February 27, 2026

SECTION 13930 – FIRE SPRINKLER SYSTEM

PART 1 - GENERAL

1.01 PERFORMANCE REQUIREMENTS

A. The work includes designing and providing new automatic wet pipe fire extinguishing sprinkler systems for fire protection coverage throughout the entire project. Fire sprinkler system must be provided with earthquake protection and must include all materials, accessories, and equipment necessary to provide each system complete and ready for use. Design and install each system to give full consideration to blind spaces, piping, electrical equipment, ductwork, and all other construction and equipment to afford complete coverage in accordance with detailed drawings to be submitted for approval. Devices and equipment for fire protection service must be listed by the Underwriters' Laboratories, Inc. or approved by Factory Mutual System. In the NFPA publications referred to herein, the advisory provisions must be considered to be mandatory, as though the word "must" had been substituted for "should" wherever it appears; reference to the "authority having jurisdiction" must be interpreted to mean the Hawaii Insurance Bureau and the Building and Fire Departments. The work must begin at the point indicated.

B. Qualification of installers: Prior to submission of bid, submit data for approval by the Engineer, showing that the Contractor is a licensed fire protection contractor (C-20) and has successfully installed automatic fire extinguishing sprinkler systems of the same type and design as specified herein, or that he has a firm contractual agreement with a subcontractor having such required licensed experience. The data must include the names and locations of at least five installations where the Contractor, or the subcontractor referred to above, has installed such systems. The Contractor must indicate the type and design of each system and certify that each system has performed satisfactorily in the manner intended for a period of not less than 18 months.

C. Qualification of system technician: Installation drawings, shop drawings and as-built drawings must be prepared, by or under the supervision of, an individual who is experienced with the types of works specified herein and is currently certified by the National Institute for Certification in Engineering Technologies (NICET) as an engineering technician with minimum Level-III certification in the Fire Protection/Automatic Sprinkler System program. Contractor must submit data for approval showing the name and certification of all involved individuals with such qualifications at or prior to submittal of drawings.

1.02 ELECTRICAL WORK

A. Building fire alarm system connections must be provided under Section 13851, Addressable Fire-Alarm Systems.

1.03 SUBMITTALS

A. Partial submittals will not be acceptable. Submit for approval one complete digital set of submittals as described below. Annotate descriptive data to show the specific model, type, and size of each item the Contractor proposes to furnish. Prepare working drawings on sheets not smaller than 24 by 36 inches, in accordance with the requirements for "Working Drawings (Plans)" as specified in

NFPA 13 and NFPA 14 and include data essential to the proper installation of each system. Do not commence work until the design of each system and the various components have been approved. The Engineer and Special Inspector will review and approve all submittals. Before work is commenced, submit for approval complete sets of working drawings and calculations for each sprinkler system. Working drawings and calculations must be stamped by a licensed professional engineer.

B. Manufacturer's data:

1. Sprinklers
2. Spare sprinkler cabinet and sprinkler stoppers
3. Pipe, fittings, and mechanical couplings
4. Pipe hangers and supports
5. Earthquake sway bracing and seismic restraint
6. Air vent

C. Shop drawings: Sprinkler system layout conforming to NFPA 13.

D. Calculations:

1. Sprinkler system hydraulic calculations
2. Seismic bracing calculations

E. Certificates of Compliance

1. Contractor's material and test certificate per NFPA 13
2. Pipe and fittings

F. Test plan: A minimum of fifteen (15) days prior to the Preliminary Testing, the contractor must submit a "Test Plan" which must describe how the system will be tested. This must include a step-by-step description of all tests and must indicate the type and location of test apparatus to be employed. Tests must not be conducted until the test plan is approved by the Engineer.

G. Publications: NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

H. As-built drawings: Submit in accordance with Section 01333 – SUBMTTAL PROCEDURES.

1.04 GUARANTY AND CERTIFICATE

A. The Contractor must guaranty and certify in writing all work in this section for period of one (1) year. Should any equipment or material fail due to defective equipment, material or workmanship within this period, the Contractor must replace the item at no cost to the Owner.

B. The The one (1) year guaranty must start at the end of thirty (30) consecutive days of trouble-freeoperation after certification by the Fire Department and acceptance by the Owner whichever date is the latest.

PART 2 - PRODUCTS

2.01 DESIGN OF SPRINKER SYSTEM

A. The design of wet pipe fire extinguishing sprinkler system must be hydraulic calculations for uniform distribution of water over the design area and must conform to NFPA 13 and to the requirements as specified herein.

