

Stoneware and Earthenware from the Beeswax Wreck:
Classification of the Dubé Collection and Discussion of the Interpretation of the
Materials in Protohistoric Sites

by

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Abstract

Over the past three centuries, items from the Beeswax Wreck have been discovered on Oregon's northern coastline near Manzanita, including stoneware and earthenware fragments. While the stoneware and earthenware were not noticed by beachcombers washing ashore until more recently, similar artifacts have been noted within Indigenous sites for decades. While most of the analysis of the artifacts found in protohistoric settings are used to provide proof of a wreck or potentially a marker of the start of the contact period, this study aims to provide some context to the stoneware and earthenware sherds related to the wreck. The goal was also to present a discussion on how artifacts related to the wreck can provide an opportunity to reevaluate some of the colonial narratives related to Native usage of historic trade goods and the issues surrounding how historic artifacts are interpreted and documented in protohistoric sites. While this paper examines a private collection of stoneware and earthenware from the Beeswax Wreck, the study also provides questions for how these materials could be used to discuss larger questions of Native use and trade in the region

Dedication

To Aaron Litzenberg, my strength, best friend, and most wonderful husband. The journey has been long, tiring, and stressful but you have provided unwavering support and encouragement throughout

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1 Chapter 1: Introduction

This thesis explores a collection of ceramic artifacts from a wreck known locally as the Beeswax Wreck near Manzanita, Oregon. The items are thought to be from a Spanish galleon that wrecked off the Oregon Coast in 1693 (Williams et al. 2018). The wreck is known locally as the Beeswax Wreck due to the large quantities of beeswax historically found in the area but they are not the only type of artifacts found related to the wreck. Aside from the beeswax and Chinese porcelains, ceramics of stoneware and earthenware are the most prevalent artifact type associated with the wreck. This is not surprising since within the Manila galleon trade, most of the ceramic cargo onboard the ships consisted of stoneware and earthenware used for food and water on the long journey or to transport different types of commodities. Prior studies related to the wreck have focused on providing evidence, potential dating, and the origin of the wreck through the examination of materials like the Chinese porcelains. While the focus has been on the materials that provide more tangible dates, the second largest artifact type from the wreck, the stoneware and earthenware, have been historically understudied. Just like the porcelains, the stoneware and earthenware are not only found washing ashore but also within protohistoric. They are often written off as materials related to colonial settlement instead of items collected by Native peoples from a protohistoric wreck, even when they are found in the contexts that do not support the colonial contact period narrative.

The presence of early European goods in protohistoric Native American sites in the area are often seen as evidence of the wreck (Beals and Steele 1981; Woodward 1986), but the agency of the Native people and their interaction with these materials is overlooked. The colonial divide within archaeology between precontact and post contact

periods has historically caused the misinterpretation of historic materials found in protohistoric sites and sometimes caused archaeologists to not record the “historic” materials at all, which can make the identification and acknowledgement of materials in the record extremely difficult. By acknowledging the presences of historical trade materials from protohistoric wrecks as part of the Indigenous historical record, instead of solely evidence of the post-European settlement of the west coast, we can begin to change the focus of these trade items from solely evidence of a shipwreck to evidence of how the Native Americans “metaphorically folded the Europeans and the goods they left behind into *their* cultural practice” (Russell 2011; 2018). A great example of Native utilization of materials is the multiple historical accounts of Native people utilizing Asian beeswax from the wreck, but unfortunately not much is known about the other materials (Jacobs 1933). Furthermore, acknowledging and examining why the materials were in the sites is important as it can potentially tell us how Native peoples were interacting with wrecks and integrating the materials into their daily practice and potentially into larger regional trade. Unfortunately, this has not been the priority of the prior investigations related to these colonial shipwreck materials. Reexamination of the materials from the wreck in Native sites through a post-colonial lens presents an opportunity to reevaluate some of the colonial narratives and the emphasis that is often placed on how culture contact, even short term, required the Indigenous people to change (Lightfoot et al. 1998; Silliman 2005; Panich 2013). But first, archaeologists need to be able to identify and acknowledge these atypical occurrences within sites.

1.1 Research Purpose

Prior to this research, there have been only a handful of studies regarding the classification of stoneware and earthenware utilized during the Manila galleon trade between Asia and the New World, and even fewer studies of the early 17th century stoneware and earthenware occurrence in the Pacific Northwest (Stenger 1990). The research conducted in this thesis provides an analysis of a previously undocumented private collection of stoneware and earthenware sherds collected from beaches around Manzanita, thought to be from the 1693 wreck. This research also contributes to the scientific understanding of Asian earthenware and stoneware found on the north Oregon Coast. This will allow future archaeologists to identify the shipwreck ceramics from post-contact or colonial ceramics such as European-American stoneware, ironstone, and European-American earthenware in archaeological collections, determine to what extent the Native population interacted with the material goods, and determine if the ceramics were integrated into the Natives people's daily cultural practices. The goal of this study is to contribute to the knowledge of early period historical ceramics that appear on the Northern Oregon Coast; offer greater detail to the stoneware and earthenware cargo of the Beeswax Wreck; to prepare a comparative collection and typology to allow for the future examination of how the early yet limited colonial encounters is reflected through the integration of material goods into Native practices; and to contribute to the breakdown of arbitrary boundaries historically created by archaeologists between prehistoric and historical archaeology.

My thesis also creates a unique opportunity to work with private collectors in the Manzanita area to examine their stoneware and earthenware collections from the

Beeswax Wreck. The larger Beeswax Wreck Project is an example of how the public can be a part of the dialog, providing comments and input based on their knowledge (Hart and Clinton 2015). There is a basic understanding by most people that archaeologists have training in the methodology to gather data and provide interpretations. Similarly, it is just as important to acknowledge that members of the public have valuable knowledge on cultural resources as well (Angelbeck and Grier 2014). A private collection from Mr. John Dubé (named the Dubé Collection), a Manzanita Oregon resident and avocational artifact collector and beach comber, provided baseline data to create a typology of the stoneware and earthenware ceramics from the Beeswax Wreck to expand our understanding of the variety of vessels on board the ship and provide a baseline to aid in the future identification of the early period ceramics within archaeological collections from Nehalem Bay, Netarts Spit, and other archaeological sites in the region. The collection was beach combed from three beaches by Mr. Dubé over the course of the past 15 years: Oswald West State Park, the ocean side of Manzanita Beach/ Nehalem Spit, and Nehalem Bay (Figure 1).

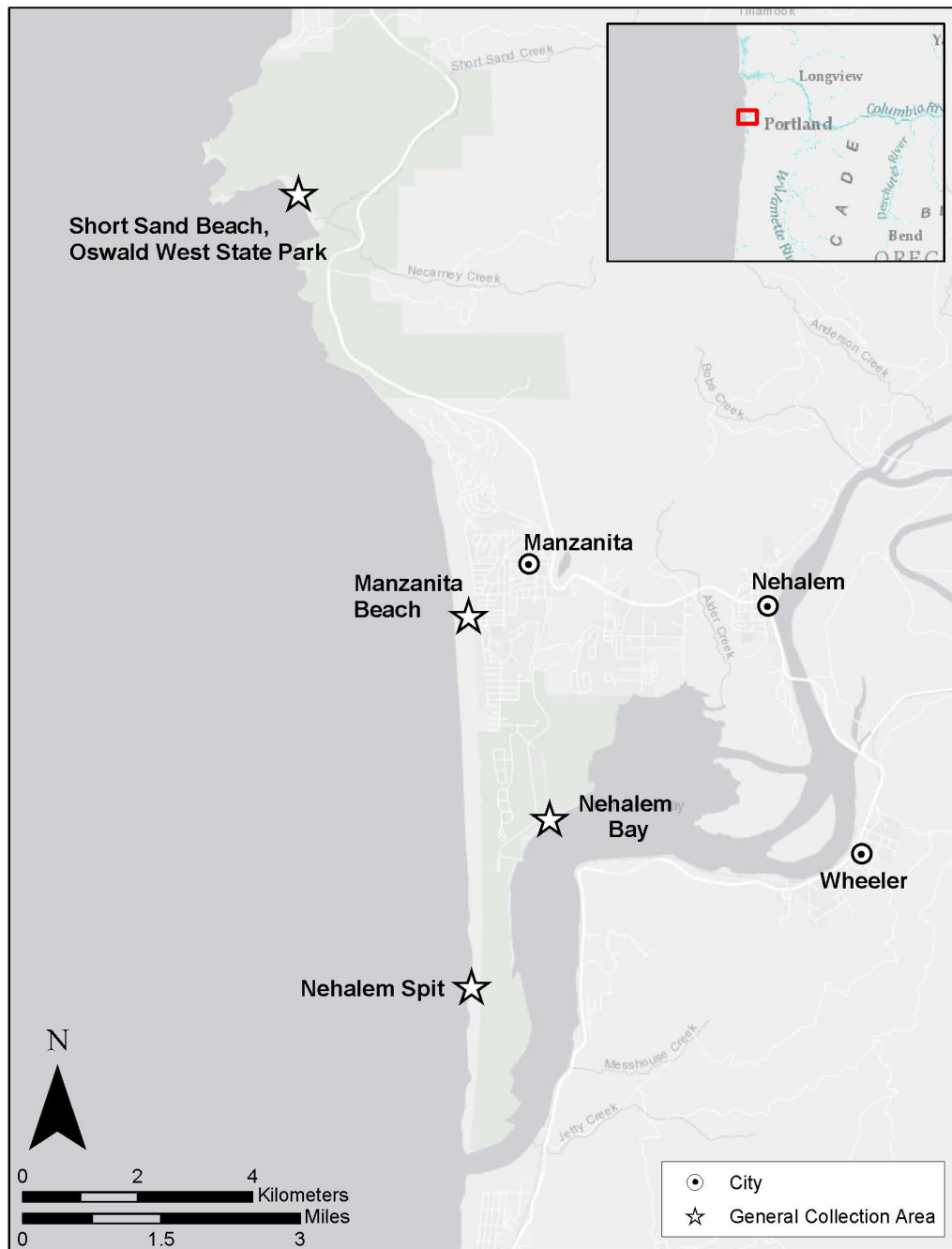


Figure 1. General locations where Dubé Collection ceramics were collected

This thesis project consisted of two phases. First, I explored the literature from precontact sites known to contain materials from the wreck to formulate expectations about whether Indigenous populations were collecting and utilizing plainware in addition

to the blue and white porcelains and beeswax. This literature review included documentation related to the construction and materials used in making Asian stoneware and earthenware, in addition to literature related to contact period European-American ceramics known to the region. Second, I conducted an analysis and created a typology for the ceramics in the Dubé Collection to begin to understand the diversity of non-porcelain ceramic containers on board the ship. This also provided a comparative collection for helping identify plainwares from the wreck that may be found in archaeological sites in the future.

While this project originally intended to look at previous archaeological collections to determine if the stoneware and earthenware were present in sites which also contained porcelains from the wreck, complications from the Covid-19 Pandemic prevented me from doing so. In addition to discussing the findings about the variety of ceramics present in the Dubé Collection and some of the challenges encountered throughout the study, the goal is to provide a baseline from the Dubé Collection to compare with collections of stoneware and earthenware found in collections from Native American sites. This thesis also proposes further research questions about possible Indigenous use of material remains from short-term contact encounters and provides an analysis for the Dubé Collection so it can be used as a resource for identification of pre-US colonial European ceramics.

1.2 Thesis Structure

This thesis is organized into five chapters. In Chapter 2, I provide a brief history of the Manila galleon trade, discuss what is known about the Beeswax Wreck, and present prior research. I then discuss prior archaeological studies related to the wreck and

precontact Native American sites. Last, I discuss prior studies related to earthenware and stoneware from other Manila galleon wrecks that provide the basis for my analysis of the Dubé Collection. In Chapter 3, I explain my research design in more detail, including the methodology employed to create a typology for the Dubé Collection. I include a detailed discussion of methods used to identify stoneware and earthenware within the archaeological collections using the typology created from the Dubé Collection. In Chapter 4, I present my findings from the ceramic analysis, the plainware typology, issues related to the creation of the typology, and discuss the different groupings of materials within the collection. Finally, in Chapter 5, I discuss my findings for the ceramics, the issues of how we interpret historic trade items in protohistoric sites, and consider the implications of my work for future study of the Beeswax Wreck and its impact on Native people. I conclude with a discussion of future research directions including a reconsideration of my original proposal analyzing prior archaeological collections, which was interrupted by the Covid-19 pandemic, and the implications of having preconceived notions when interpreting prehistoric sites containing historic artifacts.

2 Chapter 2: Background and Literature Review

In this chapter I present the project's setting and its relations to the historical and cultural setting. First, I address historical and archaeological research relating to the Beeswax Wreck and the Manila galleon trade. Second, I discuss issues surrounding historical materials identified in precontact archaeological settings and how the short-term interactions with the Nehalem-Tillamook tribe, a Salish speaking Native community who inhabited the area during the time of the wreck, have interacted with the stoneware and earthenware as well as other material from the wreck. Finally, I provide some background on the prior research around East Asian ceramics and their association with other known shipwrecks.

2.1 Project Location and Environmental Setting

The project is located in the Nehalem/Manzanita area in Tillamook County, Oregon. The majority of the Dubé Collection is from Short Sand Beach in Oswald West State Park, approximately 4.2 miles (6.75 km) north of Manzanita (Figure 1 and Figure 2). Located in Smuggler Cove, Short Sand Beach is a sandy beach bordered by high basalt cliffs to the north and south. To the east is a thickly vegetated terrace about four to six meters above the beach. Both Necarney Creek and Short Sand Creek enter the ocean at the cove, flowing through the southern end of the beach. The southern cliffs contain a shelf with tidal pools and a few small caves accessible during very low tides. The headlands created by Cape Falcon and Neahkahnie Mountain create a natural cove (Lund 1972). The water in the cove is relatively deep and can be used by smaller boats when the ocean gets rough. The cove provides a natural wind barrier from the northwestern winds during summer months (Lund 1972:183). The beach is approximately a half of a mile long (0.83 km).

Manzanita Beach and Nehalem Spit run from the southern base of Neahkahnie Mountain to the mouth of the Nehalem River, and together consists of an approximately 5.3 miles long stretch of beach (8.5 km). Prior to construction of the stone jetties in 1916 (south) and 1918 (north), the mouth of the Nehalem River constantly shifted north-south (USACE 2021). The beach and spit consist of beach and active foredunes impacted by daily tides and high energy events (Allan 2020). The dunes were dynamic and fluctuated with the seasons until they were stabilized by planting of non-Native grasses, trees and shrubs in the 1950s (Oregon Parks and Recreation Department 2009). Nehalem Bay is a highly river-dominated, drowned river mouth estuary consisting of tidal wetlands and marshes with wet interdunes and coastal terraces (Allan 2020).

To understand the origins of the ceramic materials it is important to understand the landscape history of the areas where the sherds are often found. Personal communications with Mr. Dubé indicate the sherds at Short Sand Beach were identified within the active tidal zone (Figure 2). The rest of the sherds in the Dubé Collection are from Manzanita Beach-Nehalem Spit and Nehalem Bay (Figure 1). The latter two locations were visited less frequently by Mr. Dubé due to the large stretch of beach between Manzanita and Nehalem Spit, as well as concerns about disturbing intact archaeological deposits that possibly extended into Nehalem Bay which has resulted in a lower frequency of ceramics identified over the years.



Figure 2. Oswald West State Park near Manzanita (Photo by Vanessa Litzenberg, 2018.)
The largest number of sherds in the Dubé Collection originate from Oswald West

State Park at Short Sand Beach, in an area without a nearby homestead that could lead to the sherds being misidentified as early historic-era artifacts. The original General Land Office (GLO) maps from 1854 do not include the Short Sands area, only stating “High Mountains. Impossible to Survey”. It was not until 1894 that the rugged terrain around Neahkahnie Mountain was finally surveyed, and no homesteads are indicated on the maps (though there is non-Native settlement by this time in what becomes Manzanita, a short distance to the south). The GLO records indicate the Short Sands area was not claimed until 1902 by Mary Burch under the Land Act of 1820 (GLO 1902). This suggests that the terrain was too rugged for homesteads, unlike Nehalem Bay just three miles south, and the ceramics found on shore at Short Sand Beach are unlikely to be associated with early homesteaders in the area.

In early 1912, Short Sand Beach was platted to be developed as a resort, but the idea was dropped a few months later. In 1929, Helen Drollinger, who owned 160 acres of property comprising the cove, wrote Oregon state park Superintendent, Samuel Boardman, and recommended it for use as a park. Additionally, adjacent landowners to the east and west donated or sold property on Neahkahnie Mountain and Cape Falcon. In the 1930s, Short Sand Beach formed the nucleus of today's Oswald West State Park (Beach 2018). It was not until 1941, when the highway was complete, that wide-spread vehicle access to the cove was available. The lack of roads did not stop early homesteaders of the area from using the Indigenous trails to visit the beach and use the spot for picnics. Additionally, in the early 20th century, the cove provided natural protection for fishing boats in the area. Finally, in the 1970s, the park was developed for the cove and became a popular destination for surfers seeking its dependable waves (Beach 2018). While these activities did bring the potential for some 20th century materials to be present in the area, the lack of early permanent residents created a relatively uncontaminated area for identifying the stoneware and earthenware ceramics from the wreck.

The area around Manzanita and Nehalem Bay were much more suitable for early homesteads, which makes differentiating the stoneware and earthenware ceramics found in those areas more difficult. The first settlers to arrive in Nehalem Bay were in 1870, but by the turn of the 20th century the logging and railroad industries increased significantly bringing more people to the area (Nehalem Historical Society 2019). There have been multiple shipwrecks that occurred in the early 20th century in the Manzanita-Nehalem area. The two most notable wrecks are the *Mimi*, a German Barque which ran aground on

Nehalem Spit in February 1913 and the schooner *Glenesslin* which wrecked on October 1, 1913 at the northern end of Manzanita Beach where the beach meets the jagged shoreline of Neahkahnie Mountain. While important to note, the metal hull shipwrecks that occurred during the 20th century would not have been carrying the type of cargo we associate with the Beeswax Wreck.

2.1.1 Depositional processes

Shipwreck sites, such as that of the Beeswax Wreck, act as open-systems where their materials interact with the ongoing and changing environment around them. The formation processes at wreck sites are driven by a variety of processes including chemical, biological, and physical (Stewart 1999). The physical processes caused by hydrodynamic forces, such as scouring, wave, and tidal action, are commonly the dominant process acting during the initial deposition process. The Oregon coast has one of the most severe wave climates (meaning the distribution of wave height, period, and direction over a period of time for a particular location) in the world (Herbich and Walters 1987; Allan et al. 2003). The materials we find from the ship today are largely those that continue to wash ashore, and we are finding the secondary deposits that have been further impacted by wave action and erosion in the sand.

The exact location of the Beeswax Wreck has yet to be identified; historically, wreckage was reported in the dunes of Nehalem Spit and the early studies trying to locate the wreck in 2007 focused on that area (Williams 2008; Peterson et al 2011). But the areas in which the sherds and other artifacts are commonly found is nearly 7.5 miles (12 kilometers) long and is a high-energy environment that has widely dispersed the artifacts, likely compounded by the 1700 Cascadia earthquake event. Additionally, around 2007, it

was brought to the attention of researchers that the ceramic sherds were primarily washing ashore in the large cove within Oswald West State Park, indicating an offshore source is “feeding” the beach and that part of the wreck was in fact located further north than originally thought (Williams 2021). The distribution pattern of the ceramics potentially provides insight to the location of the wreck since they have been identified in fewer areas along the coastline than the beeswax or teak wood. Unlike the beeswax and wood, which are much lighter and are easily carried by wave action, the ceramics are dense and require more energy to move or dislodged (Figure 3). As a result, large sherds (over 8 cm along the longest axis) are rarely found together or in large quantities. Small (less than 5 cm along the longest axis) to medium (5 cm to 8 cm along the longest axis) sized sherds are found more often as they require less wave energy to move. Additionally, the sherds from the Dubé Collection vary greatly in their degree of erosion based on the clay composition of the sherd as well as the location from which it was collected. The three main localities where the sherds have been identified consist of two high energy surf areas (Oswald West State Park and Manzanita Beach/Nehalem Spit) and lower energy tidal wetlands and estuary (Nehalem Bay). This created issues when trying to determine if sherds in the collection are the same type that are highly eroded or if they had different characteristics prior to their deposition. This issue is identified mostly in the sherds containing the dark gray margins and if some have eroded or not.

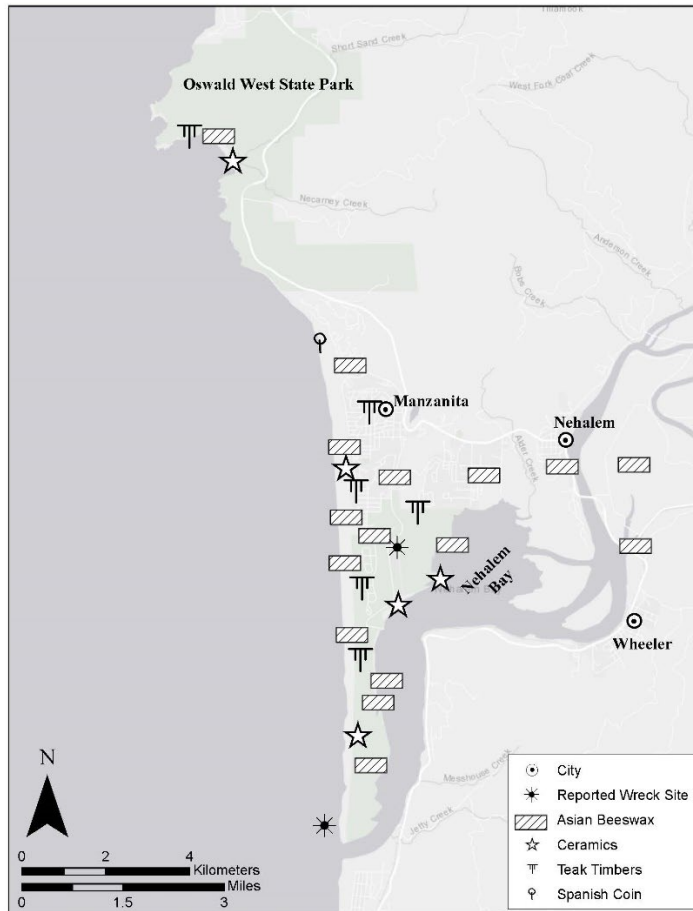


Figure 3. Dispersal distribution of beeswax chunks and debris wreckage across the Nehalem Spit and Oswald West State Park. Expanded from the Williams et al (2018) map

Because the archaeological site of the Beeswax Wreck is possibly scattered in multiple locations due to the Cascadia Event, the depositional environments in which the artifacts appear, and the degree of deterioration based on their location and exposure time to surf, identification of some of the sherd's location within the jar or even the type of jar is difficult to determine.

2.2 Manila Galleon Trade and Recent Research on the Oregon Coast

The 2018 summer issue of the Oregon Historical Society's (OHS) journal, *Oregon Historical Quarterly*, featured the Beeswax Wreck in an array of articles

presenting historical, archival, and archaeological research from over the past decade. Much of the data in the following sections draws from the research presented in this issue, but also includes other cultural and archaeological studies. Based on the data, much scholarship supports the hypothesis that the Beeswax Wreck is the *Santo Cristo de Burgos* that disappeared in 1693 and not the *San Francisco Xavier* which disappeared in 1705.

Globalization and trade commenced the first pulse of colonial encounters in 1542 with Spanish and European sailors exploring the southern California and Mexican coastlines. There have been multiple protohistoric wrecks known to have occurred along the Pacific Northwest coast. Some of the largest were the three Spanish Manila galleons that wrecked on the North American coast including the *San Juanillo* (1578), although the *San Juan* (1568) remains an alternate, the *San Agustín* (1595), and the *Santo Cristo de Burgos* (1693) (Williams and Junco 2021). Following the colonization of the Philippines by the Spanish, the Manila galleon trade operated for 251 years, from 1565-1815, carrying a years' worth of goods annually between Manila in the Philippines and the Spanish colony in Acapulco, Mexico. The galleon trade brought precious Asian merchandise consisting of Chinese silks and porcelain, Indian textiles and spices, Asian beeswax, honey, mercury, and forest products to Acapulco. It then returned to the Philippines with precious Peruvian and Mexican silver, which was highly valued by the Chinese (Tremml-Werner 2015; La Follette et al. 2018c: 276). The galleons carried more than just trade goods across the Pacific, they also carried passengers headed for New Spain (Girardz 2015). The Spanish kept meticulous records of the official cargo on the galleons, but merchants looking to maximize profit would smuggle additional cargo

aboard (La Follette et al. 2018c:252-253). The loss of a galleon meant the disruption of the colony's economy for the year, so the Spanish would send scouting groups to look for missing galleons to recover the goods (La Follette et al. 2018b:244).

As previously stated, much scholarship supports the hypothesis that the Beeswax Wreck is the *Santo Cristo de Burgos* that disappeared in 1693. The 1,600 to 1,800-ton *Santo Cristo de Burgos* was constructed in the Royal shipyard of Solsogón, on Bagatao Island out of exotic hardwoods such as teak, with iron fittings of bolts, nails, and chains. The ship had one previously successful trip in 1690 but in 1692, shortly after departing from Cavite in the Philippines, the galleon was forced to return to Naga in Camarines for repairs to the mast and rigging (La Follette et al. 2018b: 217- 220). The failed journey affected the 1693 journey in multiple ways and caused the ship to leave Naga abruptly to avoid paying fines and for the repairs (La Follette et al. 2018b: 224). Archival research shows the crew and passenger lists are the same as the 1692 trip but some of the passengers likely changed and some 30 crew members were left behind for the 1693 journey. In addition to the officers, artillery men, seamen, and skilled craftsmen who were required to maintain the ship on its journey, the passenger log shows 16 passengers on board, six of whom were priests. Although it was prohibited by the Spanish government, slaves were also often transported on the ships but not reported (La Follette et al. 2018b: 242-243). Limited manifests for the *Santo Cristo de Burgos* cargo were located at the archives but based on the partial manifest and the complete manifest of the later voyage of the *San Francisco Xavier* we have a basic understanding of the types of goods on the ship. The partial manifest from the *Santo Cristo de Burgos* lists various silks and materials but also lists the origin of some of the materials as well, such as from India,

China, Japan, Philippines, Guatemala, and France. The cargo capacity was often contested by merchants when audits showed the galleon's cargo capacity less than what they thought, although usually the extra capacity was meant for water and supplies for the journey. This would in turn lead to cargo being placed in areas meant for water, or the water containers being placed in improper places leading to breakage. In addition to the ceramic storage containers, beeswax was also a large portion of the ship's cargo (La Follette et al. 2018c).

While archaeologists have located some of the galleon wrecks on the Pacific coast, like the 1595 *San Agustín* wreck at Drakes Bay, California, researchers and volunteers working the Beeswax Wreck Project have not located the exact wreck site of the *Santo Cristo de Burgos* (Williams and Junco 2021). The recent studies have focused on locating the Beeswax Wreck and determining its identity (Williams 2008). Historically, throughout the archaeological studies discussed in Section 2.4, the question remained as to the origin of the shipwreck. The origins of the Beeswax Wreck have been a primary debate for decades; whether it was a Spanish galleon (Williams 2018; Williams et al. 2018), a Chinese junk (Stenger 1990), a Portuguese ship (Woodward 1986) or some other wayward ship (Brooks 1876; Webber and Webber 1999; Giesecke 2007). While archaeologists and the public have been interested in the mystery wreck, it was not until 2006 that the Naga Research Group (a Hawaiian based organization) formally established the Beeswax Wreck Project, a nonprofit volunteer-based research project for those interested in locating and identifying the wreck. Today, the Beeswax Wreck Project is headed by the Maritime Archaeology Society, a registered non-profit research organization that includes volunteer researchers and local community members who

continue to search for the wreck. Currently, through radiocarbon dating of the beeswax and teak (an exotic hardwood used in the construction of galleons) (Williams et al. 2018), the analysis of the Dubé Collection of blue and white Chinese porcelains collected from the Manzanita area (Lally 2008, 2016), geoarchaeological investigations related to the impacts of the 1700 tsunami on the possible location of the wreck (Peterson et al. 2011)(Figure 4), and archival research (La Follette et al. 2018b, La Follette et al. 2018c) all provide strong evidence that the Beeswax Wreck was indeed an Acapulco-bound Manila galleon (William 2016; Williams et al. 2018). The task of locating the wreck is made harder due to the fact it was impacted by the 1700 Cascadia earthquake event (and subsequent tsunami) which scattered the wreckage, but exotic goods carried by the galleon still wash ashore today along the Manzanita/Nehalem stretch of coastline (Williams 2016).



Figure 4. Tsunami deposit in the cutbank in Nehalem Bay (Photo by Vanessa Litzenberg, 2021)

Based on the geoarchaeological research and the prior porcelain analysis, researchers think that the wreck is the *Santo Cristo de Burgos*, which wrecked in 1693 rather than the *San Francisco Xavier* that wrecked in 1705 (La Follette et al. 2018a:151-152; Williams et al. 2018:202). The ongoing work from volunteers and the community have provided new information and new angles to explore in relation to the wreck, and hopefully the work completed under this thesis will contribute to our understanding of it as well. Based on the accumulation of data from artifacts washing ashore that originated from Asia such as the Chinese porcelain and wood timbers, and more recently Spanish coins, it seems likely the stoneware and earthenware found on the shores between Nehalem Bay and Oswald West State Park also originated from Southeastern and Eastern Asia and related trade locations.

2.3 Conceptualizing Contact-Period Archaeological Sites

In order to discuss the biases in interpretation caused by the presence of historic artifacts in precontact sites, it is important to understand the history of historical archaeology in the region. Historical archaeology tends to consider the time of contact with European settlers on the Northwest Coast to start around the time of Captain Cook's voyage in 1778, and the subsequent increase of the maritime fur trade between 1785 to 1825 (Losey 2005; Lightfoot 2006:276;). Historical archaeology in the 1950s revolved around European American history to aid in the patriotic telling of the settlement of America, and the theoretical framework of acculturation fit the culture-history basis common in archaeology at the time. This meant that when historical archaeologists did turn their attention to Indigenous sites it was usually to use historical items in Indigenous sites as a dating method to help aid the historical narratives. The presence of historical

material was interpreted as being indicative of acculturation and the death of Native culture. Colonial and postcolonial studies have created conceptualized categorical tropes that structure current research narratives to require people to fit into either the colonized or the colonizer (Beaudoin 2016:47), but the divide between these two groups is not as clear as past researchers have assumed. Quimby (1966) suggested materials are how we represent culture and saw changes in types of Indigenous and European materials within the archaeological record as the loss of culture in Indigenous belongings, and assimilation into the dominant culture in terms of European things. In doing this, he missed the meaning given to objects by people; the presence of new cultural materials does not necessarily mean the complete loss of a cultural identity. This arbitrary divide between historical and precontact artifacts has previously caused researchers to misinterpret or disregard potentially valuable data about protohistoric contact and the impacts of short term contact on Indigenous groups. Postcolonial approaches seek to examine culture from different angles, to avoid perpetuating colonial ideas in the process of interpreting the past or in understandings of the present (Silliman 2005).

Historical archaeologists today interpret the presence of trade goods mixed with “traditional” Indigenous goods as evidence of contact and the relationships between the colonizer and the colonized (Beaule 2017). Silliman (2005) highlights the importance of making clear distinctions between the short-term engagements of cultural contact and the long-term entanglements of colonial encounters, none of which is discussed in previous explorations of the sites. Beaule presents a good discussion of how when archaeologists find objects with obvious foreign origins, we tend to interpret them as objects that play a role in reinforcing relationships between subject populations and the rulers especially in

the early culture history studies (Beaule 2017:22-23). Reexamination of objects through different theoretical lenses allows for the reevaluation of colonial narratives through the understanding of how Native populations adapted European goods for their own needs. The divide between the fields of historical and precontact archaeology is reflected in how we approach sites based on predefined research goals. Historically, and even as archaeology has progressed, studies tended to feature an all-or-nothing approach that excludes entire parts of history, depending on the researcher's goals (Lightfoot 1995).

The Indigenous people who lived in the Nehalem area at the time of the wreck were of the Nehalem-Tillamook people, a Salish-speaking tribal community (La Follette and Deur 2018). During the maritime fur trade period, early traders and settlers on the Northwest Coast noted Natives in the area trading beeswax, porcelain, and other trade goods. Beeswax was an important trade good in the region and was also used to wax canoes and canvas, as an ingredient in salves for infections, and sometimes as candles (Erlandson et al. 2001:18; La Follette and Deur 2018:183). The earliest recording of the wreck by explorers is by a local fur trader named Alexander Henry in 1813, who simply mentioned the wreck as “the Spanish ship... cast away some years ago” (Coues 1897: 841). In the early 1900s, cultural anthropologists such as Boas (1923) and Jacobs (1933, 1957) collected ethnographies and oral histories that tell of a wreck off the Oregon coast around Nehalem-Manzanita. Reports and documentation of stories and materials from the wreck continued to be documented and explored by historians and settlers throughout the 19th and 20th centuries (Franchere 1854; Vaughn 1948; Gibbs 1971; Gitzen and Cotton 2013). Unfortunately, by that time most of the Indigenous populations in the area had dwindled due to disease or relocation, which impacted the number of informants who

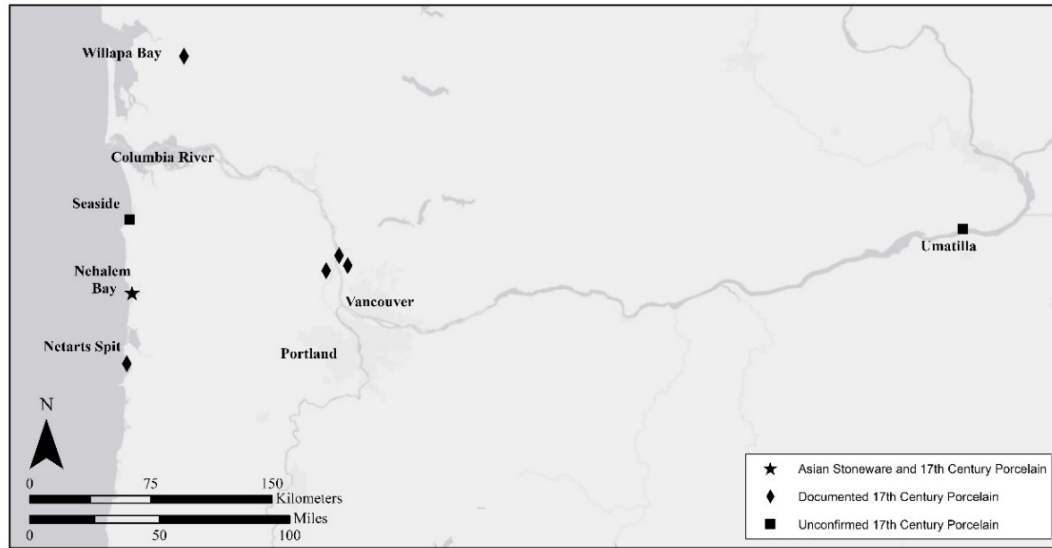
could speak about the wreck. Based on the limited ethnographic accounts taken by Jacobs (1933), the interviews describe how the Tillamook and other Native communities adapted the influx of beeswax into their cultural practices. Only within the past two decades have archaeologists and cultural anthropologists begun taking the oral histories of the coastal tribes seriously and recognizing the merit of these accounts as more than myth (Erlandson et al. 2001). Although contact with the survivors may have been limited, the exotic items that washed ashore from the Beeswax Wreck potentially provided an influx of new materials for Indigenous people to utilize.

A cultural anthropologist, Yvonne Hajda (in Scheans et al. 1990:32), states “Shipwrecks would have easily fitted into the native economy, with Tillamooks at places like Nehalem specializing in shipwrecked goods; as well as whalebone and ocean—going canoes”. The inclusion of exotic items in trade may have provided the Native Tillamook people new opportunities to negotiate their social status with new trade items, such as beeswax or porcelain (Lightfoot et al. 1998:202). Because material culture is what archaeologists use as visible representations of social identity within households (Lightfoot et al. 1998), the identification of items from the wreck appearing in archaeological sites in the region may contribute to a larger scale analysis of exotic trade prior to the influence of British and American 19th century fur traders. This is not to say that all the ceramics dating to the late 1600s are from the Beeswax Wreck, as there could be other wrecks we are currently unaware of, but the sites containing ceramics dating to the period have the potential to examine early Native practices and the trade of exotic items.

As previously mentioned, archaeologists have identified porcelains from the wreck in five archaeological sites in the Manzanita and Netarts area and have gained attention primarily for providing evidence for the wreck (Woodward 1986, Scheans et al. 1990). In these cases, the presence of historical artifacts within Native sites automatically changes the methodology and theory we use to interpret a site (Beaudoin 2016).

2.4 Past Archaeological Research Related to the Beeswax Wreck

Until recently, studies that focused on early culture contact maintained a divide between Native people prior to contact (precontact) and after encountering colonists (post contact) (Lightfoot 1995:200; Beaudoin 2016). The archaeological evidence and some early documentation by explorers as they moved west provides a different narrative of considerably more complex social relationships between Native groups, Europeans, and others (Lightfoot 1995:200). This also has been the interpretation for most of the sites on the Oregon coast where there are at least five precontact sites in Nehalem Bay and Netarts are known to contain historic trade goods dating to around the late 17th century, long before the beginning of the maritime fur trade. Additionally, there are reports of other sites in Washington and along the Columbia River reported to contain materials from the time period of the Beeswax Wreck (Figure 5).



A
 Figure 5. General locations of archaeological site reported to contain stoneware or porcelain dating to the Beeswax Wreck

Although this paper is focused on the stoneware and earthenware, for prior studies analysis, I started looking through site reports and studies that I knew contained artifacts from the Beeswax Wreck and did not limit it to only the stoneware or earthenware. Using the State Historic Preservation Office’s online database *Oregon Archaeological Records Remote Access* (OARRA) and the Washington Department of Archaeology and Historic Preservation’s online database *Washington Information System for Architectural and Archaeological Records Data* (WISAARD). I selected the areas around sites 35-TI-1 and 35-TI-4 and pulled the reports to search through. I downloaded most of the reports from OARRA in those areas and skimmed through them to see if they talked about historic or wrecks. If they discussed neither I would place them in a separate folder and move on to the next. I also searched pdfs with text recognition enabled for terms such as “ceramic”, “porcelain”, “china”, “trade”, “historic”, “ming”, “kraak”, and “wreck”. By pulling report data from locations around 35-TI-1 and 35-TI-4, some of the reports referred to studies from other locations that had ceramics dating to the protohistoric period. If a

report was not available on OARRA or WISAARD, I searched for the articles on Google scholar or, the Portland State University Library website. If I could not locate the report, I made a note of it at the end of an annotated bibliography. To keep track of the data collected from the reports, I created a simple Excel spreadsheet for the reports containing information about early ceramics and other trade goods. The spreadsheet contained the report citation, date, site number or name, unit/location, type of artifact, number of artifacts, page number, and any notes about inconsistencies or other information I thought might be needed. This section discusses the archaeological excavations from five well known sites on the Oregon coast to have contained porcelains and other materials from the wreck and a couple others along the Columbia River.

The initial archaeological documentation of blue and white porcelains was at the Netarts Spit site (35-TI-1) by Thomas Newman (1959). Newman was interested in answering questions related to the origins of the Oregon coastal groups, the sequence of coastal occupations, and what their cultural position was to other major coastal tribes (Newman 1959:2). He used the direct historical approach, which involved working from the historic known to the prehistoric unknown, to inform his methodology and the selection of which site to excavate. Between 1956 and 1958, Newman (1959) led the excavations at 35-TI-1. During the excavation on “House 13” they uncovered 127 pieces of Chinese porcelain in the upper half of the house fill (Newman 1959:28; Losey 2005). The presence of trade goods wasn’t necessarily surprising to Newman, most of which he incorrectly dated to the Chien Lung Period of the Ching Dynasty (A.D. 1735 and 1795). His proposed chronology fit within the maritime fur trade era (ca. A.D. 1790 to 1825) on the Northwest Coast, but one had the mark of the Ming Dynasty dating to ca. 1644

(Newman 1959:32; Losey 2005). Since the dates were outside of the known historical contact period, he dismissed the Ming Dynasty artifact as a forgery created during the Chien Lung Period. Although he briefly entertains the idea that "a derelict drifted in shore near 35-TI-1 and was plundered by Indians", he determines it "less than unlikely" (Newman 1959:33). To Newman, the presence of trade goods merely provides a date based from the historical record and proof of contact. Newman makes this point beautifully when he states:

"History of contact with traders and others who could have supplied these goods is relatively recent. It is only after Cook's third voyage of exploration in 1778 that contacts between whites and Indians became numerous or consistent.... It would seem reasonable, then, that trade goods at TI-1 may be tentatively placed no earlier than the closing decade of the eighteenth century." (Newman 1959:32)

Newman's inferences about the porcelain based on the historic documentary record is skewed because of the limitations created by his theoretical framework. To state an artifact or feature as an anomaly can have its own dangers (De Lucia 2008), but the nature of his statement does not suggest any inconclusiveness in regards to explaining culture from the material past at the site (Wylie 1982:399). The dating of the houses and the overall occupation of the site is an example of the danger of trying to prove a hypothesis using historical records first and archaeological data second when conducting research. Based on radiocarbon dates and historical data, Newman determined the main occupation of the site as being between A.D. 1400 and A.D. 1675, but only the occupation of House 13 extended into the early 19th century due to it being the only house with trade goods. Interestingly, he notes that the artifacts, excluding the trade goods, in House 12 and 13 are strikingly similar, even though they were separated by a

century and a quarter (Newman 1959:31). The trade goods are viewed merely as a signifier of colonial contact.

The misinterpreted data was not reexamined until 1980 when Beals and Steele (1981) examined the porcelain ceramics from the Newman excavation and found they predated the fur-trade contact period. Newman does not discuss the presence of other potential historical goods in the report discussion, so it is unknown if other items related to the wreck, including plainwares, may have been present. Similarly, Beals and Steeles' (1981:1) analysis of the porcelain at 35-TI-1 mentions personal communication with Phebus about his excavations at 35-CLT-20 (the Par-Tee Site, in Seaside), and the identification of a porcelain sherd potentially dating to the Ming dynasty, but there is no mention of such an artifact within Phebus' catalog or report on the 1970s excavations (Phebus and Drucker 1979). The mentality of the colonial divide between precontact and post contact periods of the era caused material to be recorded incorrectly or possibly not recorded at all, which can make the identification of these materials in archaeological sites difficult.

After the reexamination of the 35-TI-1 sherds by Beals and Steeles (1981), there was increased interest in the Beeswax Wreck. 35-TI-4 is located to the north in Nehalem Bay, closer to probable wreck location. There have been multiple excavations at the site, including the other loci with new numbers (Losey split 35-TI-4 into 35-TI-4, 35-TI-75, 35-TI-76, and 35-TI-77), over the last 40 years (Woodward 1986; Scheans et al 1990; Losey 2002). Research indicates 35-TI-4 was occupied from A. D. 1500 extending into the historic settlement period of the early 1900s (Losey and Erlandson 1999). Between

1981 and 1984, John Woodward conducted the initial excavations at site 35-TI-4 in order to link shipwreck folklore with archaeological evidence on Nehalem spit. He employed early historical accounts, ethnographic tales collected by Jacobs in 1934, and local legends to inform his research design. He performed surface collection and non-random testing at 35-TI-4 in 1981, 1982, and 1983 for the purpose of locating ceramic sherds in undisturbed prehistoric contexts (Woodward 1986:229). His fieldwork resulted in locating porcelain and stoneware in the middens and on the floors within the lower levels of the precontact houses. During my literature review, Woodward (1986) is the only archaeologist to call out stoneware fragments as experiencing some level of modification. These sherds were located in the midden at 35-TI-4 (now 35-TI-76) at approximately 65-80 centimeters below surface. They were found in context with the highly identifiable blue and white porcelains associated with the wreck. He states:

“Two large stoneware sherds were recovered from the midden. One is a base showing evidence of intentional modification into a scraper with resultant edgeware. This sherd with brown exterior glaze and a gray stoneware body is from the base of a Martavan style storage jar. The second stoneware sherd has a gray body with black impurities. Thin feldsparic, olive—gray glaze is partially worn off the exterior surface. The interior surface is broken off and the edges show evidence of use wear. This specimen appears to be from a 17th century Martavan jar of the type illustrated by Hogervorst” (Woodward 1986:230)

This brief statement by Woodward suggests the stoneware located within site 35-TI-76 were not only being collected but modified and used. Woodward identified sherds of hard, unglazed brown stoneware of Asian origins from the floor of this excavation at house site seven (Woodward 1986:234). The fact they are being found on the floor of a house site, instead of middens or outside of the home, indicate the inhabitants were actively engaging with the materials. He describes the sherds as being made from a

coarse paste with sand and melted feldspar granules visible on the surface and were from large storage jars made through the coiling manufacturing method. Woodward believed the jars to be from Japan or possibly Luzon in the Philippines but was unable to confirm the origins (Woodward 1986).

While not discussing stoneware and earthenware, an appendix was later added to the report discussing the knapping of porcelain using experimental archaeology (Cummings 1986). The research includes locating other references about Native Americans utilization of Chinese porcelain sherds at other archaeological sites on the Pacific Coast, but is unable to locate any references for projectile points being fashioned from porcelain sherds outside of sites at in Nehalem (Cummings 1986:255). He briefly mentions how porcelains from other wrecks in California and in various sites in Oregon have different types of modifications to the sherds and are not consistent across the region. Cummings uses middle range experimental archaeology to understand how the Native coastal people fashioned the hybrid artifacts out of porcelain sherds (Cummings 1986:256). Using multiple types of tools, both historic and prehistoric, he was able to provide an analogous representation of how the points were made and that they were relatively easy to make in a small amount of time. The presence of “hybrid” objects, such as projectile points fashioned from ceramics, tends to cause a focus to be on the production of the object instead of the practices that created the object (Silliman 2015:284). The lack of projectile points at other sites where porcelain has been utilized by Natives people potentially indicates that the porcelain projectile points did not translate to long term or widespread cultural adoption. Silliman (2015) would consider it a “mule” in terms of hybridization; the points were produced but were not reproduced

over the long durée or beyond the Nehalem village, even when porcelain and other goods from the wreck were being traded.

Woodward went back to the area in 1989 and tested multiple locations, including Elk Meadow (reported as 35TI4, but later reassigned the number 35TI77). The article includes an overview of artifacts found in the test unit stating: “The lithic artifacts recovered from the site include two pestles, eight small arrow points, a stone knife, and 25 hide scrapers. Beeswax, Chinese ceramics, and iron, lead, and bronze artifacts that were found on the house floor...” (Woodward et al. 1990:63). Woodward et al. (1990) also states “Absent are glass beads, rolled copper ornaments, or other artifacts associated with the early historic period” suggesting that the historic artifacts date to the Nehalem Beeswax Wreck. Figure 8 in the Woodward et al. (1990) report contains drawings of eight of the historic artifacts located at the Elk Meadows site, including two stoneware sherds and an earthenware sherd, but does not indicate if there were more. Based on Woodward’s testing alone, it appears that Indigenous populations did collect some of the stoneware and earthenware materials from the Beeswax Wreck.

Later excavations by Scheans’ and others (1989, 1990) mention earthenware mixed with porcelain in the summary report but provide little to no discussion on the ceramics, suggesting they are 19th century even when they included blue and white porcelains associated with the Beeswax Wreck. The preliminary report and final report from the excavation exemplify how historic goods in the context of protohistoric sites are either under reported or excluded completely based on the researchers’ goals or biases. In the preliminary report for the 1989 excavation reports for *Cronin Point Site (35-TI-4B)* at

Nehalem State Park states that “Thirty sherds of Asian porcelains accompanied by a few sherds of European American stone and earthenware were recovered” (Scheans et al. 1989:6). It should be mentioned that Nehalem Bay did have more of a historic settlement in the late 1870s; but, based on the location and context of the materials identified within the site they are related to the wreck and not historic settlement. From the data presented in their final report, Scheans et al. (1989) only have porcelain and glass as categories for the historic items recovered from the testing effort, and the single porcelain fragment found on the surface was a modified porcelain projectile point. This could lead either to the assumption that other historic items were not tallied, or the stoneware was tallied with the porcelains which calls into question the context for stating they were historic “European American” stoneware while the porcelains were protohistoric. The presence of stoneware and earthenware suggests the Native communities were collecting more than the blue and white porcelains highlighted in associated archaeological reports.

The scale of the current project only focuses on the immediate region where the exotic materials likely originated, but the ability to identify material items from the wreck could help us to understand how materials were scavenged to be used as raw materials for Native forms, or potentially used in larger scale trade (Lightfoot et al. 1998). The previous archaeological studies of the artifacts in the region also reflect the focus in which archaeologists have looked at their data. A majority of studies look at site or area-specific data without examining the larger collection of regional data. The combination of scale and focus within historical archaeology reflects the potential to miss important information about the incorporation of western (foreign) goods into the daily life and trade of Indigenous people in the protohistoric period. In 2008, a porcelain projectile

point was recorded in Willapa Bay Washington at site 45-PC-186 and multiple sites on the Columbia River have noted porcelains potentially related to the wreck, suggesting trade of the materials as well. Village sites in the Portland and Vancouver area such as 35-CO-5 (Meiers Site), 45-CL-1 (Cathlapotle), and 45-CL-12 suggesting the materials were being traded further than just the immediate Nehalem coastal area (Scheans and Stenger 1991; Cromwell 2017). The reports from the excavation of the three sites only mention historic materials in passing or not at all. but within all the early reports determining the context in which the historic were identified within the site is impossible. In 2017, Cromwell (2017) compared fur trade ceramics of Chinookan and 19th century fur trade sites along the Columbia, looking at six sites along the Columbia that spanned over 300 miles. He identifies that some of the ceramics from 35-CO-5 and 45-CL-1 may be from protohistoric wrecks but without Cromwell's report, earlier reports make it difficult to identify or assess these types of materials. As an example, the 337-page excavation report for 45-CL-1 has two sentences that mention ceramics:

“Ceramic (n = 91; 1.4%): All ceramic items are cataloged. Ceramic items are limited to trade beads and a few pieces of porcelain, at least one of which is shaped into a scraper.”

It is reasonable to not expect in-depth discussions about every single item from a large-scale excavation, but there is no indication about the context of where the porcelain scraper was identified or what is meant to have this modified trade item within the site. Both Beals (1983: 201) and Hajda (in Scheans et al. 1990:32) mention the presence of a porcelain pendant near Umatilla (eastern Oregon) discovered by Osborn during the River Basin Surveys. Osborne's (1957:109) report states that the sherd dates to the Ming Dynasty in the late 1600s. Unlike Newman, Osborne did not dismiss the age of the

artifact, stating that Native people traded European goods up the Columbia or that it potentially came from the interior, but stated that conclusions about its origin could not be drawn until there had been a thorough study of early trade (Osborne 1957:109).

2.5 Ceramics related to shipwrecks

Chinese porcelains to be sold in the New World were not the only type of ceramics on the Manila galleons. The galleons carried jars manufactured from a variety of locations including China and Southeast Asia, showing the extensive trade around the region. Most of the ceramic cargo onboard the ships consisted of stoneware and earthenware used to transport different types of commodities. They were used to protect fragile goods like porcelain, spices and other goods, and storage of liquids and brined food for the journey (Figure 6)(Rinaldi 1990:432; Dupoizat 1996).



Figure 6. Example of how stoneware jars could be used to hold fragile goods from the Pandanan Wreck (Image courtesy of Gilbert Fournier)

These storage jars were used repeatedly creating a thriving market for secondhand jars from all over Southeast Asia (Rinaldi 1990:432). According to Captain George Anson, one of the main uses for the jars was to store water for the long journey. The Spanish in the Philippines adopted the use of jars instead of barrels as they preserved better during the long journey (Dupoizat 1996). The diary of Geovanni Francesco Gemelli Careri provides further insight into how extensively the jars were used on board, writing “it is the practice in this voyage to carry the water in earthen (stoneware) jars, to the number of 2, 3, or 4,000 proportionally to the number of people, and bigness of the galleon” (Schurz 1939). Additionally, it should be noted that cargo jars were not the only type of stoneware and earthenware ceramics being transported on the galleons; the *San Diego*, discussed below, carried a wide variety of earthenware vessels including pots, footed dishes, and cups (de la Torre 1996:31).

Internationally and in the Americas, there has been some level of analysis on the plainware ceramics from wrecks associated with trade throughout East and Southeast Asia, as well as in the Philippines and Americas. The biggest differences between these studies and the current analysis are that the wreck locations are known and often contain largely complete vessels. Most recently, Schlagheck (2021) performed a similar cursory study of the stoneware from the Baja California Manila galleon wreck. The wreck is like the Beeswax Wreck as it has not been located but artifacts, such as stoneware, have been identified in association with the wreck. The stoneware sherds from the Baja California galleon appear to be more complete than those in the Dubé Collection.

Prior finds from the wrecks of the *Nuestra Señora de la Concepción* and *San Diego* have provided vital information about the types of jars used on galleons. While the Spanish did manufacture their own type of jars, commonly known as olive jars, they found that they did not have the same stability and strength in the hot moist climate that the Asian jars did (Dupoizat 1996). Instead, the Spanish chose to use locally (within the region) manufactured jars to store and transport goods. It has been suggested the earthenware was associated with the crew on board the ships and less with the cargo intended for sale (Valdes 1993:39).

An extensive collection of ceramics was recovered between 1994 and 1996 from the *San Diego*, a Spanish merchant galleon sunk in Manila Bay by Dutch forces in 1600. It contained over 5,000 artifacts including over 800 earthenware and stoneware storage jars. The jars found on board the *San Diego* were produced in a variety of kiln locations including China, Siam, Burma, Thailand, other Southeast Asian countries, and the Iberian Peninsula in Europe, but none (at the time) were found to be produced in the Philippines (Dupoizat 1996; Desroches et al. 1996; Cort 2017). In 1990, Pacific Sea Resources conducted an analysis of the ceramics from the *Nuestra Señora de la Concepción*, an Acapulco-bound galleon sunk in 1638 off Saipan, and provided a typology for the ceramic jars recovered from the wreck (Rinaldi 1990). From the 156 intact storage jars salvaged from the *Concepción*, Rinaldi identified eight different types of jars which are labeled “Type A” through “Type H”. Many of the types have subtypes which identify variations in the jars. The *Concepción*’s stoneware and earthenware cargo had similar origins in Southeast Asia and China to that of the *San Diego*, but also contained the presence of possible local Manila-produced jars that were a low fired, poor-quality

emulation of the southern Chinese plain jars (Grave and Maccheroni 2009). Both wrecks contained jar types from around the region that would have been easily accessible in the Philippine ports at the time.

There is not as much literature and studies pertaining to the stoneware and earthenware vessels since they do not tend to have distinct diagnostic properties like decorated porcelains, and especially when they are highly fragmented. Additionally, these ceramics are not as aesthetically pleasing and are less likely to be highlighted in public settings even though they played an important role in trade. Without a large sample of the ceramics, it is difficult to know the extent of types associated with the wreck and their origins. More recently there has been increasing interest on the topic including chemical analysis of the sherds identified in shipwrecks and archaeological sites and comparison to known archaeological kiln sites in China and Southeast Asia (Grave and Maccheroni 2009; Graves and McNiven 2013; Cort 2017). There is also increased interest in decorative jars and their typologies such as dragon jars (Sinopoli, et al. 2006; Dueppen 2013) and discussions about the processes used in making the storage jars (Kivi 2019). Grave and Maccheroni (2009) found the containers on both the *San Diego* and *Concepción* originated from kilns in Thailand, China, Vietnam, and possibly from the Philippines as well.

Unfortunately, most of the ceramics in the Dubé Collection are highly fragmented, but by categorizing discernable patterns based on the pastes, glazes, and features of the stoneware and earthenware in the collection, we can begin to infer the different types of containers on the ship. This analysis will be useful to provide a structured comparative collection for identification of these ceramics in the future.

2.6 Ceramics of East Asia

When discussing earthenware and stoneware, it is important to recognize the difference in terminology between Asia and modern European or American definitions. The majority of Asian countries identify two types of ceramics: earthenware (porous), or stoneware and porcelains (non-porous). Earthenware ceramics are made from various clays fired between 600°C and 1,000°C (Finlay 2010). This results in a porous clay that has not entirely fused, which produces clay that is red, brown, buff, or black. This creates vessels that are good for cooking because they can be placed on a fire without cracking (Smithsonian Institution 2021a). Often these vessels require a second firing to place a glaze, such as a slip, if they are to become impermeable. Stoneware is produced at higher temperatures ranging between 1,100°C and 1,400°C that results in a material that is vitreous, almost nonporous, and can vary in colors from light gray to red to black (Grave and Maccheroni 2009). For Asian ceramics the main distinction between stoneware and porcelain is the whiteness and translucency (Finlay 2010: 82). The category of stoneware in Asia covers a wide range in quality of stoneware, some of which in the Americas would be considered a high quality of earthenware.

Stoneware production was a balancing act for the producers, as they needed to correctly estimate the relationship among clay mixtures, firing time, temperature, and melting point. In Southeast Asia, clays to create the stoneware were brought in from different source locations and were often stored outside to allow for some weathering. The clays were also sometimes mixed to produce different properties (Smithsonian Institution 2021a). The clay was mixed with a variety of inclusions ranging from organic material such as shell, charcoal, grass, or rice chaff, to inorganics such as sand, gravel, or

grog (fired clay that had been crushed to be added to clay bodies to reduce shrinkage) depending on the need (Smithsonian Institution 2021a).

