

## Section 5 Results of Laboratory Analysis

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Fifty-seven historic artifacts were recovered from two locations within the project area with the majority of them (55) coming from the trash pit feature of SIHP # 50-30-11-2307. The artifacts are described in Table 20 and most are depicted in Figure 84 through Figure 95. The artifacts collected consisted of 24 glass bottles, six glass jars, one fragment of flat glass, two glass drinking glasses, five glass marbles, two light bulbs, one ceramic electrical component, one door knob, three enamel metal tableware, two shells, one harmonica, one water tap handle, one brake drum from an automobile, one plastic button, one plastic cosmetic case, one plastic ornament, one plastic plate fragment, 17 sheets of plastic (likely photographs), and one plastic toy gun.

### 5.1 Glass Bottles and Jars

All terminology used to describe bottle traits and all bottle dating information in this report section is based on information from the U.S. Department of Interior, Bureau of Land Management (BLM)/Society of Historic Archaeology (SHA) Historic Glass Bottle Identification and Information website (BLM/SHA 2014), unless otherwise noted. Research on historic bottles focused on the function and manufacturing dates of the items, using reference texts and online resources to identify glass manufacturers' marks on bottles and company histories of the content brands.

There are three stages in the evolution of glass bottle manufacture. Since antiquity, bottles have been free-blown with a blow-pipe. These types of bottles are usually asymmetrical, crudely made and often have a pontil mark where a rod was used to hold the bottle during the last stages of manufacture, finishing the lip of the bottle by hand. In the United States, these types of bottles usually pre-date ca. 1865 (BLM/SHA 2014\_Glassmaking). There were no free-blown bottles in this historic artifact collection.

Circa 1800, glassworkers began to blow bottles into some type of mold, usually a metal mold. The most common mold from the mid-nineteenth century into the twentieth century (post-1850) was a two-piece mold with a separate cup-bottom plate. These types of bottles have a mold seam around the base of the bottle, and two side seams that run vertically up the sides of the bottle. The side mold seams usually end on the neck, as the lip on mold-blown bottles was still finished by hand. Two-piece molds were the dominant form used in the post-1880 period. A four-piece cup-bottom mold was also used from 1880 into the 1910s. A four-piece mold has two side seams and a horizontal seam around the body. Four-piece molds were commonly used from the 1880s to the 1910s. In the 1880-1915 period, bottles were also blown in a turn mold, in which the side seams were erased during the manufacturing process.

Semi-automatic machines were introduced in the 1890s and mainly used to make wide-mouth bottles/jars; glass still had to be manually fed into the machines by the glass workers. In 1903, Michael Owens invented a machine that did away with most of the skilled glass workers. The machine was used to blow wide-mouth bottles as early as 1905 and narrow-necked bottles (such as beverage bottles) as early as 1908. This Automatic Bottle Machine (ABM) blew a bottle from base to lip, usually using a two-piece cup-bottom mold. The two side seams extend to and over the lip of the bottle, or to a horizontal seam at the bottom of the bottle finish. The base of a bottle made in early Owens ABM machines often had a round scar with feathered edges on the base. There

