

WASTEWATER COLLECTION SYSTEM NOTES (2017)

GENERAL REQUIREMENTS

1. The General Requirements and Covenants of the Department of Public Works, County of Hawai'i (July 1972), the Standard Specifications for Public Works Construction (applicable non-wastewater sections, September 1986), the Standard Details for Public Works Construction, Departments of Public Works, County of Hawai'i (applicable non-wastewater sections, September 1984), Wastewater System Design Standards, City and County of Honolulu (July 2017), Wastewater System Standard Details, City and County of Honolulu (July 2017) and the County of Hawai'i, Department of Environmental Management, Wastewater Division (WWD) Standard Details (WW-1 thru WW-9, current version) shall be applicable and incorporated herein unless otherwise noted.
2. Basis of bearing (horizontal control): _____.
3. Basis of elevation (vertical control): _____.
4. Survey control and layout, when required, shall be performed by, or under the direct supervision of, a professional land surveyor licensed in the state of Hawai'i.
5. The Contractor shall procure and conform to all permits and licenses required, pay all associated charges and fees and give all notices necessary and incidental to the due and lawful prosecution of the work.
 - a. The Contractor shall procure and conform to a National Pollutant Discharge Elimination System (NPDES) Permit from the State of Hawai'i, Department of Health, Clean Water Branch for any project where construction activities will disturb one (1) acre or more of total land area or where dewatering is required.
 - b. All stormwater pollution prevention measures shall be installed so as to prevent stormwater runoff, construction water, fuels, chemicals, or other liquids being directed into or onto any sanitary sewer facilities within the project limits. Best Management Practices (BMPs) may include, but shall not be limited to, use of Rainstopper manhole inserts.
6. A minimum horizontal separation of 8 feet between water and sewer lines are required. If not possible, Section 2.4.12.B of the "Wastewater System Design Standards, City and County of Honolulu, July 2017" applies.
7. A minimum of 18 inch vertical clearance at water and sewer main crossings with sewer underneath the water is required. If not possible, Section 2.4.12.B of the "Wastewater System Design Standards, City and County of Honolulu, July 2017" applies.
8. The Contractor shall furnish all labor, materials, and equipment required for the complete installation of the subject work unless specifically noted otherwise on the plans approved by the WWD.
9. It shall be the contractor's responsibility to perform all work necessary to complete construction per the approved plans and specifications and such incidentals as may be necessary to meet applicable agency requirements including, but not limited to, occupational safety and health administration (OSHA) regulations, and provide a completed project. Only plans approved by WWD shall be used for construction of, or connection to, the County's public wastewater system. Any additions, deletions, or changes to the wastewater system shall meet the written approval of the County of Hawai'i, Department of Environmental Management, Wastewater Division prior to starting the revised work.

- a. The Contractor shall maintain one complete set of approved plans on the construction site at all times where he shall record the sizes, materials, station locations and elevations of all existing utilities encountered. These field record drawings shall be kept continuously up to date and shall be available for inspection by the WWD on request.
10. Inspections shall be required for all work which involves the WWD's sewer mains, laterals, cleanouts, and all new sewer construction to be dedicated to the County of Hawaii. Call the Wastewater Division at (808)961-8338 during normal business hours (7:00 a.m. to 3:30 p.m., Monday through Friday, except County of Hawai'i holidays) at least two (2) working days in advance to schedule an inspection.
 - a. WWD inspection shall be performed prior to backfilling or covering the pipe and associated appurtenances in public easements or rights-of-way, before private sewer or laterals are connected to the public sewer system, and after all associated plumbing work on private property is complete, in accordance with the plumbing permit.
 - b. When WWD determines through inspection that material, equipment or workmanship do not meet requirements, the Contractor will be given written notice of noncompliance. Immediate correction of the deficiencies shall be addressed by the Contractor with the WWD Engineer and/or their representative.
 - c. Any inspection by WWD, Hawai'i County or other agencies shall not, in any way, relieve the Contractor from any obligation to perform the work in strict compliance with applicable regulations, codes, contract documents, plans, specifications, or governing agency requirements.
11. Sewer work shall be scheduled such that work shall not be performed on Saturdays, Sundays or County of Hawai'i holidays. If such work dictates performance on these non-work days, or after normal hours of operation (3:30 PM to 7:00 AM), the Contractor shall be responsible for payment of overtime charges to the WWD.
12. The Contractor shall notify the Hawai'i One Call Center of any planned excavation on public or private property at least five working days, but not more than twenty-eight calendar days, prior to commencing such excavation (in accordance with HRS 269 E-7). Call 1-866-423-7287 (or 811). Errors in One Call's sanitary sewer locates shall be reported immediately to the WWD at (808)961-8338.
13. Locations and descriptions of existing utilities shown on the plans are compiled from available records and/or field survey. The Engineer and utility providers do not guarantee the accuracy or completeness of such records. The Contractor shall field verify locations, sizes, materials and depths of all existing utilities where proposed facilities cross.
14. The Contractor shall field verify existing sanitary sewer locations, elevations, and materials within the project limits prior to construction. Pot-holing may be required for such verification.
15. The Contractor shall be responsible for exposing potential utility conflicts far enough ahead of construction to make necessary line and grade modifications without delaying the work.
16. All existing utilities except those specifically designated for abandonment or removal on the approved plans, including wastewater line(s), whether or not shown on the plans, shall be protected and repaired by the contractor if damaged during construction. The Contractor shall leave existing facilities in an equal to or better than original condition. The contractor shall pay all associated expenses. In the event of damage to existing utility facilities other than sanitary sewer, the contractor shall immediately notify the utility service provider. In the event of damage to existing sanitary sewer facilities, the contractor shall immediately notify the WWD at (808)961-8338.

