

## Hotel Indigo Site (44AX229) Ship Preservation Updates

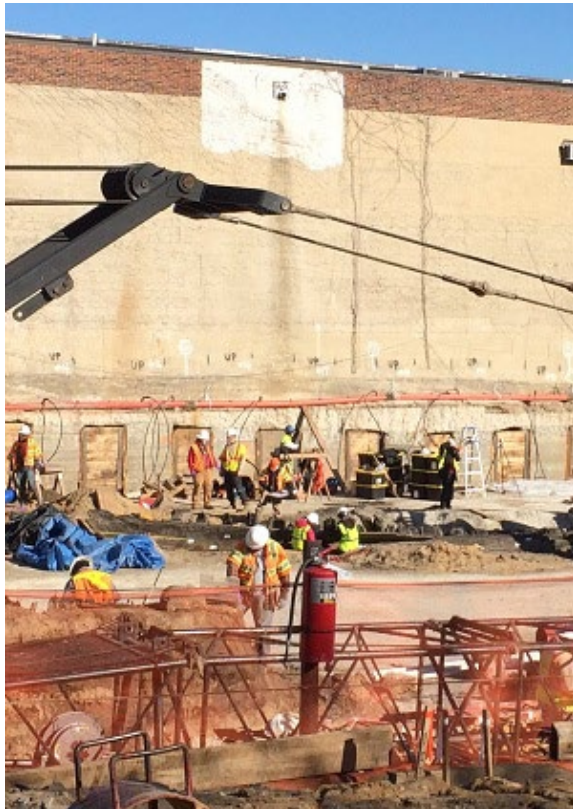
May 2016 – December 2021

*Note: This information reflects the state of knowledge when this update was written. Information may have changed. Please see the Hotel Indigo Report [Volume I](#) and [Volume II](#) for updated information.*

### The Ship, Post-Excavation

May 2016

#### Conservation

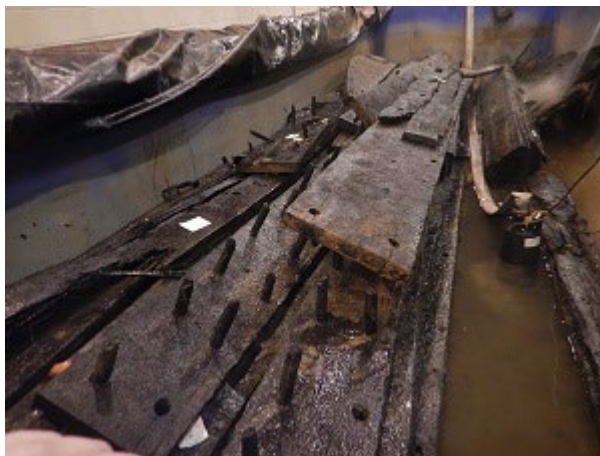


After excavating and disassembling the ship in January, it was transported to a facility here in the city and placed into two large tanks of water to begin the long conservation process. Because the ship sank and then was buried below the water table, it has been in a stable, consistent, anaerobic or oxygen-free environment for the last 200 years. Here, you can see against the wall and above the orange pipe the previous ground level in relation to the depth of the ship. Without oxygen, the bacteria, mold, and fungi that would otherwise begin to break apart and decompose the wood cannot live. Being buried and submerged has kept the wood from freezing and thawing or alternating between drying out and rewetting, both processes act to physically break apart the structure of the wood. Once re-exposed by archaeologists to oxygen and to the elements, the ship's timbers would rapidly break down and fall apart if left untreated. For this reason, it was necessary to quickly document the ship in the ground before taking it apart and removing it to a more stable environment.

Like the 1755 John Carlyle warehouse excavated before it, storing the timbers in tanks of water serves two purposes. First, the water acts to physically stabilize the wood. Because the wood has been soaking in water for the last 200 years, the tiny spaces within and between the cells of the wood are filled with and supported by water. If we were to remove this water all at once, much of the structural support keeping the wood together would be lost. We saw this process on site in the weeks between when the ship was exposed and when it was excavated. As the timbers dried out, the edges became fragile and started to crack. To combat this, archaeologists on site regularly sprayed the wood with water and covered it at night with sheets of black plastic to trap the condensation.