Table 20. Summary of Historic Artifacts

Acc. #	Trench	SIHP #	Str.	Material	Type	Description	L/H	W/Dia	Wt. (g)	Age	Origin
0001	11	-2307		Glass	Bottle	Colorless soda bottle, complete, round base, machine made, crown finish, embossing: "GEO'S" on neck	21.5	5.5	396	pre-1958	Hawaiian
0002	11	-2307		Glass	Bottle	Colorless soda bottle, complete, round base, machine made, crown finish, embossing: "GEO'S" on neck	21.5	5.5	390	pre-1958	Hawaiian
0003	11	-2307		Glass	Bottle	Colorless soda bottle, complete, round base, machine made, crown finish, embossing: "GEO'S" on neck	21.5	5.5	396	pre-1958	Hawaiian
0004	11	-2307		Glass	Bottle	Colorless soda bottle, complete, round base, machine made, crown finish, embossing: "GEO'S" on neck	21.5	5.5	394	pre-1958	Hawaiian
0005	11	-2307		Glass	Bottle	Colorless soda bottle, complete, round base, machine made, crown finish, embossing: "GEO'S" on neck	21.5	5.5	392	pre-1958	Hawaiian
0006	11	-2307		Glass	Bottle	Colorless soda bottle, complete, round base, machine made, crown finish, stippling on neck and base, vertical fluting on body, recessed area for label, embossing: "KIST" on base	21	5.7	378	1947	Hawaiian
0007	11	-2307		Glass	Bottle	Colorless soda bottle, complete, round base, machine made, crown finish, stippling on neck and base, vertical fluting on body, recessed area for label, embossing: "KIST" on base	21	5.7	384	1947	Hawaiian
0008	11	-2307		Glass	Bottle	Colorless soda bottle, complete, round base, machine made, crown finish, white ACL label "GARDEN ISLAND REFRESHER" on front	20.5	5.7	340	1946	Hawaiian
0009	11	-2307		Glass	Bottle	Colorless soda bottle, complete, round base, machine made, crown finish, embossing: "NESBIT'S" on shoulder, horizontal decorative bands around body	21.3	6.1	388	1955	Hawaiian

Acc. #	Trench	SIHP #	Str.	Material	Type	Description	L/H	W/Dia	Wt. (g)	Age	Origin
0010	11	-2307		Glass	Bottle	Colorless soda bottle, complete, round base, machine made	19.8	5.5	400		
0011	11	-2307		Glass	Bottle	Aqua soda bottle, complete, round base, machine made, Hobble-skirt design, crown finish, embossing: "COCA COLA / TRADE MARK REGISTERED / BOTTLE PAT D – 105529" on body	20	6	400	1942	
0012	11	-2307		Glass	Bottle	Amber bottle, complete, round base, machine made, continuous external thread finish, embossing: "CLOROX / CLOROX 16 OZ" on shoulder, "CLOROX" on heel	20.5	7.1	314	1943-1944	American
0013	11	-2307		Glass	Bottle	Colorless milk bottle, complete, round base, machine made, capseat finish, shadow of ACL label: "WAIMEA DAIRY" on body	24	9.7	626	1904-1964	Hawaiian
0014	11	-2307		Glass	Bottle	Colorless liquor bottle, complete, oval base, machine made, continuous external thread finish, embossed horizontal lines on body, embossing "HALF PINT" on shoulder	6.3	3.3	306	post-1904	
0015	11	-2307		Glass	Bottle	Amber beer bottle, complete, round base, machine made, crown finish, embossing: "DAINAPPON BREWERY [circle and dot]" on shoulder (Ross 2009:9)	29	7.8	680	1906-1949	Japanese
0016	11	-2307		Glass	Bottle	Colorless food bottle, complete, round base, machine made, continuous external thread finish	20	7.1	528		
0017	11	-2307		Glass	Bottle	Colorless cosmetic bottle, complete, oval base, machine made, continuous external thread finish, textured over entire body		3.3	88		
0018	11	-2307		Glass	Bottle	Colorless cosmetic bottle, complete, oval base, machine made, continuous external thread finish, textured over entire body		3.3	96		

Acc. #	Trench	SIHP #	Str.	Material	Type	Description	L/H	W/Dia	Wt. (g)	Age	Origin
0019	11	-2307		Glass	Bottle	Colorless bottle, complete, oval base, machine made, continuous external thread finish, embossing: "PEE-CHEE" on body	4.5	5.2	156	post-1920s	American
0020	11	-2307		Glass	Bottle	Colorless cosmetic bottle, complete, oval base, machine made, continuous external thread finish, fluted sides	12.3		102		
0021	11	-2307		Glass	Bottle	Colorless cosmetic bottle, complete, round base, machine made, continuous external thread finish	9		76		
0022	11	-2307		Glass	Bottle	Colorless cosmetic bottle, complete, round base, machine made, continuous external thread finish	6.1	42431	32		
0023	11	-2307		Glass	Bottle	Colorless medicine bottle, complete, oval finish, machine made, collared ring finish, markings on sides for measurement	8.8		50		
0024	11	-2307		Glass	Bottle	Amber medicine bottle, complete, square base, machine made, collared ring finish, glass rod applicator	8.2	2.9	54		
0025	11	-2307		Glass	Jar	Milk glass cosmetic jar, complete, round base, machine made, continuous external thread finish, embossing: "WOODBURY"	6.4		272	1901-1967	American
0026	11	-2307		Glass	Jar	Colorless jar, complete, round base, machine made, capseat finish	7	7.4	162		
0027	11	-2307		Glass	Jar	Colorless jar, complete, round base, machine made, external thread finish	6.4	5.8	116		
0028	11	-2307		Glass	Jar	Colorless jar, complete, round base, machine made, continuous external thread finish	6.3	4.4	72		

