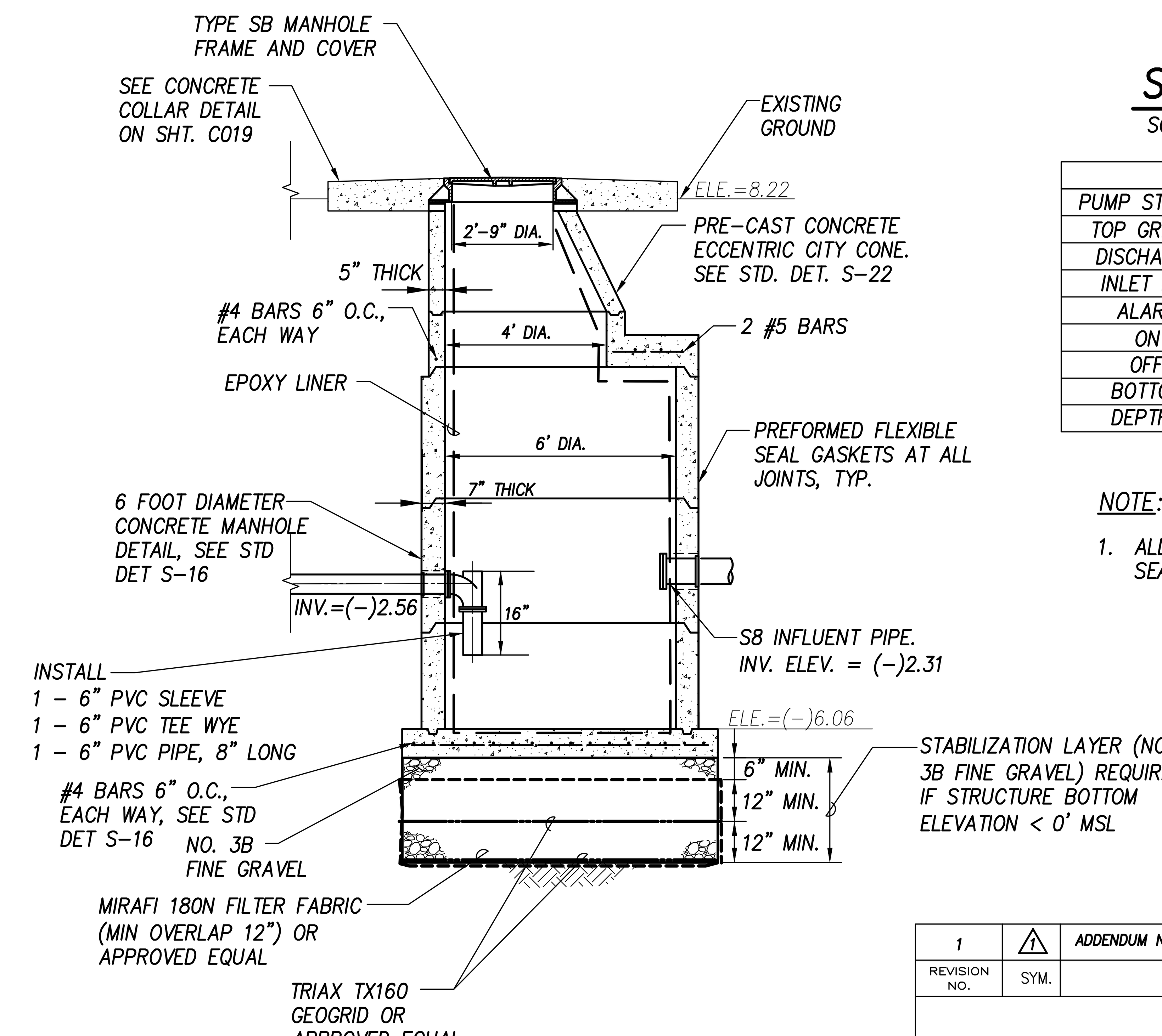
1. ALL BOLT PENETRATION THROUGH WALL MUST BE SEALED WITH SILICONE SEALANT.



STA. 0+14
VALVE VAULT



STA. 0+00
PUMP STATION 3



STA. -0+14
PRELOADER 3

SECTION A-A

PUMP STATION 3 DESIGN DATA

DESIGN FLOWS		
AVERAGE FLOW	110 GPM	
PEAK FLOW	210 GPM	
OPERATING POINT		
1 PUMP	210 GPM	@ 105' TDH
2 PUMP	225 GPM	@ 125' TDH
WET WELL		
CAPACITY	649 GALLONS	
DETENTION TIME @ AVE FLOW	11.3 MIN.	
FORCE MAIN		
4" PIPE	300 FT.	
6" PIPE	1,833 FT.	

PRELOADER 3, SEWER PUMP STATION 3, AND PRELOADER DETAIL

SCALE: 1" = 3'

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: REVISED DETAIL, ADDED DESIGN DATA	18 of 25	2/19/2021	

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

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SIGNATURE APRIL 30, 2020 LIC. EXP. DATE

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R. M. TOWILL CORPORATION

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Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