Second, by storing the wood in tanks of water we can both clean and chemically stabilize the wood as well. During their use as a ship and since being buried, the ship's timbers have absorbed salts and metals and other elements from the soil that are harmful to their stability. Every few weeks, Alexandria Archaeology drains and refills the tanks with clean water in order to remove these foreign components from the timbers. This "purging" process can last as long as several years, depending on how much foreign material the timbers have absorbed, the porosity of the wood is, and how often we drain and refill the tanks.



Just like the warehouse, after the wood is physically and chemically stable, the next step in the conservation of the ship involves removing all of the water from the wood and replacing it with a chemical called polyethylene glycol (or PEG). The PEG will help retain the physical stability of the wood without evaporating like water. Lastly the wood will be freeze-dried in order to remove any remaining traces of water.

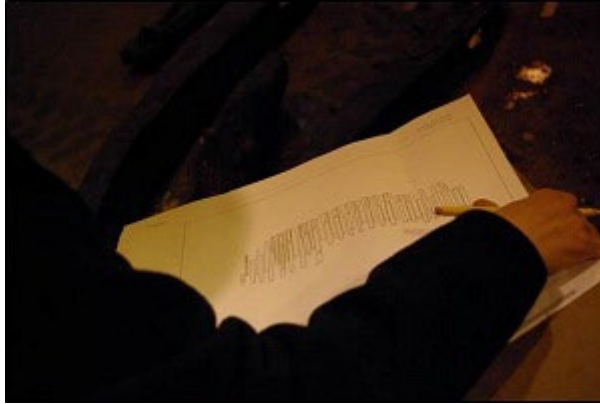
Alexandria Archaeology is currently putting together a request for proposals for finding a conservation facility to take over and complete the conservation of the ship. Once it is properly conserved and stable, the ship will hopefully return to Alexandria for long-term interpretation and display.



## Documentation

In mid-April, we had to take the timbers out of the tanks in order to install liners in the tanks. This was important to do in order to prevent the water and wood from coming into contact with the sides of the metal tank, which can leech harmful metallic ions into the ship's timbers. We took this opportunity to lay out each timber as it was originally found and to document each part of the ship in a warmer, drier, and less hurried setting. Archaeologists and volunteers from Alexandria Archaeology and the Naval History & Heritage Command spent a week in mid-April laying out the ship on the floor of the storage facility and going over every inch of every timber. We examined, measured, drew, photographed, and inventoried the parts of the ship and we now have a detailed record of many of the ship's timbers and a descriptive inventory of the rest. From these, researchers will be able to continue to research the finer points of how the builders constructed the ship, which may allow us to eventually identify the ship and its makers.

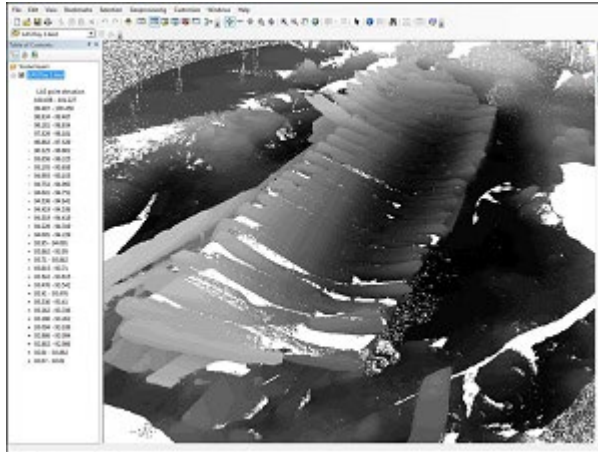




In addition to these records of the ship, we also have a pair of digital datasets that we recorded while the ship was still in the ground. The first of these is a digital model of the ship as it was discovered produced by stitching together many photographs of the ship taken from slightly different—but overlapping—angles. Known as photogrammetry, this process is a quick and efficient way for us to produce a 3D model of the ship before we dismantled it.







The second of these digital datasets comes from a series of laser scans conducted as the ship was being excavated. Laser scanning works by aiming a pulse of light at a specific point on the ship, timing how long it takes to travel to the ship, reflect off of the ship, and return to the scanner, and then converting that time into a distance using the equation:  $\text{distance} = \text{speed of light} * \text{time} / 2$ . Repeating this process hundreds of thousands or even millions of times across the entire surface of the ship, we were able to obtain an extremely accurate and precise digital model that records each layer of the ship. This scan was made

after the frame of the ship was completely exposed and contains 43,857,638 individual points recorded on and around the ship.