1. Distribution of Water: Distribution must be essentially uniform throughout the area in which it is assumed the sprinkler heads will open.
2. Density of Application of Water: Size pipe to provide the specified density when the system is discharging the specified total maximum required flow. Application to horizontal surfaces below the sprinklers must be as indicated on the drawings.
3. Hose Allowances: Hydraulic calculations must include the allowance as indicated on the drawings.
4. Friction Losses: Calculate losses in pipe in accordance with the Hazen-Williams formula with 'C' value of 120 for steel pipe, 140 for buried cement-lined ductile-ironpipe and 150 for CPVC.
5. Location of Sprinkler Heads: Heads in relation to the ceiling and walls and the spacing of sprinklers must not exceed that permitted by NFPA 13.
6. Water Supply: Base hydraulic calculations on the water supply as indicated on the drawings.

2.02 EQUIPMENT

A. Sprinkler Heads: Release element of each head must be as indicated on the drawings or higher as suitable for the individual location where it is installed. Provide conceal quick response pendent sprinklers with white polyester finish below finished ceilings.

B. Cabinet: Provide extra sprinkler heads and sprinkler head wrench and three of the proper types of sprinkler stoppers in a metal cabinet adjacent to the sprinkler riser. The number and types of extra sprinkler heads must be as specified in Kauai County Fire Code Article 13.3.3.5.1.5.

2.03 ABOVE GROUND PIPING SYSTEMS

A. Inspect, test and approve piping before burying, covering, or concealing. Provide fittings for changes in direction of piping and for all connections. Make changes in piping sizes through reducing pipe fittings; the use of bushings will not be permitted. Welding must be performed in the shop; field welding will not be permitted.

B. Pipe and Fittings

1. Provide in accordance with NFPA 13 and NFPA 14 except that copper pipe must not be permitted. Flexible hose sprinklers are permitted. All piping subject to full system pressure must be Class 350. All piping and fittings on

the fire sprinkler riser must be painted. All piping on the wet pipe system must be schedule 40 black steel for 2" and less and minimum schedule 10 for 2.5" and larger. All piping in finished areas must be concealed.

2. Fittings into which sprinkler heads, sprinkler head riser nipples, or drop nipples are threaded must be welded, threaded, or grooved-end type. Use of plain-end fittings with mechanical couplings which utilize steel gripping devices to bite into pipe when pressure is applied will not be permitted. "Mechanical T", "Clamp T" or any other bolted branch outlet tees will not be permitted. Rubber gasketed grooved-end pipe and fittings with mechanical couplings must be permitted in pipe sizes 1.25 inches and larger; fittings must be UL listed or FM approved for use in sprinkler systems.

3. Provide an earthquake sway brace within 24 inches of each flexible coupling which is installed in horizontal piping for purposes other than earthquake protection.

4. Flexible Hose: Victaulic VicFlex AH2 or approved equal. UL-listed flexible sprinkler hose must be braided 300 series stainless steel, with minimum bend radius of 2 inches. Provide with manufacturer's mounting brackets as required. Maximum number of bends and friction loss must be in accordance with manufacturer's UL-listed performance charts.

C. Pipe Hangers, Supports, and Earthquake Sway Bracing: Provide in accordance NFPA 13. Provide retaining straps on beam clamps. Provide branch line seismic restraint.

D. Escutcheon Plates: Provide one piece or split hinge type metal plates for piping passing through floors, walls, and ceilings in exposed areas. Provide chromium-plated finish on plates in finished areas. Provide paint finish on plates in unfinished areas. Securely anchor plates in place with setscrews or other approved positive means.

2.04 ELECTRIC WORK

A. Electric work is specified in Division 16.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Equipment, material, installation, and workmanship: Provide in accordance with NFPA 13 and NFPA 14, except as modified herein. Install piping straight and true to bear evenly on hangers. Keep the interior of new and existing piping affected by the Contractor's operations thoroughly cleaned of water and foreign matter. Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping and fittings so that water and foreign matter will not enter the pipes or fittings. Inspect piping before placing into position. Inspect, test, and approve piping before burying, covering, or concealing. Provide fittings for changes in direction of piping and for all connections. Make changes in piping sizes through tapered reducing pipe fittings; do not use bushings.

B. Locate sprinklers in a consistent pattern with ceiling grid, lights, and air supply diffusers. Install sprinkler system over and under ducts, piping and platforms when

such equipment can negatively affect or disrupt the sprinkler discharge pattern and coverage.

1. Piping offsets, fittings, and other accessories required must be furnished to provide a complete installation and to eliminate interference with other construction.

2. Wherever the contractor's work interconnects with work of other trades the Contractor must coordinate with other Contractors to ensure all Contractors have the information necessary so that they may properly install all necessary connections and equipment.