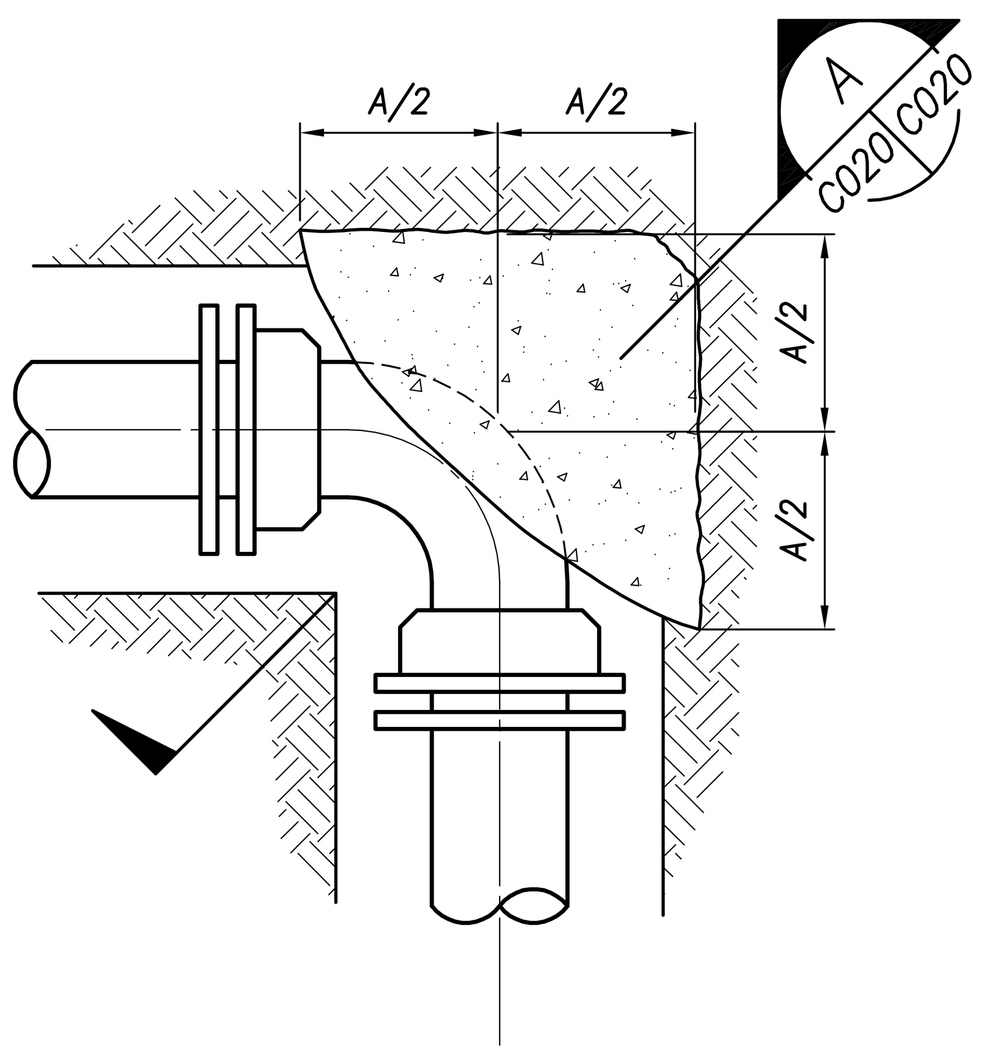
SEWER DETAILS – 4

DESIGNED:	AM/JB	SUBMITTED:	
DRAWN:	SF	DATE:	
CHECKED:		SCALE:	
APPROVED:		DRAWING NO.	C019

JOB NO. F70C616E SHEET NO. 20 OF 30 SHEETS

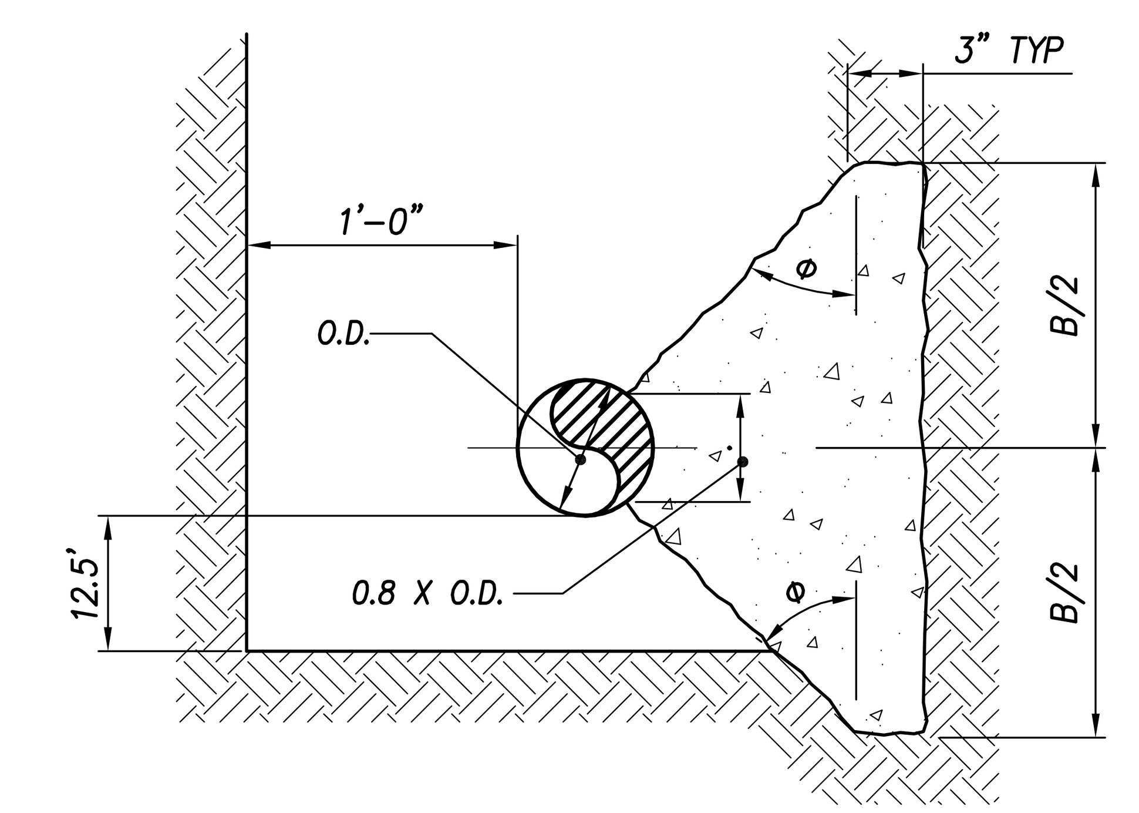
STANDARD THRUST BLOCK SCHEDULE – ENGINEERED FILL MATERIAL

NOMINAL PIPE DIAMETER (INCHES)	TEST PRESSURE (PSI)	DEAD ENDS AND TEES			ANGLE ø (DEG)	HORIZONTAL BENDS LESS THAN OR EQUAL TO ANGLE																				
						11-1/4°		22-1/2°		45°		90°		ALL ANGLES	ALTERNATE DETAIL D				UPWARD		DOWNWARD				ALL BENDS
															11-1/4°	22-1/2°	45°	90°	45°	90°	45°		90°		
		A	B	C		A	B	A	B	A	B	A	B	C	L	L	L	L	F	F	D	E	D	E	C
4	0-30	1'-0"	1'-6"	4"	+45	1'-0"	1'-6"	1'-0"	1'-6"	1'-0"	1'-6"	1'-0"	1'-6"	4"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6"	1'-6"	2'-6"	4"
4	30-75	1'-6"	1'-6"	4"	+45	1'-0"	1'-6"	1'-0"	1'-6"	1'-0"	1'-6"	1'-6"	1'-6"	4"	1'-0"	1'-0"	1'-0"	2'-0"	1'-0"	1'-0"	1'-6"	2'-6"	2'-0"	4'-0"	4"
4	75-150	2'-6"	1'-6"	4"	+45	1'-0"	1'-6"	1'-0"	1'-6"	2'-0"	1'-6"	3'-0"	1'-6"	4"	1'-0"	1'-0"	1'-6"	4'-0"	1'-0"	2'-0"	2'-0"	3'-6"	2'-6"	5'-0"	4"
4	150-225	3'-6"	1'-6"	4"	+45	1'-0"	1'-6"	1'-6"	1'-6"	2'-6"	1'-6"	4'-6"	1'-6"	4"	1'-0"	1'-6"	2'-6"	5'-6"	1'-6"	3'-0"	2'-6"	4'-6"	3'-0"	6'-0"	4"
6	0-30	1'-0"	2'-0"	6"	+45	1'-0"	2'-0"	1'-0"	2'-0"	1'-0"	2'-0"	1'-0"	2'-0"	6"	1'-0"	1'-0"	1'-0"	1'-6"	1'-0"	1'-0"	1'-6"	2'-6"	2'-0"	3'-6"	6"
6	30-75	2'-0"	2'-0"	6"	+45	1'-0"	2'-0"	1'-0"	2'-0"	1'-6"	2'-0"	2'-6"	2'-0"	6"	1'-0"	1'-0"	1'-6"	3'-6"	1'-6"	2'-0"	2'-0"	3'-6"	2'-6"	5'-0"	6"
6	75-150	3'-6"	2'-0"	6"	+45	1'-0"	2'-0"	1'-6"	2'-0"	3'-0"	2'-0"	5'-0"	2'-0"	6"	1'-0"	1'-6"	3'-0"	7'-0"	2'-6"	4'-0"	2'-6"	5'-0"	3'-6"	7'-0"	6"
6	150-225	5'-6"	2'-0"	6"	+45	1'-0"	2'-0"	2'-0"	2'-0"	4'-0"	2'-0"	6'-0"	2'-0"	6"	1'-6"	2'-6"	4'-6"	10'-6"	3'-6"	6'-0"	3'-0"	6'-0"	4'-0"	8'-0"	6"



HORIZONTAL BEND DETAIL 1 VAR C020

NOT TO SCALE

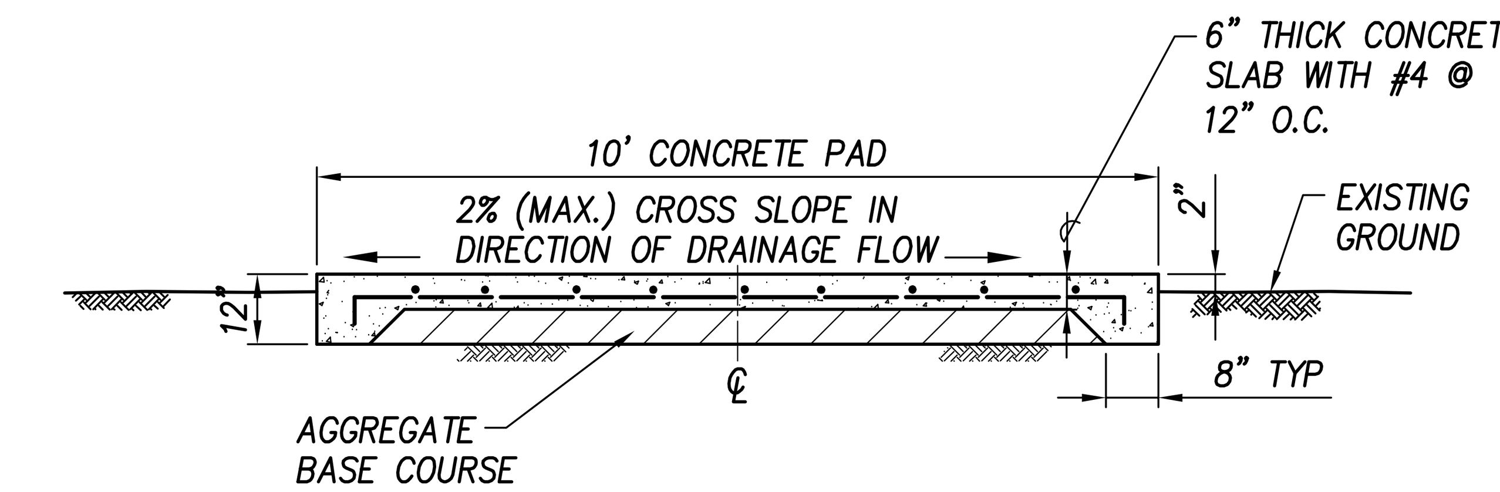


SECTION A C020 C020

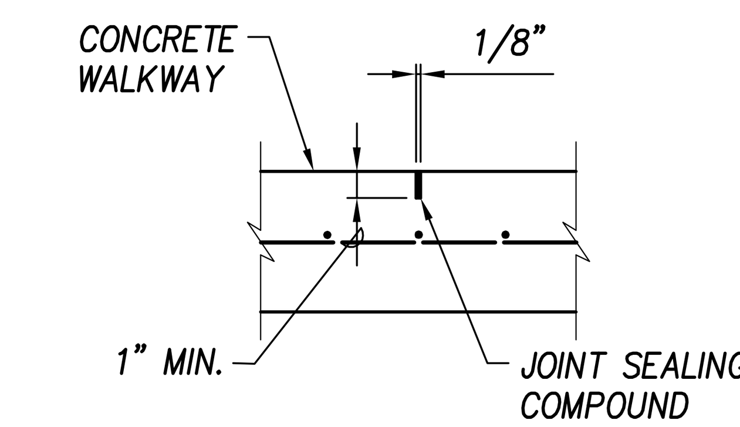
NOT TO SCALE

NOTES:

1. THRUST BLOCK SIZES BASED ON A UNIT PASSIVE SOIL PRESSURE OF 300 PSF PER FOOT OF DEPTH, ABOVE GROUNDWATER AND 150 PSF PER FOOT OF DEPTH BELOW GROUNDWATER, MINIMUM SOIL COVER OF 2'-6".
2. THRUST BLOCKS SHALL BE POURED SOLIDLY AGAINST FIRM, UNDISTURBED SOIL WITH PASSIVE PRESSURE EQUAL TO OR GREATER THAN THAT SHOWN IN NOTE 1.
3. IF LOOSE OR PREVIOUSLY BACKFILLED SOILS ARE ENCOUNTERED, CONTRACTOR SHALL NOTIFY THE ENGINEER WHO MAY ADJUST THE DIMENSIONS SHOWN IN THE SCHEDULE.
4. CONCRETE COMPRESSIVE STRENGTH SHALL MEET SPECIFICATIONS FOR 2500 PSI AT 28 DAYS CURING WHEN TESTED IN ACCORDANCE WITH ASTM C94.
5. DIMENSIONS SHOWN REFER TO THRUST BLOCK DETAILS "A" THROUGH "I", AND ARE MINIMUM VALUES ONLY.
6. MINIMUM C-DIMENSIONS SHOWN ON THE DETAILS SHALL BE EQUAL TO PIPE OD.
7. CONCRETE SHALL NOT EXTEND BEYOND THE ENDS OF PIPE FITTINGS WITHOUT APPROVAL OF THE ENGINEER.
8. MINIMUM VALUE OF THRUST ø SHALL BE 45 DEGREES.
9. WHERE THERE IS INADEQUATE SPACE FOR DETAIL "A" THRUST BLOCK AT ANY HORIZONTAL BEND, DETAIL "D" SHALL BE USED.
10. TYPE D, AND TYPE F, THRUST BLOCKS ARE ALTERNATES TO BE USED WHERE SPECIFIED OR DIRECTED BY THE ENGINEER.