## Public Interpretation

Because we had to take the timbers out of the tanks in order to install liners in the tanks and because we were going to be laying out the timbers for documentation anyway, we had a wonderful opportunity to open the storage facility and allow the public in to see the ship. We offered guided tours of the ship April 14th, 15th, and 16th and almost 1,000 people booked a tour on one of those three days; that number doesn't even include those who showed up without reservations.

## Ongoing Research

We know from historic maps that show Alexandria's changing shoreline that the ship had to have been sunk and buried sometime between 1788 and 1798. In 1788 the location of the buried ship would have been underwater. Ten years later, by 1798, the property owner had filled in the shoreline with tons of earth so as to create more land. In this building out process, savvy waterfront landowners acquired older ships no longer seaworthy or worth the cost of repair and purposely sink or scuttle them so as to expedite the filling process. This means that our ship became part of the archaeological record sometime in that intervening decade.

Previously, we had identified a lease from 1798 between Elizabeth Copper, the owner of the lot on which the ship was found, and John Thomas Ricketts, an Alexandrian merchant. The lease specified that Ricketts was to "extend [land] into the River immediately in front of the premises." However, after carefully reading the legal description of the 1798 agreement, it appears as if it includes and references the Strand as "...a space of Ground...left open as a passage by which to communicate with other parts of the Town and as a landing place..." This means that by 1798, the lot at 220 S. Union Street already had been filled in, and the scuttled ship must have been in the ground by the time John Thomas Ricketts signed the lease. Instead, Mr. Ricketts was agreeing to fill in land further to the east on the other side of The Strand.

Even though this lead turned out to be a dead end, other leads remain. For example, an Act passed by the Alexandria Corporation in 1799 in order “to preserve the navigation of the Public Docks in the town of Alexandria” may have a bearing on our buried ship. It begins:

*“Whereas...That diverse persons, inhabitants of the said town, and others, have been and still are in the habit of introducing into the public docks adjacent to the several wharves in said town, the decayed and rotten hulks of old vessels, boats, and craft, of different descriptions, under pretense of repairing the same, but in reality to serve the purposes of fuel, which when cut down to the surface of the water are willfully and negligently suffered to sink to the bottom of said docks where they remain obstructions to the navigation...”*

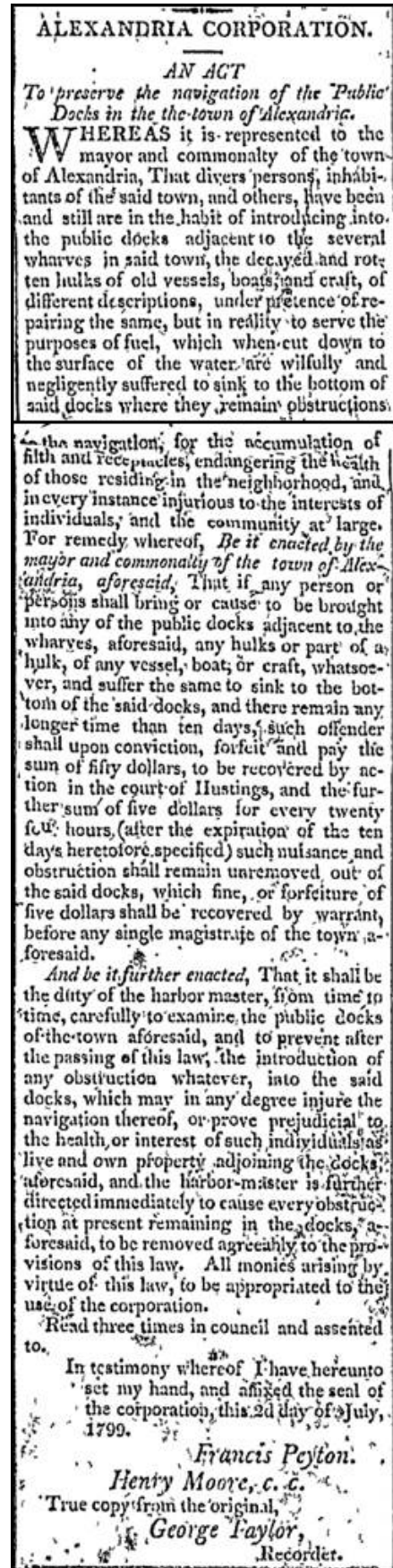
The 1799 Act then states:

*“...Be it enacted by the mayor and commonalty of the town of Alexandria, aforesaid, That if any person...shall bring...into any of the public docks...any hulks...of any vessel...and suffer the same to sink...and there remain any longer time than ten days, such offender shall upon conviction, forfeit and pay the sum of fifty dollars...and the further sum of five dollars for every twenty four hours...such nuisance and obstruction shall remain unremoved out of the said docks...”*

At the turn of the 19th-century, this seems to have become enough of a problem that the City had to do something about it, going to far as to impose heavy fines for people who allowed their ships to sink from abuse and neglect at the docks. We have only half of the bottom of a ship, which appears to have been chopped down to the waterline with an axe, and then was allowed to sink on what used to be the City’s waterfront, and which dates to the years just before the City essentially said “Enough is enough! You all have to stop chopping your ships down to the waterline and then letting them sink to the bottom of the City’s waterfront!” Added together, a picture for how our ship was cut apart and came to rest at the bottom of the Potomac River along the Alexandria waterfront is coming together.

Other lines of research we are currently pursuing include:

1. Analysis of the tree rings in the ship’s timbers (dendrochronology) which may reveal the source of the wood and the age of the trees used to build the ship.



2. Initial study of the extensive worm damage to the ship's sacrificial planking suggests that the worms are indigenous to the Caribbean region. Further analysis may help us to understand how far our vessel ventured during its lifetime.
3. Continued investigation of the artifacts found scattered among the ship timbers may help us continue to zero in on a date of use and the function of the ship
4. Analysis of the many wooden fasteners or treenails ("trunnels") that held the ship together can tell us about the lifespan of the vessel, how well it withstood the stress of many years of sea travel, and the amount of weight it carried and its distribution inside the ship.

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## Ship Conservation and New Research

*May 2017*

Through the multi-year process of conservation, the ship's wooden timbers will be preserved for future generations to study and appreciate. TAMU's Lead Conservator, Dr. Peter Fix, said "we are looking forward to partnering in the stewardship of this artifact."

In January 2016, archaeologists from Thunderbird Archaeology, a division of Wetland Studies and Solutions, Inc., excavated the 50-foot-long fragment of the ship's hull in coordination with Alexandria Archaeology. Thunderbird was hired by Hotel Indigo developers Carr City Centers to conduct the investigations as part of the City's Archaeological Protection Code. Since then, the ship's timbers have been stabilized and stored in tanks of water in a City facility awaiting professional conservation.

Operating under TAMU's Center for Maritime Archaeology and Conservation, the Conservation Research Laboratory is one of the oldest continuously operated conservation laboratories that deals primarily with archaeological material from shipwrecks and other underwater sites. The laboratory has undertaken the monumental task of treating all material recovered from the *Belle*, a 17th century French ship that wrecked off the Texas coast in 1686. The *Belle* went on exhibit last year at the Bullock Texas State History Museum in Austin, Texas. The laboratory is also currently conserving the remains of an 18th century ship uncovered during excavations at the World Trade Center.

A recent study of the tree rings (called dendrochronology) by Oxford Tree-Ring Laboratory ([read the full report here](#)) revealed that the ship's timbers were felled in Massachusetts sometime after 1741.

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## Ship Sets Sail for Texas A&M University

June 2017



*Mayor Allison Silberberg and Acting City Archaeologist Eleanor Breen address crowd at Bon Voyage send-off party, Thursday June 15<sup>th</sup>. (Photo, Jeff Hancock, Hancock Photography.)*

On Saturday, June 17<sup>th</sup>, the 18<sup>th</sup> century ship found during the construction of the new Hotel Indigo began its voyage to [Texas A&M University's \(TAMU\) Conservation Research Laboratory](#).

The ship was [excavated from the waterfront](#) in January 2016 by a team of archaeologists from Thunderbird Archaeology. After excavation, the ship's timbers were held in large tanks of water to prevent the fragile wood from deteriorating while awaiting conservation.

To avoid being damaged in transit, the ship was first carefully packaged over the course of one week with the help of 40 volunteers, for a total of 656 volunteer hours.

Each timber was removed from the tanks and photographed and cataloged individually. The timbers were then wrapped in layers of wet towels to keep the wood wet during its long trip to Texas. This layer of towels was followed by several layers of plastic wrap to prevent the water from evaporating, and then foam to help cushion the timbers. Over the course of the week, we went through three miles of towels and one and a half miles of foam!

While in Texas, the ship will be conserved and analyzed to provide further insight into the 18<sup>th</sup> century ship's story. The conservation process will take multiple years, during which time we will begin to plan for the ship's return to Alexandria. For this to happen, we need your help! Please consider [donating today](#) to our "Save Our Ship" conservation fund.