Acc. #	Trench	SIHP #	Str.	Material	Type	Description	L/H	W/Dia	Wt. (g)	Age	Origin
0029	11	-2307		Glass	Jar	Colorless jar, complete, round base, machine made, continuous external thread finish	6.8	4.8	108		
0030	11	-2307		Glass	Jar	Colorless jar, complete, round base, machine made, external thread finish	6	4.8	64		
0031	11	-2307		Glass	Tableware	Colorless pressed glass tumbler	13.2	6.6	206	post-1825	
0032	11	-2307		Glass	Tableware	Colorless pressed glass tumbler	13.2	6.6	210	post-1825	
0033	11	-2307		Plastic	Cosmetic	White plastic compact half, corroded ferrous metal insert, embossing: "AVON PRODUCTS INC. / NEW YORK, N.Y. 10019" on lid	7.4	0.8	30	post-1932	American
0034	11	-2307		Ceramic	component	Porcelain electrical component	6.3	2.7	18	post-1905	
0035	11	-2307		Glass	Electrical	Light bulb, missing base	7	4.8	16	post-1905	
0036	11	-2307		Glass	Electrical	Light bulb base	7.5	4.8	20	post-1905	
0037	11	-2307		Plastic	Decorative	Plastic (possible Lucite) ornament, likely for costume jewelry	5.8	0.9	6	post-1937	
0038	11	-2307		Glass	Marble	Blue glass marble, machine made	2.3	0.9	14	post-1912	
0039	11	-2307		Glass	Marble	Red/white swirl marble, machine made	1.5	0.9	6	post-1912	
0040	11	-2307		Glass	Marble	Blue/white swirl marble, machine made	1.5	0.9	6	post-1912	
0041	11	-2307		Glass	Marble	White/yellow/green swirl marble, machine made	1.5	0.9	6	post-1912	
0042	11	-2307		Metal	Toy	Metal and plastic harmonica, "MAGNUS HARMONICA" embossed on one side	10.6		36	1944-1955	American
0043	11	-2307		Plastic	Toy	Molded maroon toy gun, missing barrel	11		32	post-1940	
0044	11	-2307		Plastic	Clothing	Plastic button, two-hole	1.8	0.4	1	post-1940	

Acc. #	Trench	SIHP #	Str.	Material	Type	Description	L/H	W/Dia	Wt. (g)	Age	Origin
0045	11	-2307		Shell	Shell	<i>Neritidae</i> spp. ('opihi)	4.3	1.8	1		
0046	11	-2307		Shell	Shell	<i>Neritidae</i> spp. ('opihi)	2.7	1	1		
0047	11	-2307		Glass	Household	Colorless flat glass	12.3		44		
0048	11	-2307		Plastic	Photo	Sheets (17) of plastic, likely from photographs	11.3	6.9	16		
0049	11	-2307		Metal	Household	Corroded capricious water faucet tap with corroded ferrous pipe attached	17.5	11	640		
0050	11	-2307		Metal	Household	White enamel bowl fragment	51	12	124	post-1900	
0051	11	-2307		Metal	Household	White enamel plate	25	3	342	post-1900	
0052	11	-2307		Plastic	Household	Blue/green plastic plate fragment	13	6	16		
0053	11	-2307		Metal	Household	White enamel cup	8.2	7	98	post-1900	
0054	11	-2307		Metal	Household	Copper sheet	55	29	1054		
0055	11	-2307		Metal	Auto	Corroded metal brake drum	27	8.5	2400	post-1901	
0056	9		I	Glass	Marble	Blue glass marble, machine made	1.5	0.9	4	post-1912	
0057	9		I	Ceramic	Household	Porcelain door knob fragment, transparent glaze	6	3.3	45		