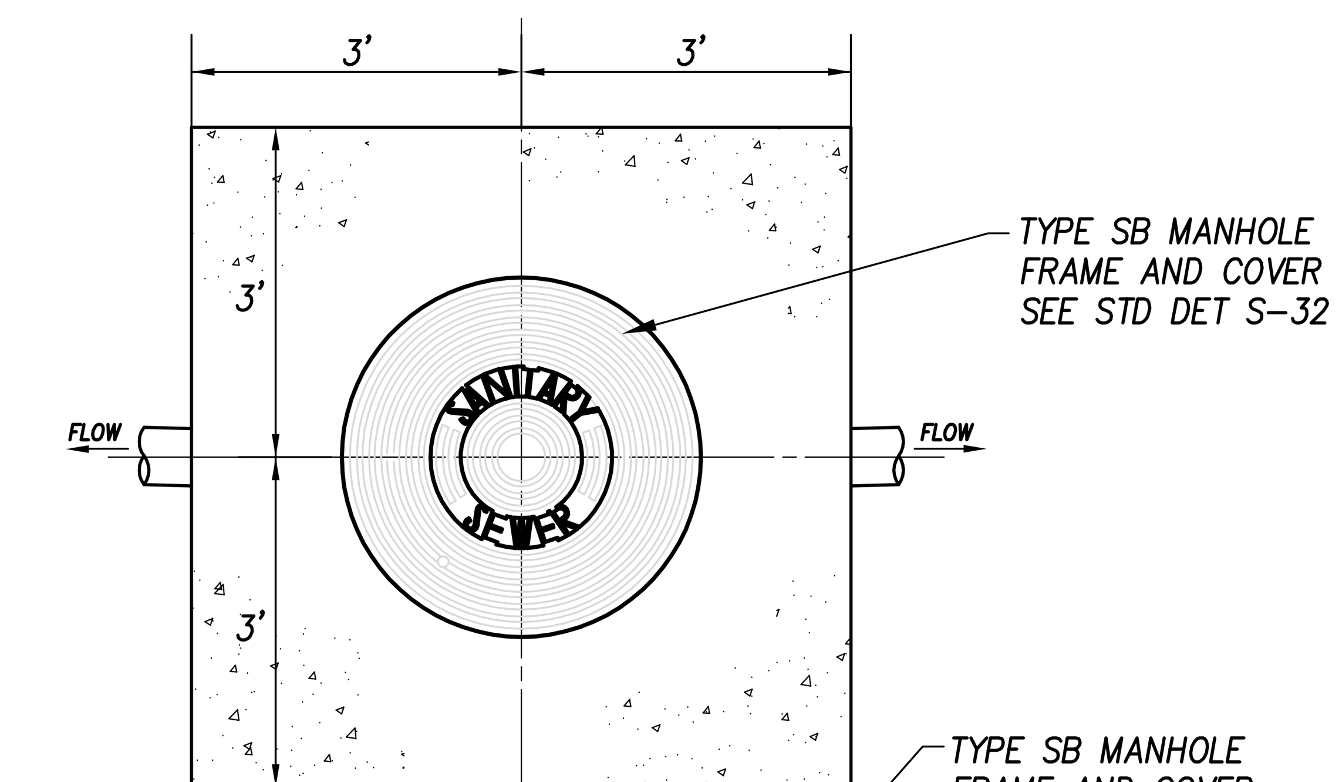
TYPICAL CONCRETE PAD SECTION



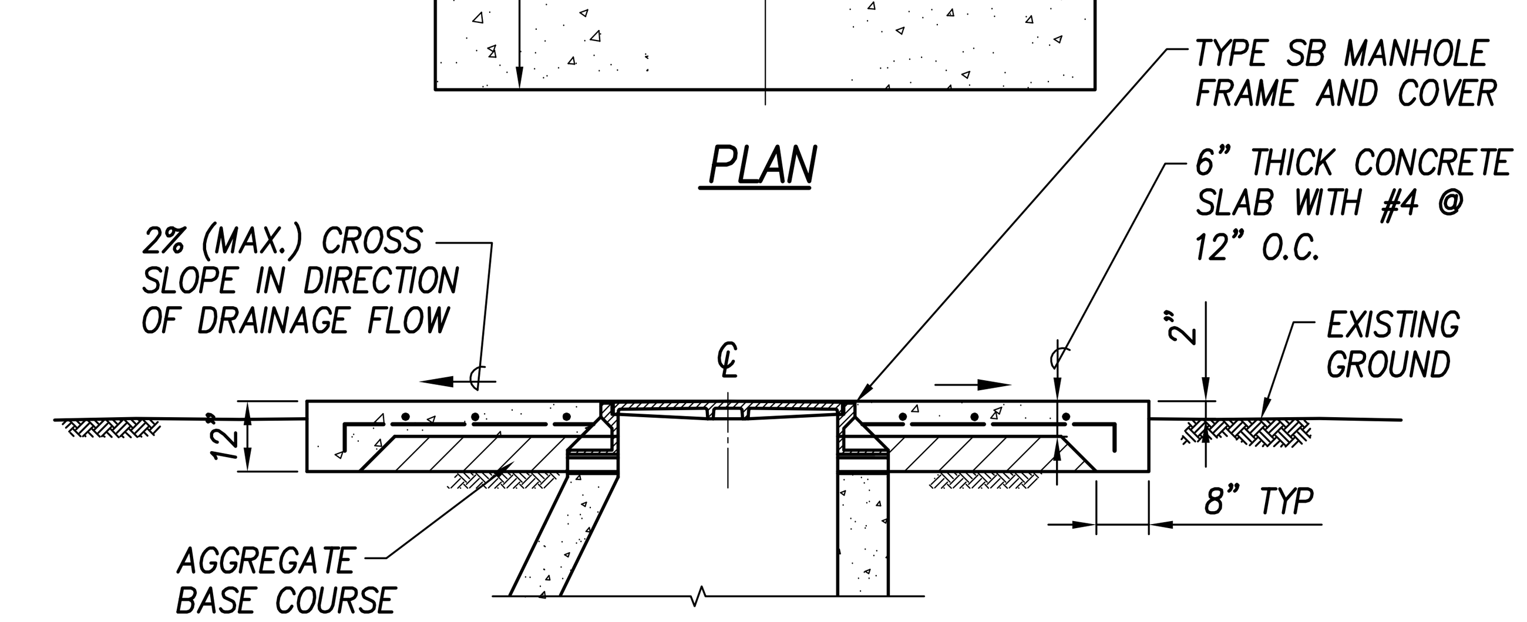
CONCRETE PAD CONTRACTION JOINT DETAIL

TYPICAL CONCRETE PAD DETAIL

NOT TO SCALE



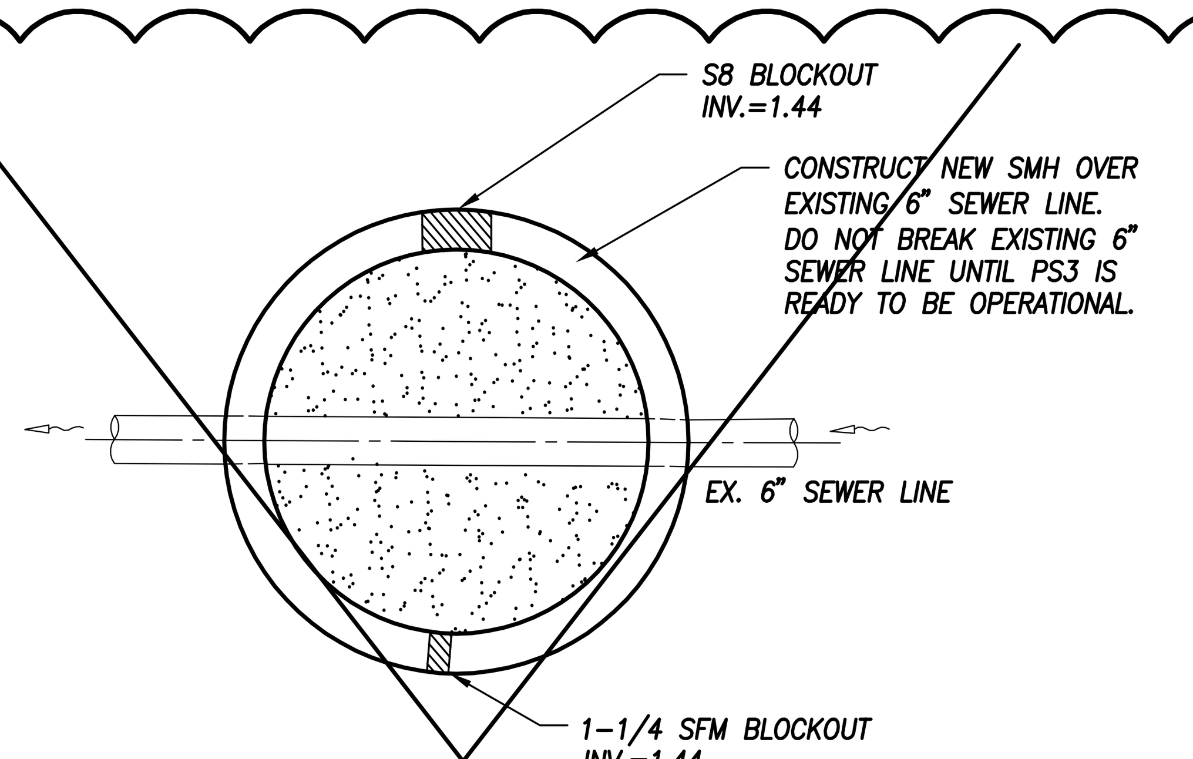
PLAN



CONCRETE COLLAR DETAIL

NOT TO SCALE

1



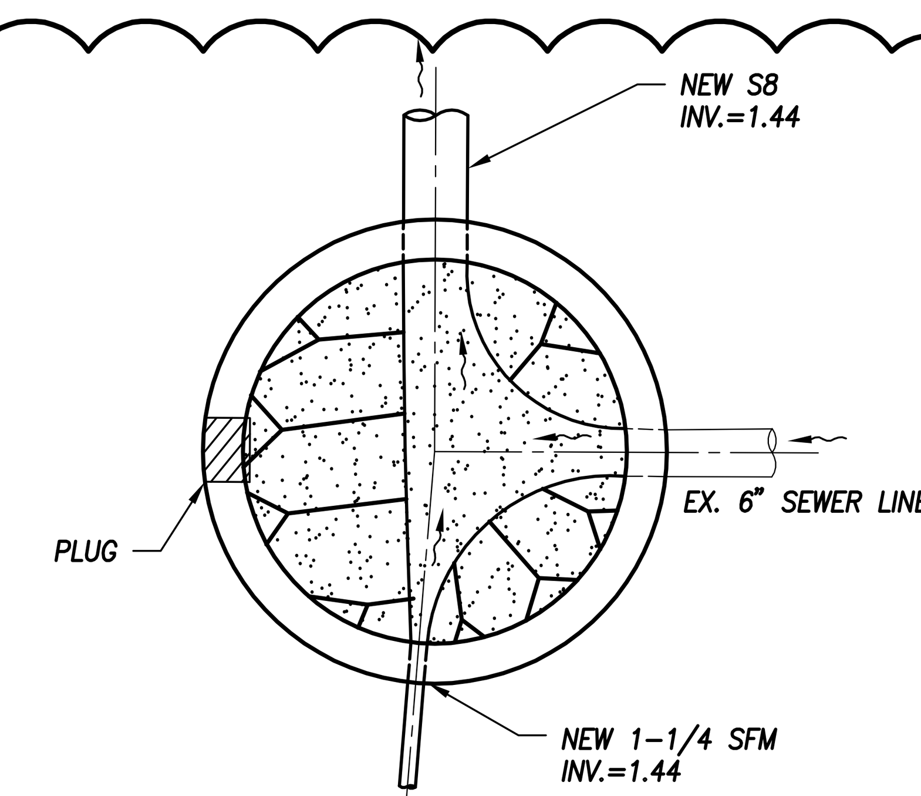
PLAN VIEW

NOTES:

1. EXISTING 6" SEWER LINE STILL IN USE.
2. DO NOT CHANNELIZE NEW SMH BASE.
3. DO NOT REMOVE OR BREAK EXISTING EXISTING 6" SEWER LINE.
4. CONSTRUCT 8" AND 1-1/4" BLOCKOUT.

PHASE 2 – SMH D1 DETAIL

NOT TO SCALE



PLAN VIEW

NOTES:

1. CHANNELIZE NEW SMH D1.
2. CUT AND PLUG EXISTING SEWER LINE.