Storage jars were too large to be thrown the same way smaller vessels or plates were made. Coil-and -throwing process has largely been used for the formation of large jars in Asia and is still practiced today in both East and Southeast Asia. Due to the size, the large jars were often manufactured in two or three separate pieces and then joined together. Potters would work in pairs with one person on the wheel, and the other as the shaper (Cort and Lefferts 2010). Potters would place a clay base slab on the wheel and then start to coil clay around the exterior. Once the vessels or the individual parts of the vessels were formed, the clay was packed by holding a rounded stone tool called an anvil to the interior, while the outside was gently tapped with a paddle or concave mallet (Harrison 1984). Any molded or hand ported decoration was applied directly to the jar or could be stamped into the clay prior to firing.

The ability to control temperature is critical for stoneware production but can be achieved by a wide range of designs. Large kiln sites that produced stoneware have been identified in parts of Southeast Asia such as Myanmar (Burma), Thailand and Vietnam, as well as in China. The Chinese kiln sites were largely clustered along the coast whereas the Southeast Asian sites are located inland. The Southern China manufacturers utilized large-scale cross-draft dragon kilns, named for their resemblance to a dragon with a smoking head and long body that formed the kiln, whereas the Southeast Asian manufacturers utilized two types. Southeast Asian sites such as the Khmer kilns (9th to the 13th century), were slab-built cross-draft kilns located on either natural or artificial

slopes. The latter type was a relatively simple cross-draft form dug out from a clay bed or riverbank (Grave and Maccheroni 2009). Those found in Thailand at the Maenam Noi kiln were single-chamber cross-draft kilns, with brick-built side walls and arched roofs (Cort 2017).

A variety of techniques for finishing the surfaces were common for the jars. Depending on the locality of manufacture of the jars, certain techniques such as unglazed, colored glazes, slips, or resins were used. For glazes, the color of the glaze depended on the iron oxide content with 0.8- 1.7% coloring yellow to dark green glazes, and 7-10% coloring medium brown to black glaze (Kivi 2019; Smithsonian Institution 2021a). Black glazes are the result of a high concentration of coloring oxides, such as a mixture of copper and manganese oxides, but alone manganese oxide gives a purplish tint. For blue, cobalt oxide is used in alkaline glazes and when fired at high temperature, cobalt and manganese oxide tend to give a mottled glaze with splashes or spots of purple, red and pink. Brown glazes are produced from the use of iron oxide and the resulting glaze can vary greatly depending on the quantity of iron and other variants in the glaze composition. The copper oxide in lead glazes produces blue or green glazes, and under reducing fire red (Wood 1999; Rice 2015). The jars would often be partially dipped and the glaze would run down the sides as the vessel was fired. Additionally, depending on the type of exposure the paste received during firing, and glazed or not glazed, amounts of oxygen could result in variation of the body color throughout the jar.

Ash glazes were often accidental but a result of organics that built up in the kiln; as the fire hit the ceiling of the kiln, small bits of stone and other matter would fall on the

ceramic and adhere to the surface, or sometimes the ash on the ceiling of the kiln would melt and drip down onto the ceramics (Wood 1999). Below I provide a summary of some of the known types of ceramics identified on galleons.

2.7 Earthenware

The terracotta pieces identified on Manila galleon wrecks are some of the few pieces of European ceramic made in the Philippines that were an amalgamation of the earthenware produced in the Philippines and the influences of the traditional Spanish ceramic forms. These “Manila” style ceramics produced pieces in terracotta or stoneware of a red or buff color (Desroches et al. 1996). The pieces would sometimes be painted, have engraved decorations, or were studded with small pieces of chipped porcelain inlaid into the vessel (Figure 7).



Figure 7. Example of the Philippine earthenware at the wreck of the *San Diego* (Image courtesy of Gilbert Fournier)

Examples of pots and jars from the *San Diego* showed that they played an essential role in the preservation and preparation of food (Dupoizat 1996). Lids were another common use for earthenware. Although not as common as the Atlantic trade

route, the Manila galleons did utilize the Spanish olive jars and these have been found in prior Manila galleon wreck sites. The olive jars found on previous wrecks consist of coarse light or beige paste with large quartz inclusions.

2.8 Stoneware

The usefulness of earthenware centers around its porosity, which allows for evaporation of contents, and its ability to not shatter from thermal shock when exposed to heat sources. Stoneware's usefulness relates to its density and durability, since it is fired to near vitrification and does not allow seepage of its contents (Cort and Lefferts 2010). This is why the jars were optimal for the long voyage and transport of goods. The innovation of stoneware originated in China in the first millennia B.C.E before spreading to other parts of East and Southeast Asia (Grave and Maccheroni 2009).

The geographical location of the Chinese's kilns such as Guangdong, Fujian, and Zhejiang clustered along the coastal fringe showing the geopolitical significance of the kilns to cater to the maritime trade and internal markets. This differs from the kiln sites of Southeast Asia which tended to be located inland showing the significance of the connection to the inland resources and the coastal trades (Grave and Maccheroni 2009). The general traits of the Chinese jars included four clay lugs (handles) that were attached horizontally and spaced evenly around the jar's shoulders, and that they had standard sizes included small (H. 23 cm), medium (H. 42 cm), large (H. 78 cm) and massive (H. 98 cm) (Figure 8*a-d*). The early Chinese storage jars were covered in a yellow or olive-green glaze and were later replaced by amber, brown, or dark brown glazes (Cort 2017). As the jars spread across Asia, new production centers appeared in Thailand and Vietnam (Figure 8*e-n*).

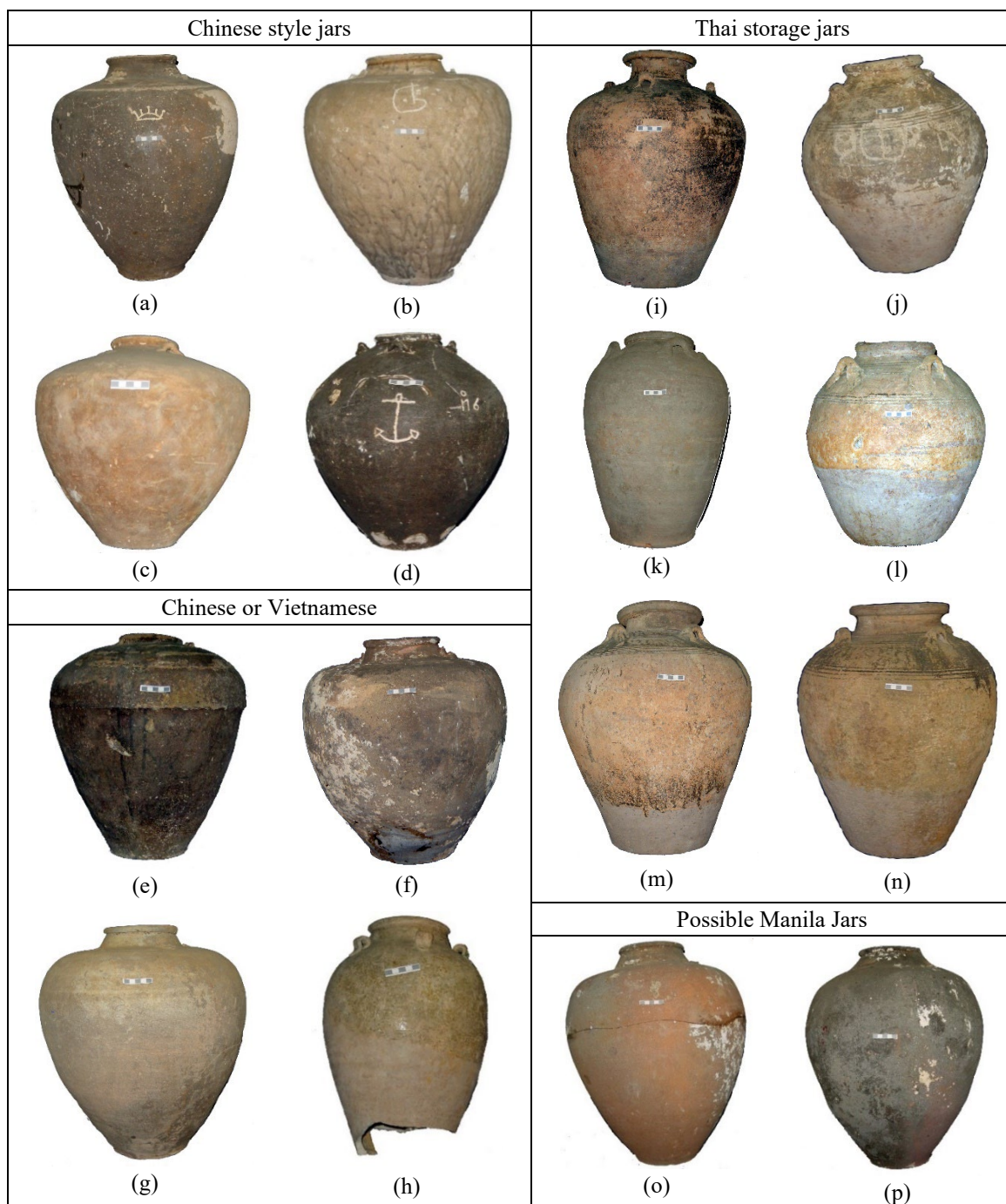


Figure 8. Examples of different forms of jars recovered from the Concepción and the San Diego and the country of origin based on data from Duponizat (1996) and the compositional groups described in Grave and Maccheroni (2009). UNE number is the location number on Open context. (SD) stands for the San Diego and (C) stands for the Concepción. Jars of Chinese origin (a) UNE267(C) and (b) UNE245(C) represent compositional Group 1; and (c) UNE131(SD) and (d) UNE373(C) represent compositional Group 3. Jar of Chinese or Vietnamese origin: (e) UNE 110 (SD), (f) UNE283(C), and (g) UNE 338(C) are compositional Group 2 and (h) UNE126(SD) is compositional Group 1.3. Jars of Thai origin: (i) UNE112(SD), (j) UNE358(C), (k) UNE115(SD), (l) UNE107 (SD), (m) UNE115(SD), and (n) UNE140(SD) are compositional Group 4. Jars possibly from Manila: (o) UNE291(C) and (p) UNE247(C) are compositional Group 5. (Images courtesy of Peter Grave through Open Context, 2007)

The dark brown-glazed container jars from north-central Thailand (such as the Maenam Noi kiln and Si Satchanalai kiln sites) provided standardized sizes and facilitated the ability to calculate the snug packing of a ship's hold. The stoneware jars become stronger and more durable over time, and these well-fabricated, high fire stoneware jars were resistant to salt and sea air making them survivable for multiple voyages, with some of the jars reported to last for centuries. In comparison, cargo containers today have an average lifespan of five years (Cort 2017:269). The Thai kilns suggest they did make some earthenware products, most notably the container lids. Jars originating from Thailand have been identified on both the *San Diego* and the *Concepción* (Grave and Maccheroni 2009; Cort 2017:274).

More recently, studies on characterizing the chemical composition of a variety of stoneware jars from Southeast Asia, including those found on the *San Diego* (1) and *Concepción* (7), found that some of the jars were not from China or Thailand. These studies suggested that the stoneware jars had been produced in Manila, although the production may have been short lived and in response to meeting shortfalls in the jar supply chain as restriction in trade changed (Figure 8o, p). These jars are a rough amalgamation of the Chinese jar form and utilized local resources (Grave and Maccheroni 2009).

2.9 Martaban Jars and Dragon Jars

Martaban jar is a general term for common stoneware storage pots from Asia, but when discussed in the literature they tend to have specific style of glaze and design to them (Figure 9a, b). These jars were originally named after the Burmese port of Martaban (Mottama) in Lower Burma (Borell 2014). The name has been used by

westerners over the decades to discuss a general type of storage jar from China or other Southeast Asian countries. Borell (2014) provides an extensive discussion about the origins and the generalization of the jars' name that became ubiquitous with large storage jars from Asia. The Martaban jars originated in Burma were known for their robust ceramic bodies with a solid thick, non-porous wall that had an almost granite-like texture. The paste of Burmese jars is usually reddish brown or red in contrast to the greyish paste found in the Thai Sawankhalok wares, which only fire red on the unglazed surfaces (Brown 2000: 104). Around the same time, China was also producing comparable storage jars which have similar characteristics. The Martaban jars from the *San Diego* consisted mainly of dark red or pinkish-gray with numerous inclusions and an uneven black glaze. The jars had an applied clay decoration in the forms of lines on the upper half of the belly of the jar. The bottom half, which is formed independently before being joined to the top, lacks decoration and is largely unglazed (along with the interior) except for a few splatters (Dupoizat 1996).

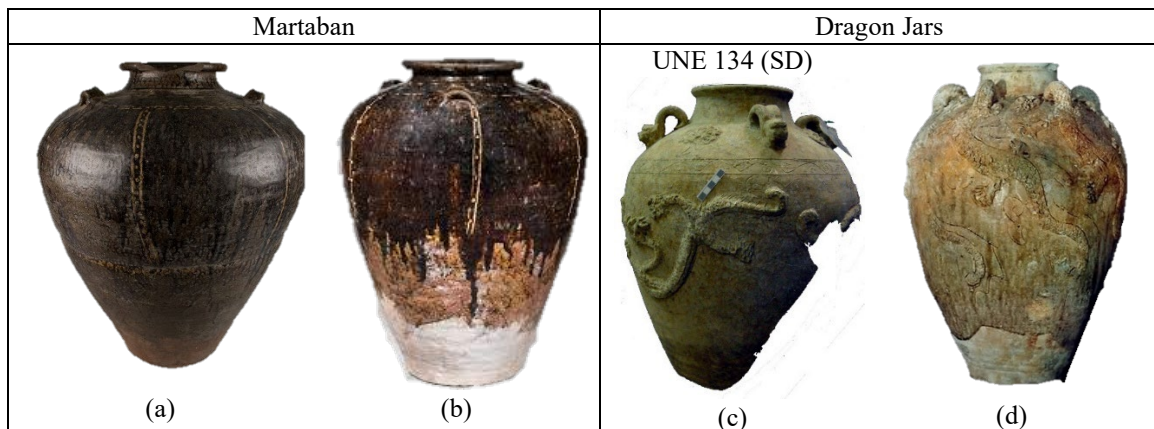


Figure 9. Example of typical Martaban type jars (a) and (b) (Images courtesy of the Met Museum 2022, Singapore's National Heritage Board 2019); and dragon jars (c) UNE 134 and (d) dragon jar from the San Diego (Peter Grave through Open Context, 2007; Image courtesy of Gilbert Fournier)

(b)

Dragon jars are a type of large storage and transport jar, often with dragon motif decorations, that were used for a variety of purposes including transport of goods, decoration, burials, and often were highly prized or used as heirlooms (Figure 9c, d). They are large, often brown-glazed stoneware storage jars that are all over East and Southeast Asia including China, Vietnam, and Thailand. These jars tend to have a buff or light gray paste. The glaze colors range from a yellowish brown (7.5 YR 4/4; Munsell designation "dark brown") to very dark brown (10 YR 3/2; "very dark grayish brown") to olive brown tones and tend to be fully glazed on the interior and fully or partly glazed on the exterior. Although most of the types that Sinopoli, et al. (2006) identify in their paper are composed of a gray paste, there is one type that is composed of red paste and a dark brown or dark yellow brown glaze. The jars generally display zoomorphic designs including dragons, lions, demons, or botanical designs (Sinopoli, et al. 2006: 240, 244). The designs are created through a variety of techniques including being applied, incised, or pressed into the main body of the vessel before being glazed. In addition to being carried as cargo on many of the Manila galleons they were also prized by people all over Asia and could be passed down through generations as heirlooms or used for burials (Sinopoli, et al. 2006).

3 Chapter 3: Study Sample and Methods

The Dubé Collection belongs to a private collector who found them on local beaches near Manzanita over several years. The collection provided data about earthenware and stoneware associated with the wreck as well as providing a comparative sample to identify potential artifacts found in archaeological sites. The Dubé Collection numbers 628 sherds, collected between 2006 and 2021 from three separate locations. The number of sherds in the Dubé Collection from each location is as follows: 615 from Oswald West State Park active tidal areas, 11 from Nehalem Bay, and two from the Nehalem Spit/Manzanita Beach. One additional sherd was identified by Mr. Vernon Cromwell in 2021 at Nehalem Bay while writing my thesis and is included in the sample. As previously stated, the high number of sherds identified from Oswald West State Park is likely due to the size of sherds there and the longer time spent by Dubé collecting at that location. Mr. Dube did not spend as much time beach combing within Nehalem Bay after learning about the presence of archaeological sites within the bay and concerns about removal from intact archaeological deposits which could remove the materials from the important in situ context. The numbers in sample locations differ quite drastically from the porcelain in the Dubé Collection which is comprised of 415 sherds from Nehalem Bay, 770 from Oswald West State Park, 2 from Tillamook Head, 1 from Tillamook Bay, and 1 from Nehelem Falls and were collected between 1985 and 2008, though there are more in the collection today (Lally 2008).

One of the main goals of this thesis is to provide a typology for the stoneware and earthenware so that it may be used in the future as a comparative collection. The practicality, usefulness, and utilization of typologies has long been debated in archaeology.

Typologies are used as classification systems to communicate standardized knowledge between researchers and for interpretation purposes, but there is disagreement because of issues with consistency (Whittaker et al. 1998). It has long been regarded as an organizational tool to interpret change across cultures and time, but Ford and Steward (1954) argue that the usefulness of a type is only relative to the scale to which it is attributed. Establishing the level of difference between types, or on a smaller scale their attributes, can impact the consistency of identification between researchers (Ford and Steward 1954). The reliability of a classification system and the consistency of its outcomes impacts the validity of the type. The ability of an archaeologist to provide detailed descriptions of the artifacts and methodologies employed during an analysis is key to maintaining quality assurance (QA) and quality control (QC) for future work. Quality control within archaeology is “the reproducibility of results produced by a single observer, and the agreement of results produced by different observers” (Whittaker, et al. 1998:136). Often archaeological reports lack the descriptive qualities that would allow for the reproduction of a study, relying on the reader’s knowledge of the terminology to understand what is meant by specific terms. The perception and communication of color, while a very prominent attribute of an artifact, is inherently one of the harder attributes to measure and communicate due to personal perceptions and environment. Archaeologists have used Munsell color categories to create some level of consistency or mechanical measures, such as spectrometers, which are often costly (Chenoweth and Farahani 2015:312).

3.1 Dubé Collection Analysis Method

The initial analysis took place at the Nehalem Historical Society, over nine one-to-three-day sessions. Individual sherds were bagged with an artifact number written on the bag, rather than directly on the sherd. Small, nondiagnostic sherds with similar attributes were bagged as lots and assigned a single artifact number, while diagnostic sherds were individually bagged and numbered. Information regarding each sherd or lot was recorded in spreadsheet format. The work utilized the Jar Fragment (JF) numbers provided by Mr. Dubé as well as the general collection location. Appendix A provides the table for how the catalog was formatted and further descriptions used for the types.

When possible, sherd type was determined and categorized as base, body, neck, or rim sherds. Many of the sherds were too small to definitively determine their place on the jar and were labeled as unknown; this was often the case when sherds were too small to be able to see any curvature. For rim sherds, profile drawings of those large enough to estimate their shape were measured on a diameter chart to determine the size of the opening. Notes were made when the sherds had visible markings related to the potential manufacturing methods, such as areas where joints (locations on the large jars where the top half and the bottom half were brought together during the manufacturing process), brush strokes from smoothing paddles, and indents from the hands or the coils were not smoothed all the way. A modified version of Lally's (2008) definitions of breakage and erosion classification was used to determine the level of erosion. Modifications in the descriptors were made to better suit stoneware and earthenware instead of the Chinese porcelains (Table 1).

Table 1. Modified Definitions of Breakage and Erosion Classifications.

Breakage Type	Definition
Clean break	Edges show no erosion whatsoever; sharp edges, features fully intact. This does not include sherds with a recent break but with large quantities of erosion in other areas.
Slightly eroded	Overall have freshly broken appearances, however, sharp edges are worn down or slightly rounded. Features such as joints or construction methods are still visible when present. <i>Glazes or finishes are still mostly present.</i>
Moderate Erosion	Edges are rounded; features are rounded down or no longer present. Glazes or finishes are mostly eroded with only specks of very thin pieces of it remaining. Still has part or all the margins intact
Severely eroded	Edges are rounded; Most bases it is just the core paste color that remains. Rarely are there any exterior or interior margins colors present.













































The individual sherds were measured for maximum and minimum thickness, using digital calipers, to the nearest hundredth of a millimeter to provide a generalized range of the sherd's size. When present, the margin width on the interior or exterior of the sherds was measured with the digital calipers unless it was too thin due to erosion to be able to get a proper measurement; then it was noted as present. The inclusion colors were documented as light or dark. The paste texture, as well as some levels of the vitrification were documented using the descriptions in Table 2. Definitions for Paste Texture Classifications.. When possible, determinations of paste texture and vitreousness were made based on areas of clean breaks or where the sherds exhibited less erosion. When no clean breaks were visible, the texture of the paste was based on the size of the inclusions and voids on the sherd. This also tied into the types of firing based on the Asian ceramics and were labeled as high, low, or undetermined.

Table 2. Definitions for Paste Texture Classifications.

Texture	Definition
Fine	Very smooth to touch, inclusions are non-existent or very fine.
Moderately Fine	Almost all is smooth to touch, inclusions are very fine to fine. Paste is compact and has vitrified to the point the paste shows a complete melting of the granules and the paste.
Moderately Coarse	Fine to medium inclusions in the clay, fine to very fine voids are present. Majority have evidence of some melting between the fabrics and gradual and can see some boundaries. Can be slightly rough to touch.
Coarse	Porous and large pieces of sediment in the clay, rough to touch. Fine to medium voids throughout the paste

The chroma and value of the paste was determined using a Munsell soil color chart to provide standardization of the color type. Secondary colors either from the margins and/or the glaze on the exterior and interior of the sherd, if present, were documented using the same method. All the data were recorded in the same location under the same lighting to eliminate individual variations in color perception. Munsell colors were entered into the spreadsheet as the exterior, core, and interior. If there was no difference between the core and the exterior and interior paste color, the core was the color entered. Similarly, if there was a noticeable interior and exterior color they were recorded as such and the core slot was left empty. Secondary processing of the data included dividing the various Munsell colors into larger groups such as “Dark Red/Brownish Red”, “Red”, “Pink”, “Buff”, “Gray”, and “Brown (terracotta)”. Table 3 provides the Munsell chroma, value, and hue for each of the larger groups. The categories of red, dark red/brownish red, gray, buff, pink, and terracotta were based off the core paste color.

Table 3. Categories for paste hue based on Munsell soil chart color findings.

Dark Red/Brownish Red			Red			Pinks		
2.5YR 3/2		Dusty red	2.5YR 4/6		Red	2.5YR 6/6		Light red
2.5YR 3/3		Dark reddish brown	2.5YR 4/8		Red	5YR 7/3		Pink
2.5YR 3/6		Dark red	2.5YR 5/8		Red	5YR 7/4		Pink
2.5YR 4/2		Weak red	2.5YR 5/6		Red	5YR 6/4		Reddish brown
2.5YR 4/3		Reddish brown	10R 4/6		Red	5YR 6/6		Reddish yellow
2.5YR 4/4		Reddish brown	10R 5/6		Red	7.5YR 7/4		Pink
2.5YR 5/4		Reddish brown	5YR 4/6		Yellowish red			
10R 4/3		Weak red	5YR 5/6		Yellowish red			
5YR 4/4		Reddish brown						
5YR 4/3		Reddish Brown						
Buff			Gray			Brown		
2.5Y 7/3		Pale brown	2.5Y 6/1		Gray	7.5YR 5/4		Brown
2.5Y 8/1		White	2.5Y 7/1		Light gray	7.5YR 5/6		Strong brown
2.5Y 8/2		Pale brown	2.5Y 7/2		Light gray	7.5YR 6/3		Light brown
2.5Y 8/3		Pale brown	5Y 6/1		Gray	7.5YR 6/6		Reddish yellow
5Y 8/1		White	Gley 1 N5		Gray			
10YR 7/3		Very pale brown	Gley 1 N6		Gray			
10YR 7/4		Very pale brown	Gley 1 N7		Light gray			
10YR 8/2		Very pale brown						
10YR 8/3		Very pale brown						

After initial recording of information for each of the sherds, the owner donated the collection to the Columbia River Maritime Museum in Astoria, Oregon. After the initial data were collected, I went back and was able to lay out the entire collection to better sort and classify the specimens (Figure 10). During the sorting of the sherds into groups at the museum, I focused on paste color, exterior and interior margin paste color, paste texture/vitreousness, glaze color, inclusion size, and color. While recording the groups, I documented the general size of the inclusions and voids in my notes as very fine to medium based on the granular and crumb structure size in the 2009 Munsell soil color chart, and the percentages based on the comparison chart for particle sizes in cross

sections in Rice (2015). The sherds were laid out and separated based on the categories above with attention to how the glaze, margins, and core paste were similar or related. Some of the sherds had hard stops (varying in width) between the margins while other sherds provided a gradient between the margins and the core paste colors.



Figure 10. Some of the ceramic sherds laid out during review at the Columbia River Maritime Museum

From the larger color categories, when able to discern specific characteristics such as differences in inclusions, vitreousness, glaze, and margins, the sherds were separated into types under each of the paste hues. It is noted that attributes can vary across large vessels depending on how the heat is applied and if there are glazes, but for the purpose

of sorting the sherds these were the main attributes considered. The sherds too eroded to determine which type they belonged to were labeled as too eroded (TE). While not severely eroded, some of the moderately eroded sherds had very similar characteristics of the multiple of the smaller types I am making, and the choice was made to label them as unknown type in order to prevent incorrect grouping of the sherds. Since there are so many sherds in the collection, one to three sherds from each of the proposed types were chosen to be used as the primary example for explaining the type. Explanation of the different types, their properties, and images are detailed in Appendix B.

4 Chapter 4: Results of the Dubé Collection Analysis

In this chapter I summarize the results of my archival research, fieldwork, lab analysis, and comparison to other wreck data. I specifically discuss the results of the collection analysis, the difficulties encountered during the analysis, and the observations relating to the origin location, erosion degrees, paste types, and decoration. This chapter focuses on the historic artifacts in the Dubé Collection and their properties.

4.1 Identification of Attributes

The majority of the sherds were collected from Oswald West State Park, numbering 615 sherds; Nehalem Bay, numbering 12 sherds; and Nehalem Spit/Manzanita Beach, numbering two sherds. Of the total 628 Dubé Collection plus the one discovered by Mr. Cromwell, 617 were positively identified as stoneware or earthenware, having evidence of firing or obvious human shaping. The remaining ten sherds were listed as "suspect". One of the suspect sherds was identified as a modern piece of ironstone (JF 627) which looked like the rim of a crockpot or mechanically manufactured piece of stoneware that had been molded with sharp corners on the rims. In addition to the one modern sherd, there were at least nine sherds that could not be distinguished as highly eroded pieces of earthenware or if they were rocks.

One of the biggest obstacles while conducting the analysis was the deteriorated condition of many of the sherds and determining when to lump or separate into types. Secondary processing discussed in the methods section above, and dividing of the various Munsell colors based on the core paste color, allowed for broader generalizations to be made about the sherds. Another issue encountered was the general overall makeup of many of the stoneware or earthenware vessels, since treatments or color were not applied

evenly to a single object, and where the sherd originated on the vessel could impact the color.

4.1.1 Color and Erosion

By far the most dominant type of sherds in the collection are the dark reds/brownish red (N= 290), followed closely by the reds (N=272). After those two main categories the variation in the number of other paste colors significantly drops with buff (N=25) accounting for the third largest number followed by gray (N=15), pink (N=10), and lastly brown or terracotta color was the least (N=5) (Figure 11).

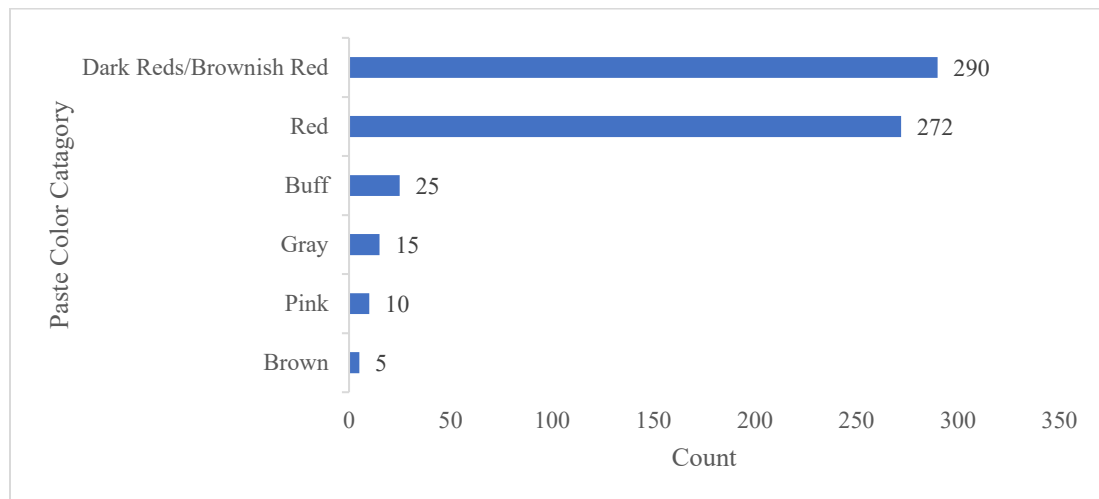


Figure 11. Results of paste hue

The degree of erosion varies over the entire population but is generally similar by provenience. Nehalem Bay produced sherds that had mostly clean breaks with no visible erosion or those that are just starting to show some erosion. None of the sherds collected from Nehalem Bay were classified as being moderately eroded or severely eroded. The sherds from Oswald West State Park display a very different pattern of erosion. The greatest number of sherds from Oswald West State Park are in the moderately to severely eroded class due to the highly active tidal zone where they were found. While the sample

size of the stoneware and earthenware for the Nehalem Spit/Manzanita Beach and Nehalem Bay is small. the current study reflects the erosion findings in Lally's (2008) study of the porcelain. The lack of erosion within the sherds from Nehalem Bay suggests they were broken up and deposited during a single high energy event such as the tsunami from the Cascadia Event whereas the sherds from Oswald West State Park suggest a more continuous release of sherds from the wreck site and impacts from the high energy environment in the area. The energy required to carry large to medium size sherds would suggest part of the ship's cargo is located off the Oswald West State Park. The degree of erosion is further reflected in larger categories of paste colors which is reflective the firing levels of the stoneware and earthenware for each of the colors (Table 4). For example, the buff, gray, and dark red contain the highest concentration of ceramics that would be considered stoneware (high fired), and similarly they comprise a higher percentage of sherds that do not exhibit very eroded sherds as those in the reds, pinks, and brown categories.

Table 4. Comparison of breakage type and degree of erosion exhibited by sherds from Oswald West State Park, Nehalem Bay, and Manzanita Beach/Nehalem Spit.

Base Paste Color	Manzanita Beach/Spit	Nehalem Bay		Oswald West State Park			
	Moderately Eroded	Clean Break	Slightly Eroded	Clean Break	Slightly Eroded	Moderately Eroded	Highly Eroded
Gray					7	6	2
Buff				1	13	9	2
Brown				1		1	3
Pink					1	4	5
Red	2	1	2		11	127	129
Dark Reds/ Brownish Red		9			45	178	58

Interestingly, none of the sherds showed accumulation of marine life. At most a few sherds had some encrusted salt deposits, but unlike the condition of the vessels

brought up from the *San Diego* the sherds from the Beeswax wreck are surprisingly “clean”, even if they are eroded. While Oregon’s coastal environment is extremely different from that of the Philippines or Marianas Islands, where the two prior excavations of galleons has occurred, the lack of sea life accretion on the stoneware and earthenware, as well as the porcelain, is interesting. The seafloor off Oswald West State Park, where most of the sherds derive, is highly turbulent, but during my dives in the area with the Beeswax Wreck group the seafloor is at times covered in sand dollars, a species of flat, burrowing sea urchin, and other sea life. But, in other areas there is only sand and few outcroppings with little marine life. Marine life, such as mollusks or Coralline algae, clings to the rocky areas or when there is something to grab on to. In 2014 during one of the dives at Smugglers Cove in Oswald West State Park, the accumulation of marine growth prevented divers from conducting a detailed inspection of a ship’s hull. During a later dive, it was determined to likely be a reasonably large part of the *Glenesslin*’s stern (William and Marken 2019). Unlike porcelains, the stoneware and earthenware allow for sea life to attach themselves to it, especially if it has been in the environment for over three centuries. Even with the erosion from the tidal environment, if the sherds are moderately eroded or less it would be reasonable to expect to see some sea life attached. This likely means the sherds are buried and swept up into the tidal zone soon after they detached or were exposed. If the iron hull found at Smugglers Cove is in fact the *Glenesslin*, which would have moved a mile north of where it sank a little over hundred years prior to the current discovery, it speaks to the turbulence in the area (Williams and Marken 2019). Another possible reason for lack of marine life on the sherds is that those that are encrusted are not recognized as such and therefore not collected.

Sherd type was identifiable on 63% of the Dubé Collection. From the analysis, the part locations from the vessels for the reds and dark red/brownish reds were very similar, with the darker paste making up a larger number of body sherds (see Table 5). Concerning the entirety of the Dubé Collection, body sherds are by far the most common, comprising 60% of the identifiable sherds.

Table 5. Sherd location types based on their location and color category

Fragment Type	Manzanita Beach	Nehalem Bay		Oswald West State Park						Totals	
	Red	Dark Reddish Brown	Red	Brown	Buff	Dark Reddish Brown	Gray	Pink	Red	No	%
Base						1		1	3	5	0.8
Neck						1			1	2	0.3
Rim		1				4			4	9	1.4
Body	2	8	3	2	20	199	14		128	376	61
Unknown				3	5	76	1	9	131	225	36

Aside from the unknown category, the sherds types of red and the dark red/reddish brown were similar in their appearance. Unfortunately, due to the small sample size of sherds from Nehalem Bay and Manzanita Beach, it is difficult to detect patterns between the different locations.

4.1.2 Paste Texture, Vitrification, and Margins

The numerical codes in the Munsell for the chroma and value provide hints at the amount of free carbon present in the sherds and provides an approximation with respect to the firing time, temperature, and atmosphere. The presence of dark gray (low chroma and value) can indicate the incomplete oxidation from an atmosphere with either insufficient oxygen or a short period and/or low temperatures of firing. Higher value and chroma indicate greater oxidation or less organic matter in the original clay or both. Additionally, the percentage of iron compounds in the clay when fired will present

differently, such as fired clay with iron oxides in amounts of 1% will contribute a yellowish tone to the fired clay, 1.5–3% will cause light brown or orange, and 3% or more will appear red (Rice 2015). When iron compounds are exposed to higher temperatures they can act as a flux, especially when they are fine particulate or are exposed to a reducing or incompletely oxidizing atmosphere. This will result in a red color paste, possibly changing from red to brown to blackish as the formation of a glassy phase occurs (Rice 2015). These changes in color provide some indication about the firing methods of the pastes and the resulting paste texture.

Within the study the observed paste texture was impacted partly by the erosion of the sherds and notes were made during the study about the vitrification process, since many of the moderately coarse sherds did not have recent breaks to the interior (Table 6). The textures do have some correlation to the erosion type (further discussed in the ceramic color citatory below) but are also based on the inclusions and voids.

Table 6. Observed paste texture based on color category

Base Paste Color	Fine	Moderately Fine	Moderately Coarse	Coarse
Brown	2			3
Buff	5	19	1	
Gray		12	3	
Pink		1	2	7
Dark Reds/Brownish Red		14	212	64
Red		2	84	186

Throughout the sherd collection, it is apparent there are different levels in which the paste and inclusions have melded together in the vitrification process. Within the red and dark red/reddish brown categories the fabric of the sherds varies but the melting of the inclusion particles appears in a majority of the sherds. Based on appearance and

groupings of the sherds in the dark red/reddish brown category, it appears approximately 75.5% have started to form glass within the paste fabric. As shown below the broader color category has a range of mineral inclusions with distinct, un-melted grain boundaries whereas others appear more evolved, with larger areas of glass and indistinct boundaries between mineral inclusion (Figure 12). Both the buff and the gray pastes have vitrified to create strong walls without visible granular boundaries between the inclusions.

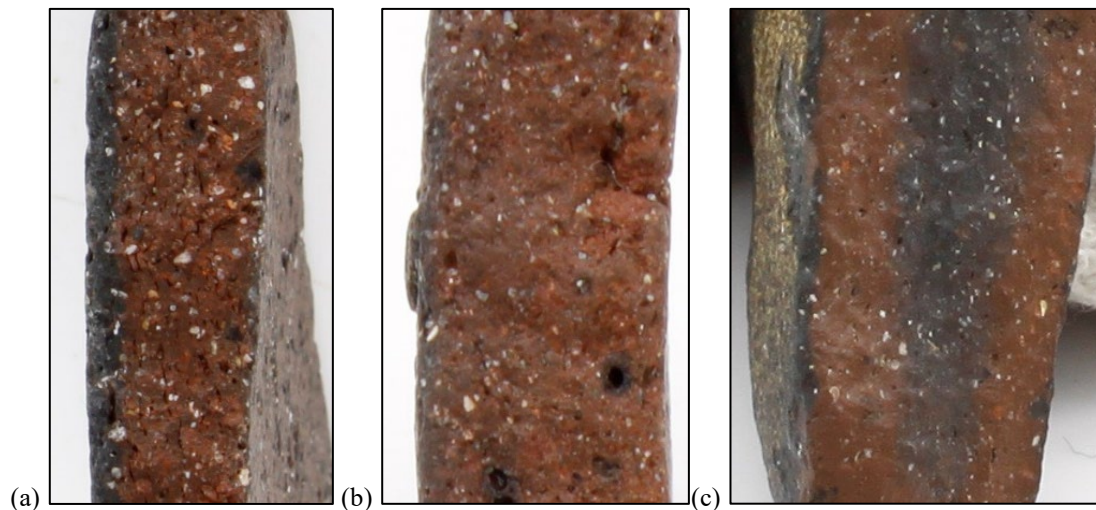


Figure 12. Example of the stoneware paste fabric within various sherds of the dark red/reddish brown category, all are from recent break locations. (a) shows the beginnings of the melting between the fabrics but the granules are clearly visible (JF 275), (b) shows less distinct boundaries between the mineral. (c) shows a complete melting of the granules and the paste.

Due to the erosion and without a slightly fresh break to the shreds, it can be difficult to determine the sherds true vitrification levels. Sherd JF248 provided some insight into how the erosion over time affects the displayed vitreousness of a sherd. The sherd was found shortly after it had broken into three pieces, allowing for the interior to be differentially affected by wave and sand erosion. The exterior areas affected by erosion look worn and moderately coarse with additional voids present on the interior

than may have originally been present. But, in the area where the breaks occurred the sherd is compact and clay particles have fused (Figure 13).

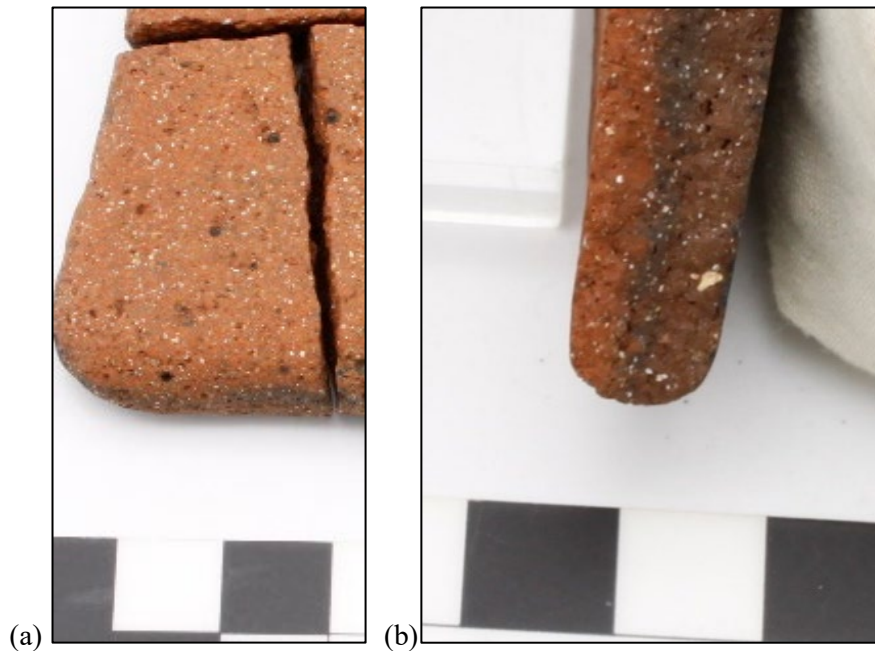


Figure 13. Example of JF248 showing the erosion levels, (a) the exterior looks rough and grainy but (b) the interior is has almost fused during the firing process.

The sherds can typically be sorted into three types based on the presence of the interior and/or exterior margins that are visible when looking at the cross sections of the sherds. Unlike the refined Chinese porcelains, the stoneware as well as the earthenware sherds' cross sections provide additional information about the firing techniques and pastes contributed to which type they were categorized into (Figure 14). On some of the sherds the margins were non-existent and did not display any difference between the core paste and the interior or exterior paste. The second type of margin commonly noted was a gradual change, from the exterior of the paste towards the interior. At times there were three distinct levels of the margins which were displayed from the exterior to the core, and then the interior. Generally, the exterior margin is gray or black in color from the

chemical reaction during firing. The third margin type is the external and/or internal margin, which is a distinct change from the core. At times it was difficult to determine if the dark gray or black exterior was actually a thick glaze, like an iron glaze, or part of the margins that resulted from the firing conditions. Sometimes fragments of a secondary glossy glaze were still visible on the sherds and that would be counted as the glaze. Generally, if the margin's paste has similar inclusions to the core of the sherd it was counted as a margin, and if the paste differed or was glossy it would be counted as a glaze.



Figure 14. Margin types: (a) showing no distinct margins between the core (JF60); (b) margins fade into the core under the dark gray glaze (JF22 or JF319); (c) core and margins have distinct line between them (JF111).

4.2 Ceramics

Chapter five will connect the ceramics identified in this study and how they relate to prior archaeological studies and their findings. The types created here do not relate to those created by Rinaldi (1996) for the *Concepción* or those by Grave and Maccheroni (2009) as the majority of the ceramic sherds are not large enough or are too eroded to discern the vessels' form and no chemical analysis of the sherds was performed during this study; both of which are necessary to categorize artifacts in those typologies. Recently Schlegheck (2021) examined stoneware fragments from the Baja California

Manila galleon; while he did not break down the ceramics into types beyond the larger paste color, he discusses the paste categories more broadly as I do below. Additionally, Grave and Maccheroni (2009) do not actually describe the pastes of the vessels. While the descriptions of the pastes in the studies are sometimes included, they are at very high levels, as in “The clay is either gray or buff and contains many black impurities” or “The color of the clay is very dark reddish gray, with many black impurities, and shows a high degree of vitrification” (Rinaldi 1996:437, 441). While the pandemic prevented a lot of in-person access, online resources such as Grave’s data on the stoneware jars on Open Context and imagery of Asian stoneware vessels in the Smithsonian’s National Museum of Asian Art collection proved to be extremely helpful in connecting attributes from provenanced jar fragments or jars to some of the characteristics seen in the sherds from the Oregon Coast. As previously stated, Grave and Maccheroni (2009) do not describe the pastes but the imagery on Open Context allowed for color visuals of the jars that were discussed in Rinaldi’s (1996) analysis of the jars from *Concepción*.

4.2.1 Dark Reds/Brownish Red

By far the most dominant type of material in the stoneware and earthenware assemblage is the dark red-paste wares, accounting for 47% of the collection. Of the 290 sherds within the category, 78 (27%) were not able to be determined if they fit into a smaller subtype largely due to erosional issues. The remaining sherds in this color category resulted in 38 different types based on visual analysis of the paste, inclusions, vitreousness, glaze, and margins while considering the variations within the complete jars and erosional status of the sherds (Figure 15). It is possible that some of the variations

overlap but are located on different sections of the vessel and have slightly different attributes.

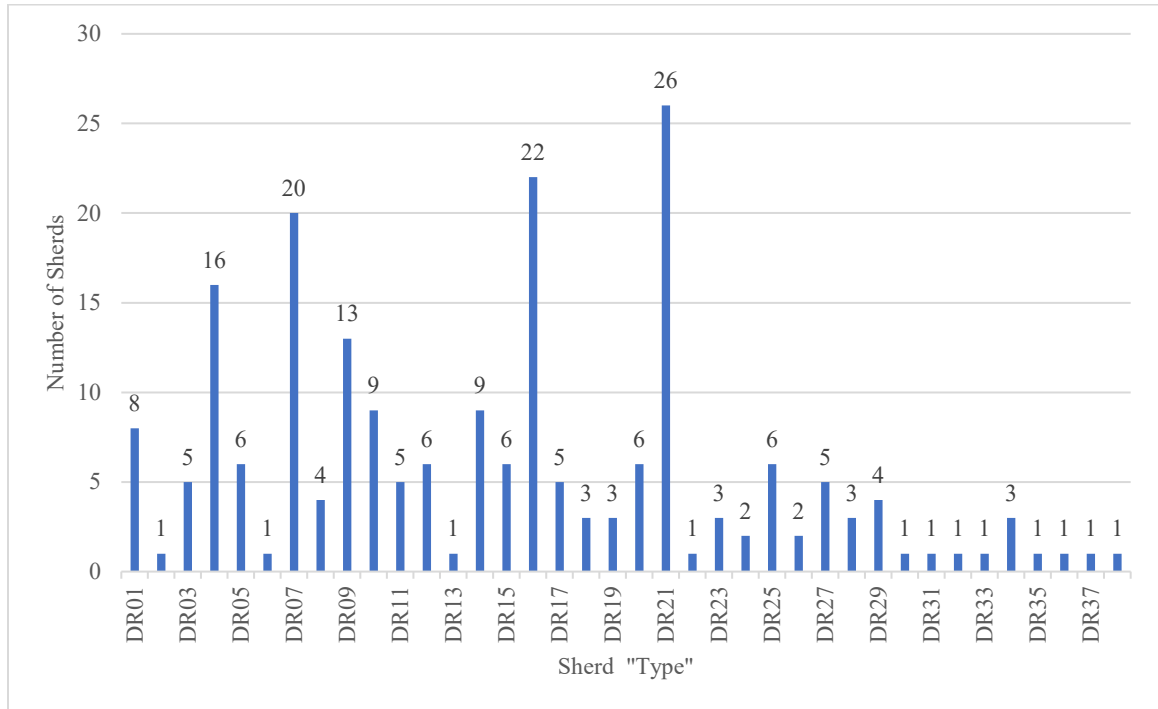


Figure 15. Number of sherds within each of the types within the dark red/reddish brown, does not include those that were unknown or too eroded.

This paste color is a range of dusty reds to reddish browns to weak reds (Table 3).

All of the pastes in this category had both dark and lighter inclusions but the degree to which each of them was present varied between the different types. All the white and lighter inclusions in the paste tend to be very fine (less than 1mm) well sorted sands such as feldspars or quartzites and some crushed organic materials that could be considered fine (1–2 mm) in size. The variation in inclusions came from the dark particles which were likely a combination of sands as well as organics which sometimes left voids in the ceramics when they burned out, especially in the lower quantity stoneware. Within some of the sherds fired at a higher temperature, the voids are glassy from where the organic materials have burned away leaving a glass-like void in the sherd, or where glaze has

seeped into the void while it was being fired. This category of paste had all three types of margins discussed above. There were no fine sherds within the dark red paste category but 14 were moderately fine (5%), 212 were moderately coarse (73%) and 64 were coarse (22%) (Table 6).

Of the 290 sherds identified in this category, 219 (75.5%) could be considered high fired stoneware showing some level of sintering/vitreousness. The level of erosion made determining whether the sherd was considered high fired or low fired difficult at times, but through the creation of categorized types and the ability to see clean breaks and a vitreous interior on some of the moderately to severely eroded sherds, it allowed for the determination of the ware type to be stoneware.

Due to centuries of exposure to wind, waves, and the salts in the beach sands, the glaze on a majority of the sherds is in various states of preservation but is generally best preserved in pieces near the neck, in grooves, or in pieces that were likely found soon after they had washed ashore. In these sherds it was impossible to determine the glazing technique for the jars; whether they were part of jars that were dipped in glaze one half to two thirds down the side of the jar, or if the entire jar or ceramic had been completely dipped in glaze. At these thick locations, or on those that were slightly to moderately eroded, the glaze is dark grayish brown (5YR 4/1, 5YR 3/2) to dark reddish brown (2.5YR 3/2, 2.5YR 4/3, 5YR 4/2, 5YR 4/3) to black. Some of the interior sherds had a reddish-brown slip glaze that tended to be lighter in color than the core paste. For example, the core paste may have been a weak red (2.5YR 4/2) but the thin interior glaze presented as a brighter reddish brown (2.5YR 4/4) by comparison. These glazes tend to

be more of a slip glaze as they were not glossy but presented a seal for the interior. There are sherds that exhibit a secondary glaze where it is thinly applied (can be on exterior or interior or both), it has degraded to light brown to yellow green to pale yellow (2.5YR 4/2 and 2.5Y 6/4). There is a large presence of unglazed sherds in the collection which have some color distortion on the interior and exterior from firing, or they have a secondary ash glaze from the kilns.

The single base fragment that can yield an estimated base diameter is 12 cm. Of the five rim fragments, only one is large enough to get an accurate estimate of the internal diameter comprising 22.5% of the rim; the three others only present about 7.5% of the total rim. Sherd JF 629 (VC) is the largest and most complete of all the sherds in the collection and it has an internal rim diameter of 7.5–8 cm. While the other three sherds only present about 7.5% of the total diameter, two suggest they have an internal rim diameter of about 9 cm (JF33 and JF66) and one (JF537) suggests an internal rim diameter of 11 cm. Below are profiles of the rim fragments from the dark red category (Figure 16). Profiles of sherds JF33 and JF537 suggest a shorter necked vessel, whereas JF629 (VC) is slightly longer neck before moving to the shoulder.

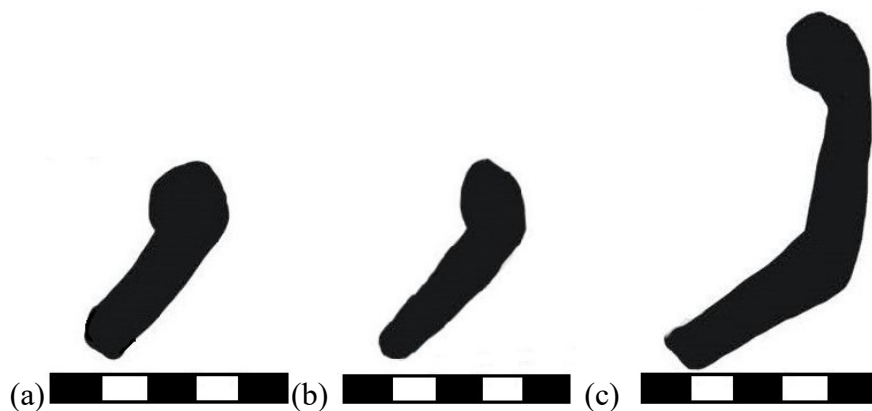


Figure 16. Profiles of the rim fragments for jars fragments (a). JF33, (b) JF537, and (c) JF629 (VC). Scale is in centimeters.

The dark red/brownish red stoneware sherd counts for all but one of the clean breaks found at Nehalem Bay. All were identified as stoneware. Eight out of the nine sherds were determined to be part of the body based on the curvature and lack of other distinguishing properties. The average maximum thickness of the wall sherds was 10.19 mm and average minimum thickness was 8.78 mm. The final sherd identified at Nehalem Bay as a clean break is a large rim and shoulder sherd. Of the stoneware sherds identified from Nehalem Bay, four had glazes visibly present with one having a natural ash glaze and five were unglazed, though one had specks of a natural ash glaze.

Of the 281 sherds identified from Oswald West State Park, 210 were determined to be stoneware, while 71 of them remained undetermined. None of the sherds in the category appeared to be earthenware. Excluding the severely eroded sherds, the average maximum thickness of the body sherds was 10.65 mm and average minimum thickness was 9.13 mm.

4.2.2 Red

The red-paste sherds are the second largest sample in the assemblage, accounting for 43% of the sherds. Of the 272 sherds within the category, 123 (45%) were not able to be determined if they fit into a smaller subtype largely due to erosional issues (Figure 17). The remaining sherds were sorted into 19 different types based on a visual analysis of the paste, inclusions, vitreousness, glaze, and margins, while considering the erosional status of the sherds. While some of the sherds had similar pastes, margins, and inclusions, the extent to which the sherds had eroded sometimes caused parts to be worn down yet still slightly visible.

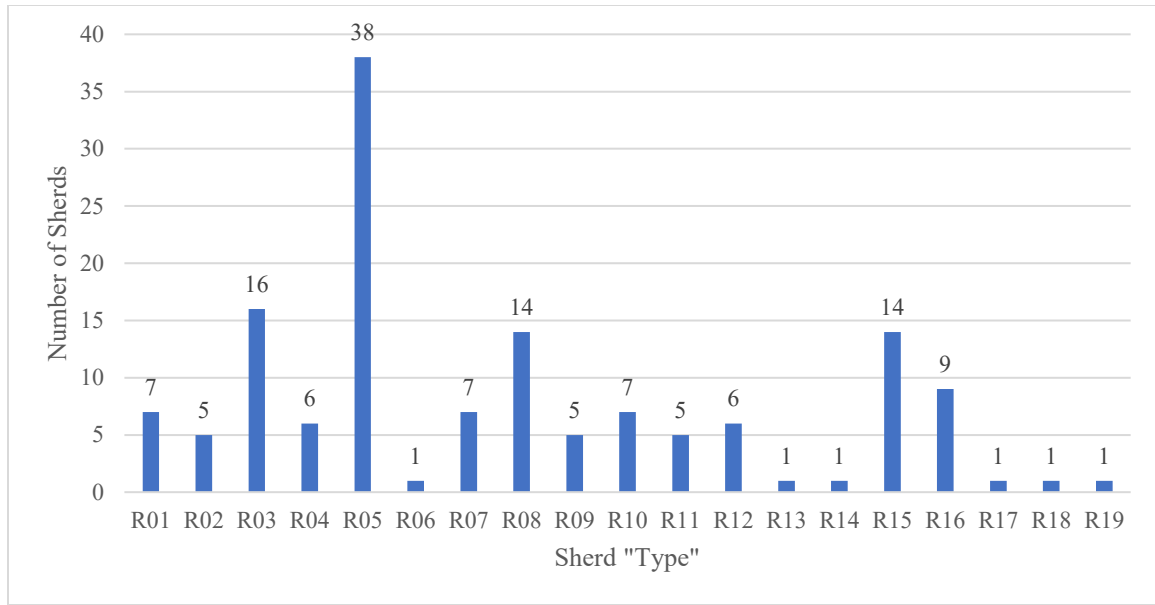


Figure 17. Number of sherds within each of the types of the red category, does not include those that were unknown or too eroded

This paste hue is a range of reds to yellowish red (Table 3). This category of paste had all three types of margins discussed above. The majority of the pastes have both dark and light inclusions, with the exception of three types. One type (R13) has no visible inclusions whereas the other two types of sherds (DR15 and DR16) had a much higher percentage of dark inclusions, causing the paste to look darker than it is. All the white and lighter inclusions in the paste tend to be very fine (less than 1 mm) well sorted sands such as feldspars or quartzites and some crushed organic materials that could be considered fine (1–2 mm) in size. While the red sherds contain a much higher rate of medium (2–5 mm) dark inclusions, there is still an extensive range in size of the inclusions exhibited throughout the different types of red sherds. During the secondary sorting of types at the Columbia River Maritime Museum, it was noted that voids within the reds occur at a much higher rate within the red sherds and tend to be fine to medium in size (1–5 mm) throughout 5-10% of sherd. Only two sherds in the red paste could be described as having moderately fine paste (0.7%), 84 were moderately coarse (31%) and

186 were coarse (68.3%). This is also reflected in the erosion conditions exhibited in the red pastes, with only one clean break and 13 slightly eroded sherds experiencing clean breaks, the remaining could be split evenly between experiencing moderate erosion (N=129) and severe erosion (N=129).