Figure 84. Artifacts from T-11, trash pit feature (from left to right): soda bottles (Acc. #s 5, 6, 8, 9, and 11)



Figure 85. Artifacts from T-11, trash pit feature (from left to right): miscellaneous bottles (Acc. #s 12, 13, 14, and 15)





Figure 86. Artifacts from T-11, trash pit feature (from left to right): miscellaneous bottles (Acc. #s 17, 20, 23, and 24)



Figure 87. Artifacts from T-11, trash pit feature (from left to right): jars (Acc. #s 25, 26, 28, and 29)





Figure 88. Artifacts from T-11, trash pit feature (from left to right): miscellaneous items, drinking glass (Acc. # 31); half a woman's compact (Acc. # 33); an electrical component (Acc. # 34); and a light bulb (Acc. # 36)



Figure 89. Artifacts from T-11, trash pit feature (from left to right): harmonica (Acc. # 42); half a plastic revolver (Acc. # 43); 'opihi (*nertidae* spp.; Acc. # 44); and button (Acc. # 45)



Figure 90. Artifacts from T-11, trash pit feature (from left to right, top and bottom): a stack of thin plastic sheets (Acc. # 48); half a plastic flower ornament (Acc. # 37); and marbles (Acc. #s 38, 39, 40, and 41)



Figure 91. Artifact from T-11, trash pit feature: household item, enameled plate (Acc. # 51)





Figure 92. Artifact from T-11, trash pit feature: household item, enameled cup (Acc. # 53)



Figure 93. Artifact from T-11, trash pit feature: household item, water faucet (Acc. # 49)



Figure 94. Artifact from T-11, trash pit feature: brake drum (Acc. # 55)



Figure 95. Artifacts from T-9, near the top of Stratum I (from left to right): blue marble (Acc. # 56) and half a ceramic doorknob (Acc. # 57)



are few ways, other than the presence of the Owens suction scar on the base, to distinguish a bottle made by a semi- versus a fully automatic machine, so both types of bottles are described in this report section simply as “machine-made.”

All bottles and jars recovered from the project area are machine-made. Of the bottles and jars recovered, several are soda bottles from Hawaiian soda bottlers. Comparing the soda bottles in the collection to the book *The Handbook of Hawaiian Machine Made Soda Bottles* (Millar 1988), they could be dated to specific date ranges. Some of the bottles have ACL labels. In 1933, a new labeling technique was introduced, Applied Color Labels (ACL), a method that baked pigments and enamels onto the body of the bottle in various colors. These ACL bottles may still have embossed information on the heel or base. Hawaiian soda bottlers did not switch to ACL labeling until the 1940s or later (Millar 1988).

Acc. # 9 is a soda bottle with “NESBIT’S” embossed on the shoulder, which can be dated to 1955. Acc. #s 6 and 7 are bottles with the word “KIST” embossed on the base. Comparing these to Millar’s book, these bottles once had ACL labels that have since faded or eroded. These bottles can be dated to 1947. Acc. # 8 is a bottle with an ACL label that says “GARDEN ISLAND REFERESHER.” This bottle design was utilized from 1944-1946, but the 1944 design was on an aqua bottle, where the 1946 design was on a colorless bottle. Acc. #s 1–5 are all Geo’s Soda bottles. The company switched from an embossed label on the neck to an ACL label in 1958, dating these bottles pre-1958. Acc. # 11 is an aqua Coca-Cola bottle that can be dated to 1942 via a maker’s mark.

Acc. # 13 is a colorless milk bottle with an ACL shadow identifying it as a Waimea Dairy milk bottle. Waimea dairy was established in 1853 by missionary Rev. George Rowell when he owned and milked 20 cows with the purpose of using the milk for his family and other missionaries. When he died in 1884, Rowell’s family leased the land and the dairy to E.E. Conant. By 1895, the dairy had combined with H.P. Faye who owned Moloaa Dairy. The Fayes ran Waimea Dairy throughout much of the first half of the twentieth century, when they finally sold the dairy to Meadow Gold in 1964 (Soboleski 2014).