~~PHASE 4~~ – SMH D1 DETAIL

NOT TO SCALE

1	1	ADDENDUM NO. 1: DELETE DETAIL AND REVISE DETAIL	19 of 25	2/19/2021	
REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED

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

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SIGNATURE APRIL 30, 2020 LIC. EXP. DATE

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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 Land and Natural Resources

SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV

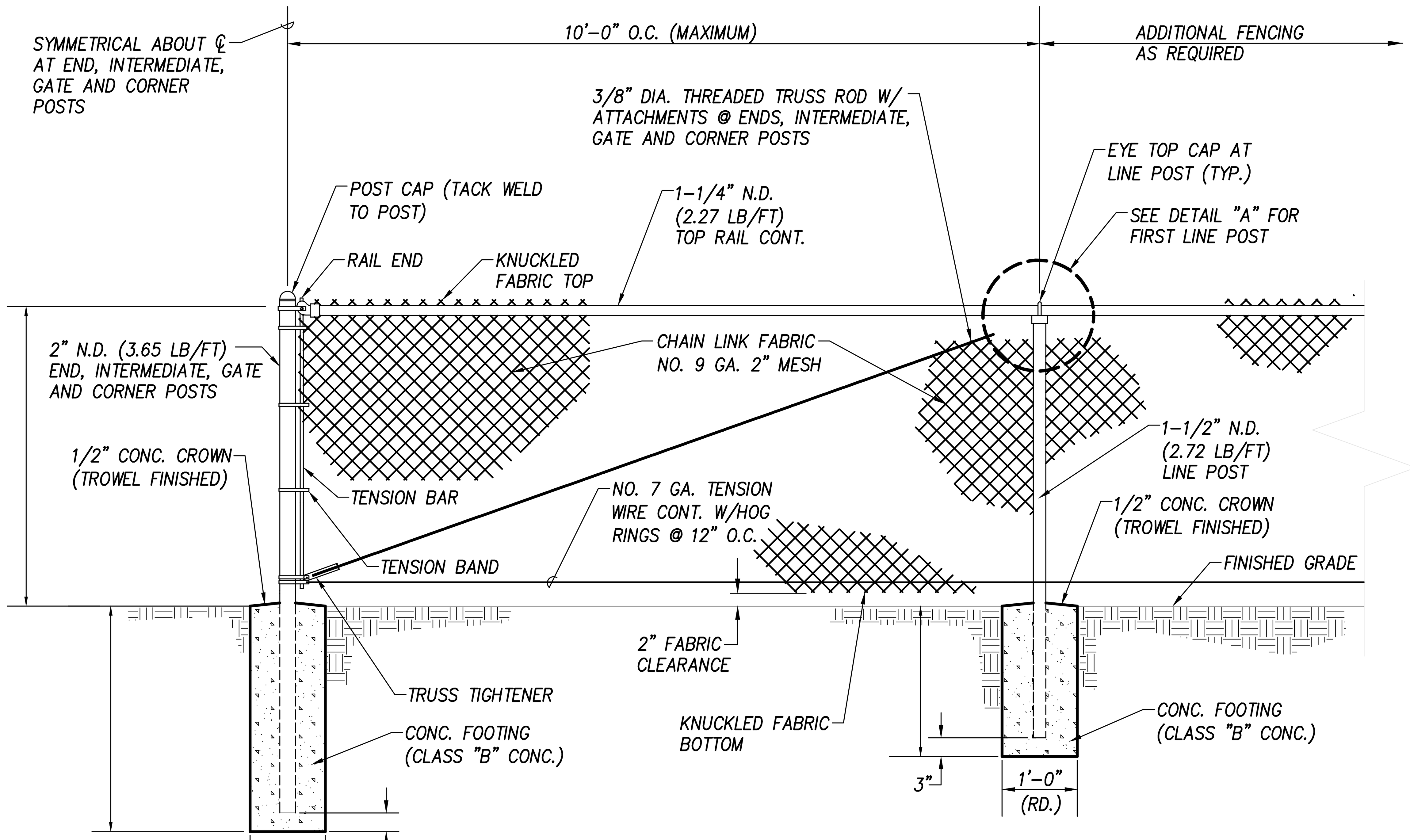
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT

Sand Island, Honolulu, Oahu, Hawaii

SEWER DETAILS – 5

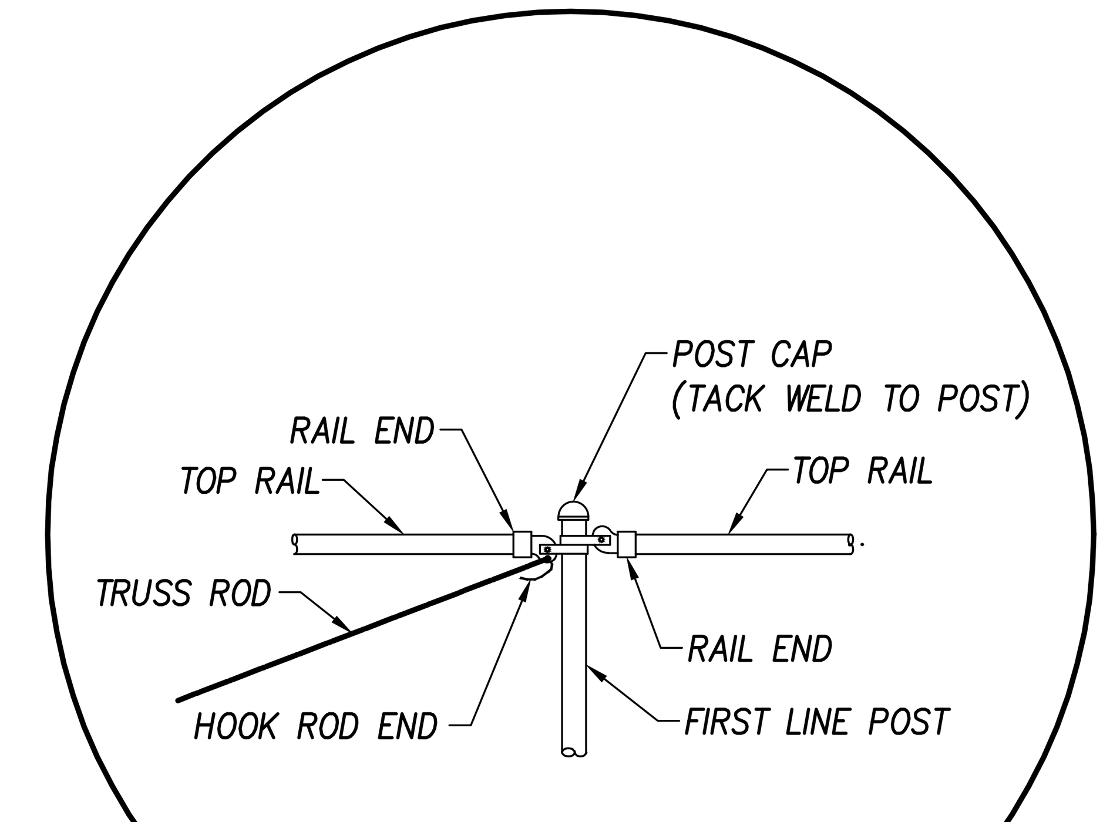
DESIGNED:	AM/JB	SUBMITTED:
DRAWN:	SF	DATE:
CHECKED:		SCALE:
APPROVED:		DRAWING NO. C020

JOB NO. F70C616E SHEET NO. 21 OF 30 SHEETS



4'-0" HIGH CHAIN LINK FENCE DETAIL

NOT TO SCALE

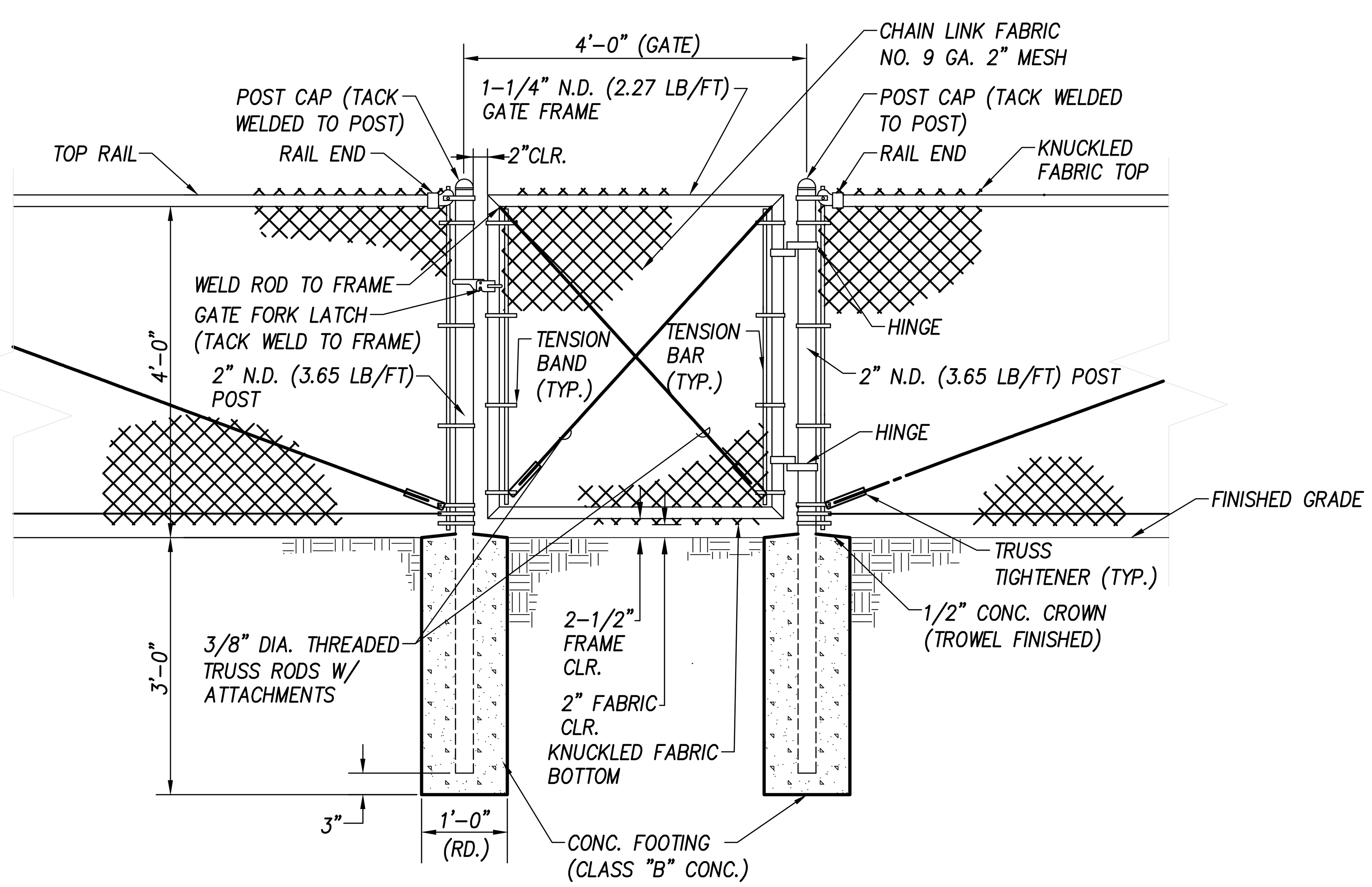


DETAIL "A"

NOT TO SCALE

NOTES:

1. ALL PIPE AND POST SIZES ARE NOMINAL DIAMETER (N.D.).
2. ALL FENCING MATERIALS SHALL BE HOT-DIP GALVANIZED.
3. CHAIN LINK FABRIC SHALL BE CONTINUOUS AND FASTENED TO END, INTERMEDIATE, GATE AND CORNER POSTS BY TENSION BARS WITH TENSION BANDS EVENLY SPACED AT 15" O.C. (MAX.).
4. WIRE FASTENINGS SHALL BE NO. 12 GAUGE GALVANIZED TIE WIRE.
5. CHAIN LINK FABRIC SHALL BE FASTENED TO LINE POSTS WITH WIRE FASTENINGS EVENLY SPACED AT 12" O.C. (MAX.).
6. CHAIN LINK FABRIC SHALL BE FASTENED TO HORIZONTAL RAILS WITH WIRE FASTENINGS EVENLY SPACED AT 12" O.C. (MAX.).
7. ALL WIRE FASTENING ENDS SHALL BE WRAPPED AROUND CHAIN LINK A MINIMUM OF ONE COMPLETE TURN. (HOOKING OF WIRE ENDS SHALL NOT BE PERMITTED).
8. CHAIN LINK FABRIC SHALL BE FASTENED TO TRUSS ROD WITH NO. 9 GAUGE HOG RINGS AT 12" O.C.
9. NO SPLICING SHALL BE ALLOWED ON ALL STRAIGHT-RUN PIPES.
10. TOP AND BOTTOM SELVAGES OF CHAIN LINK FABRIC SHALL BE KNUCKLED.
11. INSTALL INTERMEDIATE POSTS AT 200' MAX. INTERVALS.
12. ALL FIELD WELDS AND DAMAGED GALVANIZED SURFACES SHALL BE PAINTED WITH TWO COATS OF Z.R.C. COLD GALVANIZING COMPOUND.
13. ALL FENCE POSTS SHALL BE INSTALLED EVENLY SPACED.
14. AFTER INSTALLATION, ALL BOLT ENDS SHALL BE CUT FLUSH WITH THE NUTS AND GROUND SMOOTH.



4'-0" HIGH GATE DETAIL

NOT TO SCALE

NOTES:

1. ALL PIPE AND POST SIZES ARE NOMINAL DIAMETER (N.D.).
2. GATE FRAME SHALL BE OF WELDED PIPE CONSTRUCTION. ALL WELDING SHALL CONFORM TO THE SPECIFICATIONS OF THE AMERICAN WELDING SOCIETY "STRUCTURAL WELDING CODE".
3. GATE SHALL BE PROVIDED WITH PROVISIONS FOR PAD LOCKING WITH MULTIPLE LOCKS.
4. FOR ALL WELDED CONNECTIONS: CORNERS SHALL BE MITERED AND ALL PIPE BRACES PROPERLY COPED.
5. ALL WELDED CONNECTIONS SHALL BE PAINTED WITH TWO COATS OF Z.R.C. COLD GALVANIZING COMPOUND.
6. GATE HINGES SHALL BE TACK WELDED TO GATE POSTS AND FRAMES.
7. ALL FENCING MATERIALS SHALL BE GALVANIZED STEEL.
8. WIRE FASTENINGS SHALL BE NO. 12 GAUGE GALVANIZING TIE WIRE.
9. CHAIN LINK FABRIC SHALL BE CONTINUOUS AND FASTENED TO SIDE FRAME PIPES BY TENSION BARS WITH TENSION BANDS EVENLY SPACED AT 15" O.C. (MAX.).
10. CHAIN LINK FABRIC SHALL BE FASTENED TO TOP AND BOTTOM FRAME PIPES WITH WIRE FASTENINGS EVENLY SPACED AT 12" O.C. (MAX.).
11. CHAIN LINK FABRIC SHALL BE FASTENED TO TRUSS RODS WITH NO. 9 GAUGE HOG RINGS EVENLY SPACED AT 12" O.C. (MAX.).
12. TOP AND BOTTOM SELVAGES OF CHAIN LINK FABRIC SHALL BE KNUCKLED.
13. ALL WIRE FASTENINGS SHALL BE WRAPPED AROUND CHAIN LINK A MINIMUM OF ONE COMPLETE TURN. (HOOKING OF WIRE ENDS SHALL NOT BE PERMITTED).
14. AFTER INSTALLATION, ALL BOLT ENDS SHALL BE CUT FLUSH WITH THE NUTS AND GROUND SMOOTH.