On June 15<sup>th</sup>, 2017, Alexandria Archaeology held a *Bon Voyage* send-off event for the ship at the old Dash bus barn on South Quaker Lane, where the public was invited to watch the packaging process, ask questions, and participate in family-friendly activities that encouraged critical thinking about maritime history and preservation. Citizens and archaeology enthusiasts alike enjoyed speeches from Mayor Allison Silberberg and Eleanor Breen, Acting City Archaeologist.

Alexandria Archaeology extends its deepest gratitude to those who participated in the packing effort, as well as those who attended the *Bon Voyage* event. It is thanks to the time, effort, and support of the Alexandria public that the preservation of the city's history continues to be possible.





*Above left: Alexandria Mayor Allison Silberberg examines the holding tank during the Bon Voyage send-off event. (Jeff Hancock, Hancock photography.) Above right: Heavy timbers await removal with the help of a forklift.*



*Above left: Each timber was photographed and catalogued when it was removed from the water tank. Above right: Alexandria Archaeology Museum educator Emma Richardson smiles while rolling towels for the first layer of timber packaging.*

*Bottom left: All volunteers were tasked with rolling towels at least once throughout the week. Though tedious, the rolled paper towels allowed for easy and precise application to the timbers.*



*The rolled towels, made of a special sturdy paper, were soaked in water and carefully draped around the timbers. All timbers, no matter the size, underwent the same layering process. (Images 2 and 3, Jeff Hancock, Hancock Photography).*







Top left: Peter Fix from Texas A&M demonstrates how to wrap timbers in plastic wrap. Top right: The larger planks often took two to three people to wrap securely. (Jeff Hancock, Hancock Photography) Right: Once the timber is wrapped in plastic wrap, it is packaged and labeled in one final layer of foam.





*Top left: The warehouse resembled a factory assembly line during the week. From left to right: water tanks, foaming station, plastic wrapping station, paper towel station, and photography station. Top right: The crates were loaded with a layer of straw to further keep in moisture during transit.*

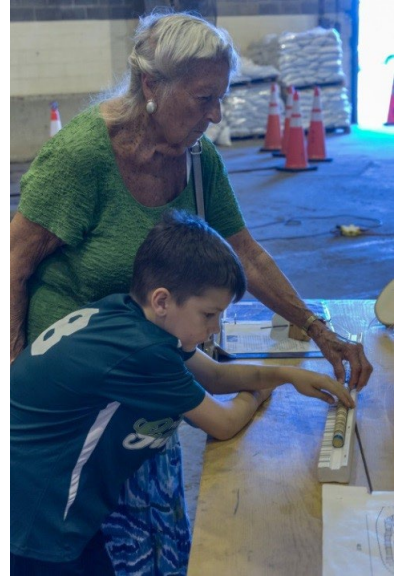


*At the Bon Voyage event on June 15<sup>th</sup>, the warehouse was transformed into a working showcase for the public to explore and ask questions regarding the timber packaging process. (Jeff Hancock, Hancock Photography.)*



*Image 2: A guest peers into the water tank. (Jeff Hancock, Hancock Photography)*





Guests enjoy the dendrochronology station, which illustrates the process of dating the ship's timbers. (Jeff Hancock, Hancock Photography)



Guests explore the pH station, which provides a visual understanding of acids and bases. (Jeff Hancock, Hancock Photography)

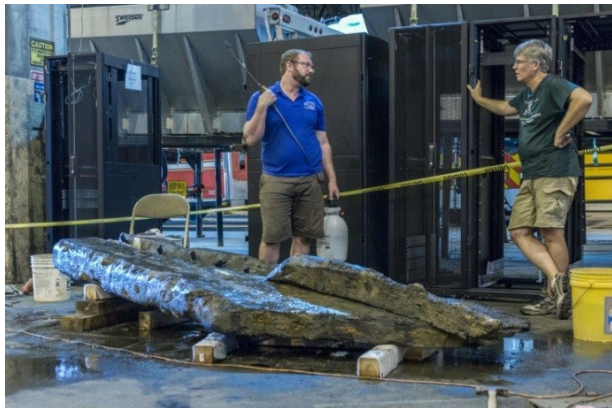




The public had the chance to test out their packaging skills at the “Pack a Pringle” station, where they had to devise a container for a Pringle chip that would withstand the weight of a brick. (Jeff Hancock, Hancock Photography)