C. Pipe Hangers (supports): Provide additional hangers to support the concentrated loads in piping between hangers, such as for flanged valves.

3.02 ABOVEGROUND PIPING INSTALLATION

A. The methods of fabrication and installation of the aboveground piping must fully comply with the requirements and recommended practices of NFPA 13 and this specification section.

B. Seismic restraint is required and must be provided in accordance with NFPA 13.

C. Install exposed piping without diminishing exit access widths, corridors or equipment access. Exposed horizontal piping, including drain piping, must be installed to provide maximum headroom.

D. In area with suspended or dropped ceilings and in areas with concealed spaces above the ceiling, piping must be concealed above ceilings. Piping must be inspected, hydrostatically tested and approved before being concealed. Risers and similar vertical runs of piping in finished areas must be concealed.

E. Pendent sprinklers

1. Drop nipples to pendent sprinklers must consist of minimum 1 inch pipe with a reducing coupling into which the sprinkler must be threaded.

2. Where sprinklers are installed below suspended or dropped ceilings, drop nipples must be cut such that sprinkler ceiling plates or escutcheons are of a uniform depth throughout the finished space. The outlet of the reducing coupling must not extend below the underside of the ceiling.

3. Recessed pendent sprinklers must be installed such that the distance from the sprinkler deflector to the underside of the ceiling must not exceed the manufacturer's listed range and must be of uniform depth throughout the finished area.

F. Pipe joins must conform to NFPA 13, except as modified herein. Not more than four threads must show after joint is made up. Welded joints will be permitted, only if welding operations are performed as required by NFPA 13 at the Contractor's fabrication shop, not at the project construction site. Flanged joints must be provided where indicated or required by NFPA 13. Grooved pipe and fittings must be prepared in accordance with the manufacturer's latest published specification according to pipe material, wall thickness and size. Grooved couplings, fittings and grooving tools must be products of the same manufacturer. The diameter of grooves made in the field must be measured using a "go/no-go" gauge, vernier or dial caliper, narrow-land micrometer, or other method specifically approved by the coupling manufacturer for the intended application. Groove width and dimension

of groove from end of pipe must be measured and recorded for each change in grooving tool setup to verify compliance with coupling manufacturer's tolerances.

G. Reducers: Reductions in pipe sizes must be made with one-piece tapered reducing fittings. When standard fittings of the required size are not manufactured, single bushings of the face or hex type will be permitted. Where used, face bushings must be installed with the outer face flush with the face of the fitting opening being reduced. Bushings cannot be used in elbow fittings, in more than one outlet of a tee, in more than two outlets of a cross, or where the reduction in size is less than ½ inch.

H. Pipe penetrations

1. Cutting structural members for passage of pipes or for pipe-hanger fastenings will not be permitted. Pipes that penetrate concrete or masonry walls or concrete floors must be core-drilled and provided with pipe sleeves. Each sleeve must be Schedule 40 galvanized steel, ductile-iron or cast-iron pipe and extend through its respective wall or floor and be cut flush with each wall surface. Sleeves must provide required clearance between the pipe and the sleeve per NFPA 13. The space between the sleeve and the pipe must be firmly packed with mineral wool insulation.

2. Where pipes and sleeves penetrate fire walls, fire partitions, or floors, pipes/sleeves must be firestopped.

3. In penetrations that are not fire-rated or not a floor penetration, the space between the sleeve and the pipe must be sealed at both ends with plastic waterproof cement that will dry to a firm but pliable mass or with a mechanically adjustable segmented elastomer seal.

I. Escutcheons must be provided for pipe penetration in finished areas of ceilings, floors and walls. Escutcheons must be securely fastened to the pipe at surfaces through which piping passes.

J. Inspector’s test connection

1. Unless otherwise indicated, the test connection must consist of a 1 inch pipe connected at the riser as a combination test and drain valve; a test valve located approximately 6 feet above the floor; a smooth bore brass outlet equivalent to the smallest orifice sprinkler used in the system; and a painted metal identification sign affixed to the valve with the words "Inspector's Test". All test connection piping must be inside of the building and penetrate the exterior wall at the location of the discharge orifice only. The discharge orifice must be located outside the building wall no more than 2 feet above finished grade, directed so as not to cause damage to adjacent construction or landscaping during full flow discharge, or to the sanitary sewer. Discharge to the exterior must not interfere with exiting from the facility. Water discharge or runoff must not cross the path of egress from the building. Do not discharge to the roof. Discharge to floor drains, janitor sinks or similar fixtures is not permitted.