Of the four rim fragments, two present approximately 10% of the rims and one 7.5% of the rim. The last rim sherd is too small to make any estimates. The two larger sherds suggest an internal rim diameter of 6 cm (JF323) and internal rim diameter of 10 centimeters (JF363). The third suggests an internal rim diameter of 9 cm (JF429). Below are profiles of the rim fragments from the red category (Figure 18)

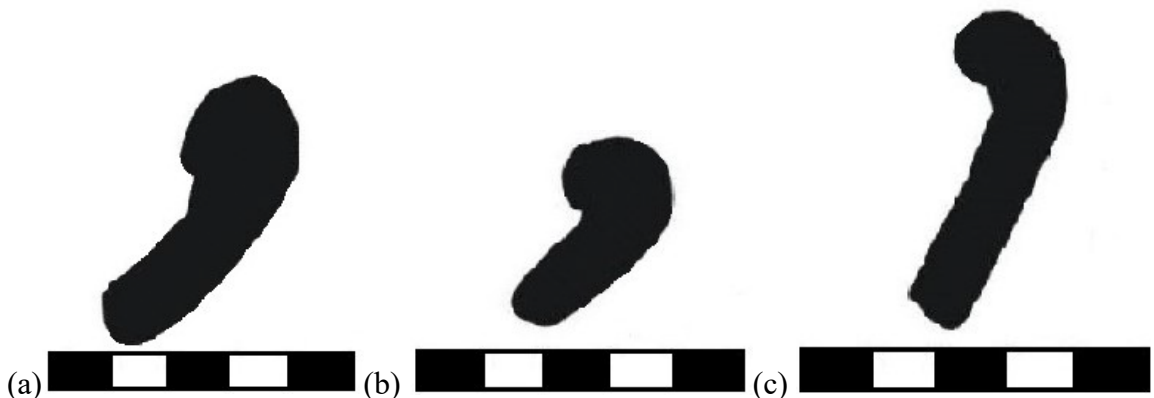


Figure 18. Profiles of the rim fragments for jars fragments (a) JF363, (b) JF323, and (c) JF429. Scale is in centimeters.

The two red sherds from Nehalem Bay are both slightly eroded unglazed stoneware body sherds. Both are very different in terms of thickness, with one having a maximum thickness of 15.45 mm and minimum thickness of 10.41 mm. The other sherd had a maximum wall thickness of 7.96 mm and a minimum wall thickness of 7.64 mm. The two sherds from Manzanita Beach were both unglazed and moderately eroded, making it difficult to determine if the sherds were low quality stoneware. It is more likely that they are a high-quality earthenware that have experienced some erosion,

similar to the Oswald West State Park sherds. Both are very different in terms of thickness, with one having a maximum thickness of 13.14 mm and minimum thickness of 9.97 mm. The other sherd had a maximum wall thickness of 7.70 mm and a minimum wall thickness of 6.19 mm.

Of the 267 sherds identified from Oswald West State Park, only 28 could be identified as stoneware, 49 were earthenware, while the majority (195) of them remained undetermined. It is likely most of them are either earthenware or low-quality stoneware but due to erosion and the lack of clean breaks making a firm determination was difficult. Additionally, some of the highly coarse sherds were extremely strong and durable and it was ultimately decided to mark them as undetermined for if they were stoneware or earthenware for this analysis. Excluding the sherds determined to be highly eroded, the average maximum thickness of the body sherds was 10.31 mm and average minimum thickness was 8.93 mm. Of the stoneware sherds identified from Oswald West State Park, 31 had glazes, either speckled or a full glaze over the sherd, and three were unglazed, where the exterior of the sherd had changed color during firing.

4.2.3 Buff

The buff paste sherds account for 25 (4%) sherds within the assemblage and all originate from within the tidal zone of Oswald West State Park. Of the 25 sherds within the category, five (20%) were not able to be determined if they fit into a smaller subtype largely due to erosional issues. The remaining sherds were sorted into eight different types based on a visual analysis (Figure 19). This paste hue is a range of white, pale brown, to very pale brown (Table 3). All the sherds in this category are considered stoneware, although there are three which appear to be a lower quality of stoneware

possibly due to erosion. All except for one of the sherds were identified as part of the body of a vessel based on the curvature; the single unknown is due to the fragment being too small to determine if there was any curvature visible.

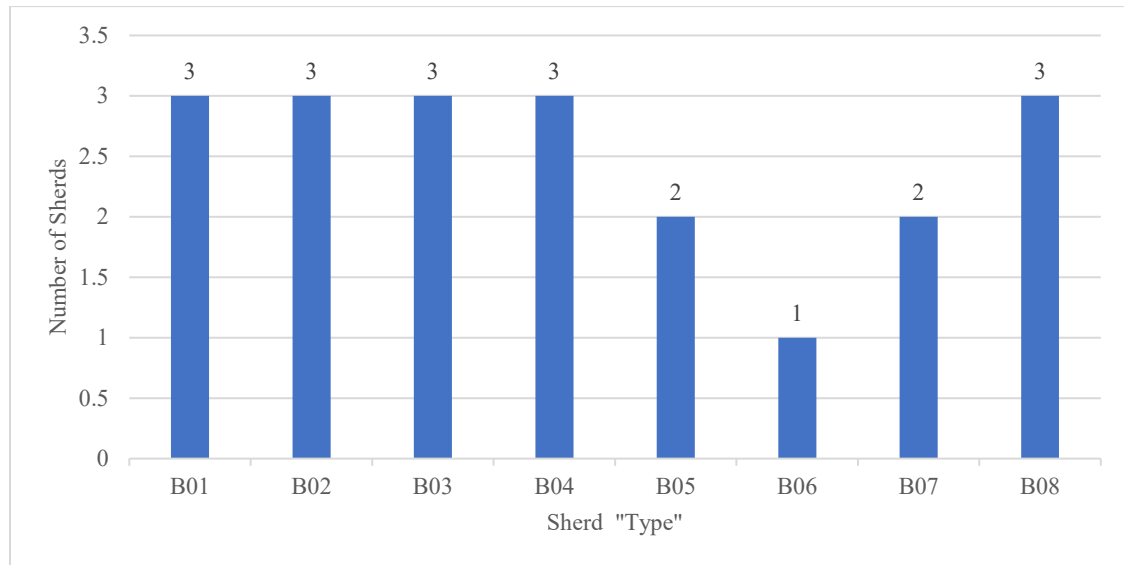


Figure 19. Number of sherds within each of the types of the buff category, does not include those that were unknown or too eroded.

All the sherds have the external glazes intact but with varying degrees of erosion. The exterior glazes consist of either a black to very dark gray glaze, an olive-yellowish brown, or reddish brown or brown glaze. All but four of the sherds had an interior glaze with the majority either olive-yellowish brown, reddish brown, or brown glaze. One sherd had black glaze on both the interior and exterior but was the only one of its kind and is fairly eroded. The other four sherds without the interior glazes were highly eroded, which may account for the lack of interior glaze. Depending on the type of sherd the paste ranges from white to very pale brown to pale brown (Table 3). Two of the sherds (Types B03 and B06) have the paste color spit through the core, with the exterior a gray granite-like texture and the interior a pale or very pale brown granite-like appearance.

Based on the paste and exterior glaze coloration, Type B02 is possibly fragments of Chinese Powder Jars similar to those found on the *San Diego* (Dupoizat 1996). The pale brown color paste and the whitish-gray glaze on both the interior and exterior of the sherds are similar to images of the powder jars shown in Dupoizat's (1996: 227) discussion of types of jars recovered from the *San Diego*. More likely they are part of a smaller ceramic vessel such as a dish or small decorative container, which was common during the time period. Type B01 is similar in the glaze color but the paste has higher amounts of dark inclusions, whereas Type B02 has no dark inclusions visible. This type was the only one within the buff category that had a noticeable decoration, and it is discussed further in Section 4.3.

4.2.4 Gray

The gray paste sherds account for 15 (2.4%) sherds within the assemblage. All the sherds in this category were determined to be stoneware based on the stages of sintering or vitrification. Of the 15 only two (13%) of the sherds were unable to be placed into a type due to their high level of erosion (Figure 20). The paste hue for this category ranges on the Munsell soils chart from gray to light gray (Table 3). All of the sherds were identified within the tidal zone of Oswald West State Park. With the exception of one sherd, which was unknown, all the sherds were identified as being part of the body of the vessel (14). One of the body sherds appears to be the location of a joint where the two parts of the jar were joined together during the manufacturing process. Based on the paste color(s), margins, glazes, and inclusions the sherds were sorted into six different types.

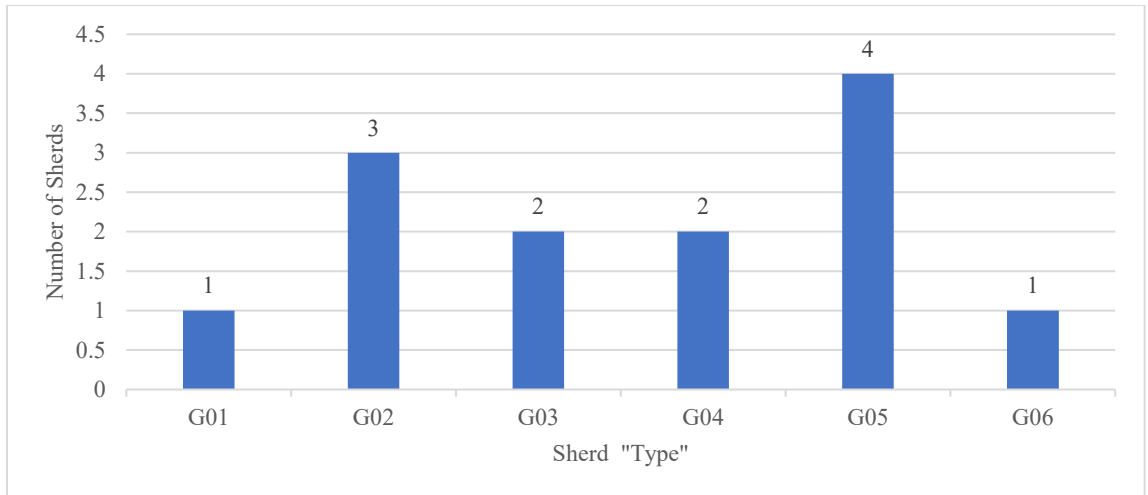


Figure 20. Number of sherds within each of the types of the gray category, does not include those that were unknown or too eroded.

The majority of the sherds exhibit both exterior and interior glazes, but the level of degradation varies. Except for two highly eroded sherds, all the sherds have exterior glazes consisting of either a black to very dark gray glaze, an olive-yellowish brown, or reddish brown or brown glaze. The interior glazes are either the olive-yellowish brown, or reddish brown or brown glaze but there are none with the black to very dark gray glaze. Type G04 shows evidence of the exterior runny dip glaze that usually covered only the upper portion of the jars while leaving some areas exposed and the base unglazed, which is a notable characteristic of the large storage jars from East and Southeast Asia (Figure 21).



Figure 21. Black glazed stoneware. Runny glaze associated with large storage jars from Asia (JF386)

This category contains one of the most aesthetically dramatic decorations in the stoneware collection from the wreck, with the exterior containing the fin and a foot of a dragon (JF09) and to-date is the only one of its type (G01). The design of the dragon jar is discussed further in Section 4.3.

There are three sherds with possible decoration but due to the small size of the sherd or erosion it is difficult to determine if they were a result of the manufacturing process or intentional design choices. Sherd JF391 contains an incised line across the exterior of the sherd but it is not continuous due to the glaze covering part of the line. Initially it was thought it was related to the joint location but the location on the interior of the joint does not match the exterior incised line. Sherd JF436 has an incised line that is 1.33 mm wide and 8.96 mm long but it is cut off on either side by the breakage. The exterior black glaze is degraded but is still filling the existing incised line. On board the *San Diego*, the jars from Thailand (shown as Siam in the book) are described as gray, thick-walled stoneware jars with a series of fine lines under the brown-black glaze to decorate the upper portion of the belly of the jar (Dupoizat 1996), but due to the size of the sherd and limited amount of potential decoration, no conclusions can be made about the origin of the sherd (Figure 22). Finally, sherd JF351 has possible circular dots in the corner (~ 4 mm diameter) similar to the applied clay bead lines on Martaban jars, but due to the unevenness of the glaze it is hard to determine if they are intentional or created during the firing process.



Figure 22. Jar with incised lines across the shoulder from the San Diego (Image courtesy of Gilbert Fournier). And fragment from the Dubé Collection (JF436) with possible line on part of the fragment (arrows pointing)

During my research I found that Sherd JF291 (type G06) has as a grey granite like body with a black exterior and red interior glaze that is visually remarkably similar to one of the ceramic sherds shown on the National Museum of Asian Art (accession number FSC-P-2469). Although the form is not identified, it is listed as originating from Thailand and listed as San Kamphaeng ware from the Lan Na period, 14th to mid-16th century (Smithsonian Institute 2022) (Figure 23). Even though the dates are earlier than that inferred for the Beeswax Wreck, the long-term use of the jars would make the possibility of having a sherd in the group that would date to an earlier time period.





Figure 23. Top Row: Stoneware fragment from Smithsonian Institute National Museum of Asian Art (accession number FSC-P-2469). Bottom Row: Stoneware fragment from Dubé Collection (JF291)

4.2.5 Pinks

The pink paste sherds account for the next largest amount in the assemblage with 10 (1.6%). Of the four types of ceramics identified in this category, the majority of the ceramics were very low quality, coarse earthenware with the exception of Type P04 and P05. The body hue for this category ranges on the Munsell soils chart from pink to light red, reddish brown/reddish yellow, and a pale brown (Table 3).

Type P01 is by far the coarsest of the earthenware in the collection. They are composed of extremely coarse unsorted pastes with large quartzite inclusions and at times some of the sherds were questionable if they were actually earthenware or if they were a type of eroded sedimentary conglomerate. They remained in the study due to some of the sherds having discolorations on the margins from firing, and the constancy of the sherd's thickness throughout the sherd. Additionally, some sherds within the dark red grouping (Type DR15) have a similar paste composition of extremely coarse paste with large inclusions, most of which have margins on both sides, have a glaze present, and one of which appears to be a rim piece. None of the archaeological reports reviewed discuss any of this category within known sites.

4.2.6 Brown (Terracotta)

The brown paste sherds are the least common sherd found in the assemblage, with only five sherds in this category (1% of the assemblage). Of those five sherds, only two could be identified positively based on the type of ceramic. The other three sherds are very coarse and porous and too eroded or questionable to be able to positively place them into their own type. All of the sherds were identified within the tidal zone of Oswald West State Park.

The terracotta sherds both consist of a very fine, well-sorted paste and have some level of decoration on them which is further discussed below in the decoration section. Both sherds appear to be smaller vessels based on the strong curvature of the sherd's walls. Sherd JF65 (Type T01) is an unglazed piece with very fine compact brown paste. The exterior color of the sherd is an uneven brown color which likely resulted during firing, whereas the interior has no discoloration. The sherd has an average thickness of 8.18 mm and has clean edges, but one side of the sherd is uneven near the exterior suggesting it may have broken apart along one of the designs which created a weak point for breakage (Figure 24).



Figure 24. Example of the uneven breakage on JF065 near the exterior suggesting it may have broken apart along one of the designs.

Sherd JF618, Type T02, has heavy erosion based on the rounded edges and the deterioration of the finish on the exterior and the near absence on the interior of the sherd. The paste is fine but less compact. The sherd is thicker than the JF65 sherd, with an average thickness of 10.89 mm. None of these sherds have been reported within archaeological sites but based on the design and composition of the earthenware they are likely to not be from the 19th or 20th century.

4.3 Decoration

Only five of the sherds displayed some type of decoration and these were restricted to the buff or terracotta pastes. Although one additional sherd was thought to have an incised line design element, secondary examination concluded the line is likely part of the seam where the two sections of the jar were connected, and glaze collected in the area. All the sherds with some type of decoration or marking were collected from Oswald West State Park. Of the two terracotta sherds, sherd JF65 has an incised design cut into the surface of the clay (Figure 25a). The sherd has not experienced much erosion and was likely found shortly after the breakage. The second sherd, JF618, has experienced more erosion. The interior and exterior have black coloring present and the exterior has what appears to be an almost absent blue triangle on the corner of the sherd. This could be part of a gilded design on a Mexican made European styled pot, similar to what was found on the *San Diego* (de al Torre 1990:254).

The glaze on JF473 consists of a clear glaze and a very light greenish-blue glaze with an incised line through colored glaze on the exterior of the sherd (Figure 25b). The sherds of this type are likely from a decorative bowl, dish, or small vessel based on the

curvature of the sherds. All of the sherds in this type are relatively thick, between 6.13 mm – 10.53 mm, with an average thickness of 8.43 mm.

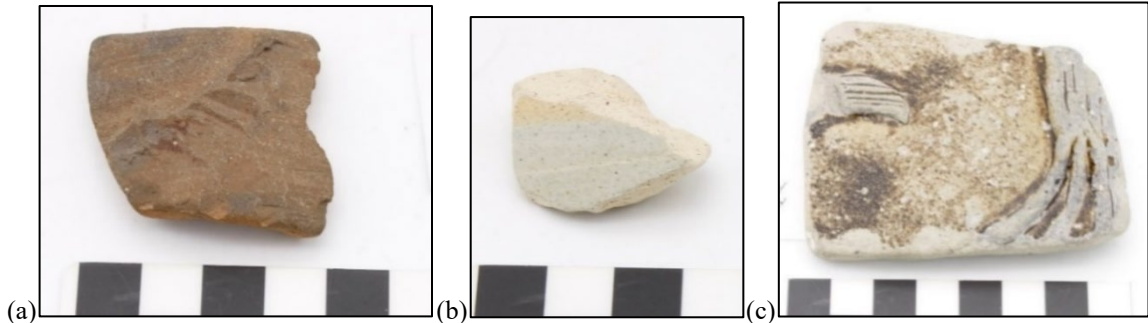


Figure 25. (a) Unglazed stoneware sherd with incised design (JF65); (b) incised line within the glaze (JF473); (c) dragon jar fragment with applied design (JF009). Scale bars are in centimeters

There is a single sherd in the collection that can be identified as coming from a Dragon Jar. The sherd is a light gray paste with an olive to olive-brown glaze on the exterior. The paste contains some relatively fine white inclusions and fewer fine black and brown inclusions. There are very few voids in the paste creating a relatively dense and compact paste. The fragments of the applied motif visible on the sherd show what appears to be the foot with toes rather than claws. And another part of the dragon (Figure 25c). In 2006, Sinopoli, et al. (2006) conducted a study of the Guthe or Philippine Expedition Collection of the University of Michigan Museum of Anthropology (UMMA) to characterize the jars types in the collection. Of the five groups described in the paper, the sherd in the Dubé Collection appears to fit within Tradition 2 as described by Sinopoli et al. (2006) as the paste, glaze, and some of the elements of the decoration, such as the use of feet instead of claws, are extremely similar. An image of the sherd was sent to Dr. Stephen Duppen at Oregon State University who also agreed that the sherd was consistent with Tradition 2. Tradition 2 is present in several shipwreck sites dating between 1400-1600 including the *San Diego* (Sinopoli, et al. 2006). All the dragon jars

from the *San Diego* were identified as belonging to Tradition 2. There is some disagreement from scholars about where the jar originates; Valdes et al. (1992) suggests the jar type is likely from the sixteenth century and derived from the Guangdong region in China. Others such as Harrison (1986) and Brown (2000: plate 22) date the Tradition 2 dragon jars to the Vietnamese Go Sanh kilns in the fifteenth–sixteenth-century (Sinopoli, et al. 2006). In 2014, a follow up study discussing the temporal viability of the jars discusses how the Tradition 2 style likely originated from China instead of Vietnam due to little evidence from the Vietnamese kilns for the primary motifs and plastic handle decorations, even though the rims are similar (Dueppen 2014). None of the earthenware examined suggested the sherds were the Spanish-Manila made terracotta found on previous wrecks.

4.4 Construction methods

While many of the sherds suffer from varying levels of erosion, 62 of the sherds have indicators about how they were constructed. This includes indenting from the joints and smoothing of the coils, striations from the anvils and paddles or from brushing on a slip paste, and indentations from hand smoothing uneven lumpy bodies. The dark red/reddish brown paste has the largest quantity of sherds with these types of marks on them, likely because they are stronger and do not break down as easily in the tidal zone or they were recovered soon after breaking free.

At least three of the shreds exhibited evidence of the joint where two halves of the jars were brought together (Figure 26a-c). The depressions from the joint location can be very pronounced like in the example shown on sherd JF01. Other sherds have a less pronounced joint feature on the exterior that does not create the same deep depression

(JF95). Additionally, 54 of the sherds have evidence of the coiling and smoothing methods on the interior of the sherds that were employed in the jar's creation. The impressions are either from hand smoothing, or from the compression on the coils using the paddle and mallet (Figure 26*e-i*). A few of the sherd's bodies are uneven in thickness but have depressions on them from their construction, which gives the sherds a range in thickness throughout the sherd. In addition to the indents, many of the sherds have striations in the paste from smoothing with an anvil on the interior that are directly into the body of the shreds, whereas some of the brush marks on the sherds appear to be associated with the application of a thin glaze such as in Figure 26*j*. Two of the base fragments, JF244 and JF245, have the wrinkled surface and slightly projecting rim often seen in large jars that utilize the coiling and throwing method due to the potter throwing a flat disk onto the wheel and adding a long coil around the circumference of the disk to create the base (Figure 26*k-l*)(Cort 2000, 112-113).

Finally, although no lug pieces (the handles on the jar) have been identified in the collection, one sherd (JF241) appears to be the location where the lug has broken off and all that remains is an eroded mound of clay attached to the body of the sherd (Figure 26*m*). The mound is 22.91 mm by 16 mm. The presence of the yellow wood ash glaze suggests the sherd is from around the top of the body. Additionally, the glazes' location concentrated to one side of the mound but not on the opposite side suggests that the lug was covering that portion of the body during the firing process.



Figure 26. Construction Methods Row one: (a) Arrow points to the joint on a large stoneware jar from the San Diego; (b) sherd JF001 has the same indent on the exterior of the sherd; (c) The exterior of JF95, has a less pronounced joint than the gray stoneware jar. Row two: (d) and (e) Interior of the sherds show coil lines or finger indents from the potter (JF80) and (JF525); (f) lumpy thickness, internally there are possibly three finger imprints from the making of the pot (JF216). Row three: (h) striations directly into the paste (JF421); (i) striation or bush marks in the paste and as well as the glaze (JF275); (j) The strokes on the sherd appear to be related to the application of the glaze as they are applied in multiple directions (JF246). Row four: (k – l). Rim sherds showing the unevenness of the base of the jar that is associated with the coiling methods used for the construction of large jars (JF244) (JF245); (m). Possibly lute attachment location on the exterior of JF241, outlined in black. (Martaban Jar image Courtesy of Gilbert Fournier 1991)

5 Chapter 5: Discussion of results and recommendations for future research

This chapter discusses the results from the analysis of the ceramics and how the findings relate to prior stoneware and earthenware sherds found in archaeological sites, discusses the issues of identification and interpretation in protohistoric sites, and how they can be used expand future research.

5.1 Discussion of the Stoneware and Earthenware from the Dubé Collection

Without finding the wreck location, this study does not help confirm the identity of the Beeswax Wreck as the *Santo Cristo de Burgos*, but based on my analysis and research, the sherds in the Dubé Collection represent a variety of vessels of various quality of stoneware jars, earthenware containers, and possibly a few smaller vessels such as bowls. Presently, it appears the materials in the Dubé Collection originated from East and Southeast Asia. These conclusions are based on the combination of data collected over the last 15 years including the context in which the sherds are washing ashore with other Asian ceramics and teak, the presence of a dragon jar fragment (likely from China), the fabric of the sherds, and the shape of the few base and rim fragments in the collections. The construction methods visible in some of the sherds is also consistent with the coil, smoothing, and wheel methods utilized historically and presently in East Asia for the large jars commonly found in galleons. Also, multiple sherd fragments in the collection contain evidence of the joint locations where two sections of the jar were brought together during the construction process.

The composition of the stoneware and earthenware in the Dubé Collection is not like later ceramics found at fur trade and 19th and 20th century European American settlement sites. Based on descriptors of Asian stoneware vessels from Brown (2000),

Cort (2017), Duponizat (1996), Kivi (2019), Grave and Maccheroni (2009) and Valdes et al. (1992) as well as using the images of Asian stoneware vessels in the Smithsonian's National Museum of Asian Art collection, visually the composition of the sherds found in the Dubé Collection are all like those from Thailand, China, Vietnam, and possibly from the Philippines. Throughout the study to avoid confirmation bias, I researched the descriptions, compositions, and common identifiers of European and contact period stoneware and earthenware. I used prior archaeological site reports discussing fur trade and other colonial ceramics within the region (Peterson 2008; Cromwell 2021), historic ceramic guides for identification and dating historic European and American wares (Galle et al 2018), online museum repositories (Florida Museum of Natural History 2021; Smithsonian Institute 2021b), as well as personal experience recording ceramics at historic sites determination. The ceramic sherds recorded within the Dubé Collection displayed unique characteristics related the manufacturing and firing technology used to create the large pots, such as the coil and throwing methods, the size and amounts of inclusions, and vitrification levels within the stoneware.

The fabric of the stoneware sherds, especially on those with limited erosion or clean breaks presents a vitreous fabric that has largely fused together around the inclusions to make hard, at times shiny, durable fabric that was essential for the longevity of the storage jars as they were traded throughout Asia and used to transport goods globally. The margins and vitrification within the sherds are reflective of the firing and oxidation regimes from the kiln technology used in Asian countries. The ability to control the temperature within the cross-draft kilns of Asia allowed for controlled firing and oxidation of the vessels, as well as utilization to create multiple types of ceramics

depending on the vessel's location of the kiln. The way the paste vitrifies in these conditions results in a visibly different texture than historic European and American ceramics. The ceramics found at fur trade and 19th century American immigrant sites were generally formed using the wheel throwing methods and the sherds in the Dubé Collection contained more evidence of coil and throwing, consistent with the types of large jars found in galleons and Southeast Asia. While not all utilitarian 19th century ceramics have decoration, both the stoneware and earthenware are often completely glazed or have some type of decorative pattern. Even on those that are not glazed or a combination of both, they were often decorated using die stamped reliefs, sprig molded designs, or engine turning. This is vastly different from the earthenware and stoneware sherds from the Dubé Collection which are often unglazed or partly glazed with a black or brown glaze, and do not have stamped or incised designs throughout the sherds.

Cort and Leffert's (2010) discussion of the maritime use of the container jars from Thailand and the type of construction methods and rim structures are similar to those in the Dubé Collection. The medium sized (5–8 cm long) rim fragments have only around 7.5-10% of the rim. This alone does not confirm that the specific vessels originated in Thailand, since China was also producing similar styles but at least three sherds (JF33, JF323, JF537) are short necked jars like the Type 2 shape produced in the Mao Nai Kilns and utilized on European ships from the late fifteen century until the early 1700s (Cort 2017). They are similar to the profiles with the curled lip of the Chinese jars from the *San Diego* (Valdes 1993) and the profiles of jars from the *Concepción* (Rinaldi 1990). If the Beeswax Wreck is indeed the *Santo Cristo De Burgos*, it would not be surprising if some of the jars originated in the Philippines. Jars tested from the 1600 wreck of the *San Diego*

and the 1638 wreck of the *Concepción* showed an increase in the jars on board likely produced in Manila, though it has not been determined how long the production of the Chinese style of jar was produced in Manila. Visually, at least one of the jars on the *Concepción* (UNE247) that was identified as likely manufactured in Manila has many similar characteristics. The body is a dark gray and dark red with the dark gray areas having fine white tempers visible, which is similar to what is seen in the sherds from the Dubé Collection.

Looking at the current studies of ceramics in relation to prior archaeological studies in the Nehalem, Woodward's (1986) excavations of 35-TI-4 provide the most description related to the stoneware sherds and identifies them as having Asian origins. He described the two gray stoneware sherds found in the midden both as pieces of Martavan jars. Based on his descriptions, they would match something similar to the Types G04 and G05 under the current study. The third sherd he describes is a hard, unglazed brown stoneware of Asian origins made from a coarse paste with sand and melted feldspar granules visible on the surface, and that it is from a large storage jar made through the coiling manufacturing method. As previously stated, Woodward believed the jars to be from Japan or possibly Luzon in the Philippines but was unable to confirm the origins (Woodward 1986). None of the studies I encountered while doing background research had previously identified ceramics that originated from Japan but the largest of the sherds, the rim fragment JF629(VC) strikes a remarkably strong visual similarity to some of the large storage jars produced in Japan with the relatively small lip and longer neck and the very prominent natural ash glaze. Similarly, a few of the stoneware sherds have similar visual characteristics of the Burney Jars produced in the

Philippines prior to the Spaniards arrival, after which much of the traditional pottery production in Luzon stopped, though they were still highly prized by the Japanese (Valdes et al 1992). It is likely the sherds originated from Southeast Asia or China instead of Japan.

While the purpose of this study is largely to give context for the sherds washing ashore from the wreck, it is also to provide useful information as a comparative collection for potential identification of stoneware and earthenware in archaeological contexts. These types of comparative collections are important in that they allow researchers to examine the sherds in various states of deterioration. In archaeology, intact and complete jars are rarely found. Instead, researchers experience the material in fragments of their original forms. The source and condition of the sherds from the collection provides information about the condition in which they are likely to be found in archaeological contexts. Sherds found in the archaeological record or in Nehalem Bay are more likely to have not experienced the same amount of erosion as those found at Oswald West State Park or Manzanita Beach/Nehalem Spit. Though the sherds composed of the dark red/reddish brown, gray, and buff stoneware in general experience less erosion. It is a testament to the strength of the stoneware jars whose fragments continue to wash ashore a few centuries after the wreck. Those found in the archaeological context will likely be more intact (glazes and paste) and not exhibiting the extensive wave and tidal erosion of the sherds found on the beaches.

Even within the context of the more recent endeavors to identify and understand the Beeswax Wreck, the identification and acknowledgement of the presence of

stoneware and earthenware did not really start until the mid-2000s by Mr. Dubé during his interactions with Scott Williams and the rest of the Beeswax Wreck team. The Dubé Collection has brought to light another piece of the puzzle to expand our understanding of the materials within the region's archaeological sites, provide further discussion and comparison in other areas of the Pacific Northwest coast, and to allow for further understanding of the types of ceramics carried on the ship that became the Beeswax Wreck.

5.2 Discussion of Results in Relation to Protohistoric Sites and Theoretical Frameworks Used to Interpret Historic Materials

The theoretical framework within archaeology has evolved in how it impacts interpretations of material objects. We are moving in the direction of approaches that address pluralism and operate at multiple scales of analysis. This discussion is not meant to demean data collected by previous archaeologists as invalid or not important, but attempts to show the limitations of the colonial perspective on the presence of historical artifacts within precontact sites. There are relatively few studies of the impacts of protohistoric contact between Europeans and Native Americans between 1542 and 1778 (Lightfoot and Simmons 1998). Specifically, how the introduction of trade goods from short-term encounters during the period affected Native practices and trade along the Pacific Coast. It is not to say protohistoric contact between Natives and westerners has not been researched to some extent, but that the encounters are often seen through a western colonial perspective, usually using historical documentation (Beal 1983; Kelsey 1985). They rarely address or completely ignore documentation on the practices of and utilization by the Native groups that collected, created, and traded the objects.

Regrettably, due to multiple extenuating factors including the Covid-19 pandemic, I was unable to access the majority of the Nehalem collections for the examination portion of this thesis. Instead, I focused on identifying protohistoric sites with materials related to the Beeswax Wreck, such as porcelain, stoneware; and earthenware, and the issues related to their identification; as well as give scientific uses for the Dubé Collection as a comparative collection. This is meant to start the discussion about the identification issues of historic artifacts in protohistoric sites, and the tendency to associate the earthenware and stoneware to those used by settlers in the late 19th and 20th centuries. This analysis will allow for the identification of other foreign types of sherds in archaeological sites in the future as not related to fur trade. I am not asserting that all ceramics found in precontact sites in the Nehalem area are linked to the Beeswax Wreck but helping to justify further discussion about the potential for Asian ceramics to be located within a precontact sites along the coast and elsewhere in the region, and to examine early Native practice and trade of exotic items.

As the literature review reflects, there are not many large-scale excavation reports on the Oregon Coast that mention early trade goods, specifically from the protohistoric period prior to the fur trade era starting in 1790 (or if they do, it is in passing). In many reports, the historic items are lumped into the general term of “historics”, larger category of historics, or in some cases not mentioned at all. This is largely related to the time period and how the archaeological practice of the 1950s through the early 2000s focused on analysis of traditional material culture or on specific highly diagnostic historical artifacts.

As mentioned in the literature review, in the Nehalem region the blue and white Chinese export porcelains and other materials related to the Beeswax Wreck have been found near Nehalem in at least five archaeological sites. Additionally, the Chinese porcelains connected to the wreck have been identified in sites along the Oregon coast from Netarts Bay to Willapa Bay in Washington, as well as extending up the Columbia River (Beals and Steele 1981; Lally 2008; Nakonechny 2015; Cromwell 2017). The background and literature review of prior archaeological data highlight if not for the secondary studies such as Beals and Steele (1981) or Cromwell (2017), it is possible to completely miss the protohistoric artifacts in the excavation reports, especially in sites not around Nehalem since the materials are not discussed in the original reports or are given only a sentence or two.

Cromwell's (2017) article on fur-trade items in protohistoric sites discussing the ceramics found in Chinookan sites and 19th century fur-trade sites on the Columbia. Cromwell's paper mainly focuses on the proper identification and discussion of the materials origins within the Chinookan sites but leaves it open for further discussion about how they were utilized by Native populations since there are multiple examples which display the materials being modified to suit the needs of the Indigenous population. His paper highlights information on the historic artifacts that was omitted from most of the original excavation reports of the Meier and Cathlapotle sites (Ames 1990; Ames et al. 1992; Ames et al. 1999). The studies used in the background exemplify the historic and prehistoric divide of how these materials are discussed based on the theoretical methods guiding the research. At Cathlapotle (45-CL-1) where the focus was the prehistoric archeology, the historic trade materials resulted in essentially being a foot

note to the larger conversation even when some show modification, whereas Woodward's (1986) theoretical framework at 35-TI-4 was centered around the trade items within the site. Both excavations resulted in the location of hybridized objects in the form of either porcelain projectile points, porcelain scrapers, or other modified sherds. Woodward succeeded in locating materials from the potential wreck in precontact setting but, aside from the mention of the Douglas fir root basket fragment found within the wet portion of 35-TI-4 used for dating, there was relatively no discussion about the precontact artifacts found during the excavation, whereas the excavations at Cathlapotle are focused on the precontact aspect of the site and offer little to no explanation of the trade materials (Woodward 1986:233; Ames et al 1996). Silliman discusses how the presumed engagement and use of a hybrid object in archaeological assemblages dominated by native material culture can become a damning object in the interpretation of a "supposed" precontact site (Silliman 2015:285-286). Though at 35-TI-4, it could be argued the mere presences of historic artifacts within the site were the damning objects, regardless of their hybridity. The associated middens, features, faunal remains, and other precontact materials are ignored by Woodward in his quest to find evidence of the shipwreck within the site. The historic materials and their potential narrative as coming from a Spanish Galleon overshadow the precontact house pits and midden and ignoring what it meant for the people who occupied the site to be essentially adopting the materials from the wreck for their own uses.

The complexity identifying these types of materials is compounded for sites that extend into the historical fur time trade period. Our ability to identify materials related to engagement with a protohistoric wreck requires us to critically examine the context in

which the materials originate within the sites. The intent is that the information collected from this study can be used in the future to identify how Native populations collected and utilized stoneware and earthenware ceramic goods to the same extent as other goods from the wreck, such as porcelain or beeswax. We know from some of the prior work that the items were actively being used and incorporated into daily lives as evident from Woodward's identification of hard, unglazed brown stoneware of Asian origins from the floor of this excavation at house site seven. The fact they are being found on the floor of a house site, instead of middens or outside of the home, indicate the inhabitants were actively engaging with the materials. The appendix in Woodward's report by Cummings (1986) is one of the few archaeological studies that tries to understand how Native people were modifying the porcelains through experimental archaeology and his discussion on how various Asian porcelains found in protohistoric sites from California and Oregon vary in their modification. This brings forward interesting questions to how regionally Native people viewed these materials, but Cumming does not go further into the discussion, only presenting the results of the experimental archaeology. Finally, an article by Erlandson et al (2001) within the book from the *Proceedings of the 4th Coquille Cultural Preservation Conference* is one of the earlier papers I located that specifically asks questions about impacts from the wrecks and Native agency.

Based on the analysis of the sherds in the Dubé Collection and the discussion of stoneware and earthenware by Woodward (1986) as well as in Scheans and others (1989, 1990) it is apparent that the Native people in the area were also utilizing the stoneware and earthenware for more than simply items to collect on the beach. Between the limited descriptions in prior archaeological studies and the examination of the materials in the

Dubé Collection, I expect that the type of stoneware and earthenware the Indigenous populations were collecting in addition to the porcelains were the darker red, gray, or buff sherd. This is due to the sherd's hardness or vitrification level. Most of the sherds I examined did not seem to have properties that would allow for controlled modification, though the hardest stoneware sherds could potentially have some utility uses and could be flaked to some degree. It is possible that the stoneware due to the hardness would be more suitable for tools such as scrapers but not projectile points, whereas the earthenware may more likely be used for decorative purposes. Although, the majority of the stoneware is more aesthetically pleasing than identified earthenware. I hypothesize that the pieces like the dragon jars had a more performative decorative functioned. A large intact sherd with the motifs of a dragon leads to the question of what the Indigenous people would think of the imagery and if it could relate back into their own narratives. While I would suspect sherds with designs may be less likely to be used for utilitarian purposes, the use of the decorative porcelains into projectile points means that the uniqueness of the sherds and determination of what they would be used for still requires further research.

Unfortunately, without examining the collections or doing further testing we will not be able to determine to what extent they were being utilized or to say for certain they are the same type of ceramics in the Dubé Collection, but the likelihood is high.

Fortunately, there appears to be a growing interest in this area of study and questioning of colonial frame of knowledge in relation to protohistoric sites within the Pacific Northwest regions. Untangling starts with acknowledging the issues of prior research resulting from the historic and prehistoric archaeological divide and how what the historical record tells us is often flawed. The material goods selected by Native people to be incorporated into

their lives were likely by trial and error to determine which materials from wrecks as well as from early trade could be used for their needs.

Research at Drakes Bay, California about the artifacts associated with the Spanish galleon the *San Agustín* is reexamining how the materials are discussed in protohistoric sites. At least 16 precontact sites surrounding the Drakes Bay wreck location contained trade goods from the Spanish galleon. Starting in 2008 and still ongoing, the Tamál-Húye Archeological Project is a collaborative effort between the National Park Service, the University of California, Berkeley, and the Federated Indians of Graton Rancheria in northern California. They are working to answer questions about the “intercultural interactions and processes of culture change and continuity in sixteenth-century resulting from the shipwreck of the Manila galleon *San Agustín*” (Russell 2018). The project is moving beyond historical anthropological framework that has framed any contact between natives and Europeans as long-term entanglement to a new perspective revolving around short term encounters (Russel 2011; Silliman 2005). It extends beyond the previous monolithic colonial narrative of the wreck and incorporates traditional knowledge, historical and ethnographic data, and archaeological data to provide a pluralistic narrative to understand multiscale implications the short-term encounters. These studies provide examples for how moving into the future, archaeologists in our region can start to examine the narrative behind historic materials in protohistoric sites as well.

5.3 Recommendations for future work

The sherds assessed during this thesis have been donated to the Columbia River Maritime Museum and will provide a comparative collection for future research. Some

fundamental research questions for future work revolve around whether stoneware or earthenware sherds are in sites that contain shipwreck porcelain sherds. Although the first step in the process is the ability to recognize Asian stoneware and earthenware ceramics in excavations or find them in prior archaeological collections, the reexamining and acknowledgement can provide us wider understandings of use as well as trade. Some suggested research questions or topics for future research are below.

While stoneware and earthenware sherds in prior collections still need to be verified that they are the same we see in the Dubé Collection, based on the context it is reasonably certain to state they are Asian stoneware and earthenware sherds. While data from prior research slightly documents the collection of the Asian stoneware and earthenware, it would be interesting to investigate whether certain types were more prevalent and if it was due to their functionality or aesthetics. When Asian stoneware and/or earthenware are present within the collections, to what extent were Indigenous populations collecting these materials and was there a certain type of ceramics porcelain, stoneware, or earthenware they preferred?

- Ho: Only porcelains were scavenged by Indigenous peoples
- H1: Stoneware and/or earthenware were scavenged to the same extent as the porcelains by Indigenous people
- H2: Stoneware and/or earthenware was scavenged at a higher rate than porcelains

If the stoneware or earthenware shows use wear, is there a certain type of use?

- Ho: The plainware was not being reformed into tools by Indigenous people.
- H1: Only stoneware shows signs of being reworked into tools
- H2: Only earthenware shows signs of being reworked into tools

Regionally, what can the modification to historic trade goods, specially towards the materials related to the Beeswax Wreck, tell us about how people were utilizing them? What can regional variations on modification tell us about how Native groups engaged with materials from the wreck, as suggested by the differences in modification of the porcelains in the archaeological sites in Oregon or those differences between California and Oregon (Cumming 1986).

Unrelated to Native interactions with materials related to the wreck, additional analysis of the sherds could also provide context about the geographic origin of the sherds and add to the larger dataset about stoneware and earthenware from Spanish galleon wreck sites that already have published chemical analysis through XRF or other methods. This would likely provide additional data relating to the origin of the sherds and provide context to the larger dataset, such as the project on Open Context “Element composition of Asian Stoneware Jars from the 9th - 19th centuries C” (Grave 2013; Meniketti 2014). Finally, it is recommended that performing thin section petrography on a selection of the sherds would further illuminate paste and inclusion mineral characteristics. This would be especially helpful due to the erosion issues of the sherds, to determine if there are similar geological characteristics that are being missed from the high-level analysis conducted here. SEM and x-ray mapping of representative samples may be able to determine the pore spaces between the sherds to determine if some of the sherds that appear to be earthenware are in fact stoneware, where the bodies of the jars are adapted from less than optimal and more variable clay sources (Grave and Maccheroni 2009).

5.4 Conclusion

The goals of my thesis were to provide a baseline analysis for the stoneware and earthenware sherds associated with the Beeswax Wreck and provide a typology for the sherds to be able to use as a comparative collection. The findings of the stoneware and earthenware analysis support prior data that the Beeswax Wreck is a Spanish galleon. Based on the analysis, I am confident the sherds from the Dubé Collection are from East or Southeast Asia due to the context in which they are identified, and the composition of the bodies and construction methods of the sherds (especially those that are more intact). While I cannot determine the exact origin of the sherds, based on my research the origin locations for the stoneware and earthenware sherds, they are a combination of China, Thailand, Vietnam, or Burma. I also suspect that some of the sherds originate from Manila, to relieve supply chain issues from the periodic trade ban in China. Unlike Woodward (1986) and Scheans et al (1990), the stoneware and earthenware are from a Manila galleon and not from a Portuguese ship, a Japanese's junk, or depending on the context, related to the historic record. Further work should be completed to identify and compare the chemical and mineral characteristics of the sherds but the work I have completed here lays the foundation for future research.

Additionally, my thesis draws attention to the issues of the arbitrary divide and methodology used when reporting on trade items within Native sites and starts a discussion about how protohistoric interactions may be reflected with the materials from the wreck. The discussion of prior archaeological reporting and excavations is not meant to discredit those works. Instead, I intend to highlight how, as archaeological research moves forward, there is a need to understand that historic artifacts do not always mean

colonial contact and should be interpreted based on the context in which they are found, not based solely on the western's perspective of the historical record. The artifacts from shipwrecks, such as that from the Beeswax Wreck, can be hard to identify in the written archaeological record but can provide an opportunity to discuss and explore how Native peoples were interacting and using the materials for their own purposes if we take the time to reexamine them. The stoneware and earthenware is difficult to identify in prior excavation reports. But where these materials are identified, the analysis indicates that Native peoples collected and modified the less attractive materials as well as the porcelains.

Despite the tentative nature of my conclusions for the larger discussion of Indigenous use of stoneware from the Beeswax Wreck site, this analysis provides a dialog about the stoneware and earthenware that was largely unreported until about a decade ago thanks to Mr. Dubé and those working on the Beeswax Wreck project. Furthermore, the larger theoretical framework explored in this document creates a starting point for understanding and exploring the potential protohistoric interactions Indigenous people had with potential survivors of the wreck, and also with the materials washing ashore.

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Appendix A:
Dubé Collection Catalogue Definitions

Catalogue number		JF 0000	Catalog number, or JF number of artifact
Frag_type	RM	Rim, edge, and neck	Rim with lip
	NK	Neck	Curvature with the sherd flare on either end to indicate it was in transition.
	SW	Body	Sherd with no other defining marks but has curvature
	BS	Base	Flat or almost flat, sometimes with the connection to the body.
	UNK	Unknown	
Paste_texture	FN	Fine	Very smooth to touch, inclusions are non-existent or very fine
	MF	Moderately Fine	Almost all is smooth to touch, inclusions are very fine. Paste is compact and has vitrified to the point the paste shows a complete melting of the granules and the paste.
		Moderately Coarse	Some pieces of fine to medium inclusions in the clay, fine to very fine voids are present but there has been some melting between the fabrics and gradual and can see some boundaries. Can be slightly rough to touch the
	CR	Coarse	Porous and large pieces of sediment in the clay, rough to touch. Fine to medium voids throughout the paste
Inclusions	DT	Dark Impurities/Inclusion	Black or other dark color inclusions added to the clay
	WT	White Impurities/Inclusion	White, cream, or other light color inclusions added to the clay
	BT	Dark & White Impurities/Inclusion	Both white and dark inclusions included
	NA	None Visible	None visible to naked eye.
Core Color		Munsell Color	
Int Margin color		Munsell Color	
Ext Margin color		Munsell Color.	
General Paste Color Category	Pink		2.5YR 6/6, 5YR 7/3, 5YR 7/4, 5YR 6/4, 5YR 6/6, 7.5YR 6/3, 7.5YR 6/6, 7.5YR 7/4
	Red		2.5YR 4/6, 2.5YR 4/8, 2.5YR 5/8, 2.5YR 5/6, 10R 4/6, 10R 5/6, 5YR 4/6, 5YR 5/6

		Dark Red/Brownish Red	2.5YR 3/2, 2.5YR 3/3, 2.5YR 3/6, 2.5YR 4/2, 2.5YR 4/3, 2.5YR 4/4, 2.5YR 5/4, 10R 4/3, 5YR 4/4, 5YR 4/3
		Terracotta/Brown	7.5YR 6/6, 7.5YR 5/6, 7.5YR 5/4
		Buff	2.5Y 7/3, 2.5Y 8/1, 2.5Y 8/2, 2.5Y 8/3, 5Y 8/1, 10YR 7/3, 10YR 7/4, 10YR 8/, 10YR 8/3
		Gray	2.5Y 6/1, 2.5Y 7/1, 2.5Y 7/2, 5Y 6/1, Gley 1 N5, Gley 1 N6, Gley 1 N7
Int glaze color		Munsell Color.	
Ext glaze color		Munsell Color.	
Ext margin width		mm	The relative thickness of the discoloration from the exterior surface in profile from the firing process.
Int margin width		mm	The relative thickness of the discoloration from the interior surface in profile from the firing process.
Thickness Max		mm	measured at thickest part of the sherd
Thickness Min		mm	measured at thinnest part of the sherd
Decoration	NA	None Visible	No decorative markings visible.
	AD	Applied Decorations	Added decoration on top of original clay body (paint or additional clay)
	ID	Incised Decorations	Random or part of a decorative pattern. Incising is to engrave a design by cutting or scraping into the clay surface at any stage of drying, from soft to bone dry.
	ED	Excised Design	Shaving off a piece of clay evenly on the body to leave a design or where the background is carved away leaving a raised design in relief.
	IM	Incised Markings	None “random” markings, part of a makers mark
Breakage type (Lally 2002) with some edits.	CB	Clean break	Edges show no erosion whatsoever; sharp edges, features fully intact.
	SE	Slightly eroded	Overall have freshly broken appearances, however, sharp edges are worn down or slightly rounded. Features such as joints or construction methods are still visible when present. Glazes or finishes are still mostly present.
	ME	Moderate Erosion	Edges are rounded; features are rounded down or no longer present. Glazes or finishes are mostly eroded

			with only specs of very thin pieces of it remaining. Still has part or all the margins intact
	VE	Severely eroded	Edges are rounded; Most bases it is just the core paste color that remains. Rarely is there any exterior or interior margins colors present.
Type	H	High	Showing some fusion of glass formation on within the fabric of the sherd
	L	Low	Porous and coarse fabric.
	UD	Undetermined	Unsure due to erosion
Location	SH	Short Sands Beach	Oswald West State Park, Short Sands beach tidal zone
	MB	Manzanita Beach/Nehalem Spit	Ocean facing side of Manzanita Beach Nehalem Spit within the tidal zone and beach.
	NB	Nehalem Bay	Within Nehalem Bay and estuary in the tidal zone and beach.

Appendix B:
Dubé Collection Ceramic Type Descriptions and Images

Gray Paste Types

G01

Light gray stoneware with a muddled light olive brown to dark brown glaze on the exterior with applied decorations. The body has completely fused, is compact, and robust. The inclusions in the paste have no boundaries between the base paste and the inclusions. The paste is well sorted with very few very fine to fine inclusions. The dark inclusions make up around 1% and the light inclusions constitute 1-3% of the paste. Though there are some variations in the sherds thickness, there are no lumps or visible unevenness.

Type: Stoneware (high fire), Dragon Jar

Paste Color: 2.5Y 7/1 (light gray)

Texture: Medium fine

Vitreous: Yes, completely fused.

Exterior Glaze: 2.5Y 5/3, 2.5Y 3/1, 10YR 4/3 (light olive brown, very dark gray, brown)

Interior Glaze: Interior is almost a Gley 1 7/10GY (light greenish gray)

Inclusions: The darker inclusions are very fine (less than 1 mm) (1%); light inclusions are very fine to fine (less than 1 mm – 2 mm) (1-3%).

Voids: None visible

Thickness: 10.71 mm – 12.71 mm (does not include the applied design). The average thickness is 11.71 mm, with an average difference in the sherd of 2 mm

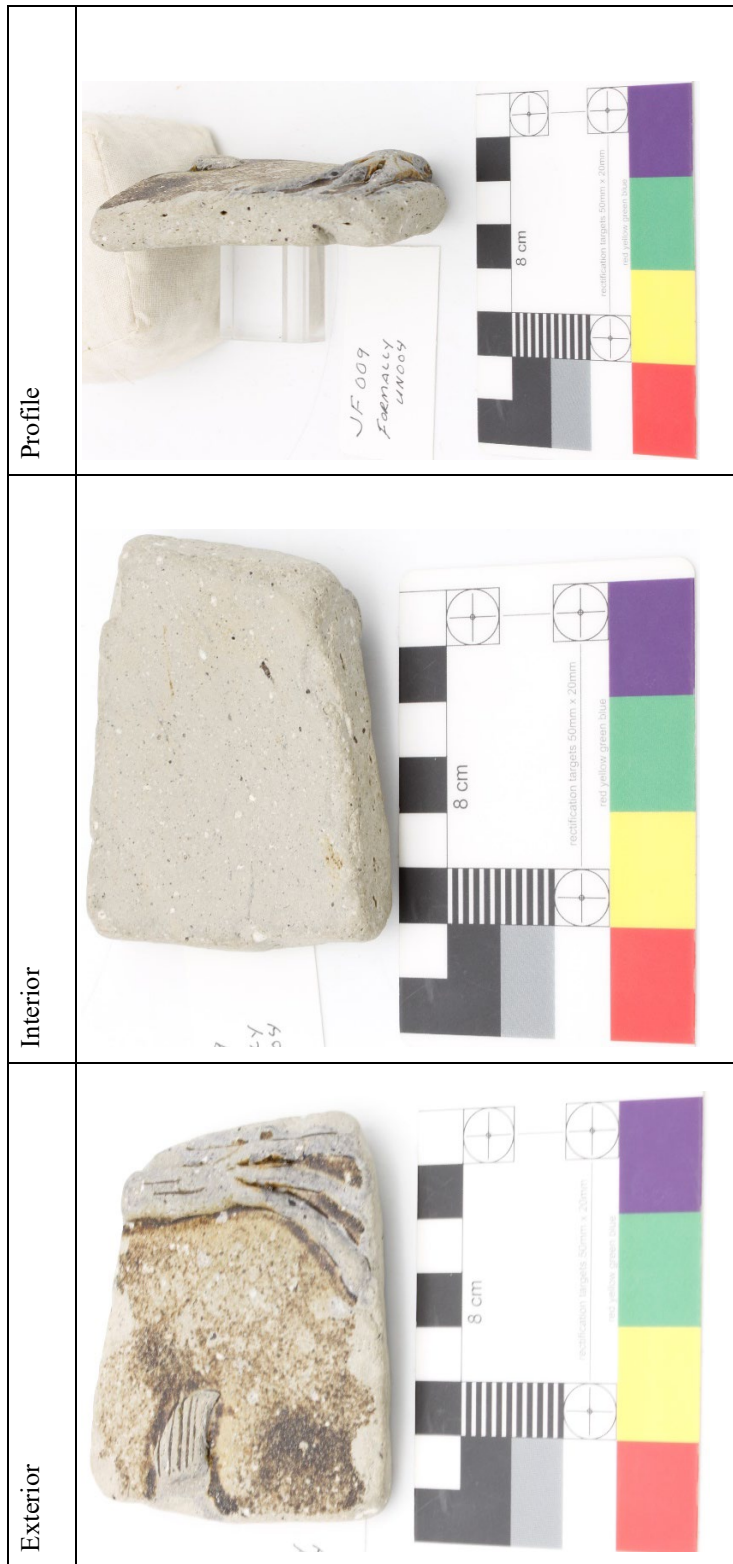
Exterior margin: N/A

Interior margin: N/A

Decorations: Applied Decorations

Location: SH

Figure 27. Example of Type G01, JF009



G02

Light gray to gray stoneware with a black glaze on the exterior and interior has a light yellowish-brown glaze that is not consistent. The body has completely fused, is compact, and robust. The paste has few boundaries between the inclusions and the base paste and the inclusions, except for some of the fine to medium quartzite inclusions. The dark inclusions compose around 3-4% and the fine light inclusions compose 1-2% of the paste. While the paste has fused into stoneware, there are fine to medium voids throughout the body. The paste is consistent throughout with no margins. There are some variations in the sherd's thickness, there are no lumps or visible unevenness. One of the sherds appears to possibly have a line on the exterior that is 1.33 mm thick (JF436).

Type: Stoneware (high fire)

Paste Color: 2.5Y 6/1, 2.5Y 7/1 (gray, light gray)

Texture: Medium coarse

Vitreous: Yes

Exterior Glaze: 2.5Y 2.5/1, 2.5Y 3/1, 10YR 3/1 (black, very dark gray)

Interior Glaze: 10YR 5/6, 10YR 6/6, 10YR 6/4 (yellowish brown, light yellowish brown, brownish yellow). Not consistent throughout the sherd.

Inclusions: The darker inclusions very fine to fine (less than 1 mm – 2 mm) (3-4%); light inclusions very fine (less than 1 mm) (1-2%), fine-medium quartzite inclusions (3%)

Voids: Fine-medium (1 mm – 5 mm) (2-3%)

Thickness: 5.87 mm - 11.28 mm. The average thickness is 8.07 mm, with an average difference in each sherd of 1.1 mm

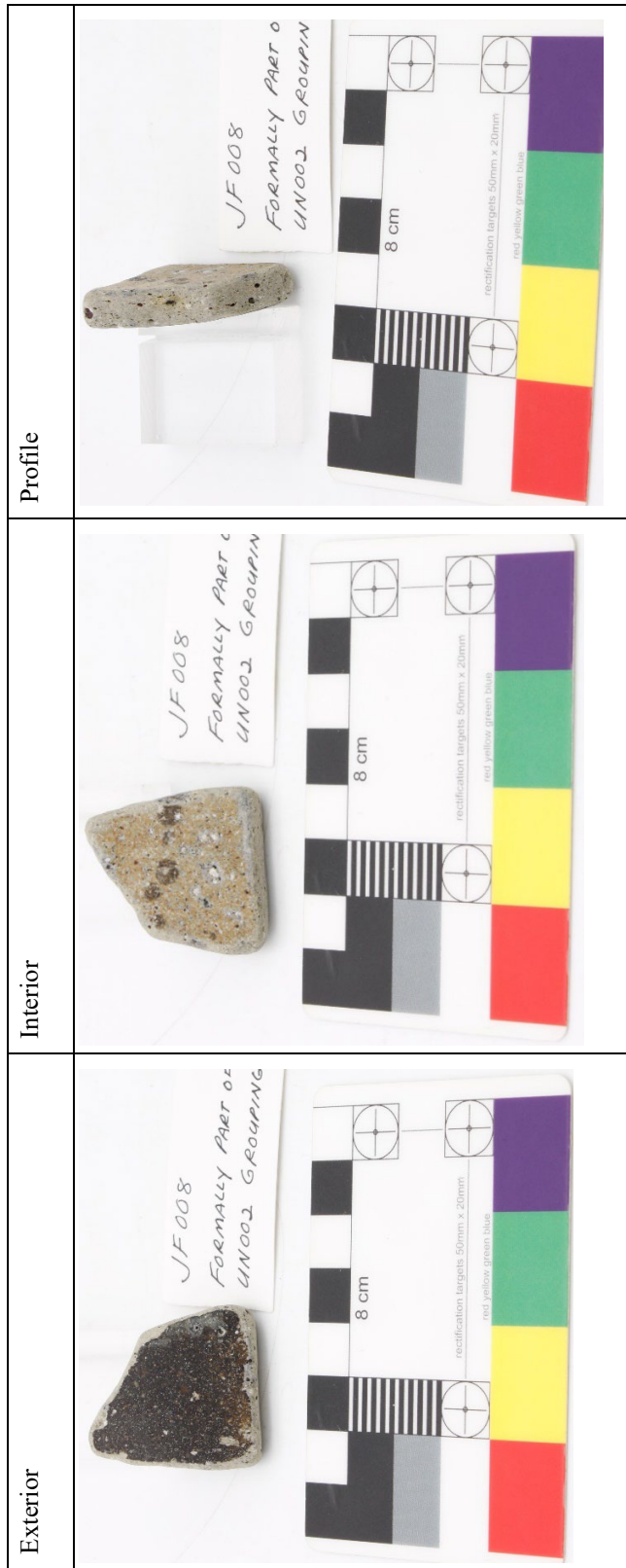
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 28. Example of Type G02, JF008



G03

Light gray stoneware with a black glaze on the exterior. The interior has a dark brown to very dark gray glaze. The body has completely fused, but the paste appears to have a platy structure shown in black horizontal lines (3%) in the core of the body. The paste has very minimal very fine light inclusions and very fine to fine round dark inclusions. Both sherds are moderately eroded with the glaze on both sherds no longer glossy and the edges of the body smoothed.