Above left: Mayor Allison Silberberg greets longtime Friend of Alexandria Archaeology, Anna Lynch. (Jeff Hancock, Hancock Photography) Above right: Staff from Alexandria Archaeology sell t-shirts to support the “Save Our Ship” fundraiser. (Jeff Hancock, Hancock Photography)



Chris, Peter, and Eleanor make sure the timbers waiting to be wrapped stay wet to avoid deterioration. (Jeff Hancock, Hancock Photography)





Two-thirds of the packaged timbers, ready to be loaded into crates. (Jeff Hancock, Hancock Photography)



Left: Mayor Allison Silberberg smiles with Peter Fix and Chris Dostal from Texas A&M University. Right: Alexandria and Thunderbird archaeologists, Texas A&M marine conservators and Mayor Allison Silberberg give a toast to the 18<sup>th</sup> century ship. (Jeff Hancock, Hancock Photography)



*From left to right: John Mullen (Thunderbird), Emma Richardson (Alexandria Archaeology), Fran Bromberg (Alexandria Archaeology), Becca Siegal (President, FOAA), Elizabeth McCall (Chair, Alexandria Archaeological Commission), Eleanor Breen (Alexandria Archaeology), Mayor Allison Silberberg, Garrett Fesler (Alexandria Archaeology), Peter Fix (TAMU), and Chris Dostal (TAMU). (Jeff Hancock, Hancock Photography)*

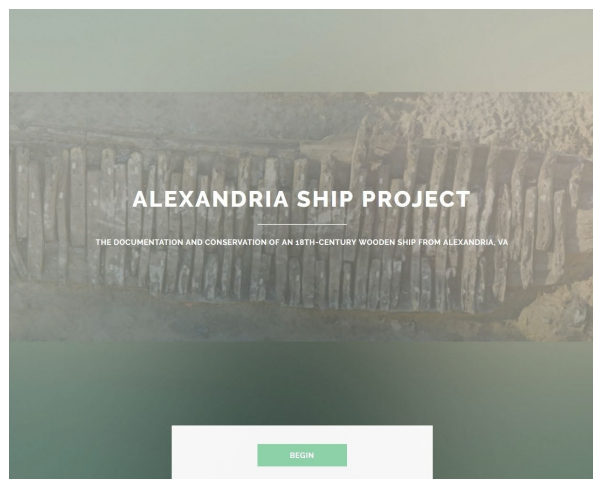
*This photo feature was prepared by Alexandria Archaeology intern, Addison Patrick, June 2017.*

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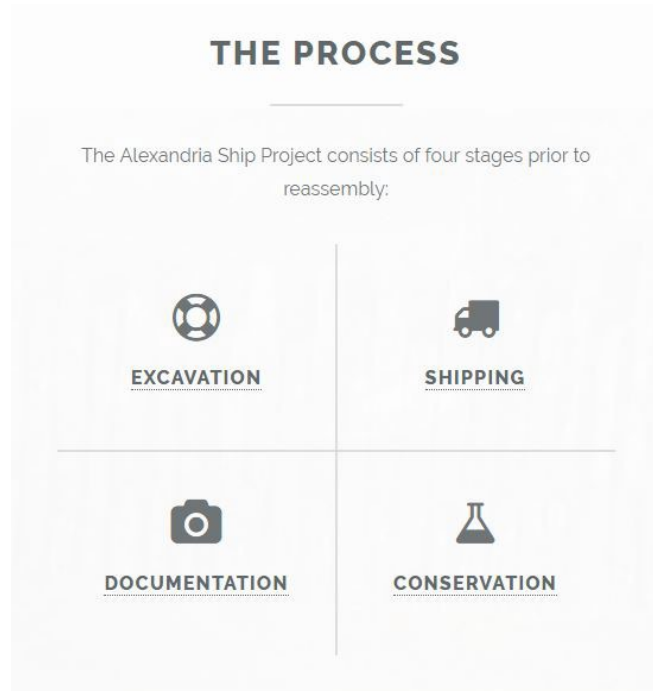
## Ship Conservation Website

November 2017

In June, the Alexandria Ship arrived safely at the Texas A&M University's Conservation Research Laboratory (CRL) in College Station, Texas and it is beginning the next phase of its journey. Even though the ship is more than a thousand miles away, we can still follow along with the CRL as they document and conserve the Alexandria Ship at its new webpage: [nautarch.tamu.edu/CRL/Alexandria/](http://nautarch.tamu.edu/CRL/Alexandria/).