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	⚠	ADDENDUM NO. 1: NEW SHEET	20 of 25	2/19/2021	

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

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Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

CHAIN LINK FENCE DETAILS

DESIGNED: AM/JB	SUBMITTED:
DRAWN: SF	DATE:
CHECKED:	SCALE:
APPROVED:	DRAWING NO. C020A

JOB NO. F70C616E SHEET NO. 21A OF 30 SHEETS

NOTE(S):

1. DEMOLISH EXISTING PUMP STATION FEEDER, UNDERGROUND DUCTS, AND HANDHOLES AFTER NEW PUMP STATION IS OPERATIONAL.
2. PROTECT ALL ADJACENT UNDERGROUND UTILITIES AS REQUIRED TO FACILITATE DEMOLITION WORK. REPAIR DAMAGED IRRIGATION LINES AS REQUIRED.
3. RESTORE EXIST SIDEWALK, OR ABANDON DUCT UNDER SIDEWALK IN PLACE. SEE WALKWAY RESTORATION DETAIL ON SHEET E-5. ⚠1
4. ELECTRICAL DEMOLITION WORK SHALL OCCUR IN PHASE 3. SEE SHEET C005A FOR PHASING PLAN.

EXIST PUMP STATION #3

EXIST COMFORT STATION #6

NORTH

DEMOLITION ELECTRICAL SITE PLAN

SCALE: 1"=50'

50' 25' 0 50' 100' 150'

SCALE: 1"=50'

GRAPHIC SCALE

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	⚠1	ADDENDUM NO. 1: ADDED NOTES	21 of 25	2/19/21	

SEY ITO JR. LICENSED PROFESSIONAL ENGINEER No. 12753-E HAWAII, U.S.A.

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

SIGNATURE APRIL 30, 2022 LIC. EXP. DATE

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828 842 1133 2024 North King Street Suite 200 Honolulu Hawaii 96819-3494

Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

DEMO ELECTRICAL SITE PLAN

DESIGNED: KU	SUBMITTED:
DRAWN: CAD	DATE:
CHECKED: SJI	SCALE: SCALE AS NOTED
APPROVED:	DRAWING NO. E-3

RELOCATED
PUMP STATION #3

SEE SHEET E-7
FOR PUMP STATION
#3 ELECTRICAL PLAN

CHH3
EHH3

CHH2
EHH2

CHH1
EHH1

GRINDER PUMP
1HP, 240V, 1PH

SEE SHEET E-6
FOR COMFORT STATION
#6 ELECTRICAL PLAN

EXIST COMFORT
STATION #6

NOTE(S):

1. ROUTE ELECTRICAL DUCT BELOW EXIST SEWER LINE. PROVIDE 24" MINIMUM VERTICAL CLEARANCE FROM EDGE OF ELECTRICAL DUCT CONCRETE ENCASEMENT TO EDGE OF 6" SEWER LINE. SEE SHEET C009 FOR SEWER LINE PROFILE.
2. PROVIDE 36" MINIMUM HORIZONTAL CLEARANCE FROM EDGE OF ELECTRICAL DUCT CONCRETE ENCASEMENT TO EDGE OF SEWER LINE.

NORTH

NEW ELECTRICAL SITE PLAN

SCALE: 1"=50'

50' 25' 0 50' 100' 150'

SCALE: 1"=50'

GRAPHIC SCALE

REVISION NO.	SYM.	DESCRIPTION	SHT. /OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: ADDED AND REVISED NOTES	22 of 25	2/19/21	

SEY ITO JR.
LICENSED PROFESSIONAL ENGINEER
No. 12753-E
HAWAII, U.S.A.

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

SIGNATURE 2021.02.16 APRIL 30, 2022 LIC. EXP. DATE

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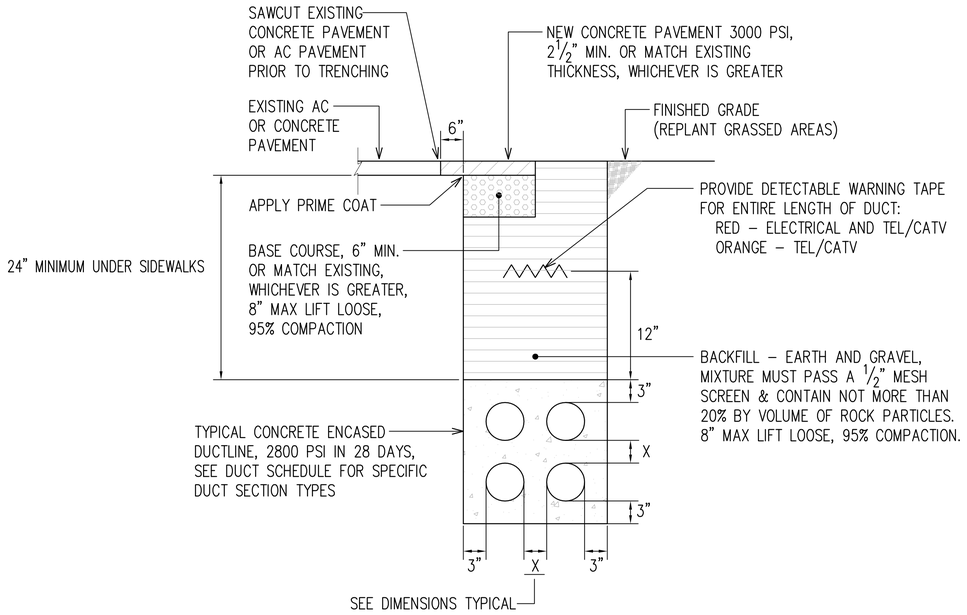
Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

NEW ELECTRICAL
SITE PLAN

DESIGNED: KU	SUBMITTED:
DRAWN: CAD	DATE:
CHECKED: SJI	SCALE: SCALE AS NOTED
APPROVED:	DRAWING NO. E-4



NOTE(S):

1. SEE DUCT SCHEDULE FOR DUCT REQUIREMENTS.

DUCT SEPARATION REQUIREMENTS (DIMENSION "X" WITH EXCEPTIONS)

ELEC – ELEC = 2"

ELEC – TEL = 6"

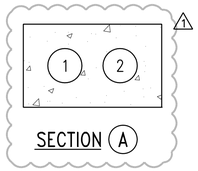
ELEC – COMM/CONTROL = 6"

TEL – COMM/CONTROL = 2"

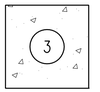
COMM/CONTROL – COMM/CONTROL = 2"

NOTES:

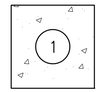
1. CONTRACTOR SHALL PROVIDE MULETAPE (WP 1800P) IN EACH TELEPHONE DUCT THROUGHOUT ITS ENTIRE LENGTH WITH PROTRUSIONS OF 2 FEET IN MANHOLES AND HANDHOLES AT EACH END, AND 1 FOOT IN PULLBOXES. MULETAPE SHALL BE RATED FOR 1800 LB PULL AND SHALL HAVE FOOTAGE MARKINGS FOR MEASURING DUCT LENGTHS. SEE HTCO STANDARD DRAWING 34028.
2. ELECTRICAL DUCT WARNING TAPE: A 6 INCH WIDE WARNING TAPE, RED IN COLOR WITH A BLACK IMPRINTED MESSAGE "CAUTION -- ELECTRIC LINE BURIED BELOW" SHALL BE PLACED 12 INCHES ABOVE THE CONCRETE JACKET FOR ELECTRIC DUCTS FOR THE ENTIRE DUCTLINE INSTALLATION. WARNING TAPE SHALL BE CONSTRUCTED WITH A METALLIC CORE SANDWICHED BETWEEN THE PRINTED POLYETHYLENE TAPE ABOVE AND A CLEAR POLYETHYLENE TAPE BELOW.