17. The Contractor shall notify and coordinate with private utilities for adjustment to or relocation of power poles, vaults, etc. to avoid conflict with County sewer structures, lines and associated appurtenances.
18. Exposed ends of sewer lines that are abandoned or to be abandoned in place shall be capped or plugged with concrete for a minimum length equal to two times the diameter of the abandoned pipe and interfering portions removed by the Contractor to the extent necessary to accomplish the work, unless otherwise specified.
19. The Contractor shall maintain access to all sanitary sewer structures and manholes at all times.
20. Bypassing or spilling of sewage to the ground, drainage system or State waters is prohibited. In such cases, the Contractor shall immediately call the WWD at (808)961-8338, take immediate action to contain the sewage, and pay penalties, including legal fees and other costs related to the bypass and/or spill.
21. The Contractor shall be in person on the job site or be represented on the job site by a responsible agent with authority to act for the Contractor in connection with this project at all times.
22. The Contractor shall, at all times during the work, keep the premises clean and orderly. Public streets and rights-of-way shall be kept clean of mud, dust and debris. The Contractor shall adequately water disturbed areas on-site for dust abatement, as needed. Upon completion of the work, the Contractor shall repair all damage caused by equipment and leave the project free of rubbish and excess materials of any kind. Dropping or washing debris or rubbish of any kind into the sanitary sewer system is prohibited.

Existing Condition Assessment

1. The Contractor shall keep all project activities within the project area. In the event that a previously unknown archaeological feature, historic property, or human remains (including human skeletal remains, cremations, ceremonial objects, funerary objects, burial goods, etc.) are exposed by construction, the Contractor shall cease work in the vicinity immediately and notify the WWD, State of Hawai'i Historic Preservation Division (SHPD), the appropriate medical examiner or coroner, and the appropriate police department, of the discovery. The Contractor shall protect the area of the remains with an appropriate material. The Contractor shall cooperate with the Police or Department of Land and Natural Resources in the investigation, recording, preservation, and salvage.

SEWER SYSTEM REQUIREMENTS

1. Sewer Main Pipe and Fittings

Gravity Main

- a. All sanitary sewer pipe and fittings shall be PVC SDR-26 bell and spigot in conformance with the latest version of ASTM D3034, unless otherwise noted on the approved plans.
- b. Laying of pipe shall generally commence at the lowest point, the bell end facing upstream, regardless of the stationing shown on the plans. Pipe shall be fitted together and matched with gaskets properly seated so that when laid it will form a uniform and smooth invert.
- c. Refer to the drawings for detailed requirements for all connections to existing sanitary sewer pipe. Details shall be provided to and approved by WWD.
- d. The interior of the sewer pipe shall be cleared of all debris and foreign materials as the work progresses. Before leaving the workplace for the night, exposed ends of sewer pipe shall be closed with temporary covers to prevent earth and debris from entering the pipe.