Type: Stoneware (high fire)

Paste Color: 2.5Y 7/1, 2.5Y 7/2 (light gray)

Texture: Medium Fine, platy structure in the paste

Vitreous: Yes

Exterior Glaze: 2.5Y 3/1 (very dark gray)

Interior Glaze: 2.5Y 5/3, 2.5Y 3/1 (brown, very dark gray)

Inclusions: The darker inclusions are very fine to fine (less than 1 mm – 2 mm) (1%); light inclusions are very fine (less than 1mm) (1%)

Voids: N/A

Thickness: 5.85 mm – 7.84 mm. The average thickness is 7.02 mm, with an average difference in each sherd of 1.41 mm

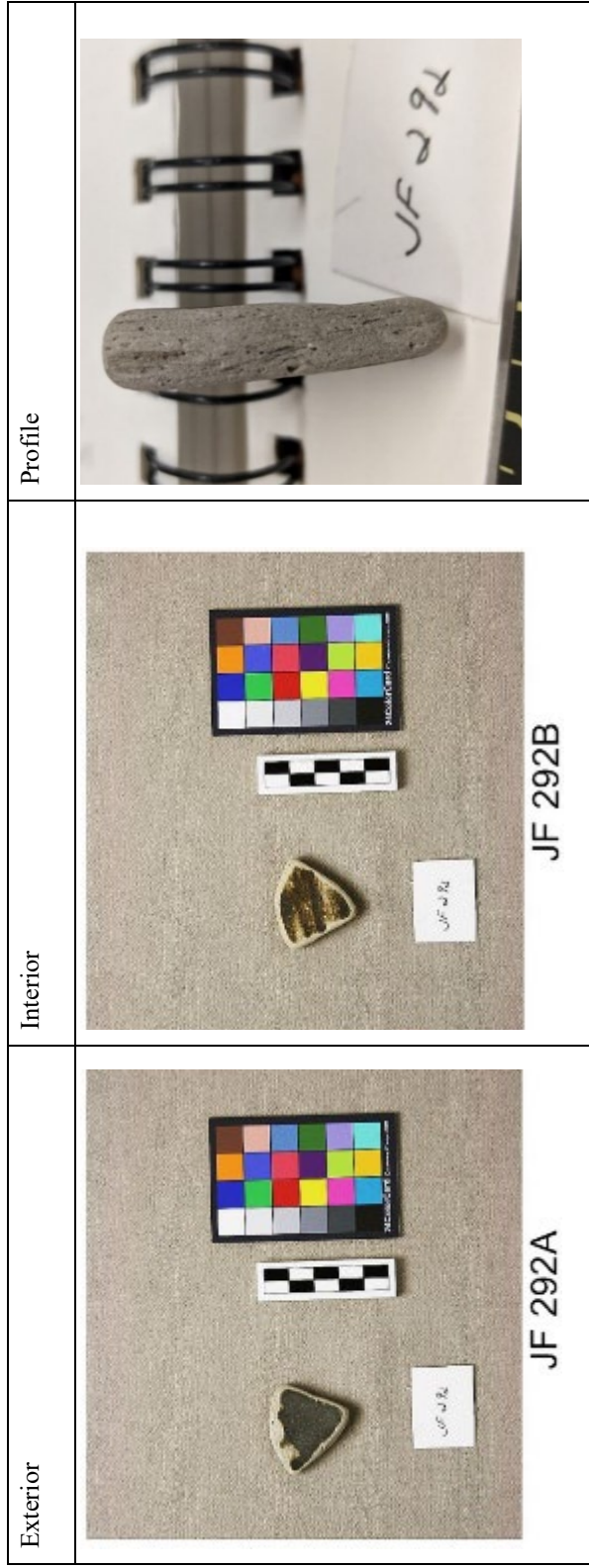
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 29. Example of Type G03, JF00292



G04

Light gray stoneware sherd with an iron glaze dripped on the exterior and a reddish-brown glaze on the interior. The glaze is uneven and bumpy in some locations. The paste is consistent throughout and the paste has completely fused as there are few boundaries between the inclusions and the base paste. The dark inclusions compose around 3-4% and the fine light inclusions compose 1-2% of the paste. While the paste has fused into stoneware, there are very fine voids throughout the body. The paste is consistent throughout with no margins. There are some variations in the sherds thickness, there are no lumps or visible unevenness. One of the sherds appears to possibly have a line on the exterior that is 1.33mm thick (JF436).

Type: Stoneware (high fire)

Paste Color: 2.5Y 7/1, 2.5Y 7/2 (light gray)

Texture: Medium Fine

Vitreous: Yes

Exterior Glaze: 2.5Y 2.5/1 (black) with 5YR 3/2 or 7.5YR 4/4 (dark reddish brown, brown) (uneven, bumpy)

Interior Glaze: Mix of 5YR 4/4, 7.5YR 4/4 (reddish brown, brown)

Inclusions: The darker inclusions very fine to fine (less than 1 mm – 2 mm) (1-2%); light inclusions very fine (less than 1 mm) (3%), fine quartzite inclusions (1 mm – 2 mm) (1%)

Voids: Very fine (less than 1 mm) (1%)

Thickness: 6.34 mm – 9.86 mm. The average thickness is 7.49 mm, with an average difference in each sherd of 1.42 mm

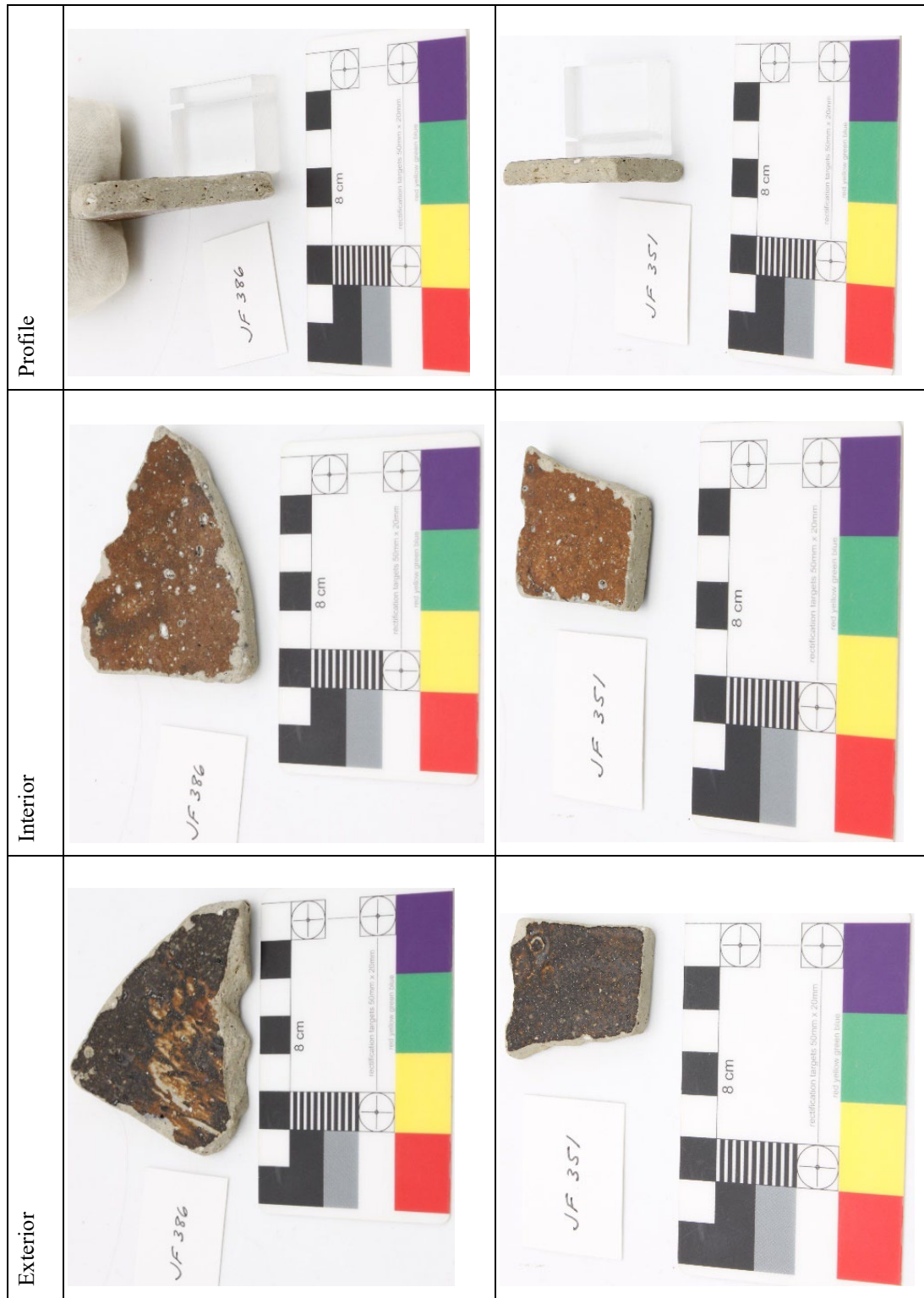
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 30. Example of Type G04. Top row JF386, bottom row JD351



G05

The type has two paste colors, light gray and gray, between the interior and exterior. The thickness for the two paste colors varies greatly between the sherds but composition of the paste is similar. The body is completely fused and is smooth but granite like. The paste has very fine to fine dark inclusions throughout and very fine light inclusions. The sherds with black glaze have more voids on the exterior and the glaze is lumpy than those with the olive-colored glaze. The interior and core of the sherds have very few voids. One of the sherds appears to be a joint or a shoulder where it was joined together. Half of the sherd is considerably thicker, but the other half quickly thins again.

Type: Stoneware (high fire)

Paste Colors: 2.5Y 7/1 (light gray), Gley 1 5/N or Gley 1 6/N (gray)

Texture: Medium Fine

Vitreous: Yes

Exterior Glaze: Depends on the sherd, some have a 2.5Y 2.5/1 (black) with 7.5YR 4/4 (dark reddish brown, brown) (uneven, bumpy) or some are muddled 7.5YR 4/4, 10YR 3/1, 2.5Y 5/3 (brown, very dark gray, light olive brown).

Interior Glaze: variations of stripped or muddled, 7.5YR 5/6, 10YR 2/2, 10YR 5/6, 2.5Y 6/3 (strong brown, very dark brown, yellowish brown, light yellowish brown)

Inclusions: The darker inclusions are very fine to fine (less than 1 mm – 2 mm) (3%); light inclusions are very fine (less than 1 mm) (3%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (1%), medium (2 – 5 mm) (>1%)

Thickness: 6.12 mm – 12.71 mm. The average thickness is 8.48 mm, with an average difference in each sherd of 2.09 mm

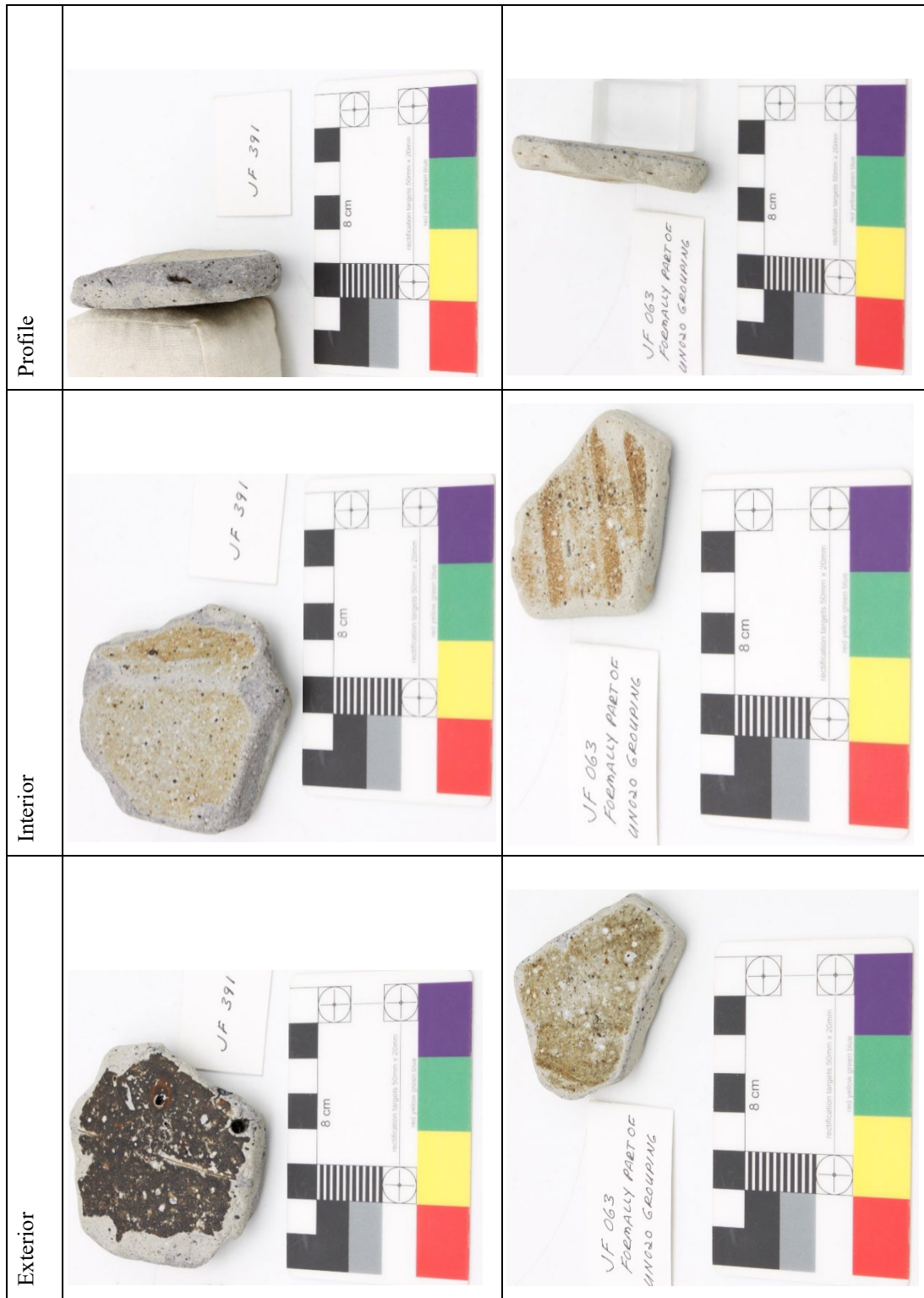
Exterior margin: Ranges between 1.66 mm – 6.22 mm

Interior margin: Ranges between 3.43 mm – 8.83 mm

Decorations: N/A or possibly incised line

Location: SH

Figure 31. Example of Type G05. Top row JF3391, bottom row JF063



G06

Gray stoneware. The body is completely fused and is smooth but granite like in appearance. The paste has flecks of reddish yellow staining throughout the body. The paste has very fine to fine inclusions dark inclusions and very fine light inclusions. The exterior has a dark gray or black glaze and the interior glaze is brown.

Type: Stoneware (high fire)

Paste Color: 5Y 6/1 (gray), flecks of 7.5YR 6/8 (reddish yellow)

Texture: Medium Fine

Vitreous: yes

Exterior Glaze: muddled 7.5YR 3/1 (very dark gray)

Interior Glaze: 7.5YR 4/3 (brown)

Inclusions: The darker inclusions are very fine to fine (less than 1 mm – 2 mm) (3%); light inclusions are very fine (less than 1 mm) (3%).

Voids: None visible

Thickness: 6.44 mm – 7.13 mm. The average thickness is 6.78 mm, with an average difference in each sherd of 0.69 mm

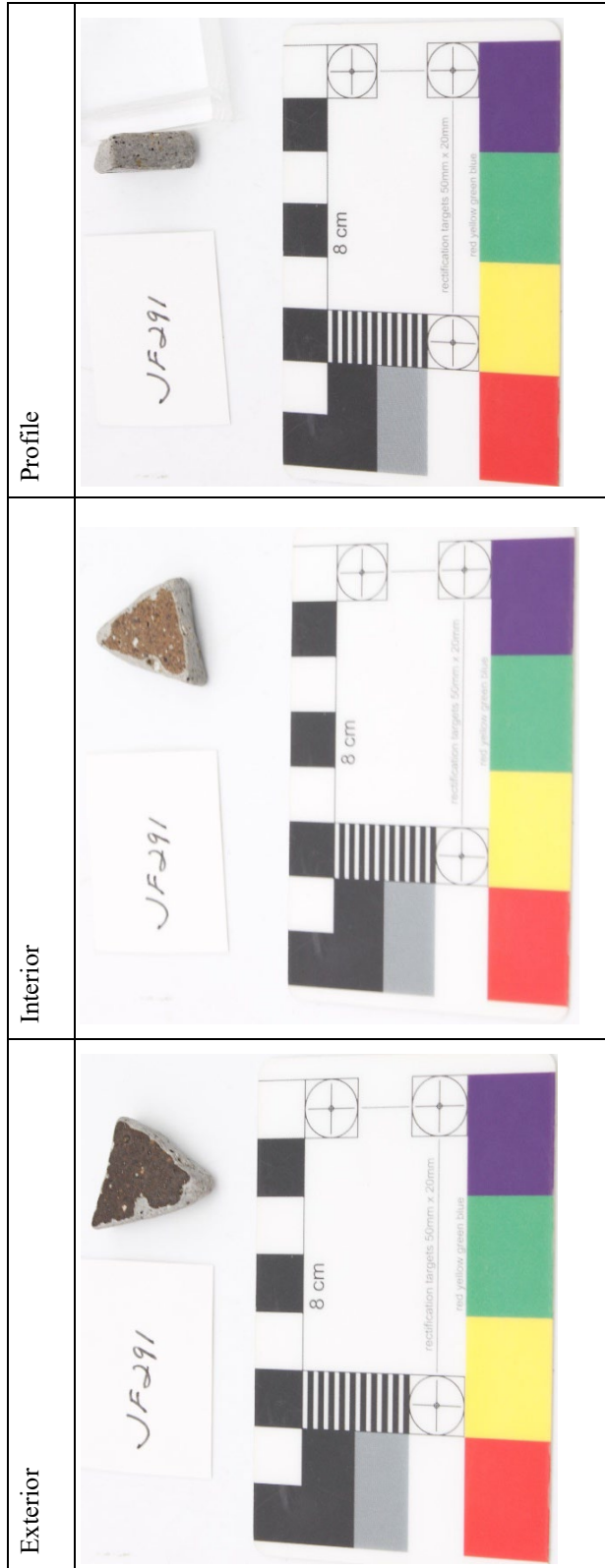
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 32. Example of Type G06, JF291



Buff Paste Type

B01

White stoneware composed of a refined well sorted vitrified paste. Body color is consistent throughout the sherd with no voids. The inclusions in the paste are likely part of the native clay but the paste has a mixture of very fine dark and light particles throughout. The exterior and interior have a very light bluish gray glazy, though on some of the sherds the colored glaze stops and has a clear glaze. Each of the sherds have a very consistent thickness but the thickness does vary slightly between sherds.

Type: Stoneware (high fire)

Paste Color: 2.5Y 8/2 (white, pale brown)

Texture: Fine

Vitreous: Yes

Exterior Glaze: Partly GY-G 8/5GY, and clear glaze

Interior Glaze: GY-G 8/5GY

Inclusions: The darker inclusions are very fine (less than 1 mm) (10%); light inclusions are very fine (less than 1 mm) (5%).

Voids: None visible

Thickness: 6.13 mm – 10.53 mm. The average thickness is 8.43 mm, with an average difference in each sherd of 0.08 mm

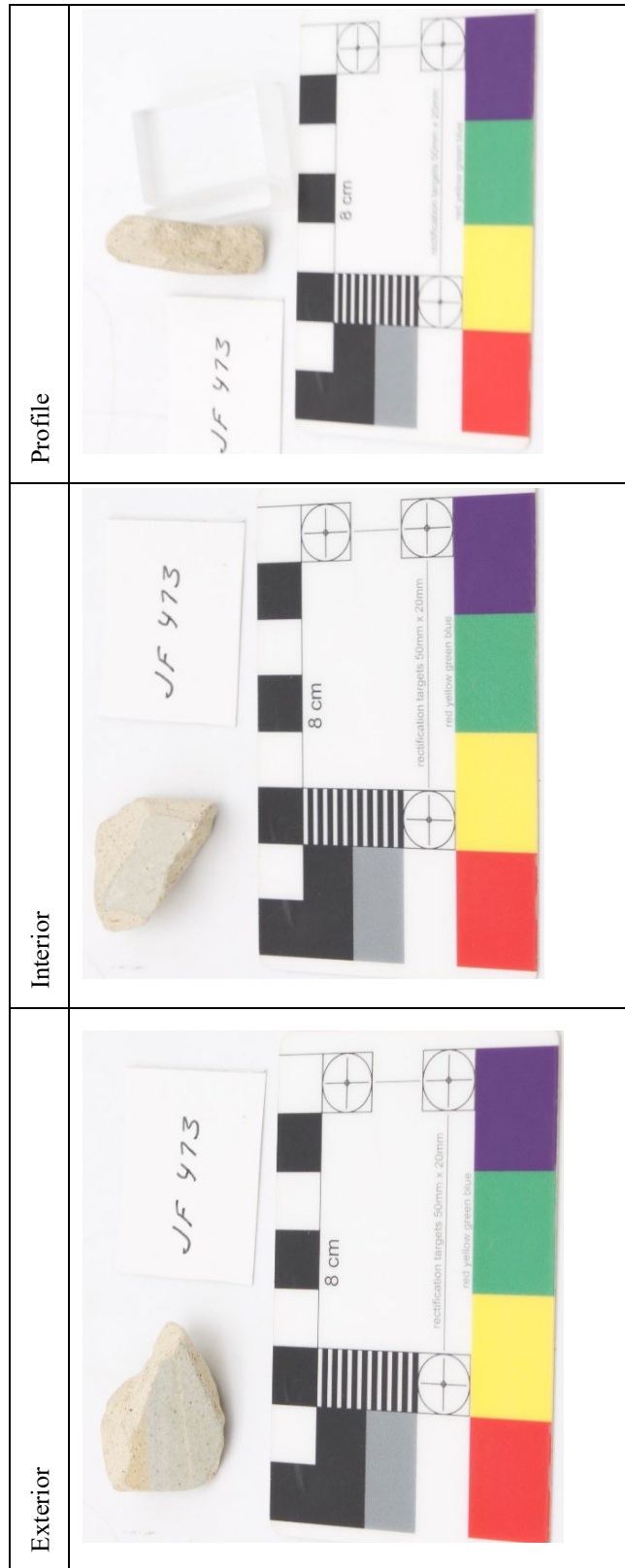
Exterior margin: N/A

Interior margin: N/A

Decorations: Line in glaze

Location: SH

Figure 33. Example of Type B01, JF473



B02

Very fine, well sorted, very pale brown stoneware. The body has no voids, margins, or visible inclusions. There is the occasional fleck of very fine darker sediment in the native clay but it is not from added tempers. The interior and exterior have a thin white glaze. The body has a consistent thickness across the sherds in the type.

Type: Stoneware (high fire)

Paste Color: 2.5Y 7/3, 2.5Y 8/3, 10YR 7/4 (pale brown, very pale brown)

Texture: Fine

Vitreous: Yes

Exterior Glaze: 5Y 8/1 (white)

Interior Glaze: 5Y 8/1 (white)

Inclusions: None visible

Voids: None visible

Thickness: 7.26 mm – 9.44 mm. The average thickness is 8.51 mm, with an average difference in each sherd of 0.5 mm

Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 34. Example of Type B02, JF064



B03

Light brown and light gray stoneware with two distinct pastes between the exterior and interior. While this type is like Type G05, the paste has no visible voids, less dark and light inclusions, and the interior paste is a pale brown instead of gray. Both the light and dark inclusions are very fine. The exterior glaze is a dark gray/dark grayish brown and the interior has a thin pale brown glaze. One of the sherds in the type is a joint where two halves of the jars were joined together (JF001)

Type: Stoneware (high fire)

Paste Color: Interior: 2.5Y 8/2 (pale brown); exterior: Gley 1 6/N or Gley 1 7/N (gray, light gray)

Vitreous: Yes

Texture: Moderately Fine

Exterior Glaze: 10YR 3/2, 2.5Y 3/2 and 3/1 (very dark grayish brown, very dark gray)

Interior Glaze: 10YR 7/4 (very pale brown), 2.5Y 6/3, 2.5Y 7/3, 2.5Y 7/4 (light yellowish brown, pale brown)

Inclusions: The darker inclusions are very fine (less than 1 mm) (1%); light inclusions are very fine (less than 1 mm) (1%).

Voids: None visible

Thickness: 7.11 mm – 10.75 mm. The average thickness is 9.25 mm, with an average difference in each sherd of 1.34 mm

Exterior margin: Gley 1 6/N or Gley 1 7/N (gray, light gray). Ranges in 2.09 mm – 5.43mm

Interior margin: 2.5Y 8/2 (pale brown). Ranges in 1.89 mm – 4.65 mm

Decorations: N/A

Location: SH

Figure 35. Example of Type B03. Top row JF001 bottom row JF418



B04

The type is a pale brown stoneware with a muddled very dark gray or dark grayish brown glaze on the exterior and a yellowish-brown to very dark grayish brown glaze on the interior. The glazes are not solid on either side. The paste is well sorted with some very fine dark and light inclusions throughout. Occasionally there are fine dark inclusions in the paste but account for less than 1% of the paste. The body has vitrified but is not to the point where the paste is glossy or waxy in appearance.

Type: Stoneware (high fire)

Paste Color: 10YR 8/2 (very pale brown)

Vitreous: Yes

Texture: Moderately Fine

Exterior Glaze: 7.5YR 3/1, 7.5YR 4/3, 10YR 4/2 and 10YR 3/2 (very dark gray, brown, dark grayish brown, very dark grayish brown)

Interior Glaze: 10YR 4/2, 10YR 6/4, 10YR 5/4 (dark grayish brown, light yellowish brown, yellowish brown)

Inclusions: The darker inclusions are very fine (less than 1 mm) (3%), fine (1 mm – 2 mm) (1%); light inclusions are very fine (less than 1 mm) (1%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (1%).

Thickness: 5.99 mm – 14.41 mm. The average thickness is 9.97 mm, with an average difference in each sherd of 1.34 mm

Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 36. Example of Type B04. Top row JF249, bottom row JF476



B05

This type consists of a pale brown stoneware with a granite like texture, though the paste is not waxy. It is possible it is due to erosion. All the sherds are moderately eroded with the glaze partly removed but the exterior has a very dark gray glaze and one of the sherds has a grayish brown glaze on the interior. The body has completely fused, but the paste appears to have a platy structure shown in black horizontal lines (1-2%) in the core. There are very few very fine light and dark inclusions. Voids are very fine and appear to be areas of tempers burning or from erosion. Overall, the paste is generally fine and well sorted.

Type: Stoneware (high fire)

Paste Color: 2.5Y 8/2 (pale brown)

Vitreous: Yes

Texture: Moderately Fine

Exterior Glaze: 7.5YR 3/1, 10YR 3/2 (very dark gray, very dark grayish brown)

Interior Glaze: 10YR 4/2 (dark grayish brown), not on all sherds.

Inclusions: The darker inclusions are very fine (less than 1 mm) (1%); light inclusions are very fine (less than 1 mm) (>1%).

Voids: Very fine (less than 1 mm) (>1%)

Thickness: 8.37 mm – 11.87 mm. The average thickness is 10.45 mm, with an average difference in each sherd of 1.99 mm

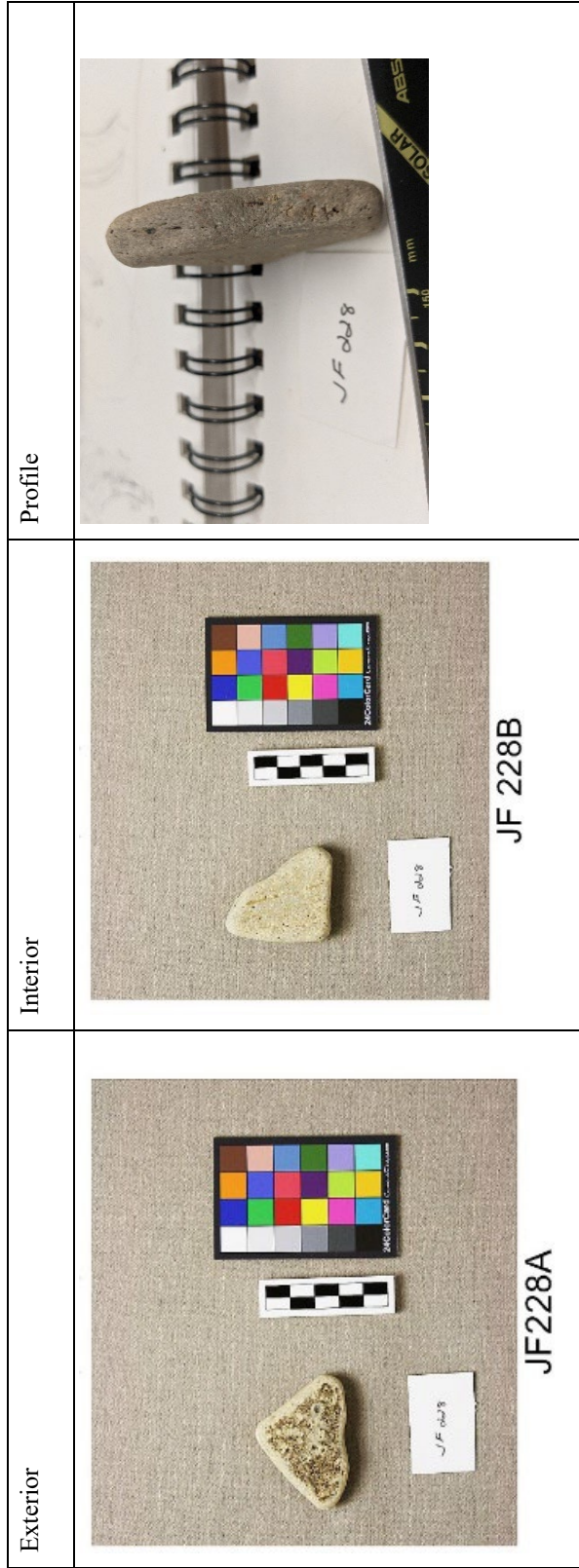
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 37. Example of Type B05, JF228



B06

This type is a light pale brown and gray stoneware with two distinct pastes between the exterior and interior. The exterior and interior glaze is a reddish brown. The body is granite like and has both light and dark inclusions. While this type is like Type B03, that paste has smaller dark and light inclusions, some very fine voids, and the glaze are very different.

Type: Stoneware (high fire)

Paste Color: Gley 1 6/N (gray), 10YR 7/3 (very pale brown).

Vitreous: Yes

Texture: Moderately Fine

Exterior Glaze: 5YR 4/3 (reddish brown)

Interior Glaze: 5YR 4/4 and black speckles (reddish brown)

Inclusions: The darker inclusions are very fine to fine (less than 1 mm – 2 mm) (1-3%); light inclusions are very fine (less than 1 mm) (1%).

Voids: Very fine (less than 1 mm) (>1%).

Thickness: 6.88 mm – 10.43 mm. The average thickness is 8.65 mm, with an average difference in each sherd of 3.55 mm

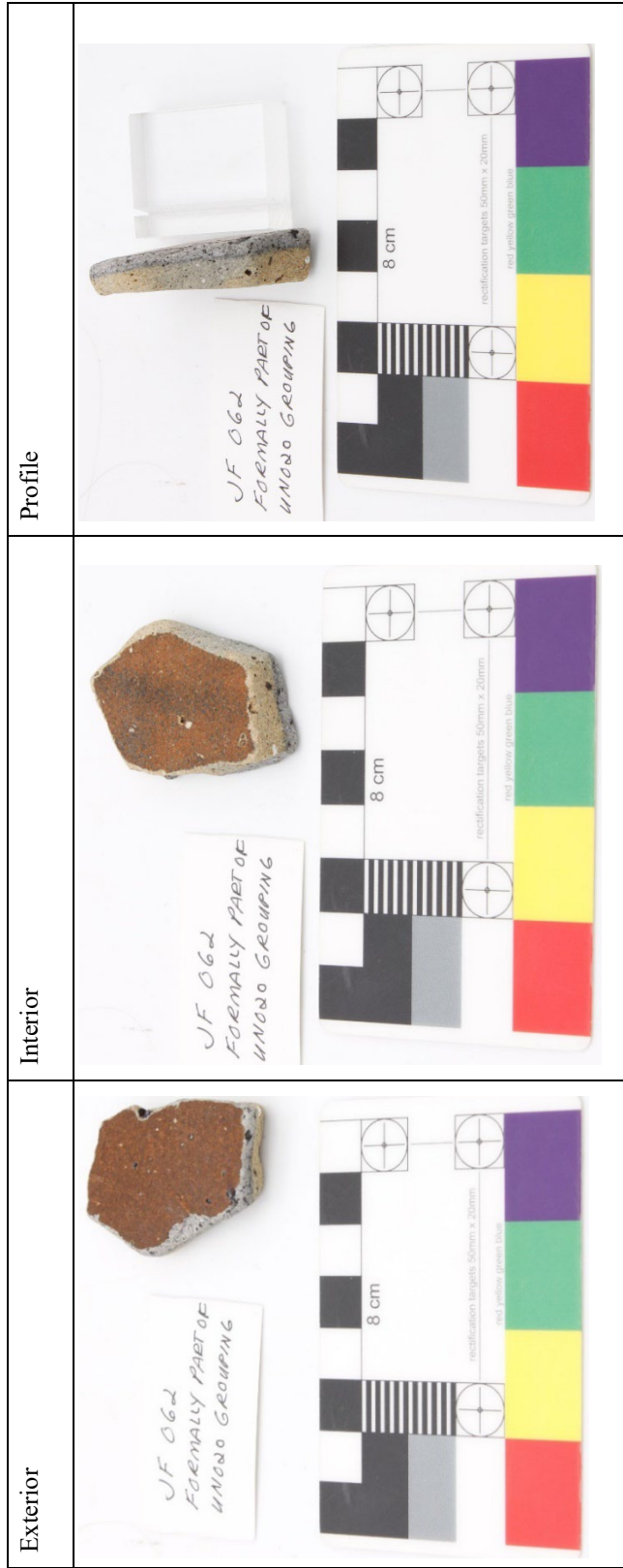
Exterior margin: Gley 1 6N (gray). Approximately 2.73 mm in width

Interior margin: 10YR 7/3 (very pale brown). Approximately 3.87 mm in width

Decorations: N/A

Location: SH

Figure 38. Example of Type B06, JF062



B07

This type is a pale brown stoneware sherd with dark gray/black glaze on the exterior, interior has a brown to light yellowish-brown parts of the sherd. The body is vitreous and has fused together. There are very few light and dark inclusions in the sherds, and the voids are very fine. Due to erosion, the exterior glaze is pitted and rough.

Type: Stoneware (high fire)

Paste Color: 2.5Y 7/3 (pale brown).

Vitreous: Yes

Texture: Moderately Fine

Exterior Glaze: 5Y 3/1, 7.5YR 3/1 (very dark gray)

Interior Glaze: 7.5YR 5/6, 10YR 4/3 and 2.5Y 6/3 (very strong brown, brown, light yellowish brown)

Inclusions: The darker inclusions are very fine (less than 1 mm) (1%); light inclusions are fine (1 mm – 2 mm) (>1%).

Voids: Very fine to fine (less than 1 mm to 2 mm) (1-3%)

Thickness: 6.26 mm – 9.66 mm. The average thickness is 8.48 mm, with an average difference in each sherd of 1.82 mm

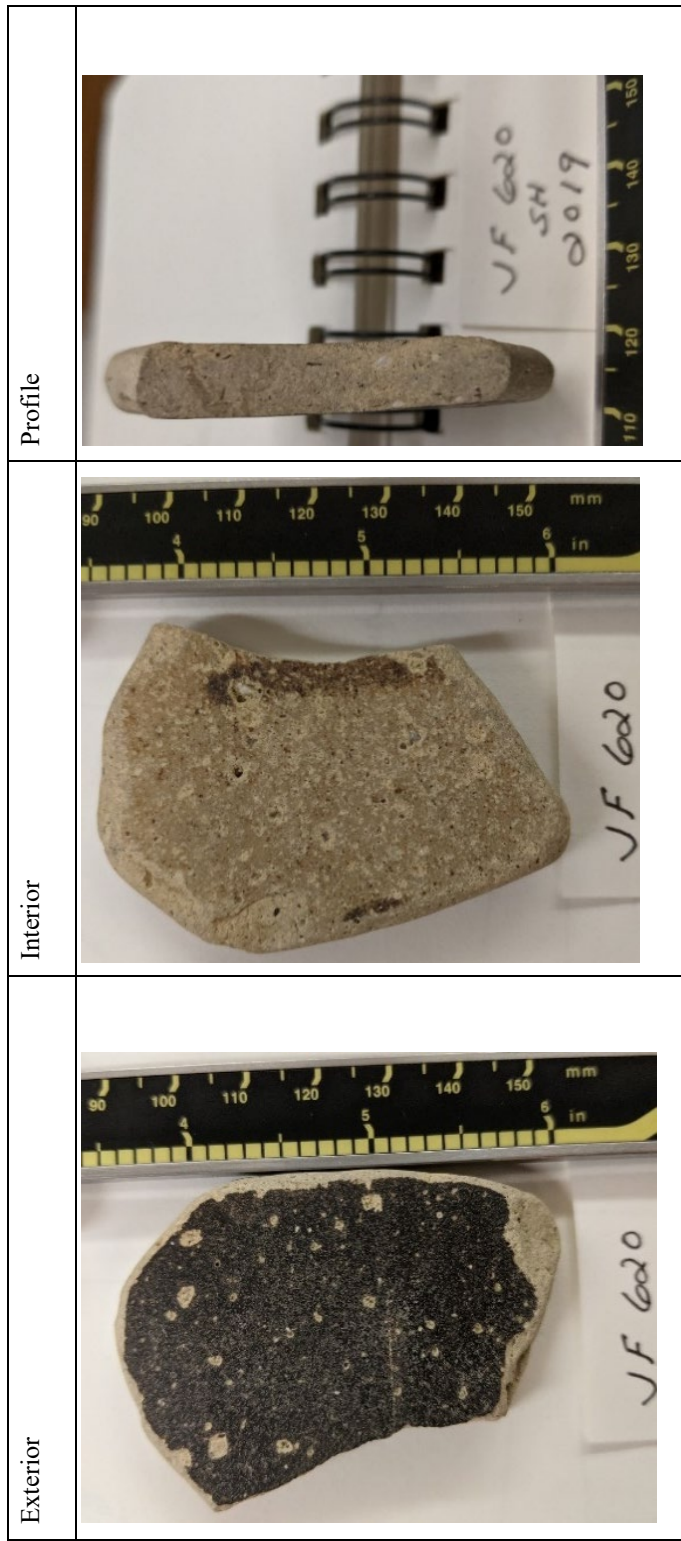
Exterior margin:

Interior margin:

Decorations: N/A

Location: SH

Figure 39. Example of TypeB07, JF620



B08

This type is a very pale brown stoneware with a black/dark gray glaze on the exterior and a muddled strong brown to reddish yellow glaze on the interior. The paste is well sorted with some very fine light inclusions and some fine dark inclusions throughout. The body has vitrified but is not to the point where the paste is glossy or waxy in appearance.

Type: Stoneware (high fire)

Paste Color: 10YR 7/3 (very pale brown)

Vitreous: Yes

Texture: Moderately Fine

Exterior Glaze: 2.5Y 2.5/1, 10YR 4/2 (black, dark grayish brown)

Interior Glaze: 7.5YR 5/6 and 7.5YR 6/6, 2.5Y 6/2 (strong brown, reddish yellow, light brownish gray)

Inclusions: The darker inclusions fine (1 mm to 2 mm) (1-2%); light inclusions very fine (less than 1 mm – 2 mm) (1-3%).

Voids: Fine (1 mm – 2 mm) (1%)

Thickness: 5.3 mm – 9.93 mm. The average thickness is 7.25 mm, with an average difference in each sherd of 1.34 mm

Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 40. Example of Type B08, JF553



Pinks Paste Types

P01

Highly coarse earthenware, with no visible glaze. A single sherd is moderately eroded and displays discoloration on the margins, with the exterior light brownish gray and the interior a light reddish brown. The paste has fine to medium quartzite, mica, shell, and other mineral inclusions while having a few fine dark inclusions. This type experiences erosion at a high rate due to the porosity.

Type: Earthenware (low fire)

Paste Color: 2.5YR 6/6 or 5YR 6/6 (light red or yellowish red)

Texture: Coarse

Vitreous: No

Exterior Glaze: None

Interior Glaze: None

Inclusions: Dark inclusions are fine (1 mm – 2 mm) (1%). Light inclusions are fine to medium, lots of mica (1 mm – 5 mm) (10%).

Voids: Fine to medium (5-10%). Paste has a platy structure.

Thickness: Unknowns 8.36 mm – 18.43 mm. Average thickness is 16.63 mm, with an average difference in each sherd of 0.72 mm (does not include base fragment). Base 21.88 mm – 22.44

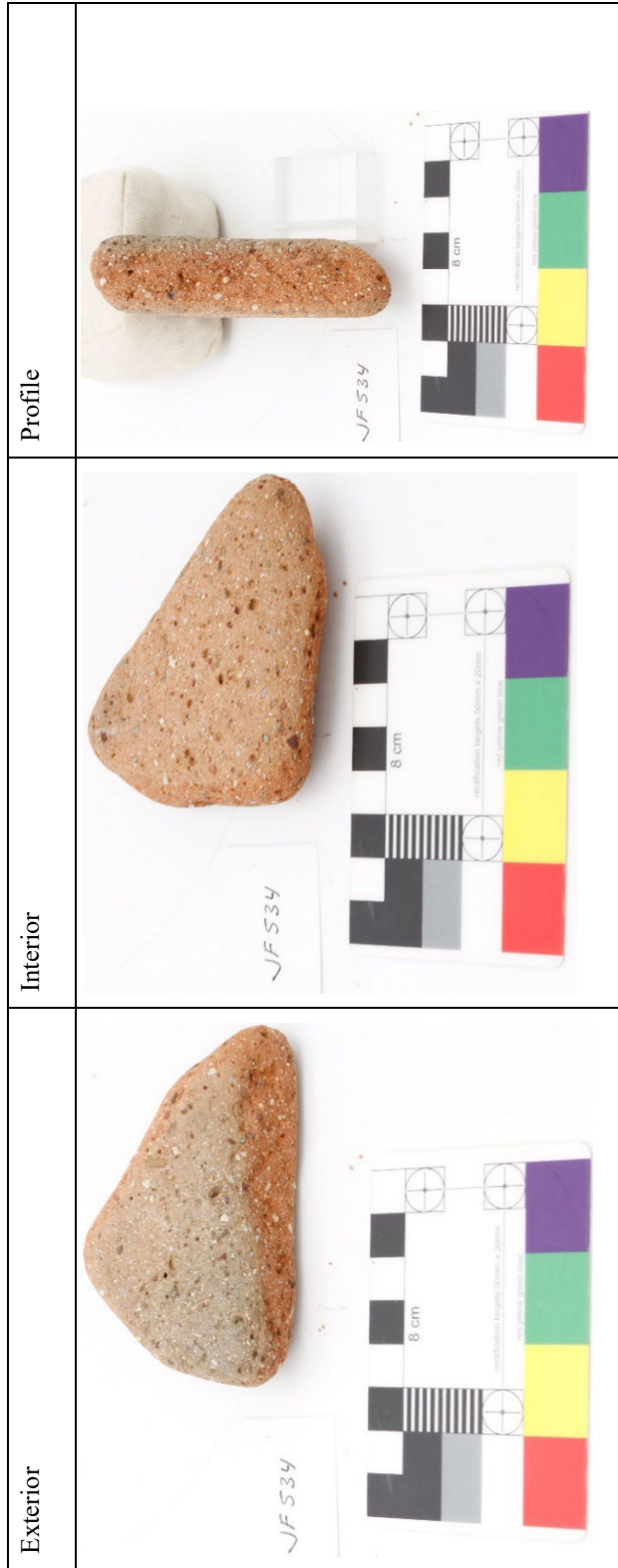
Exterior margin: Not on all, some sherds have 10YR 6/2 (light brownish gray)

Interior margin: Not on all, erosion dependent. 5YR 6/4 (light reddish brown)

Decorations: N/A

Location: SH

Figure 41. Example of Type P01, JF534



P02

The reddish yellow (pink) earthenware fragment with a brown glaze on the exterior. The body has fine to medium light inclusions but no dark inclusions. There are very fine to fine voids throughout the body and the paste has not completely melted.

Type: Earthenware (low fire)

Paste Color: 5YR 6/6 (reddish yellow)

Texture: Coarse

Vitreous: No

Exterior Glaze: 7.5YR 5/2 (brown)

Interior Glaze: None

Inclusions: Dark inclusion: none. Light inclusions are fine-medium (1 mm – 5 mm) (15%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (5-7%).

Thickness: 7.53 mm – 7.72 mm. Average thickness is 7.62 mm, with an average difference in each sherd of 0.19 mm

Exterior margin: 2.5Y 6/1 (gray), 0.96 mm thick

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 42. Example of Type P02, JF279



P03

The paste which is poorly mixed, is pink in some places (7.5YR 7/4) and buff or light brown in others (7.5YR 5/4, 10YR 6/2). The paste is smooth to the touch but contains a mix of dark sands, red sands, white and quartzite inclusions. The glaze on the outside of is dark gray/black and is consistent across the sherd. The glaze has no cracks unlike those found in P05. The interior of the sherd has an eroded brown/ light-brown glaze.

Type: Stoneware (high fire)

Paste Color: 7.5YR 7/4, 7.5YR 5/4, 10YR 6/2 (pink, brown, light brownish gray).

Muddled, poorly sorted

Texture: Medium fine to medium coarse.

Vitreous: Yes

Exterior Glaze: 10YR 3/2 with Gley 1 2.5/N under

Interior Glaze: 7.5YR 5/4 and 5YR 3/1

Inclusions: Dark inclusions are very fine to medium (less than 1 mm – 5 mm) (3-5%).

Red inclusions are fine (1 mm – 2 mm) (3%). Light inclusions fine to medium (1 mm – 5 mm) (7%).

Voids: None. Has a platy structure.

Thickness: 9.15 mm – 9.65 mm. Average difference for sherds 0.5 mm.

Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 43. Example of Type P03, JF007



P04

The paste is poorly mixed; it is pink in some places (5YR 6/6 or 10YR 5/2) and buff or light brown in others. The paste is smooth to the touch but contains white temper and is porous. The glaze on the outside is a dark gray/black with pink specks that creates a cracking effect. The interior of the sherd has an eroded reddish-brown glaze. Count 2

Type: Stoneware (high fire)

Paste Color: Poorly sorted, 5YR 6/6 and 10YR 5/2 (light red or grayish brown) in some areas,

Texture: Medium fine to medium coarse depending on erosion.

Vitreous: yes

Exterior Glaze: 2.5Y 2.5/1 (black) fragments of the pink interior. Glaze is about 0.97 mm – 1.07 mm thick.

Interior Glaze: 5YR 3/1, 5YR 5/4, 5YR 5/6

Inclusions: Light inclusions are fine, lots of mica (1 mm – 2 mm) (10%).

Voids: Fine to medium (1 mm – 2 mm) (1%). Has a platy structure

Thickness: 8.27 mm – 9.71 mm. The average thickness is 8.9 mm, with an average difference in each sherd of 0.73 mm.

Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 44. Example of Type P04, JF003



Brown (Terracotta) Paste Types

T01

The paste is compact and very fine with no visible inclusions. The interior paste is what would generally be classified as terracotta. The Munsell color is 7.5YR 5/6 (strong brown). The exterior has discoloration from firing and the paste is brown. There is no visible discoloration or glaze on the interior. The single sherd in this category has an incised design on the exterior of the sherd but not enough of the design is present to determine the larger image. The sherd ranges in thickness between 7.95 mm to 8.41 mm.

Type: Earthenware (low fire)

Paste Color: 7.5YR 5/6 (strong brown)

Texture: Very fine

Vitreous: No

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: None visible

Voids: None

Thickness: 7.95 mm – 8.41 mm. The average thickness is 8.18 mm, with an average difference in each sherd of 0.49 mm.

Margins: N/A

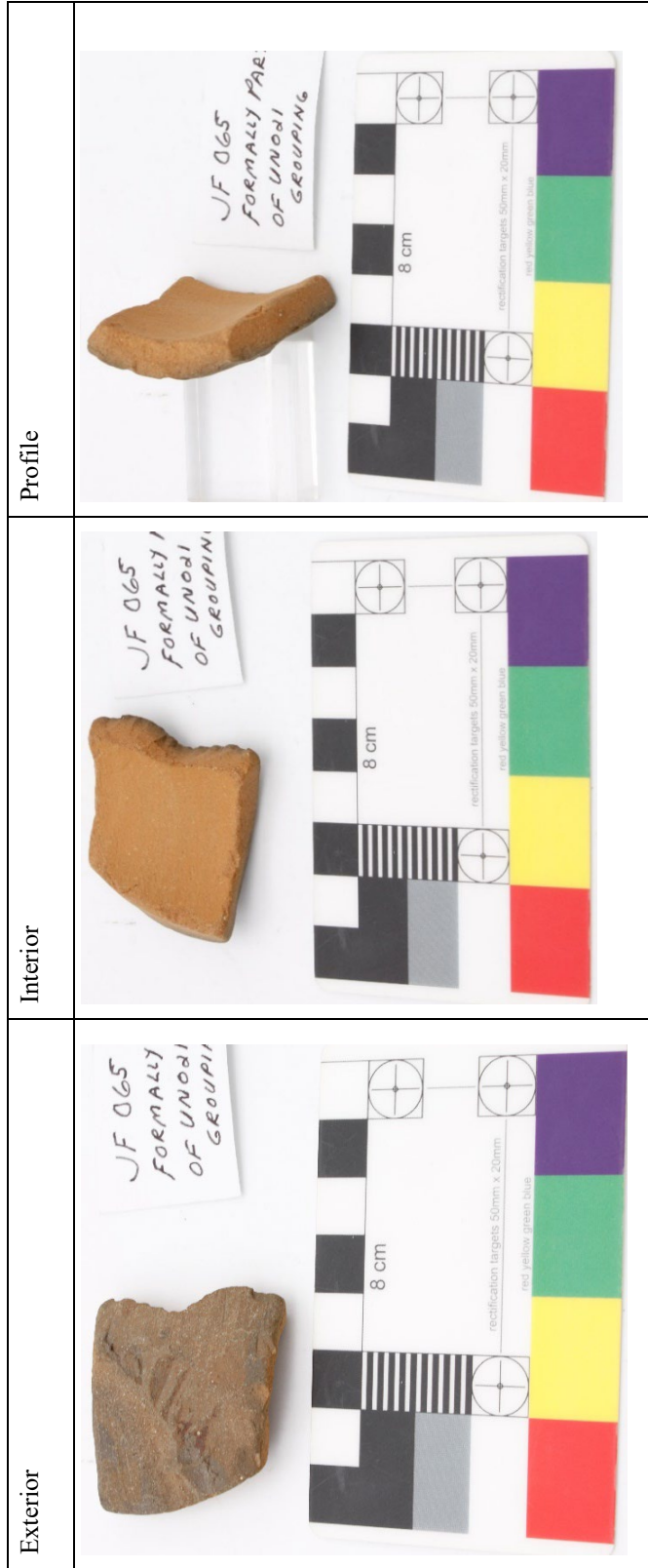
Exterior margin color: 7.5YR 5/2 (brown)

Interior margin color: N/A

Decorations: Incised design

Location: SH

Figure 45. Example of Type T01, JF065



T02

The type consists of a very fine, but rough paste with fine white inclusions mixed throughout. The type is a low fire earthenware and has a high iron content based on the color of the sherd. The paste is soft and scratches easily, there are water worn chips present around the sides of the sherd. The paste is consistent throughout the sherd and the color would generally be classified as terracotta. The Munsell color is 7.5YR 6/6 (reddish yellow). The interior has remnants of the black paint of little luster that has been worn away. The exterior is painted black and appears to be decorated with a geometric pattern of dark blue paint of moderate luster. The body is rough textured and unpolished which may be due to erosion.

Type: Earthenware (low fire)

Paste Color: 7.5YR 6/6 (reddish yellow)

Texture: Very fine

Vitreous: No

Exterior Glaze: Gley 1 2.5/N (black) and Gley 2 4/5B (dark bluish gray)

Interior Glaze: Gley 1 2.5/N (black)

Inclusions: Light inclusions are very fine (less than 1 mm) (2-3%)

Voids: N/A

Thickness: 8.09 mm – 13.69 mm. The average thickness is 10.89 mm, with an average difference in each sherd of 5.6 mm.

Margins: N/A

Exterior margin color: N/A

Interior margin color: N/A

Decorations: Applied decorations (sherd appears to have painted design)

Location: SH

Figure 46. Example of Type T02, JF618



Red Paste Types

R01

The paste is compact and an oxidized red color. The paste is consistent throughout and no changes in color from the margins to the core. The inclusions in the paste appear to be very fine, well sorted sands and some organic materials, some of which appears to be crushed shell. Additional inclusions are larger fine to medium black particles and are very few. The exterior of the sherd is a reduced dark gray/black color glaze.

Type: Earthenware or low quality stoneware.

Paste Color: 2.5YR 4/6 to 2.5YR 5/6 (Red)

Texture: Medium coarse

Vitreous: Undetermined, possibly starting to fuse

Exterior Glaze: Gley 1 3/N (very dark gray), rough like sandpaper.

Interior Glaze: N/A

Inclusions: The darker organic and red inclusions are fine to medium (1.5 mm – 2.68 mm) (1-2%); light inclusions are very fine (less than 1 mm) (3-5%).

Voids: Range from 1.5 mm – 2.31 mm in size (2%).

Thickness: 7.07 mm – 12.51 mm. The average thickness is 9.27 mm, with an average difference in each sherd of 1.43 mm

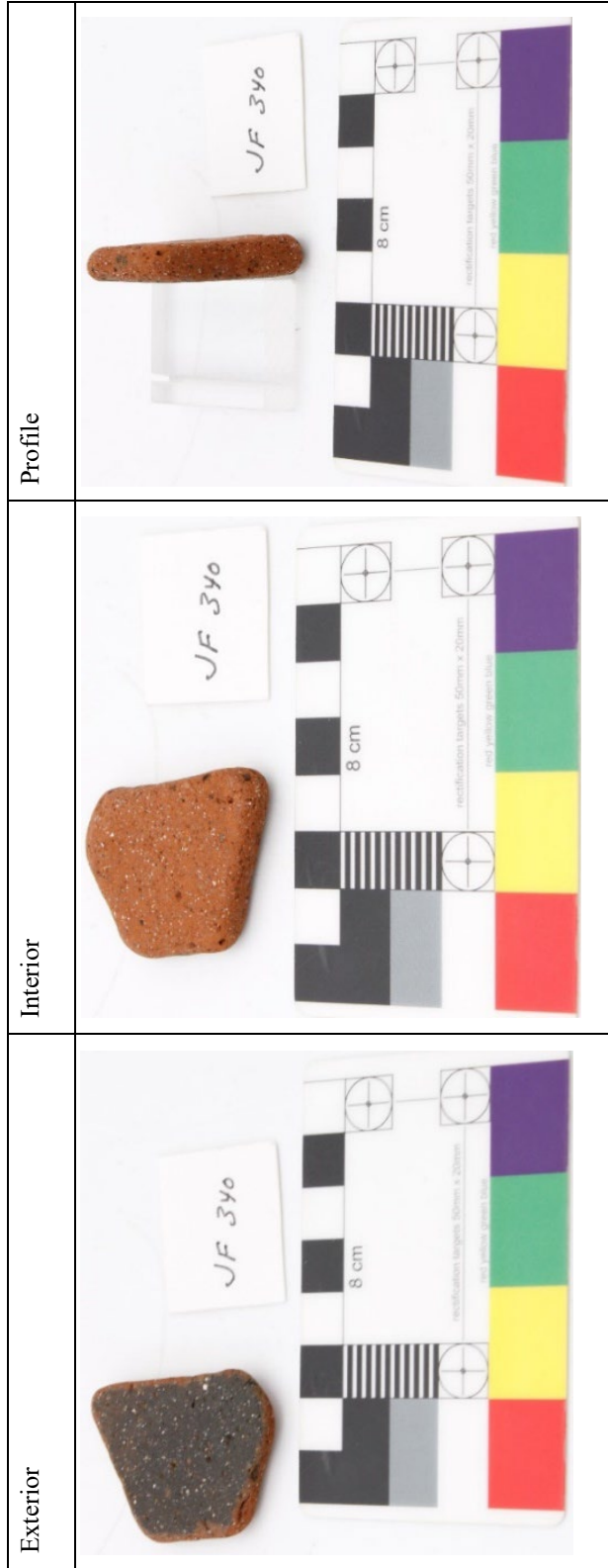
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 47. Example of Type R01, JF340



R02

The type consists of a coarse red earthenware with a dark gray /black rough glaze. Not all the sherds have glaze remaining on the interior. Some of the sherds have an exterior margin that is yellowish red or have spots of the color throughout the sherds, likely due to uneven firing. Some have a thin margin of the same color on the interior as well but most of the sherds have too much erosion for it to be present. The lighter inclusions in the paste are very fine, well sorted sands. The larger dark and red inclusions are fine to medium in size and are very few. The body has fine to medium voids throughout where organics have burned away, often leaving a glossy black residue in the void. One of the sherds had the glaze on the interior as well. This might be due to less erosion as brush marks are visible on the sherd (JF356).