SECTION (A)



SECTION (B)



SECTION (C)

SECTION (D)

DUCT AND CABLE SCHEDULE

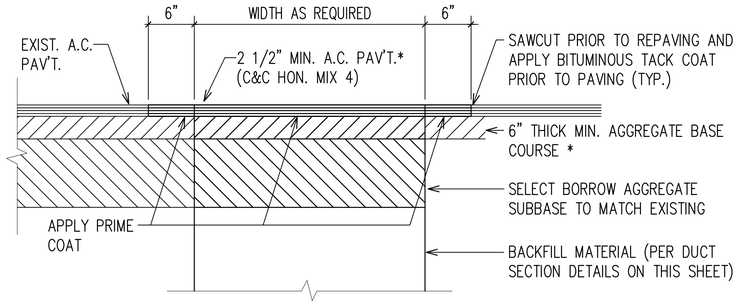
NO.	DUCT SIZE	CABLE	DESCRIPTION
1	1"C	2#10, 1#10 GND	PUMP CONTROL PANEL
2	2"C	2#1, 1#1 GND	PUMP POWER FEEDER
3	1"C	2#10, 1#10 GND, CTRL CABLES AS REQUIRED	GRINDER PUMP PANEL

DUCT SCHEDULE

SCALE: NOT TO SCALE

TYPICAL TRENCH AND BACKFILL DETAIL

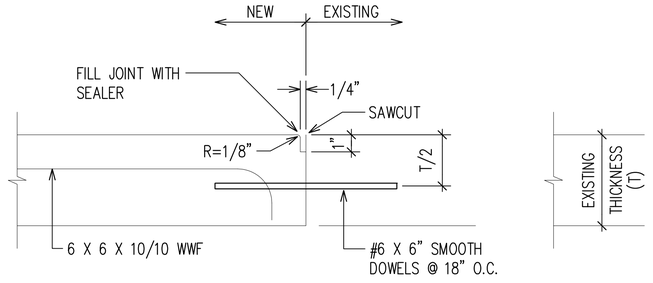
SCALE: NOT TO SCALE



* NOTE:
OR MATCH EXISTING PAVEMENT THICKNESS, WHICHEVER IS GREATER, INCLUDING A.C. AND/OR PORTLAND CONCRETE PAVEMENT, BASE COURSE AND SELECT BORROW.

TRENCH REPAVEMENT DETAIL

SCALE: NOT TO SCALE



SECTION

NOTE(S):

1. SAWCUTTING SHALL BE MADE EITHER PARALLEL OR PERPENDICULAR TO THE WALKWAY.

WALKWAY RESTORATION DETAIL

NOT TO SCALE

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: REVISED DUCT SECTION	23 of 25	2/19/21	

SEY ITO JR. LICENSED PROFESSIONAL ENGINEER No. 12753-E HAWAII, U.S.A.

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

SIGNATURE APRIL 30, 2022 2021.02.16 LIC. EXP. DATE

"OBSERVATION OF CONSTRUCTION" IS DEFINED IN CHAPTER 16-115, HAWAII ADMINISTRATIVE RULES ENTITLED "PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS AND LANDSCAPE ARCHITECTS."

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

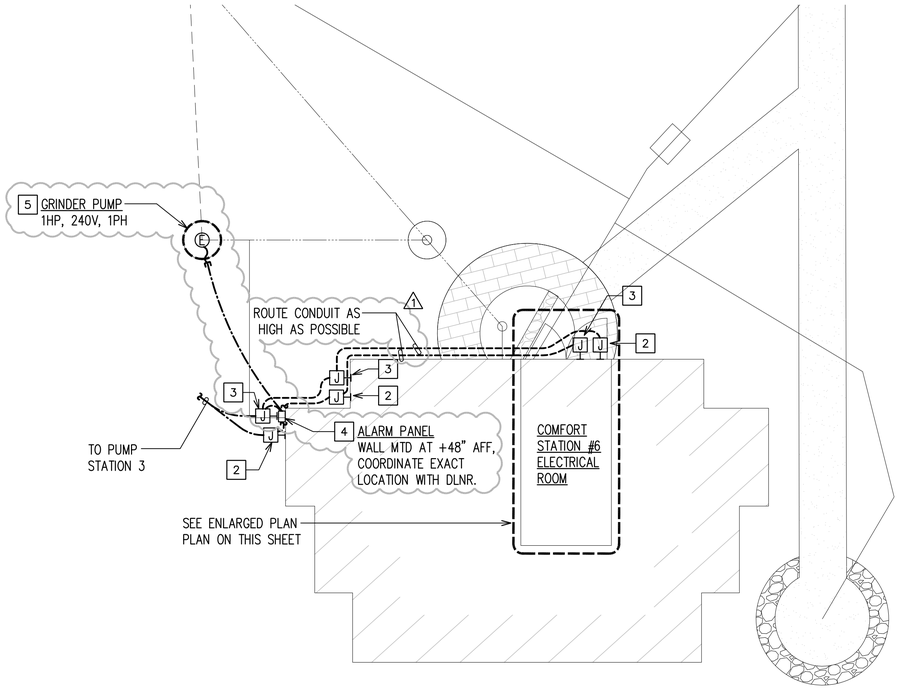
Department of Land and Natural Resources
SAND ISLAND STATE RECREATION AREA SEWER SYSTEM IMPROV
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

DUCT SECTION DETAILS

DESIGNED: KU	SUBMITTED:
DRAWN: CAD	DATE:
CHECKED: SJI	SCALE: NOT TO SCALE
APPROVED:	DRAWING NO. E-5

JOB NO. F70C616E SHEET NO. 26 OF 30 SHEETS

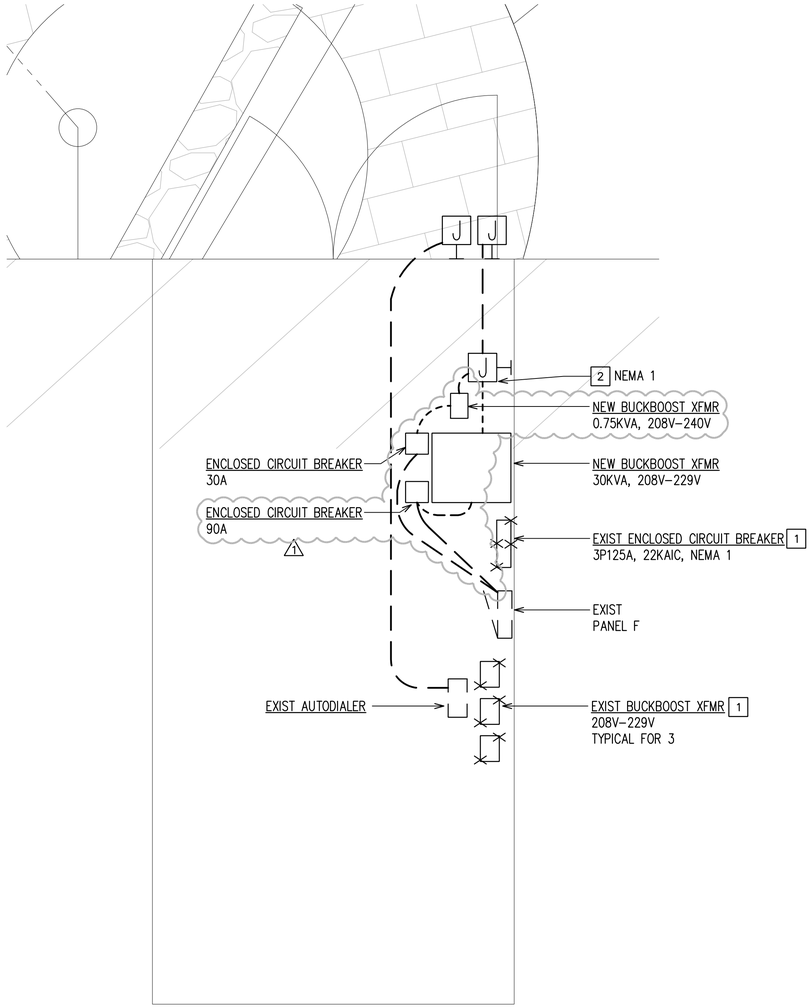
2021-02-16 9:32 AM Z:\CAD\PROJECTS\219195\E-5_219195_Duct Section Detail



NORTH

COMFORT STATION #6 REVISED ELECTRICAL PLAN

SCALE: 1/8"=1'-0"



NORTH

ENLARGED PLAN

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

NOTE(S):

1. DEMOLISH EQUIPMENT AND ASSOCIATED WIRING AFTER AFTER NEW PUMP STATION IS OPERATIONAL.
2. 18"SQ X 4"D, MTD AS HIGH AS PRACTICABLE, WITH LOCKABLE HASP. PROVIDE PADLOCK, AMERICAN STANDARD 5560 SERIES. NEMA 4X 316SS.
3. 8"SQ X 4"D, MTD AS HIGH AS PRACTICABLE, WITH LOCKABLE HASP. PROVIDE PADLOCK, AMERICAN STANDARD 5560 SERIES. NEMA 4X 316SS.
4. PROVIDE PADLOCK, AMERICAN STANDARD 5560 SERIES.
5. HAZARDOUS CLASSIFIED LOCATION: CLASS 1, DIVISION 1 DIAMETER OF PUMP STATION IS A HAZARDOUS CLASSIFIED AREA AS DEFINED IN NFPA 820. PROVIDE INSTALLATIONS IN ACCORDANCE WITH NEC 500 AND 501 AS APPLICABLE.

1

8' 4' 0 8' 16' 24'

SCALE: 1/8"=1'-0"

GRAPHIC SCALE

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: ADDED ELEC EQUIPMENT	24 of 25	2/19/21	

SEY ITO JR. LICENSED PROFESSIONAL ENGINEER No. 12753-E HAWAII, U.S.A.