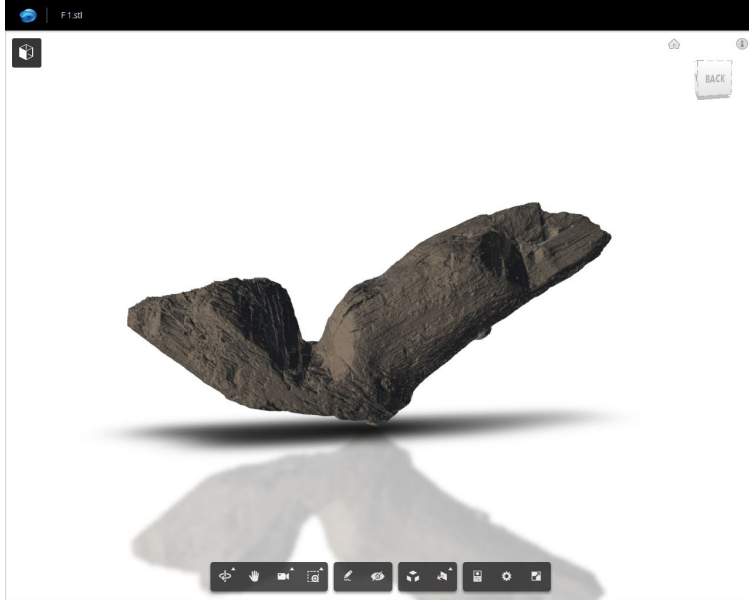
The webpage has links to the different phases of the Alexandria Ship project, including Excavation, Shipping, Documentation, and Conservation. In June, we packed up the ship with the help of dozens of volunteers, put it on a truck, and sent it to Texas. The ship arrived safely and conservators at the CRL have now unloaded and unpacked its timbers and have begun the process of documenting each floor, futtock, plank, and piece of keel and bow stem before they can start the conservation process.

As part of this phase of documentation, the CRL is using a FARO Edge ScanArm, a device that can measure and scan an object and produce a digital 3D model. They have already scanned several of the timbers and loaded the 3D models onto the website. This technology makes it easy to

examine, measure, and manipulate these very heavy and large timbers, even if they are currently in Texas and we are in Alexandria. From these digital scans, it will be possible to digitally reconstruct the remains without having to lift a single timber, approximate and reconstruct the missing portions of the ship in the computer, as well as 3D-print the individual timbers in order to create a physical model of the ship's remains.



Here, M.S. student Julia Herbst scans a timber using the FARO arm.



Pictured in this digital scan to the left is a side view of Floor 1, the fore-most framing timber of the ship (highlighted in red below). Click [here](#) to explore the digital model of Floor 1.

Visit the [Documentation section of the website](#) to explore more digital models.







From these digital 3D files, the CRL can print scaled-down physical models of each of the ship's timbers (the model of Floor 1 can be seen in the background of the photo to the left). Once all of the timbers have been scanned and printed, CRL will be able to build a scale model of our ship's remains for study and display.

Check back as more timbers are scanned and uploaded to the CRL website and as they enter the conservation process.

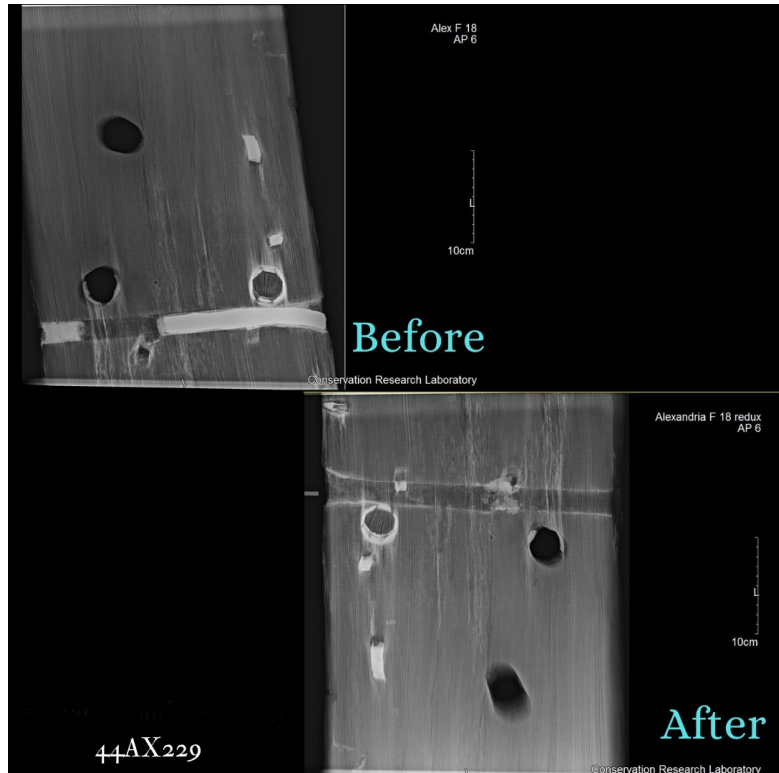
Read the news release [here](#).