Several bottles have embossing on them that can further date them. Acc. # 25 is a milk glass jar with “WOODBURY” embossed on the body. The Woodbury Soap Company was founded in 1870 by John H. Woodbury. They made a variety of soaps, lotions, and creams before being purchased by the Andrew Jergens Company in 1901. The Woodbury brand continued under the Jergens Company until the company was sold to American Brands, Inc. in 1967 and again to Japanese Company Kao Corporation in 1988.

Acc. # 19 is a colorless bottle with “PEE-CHEE” embossed on it. The Pee-Chee Company made cleaners for white leather shoes and hats. The company was formed in 1913 and ads for the cleaner are found in magazines from the 1920s.

Acc. # 12 is an amber Clorox bottle. Based on information available online from the Clorox Company, this type of bottle was made from 1943-1944 (The Clorox Company 2015). Acc. # 15 is a beer bottle with the name “DAI NAPPON” brewery embossed on the shoulder. The Dai Nappan Brewery formed in 1901 when the three largest brewers in Japan at the time combined. The company was one of the largest companies in Japan throughout the first half of the twentieth century. After World War II, the American occupation of Japan occurred and the US government forced Dai Nappan Brewery to split in 1949 into Asahi and Nippon (Ross 2009:8). All other

bottles and jars have no other diagnostic information that can be dated, and thus little else can be said about them.

## 5.2 Miscellaneous Glass Artifacts

Several miscellaneous household glass items were also recovered from the project area. Acc. #s 31 and 32 are pressed glass drinking tumblers. Most pressed glass tableware was manufactured after 1825 and is still made today (Miller 2000:7). Acc. #s 35 and 36 are light bulb fragments and Acc. # 34 is a porcelain electrical component. Kauai Electric was founded in 1905 by McBryde Sugar to provide power to the sugar plantations (Saito and Campbell 1987). Five glass marbles were also recovered from the project area (Acc. #s 38–41, and 56). In 1904, Martin Christensen invented the first automatic marble machine. Although it was automatic, it still had to be fed glass by hand. By 1915 Christensen's machine had advanced to be fully automatic and the mass production of marbles began (Block 1999).

## 5.3 Miscellaneous Artifacts

Several personal items were collected. Acc. # 33 is a white plastic Avon compact. The Avon Company was founded in 1886 by perfume salesman David H. McConnell. In 1932, the company—called California Perfume Company Inc. of New York—applied for a trademark for the “Avon” name to include goods and services including “perfumes, toilet waters, powder and rouge compacts, lipsticks, and other toiletry products” (trademark registration # 0296760).

Acc. # 42 is a metal and plastic harmonica embossed with “MAGNUS HARMONICA.” The Magnus Harmonica Company was founded in 1944 by Finn Magnus. The company originally supplied American troops during World War II because most harmonicas at the time were German-made. Magnus became wealthy due to his invention of an all plastic harmonica. Although the one in the collection is metal, he patented a plastic reed system which has since become the standard for all harmonicas (Missen 2005). The Magnus Harmonica Company closed in 1955 after a bitter court battle over the patent rights to all plastic harmonicas.

Acc. # 37 is a plastic ornament possibly made of Lucite. Lucite (polymethyl methacrylate) was a trademark name of a type of acrylic used to make costume jewelry and other decorative items starting in 1937 (Spude 2000). Acc. #s 50, 51, and 53 are enamel metal tableware. This type of tableware was introduced in the approximately 1900 and types of it are still made today (Goodman 1988).

Acc. # 48 is a stack of 17 sheets of plastic, likely from degraded old photographs. Due to the condition of the sheets, it is difficult to say what type of film or the specific method of development. The remaining miscellaneous artifacts have no diagnostic features that can be dated to a specific date range.

## 5.4 Summary of Historic Artifacts

Fifty-seven historic artifacts were collected from the project area with 55 recovered from SIHP # -2307. Of the artifacts recovered, all were machine-made and date to post-1905, with some able to be dated to a specific date range. Some of the bottles could be dated to specific years including two “Kist” soda bottles (1947), one “Garden Island Refresher” bottle (1946), one “Nesbit's” bottle (1955), and one hobble-skirt Coca-Cola bottle (1942). Several of the bottles could be dated to