- e. Because of the nature of plastic pipe and fittings, the Contractor is cautioned to exercise care in handling, loading, unloading, and storing to avoid damage.
 - i. Keep pipe and gaskets clean, away from oil, grease, excessive heat and electric motors, which produce ozone, and protected from direct sunlight and temperature changes in prolonged exposure to avoid cracking.
 - ii. Heavy impact may cause a slight longitudinal indentation on the outside of the pipe and a crack on the inside. This will result in a split as soon as the pipe is placed under loading. Any pipe that has been impacted shall be examined closely for this type of damage.

Force Main

- a. Force main piping shall be polyvinyl chloride (PVC), centrifugally cast fiberglass reinforced polymer mortar (CCFRPM) or High Density Polyethylene (HDPE), unless otherwise approved.
- b. HDPE pipe shall utilize butt-fused joints. Approved mechanical joints may be used for connection of HDPE piping to existing dissimilar piping (Ductile Iron, Cast Iron, and Reinforced Concrete Pressure Pipe). Electro-fusion joints may be utilized when authorized by the Wastewater Division. Plastic welding of joints shall not be allowed.
- c. HDPE Force Mains for sanitary sewer service shall be dark green in color.
- d. Thrust blocks or other joint restraining systems approved by WWD, shall be provided for all fittings such as tees, plugs, caps, bends, offsets, reducers, and valves as well as all other pipeline appurtenances that are subject to unbalanced thrusts. Design of thrust blocks shall be in accordance with the current edition of the Water System Standards, Department of Water Supply, County of Hawai'i, State of Hawai'i.
- e. Force mains shall be designed with a continuous upward slope to eliminate high or low points in the piping and the need for installation of gas relief valves or blow offs. Designs incorporating high or low points in the force main shall not be allowed unless specifically authorized in writing by the Wastewater Division.
- f. In the event that high points in the force main are authorized by the Wastewater Division, combined air and vacuum relief valves shall be installed on the high points. Such valves shall be installed in reinforced concrete vaults. Vaults shall be vented and drained to an adjacent sewer system with drainage of the vault to the sewer system to the maximum extent possible. In the event that the low points in the force main are approved by WWD, blow offs may be required. Blow offs shall consist of a valve connection on the force main and piping to a gravity sewer manhole or a manhole where a pump can be used to drain the force main designed by the Engineer for the specific application and approved by WWD.
- g. Design velocity shall range between 3 and 6 Feet per second unless otherwise approved by WWD. Maximum force main velocity at peak condition shall not exceed 8 Feet per second in any case.
- h. All combined air and vacuum relief valves shall be 316 stainless steel Vent-O-Mat Series RGX provided with isolation valves to allow maintenance and repair of the air relief valve during periods when the force main is active.
- i. Metallic tracer tape shall be installed above all buried piping. Tracer tape shall be acid and alkali-resistant, green or yellow, 6-inches (minimum) width, 9-mil (minimum) thickness and be reinforced for increased breaking strength. Metallic tracer tape shall be THORTEC Detectable warning tape or approved equal and shall have wording similar to "CAUTION – Sewer Line Buried Below." Tracer tape shall be installed at a depth of approximately 12-inches from grade (minimum coverage of 6-inches

required). Tape shall be placed on compacted backfill and shall be laid in continuous lengths with wording facing upwards.

- j. Scotchmark 3M Full Range Markers, 15-inches in diameter, Product Number 1253, color coded to APWA Standards designed for applications up to eight feet in depth) shall be installed above buried piping at a maximum depth of 6-feet. Markers shall be placed at all piping directional changes (horizontal and/or vertical) and at maximum intervals of 50-feet. Electronic Markers shall be installed with 12-inches of No. 4 crushed aggregate screening all around (top, bottom, sides) the Marker to protect it from damage during backfilling operations. Electronic Markers shall be installed in the horizontal position to maximize locator efficiency.
- k. Prior to excavation within 6 feet of active Force Mains, the Contractor shall purchase and have on-site the following repair items to be used in the event of damage to the existing lines during excavation work:
 - i. Two (2) each Stainless Steel pipe repair clamps of appropriate size and pressure rating for each type of existing Force Main where the excavation is taking place.
 - ii. Two (2) each "Dresser" type couplings of the appropriate size and pressure rating for each type of existing Force Main where the excavation is taking place.
 - iii. One (1) each pipe length of the appropriate size and pressure rating for each type of existing Force Main where the excavation is taking place. As an alternative, the Contractor may provide piping of a different material (PVC, HDPE, Cast Iron, or Ductile Iron) provided that sufficient WWD approved adapters also available at site.