Type: Earthenware (low fire)

Paste Color: 2.5YR 4/6 or 2.5YR 5/6 (Red)

Texture: Coarse

Vitreous: No

Exterior Glaze: Gley 1 2.5/N or Gley 1 3/N (black/very dark gray), rough like sandpaper.

Interior Glaze: Possible depends on erosion – Gley 1 3/N

Inclusions: The darker organic and red inclusions are fine to medium (1.5 mm – 2.68 mm) (1-2%); light inclusions are very fine (less than 1 mm) (3-5%).

Voids: Fine to medium (1.31 mm – 2.68 mm in size) (2-5%).

Thickness: 6.09 mm – 11.63 mm. The average thickness is 8.27 mm, with an average difference in each sherd of 1.21 mm

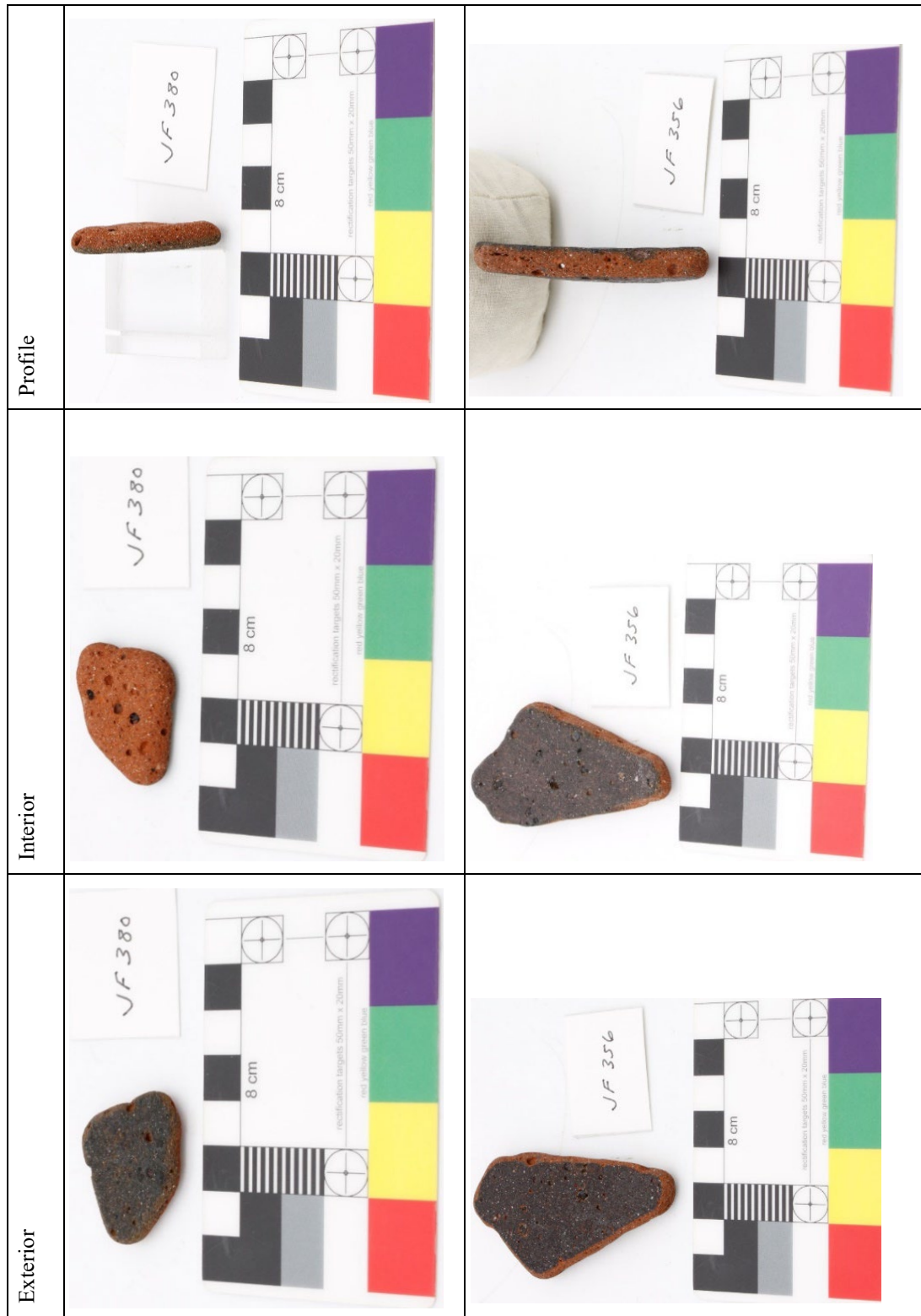
Exterior margin: Sometimes, 5YR 5/6 (very thin to 2.71 mm)

Interior margin: Depends on level of erosion

Decorations: N/A

Location: SH

Figure 48. Example of Type R02. Top row JF380, bottom row JF356



R03

This type is a red unglazed stoneware sherd with very dark gray/dark gray exterior margins from reduction in oxygen. The core color and external margin have a hardline between the exterior margin and core paste color. The body has started to fuse in the sherds that have less erosion but the sherds are compact and robust. The light inclusions in the paste are fine, well sorted minerals. Additional dark inclusions are fine to medium composing 5-7% of the paste. There are some voids in the paste where the inclusions have burned away. While the paste of the sherds looks very similar to each other, there is variations in the sherds thickness, which could be accounted for based on the origin location on the jar or possibly different sizes of jar.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/6 to 2.5YR 5/6 (red)

Texture: Medium coarse to coarse

Vitreous: Some fusion, depending on erosion status

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are fine to medium (1.38 mm – 2.56 mm) (1-2%); light inclusions are very fine (less than 1 mm) (3-5%).

Voids: Fine to medium (1.21 mm – 3.68 mm) (2%).

Thickness: SW*: 5.91 mm – 12.75 mm. The average thickness is 9.39 mm, with an average difference in each sherd of 1.39 mm. One body sherd is likely a transitional piece and is extremely thick (14.16 mm – 18.74 mm) relative to the rest and is noted here separately. Base fragment: 15 mm – 23.26 mm.

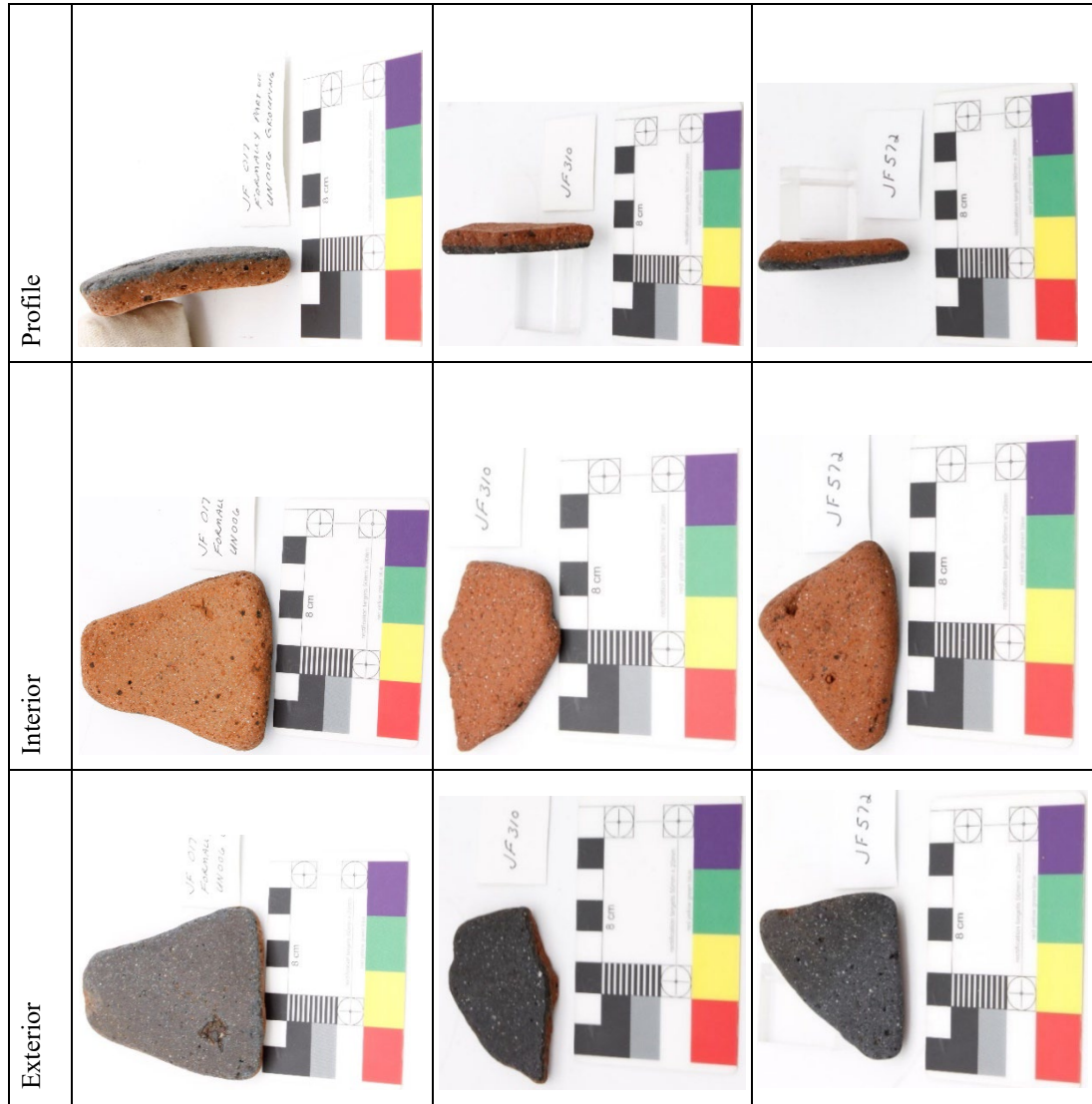
Exterior margin: Gley 1 3/N or Gley 1 4/N (very dark gray/dark gray). Ranges between 0.66 mm – 3.09 mm thick

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 49. Example of Type R03. Top row JF017, middle row JF310, bottom row JF572



R04

This type is a red stoneware with very dark gray/dark gray exterior margins from reduction in oxygen. The exterior margin of the sherd is dark gray. The paste for the core and external margin fading between the two. The body has appeared smooth and the paste has started to fuse but individual minerals are still visible. The light and dark inclusions are very fine to fine, well sorted minerals. There are a few fine voids where the inclusions have burned away. The interior has an eroded black or dark gray matte glaze.

Type: Undetermined

Paste Color: 2.5YR 4/6 (red)

Texture: Medium coarse to coarse

Vitreous: Some but individual granules still visible

Exterior Glaze: N/A

Interior Glaze: Gley 1 3/N or Gley 1 4/N (very dark gray/dark gray)

Inclusions: The darker inclusions are very fine to fine (less than 1 mm – 2 mm) (2-3%); light inclusions are very fine (less than 1 mm) (3%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (1%).

Thickness: 7.95 mm – 12.85 mm. The average thickness is 10.09 mm, with an average difference in each sherd of 1.56 mm

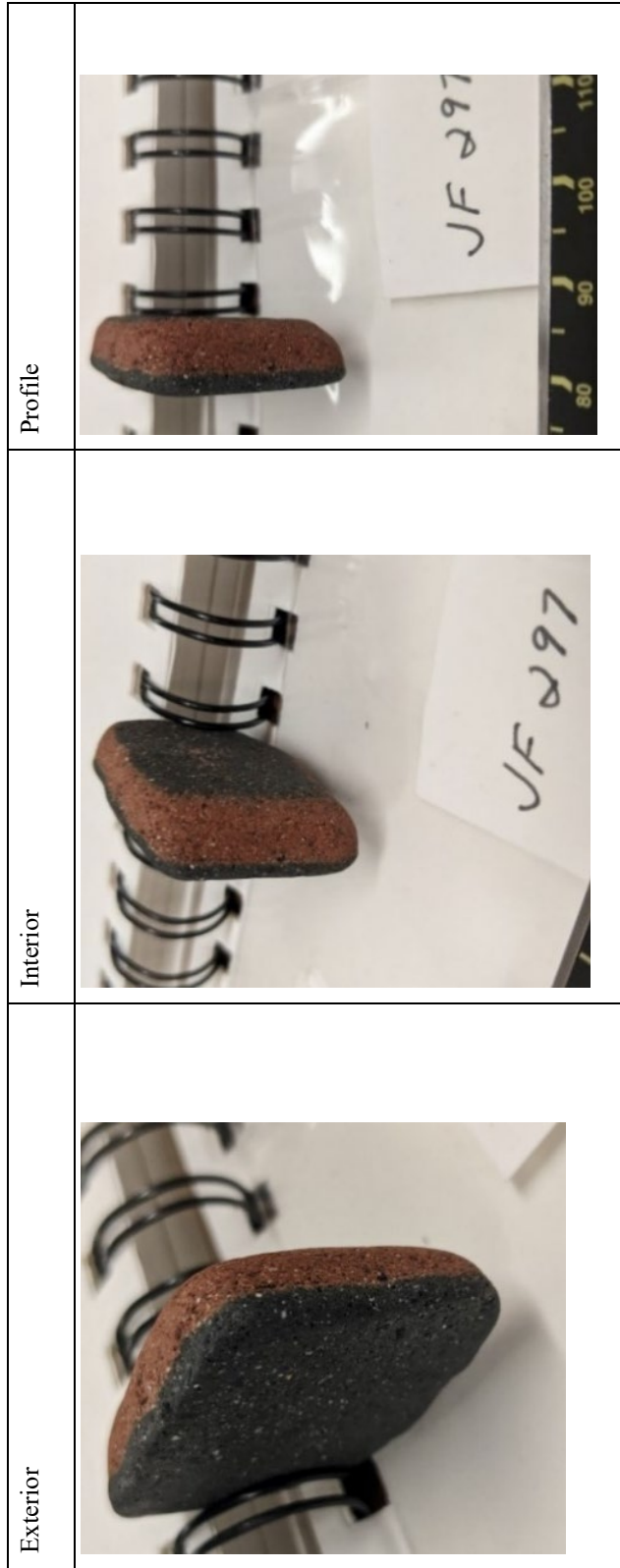
Exterior margin: Gley 1 3/N or Gley 1 4/N (very dark gray/dark gray). Ranges between thin to 0.74 mm – 2.87 mm

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 50. Example of Type R04, JF297



R05

The type is a coarse unglazed red ceramic with dark gray exterior margins. The interior ranges from a dark gray to reddish brown to brown depending on the erosion levels but all the interior margins are thin and pitted. Similarly, if the sherd is very eroded the exterior margin can be very thin. The example images in Appendix C show the variation in the erosion of the type. The core color and external margin have a hard color change. The paste contains fine to medium dark minerals and organics that have mostly burned out and very fine light inclusions. These could be a more eroded type to R04 but the erosion through the paste made the inclusions much more prominent. The paste also appears to have horizontal platy structure.

Type: Undetermined, likely earthenware

Paste Color: 2.5YR 4/6 to 2.5YR 5/6 (Red)

Texture: Medium coarse to coarse

Vitreous: No, but no clean breaks visible and all are moderately to very eroded.

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are fine to medium (1 mm – 5 mm) (1-3%); light inclusions are very fine (less than 1 mm) (3%).

Voids: Fine to medium (1 mm – 5 mm) in size (3%).

Thickness: 5.52 mm – 12.96 mm. The average thickness across the sherds is 9.64 mm, with an average difference in each sherd of 1.07 mm

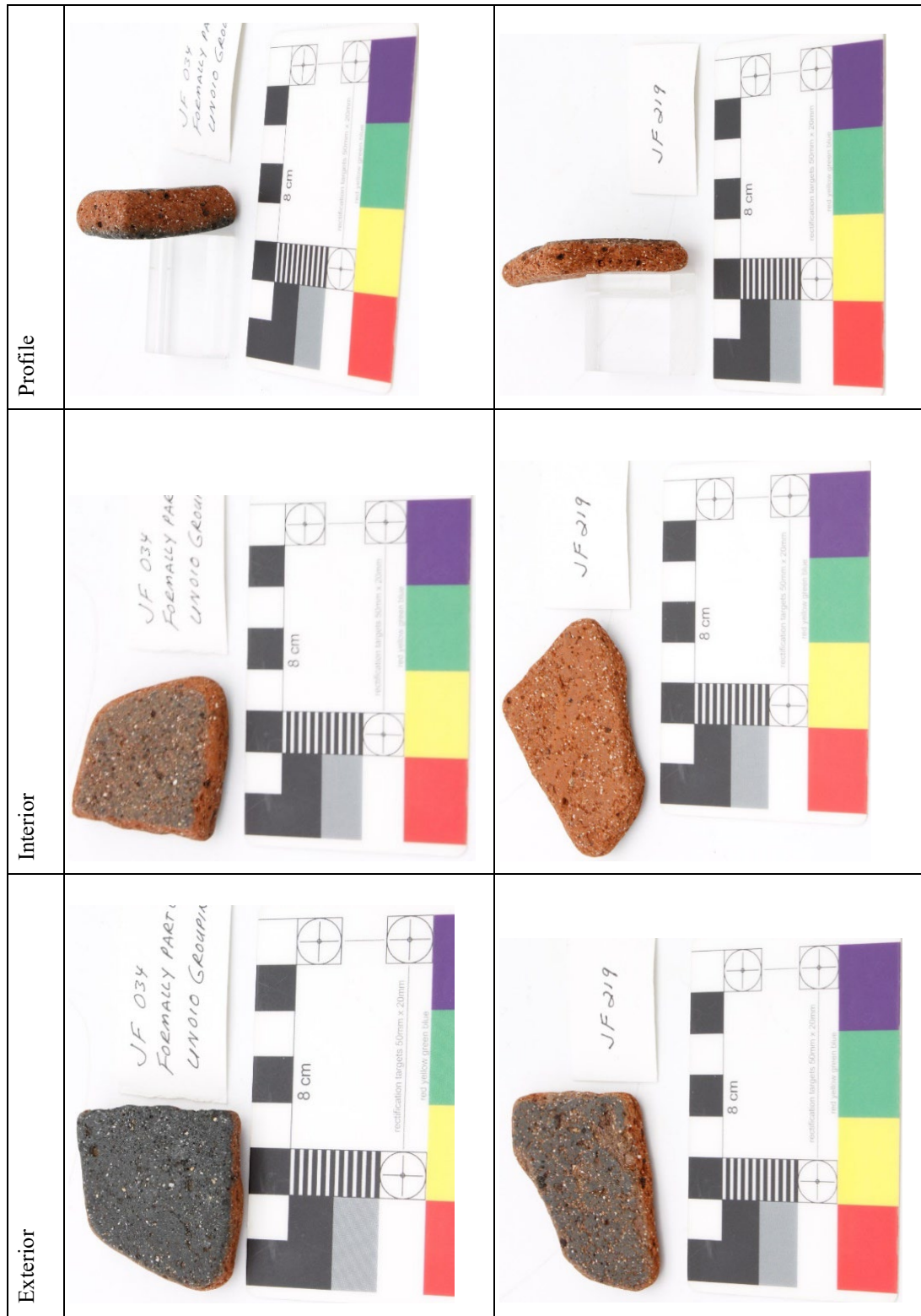
Exterior margin: Gley 1 3/N or Gley 1 4/N (very dark gray or dark gray). Ranges between thin, then 0.79 mm to 4.52 mm

Interior margin: 5YR 5/3, 7.5YR 5/2, 10YR 5/2, Gley 1 4/N (reddish brown, brown, grayish brown, dark gray). Some thin discoloration, color depends on the thickness and erosion of the margin.

Decorations: N/A

Location: SH

Figure 51. Example of Type R05. Top row JF034, bottom row JF219



R06

The paste changes in color from the margins to the core. The exterior is oxidized weak red with the interior a red. The core of the sherd shows evidence of blackening suggesting the organic material was present in the raw clay but was not completely removed in firing. The lighter inclusions in the paste appear to be very fine sands. Additional dark inclusions are fine to medium in size and are very few. The exterior of the sherd is a reduced dark gray/black color glaze. While there are some voids visible on the exterior of the sherd, it is likely due to erosion. Recent breaks on the sherds show the interior is vitreous and compact throughout with very minimal voids.

Type: Stoneware (high fire)

Paste Color: Gley 1 3/N

Texture: Medium coarse to medium fine

Vitreous: Very compact and shiny at the break locations but exterior is coarse.

Exterior Glaze: Gley 1 3/N

Interior Glaze: N/A

Inclusions: The darker inclusions are fine to medium (1 mm – 5 mm) (3%); light inclusions are very fine (less than 1 mm) (10%).

Voids: very fine to fine (less than 1 mm – 2 mm) (1%) only on exterior where eroded.

Thickness: 9.32 mm – 13.33 mm

Exterior margin: 2.5YR 4/2 (weak red) (4.43 mm)

Interior margin: 2.5YR 5/6 (red). (3.21)

Decorations: N/A

Location: SH

Figure 52. Example of Type R06, JF248



R07

Unglazed coarse red earthenware. The paste is consistent throughout and no changes in color. The inclusions are a mix of light and dark materials. Darker medium sized inclusions throughout the sherds. The body is porous with fine to medium voids throughout. Some of the sherds had a piece of large white organics mixed in. The light inclusions are very fine and make up about 5% of the paste. The sherds that were categorized as sidewalls ranged in thickness between 9.72 mm –. The thickest of the sherds identified in the category possibly a transition sherd between the body and the base but was unable to determine which ranged from 14.24 mm – 18.19 mm. There were some that the location of the ceramic was unknown but the sherds had a thickness between 10.24 mm – 12.30 mm.

Type: Earthenware (low fire)

Paste Color: 2.5YR 5/6 to 2.5YR 5/8 (red)

Texture: Coarse

Vitreous: No

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are medium (2.40 mm – 3.50 mm) (3-5%); red granular inclusions are fine to medium (1.37 mm – 2.50 mm) (3-5%), light inclusions are very fine (less than 1 mm) (5%). Some have large (over 5 mm) white inclusions.

Voids: Medium (2.40 mm – 3.50 mm) (5-10%).

Thickness: 7.17 mm - 18.19 mm. The average thickness is 10.66 mm, with an average difference in each sherd of 1.74 mm.

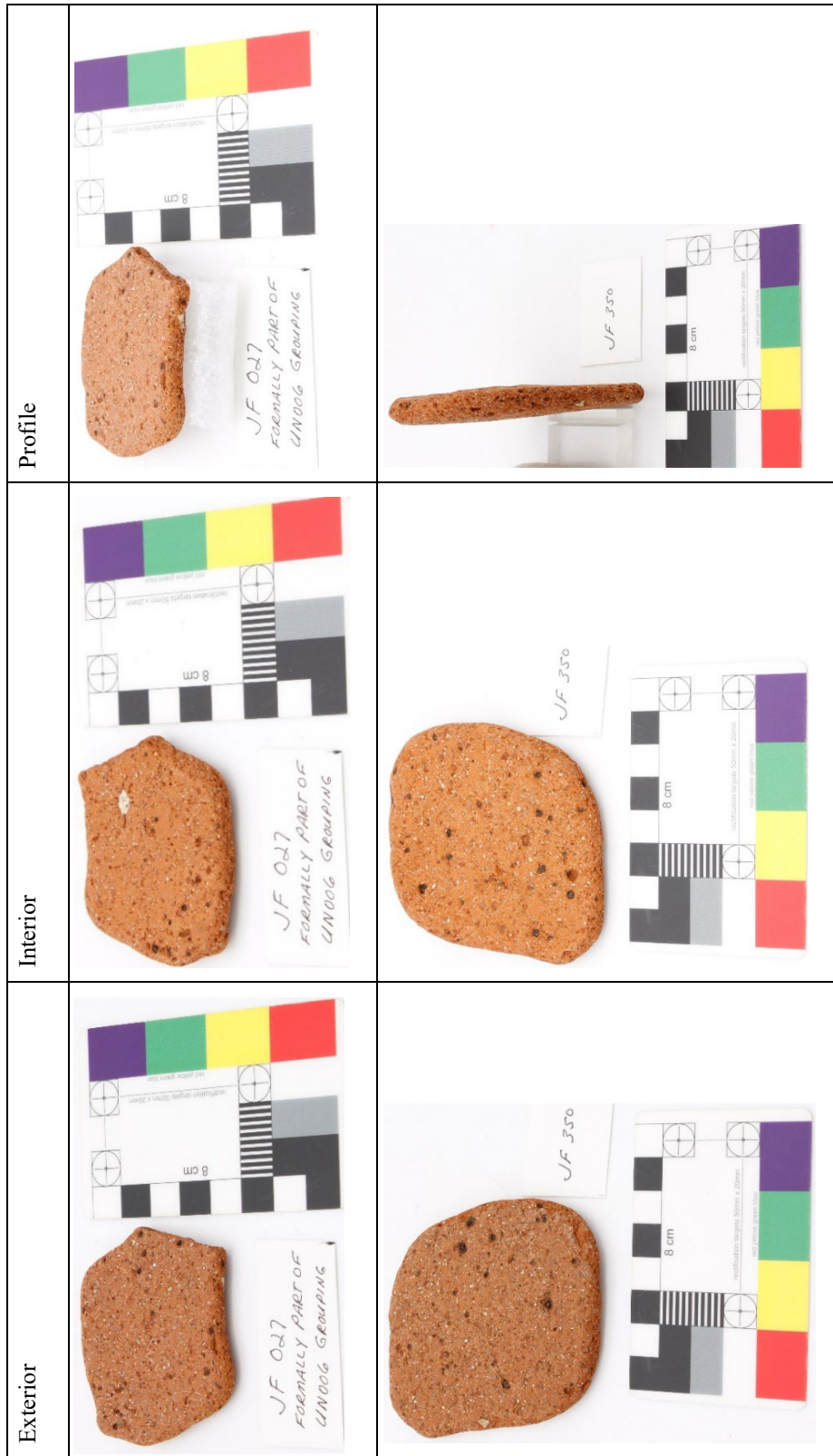
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 53. Example of Type R07. Top row JF027, bottom row JF350



R08

The paste is generally medium coarse (sometimes coarse if more eroded), the red paste is compact with some of the pieces being less porous and slightly vitreous depending on the level of erosion. The paste is consistent throughout and no changes in color. The inclusions are a mix of light and dark materials. The dark inclusions consist of medium to fine sized rounded partials and the light inclusions are very fine. Majority of the sherds have a shiny dark gray/reddish gray glaze on the exterior with no glaze on the interior. Some of the sherds may be unglazed but the firing has made the exterior paste appear glossy.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/6 to 2.5YR 5/6 (red)

Texture: Medium coarse to coarse (more eroded)

Vitreous: Yes, but due to erosion some sherds appear coarser.

Exterior Glaze: 5YR 4/1 to 5YR 5/2 (dark gray to reddish gray) or 2.5Y 4/2 (weak red). Not on all sherds though.

Interior Glaze: Not on all but one sherd appears to have 2.5YR 4/4

Inclusions: The darker inclusions are medium to fine (0.94 mm – 2.12 mm) (2-3%); light inclusions are very fine (less than 1 mm) (5%).

Voids: Fine to medium (1 mm – 5 mm) (3-5%).

Thickness: 5.58 mm – 11.63 mm. The average thickness is 8.7 mm, with an average difference in each sherd of 1.11 mm (does not include rim sherd). Rim: 12.44 mm – 18.09 mm

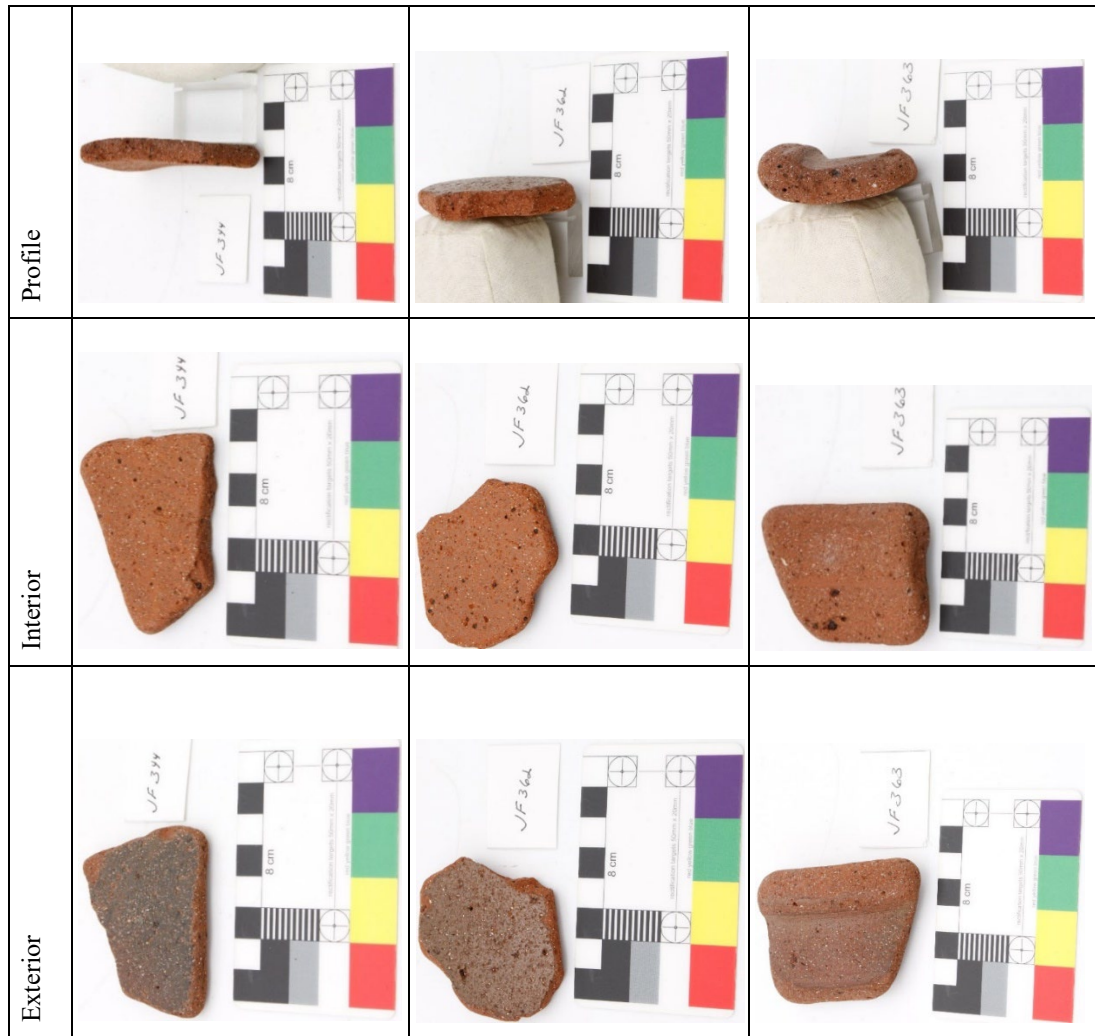
Exterior margin color: N/A

Interior margin color: N/A

Decorations: N/A

Location: SH

Figure 54. Example of Type R08. Top row JF344, middle row JF362, bottom row JF363



R09

Coarse red earthenware with a thin glaze. The paste is consistent throughout and no changes in color. The inclusions are a mix of light and dark materials. Darker medium sized inclusions throughout the sherds (3-5%). The body is porous with fine to medium voids throughout. Some of the sherds had a piece of large white organics mixed in. The light inclusions are very fine and make up about 3% of the paste. The interior of some of the sherds have indentations from where either the coils came together or people were using their fingers to smooth. It is possible this type is related to R07 and the pastes color differences are where the glaze is located. It is possible R07 is more likely to erode due to lack of glaze or finish.

Type: Earthenware (low fire)

Paste Color: 2.5YR 4/6 (red)

Texture: Coarse

Vitreous: No

Exterior Glaze: 2.5Y 4/1, 5Y 4/1, 10YR 4/1 (dark gray)

Interior Glaze: 5YR 3/1, 5YR 4/2, 2.5YR 4/1, 7.5YR 5/2 (very dark gray, dark reddish gray, brown). Depends on the sherd and thickness of the glaze. Very thin to none.

Inclusions: The darker inclusions are medium (2.08 mm – 2.63 mm) (3-5%); light inclusions are very fine (less than 1 mm) (3%). Some have large (over 5 mm) white inclusions.

Voids: Fine to medium (1 mm – 5 mm) (5%).

Thickness: 6.84 mm – 11.24 mm. The average thickness is 8.84 mm, with an average difference in each sherd of 1.28 mm

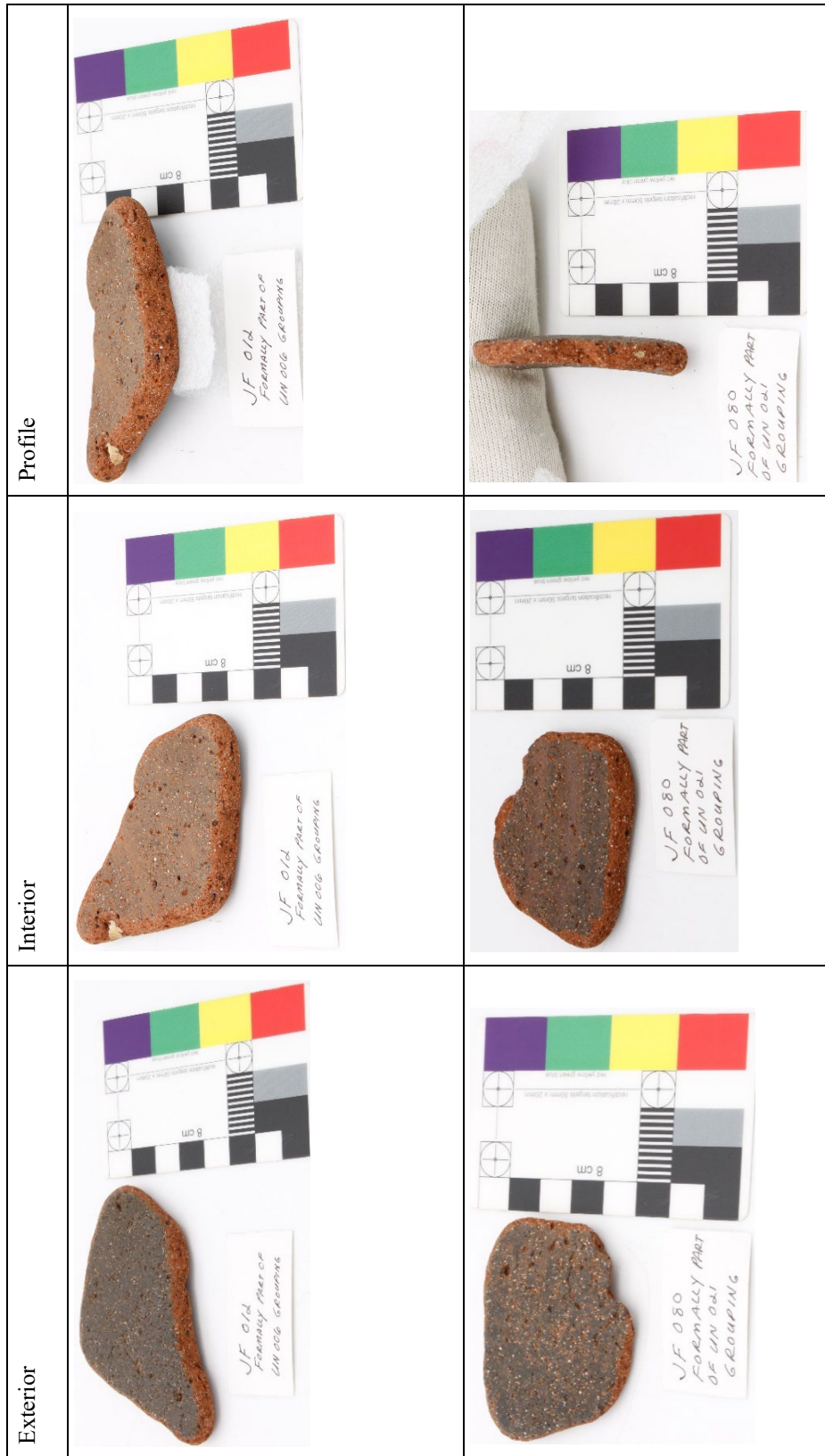
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 55. Example of Type R09. Top row JF012, bottom row JF080



R10

The type is a medium coarse to coarse red paste with remnants of either a dark reddish gray or very dark gray on the exterior. The only sherd with some glaze on the interior is the rim sherd. The paste contains very fine light inclusions, and fine dark tempers, many of which have burned away leaving darkened voids. While there are some voids, the paste is still compact. The sherds are consistent in thickness except for the neck, rim, and the sherd with a joint or coil in it.

Type: Undetermined, poor stoneware?

Paste Color: 2.5YR 4/6, 2.5YR 5/6 (red)

Texture: Medium coarse to coarse

Vitreous: Not on the exterior.

Exterior Glaze: Some have 5YR 4/2 or Gley 1 3/N (dark reddish gray or very dark gray).

Interior Glaze: 5YR 4/2 (dark reddish gray). Only on rim sherd, JF429.

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (3%); light inclusions are very fine (less than 1 mm) (3%).

Voids: very fine to fine (less than 1 mm – 2 mm) (3%). Mostly from burnouts of the dark inclusions

Thickness: SW and UNK: 6.22 mm – 13.8 mm, the average thickness is 10.27 mm, with an average difference of 1.23 mm* (one sherd, JF358, is a coil or joint location, if left out the average sherd thickness was 9.91 mm and difference is 0.46 mm). Neck: 10.36 mm – 12.91 mm. Rim: 10.35 mm – 13.58 mm

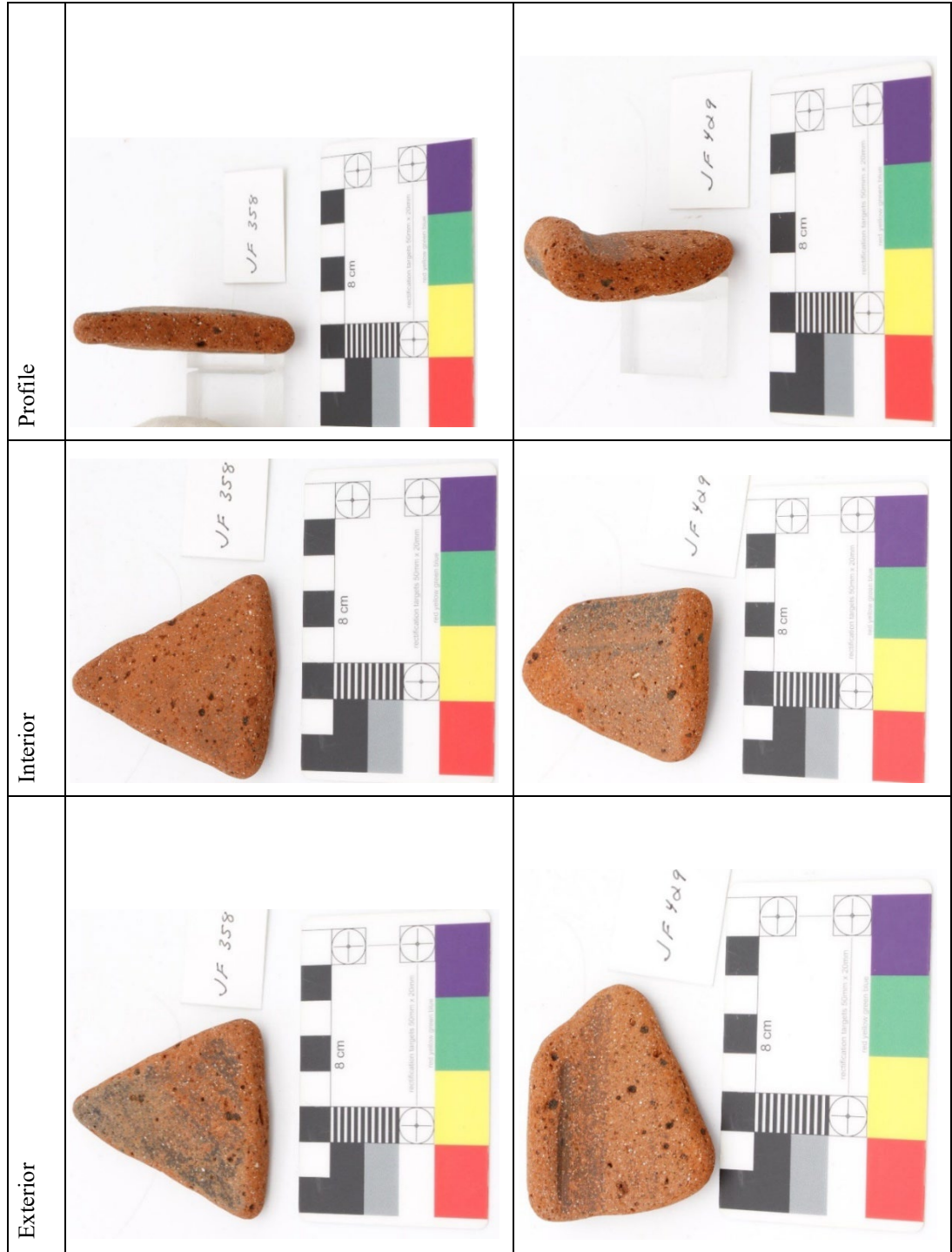
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 56. Example of Type R10. Top row JF358, bottom row JF429



R11

The type is a very coarse red earthenware with medium voids throughout. Some of the sherds have discoloration in the exterior margins, though it can be not present on very eroded sherds, or range from very thin to 2.89 mm. The discoloration is a dark reddish gray brown to brown. One of the sherds has some dark gray glaze mostly eroded away. The paste contains fine to medium dark minerals and organics that have mostly burned out, fine rounded red inclusions and very fine to fine light inclusions including quartz or mica inclusions. There is no glaze present on the existing sherds but they are all very eroded.

Type: Earthenware (low fire)

Paste Color: 2.5YR 4/6, 2.5YR 5/6, 10R 5/6 (red)

Texture: Coarse

Vitreous: No

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are fine to medium (1 mm – 5 mm) (5%); red inclusions are fine rounded (1 mm – 2 mm) (2-3%); light inclusions are very fine (less than 1 mm) (1%) and fine (1 mm – 2 mm) (1%).

Voids: Fine to medium (1 mm – 5 mm) (5-10%)

Thickness: 8.31 mm – 15.62 mm. The average thickness is 12.03 mm, with an average difference in each sherd of 2.22 mm

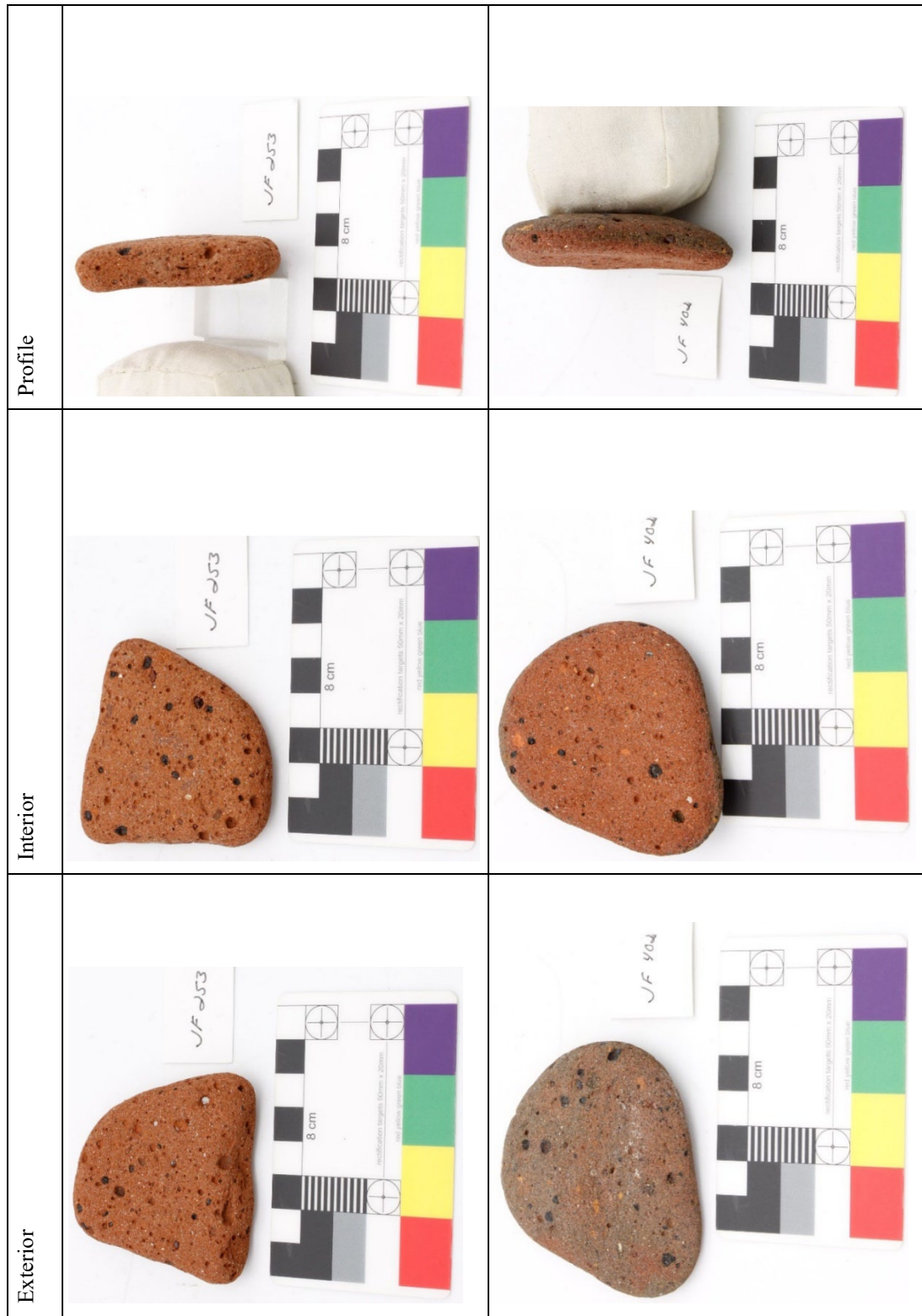
Exterior margin: 5YR 4/2, 7.5YR 4/2 (dark reddish gray to brown). Some do not have but can range from thin to 1.76 mm – 2.89 mm

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 57. Example of Type R11. Top row JF253, bottom row JF402



R12

The type has a coarse red paste with discoloration in the exterior margins, though most of the discoloration is very thin. The discoloration is a grayish brown to reddish brown. One of the sherds has some dark gray glaze mostly eroded away. The paste contains fine to medium dark minerals and organics that have mostly burned out, fine rounded red inclusions, and very fine light inclusions. High quality earthenware or low-quality stoneware even though the paste is coarse, one sherd (JF518) had a slightly clean break and shows the interior starting to fuse and is not as rough.

Type: Undetermined, poor stoneware?

Paste Color: 2.5YR 5/6, 5YR 5/8 (red, yellowish red)

Texture: Coarse

Vitreous: No, but a recent break on JF518 shows the interior starting to fuse and is not as rough.

Exterior Glaze: Gley 1 4/N (dark gray). Not always present

Interior Glaze: N/A

Inclusions: The darker inclusions are fine to medium (1 mm – 5 mm) (2-3%); red inclusions are fine and rounded (1 mm – 2 mm) (1-2%); light inclusions are very fine to fine (less than 1 mm – 2 mm) (3-5%).

Voids: Fine to medium (1 mm – 5 mm) (3%)

Thickness: 9.67 mm – 13.14 mm. The average thickness is 11.43 mm, with an average difference in each sherd of 1.57 mm

Exterior margin: 5YR 5/4, 10YR 5/2 (reddish brown to grayish brown). Very thin

Interior margin: N/A

Decorations: N/A

Location: SH, MB

Figure 58. Example of Type R12. Top row JF202, bottom row JF294



R13

The type consists of a very well sorted but porous earthenware. The paste has voids throughout the ceramic and black coring in the center, likely a result of firing too quickly or from the lack of oxygen. There is no sign of vitrification in the sherd. There is no visible light or dark inclusions in the sherd. The paste has fine to medium voids in a platy structure.

Type: Earthenware (low fire)

Paste Color: 10R 5/6 (red), and 5Y 3/1 (very dark gray)

Texture: Coarse

Vitreous: No

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: None visible

Voids: Fine to medium (1 mm – 5 mm) (5-7%), platy and circular

Thickness: 12.02 mm – 24.01 mm. The average thickness is 18.01 mm, with an average difference in each sherd of 11.99 mm

Exterior margin: 10R 5/6 (red).

Interior margin: 10R 5/6 (red)

Decorations: N/A

Location: SH

Figure 59. Example of Type R13, JF148



R14

The stoneware is a compact medium coarse red paste. The exterior has some remnants of a dark gray glaze and under the rim is a dark grayish brown glaze over top. Majority of the glaze is gone. The body has appeared smooth and the paste has started to fuse but individual minerals are still visible. The light inclusions are very fine to fine minerals and quartzite; the dark inclusions are fine dark minerals or organic matter.

Type: Stoneware (high fire)

Paste Color: 2.5YR 5/6 (red)

Texture: medium coarse

Vitreous: Yes, starting to fuse.

Exterior Glaze: Gley 1 3/N (very dark gray) and 10YR 4/2 (dark grayish brown)

Interior Glaze: N/A

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (1-2%); light inclusions are very fine to fine (less than 1 mm – 2 mm) (5%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (3-5%)

Thickness: 11.99 mm – 20.85 mm

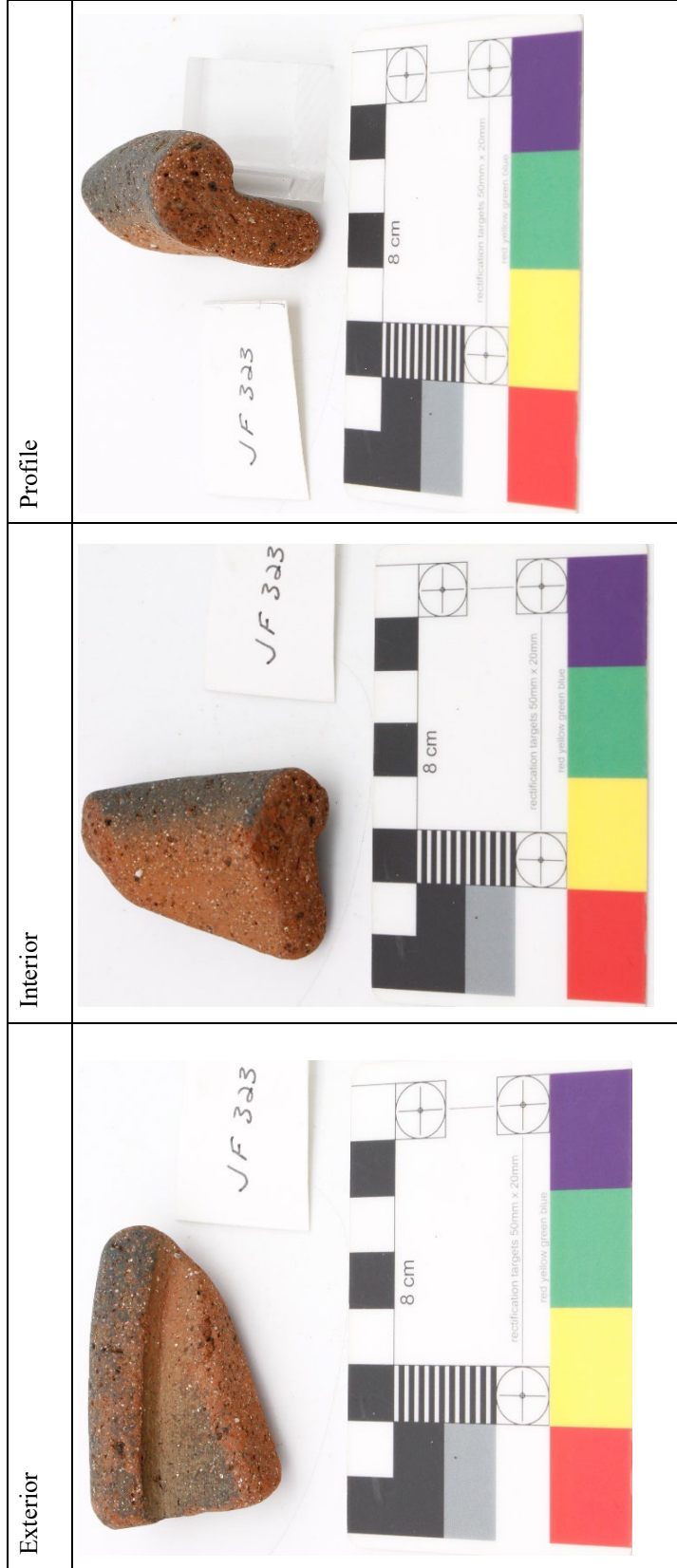
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 60. Example of Type R14, JF323



R15

The types is an oxidized red/dark red with large amounts of dark inclusions mixed throughout creating a darker looking paste. The interior paste is coarse/not glossy and the red core appears to erode easily. The inclusions in the paste appear to be fine well sorted fine to medium black sands. There are some very fine white inclusions mixed through the paste but account for only around 3% of the paste. There are varying sizes in the voids throughout but has multiple medium sized voids throughout each of the sherds either on the exterior or interior. The exterior of the sherd is a reduced dark gray/black colored with the white inclusions visible. The exterior margins of the sherd varied between barely there – 16.32 mm (generally the margin was around 0.55 mm – 4.83 mm). Does have some similarities to DR16 but paste is different enough to be broken into two types.

Type: Undetermined

Paste Color: 10R 4/6, 2.5YR 4/6 (red, reddish brown)

Texture: Coarse

Vitreous: Very coarse but may be due to erosion level. Some fusion on the exterior of the margin which is very strong and compact.

Exterior Glaze: 2.5Y 4/2 (dark grayish brown), some have specs of an ash glaze or have a particle thinner iron glaze (different from the margin).

Interior Glaze: N/A

Inclusions: The darker inclusions are very fine to medium (less than 1 mm – 2.61 mm); very fine to fine are 3-5%, while medium size are 10%. Red inclusions are fine to medium (1 mm – 3 mm) (5%). Light inclusions are very fine (less than 1 mm) (3%).

Voids: Range from very fine to medium in size (0.5 mm – 4.58 mm). Very fine to fine account for 3-5%, medium account for 10%.

Thickness: 6.16 mm – 20.41 mm, average range in sherd thickness was 9.68 mm with the average difference in each sherd is 1.67 mm*. *A couple of the sherds were especially thick (base or lower sidewall pieces (JF244 or JF225), if left out the average sherd thickness was 8.90 mm and the average difference is 0.81 mm.