2. Provide concrete splash blocks at all drain and inspector's test connection discharge locations if not discharging to a concrete surface. Splash blocks must be large enough to mitigate erosion and not become dislodged during a full flow of the drain. Ensure all discharged water drains away from the facility and does not cause property damage.

3.03 ELECTRICAL INSTALLATION

A. Comply with local ordinances and regulations of the Kauai County as well as NFPA 70, and NFPA 72. Workmanship is subject to the approval of the Engineer.

3.04 FIELD PAINTING

A. Painting: Clean, pretreat, prime, and paint new sprinkler systems including valves, piping, conduit, hangers, miscellaneous metalwork, and accessories. All black steel piping, couplings, fittings, and accessories must be painted. CPVC piping and fittings must not be painted. Apply coatings to clean dry surfaces using clean brushes. Clean the surfaces to remove dust, dirt, rust and loose mill scale. Immediately after cleaning, provide the metal surfaces with one coat of pretreatment primer applied to a minimum dry film thickness of 0.3 mil, and one coat of primer applied to a minimum dry film thickness of one mil. Exercise care to avoid painting of sprinkler heads or protective devices. Remove materials which are used to protect sprinkler heads, while painting is in process, upon the completion of painting. Remove sprinkler heads which are painted and provide new clean sprinkler heads of the proper type. Provide primed surfaces with the following:

1. Sprinkler Systems in Unfinished Areas: Unfinished areas are defined as attic spaces, spaces above suspended ceilings, crawl spaces, pipe chases, and spaces where walls or ceiling are not painted or not constructed of prefinished material. Provide primed surfaces with one coat of red enamel applied to a minimum dry film thickness of one mil.
2. Sprinkler Systems in All Other Areas: Provide primed surfaces with two coats of paint to match adjacent surfaces, except provide valves and operating accessories with one coat of red enamel.

3.05 FIELD TESTING AND FLUSHING

A. Preliminary Tests:

1. Hydrostatically test the sprinkler and standpipe system at 200 psig or at 50 psi in excess of maximum pressure when the maximum will be in excess of 150 psi, for a period of two hours. Piping above suspended ceilings must be tested, inspected, and approved before installation of ceilings.
2. Flush sprinkler piping in accordance with NFPA 13. Continue flushing operations until water is clear, but for not less than 10 minutes.
3. Following flushing of the underground piping, a main drain test must be made to verify the adequacy of the water supply. Static and residual pressures must be recorded on the hydraulic design data nameplate.
4. Perform a forward flow test for each backflow prevention assembly at the system flow demand, including all applicable hose streams, as specified in NFPA 13. A metal placard must be provided on the backflow prevention assembly that lists the pressure readings both upstream and downstream of the assembly, total pressure drop, and the system test flow rate determined during the preliminary testing. The pressure drop must be compared to the manufacturer's data and the readings observed during the final inspections and tests.
5. Test the alarms and other devices. Test the water flow alarms by flowing water through the inspector's test connection.

6. When tests have been completed and corrections made, submit a signed and dated certificate, similar to that specified in NFPA 13, with a request for a formal inspection and tests.

B. Formal Inspection and Tests: The Kauai County, Building and Fire Departments and State of Hawaii Boiler and Elevator Inspection Bureau will witness formal tests and approve all systems before they are accepted. Submit the request for formal inspection at least 15 days prior to the date for formal inspection is to take place. An experienced technician regularly employed by the sprinkler installer must be present during the inspection. At this inspection, repeat any or all of the required tests as directed. Correct defects in the work provided by the Contractor and make additional tests until it has been demonstrated that the systems comply with all contract requirements. Furnish appliances, equipment, electricity, instruments, connecting devices, and personnel for the tests. All necessary tests encompassing all aspects of system operation must be made including the following, and any deficiency found must be corrected and the system retested at no cost to the Owner.

3.06 INSTRUCTIONS OPERTING PERSONNEL

A. Upon completion of the work and at a time designated by the Owner, provide for a period of not less than 4 hours the services of experienced technicians regularly employed by the manufacturer of the sprinkler system to instruct the operating staff in the proper operation and maintenance of the equipment.

3.07 INSPECTION, MAINTENANCE, AND TESTING SERVICE AGREEMENT

A. The contractor must include one year inspection, maintenance, and testing service agreement in the bid. The one-year period must begin at the date of acceptance. The agreement must cover all labor, parts, insurance taxes, fees, and other incidental costs to inspect and test the system in accordance with NFPA 25 and the Kauai County, Fire Code. Inspection and testing of the system must be conducted on a quarterly basis for a total of four (4) visits during the one-year period.

END OF SECTION