2. Trenching, Pipe Bedding, and Backfill

- a. The Contractor shall have appropriate equipment on-site to produce a dry, firm, smooth, undisturbed subgrade at the trench bottom that is true to line and grade. The trench bottom shall be free of loose materials or tooth grooves for the entire trench width prior to placing pipe bedding material.
- b. The Contractor shall furnish and install sufficient trench boxes, shoring, sheeting, or bracing to insure the safety of workmen and the public, protect the work, and protect existing facilities.
 - i. Shoring, sheeting, and bracing shall comply with OSHA rules, orders and regulations.
 - ii. Where required by OSHA, the Contractor shall be required to provide drawings and/or calculations for specially designed bracing and shoring, prepared and stamped by a Hawai'i registered professional engineer, to the WWD a minimum of five (5) working days prior to beginning associated excavation. The Contractor shall be responsible for the adequacy of all sheeting, shoring and bracing and compliance with the law. Failure of the Inspector to suspend the work or notify the Contractor of any inadequacy of sheeting, shoring, bracing or noncompliance with the law shall not relieve the Contractor of this responsibility.
 - iii. The Contractor shall furnish and maintain shoring, sheeting and bracing until after the pipeline and appurtenances have been installed and the Inspector has approved the placement of sufficient backfill. The Contractor shall provide adequate safety measures to allow for access by the Inspector or testing personnel to perform compaction testing and inspection of the lifts of backfill placed.
- c. No trenches in roads or driveways shall be left open overnight. All such trenches shall be plated or closed and normal traffic flow restored before the end of each work day.

- i. The steel trench plates shall be capable of supporting HS-20 loading.
 - ii. The plates must extend beyond the edge of the trench wall far enough to adequately support HS-20 traffic loads. In no case shall the plates extend less than twelve (12) inches beyond the trench wall.
 - iii. Each plate must be fully supported around its' perimeter to prevent wobbling or rocking.
 - iv. The plates shall be secured to prevent any movement.
 - v. Trenches and excavations beneath the plates shall be adequately shored and braced to withstand HS-20 traffic loads.
 - vi. Temporary paving or cold-mix asphaltic concrete (cutback) shall be placed and continuously maintained around all outside edges of the trench plates until they are removed.
- d. Trenches shall be properly backfilled and compacted as shown on the approved plans.
- e. Pipe bedding shall be Class B $\frac{3}{4}$ " aggregate base course placed within the dry trench, at not less than 4 inches but not more than 5 inches in compacted thickness. Bedding shall be compacted to 95 percent maximum dry density, unless otherwise noted on plans, to avoid stress concentrations and associated irregular pipe deformations. Recesses constructed in the bedding, followed by hand compaction of backfill around the bells, will provide continuous longitudinal support and uniform bearing below the pipe joints.
- f. The remainder of the pipe embedment shall also be Class B $\frac{3}{4}$ " aggregate base course, properly placed, in lifts not to exceed 6", around the pipe haunches and extending to a minimum of 12" compacted thickness over the top of the pipe. Pipe zone embedment shall be compacted to 95 percent maximum dry density, unless otherwise noted on plans, to provide adequate side support and ensure the pipe's full strength is achieved while avoiding pipe deflection, vertical and lateral displacement.
- g. Controlled Low-Strength Material (CLSM) shall be used as the final trench backfill unless otherwise noted on the plans or approved in writing by the WWD Engineer.
- h. Compaction testing for bedding and embedment materials for sewer main installation shall be performed by an independent testing and quality control laboratory. Compaction test frequency shall be a minimum of one (1) test per 150 lineal feet per lift or a fraction thereof on alternating sides of the pipe or structure. The Engineer reserves the right to increase or decrease the frequency of compaction testing to match field conditions. Test results shall be submitted to the WWD Engineer for evaluation as part of the final acceptance process.