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## Ship Conservation: Iron Fasteners and X-ray Technology

*March, 2021*

The team at the Conservation Research Lab continues to work on the ship remnant found at the Hotel Indigo Site (44AX229). Conservators are still working on manually and chemically removing iron fasteners and corrosion and are close to being finished with this task. This is an important step in the conservation process and one that takes a great deal of time. If iron is not fully removed from the timber, the rest of the conservation process will not be as effective, and the artifact is at risk of deterioration in the future. Many of the timbers are still in ammonium citrate baths, which helps chelate (or break down) iron concretions. Once all the iron is removed, conservators will impregnate the timbers with polyethylene glycol (PEG) and



then freeze dry them.

Conservators are also manually driving out pins, nails, and spikes. This is sometimes a slow process and a balancing act. It requires simultaneously applying enough force to remove the fastener while not damaging the surrounding wood. They've also used micro-air grinder to grind down the exposed heads of fasteners and a pneumatic air-scribe to pulverize concretions inside fastener holes. A few pins are posing additional challenges that the CRL team is trying a variety of techniques to extract.

The team is using X-ray technology to assist in removing the more stubborn iron fasteners and concretions from the timbers. X-rays help document the progress of the chelation process, showing how deeply embedded fasteners break down over time. By seeing inside the timber, conservators can make informed decisions about how to best remove pins, nails, and concretions. X-Rays help conservators make plans for extracting blind pins (pins where only one end is exposed) because they show the angle at which the pin penetrates the wood.

This before and after set of x-rays show the removal of a bolt connecting two timbers. The bright white in the before image indicates that dense metal is still present. Note that the after image does not have as much white visible, indicating that there is less metal present.

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## The Ship Model

*May 2021*

As part of the conservation of the ship, researchers at Texas A&M University created a 3D printed model of the vessel. This model includes the archaeologically recovered remains and an extrapolated wire frame representing the inferred hull shape. The dimensions of the reconstructed remains are consistent with a vessel with a 58 foot long keel, a roughly 18.5 wide beam for an overall hull length of 70 feet. The heavy framing and relatively flat floors suggest the deep hold of a merchant vessel, perhaps a brig or large sloop. The 1:12 scale model is currently on display in the Archaeology Museum as part of the Preserving Alexandria's Maritime Heritage exhibit.

Read [The Model Reconstruction and Presentation of the Indigo Wreck, Alexandria, Virginia](#), Glenn Grieco, Center for Maritime Archaeology and Conservation Ship Model Lab Texas A&M University







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## Ship Progress

*December 2021*

The team at the Conservation Research Lab (CRL) are continuing their work on the ship remnant found at the Hotel Indigo Site (44AX229). Conservators are still working to remove the last remains of stubborn iron fasteners from the wood. They are using both mechanical (like drilling) and chemical means to remove these bolts. The CRL team has had to engineer some novel solutions, like a support jig, to drive out the most stubborn fasteners more effectively.

The conservators estimate that the timbers will be iron-free very soon and will then be immersed in basins of polyethylene glycol (PEG). This inert, waxy substance essentially replaces any water within the timber, allowing the artifact to be stored and exhibited without the wood warping, cracking, or shrinking. Once this step is completed, the CRL team will freeze dry the ship timbers, removing any remaining water from the wood. This remaining conservation process is scheduled to take a few more years and the Hotel Indigo Site ship is expected to return to Alexandria in late 2024.



*The conservation of the ship from the Hotel Indigo Site (44AX229) has been funded in part by the National Maritime Heritage Grant Program which is administered nationally by the U.S. Department of the Interior along with the Maritime Administration of the U.S. Department of Transportation, and in Virginia, by the Department of Historic Resources.*

*The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. Government. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Government.*

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