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SIGNATURE 2021.02.16 APRIL 30, 2022 LIC. EXP. DATE

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Department of Land and Natural Resources
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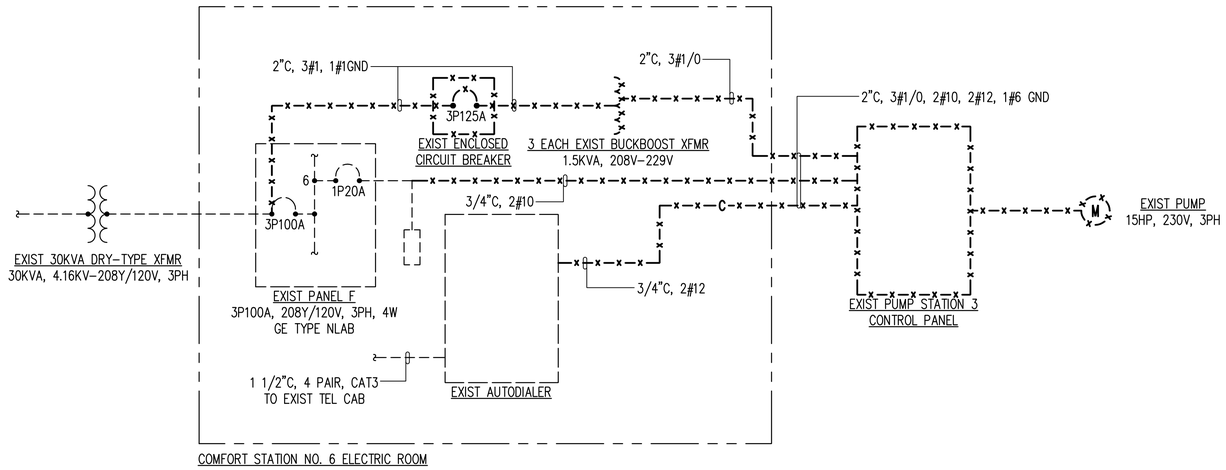
PHASE 2: PS 3 RELOCATION & FM 3 REPLACEMENT
Sand Island, Honolulu, Oahu, Hawaii

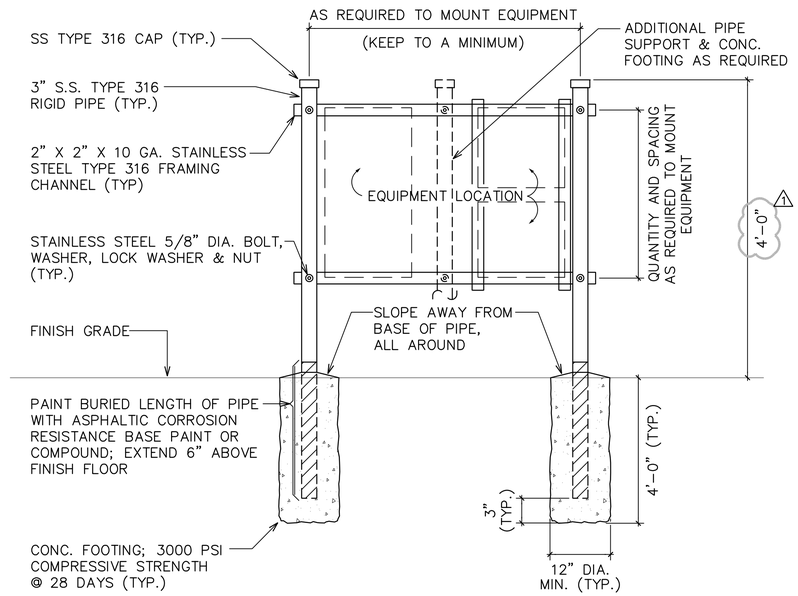
COMFORT STATION #6
REVISED ELECTRICAL PLAN

DESIGNED: KU	SUBMITTED:
DRAWN: CAD	DATE:
CHECKED: SJI	SCALE: SCALE AS NOTED
APPROVED:	DRAWING NO. E-6



DEMOLITION ONE-LINE DIAGRAM

SCALE: NONE

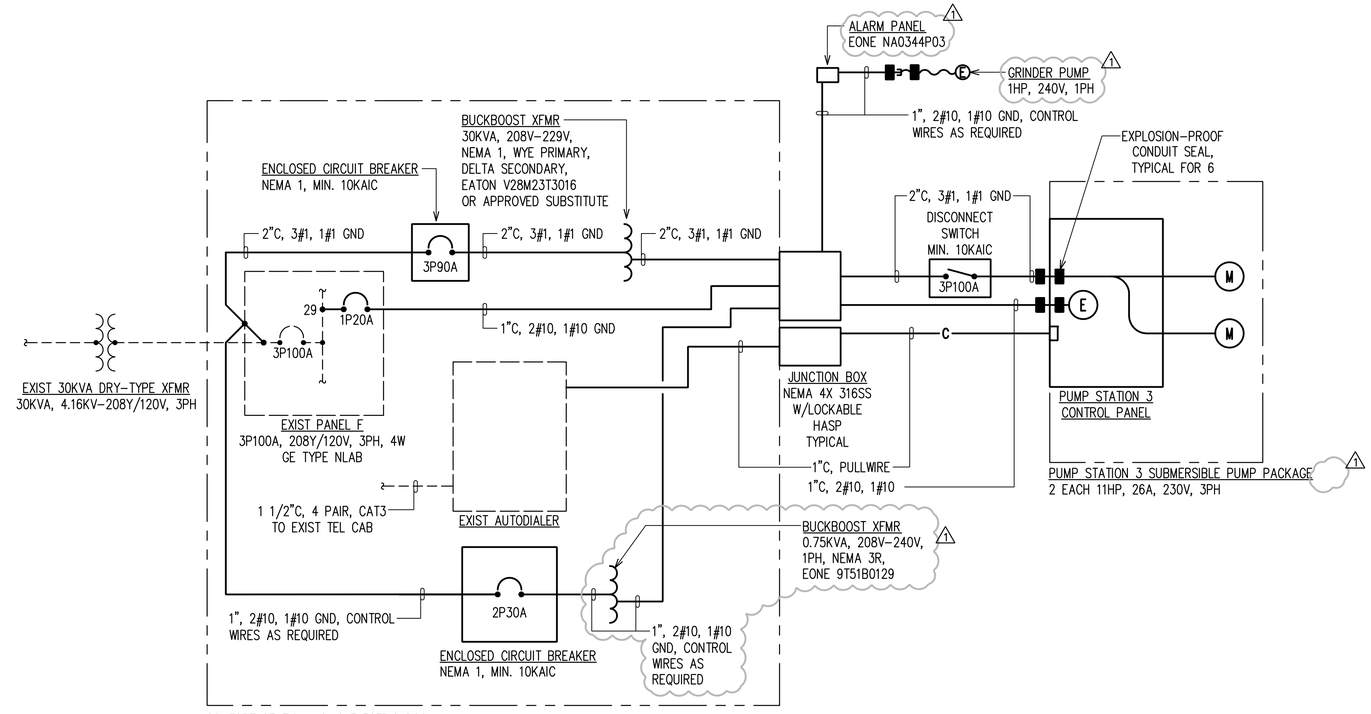


NOTE(S):

1. MAXIMUM 3' POST SPACING.

FREESTANDING EQUIPMENT RACK DETAIL

NOT TO SCALE



NEW ONE-LINE DIAGRAM

SCALE: NONE

PANEL F — COMFORT STATION 6 — 100A MAIN CIRCUIT BREAKER, 208Y/120V, 3 PHASE, 4 WIRE, 22,000 A.I.C. INDUSTRIAL-BOLTED TYPE, NEMA 1, SURFACE MOUNTED

CKT. NO.	USE: L-LTS, R-RECEP, PFB-PROVISION FUTURE BKR., S-SPARE, F-FAN, W-WARMER	BREAKER POLE	BREAKER AMPS	WIRE SIZE	KVA ON BUSSES PHASE A	PHASE B	PHASE C	WIRE SIZE	BREAKER POLE	BREAKER AMPS	USE: L-LTS, R-RECEP, PFB-PROVISION FUTURE BKR., S-SPARE, F-FAN, W-WARMER	CKT. NO.
1	NITE LIGHTS PHOTOCELL	1	20	12	0.1 0.5			12	1	20	PUMP CONTROL VERBATIM	2
3	L - CURFEW LIGHTS	1	20	12		0.5 **0.0**			**1**	**20**	**S**	**4**
5	L AND R - ELEC RM	1	20	12			0.7 0.2	12	1	20	PUMP STATION CONTROL	6
7	PUMP STATION LIGHT POLE	1	20	12	1.0 0.7			12	1	20	TIME CLOCK	8
9	MISCELLANEOUS LOADS	3	20	12		0.1 1.0			2	60	S	10
11							0.1 1.0					12
13					0.1 0.0				2	60	S	14
15	S	2	60			0.0 0.0						16
17							0.0 0.0		3	70	S	18
19	S	2	60		0.0 0.0							20
21						1.0 0.0						22
23	**PUMP STATION 3 CONTROL**	**1**	**20**	**10**			**0.1**		3	100	MAIN CIRCUIT BREAKER	24
25	PFB											26
27	PFB											28
29	PFB										PFB	30
	CONNECTED LOAD PER PHASE				2.4	2.6	2.1					

NOTE(S):
BOLD LINES INDICATE NEW CIRCUITS

TOTAL CONNECTED LOAD (KVA)	7.1
DEMAND FACTOR	100%
TOTAL DEMAND LOAD (KVA)	7.1
TOTAL DEMAND LOAD (AMPS)	19.7

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
1	1	ADDENDUM NO. 1: REVISED DETAIL AND ONE-LINE AND ADDED PANEL SCHEDULE	25 of 25	2/19/21	

SEY ITO JR. LICENSED PROFESSIONAL ENGINEER No. 12753-E HAWAII, U.S.A.

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SIGNATURE — 2021.02.16 LIC. EXP. DATE — APRIL 30, 2022

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DEMOLITION AND NEW ONE-LINE DIAGRAMS

DESIGNED: KU	SUBMITTED:
DRAWN: CAD	DATE:
CHECKED: SJI	SCALE: SCALE AS NOTED
APPROVED:	DRAWING NO. E-8

JOB NO. F70C616E SHEET NO. 29 OF 30 SHEETS

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