3. Sewer Manholes and Appurtenances

- a. All precast concrete sewer manholes shall conform to the latest version of ASTM C478.
- b. All sewer manhole base, sections, cone, flat top, benches, and channels shall include a concrete waterproofing, protection, and improvement admixture. Admixture shall be Xypex Admix C-1000 or approved equal product. Dosage shall be per manufacturer's instructions and shall not be less than 3% of the weight of the Portland cement fraction of the mix.
- c. All drop sewer manholes, transitional sewer manholes (receiving manhole and the next two manholes downstream from the discharge of a force mains), and sewer manholes with connecting pipes greater

than or equal to 12 inches nominal diameter shall also be lined with a PVC liner, Dura-Plate or an approved equal product.

- d. All constructed (cast-in-place) sewer manhole benches and channels shall be coated using Xypex Megamix I or an approved equal product.
- e. Sewer manhole channels, including those at connections to existing manholes, shall provide a smooth transition between inlet and outlet sewers. The angle between the inlet and outlet shall be a minimum of 90 degrees.
- f. Unless otherwise approved or noted, all manholes for connecting sewer lines less than or equal to 12-inch nominal diameter shall be provided with "Eccentric" cone sections with Type SA frames and covers (Std. Detail S-22).
- g. Unless otherwise approved or noted, all manholes with connecting sewer lines greater than 12-inch nominal diameter or less than 5 feet deep shall be provided with a frame and cover with a minimum 48" clear opening. The 52-inch cover shall have a smaller 25-5/16-inch cover installed for routine maintenance and inspection. The smaller cover shall be provided with recessed stainless steel bolts to allow securing. Permanent alignment marks (match marks) shall be provided for the bolts to facilitate reinstallation of the cover. The frame and cover shall be an eccentric configuration, D&L Foundry & Supply; Model A-1428 or approved equal.
- h. A flexible pipe to manhole connector shall be used whenever a pipe penetrates into a precast concrete manhole or structure. Connections shall be water-tight and shall provide for smooth flow into and through the manhole with no ponding.
 - i. New sewer pipe connections to new manholes shall be with an approved cast-in-place manhole pipe adapter (A-Lok, Econoseal, or approved equal product).
 - ii. Existing sewer pipe connections to new manholes shall be with an approved manhole pipe adapter (A-Lok Field Sleeve or approved equal product).
 - iii. Sewer pipe connections to existing manholes shall be with an approved manhole pipe adapter (A-Lok Field Sleeve or approved equal product). Openings for new connections to existing manholes shall be core-drilled and surface roughened. Small chipping hammers or similar light tools may be used to enlarge existing openings or shape channels in existing manholes. Use of pneumatic jackhammers or other heavy tools which could damage or crack the manhole base is prohibited.
- i. One hand grab rung at the top of the manhole shall be stainless steel Type "SA" per DPW Standard Detail S-42. Sewer manhole rungs shall be Type "SP" Copolymer Polypropylene Plastic, BOWCO Industries Inc./Meadow Burke Part No. 93810R in accordance with Wastewater Standard Detail WW-7.
- j. Rungs and eccentric cones or covers shall not be aligned above flow lines. They shall be placed on the side of the manhole with the largest shelf.
- k. Sewer manholes located in unpaved areas shall be provided a reinforced 3000 PSI Class "A" concrete collar. The reinforced concrete collar shall be a minimum of 12" thick, and extend a minimum of 12" beyond the frame and cover. Reinforcement shall consist of at least one (1) #4 bar placed at least 3" clear from the edge of concrete and wrapped around the manhole top section (with at least 15" lap), centered vertically in the collar.
- l. All manhole sections shall be joined using Ram-Nek RN103 or approved equal.

4. Sewer Lateral Pipe and Fittings

- a. New sewer laterals and cleanouts shall be 6" diameter, PVC SDR26 pipe and fittings.
- b. Sewer cleanouts shall be located in the *County Right-of-Way or easement* within one foot of the property line or boundary. The cleanout shall be easily accessible (i.e. not be buried or located under or close to rock walls, fences or other obstructions).
 - i. Commercial properties shall install a sewer manhole in lieu of a cleanout at the property line.
- c. Sewer lateral connections to an existing sanitary main shall be made with a wye configured flexible saddle (Fernco TSW-6 or approved equal) rotated 45 degrees above the main spring line unless otherwise directed by the WWD.
 - i. Sewer lateral saddle connections and cored sewer main entry, when directed by the WWD, shall provide a smooth transition and unobstructed flow to the main. Saddles shall completely overlay the cored area on the main. Saddles shall be secured to the main with stainless steel straps and jacketed with Class B reinforced concrete in accordance with DPW Standard Detail S-5. The reinforced concrete jacket shall completely encase the existing sewer main, be a minimum of 6" thick, and extend a minimum of 6" each way beyond the saddle.