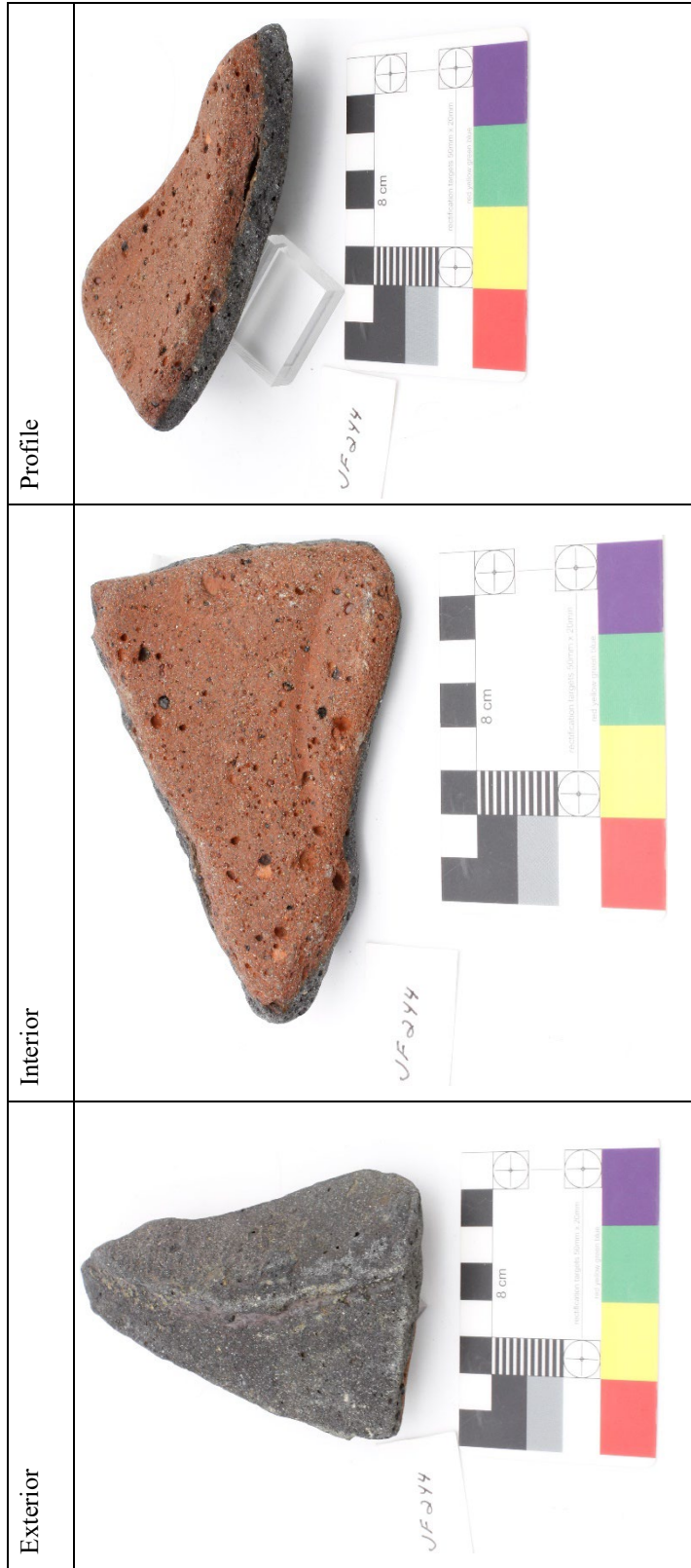
Exterior margin: Gley 1 3/N (dark gray). Ranges from thin – 16.18 mm (this was the thickest part of the base). Majority was between 0.55 mm – 4.83 mm

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 61. Example of Type R15, JF244



R16

The paste is an oxidized red with large amounts of dark inclusions mixed throughout creating a mottled look to the paste that looks darker than it is. The paste is coarse/not glossy and the red core appears to erode easily. The exterior margins appear to be further along in the fusion process. The inclusions in the paste appear to be fine well sorted black sands very fine to medium in size. There are some very fine white inclusions mixed through the paste but account for only around 5% of the core paste. There are some very fine to medium sized voids in the paste where the darker organics have burned away or the minerals have eroded. The exterior of the sherd is a reduced dark gray/black colored with the white inclusions visible. A reddish brown glaze is present on the exterior of one of the sherds but it is not continuous. The exterior margins of the sherd varied between barely there to 6.32 mm (generally the margin was around 2.09 mm – 2.57 mm). The sherds had a thickness between 6.22 mm – 17.33 mm, average range in sherd thickness was 1.12 mm. Although it should be noted that one of the sherds was thicker than the rest bringing the average up, if left out the average sherd thickness was 0.62 mm. Does have some similarities to R15 but pastes are different enough to be broken into two types.

Type: Undetermined

Paste Color: 10R 4/6 (red)

Texture: Coarse

Vitreous: Very coarse but may be due to erosion level. Some fusion on the exterior of the margin

Exterior Glaze: 5YR 3/2 (reddish brown), only found on one.

Interior Glaze: N/A

Inclusions: The darker inclusions are very fine to medium (less than 1 mm – 2.61 mm) (10-20%); light inclusions are very fine (less than 1 mm) (5%).

Voids: Range from very fine to medium in size (0.5 mm – 3.12 mm) (3-10%). Very fine to fine (3-5%), medium account on interior account for (5-10%).

Thickness: 6.22 mm – 17.33 mm, average thickness was 9.35, average difference in sherd thickness was 1.12 mm. One sherd was especially thick, if left out the average sherd thickness was 8.68 mm, and difference was 0.625 mm)

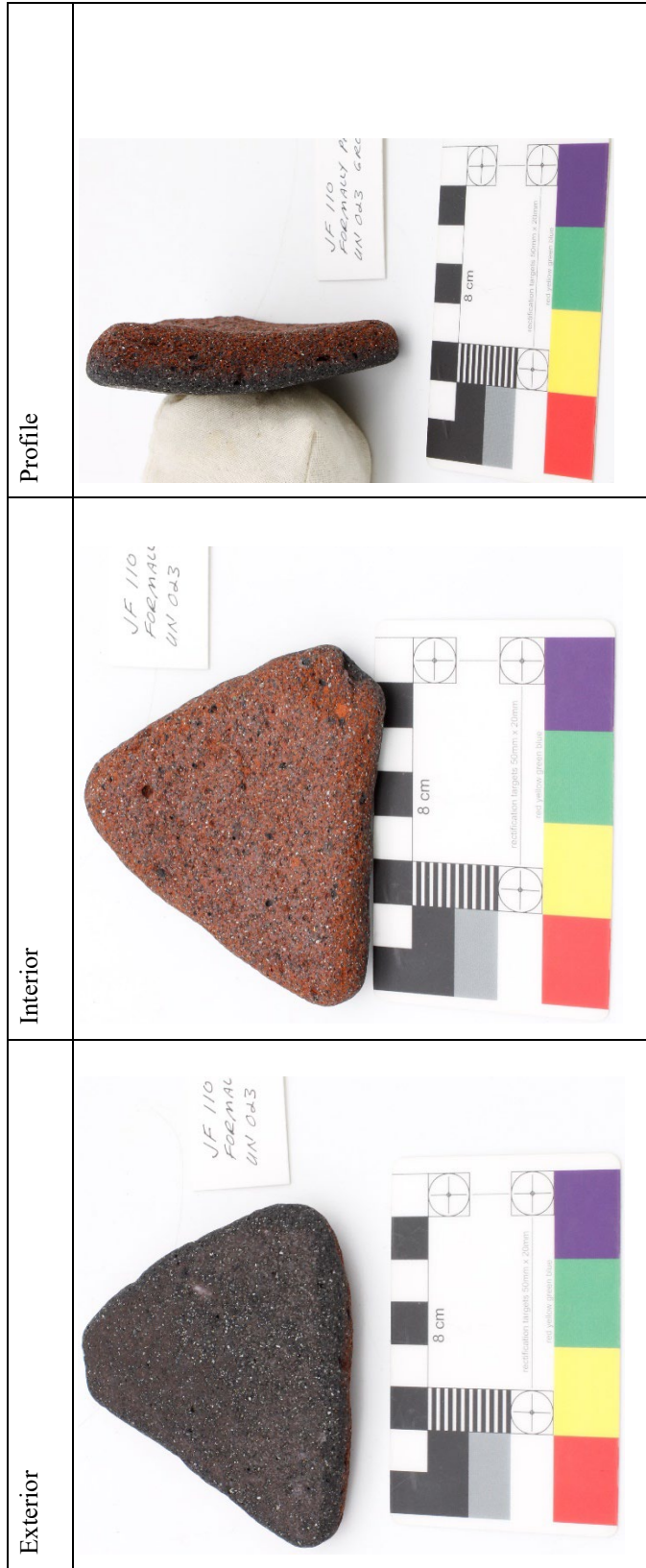
Exterior margin: Gley 1 2.5/N (black). Ranges between barely there – 6.32 mm (generally the margin was around 2.09 mm – 2.57 mm)

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 62. Example of Type R16, JF110



R17

The type is a compact dusty red to red stoneware with the paste color consistent throughout the sherd. The paste has vitrified though there are some voids within the body from air pockets. There are few, very fine light inclusions in the paste which may be part of the original clay. The exterior glaze is a reddish brown overtop of a very dark gray iron glaze undercoat. The undercoat is about 1.19 mm thick. The interior has a dark gray glaze.

Type: Stoneware (high fired)

Paste Color: 10R 3/4 (dusty red) 5.31 mm exterior, 2.5YR 4/6 (red) 2.88 mm interior

Texture: Medium fine

Vitreous: Yes

Exterior Glaze: 5YR 3/2 and Gley 1 2.5/N (dark reddish brown and black). Possibly has a fly ash glaze on top. Gray is 1.83 mm thick

Interior Glaze: Gley 1 3/N (very dark gray). Gray is 0.85 mm thick

Inclusions: Light inclusions are very fine (less than 1 mm) (>1%).

Voids: very fine (less than 1 mm) (1%).

Thickness: 10.83 mm – 12.03 mm. The average thickness is 11.43 mm, with an average difference in each sherd of 1.2 mm

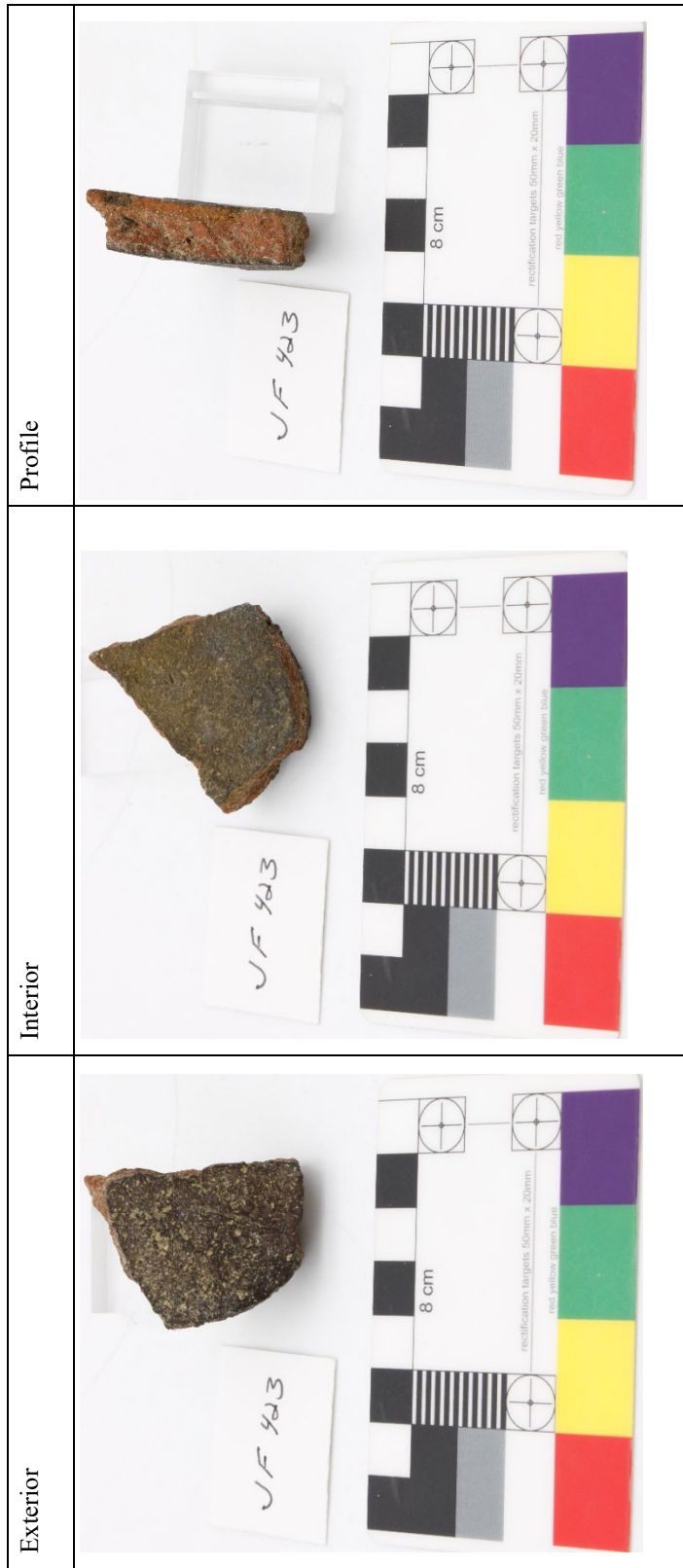
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: NB

Figure 63. Example of Type R17, JF423



R18

Yellowish red unglazed stoneware. The exterior of the stoneware has had some color change as part of the firing process. The paste is compact and has started to vitrify but has some platy structure to the interior. The paste contains fine to medium dark minerals, fine to medium rounded red inclusions, and very fine light inclusions throughout the sherd. There are some voids where organics have burned away leaving a glossy residue. The sherd has a wide variation in thickness.

Type: Stoneware

Paste Color: 5YR 4/6 (yellowish red)

Texture: Medium coarse to medium fine

Vitreous: Yes, partial

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are fine to medium (1 mm – 5 mm) (5-7%); red inclusions are fine to medium (1 mm – 5 mm) (3%); light inclusions are very fine (less than 1 mm) (3-5%).

Voids: Fine to medium (1 mm – 5 mm) (5-7%)

Thickness: 10.41 mm – 15.45 mm. The average thickness is 12.93 mm, with an average difference in each sherd of 5.04 mm

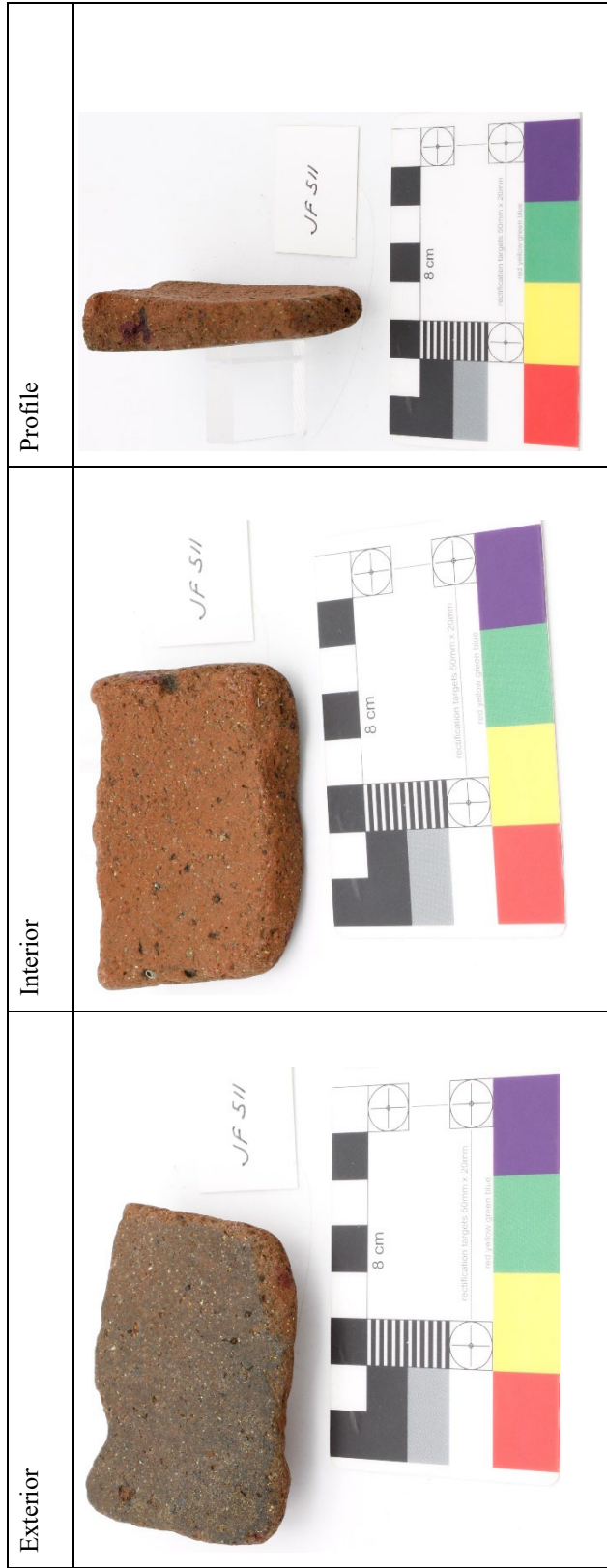
Exterior margin: 2.5Y 3/1 (very dark gray), No margin.

Interior margin: N/A

Decorations: N/A

Location: NB

Figure 64. Example of Type R18, JF511



R19

Red moderately fine glazed stoneware. The exterior of the stoneware has a black matte glaze with some dark grayish brown barely visible over top. The paste is compact and has started to vitrify. Much of the interior fused but there are some very fine voids from air pockets or the organic materials incinerating. There are voids that have a glossy black residue. The paste contains very fine dark minerals, and very fine light inclusions throughout the sherd, including the glaze.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/6 (red)

Texture: Medium fine

Vitreous: Yes

Exterior Glaze: Gley 1 2.5/N (black) and 10YR 4/2 (dark grayish brown)

Interior Glaze: N/A

Inclusions: The darker inclusions are very fine (less than 1 mm) (1-2%).
light inclusions are very fine (less than 1mm) (3%).

Voids: Very fine (less than 1 mm) (1-2%).

Thickness: 8.76 mm – 10.26 mm. The average thickness is 9.51 mm, with an average difference in each sherd of 1.5 mm

Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 65. Example of Type R19, JF593



Dark Reds

DR01

The type is a well sorted reddish brown stoneware with a moderately coarse paste. The sherds show the beginning of the fusion between the paste and inclusions but the granules are clearly visible. The very fine well sorted light inclusions are visible throughout the paste. There are few fine dark inclusions or voids. The voids appear to be from the burnout of inclusions. While not on all, the exterior of the sherds has a thin dark gray slip glaze.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/3, 2.5YR 4/4 (reddish brown)

Texture: Moderately coarse

Vitreous: Slightly

Exterior Glaze: 7.5YR 3/1, 10YR 3/1, or 5YR 5/2 (very dark gray, reddish gray)

Interior Glaze: N/A

Inclusions: The darker are inclusions fine (1 mm – 2 mm) (3%); light inclusions very fine (less than 1 mm) (5%).

Voids: Fine (1 mm – 2 mm) (3%);

Thickness: 6.81 mm – 15.66 mm. The average thickness is 9.11 mm, with an average difference in each sherd of 1.86 mm

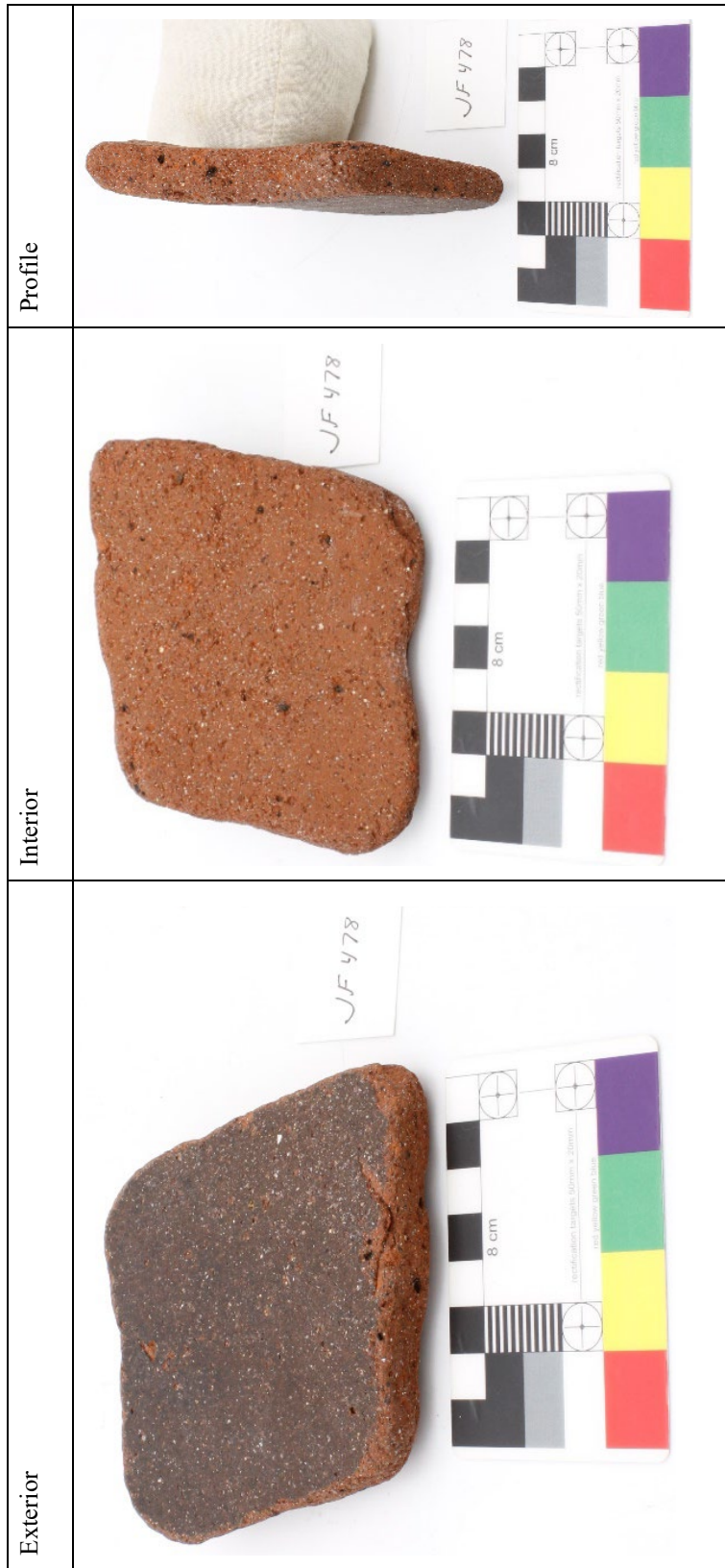
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 66. Example of Type DR01, JF478



DR02

Unglazed stoneware. The paste is very compact. It has started to vitrify but is not very glossy and contains some fine voids throughout the sherd. The voids vary in shape and are not all circular. The paste is an oxidized red color and is unglazed but the exterior is a dark reddish gray due to incomplete oxidation during the firing process. The paste contains some fine dark inclusions but generally there are more of the very fine well sorted light inclusions.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/4 (reddish brown), exterior of sherd is unglazed but has changed color during firing to 5YR 4/2 (dark reddish gray).

Texture: Moderately coarse

Vitreous: Yes

Exterior Glaze: See paste color

Interior Glaze: N/A

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (1-2%); light inclusions are very fine (less than 1 mm) (4%).

Voids: Fine (1 mm – 2 mm) (1-2%)

Thickness: 7.54 mm – 8.86 mm. The average thickness is 8.2 mm, with an average difference in each sherd of 1.32 mm

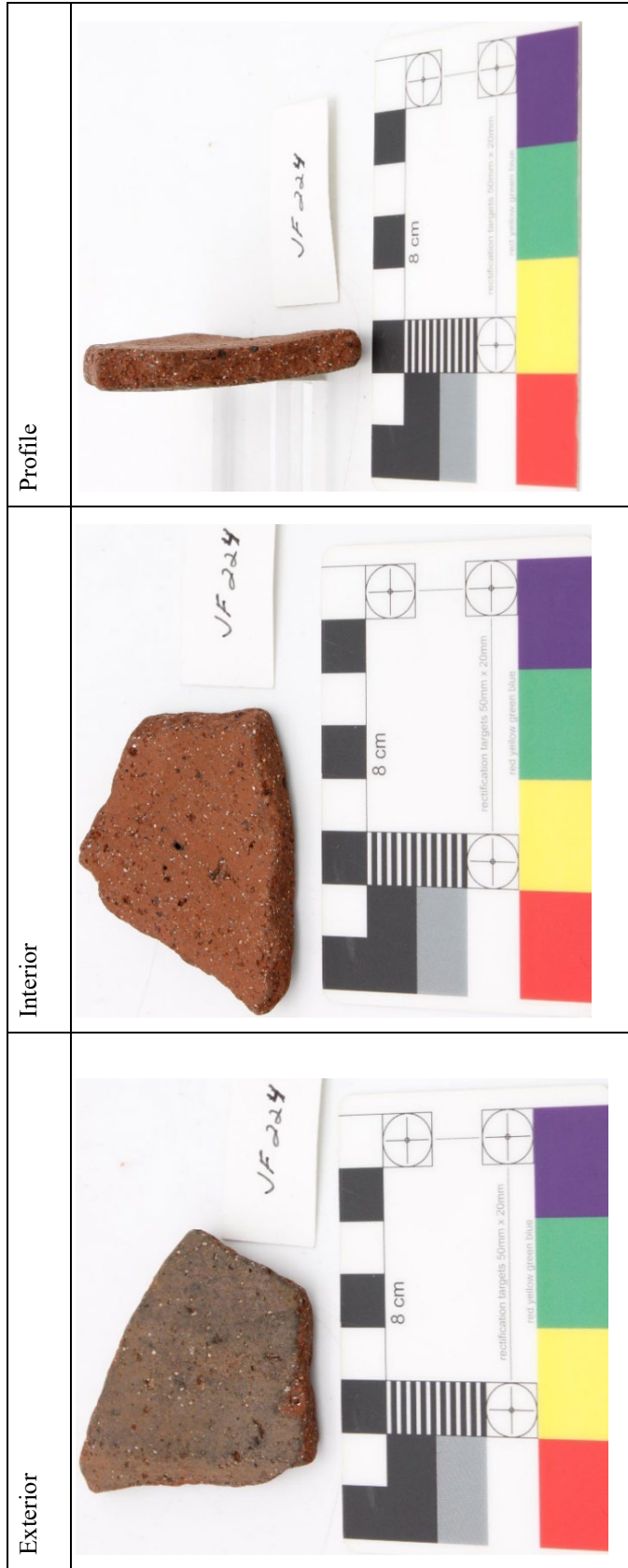
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 67. Example of Type DR02, JF224



DR03

Unglazed dense stoneware. The paste is a weak red or reddish brown but all the sherds show discoloration on the exterior from various exposure to heat sources. Some sherds have blacked area, likely due to exposure to a secondary heat source. The inclusions are visible throughout the sherds and the dark tempers are very fine to fine. The paste contains many very fine light inclusions but is still smooth to the touch. The sherds contain varying levels of voids and many appear to be from burnout of organic materials and tend to be angular. The base fragment (JF295) shows evidence of the coil and throwing method of construction as it is uneven around the edges. Some locations have brush marks or striations from smoothing.

Type: Stoneware (high fired), unglazed

Paste Color: 2.5YR 4/2 (weak red), 2.5YR 4/3 (reddish brown).

Texture: Moderately coarse due to inclusions, but smooth to the touch

Vitreous: Yes, waxy/shiny in appearance

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are very fine to fine (0.5 mm -1.75 mm) (3-5%); light inclusions are very fine (less than 1 mm) (5-10%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (3-5%)

Thickness: SW: 6.78 mm – 13.01 mm, the average thickness is 9.51 mm, with an average difference in each sherd of 2.57 mm. Base sherd: 9.93 mm – 20.03 mm

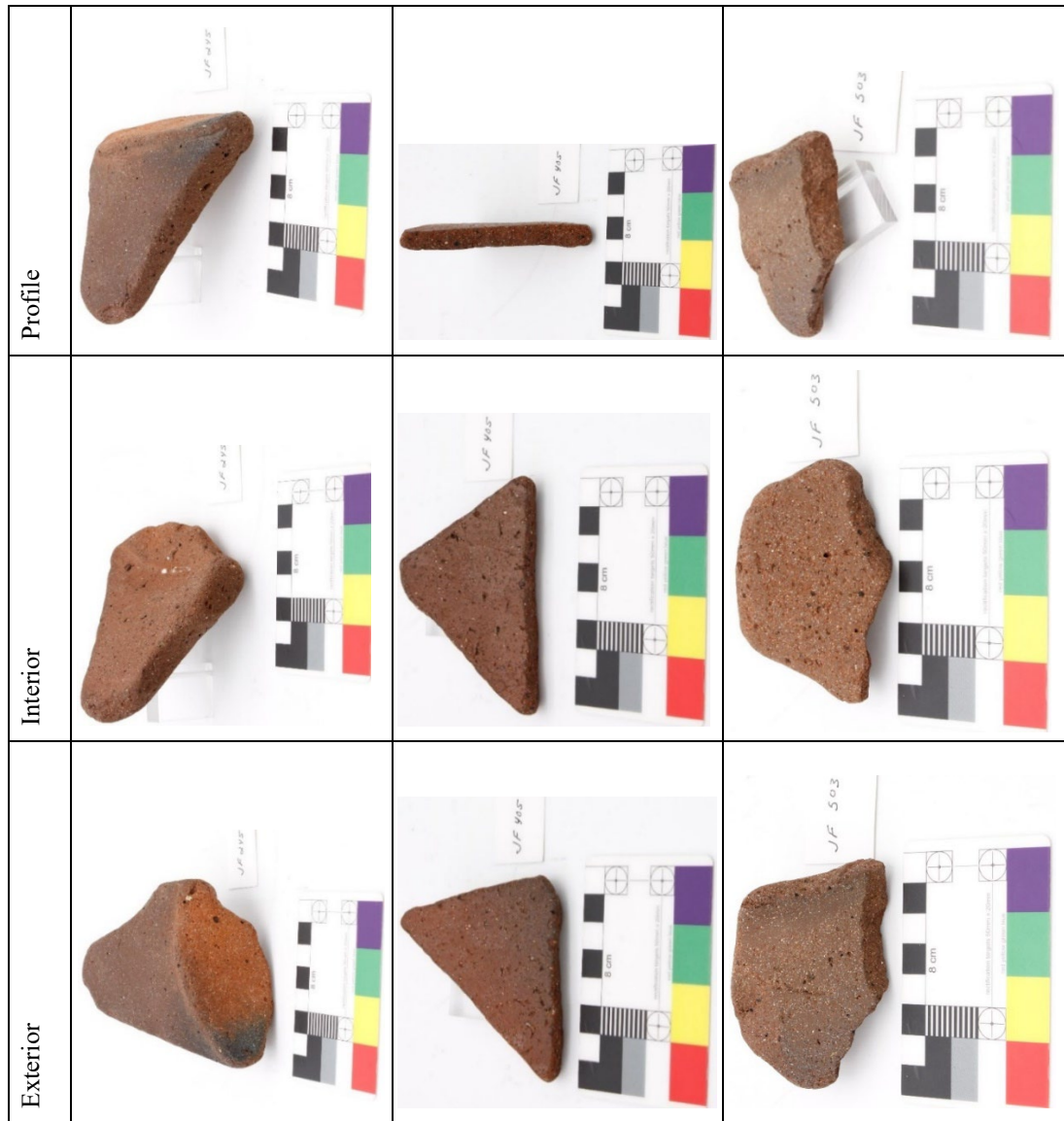
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 68. Example of Type DR03. Top row JF245, middle row JF4.5, bottom row JF503



DR04

Unglazed stoneware, though some appear to have remnants of wood ash glaze from the kiln. The paste varies a bit between a weak red and reddish brown depending on the location of the sherd. The paste is compact and has started to vitrify. The paste shows melting between the fabrics but the granules are visible. The dark inclusions are generally round and fine in size. The light inclusions are very fine and well sorted throughout the paste. The mound on one of the sherds, JF241, is 22.91 mm by 16 mm. The presence of the yellow wood ash glaze suggests the sherd is from around the top of the body. Additionally, the glazes' location concentrated to one side of the mound but not on the opposite side suggests that the lug was covering that portion of the body during the firing process

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/2 (weak red), 2.5YR 4/3, 2.5YR 4/4 (reddish brown); exterior is 5YR 4/2 (reddish gray),

Vitreous: Yes. Has a waxy appearance.

Texture: Moderately coarse to coarse depending on erosion level

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (2-3%); light inclusions are very fine (less than 1 mm) (5-10%).

Voids: Fine (1 mm – 2 mm) in size (1%).

Thickness: 6.63 mm – 14.51 mm, average sherd thickness 9.6 mm, average difference 0.62 mm

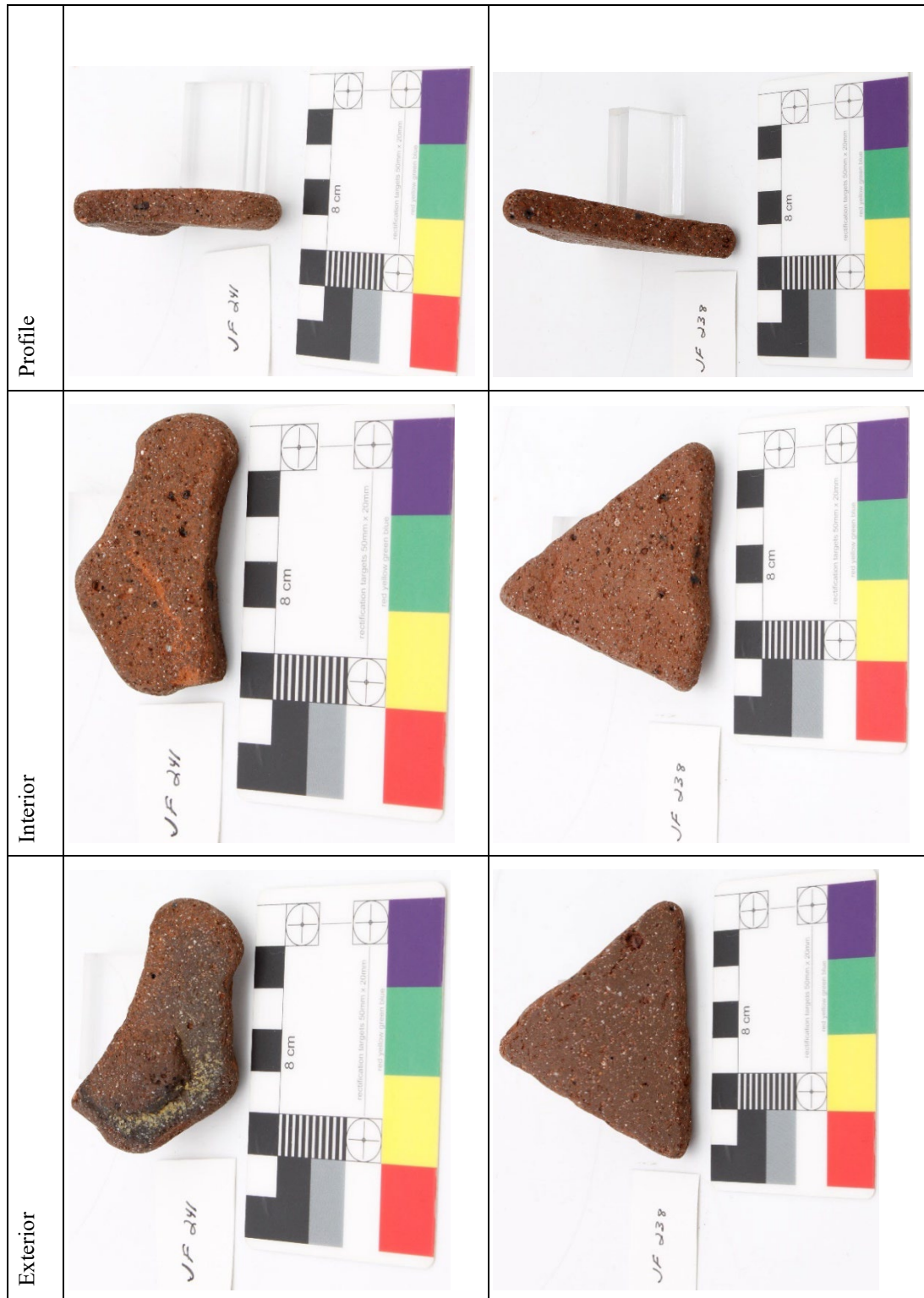
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 69. Example of Type DR04. Top row JF241, bottom row JF238



DR05

The paste is compact and an oxidized weak red to reddish brown color. The exterior margin and the core paste have a hardline distinction. The core paste color is consistent into the interior. The inclusions in the paste appear to be fine well sorted sands and some organic materials. The dark inclusions are fine in size and vary throughout the sherds. The exterior margins of the sherds are a reduced dark gray/black. On the exterior of a few of the sherds there are spots of a glossy reddish brown glaze visible.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/2(weak red), 2.5YR 4/3, 2.5YR 4/4 (reddish brown)

Texture: Moderately coarse to coarse depending on erosion level

Vitreous: Yes, beginning to fuse

Exterior Glaze: 5YR 3/2 (dark reddish brown)

Interior Glaze: N/A

Inclusions: The darker inclusions are fine to medium (1 mm – 5 mm) (2-3%); light inclusions are very fine (less than 1 mm) (5%).

Voids: Fine (1 mm – 2 mm) (3-4%)

Thickness: 8.43 mm – 14.07 mm. The average thickness is 11.10 mm, with an average difference in each sherd of 2 mm* (one sherd has large difference between max and min, without it the average difference would be 1.36 mm)

Exterior margin: Gley 1 2.5/N or Gley 1 3/N (black/very dark gray). Ranges between thin and 1.08 – 2.33 mm

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 70. Example of Type DR05. Top row JF591, bottom row JF278



DR06

The type is a coarse unglazed reddish brown ceramic with dark gray exterior margins. The interior is a dark gray, the margins are thin and pitted with multiple voids. The interior appears to have areas where the coils were not smoothed well making the surface uneven. The exterior is relatively smooth, thin, and has very few very fine voids. The core color and external margin have a hard color change. The core and exterior paste contain very fine to fine dark minerals. The entire sherd contains very fine light inclusions.

Type: Undetermined, stoneware?

Paste Color: 2.5YR 4/3 (reddish brown)

Texture: Moderately coarse

Vitreous: Slightly

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (2%); light inclusions are very fine (less than 1 mm) (5%).

Voids: Interior has fine to medium voids (5%) but majority of the rest of the sherds have fine to none

Thickness: 10.1 mm – 13.69 mm, the average thickness is 11.89 mm, with an average difference in the sherd of 3.59 mm

Exterior margin: Gley 1 3/N (very dark gray), light inclusions visible. Average 1.54 mm

Interior margin: Gley 1 4/N (dark gray). Too thin to measure

Decorations: N/A

Location: SH

Figure 71. Example of Type DR06 JF392.



DR07

The type is a compact, weak red stoneware. The paste has a little bit of a fade effect from the exterior to the core. The paste has started vitrified, there is some fusion between the fabric but the granules are clearly visible. The paste is waxy or glossy in appearance and very strong, hard, and dense. The inclusions in the paste are very fine, well sorted sands and minerals. Additional dark inclusions are fine to medium. The sherds contain some fine to medium sized voids where minerals or organics have burned away. The exterior of the sherd is a reduced dark gray/black color glaze and some of the sherds show parts of a reddish brown glaze. Some of the sherd's interiors suggest there may have been a glaze on part of the vessel. The thickness across sherds varies but it is likely due to the sherd's original location

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/2 or 2.5YR 4/3 (weak red or reddish brown)

Texture: Medium coarse

Vitreous: Yes, depending on erosion level

Exterior Glaze: 5YR 3/2 (reddish brown)

Interior Glaze: 2.5YR 4/3 (reddish brown), Ranges in thin to non-existent

Inclusions: The darker inclusions are fine to medium (1.59 mm – 2.61 mm) (3-5%); light inclusions are very fine (less than 1 mm) (5-7%).

Voids: Fine to medium (1.72 mm – 2.22 mm in size) (2-3%).

Thickness: 6.52 mm – 15.73 mm. The average thickness is 9.84 mm, with an average difference in each sherd of 1.53 mm

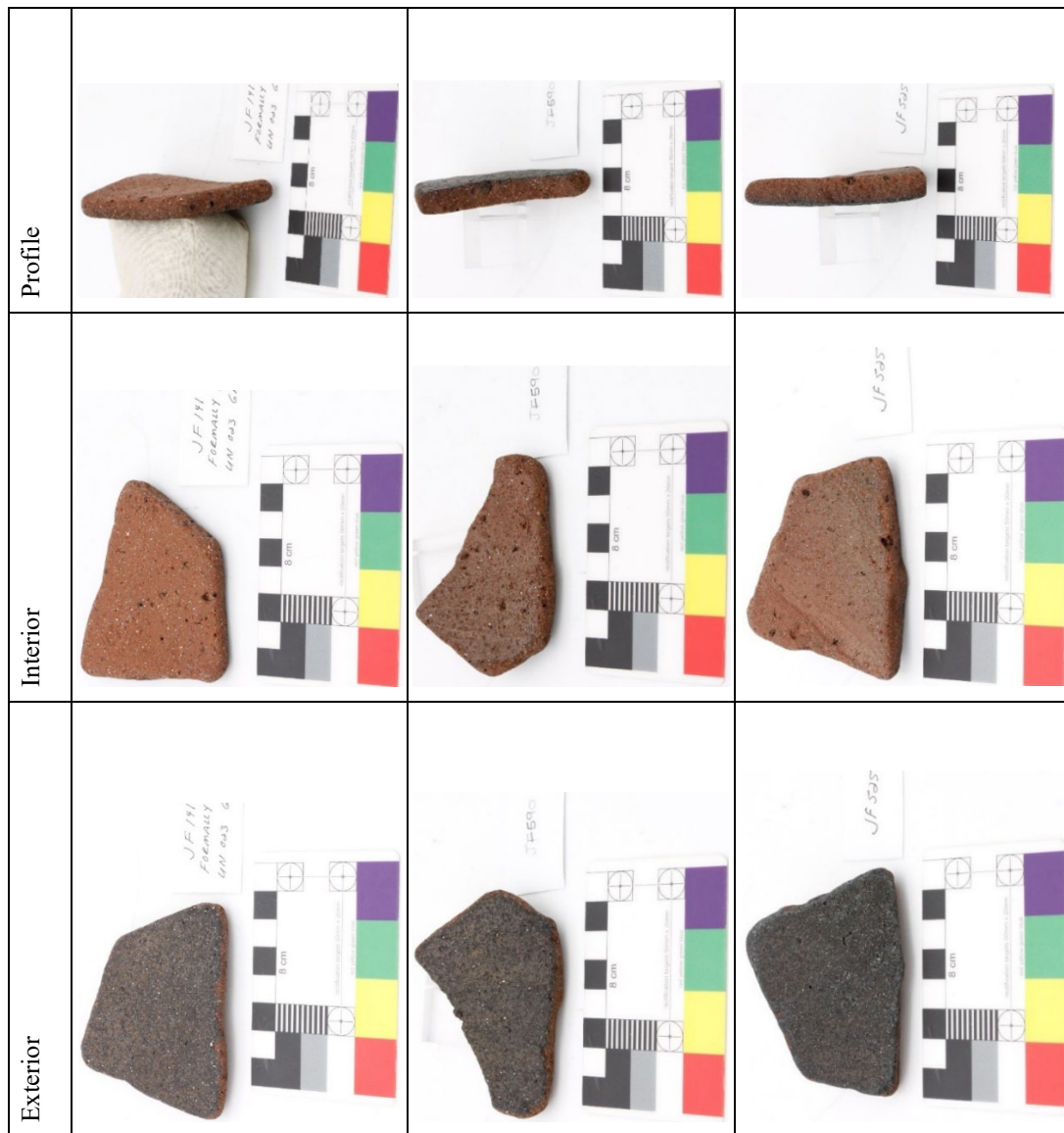
Exterior margin: Gley 1 2.5/N or Gley 1 3/N (black/very dark gray). Ranges in thin – 1.91 mm

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 72. Example of Type DR07. Top row JF141, middle row JF590, bottom row JF525



DR08

The paste is compact and a reddish brown color. The exterior margin and the core paste have a hardline distinction. The core paste color is consistent throughout the sherds. The inclusions in the paste appear to be very fine to fine well sorted sands and some organic materials. The dark inclusions are fine to medium in size and vary throughout the sherds. Some of the sherds have a very dark gray matte glaze but it is often mostly worn away. The paste is moderately coarse to coarse, and slightly rough to the touch. Two of the sherds show various signs of their construction methods, including brush marks or striations on the interior and smoothing of the coils.

Type: Undermined, likely stoneware.

Paste Color: 2.5YR 4/3 (weak red), 2.5YR 4/4 (reddish brown)

Texture: Moderately coarse to coarse

Vitreous:

Exterior Glaze: Gley 1 3/N (very dark gray)

Interior Glaze: N/A

Inclusions: Dark and red inclusions are very fine to fine ((less than 1 mm – 2 mm) (3%); light inclusions are very fine (less than 1 mm) (3%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (1-2%)

Thickness: 8.64 mm – 14.34 mm. The average thickness is 10.59 mm, with an average difference in each sherd of 2.42 mm

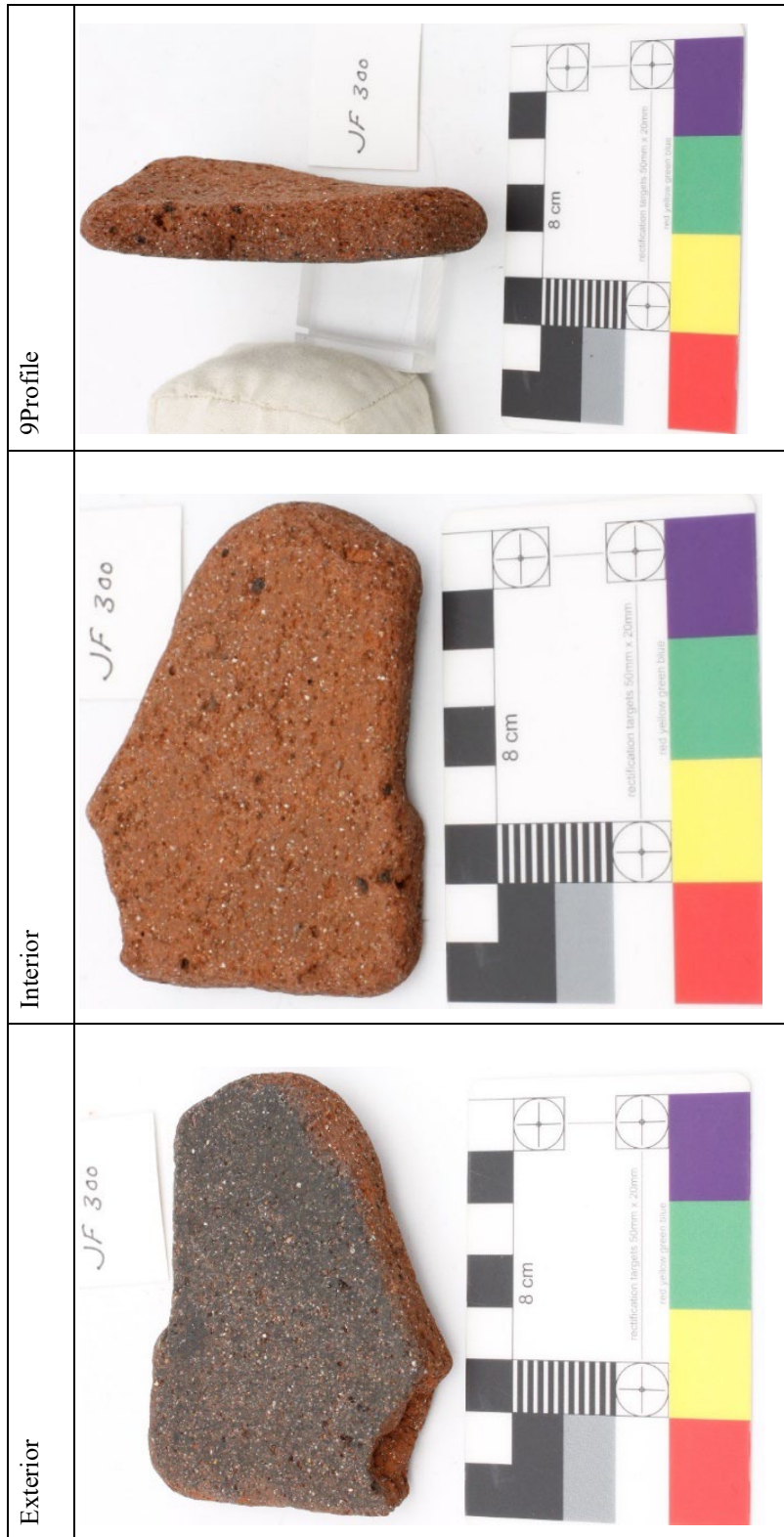
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 73. Example of Type DR08, JF300



DR09

The stoneware is an oxidized reddish brown color. The paste has a slightly waxy appearance when not too eroded. There is no fading between the exterior margin and the core. The exterior margins are very dark gray to dark gray. The interior has very thin margins or they have worn off completely. Some of the sherds have fine to medium sized voids, especially in the interior. There are some fine to medium dark sub-round inclusions within the paste. The light inclusions in the paste are very fine well sorted sub-rounded sands and possibly mica.

Type: Undermined, likely low quality stoneware

Paste Color: 2.5YR 4/3, 2.5YR 4/4 (reddish brown)

Texture: Moderately coarse to coarse depending on erosion level

Vitreous: Yes, most appear to have started to fuse.

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are very fine to fine (less than 1 mm – 2 mm) (1-2%); light inclusions are very fine (less than 1 mm) (3-4%).

Voids: Fine to medium (1 mm – 5 mm) (1-3%).

Thickness: 6.41 mm – 12.98 mm. The average thickness is 9.36 mm, with an average difference in each sherd of 1.11 mm

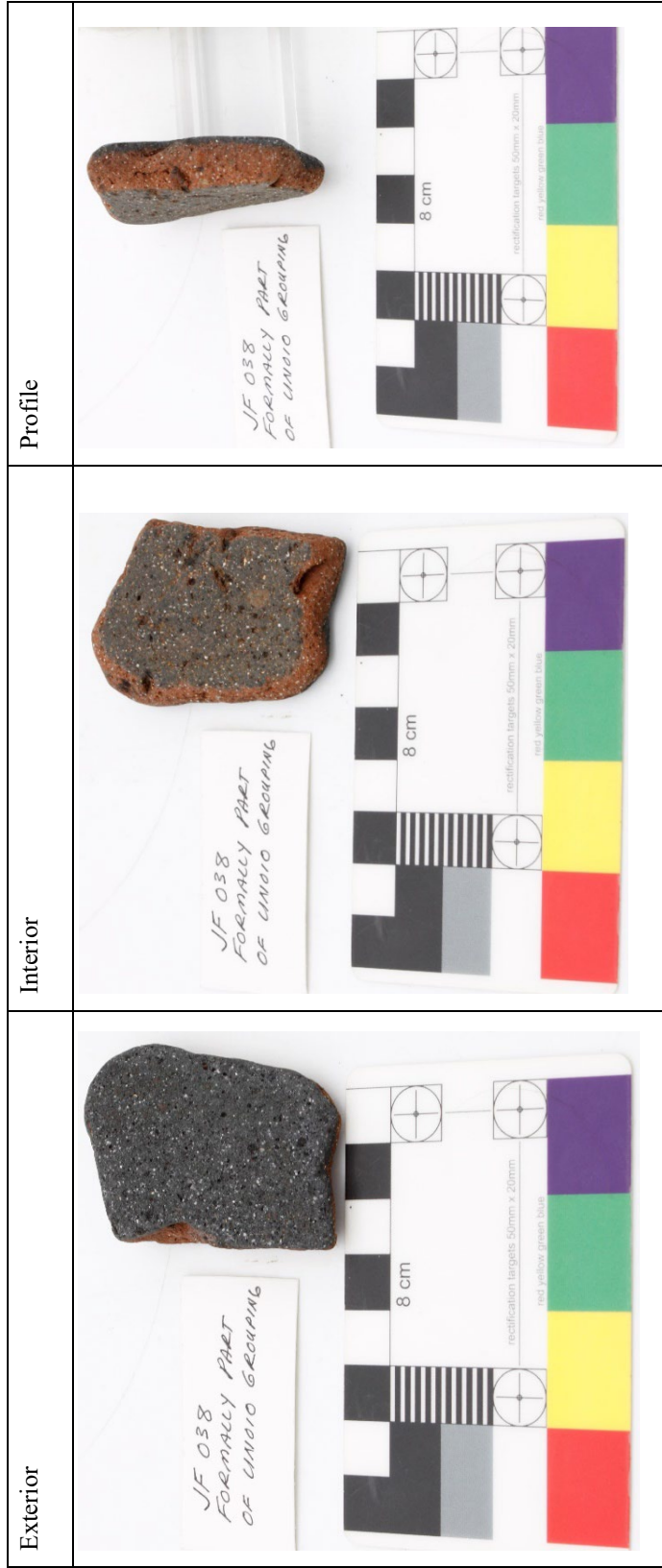
Exterior margin: Gley 1 3/N or Gley 1 4/N (very dark gray or dark gray). Ranges between very thin to 1.01 mm to 2.35 mm

Interior margin: Gley 1 2.5/N or Gley 1 3/N (black or very dark gray). Sometimes not present but generally thin or see through.

Decorations: N/A

Location: SH

Figure 74. Example of Type DR09, JF038



DR10

The stoneware is an oxidized reddish brown color. The paste has vitrified and is mostly fused with some visible boundaries between the inclusions and paste. The paste has a slightly waxy appearance. There is no fading between the margins and the core. The exterior margin and core paste have a hard stop between the two. The exterior margins are very dark gray to dark gray. The voids are from burnouts of organics containing a black glossy residue. There are some fine to medium dark sub-round inclusions within the paste. The light inclusions in the paste are very fine well sorted sub-rounded sands. Although there are a lot of inclusions in the paste, it is still smooth to the touch.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/2 (weak red), 2.5YR 4/4 (reddish brown)

Texture: Moderately coarse to coarse depending on erosion level

Vitreous: Yes, starting to

Exterior Glaze: Few sherds have specs of a wood ash glaze from the kiln.

Interior Glaze: N/A

Inclusions: The darker inclusions are fine to medium (1.25 mm – 2.25 mm) (3%); light inclusions are very fine (less than 1 mm) (5%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (1-2%).

Thickness: 7.19 mm – 14.36 mm. The average thickness is 9.78 mm, with an average difference in each sherd of 1.51 mm

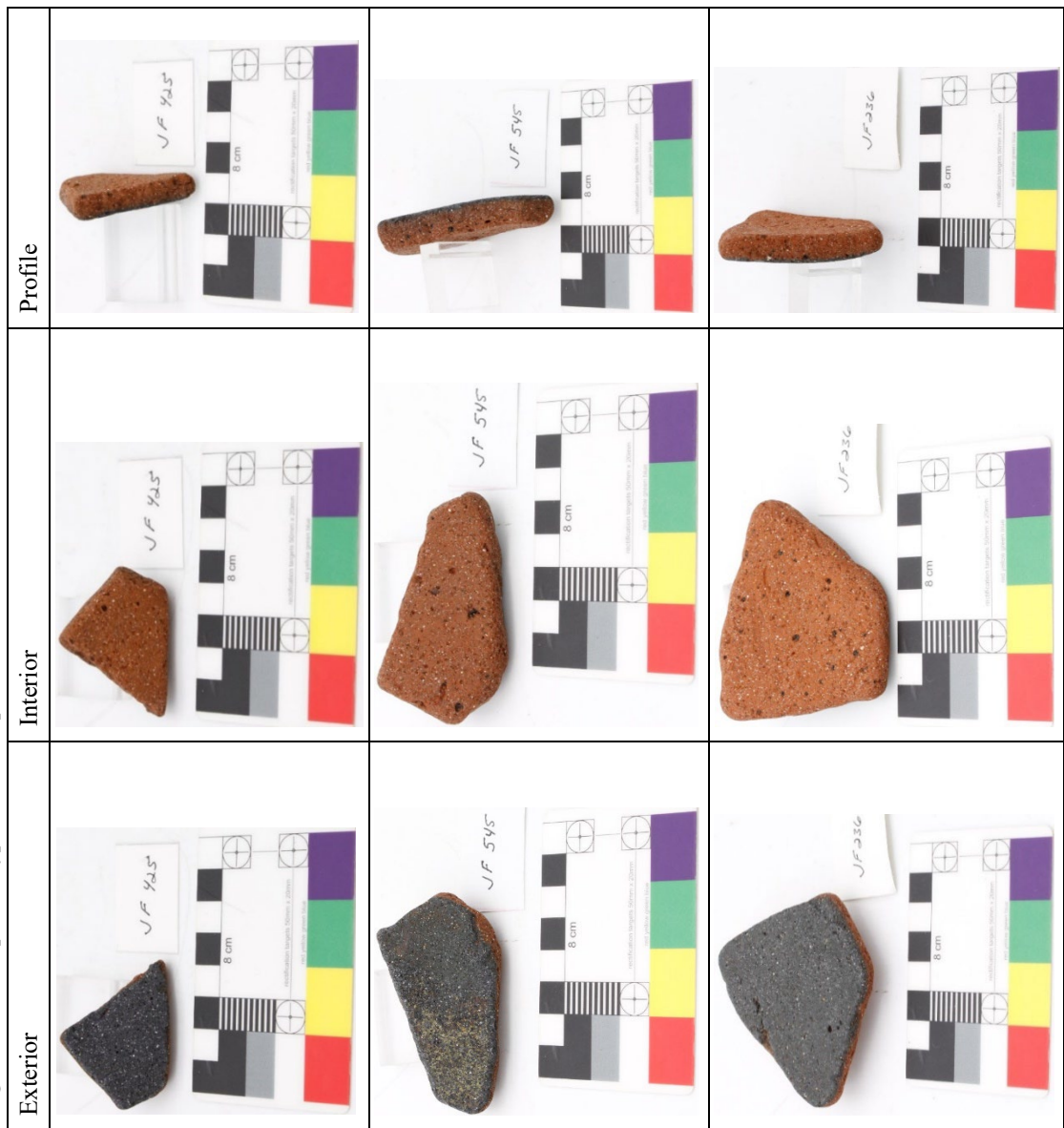
Exterior margin: Gley 1 3/N or Gley 1 4/N (very dark gray or dark gray). Ranges between very thin to 0.71 mm to 2.01 mm

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 75. Example of Type DR 10. Top row JF425, middle row JF545, bottom row JF236



DR11

The paste is compact and a reddish brown color. The exterior margin and the core paste have a hardline distinction. The core paste color is consistent until it reaches the interior and then it changes to a reddish brown or brown color. The inclusions in the paste appear to be fine sands and some organic material that has burned away. The dark inclusions are fine to medium in size vary throughout the sherds. The exterior of the sherd is a reduced very dark gray or gray. The paste is moderately coarse to coarse and has a platy structure. The sherds are uneven in thickness and often lumpy on the interior from forming.