5. Sewer Line Acceptance Tests

- a. The Contractor shall provide and pay for all materials, equipment, and facilities necessary for testing all utility backfill, pipe and structures in accordance with these plans and County standard specifications and requirements.
- b. All newly installed sewer mains and laterals are subject to Leakage Testing and CCTV inspection prior to final acceptance as directed by the WWD.
- c. Leakage testing shall be accomplished in accordance with Section 21.3 D of the Standard Specifications for Public Works Construction, September 1986. All costs for such testing shall be borne by the Contractor.
- d. Deflection testing when required by WWD, shall be accomplished in accordance with Section 21.3 E of the Standard Specifications for Public Works Construction, September 1986. All costs for such testing shall be borne by the Contractor.
- e. An Initial CCTV inspection will be performed by the County at no cost to the Contractor subject to the conditions below.
 - i. The Contractor shall obtain a copy of the Sewer Line Acceptance Test Criteria from the WWD prior to requesting or scheduling a CCTV inspection.
 - ii. The Contractor shall assist the County in the performance of the CCTV inspection, shall be responsible for all Traffic Control requirements during CCTV inspection, and shall be responsible for cleaning and removing all dirt, grit, rock, debris and foreign materials from the pipes and manholes prior to CCTV inspection. In the event that pipes or manholes are found to have been inadequately cleaned, the County will terminate the CCTV inspection. The cost of subsequent CCTV inspection(s) will be charged to the Contractor.

- iii. The contractor shall have a Supervisory representative present during performance of the CCTV inspection.
- iv. If the CCTV inspection reveals conditions such as dents, out-of-round, and etc. the work shall be considered defects and subject to repair.
- v. If the CCTV inspection reveals pipe sags exceeding the Sewer Line Acceptance Test Criteria below they shall be considered defects subject to Correction or a Deductive Payment for the entire run of the piping from structure-to-structure according to the following table:

SAG TOLERANCES

Pipe Slope	Nom. Pipe Size	Complies w/Specifications	50% Payment of Bid Amount	Reconstruction Required
<0.4%	6"	<1/2"	1/2" - 1"	>1"
	8"	<1/2"	1/2" - 1"	>1"
	10"	<1"	1" - 1-1/2"	>1-1/2"
	12"	<1"	1" - 1-1/2"	>1-1/2"
	>12"	<1"	1" - 1-1/2"	>1-1/2"
0.4% to 0.7%	6"	<1/2"	1/2" - 1-1/2"	>1-1/2"
	8"	<1/2"	1/2" - 1-1/2"	>1-1/2"
	10"	<1"	1" - 2"	2"
	12"	<1"	1" - 2"	2"
	>12"	<1"	1" - 2"	2"
>0.7%	6"	<1"	1" - 1-1/2"	>1-1/2"
	8"	<1"	1" - 2"	>2"
	10"	<1-1/2"	1-1/2" - 2"	>2"
	12"	<1-1/2"	1-1/2" - 2-1/2"	>2-1/2"
	>12"	<1-1/2"	1-1/2" - 3"	3"

- vi. CCTV inspections will be recorded. In the event that the Contractor requests a copy of the CCTV inspection, the Contractor will be charged for the copy at a rate of \$25.00.

6. Final Project Submittals

- a. "As-Built" plans and certified easements recorded with the Bureau of Conveyances, if applicable are required for final contract acceptance of sewer construction by WWD. Upon final project inspection and declaration of satisfactory completion by the Wastewater Division Chief, submit to WWD one (1) set of field record drawings and one (1) set of "As-built" plans one (1) electronic set in AutoCAD 2009 or newer version and one (1) electronic set in Adobe PDF format.
- b. It is mandatory that the "As-Built" plans show correctly identified property TMK numbers, location of sewer manholes, laterals, cleanouts and all other major components of the wastewater collection system including rim and invert elevations at all sewer manholes, lateral connections at the main, and lateral elevations at the cleanout. Submitted documentation shall be certified by a Hawai'i licensed professional land surveyor attesting to the accuracy of locations and elevations of all major components of the wastewater collection system as shown on the As-Built plans.

** End of Notes**