Type: Undermined

Paste Color: 2.5YR 4/4 (reddish brown)

Texture: Moderately coarse to coarse depending on erosion level

Vitreous: Undermined

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are fine to medium (1.86 mm – 2.09 mm) (3%); light inclusions are very fine (less than 1 mm) (3-5%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (1-3%).

Thickness: 6.79 mm – 11.32 mm. The average thickness is 8.81 mm, with an average difference in each sherd of 2.05 mm

Exterior margin: Gley 1 3/N or Gley 1 4/N (very dark gray or dark gray). Ranges between very thin to 1.94 mm to 2.89 mm

Interior margin: 5YR 5/3 or 7.5YR 5/3 (reddish brown or brown). Generally, very thin

Decorations: N/A

Location: SH

Figure 76. Example of Type DR11. Top row JF216, bottom row JF307



DR12

The type is a coarse/not glossy, oxidize dark red paste. There are fine inclusions throughout the sherd and some fine voids. The exterior margin of the sherds are dark gray and the interior is a lighter shade of gray. The interior paste/slip glaze contains many fine to medium voids while the exterior contains few, and are generally very fine. The paste is compact but is due to erosion and lack of clean breaks it is difficult to determine the vitrification level of the type.

Type: Undermined, stoneware?

Paste Color: 2.5YR 4/2 (weak red), 2.5YR 4/3, 2.5YR 4/4 (reddish brown)

Texture: Moderately coarse to coarse depending on erosion level

Vitreous: Slightly

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (3%); light inclusions are very fine (less than 1 mm) (5-8%).

Voids: Very fine (less than 1 mm) (1-4%), fine (1 mm – 2 mm) (2%).

Thickness: 4.47 mm – 13.81 mm. The average thickness is 9.39 mm, with an average difference in each sherd of 1.5 mm

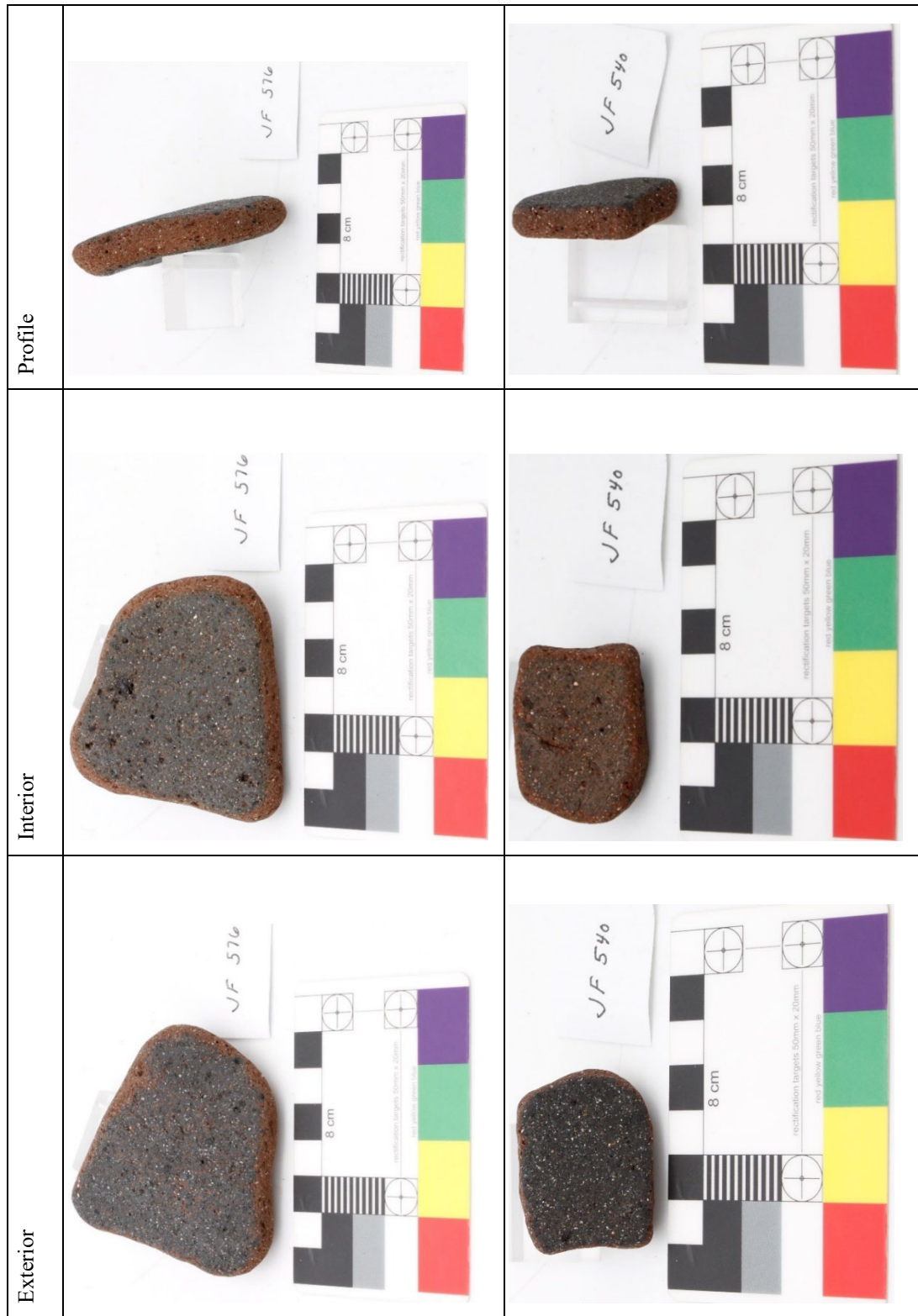
Exterior margin: Gley 1 3/N or Gley 1 4/N (very dark gray/dark gray). Generally, very thin

Interior margin: 5YR 4/1 (dark gray), thin

Decorations: N/A

Location: SH

Figure 77. Example of Type DR12. Top row JF576, bottom row JF540



DR13

This type is a very compact paste with a gradient from weak red to reddish brown on the interior. The paste is very fine but has a slightly gritty appearance and has multiple fine round red inclusions throughout the paste. The exterior has a gray glaze and no glaze on the interior. There are no visible voids throughout the paste. The interior has striation from smoothing of the paste.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/4 (reddish brown)

Texture: Moderately coarse, gritty in appearance

Vitreous: Undetermined

Exterior Glaze: 5Y 3/1 (very dark gray)

Interior Glaze: N/A

Inclusions: Red inclusions are fine (1 mm – 2 mm) (3%); light inclusions are very fine (less than 1 mm) (1%).

Voids: N/A

Thickness: 10.78 mm – 12.22 mm. The average thickness is 11.5 mm, with an average difference in each sherd of 1.44 mm

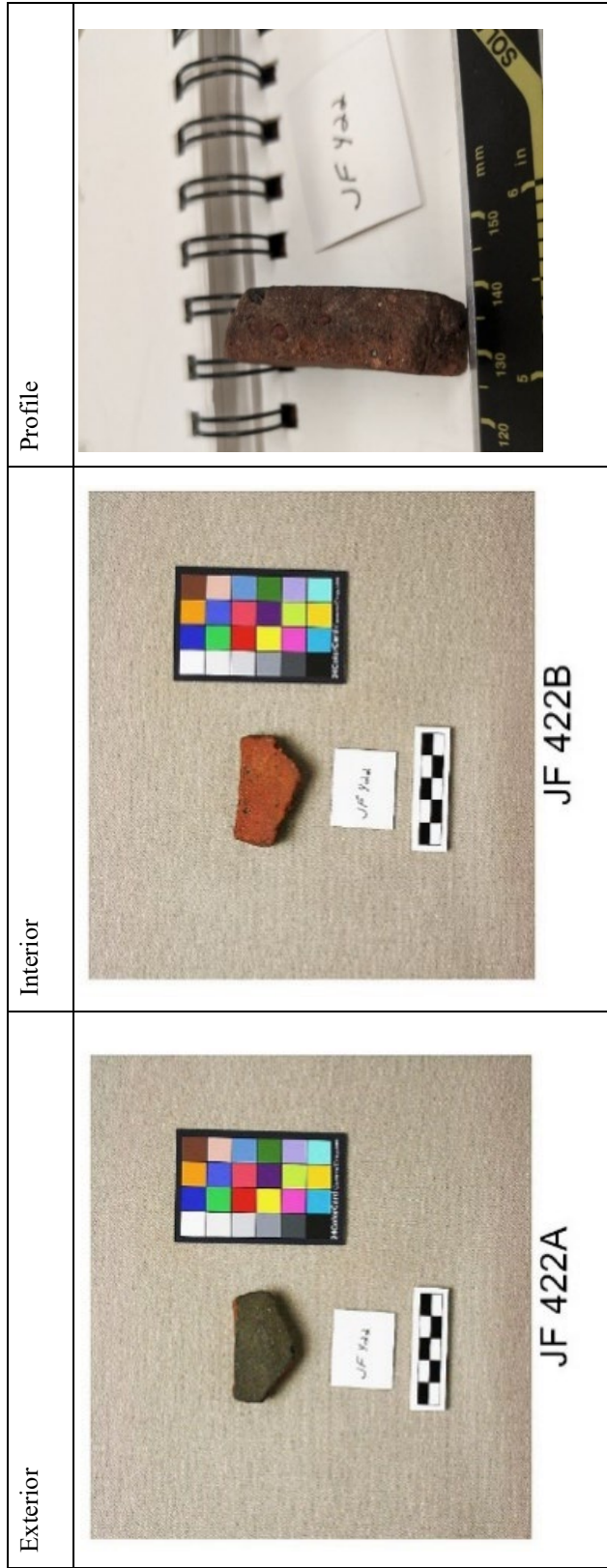
Exterior margin: 2.5YR 4/2 (weak red)

Interior margin: 2.5YR 4/4 (reddish brown)

Decorations: N/A

Location: NB

Figure 78. Example of Type DR13, JF422



DR14

The paste is compact and slightly waxy in appearance. The vitrified paste is an oxidized weak red or reddish brown color. There are a few very fine dark sub-round and fine red round inclusions within the paste. The light inclusions in the paste appear to be very fine well sorted sub-rounded sands. The exterior margins are generally dark gray and vary in thickness. The interior margins are not always present but when present they are dark gray or very dark gray. There is a slight gradient in the core paste in most of the sherds but it is not a vast change in color like many others that have a gradient. The sherds were kept within this type based on the vitreousness and inclusions within the paste.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/2, 2.5YR 4/3 (weak red or reddish brown)

Texture: Moderately coarse

Vitreous: Yes, but still has some visible boundaries between grains

Exterior Glaze: Possibly some wood ash glaze present on some sherds.

Interior Glaze: N/A

Inclusions: The darker inclusions are very fine (less than 1 mm) (>1%); red inclusions are fine (1 mm – 2 mm) (>1%); light inclusions are very fine (less than 1 mm) (1-2%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (2%).

Thickness: SW and Unk: 7.65 mm – 17.41 mm. The average thickness is 10.61 mm, with an average difference of 1.47 mm. One of the sherds is thicker (JF403) since it is a joint piece and has a large difference between max and min. Without the sherd the average difference would be 1.06 mm and average thickness would be 9.95 mm. Rim sherd ranged between 9.9 mm – 17.07 mm

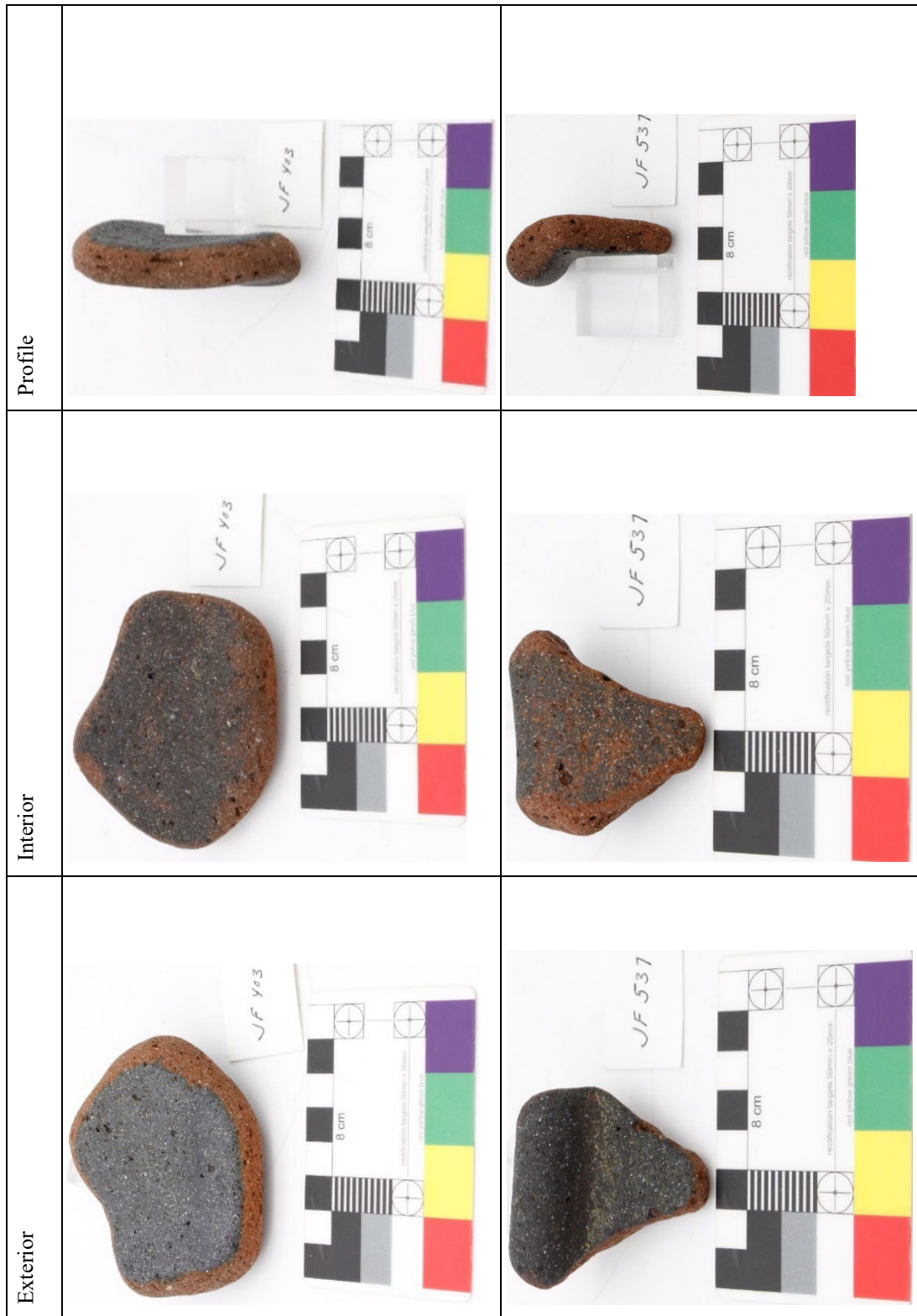
Exterior margin: Gley 3/N or Gley 1 4/N (dark gray or very dark gray) with light tempers throughout. Ranges between very thin to 0.95 mm to 1.27 mm. Not always present.

Interior margin: Gley 1 4/N (dark gray) with light tempers throughout. Ranges between very thin to 0.68 mm to 1.93 mm. Not always present.

Decorations: N/A

Location: SH

Figure 79. Example of Type DR14. Top row JF403, bottom row JF537



DR15

The exterior of the sherds are hard and compact while the core is composed of a very coarse, reddish brown paste with large quartzite inclusions. There is a hard stop between the margins and core paste. Some of the sherds have spots of a glossy dark reddish brown or gray glaze on both the interior and exterior but is not consistent over the sherd, likely due to erosion. There are voids within all of the sherds but the size of the voids are also related to the degree erosion. Except for the neck/rim sherd (JF533), the sherds are relatively uniform in thickness.

Type: Undetermined, glazed earthenware?

Paste Color: 2.5YR 4/3, 2.5YR 5/3 (reddish brown)

Texture: Coarse

Vitreous: Yes

Exterior Glaze: 10R 3/1(dark reddish gray), 5YR 3/2 (dark reddish brown), 2.5YR 3/2 (dusty red)

Interior Glaze: 10R 3/1(dark reddish gray), 5YR 3/2 (dark reddish brown), 2.5YR 3/2 (dusty red)

Inclusions: The darker inclusions are very fine to fine (less than 1 mm – 2 mm) (3%); light inclusions are very fine to medium (less than 1 mm – 3.4 mm) (10%).

Voids: Fine to medium (1 mm – 5 mm) (5%).

Thickness: SW and Unk: 10.52 mm – 17.4 mm. The average thickness is 15.77 mm, with an average difference of 0.42 mm (does not include neck sherd). Neck sherd ranged between 17.20 mm – 30.54 mm

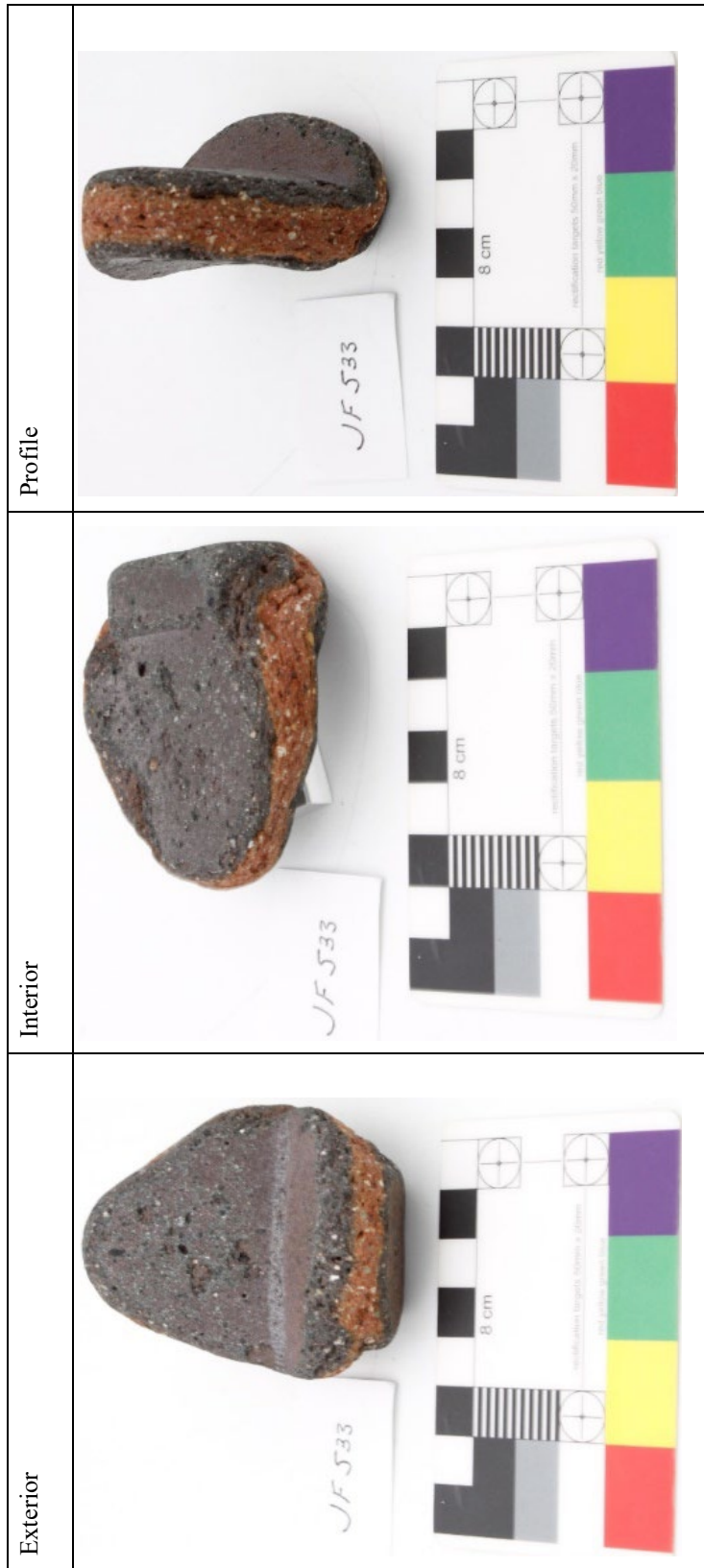
Exterior margin: Gley 1 4/N (dark gray). Ranges between 2.54 mm – 4.46 mm (not including JF533).

Interior margin: Gley 1 4/N (dark gray). Ranges between 1.98 mm – 9.92 mm (not including JF533).

Decorations: N/A

Location: SH

Figure 80. Example of Type DR15, JF533



DR16

This type varies between a weak red, dusty red, and reddish brown color that is very compact and glossy/waxy in appearance. The paste has vitrified almost completely fused. There are some very fine or fine voids but are inconsistent and located more toward the core of the sherd. The voids generally appear glossy with a black residue inside. There are very fine light inclusions throughout the paste. The exterior margins are generally very dark gray and vary in thickness. Have a hardline between the margins and the core paste. The interior margins are not always present but when present they are very dark gray. Some of the sherds have spots of a glossy dark reddish brown or dark grayish brown glaze still present. The core paste generally is one color but a few of the sherds do have it fade as it moves from the exterior to the interior. They were kept within this type based on the vitreousness and competition of the paste.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/2 (weak red), 2.5YR 4/3 (reddish brown), 2.5YR 3/2 (dusty red)

Texture: Moderately coarse

Vitreous: Yes

Exterior Glaze: 5YR 3/2 (dark reddish brown) or 10YR 4/2 (dark grayish brown). Not consistent or present on majority.

Interior Glaze: 5YR 3/2 (dark reddish brown). Not consistent or on all.

Inclusions: The darker inclusions are very fine (less than 1 mm) (1%); light inclusions are very fine (less than 1 mm) (3-4%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (1-3%).

Thickness: 7.04 mm – 15.63 mm*. The average thickness is 10.83 mm, with an average difference of 1.38 mm. A few of the sherds appear to be transition pieces between two parts of the jars making them thicker or thinner than most.

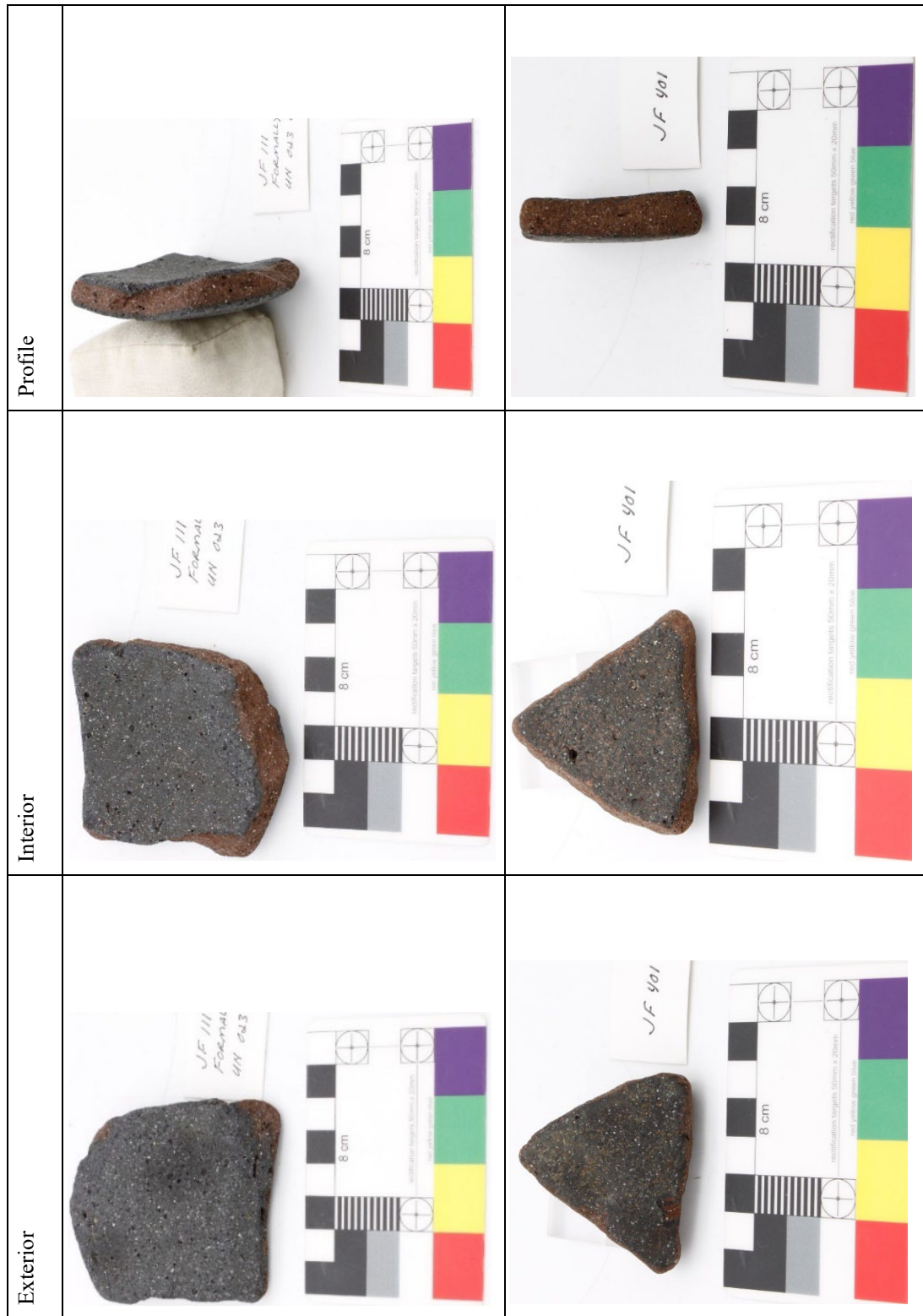
Exterior margin: Gley 1 2.5/N or Gley 1 3/N (black or very dark gray) with light tempers throughout. Ranges between very thin to 1.19 mm to 2.59 mm.

Interior margin: Gley 1 2/N.5 or Gley 1 3/N (black or very dark gray) with light tempers throughout. Ranges between very thin to 0.49 mm to 1.63 mm. Not always present.

Decorations: N/A

Location: SH

Figure 81. Example of Type DR16. Top row JF111, bottom row JF401



DR17

Unglazed stoneware consisting a very compact and glossy, oxidized weak red paste. The paste has vitrified and is almost completely fused. There are some very fine or fine voids but are inconsistent and located more toward the core of the sherd. There are very few fine inclusions throughout the paste. The exterior margins are generally very dark gray and varies in presence. The margins are too thin to measure and could be from location or erosion. The interior margins are not always present but when present they are very dark gray.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/2 (weak red)

Texture: Moderately coarse to moderately fine

Vitreous: Yes

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are very fine (less than 1 mm) (>1%); light inclusions are very fine (less than 1 mm) (1%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (>1%).

Thickness: 6.92 mm – 12.01 mm. The average thickness is 8.89 mm, with an average difference of 1.04 mm

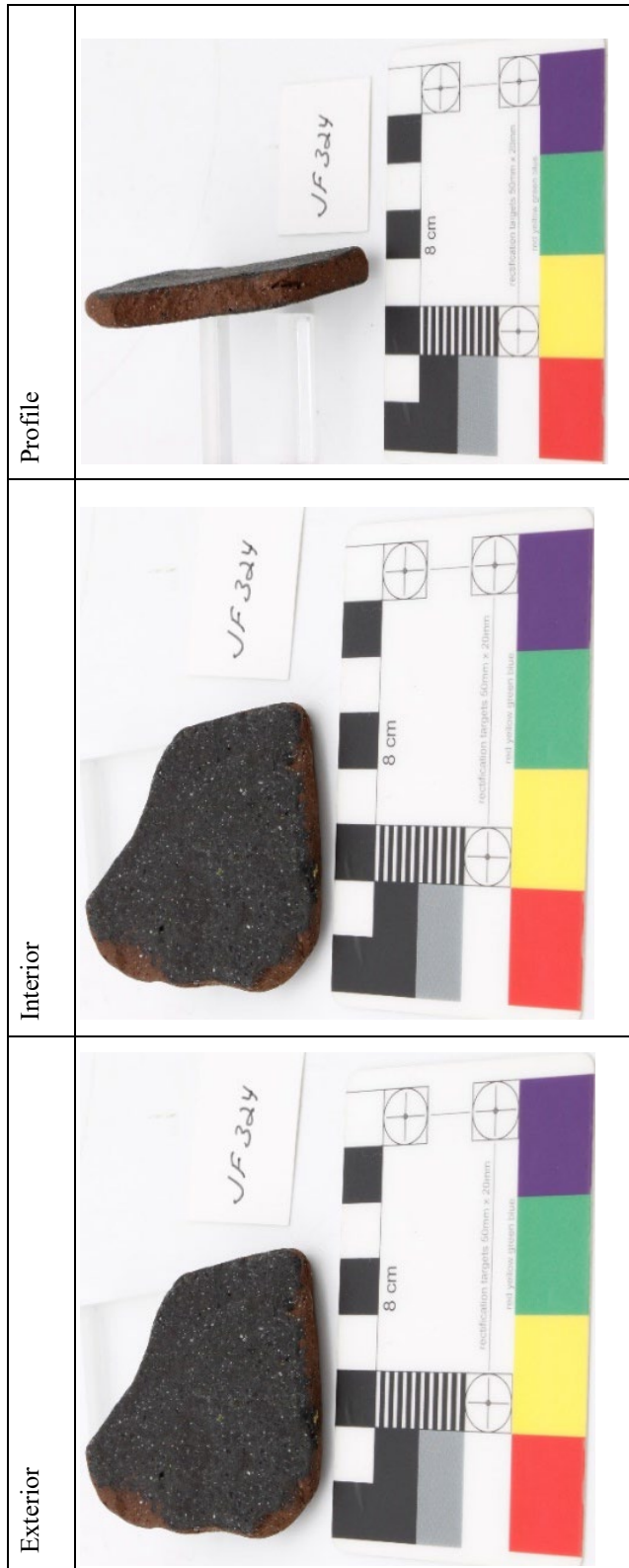
Exterior margin: Gley 1 3/N or 5Y 3/1 (very dark gray). Very thin

Interior margin: Gley 1 3/N or 5Y 3/1 (very dark gray). Very thin

Decorations: N/A

Location: SH

Figure 82. Example of Type DR17, JF324



DR18

The stoneware is a very compact and slightly waxy, oxidized reddish brown paste. There is variation in color throughout the sherds. The paste has vitrified and is mostly fused with some visible boundaries between the inclusions and paste. The light inclusions appear to be very fine to fine well sorted sub-rounded sands and compose the majority of the inclusions. There are few fine dark inclusions or voids where the organics have burned away leaving a glossy black residue inside. The exterior of the sherd is a reduced dark gray matte underglaze that is generally thin but varies in thickness with a shiny dark reddish gray overglaze covering sections of the sherds. The smoothness of the interior varies between very smooth with almost no pitting to areas that appear cracked. The interior has brush marks and at least one shows evidence of smoothing the coils.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/3, 2.5YR 4/4 (reddish brown)

Texture: Moderately coarse

Vitreous: Yes, but still has some visible boundaries

Exterior Glaze: Underglaze: Gley 1 2.5/N or Gley 1 3/N (black or very dark gray).

Overglaze brushed on and not consistent, can be a combination of 10YR 5/2 or 2.5YR 4/2 (grayish brown or weak red)

Interior Glaze: Possible slip glaze? 2.5YR 4/4 (reddish brown)

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (1-3%); light inclusions are very fine to fine (less than 1 mm – 2 mm) (3-5%).

Voids: Fine (1 mm – 2 mm) (1-3%).

Thickness: 6.59 mm – 8.35 mm. The average thickness is 7.42 mm, with an average difference of 1.15 mm

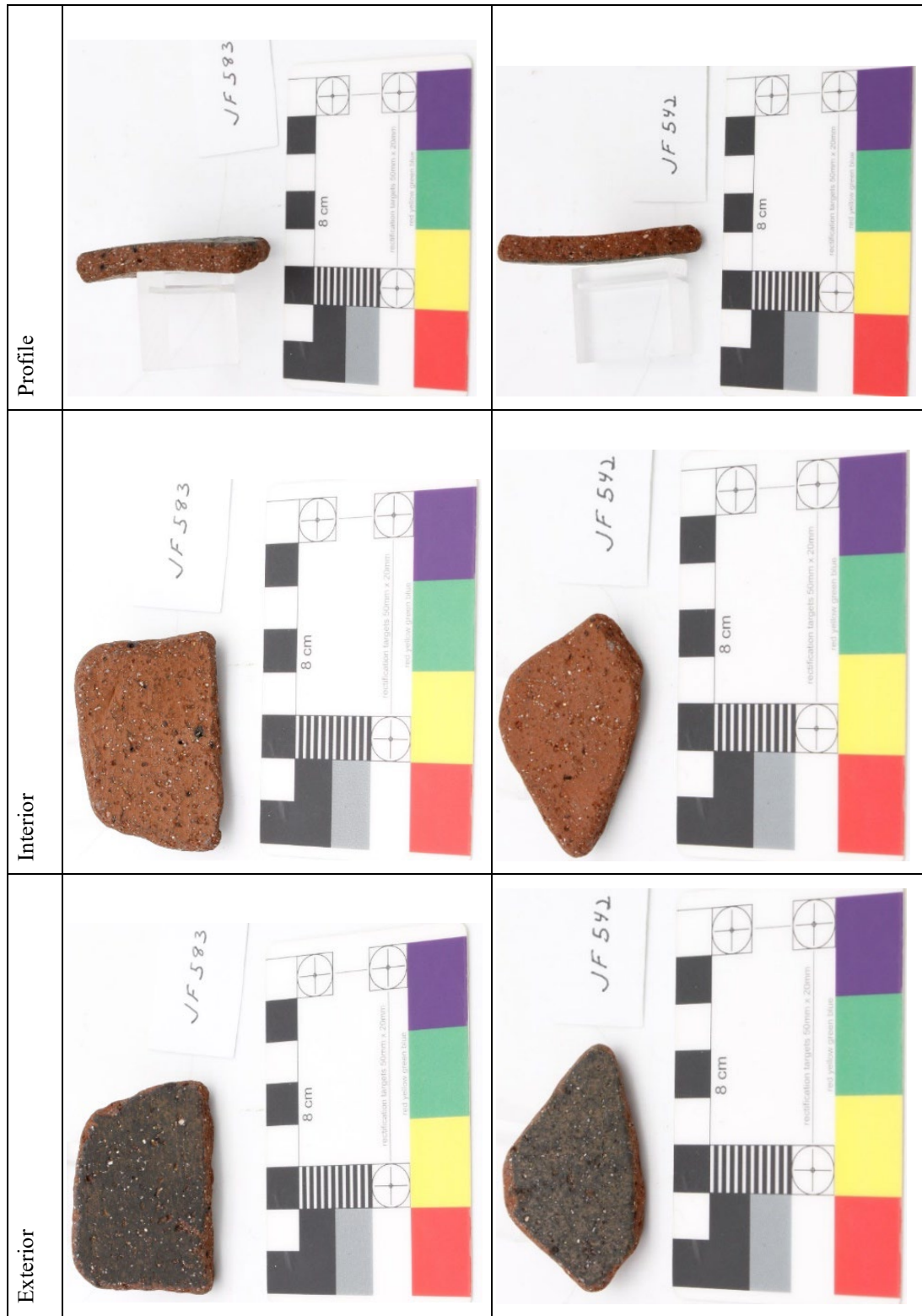
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 83. Example of Type DR18. Top row JF583, bottom row JF542



DR19

The stoneware is a very compact and glossy, oxidized weak red colored paste. The paste has vitrified and is mostly fused, leaving only the occasional void. The voids are from burnouts of organics containing a black glossy residue. There are some fine dark sub-round and red round inclusions within the paste. The light inclusions in the paste appear to be very fine well sorted sub-rounded sands. The exterior of some of the sherds have black underglaze that varies in thickness and exterior paste will fade to a dark red when not present (JF159). The exterior of the sherd is a reduced dark gray matte underglaze that is generally thin but varies in thickness with a shiny dark reddish gray overglaze covering sections of the sherds. The overglaze is not present on all sherds. The interior has a thin brushed on matte reddish brown slip glaze (or is possibly a result of the firing process) that is brighter than the core paste. The interior has smoothing striations.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/3 (reddish brown)

Texture: Moderately coarse

Vitreous: Yes

Exterior Glaze: Gley 1 3/N (very dark gray) underglaze that is inconsistent (sometimes is thin or can be 2.36 mm – 2.59 mm thick). Overglaze is spotty but some have 5YR 3/1 or 5YR 3/2 (black or dark reddish gray).

Interior Glaze: 2.5YR 4/3 or 2.5YR 4/4 (reddish brown)

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (1%); red inclusions are fine (1 mm – 2 mm) (1%); light inclusions are very fine (less than 1 mm) (1-2%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (>1%).

Thickness: 8.26 mm – 9.86 mm. The average thickness is 9.15 mm, with an average difference of 0.78 mm

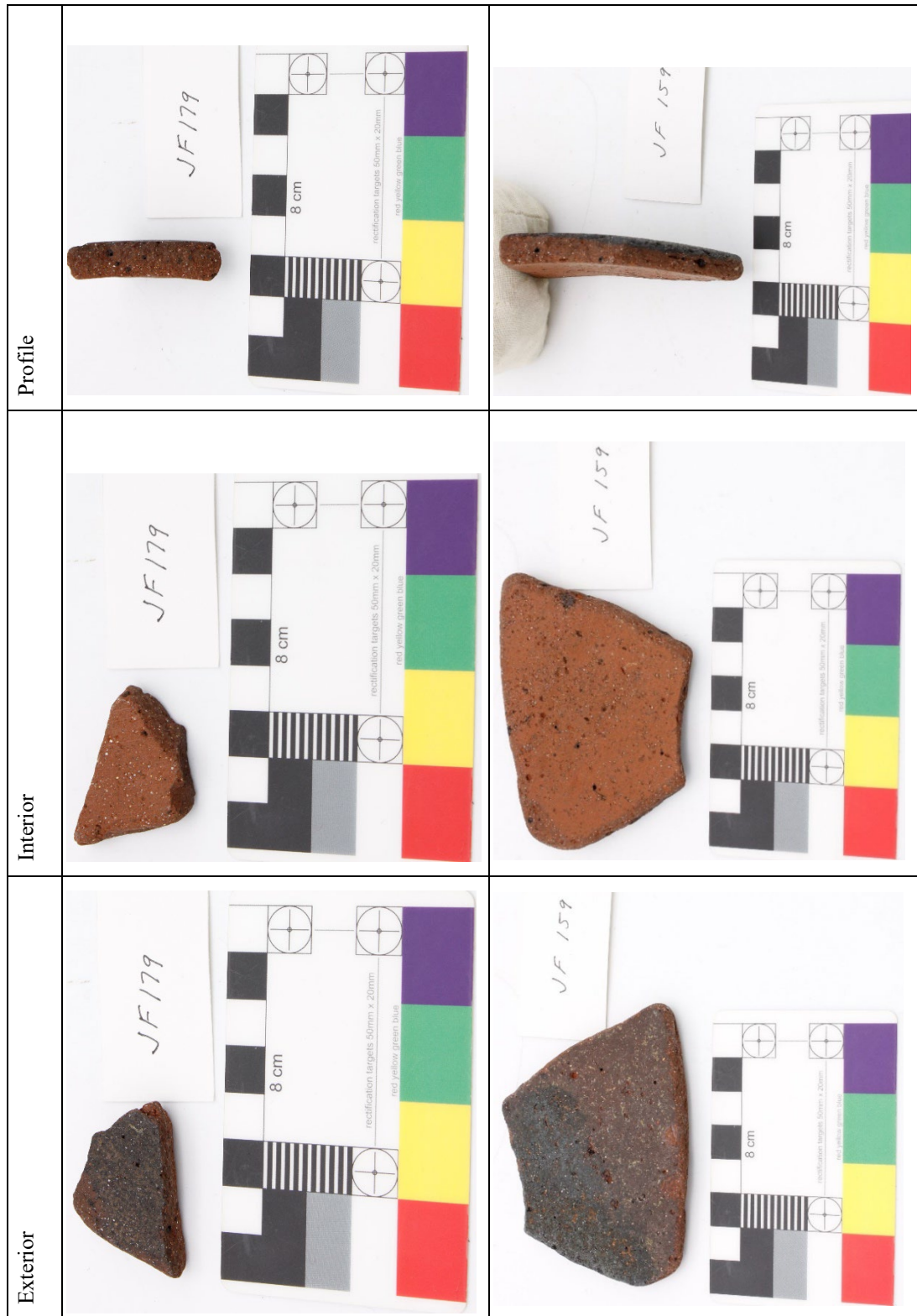
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 84. Example of Type DR19. Top row JF179, bottom row JF159



DR20

The stoneware is a very compact and waxy, oxidized weak red colored paste. The paste has vitrified and is mostly fused with some visible boundaries between the inclusions and paste. The light inclusions in the paste appear to be very fine to fine well sorted sub-rounded sands. There are very few very fine dark inclusions but there are some voids where the organics have burned away leaving a glossy residue inside. The exterior of the sherd is a reduced dark gray matte underglaze that is generally thin but varies in thickness with a shiny dark reddish gray overglaze covering sections of the sherds. The overglaze is not present on all sherds. The interior has a thin brushed on matte reddish brown slip glaze that is brighter than the core, and often is cracked.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/2 (weak red)

Texture: Moderately coarse

Vitreous: Yes

Exterior Glaze: 5YR 4/1 (dark gray), 5YR 3/2 (dark reddish gray)

Interior Glaze: 2.5YR 4/3, 2.5YR 4/4 (reddish brown)

Inclusions: The darker inclusions are very fine (less than 1 mm) (>1%); light inclusions are very fine to fine (less than 1 mm – 2 mm) (3%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (1-3%).

Thickness: 7.12 mm – 14.42 mm. The average thickness is 9.06 mm, with an average difference of 1.5 mm (two of the sherds have a large difference between max and min, without those the average difference would be 0.77 mm and average thickness would be 7.64 mm)

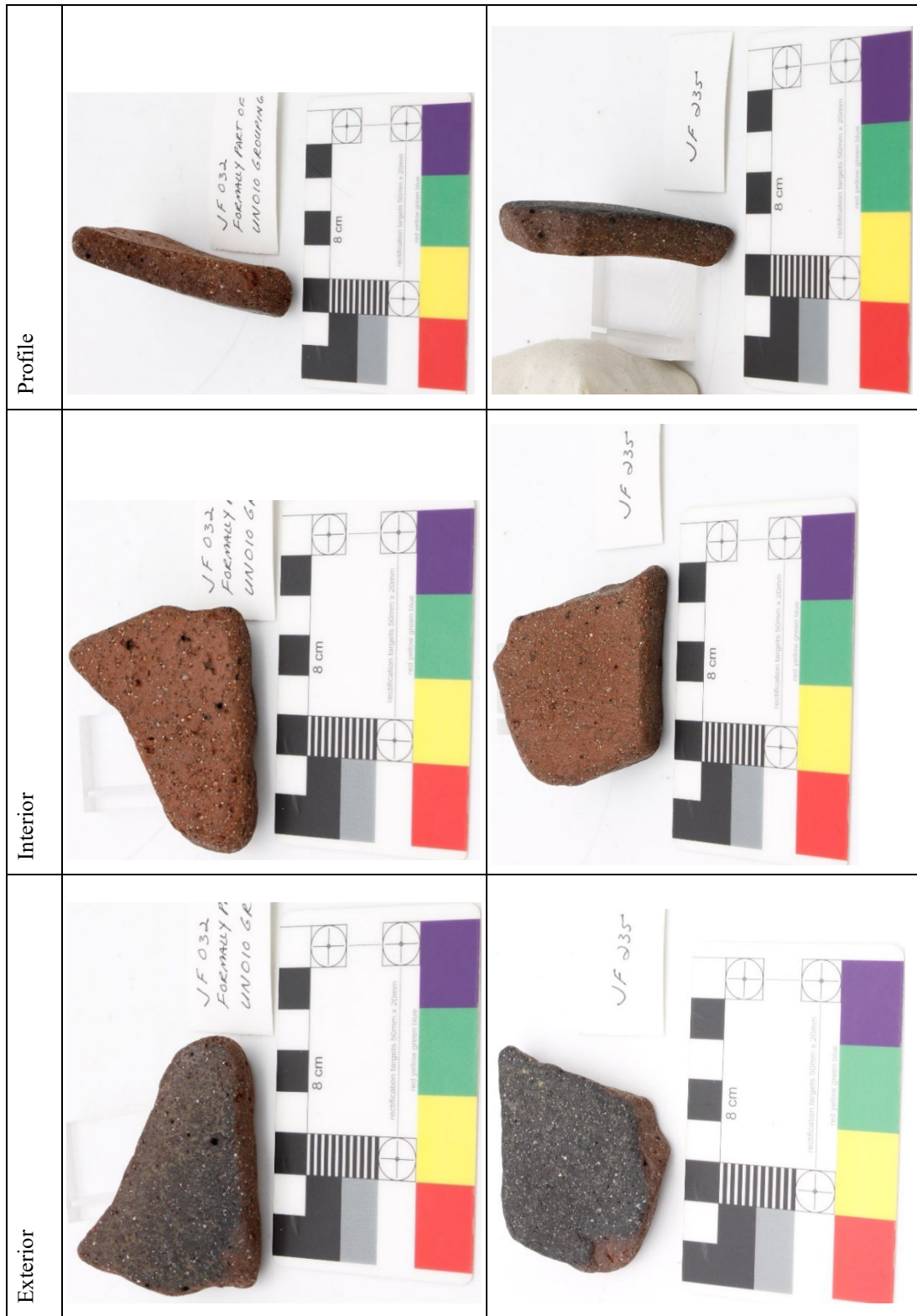
Exterior margin: Gley 1 2.5/N (black). Very thin under glaze

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 85. Example of Type DR20. Top row JF032, bottom row JF235



DR21

The paste is very compact and is slightly waxy in appearance. The paste is smooth the touch. The vitrified paste is an oxidized weak red or reddish brown color. The core paste is generally consistent throughout the sherd, with no change in coloration from the exterior to the interior. The light inclusions in the paste appear to be very fine well sorted sub-rounded sands. Larger black particles are very fine to fine in size and are very few. The exterior is a dark gray/black slip glaze that is thin with fine white inclusions visible. The interior has the same type of glaze but is not consistently present on all the sherds. For both the exterior and interior, there are some with the glaze worn away and causing the paste to have look slightly dirty look in comparison to the core.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/2 or 2.5YR 4/3 (weak red or reddish brown)

Texture: Moderately coarse

Vitreous: Yes

Exterior Glaze: Gley 1 2.5/N or Gley 1 3/N (black or very dark gray). Not always present or see through.

Interior Glaze: Gley 1 3/N or Gley 1 4/N (very dark gray or dark gray). Not always present or see through

Inclusions: The darker inclusions are very fine to fine (less than 1 mm – 2 mm) (1%); light inclusions are very fine (less than 1 mm) (3%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (1%).

Thickness: 6.48 mm – 13.99 mm. The average thickness is 9.58 mm, with an average difference of 1.08 mm

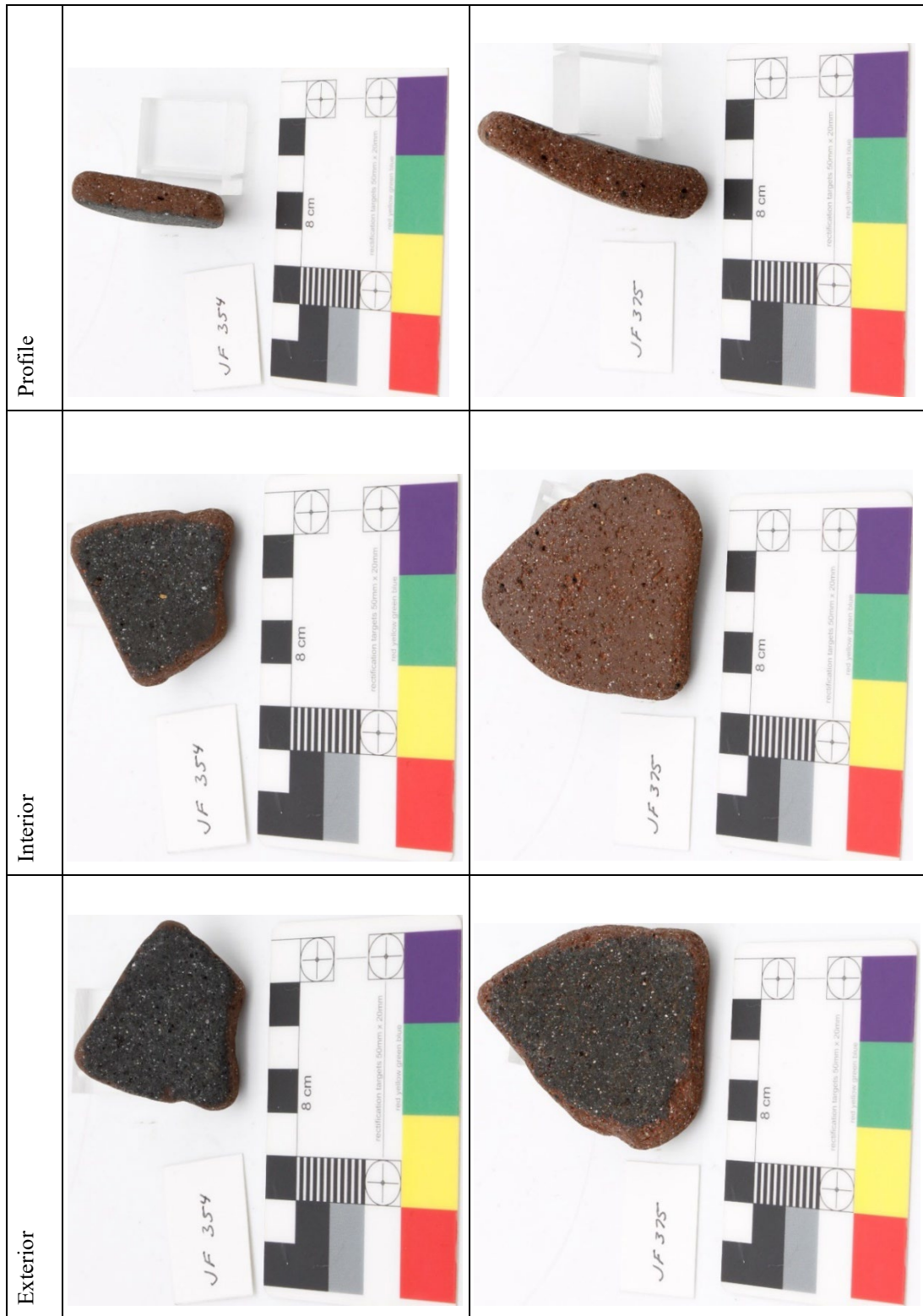
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 86. Example of Type DR21. Top row JF354, bottom row JF375



DR22

The type is an oxidized reddish brown paste and has numerous voids throughout, but may be due to erosion. The core paste has no variation in color. The interior and exterior margins are dark gray and have the same properties as the core paste. There are fine to medium sized voids in the paste where the darker organics have burned away leaving a glassy looking glaze within. The light inclusions in the paste are very fine well sorted sands and very few dark inclusions. Due to the erosion and no clean breaks visible, cannot determine the vitreousness.

Type: Undermined, possibly high quality earthenware

Paste Color: 2.5YR 4/3 (reddish brown)

Texture: Coarse

Vitreous: Undermined

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are very fine (less than 1 mm) (>1%); light inclusions are very fine (less than 1 mm) (5-7%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (5%). Medium (2 mm – 5 mm) (>1%).

Thickness: Rim: 11.82 mm – 16.18 mm. The average thickness is 14 mm, with an average difference of 4.36 mm.

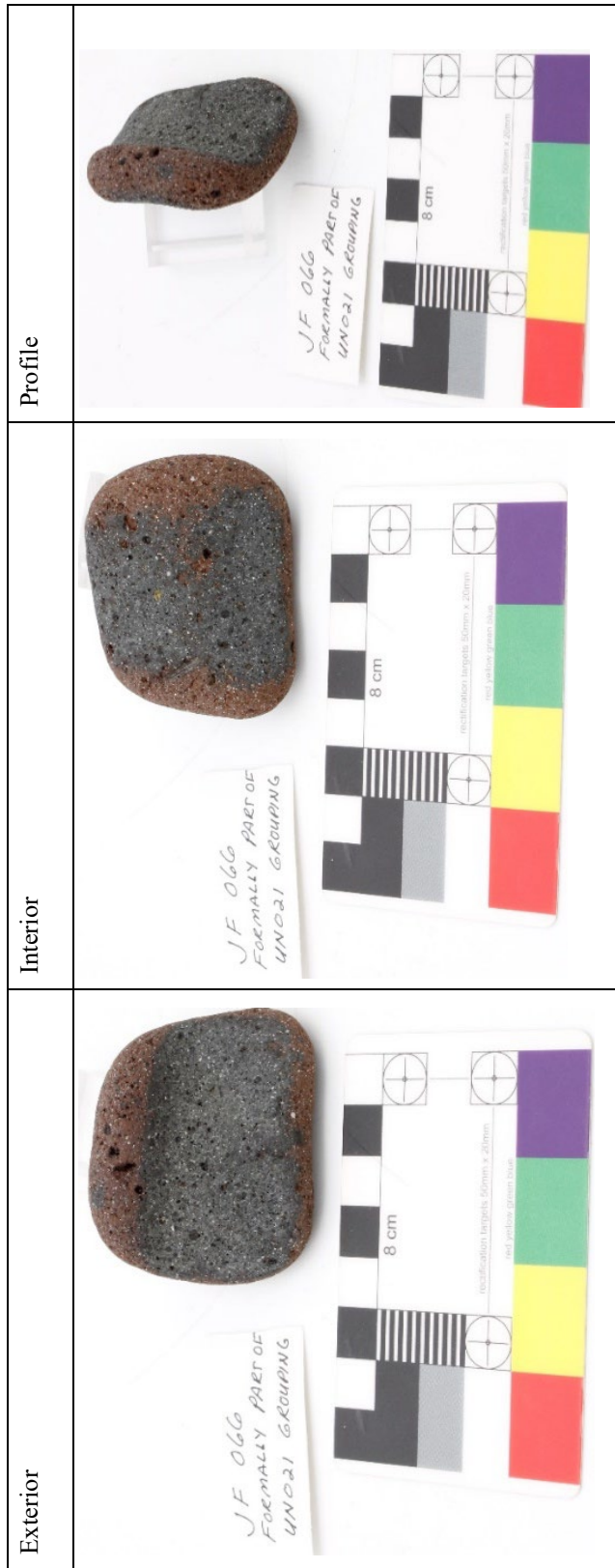
Exterior margin: Gley 1 4/N (dark gray). Very thin, worn off in some areas

Interior margin: Gley 1 4/N (dark gray). Very thin

Decorations: N/A

Location: SH

Figure 87. Example of Type DR22, JF066



DR23

The type is a compact oxidized reddish brown paste. The paste appears to have started to vitrify, though the granules are clearly visible. On the very eroded sherds, the voids are larger, making it likely a lower quality stoneware or high-quality earthenware. The light inclusions in the paste are very fine, well sorted sands. There are some fine dark inclusions. There are fine voids in the paste where the darker organics have burned away leaving a glassy looking glaze within. The sherds exterior appears to have a matte, reduced slip glaze that is very thin in most areas except for an area under the rim sherd. The rim sherd has some of the slip glaze on the interior but it is mostly worn away.

Type: Undermined, lower quality stoneware or high-quality earthenware

Paste Color: 2.5YR 4/3 or 2.5YR 4/4 (Reddish Brown)

Texture: Moderately coarse to coarse

Vitreous: Appears to have started to fuse but some sherds are very pitted due to erosion

Exterior Glaze: Gley 1 2.5/N (black)

Interior Glaze: N/A

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (1-2%); light inclusions are very fine (less than 1 mm) (3%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (3%). Medium (2 mm – 5 mm) (>1%)

Thickness: SW: 10.78 mm – 16.13 mm. The average thickness is 13.08 mm, with an average difference of 2.09 mm (does not include rim). Rim: 12.34 mm – 16.54 mm

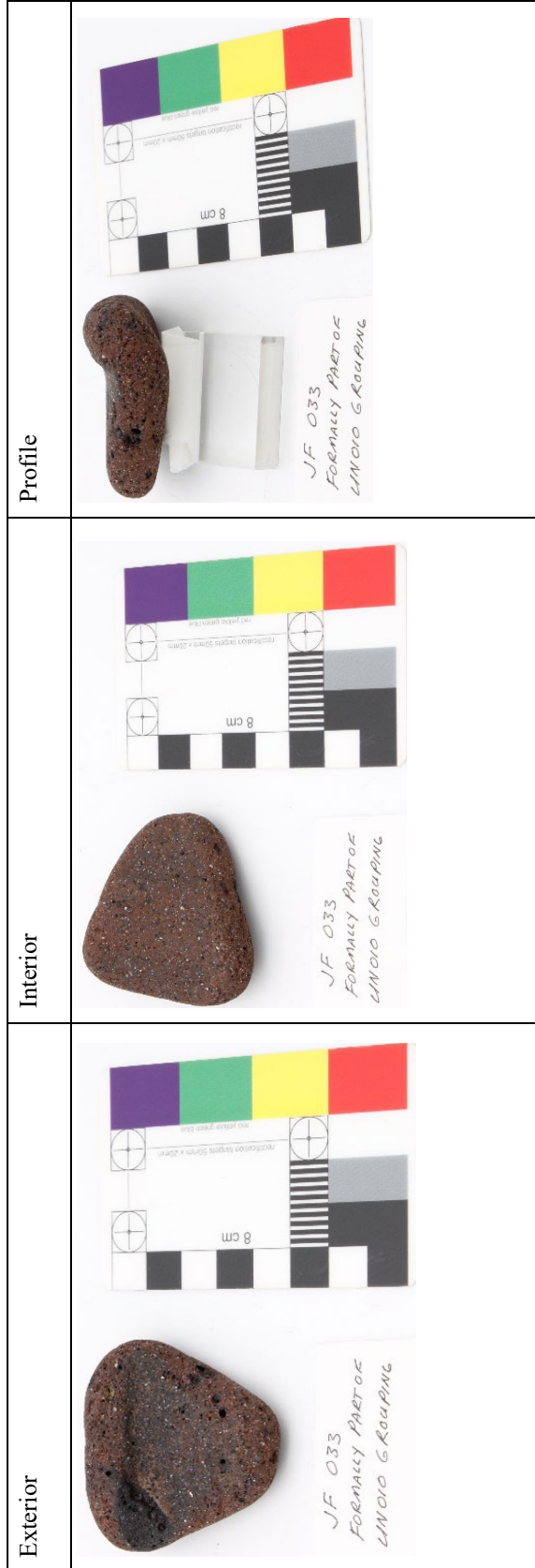
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 88. Example of Type DR23, JF033



DR24

The type is a compact oxidized weak red or reddish brown paste. The paste color changes from the exterior to the interior, with the exterior being a dark gray (approximately 1.09 mm) fading to a weak red (4.58 mm – 5.19 mm) before turning red (4.51 mm – 4.67 mm) in the interior. The light inclusions in the paste are very fine, well sorted sands. There are very few fine dark inclusions. There are almost no voids within the paste but are very fine to fine in size. The exterior could be a slip glaze but it appears more that it is a result from as a reduced oxygen environment causing the dark margin with light inclusions throughout.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/2 (weak red), 2.5YR 4/3 (reddish brown), 2.5YR 4/6 (red)

Texture: Moderately coarse

Vitreous: Yes

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (1%); light inclusions are very fine (less than 1 mm) (3%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (>1%).

Thickness 8.89 mm – 12.03 mm. The average thickness is 10.76 mm, with an average difference of 2.12 mm

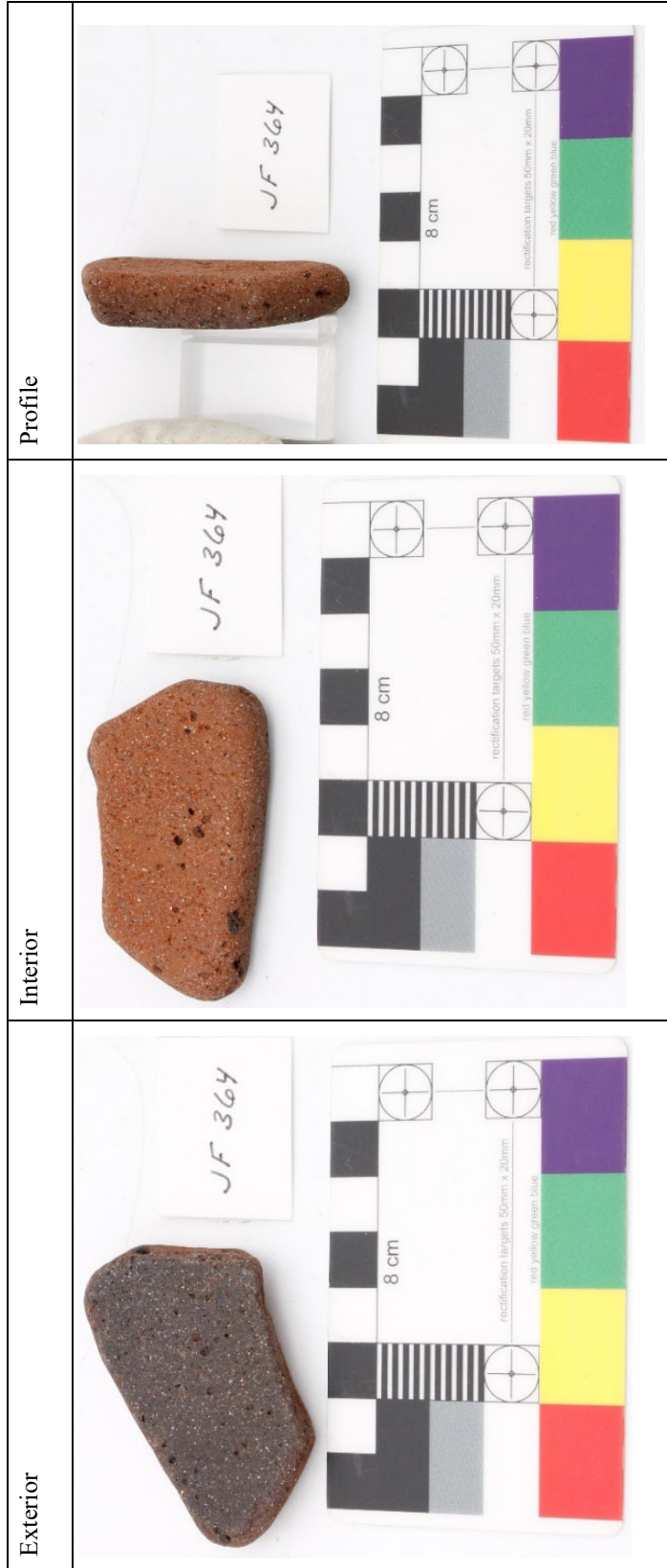
Exterior margin: Gley 1 3/N (very dark gray). Ranges between thin to 1.09 mm

Interior margin: 2.5YR 4/6 (red). Ranges between 4.51 mm – 4.67 mm

Decorations: N/A

Location: SH

Figure 89. Example of Type DR24, JF364



DR25

The type is a compact, oxidized weak red or reddish brown paste. The paste has vitrified and appears shiny. The core paste is a consistent color throughout. The light and dark inclusions in the paste are very fine well sorted sands, though there are more of the light inclusions. There are almost no voids within the paste and are very fine. The interior and exterior have a reduced black or very dark gray margin or underglaze with light inclusions throughout. Both have a spotty glossy dusty red or reddish brown glaze over the black. All the sherds show various signs of their construction methods, including brush marks or striations on the interior, smoothing coils, and at least one has a joint depression on the exterior.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/2 or 2.5YR 4/3 (weak red or reddish brown)

Texture: Moderately coarse

Vitreous: Yes

Exterior Glaze: 2.5YR 3/2 (dusty red). The exterior margin is likely an underglaze

Interior Glaze: 2.5YR 3/2 or 2.5YR 4/3 (dusty red or reddish brown). Underglaze is Gley 1 2.5/N (black)

Inclusions: The darker inclusions are very fine (less than 1 mm) (1%); light inclusions are very fine (less than 1 mm) (3-5%).

Voids: Very fine (less than 1 mm) (>1%).

Thickness: 6.62 mm – 10.72 mm. The average thickness is 8.64 mm, with an average difference of 1.51 mm

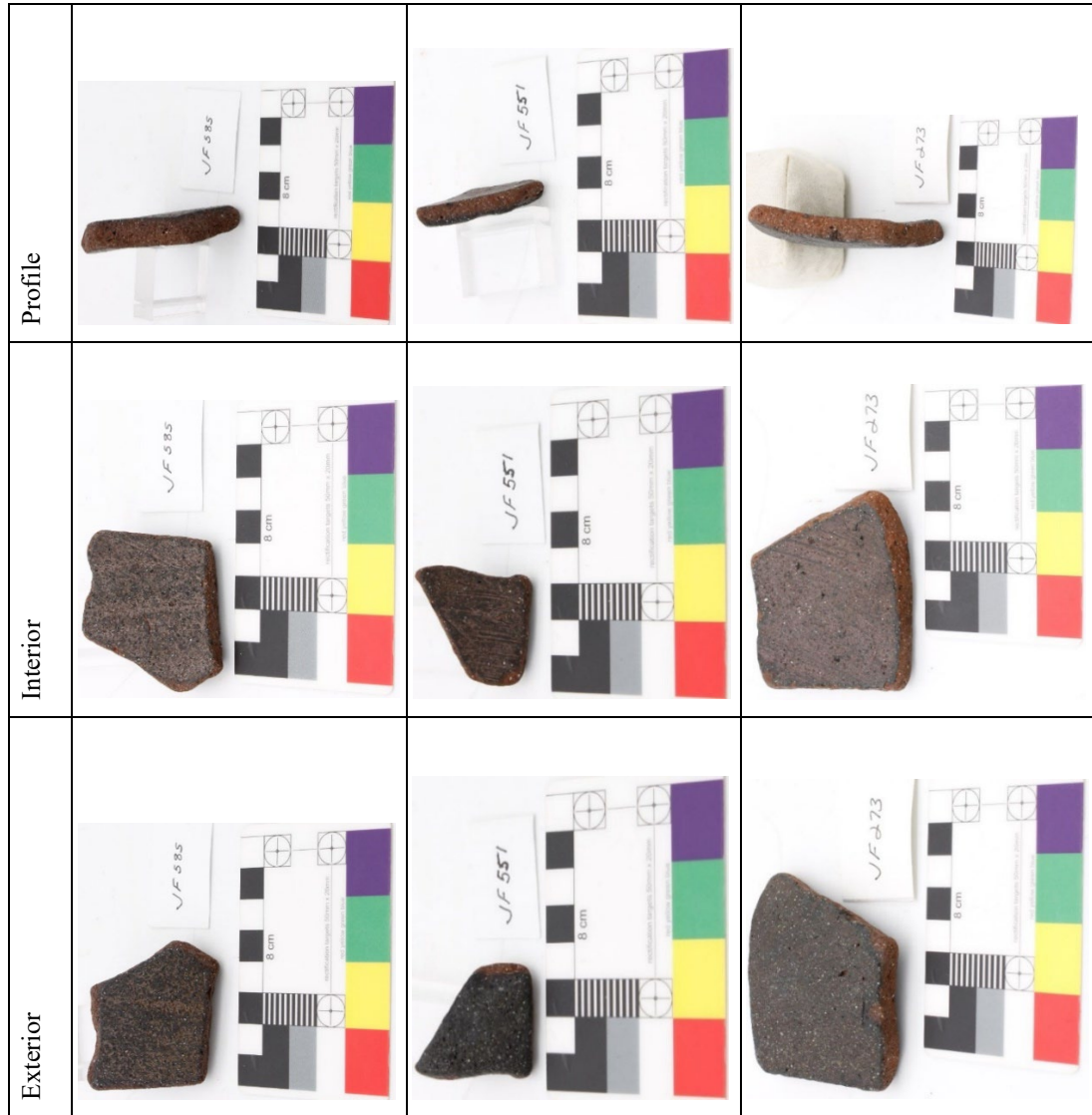
Exterior margin: Gley 1 2.5/N or Gley 1 3/N (black/very dark gray). Light inclusions present. Ranges from thin – 1.91 mm.

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 90. Example of Type DR25. Top row JF585, middle row JF551, bottom row JF273



DR26

The paste is very compact and glossy. The vitrified paste is an oxidized weak red or reddish brown color. The inclusions in the paste appear to be fine, well sorted sands. The dark inclusions are very fine to fine in size and are very few. There are some fine voids in the paste where the darker organics have burned away leaving a glassy looking glaze within the voids. The exterior of the sherd is a reduced dark gray/black colored with the white inclusions visible. A dark grayish brown glaze is present on the exterior but it is not continuous. The interior of the sherd sometimes has brighter red slip that also contains the mostly light inclusions. The sherd with the interior still has visible marks from smoothing but it is still slightly uneven.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/2 or 2.5YR 4/3 (weak red or reddish brown)

Texture: Moderately coarse to moderately fine.

Vitreous: Yes

Exterior Glaze: Underglaze: Gley 1 2.5/N (black); overglaze: 2.5Y 4/2 or 10YR 4/2 (dark grayish brown)

Interior Glaze: 2.5YR 4/4 (reddish brown)

Inclusions: The darker inclusions are very fine to fine (0.75 mm – 1.50 mm) (2%); light inclusions are very fine (less than 1 mm) (3-5%).

Voids: Very fine to fine (0.75 mm – 1.25 mm) (1%).

Thickness: 8.74 mm – 10.07 mm. The average thickness is 9.4 mm, with an average difference of 1.07 mm

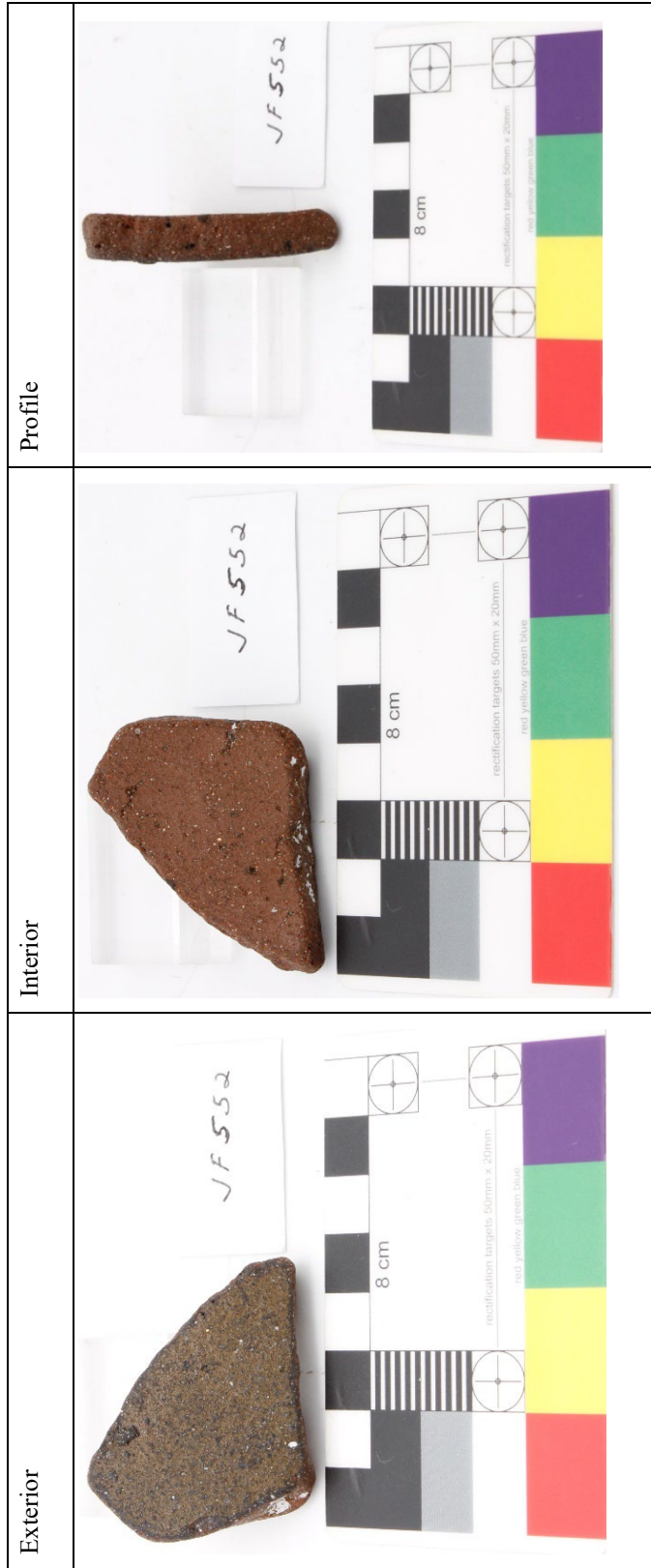
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 91. Example of Type DR26, JF552



DR27

The paste is very compact and slightly shiny. The paste is an oxidized weak red color and is consistent throughout the sherd. The paste has vitrified. The inclusions in the paste are very fine and well sorted. There are some very fine organic inclusions that have created fine voids where dark organics have burned away leaving voids but there are few within the sherds (1% or less). The exterior is a dark gray/black slip glaze that is thin with fine white inclusions visible. Some sherds show the remnants of a dark reddish gray glaze on the exterior.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/2 (weak red)

Texture: Moderately coarse to moderately fine. Waxy looking

Vitreous: Yes

Exterior Glaze: Gley 1 2.5/N (black) with fine white inclusions. Some have spots of 5YR 4/2 (dark reddish gray) or 5YR 3/2 (dark reddish brown)

Interior Glaze: N/A

Inclusions: The darker inclusions are very fine (less than 1 mm) (1%); light inclusions are very fine (less than 1 mm) (3%).

Voids: Range from very fine to fine (0.5 mm – 1.25 mm) (1%).

Thickness: 7.78 mm – 12.34 mm. The average thickness is 10.29 mm, with an average difference of 1.06 mm

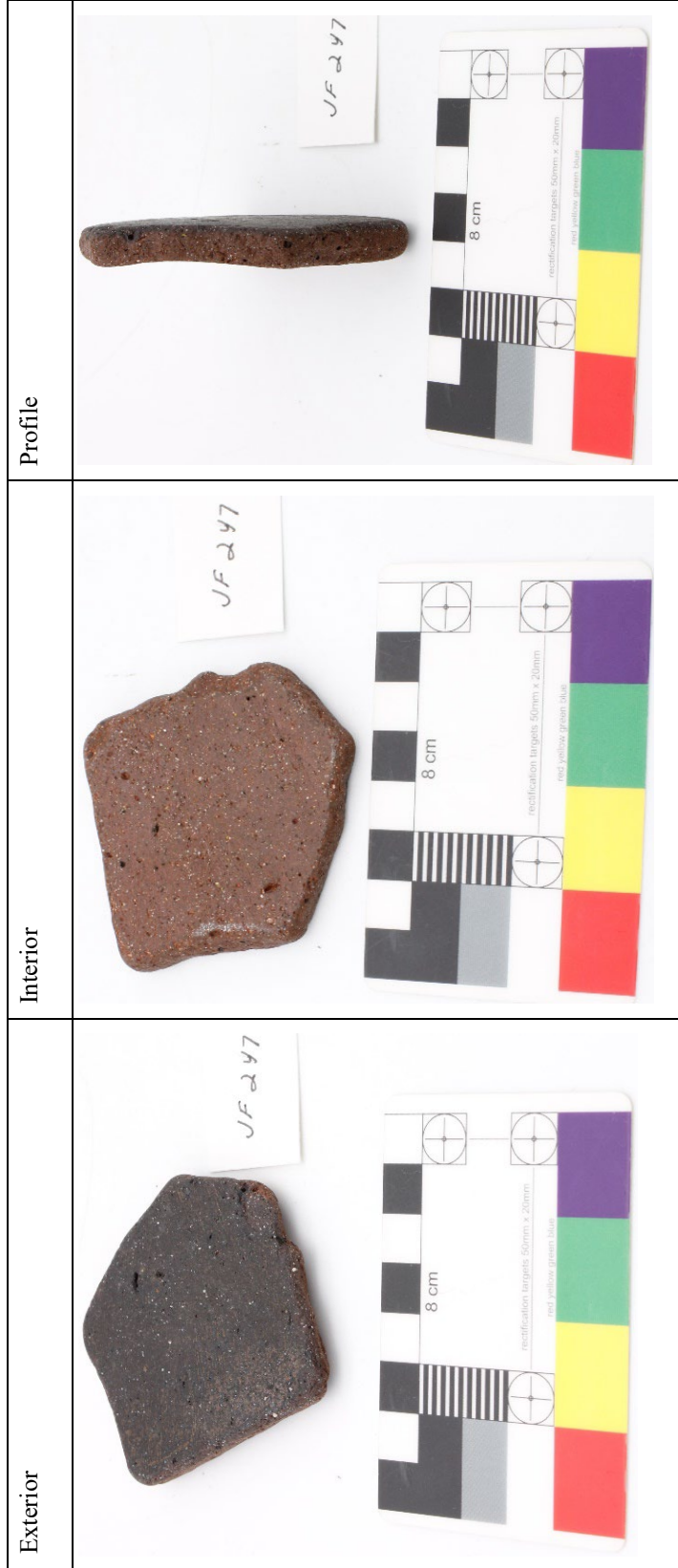
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 92. Example of Type DR27, JF247



DR28

The paste is very compact and glossy. The paste is an oxidized dark red. The light inclusions in the paste appear to be very fine, well sorted sands. There are very few, very fine to fine dark inclusions. There are some fine voids but majority of the sherds are well fused and do not contain any voids. The exterior of the sherd is a reduced dark gray matte underglaze with a shiny dark reddish brown and wood ash overglaze. The overglaze is not present on all sherds. The interior has a brushed on matte reddish gray and dark grayish brown glaze overtop a dark gray glaze. The stroke marks create a laying effect. At least one of the sherds has evidence of the joint location on the jar.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/3 (reddish brown)

Texture: Moderately coarse

Vitreous: Yes, compact and glossy.

Exterior Glaze: 5YR 3/2 (dark reddish brown) and some wood ash glaze over a Gley 1 3/N to Gley 1 4/N (very dark gray or gray) underglaze. Over glaze is not on all sherds. Underglaze is 0.93 mm – 1.51 mm thick.

Interior Glaze: Mix of a 5YR 5/2 (reddish gray) and 10YR 4/2 (dark grayish brown) over a 10YR 3/1 (dark gray) underglaze. Stoke marks visible on the interior.

Inclusions: The darker inclusions are fine to medium (1 mm – 2 mm) (1-2%); light inclusions are very fine (less than 1 mm) (3%).

Voids: None to very fine (0-1%)

Thickness: 8.4 mm – 14.55 mm. The average thickness is 11.61 mm, with an average difference of 3.16 mm

Exterior margin: Underglaze. Ranges between 0.93 mm – 1.51 mm thick.

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 93. Example of Type DR28. Top row JF095, bottom row JF246



DR29

The type is a compact reddish brown stoneware. The paste has vitrified with visible but less distinct boundaries between the inclusions and the base paste. There are few, very fine light inclusions in the paste which may be part of the original clay. The inclusions in the paste appear to be very fine sands. There are very few, very fine dark inclusions. There are some fine voids in the paste where the darker organics have burned away leaving a glassy black color within the voids. The exterior glaze is a dusty red with some wood ash glaze over top of a very dark gray glaze undercoat. The undercoat is about 0.79 mm thick. The overglazes are not overly shiny. The interior does not have a glaze but lines from smoothing the coils are visible. The sherds show evidence from smoothing or joints from merging two sections together.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/3, 2.5YR 4/4 (reddish brown)

Texture: Moderately coarse

Vitreous: Yes

Exterior Glaze: Underglaze: Gley 1 3/N (very dark gray); overglaze: 2.5YR 3/2 (dusty red) and some ash glaze.

Interior Glaze: N/A

Inclusions: The darker inclusions are very fine (less than 1mm) (1%); light inclusions are very fine (less than 1 mm) (3-4%).

Voids: Fine (1 mm – 2 mm) (1-2%).

Thickness: 6.89 mm – 10.08 mm. The average thickness is 8.45 mm, with an average difference of 1.81 mm

Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: SH

Figure 94. Example of Type DR29. Top row JF435, bottom row JF086



DR30

The type is a fairly compact, reddish brown stoneware with the paste color consistent throughout the core of the sherd. The paste has started to vitrify, though the granules are clearly visible. There are few, very fine light inclusions in the paste which may be part of the original clay. There are a few voids throughout. The exterior and interior margins are slightly pitted, reduced dark gray color, which really highlight the light inclusion. The pitting is likely from erosion.

Type: Stoneware (high fire)

Paste Color: 2.5YR 5/4 (reddish brown)

Texture: Moderately coarse

Vitreous: Yes, mostly fused. S

Exterior Glaze: N/A

Interior Glaze: N/A

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (1-2%); light inclusions are very fine (less than 1 mm) (5%).

Voids: Fine (1 mm – 2 mm) (1%).

Thickness: 7.77 mm – 8.93 mm. The average thickness is 8.35 mm, with an average difference of 1.16 mm

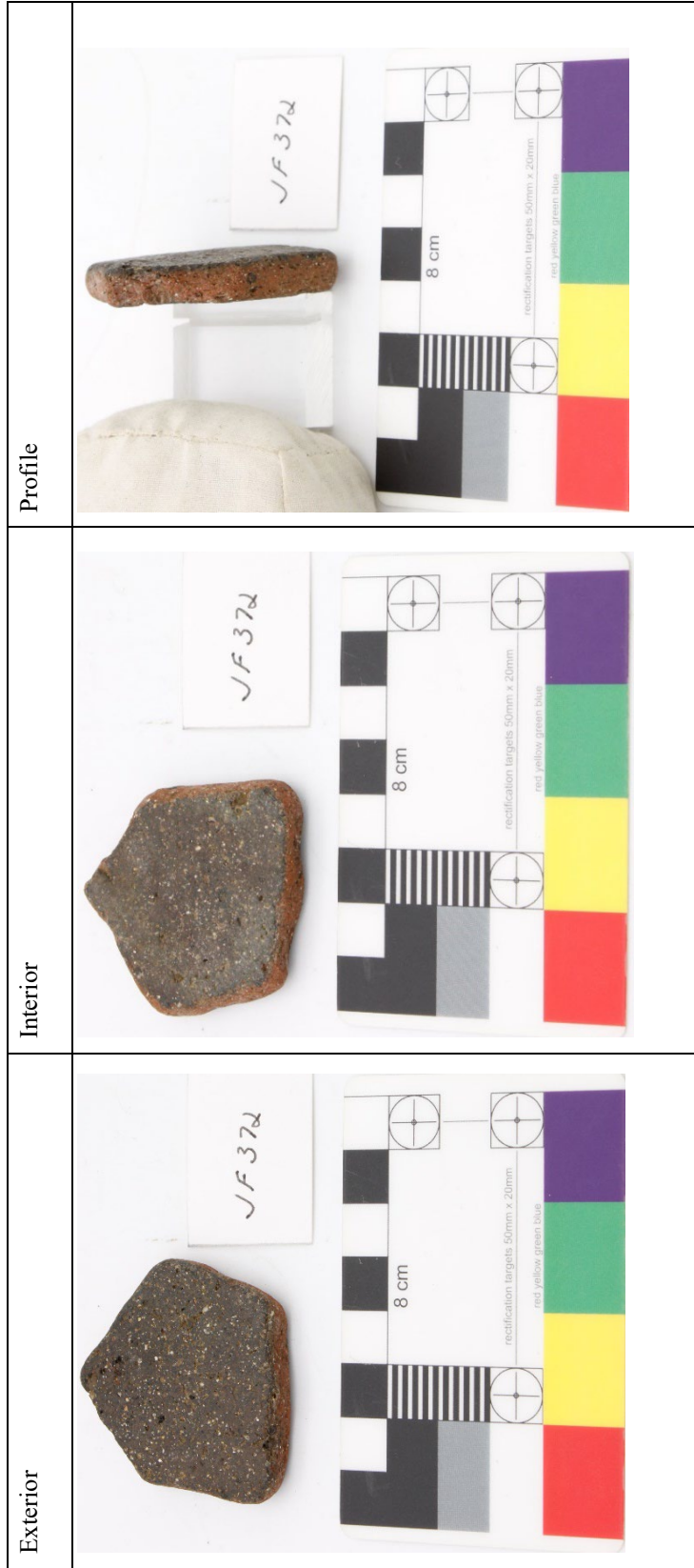
Exterior margin: 5Y 4/1 (dark gray), light inclusions are very visible. 1.09 mm.

Interior margin: 5Y 4/1 (dark gray), light inclusions visible. Very thin

Decorations: N/A

Location: SH

Figure 95. Example of Type DR30, JF372



DR31

The type is a compact, reddish brown stoneware with the paste consistent throughout the sherd. The paste has vitrified and the inclusions have no boundaries from the base paste. There are few, very fine light inclusions in the paste which may be part of the original clay. There are no voids. The exterior glaze is a grayish brown wood ash glaze over top of a very dark oxidized undercoat. The glaze is matted. The undercoat is about 1.45 mm thick. The interior appears brighter red with possibly a slip glaze, striations from application are visible. The interior of the sherd is slightly lumpy and uneven.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/2 (weak red)

Texture: Moderately fine

Vitreous: Yes

Exterior Glaze: Gley 1 3/N (very dark gray) with an 10YR 5/2 (grayish brown) ash-glaze

Interior Glaze: 2.5YR 4/3 (reddish brown). Slip glaze

Inclusions: The darker inclusions are very fine (less than 1 mm) (>1%); light inclusions are very fine (less than 1 mm) (5%).

Voids: None visible

Thickness: 7.86 mm – 9.11 mm. The average thickness is 8.48 mm, with an average difference of 1.25 mm

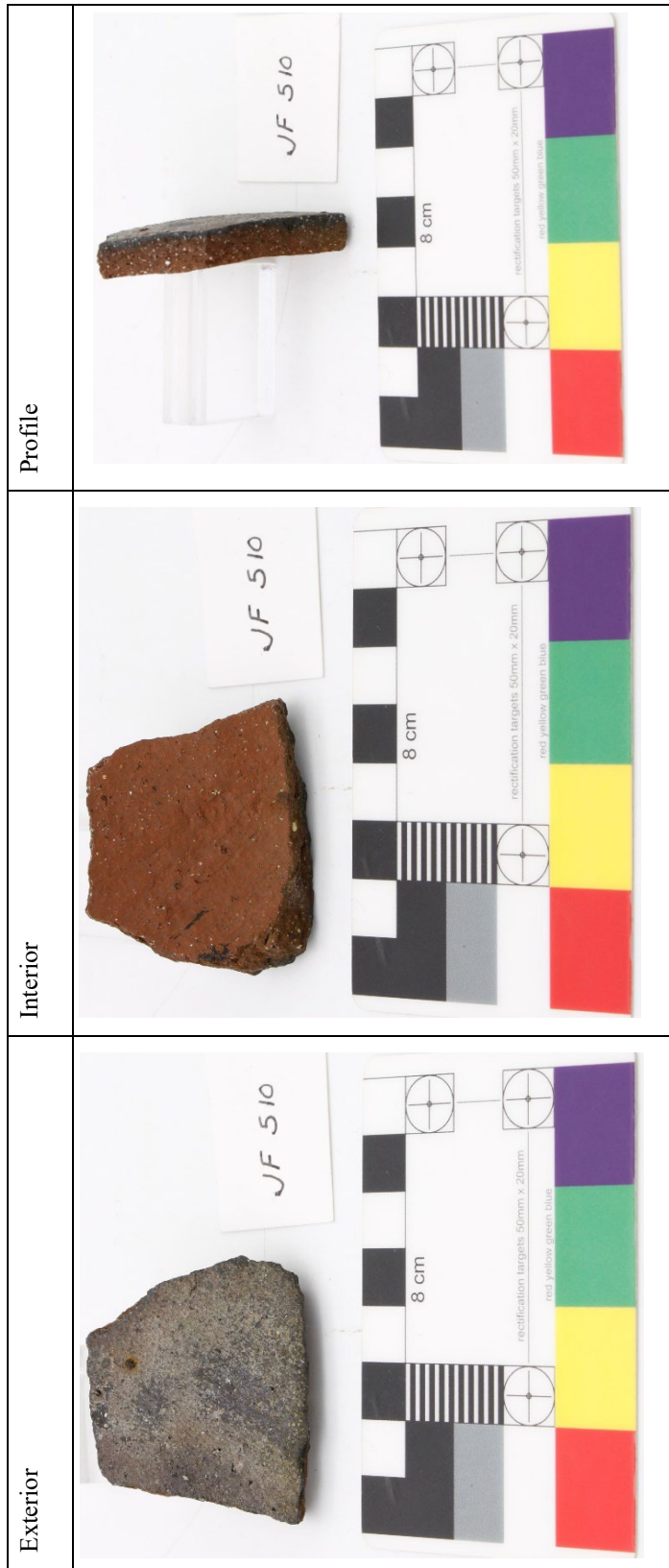
Exterior margin: Gley 1 3/N (very dark gray), approximately 1.45 mm thick

Interior margin: NA

Decorations: N/A

Location: NB

Figure 96. Example of Type DR31, JF510



DR32

The type is a compact, reddish brown stoneware with the paste color consistent throughout the sherd. The paste has vitrified and the inclusions have no boundaries from the base paste. There are few, very fine light inclusions in the paste which may be part of the original clay. There are no voids. The exterior glaze is a reddish brown overtop of a very dark gray iron glaze undercoat. The undercoat is about 1.19 mm thick. The interior does not appear to have a glaze but striations from smoothing are visible.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/4 (reddish brown)

Texture: Moderately fine

Vitreous: Yes

Exterior Glaze: 5YR 4/3 and Gley 1 3/N (reddish brown and very dark gray). Gray is 1.91 mm thick

Interior Glaze: N/A

Inclusions: Light inclusions are very fine (less than 1 mm) (1%).

Voids: None visible

Thickness: 9.42 mm – 10.83 mm. The average thickness is 10.12 mm, with an average difference of 1.41 mm

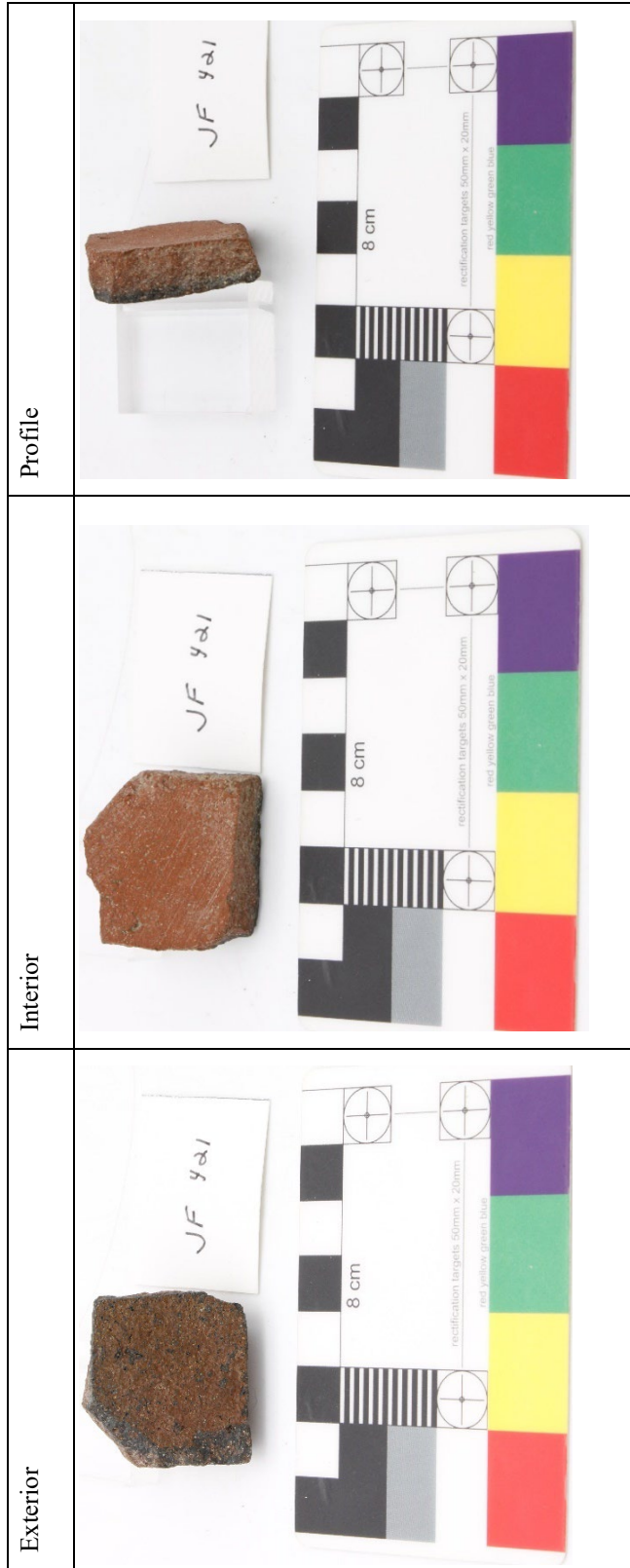
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: NB

Figure 97. Example of Type DR32, JF421



DR33

The unglazed stoneware is a compact, weak red to reddish brown paste that has a reduced very dark gray margin on the exterior. The paste has mostly vitrified, there is some fusion between the fabrics but the granules are clearly visible. The sherd is strong, hard, and dense. The interior has striations from smoothing the paste visible. The light inclusions in the paste appear to be very fine, well sorted minerals, and larger dark inclusions are fine to medium. There are a few fine voids in the paste but are less than 1 percent. The interior of the sherd is a slightly brighter reddish brown from the firing process. The sherd is lumpy and uneven.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/3 (reddish brown)

Texture: Moderately coarse

Vitreous: Yes

Exterior Glaze: Possibly ash glaze

Interior Glaze: N/A

Inclusions: The darker inclusions fine to medium (1 mm – 5 mm) (3%); light inclusions very fine (less than 1 mm) (5-7%).

Voids: Fine (1 mm – 2 mm) (>1%).

Thickness: 6.23 mm – 10.69 mm. The average thickness is 8.46 mm, with an average difference of 4.46 mm

Exterior margin: 5Y 3/1 (very dark gray). Approximately 1.15 mm thick

Interior margin: 2.5YR 4/4 (reddish brown). No measurable margin.

Decorations: N/A

Location: NB

Figure 98. Example of Type DR33, JF145



DR34

A weak red to reddish brown unglazed stoneware. The paste has vitrified and is completely fused together making it compact and dense. The core is consistent throughout the sherd but there is some color variation on the exterior and interior paste from firing. The interior has striations from smoothing the paste visible. The light inclusions in the paste are very fine minerals, and dark inclusions are fine. Aside from one void on the exterior of JF059, there are no visible voids. The sherds had a thickness between 10.43 mm – 6.51 mm, the average difference is 1.05 mm. The sherds are similar to the Tayapan jars found in the Philippines, but they are not known for being identified on galleons.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/2 (weak red) 2.5YR 4/3 (reddish brown)

Texture: Moderately fine to moderately coarse

Vitreous: Yes, completely fused

Exterior Glaze: N/A

Interior Glaze:

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (3%); light inclusions are very fine (less than 1 mm) (3-4%).

Voids: None visible aside from one 7.61 mm long by 1.86 mm wide void on the exterior of JF059

Thickness: 6.51 mm – 10.43 mm. The average thickness is 8.23 mm, with an average difference of 1.05 mm

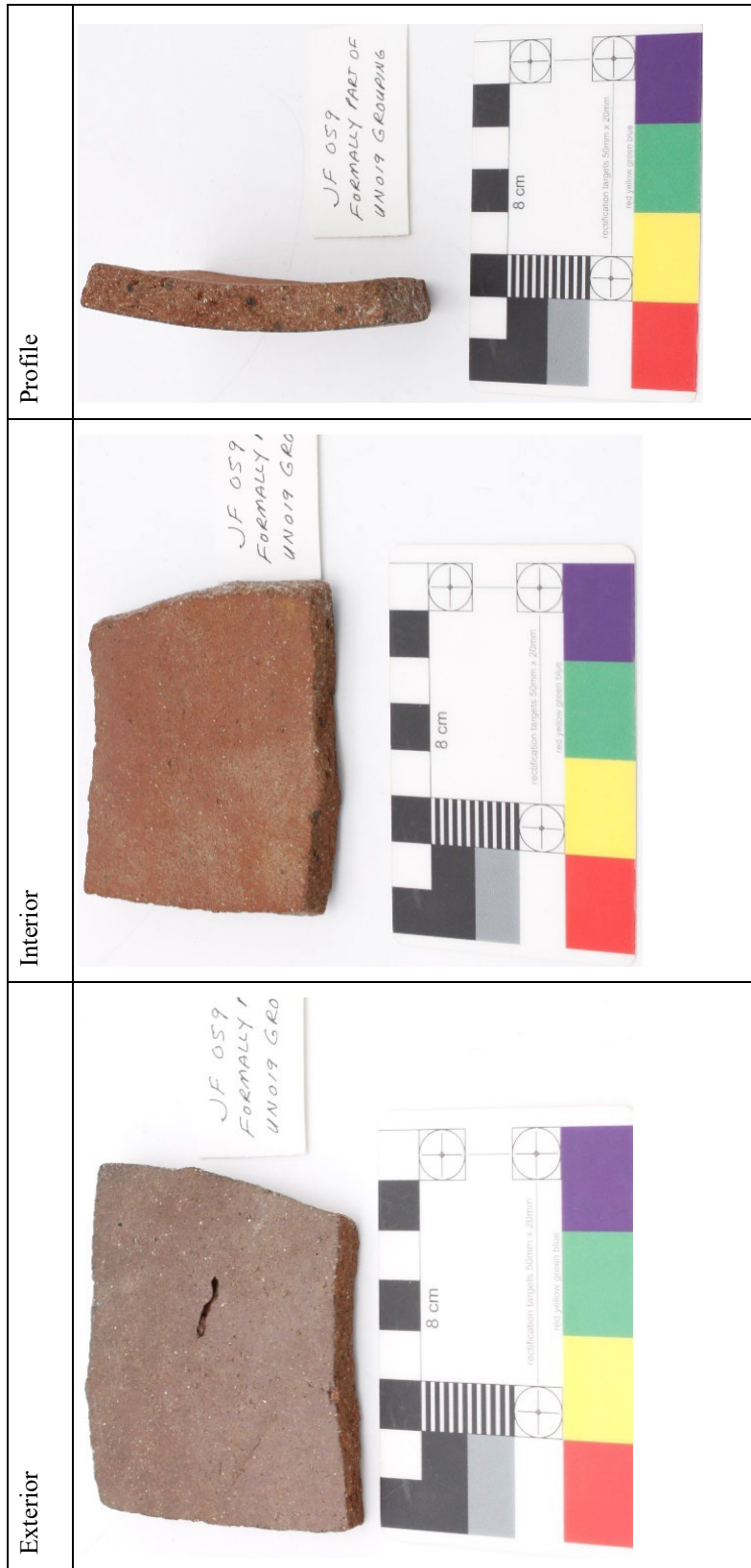
Exterior margin: Exterior paste color 5YR 4/2 or 2.5YR 3/3 (dark reddish brown or reddish gray). No measurable margin.

Interior margin: 2.5YR 4/2 (weak red), 2.5YR 4/3 (reddish brown). No measurable margin.

Decorations: N/A

Location: NB, SH

Figure 99. Example of Type DR34, JF059



DR35

The type is a compact reddish brown stoneware. The paste color consistent throughout the sherd. The paste has vitrified and is completely fused together making it compact and dense. The light inclusions in the paste are very fine minerals, and dark inclusions are fine. There are a few voids in the paste but they make up less than 1 percent. The exterior glaze is a dark reddish brown overtop of a very dark gray undercoat with some specks of a natural ash glaze. The interior has striations from smoothing but does not appear to have a glaze. The sherd has a very consistent thickness.

Type: Stoneware (high fire)

Paste Color: 2.5YR 4/3 (reddish brown)

Texture: Moderately fine

Vitreous: Yes, completely fused

Exterior Glaze: Gley 1 3/N (dark reddish brown and very dark gray) with spots of 5YR 4/2 (dark reddish brown). A section may have been exposed to ash glaze.

Interior Glaze: N/A

Inclusions: The darker inclusions are fine (1 – 2 mm) (1-2%); light inclusions are very fine (less than 1mm) (5%).

Voids: very fine (less than 1mm) (>1%).

Thickness: 10.44 mm – 10.47 mm. The average thickness is 10.45 mm, with an average difference of 0.30 mm

Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: NB

Figure 100. Example of Type DR35, JF057



DR36

The type is a compact reddish brown stoneware with the paste consistent throughout the sherd. The paste has vitrified making it very strong, hard, and dense. The inclusions have no boundaries from the base paste. The light and dark inclusions in the paste appear to be very fine well sorted minerals. There are a few very fine voids, likely where the organic inclusions burned away. The exterior glaze is a dark reddish brown overtop of a very dark gray undercoat. The undercoat is about 0.75 mm thick. The interior glaze is a dark reddish gray with some dark grays around some of the darker inclusions. The sherd a thickness between 8.12 mm - 8.53 mm, there is not much variation in the thickness.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/3 (reddish brown)

Texture: Moderately fine

Vitreous: Yes

Exterior Glaze: 5YR 3/2 and Gley 1 3/N (dark reddish brown and very dark gray).

Interior Glaze: 5YR 4/2 (dark reddish gray) with some dark gray

Inclusions: Dark inclusions are very fine (less than 1 mm) (1%); light inclusions are very fine (less than 1 mm) (1-2%).

Voids: Very fine (less than 1 mm) (>1%)

Thickness: 8.12 mm – 8.53 mm. The average thickness is 8.32 mm, with an average difference of 0.41 mm

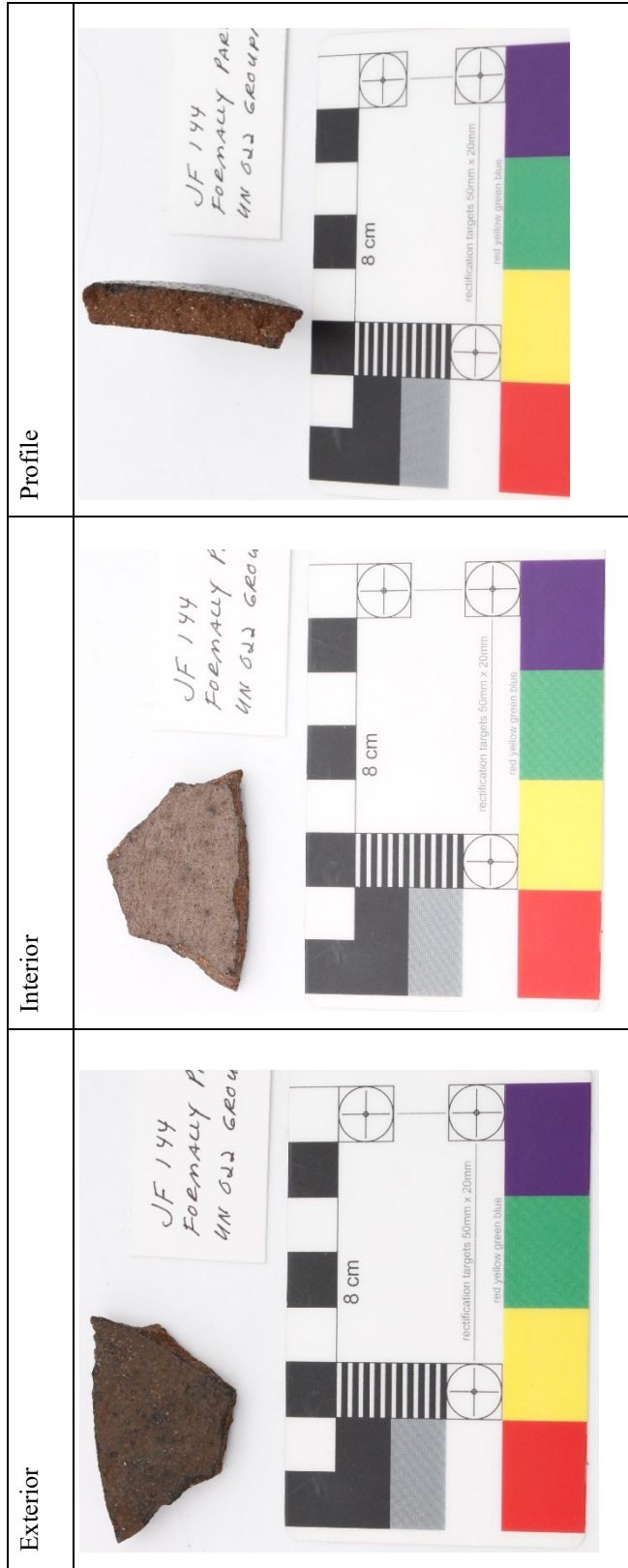
Exterior margin: N/A

Interior margin: N/A

Decorations: N/A

Location: NB

Figure 101. Example of Type DR36, JF144



DR37

The type has two paste colors, weak red exterior, and a very dark gray interior. The thickness between the two pastes varies greatly with the interior being much thicker than the exterior but the composition of the paste is similar. The body is completely fused and is smooth. The paste has very fine light inclusions throughout. There are some fine voids where there were air pockets in the paste. The interior of the sherd has striations or brush marks from possibly application of a glaze. The interior of the sherd has a dark bluish gray gloss but is not continuous. The gray interior is lumpy and uneven whereas the exterior is completely smooth.

Type: Stoneware (high fired)

Paste Color: 2.5YR 4/2 (weak red)

Texture: Moderately fine

Vitreous: Yes, glossy and completely fused.

Exterior Glaze: N/A

Interior Glaze: Gley 2 4/5PB (dark bluish gray)

Inclusions: The darker inclusions: none visible; light inclusions very fine (less than 1 mm) (5-7%).

Voids: Fine (1 mm – 2 mm) (1%).

Thickness: 12.52 mm – 14.42 mm. The average thickness is 13.47 mm, with an average difference of 1.90 mm

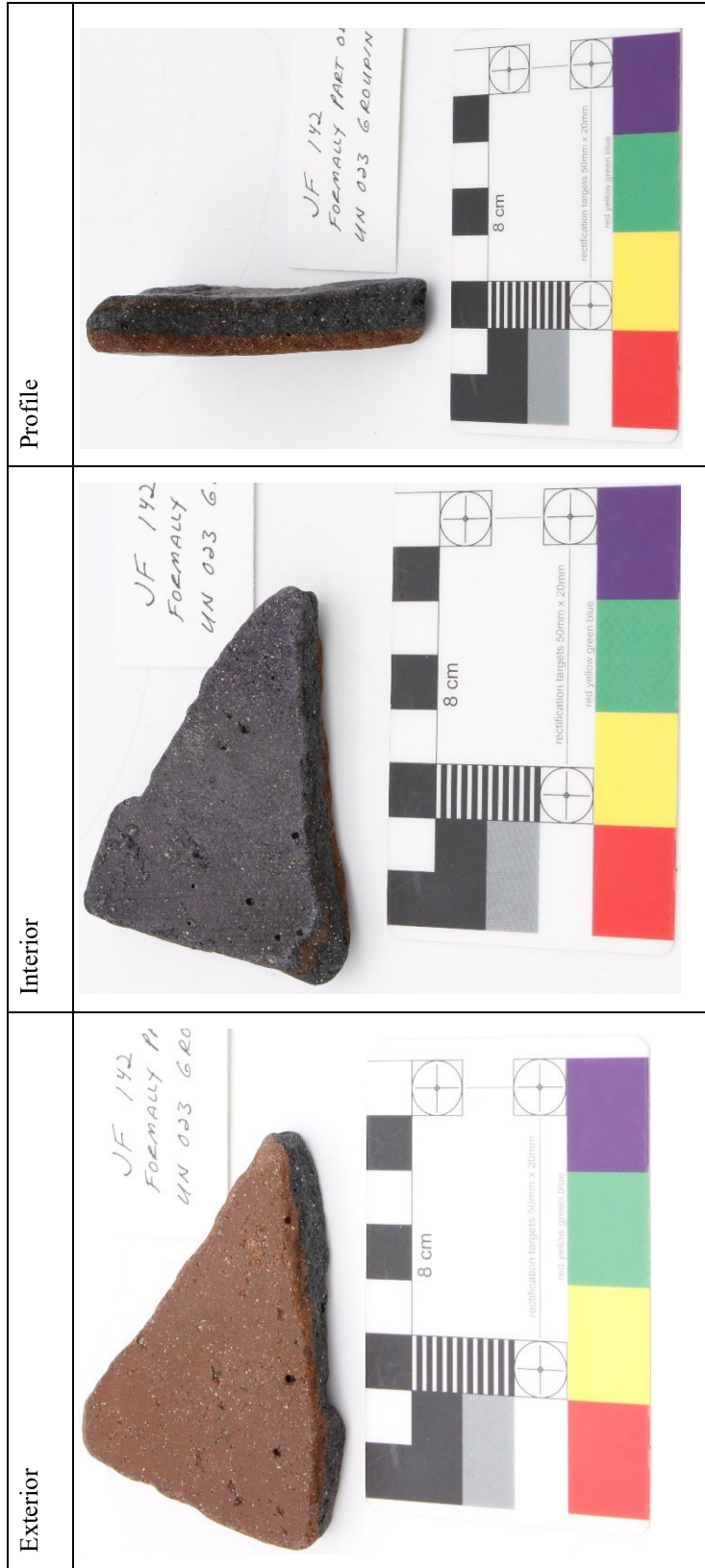
Exterior margin: 2.5YR 4/2 (weak red). Approximately 3.81 mm thick

Interior margin: Gley 1 3/N (very dark gray). Approximately 10.57 mm thick

Decorations: N/A

Location: SH

Figure 102. Example of Type DR37, JF142



DR38

The stoneware consists of a reddish brown body with black coring through the interior, likely due to a reduced firing atmosphere. The exterior of the type has a black glaze with a secondary natural fly-ash glaze over top. The paste has vitrified, glossy and compact, with no boundaries between the fabric and the inclusions. The sherd is robust and strong. The light and dark inclusions in the paste appear to be mostly very fine, well sorted minerals. There are a some very fine to fine voids where the paste had not completely fused or where there were air pockets in the paste. The sherds had a thickness between 15.33 mm – 17.94 mm. Some other measurements include: the exterior measurement for the neck is 33.77 mm long and the rim is 18.17 mm tall and 17.94 mm thick. The total length of the sherd from the rim to the shoulder's edge is 83.01 mm

Type: Stoneware (high fire)

Paste Core Color: Gley 1 3/N (very dark gray). Thickness ranged from 3.03mm – 5.43mm

Texture: Moderately fine

Vitreous: Yes

Exterior Glaze: Gley 1 2.5/N (black) with 2.5YR 4/2.5 (dark reddish brown) and 2.5Y 6/4 (light yellow brown) from the accumulation of fly-ash glaze

Interior Glaze: Gley 1 2.5/N (black)

Inclusions: The darker inclusions are fine (1 mm – 2 mm) (1%); light inclusions are very fine (less than 1 mm) (5%).

Voids: Very fine to fine (less than 1 mm – 2 mm) (1-2%).

Thickness: 15.33 mm – 17.94 mm

Exterior margin: 2.5YR 4/3 (reddish brown). Average of 3.71 mm

Interior margin: 2.5YR 4/3 (reddish brown). Average of 3.71 mm

Decorations: N/A

Location: NB

Figure 103. Example of Type DR38, JF628(VC)



Particle size chart from Rice (2015) used for estimate percentages.

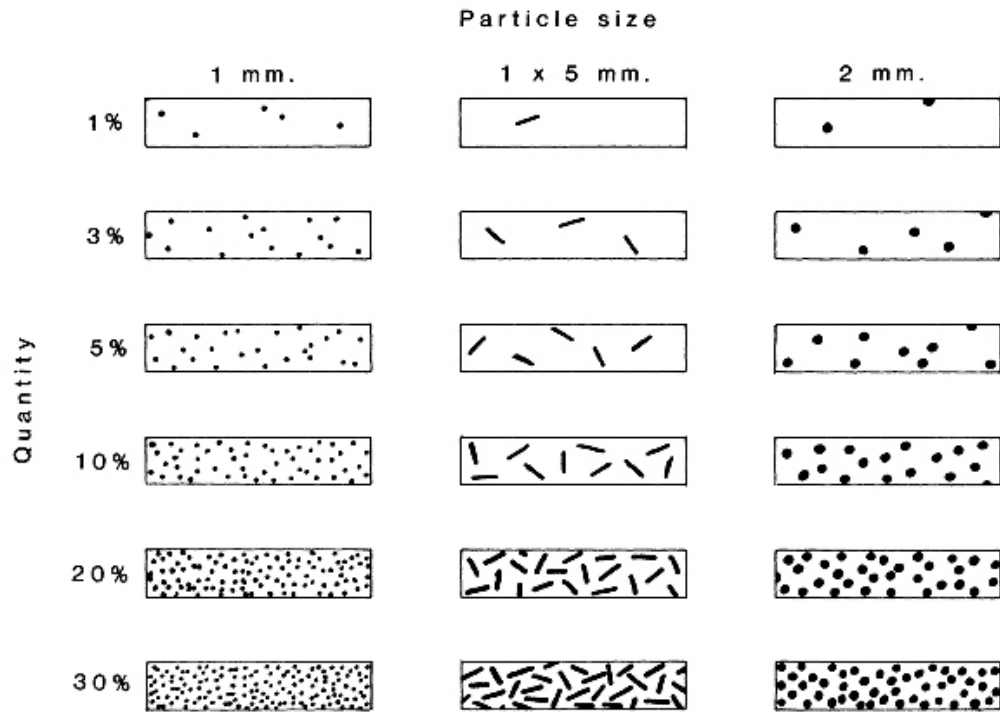


Figure 15.1 Comparison chart for estimating various quantities of different sizes and shapes of particles in a sherd cross-section.