HRBT EXPANSION Magazine

Winter 2022

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[COVER] The North Island expansion has been completed and construction is underway on the receiving pit for the tunnel boring machine.

A ship passes over the Hampton Roads Bridge-Tunnel as work continues on the South Island.

Message from Jim Utterback

Construction is underway across all 10 miles of the HRBT Expansion Project. Crews have installed hundreds of piles for the new marine trestle bridges and have been busy widening the roadway in Hampton and Norfolk. Mary, the Tunnel Boring Machine (TBM), has been delivered and will soon be in the process of being reassembled. 2022 will be full of activity as we finish the TBM launch pit and prepare to start tunneling. New marine trestles are starting to take shape across the channel and work has begun to build the new Mallory Street Bridge. As construction activities continue, motorists are encouraged to stay alert to work zones and changing traffic patterns.

James S. Utterback
HRBT Expansion Project Director

A view of the newly expanded North Island with equipment mobilized to prepare for the new tunnels.

IN THE NEWS

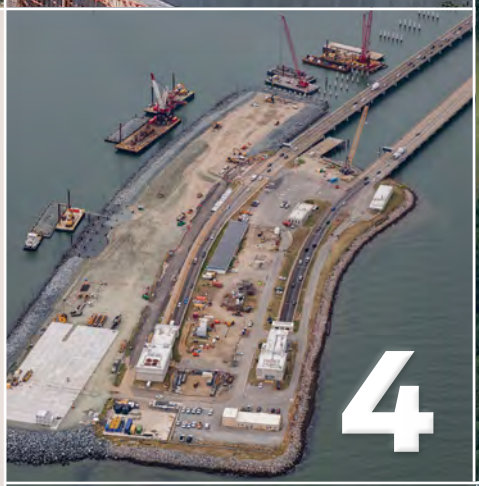
Juan Miguel Pérez takes lead as HRCP's new Project Executive for HRBT Expansion Project

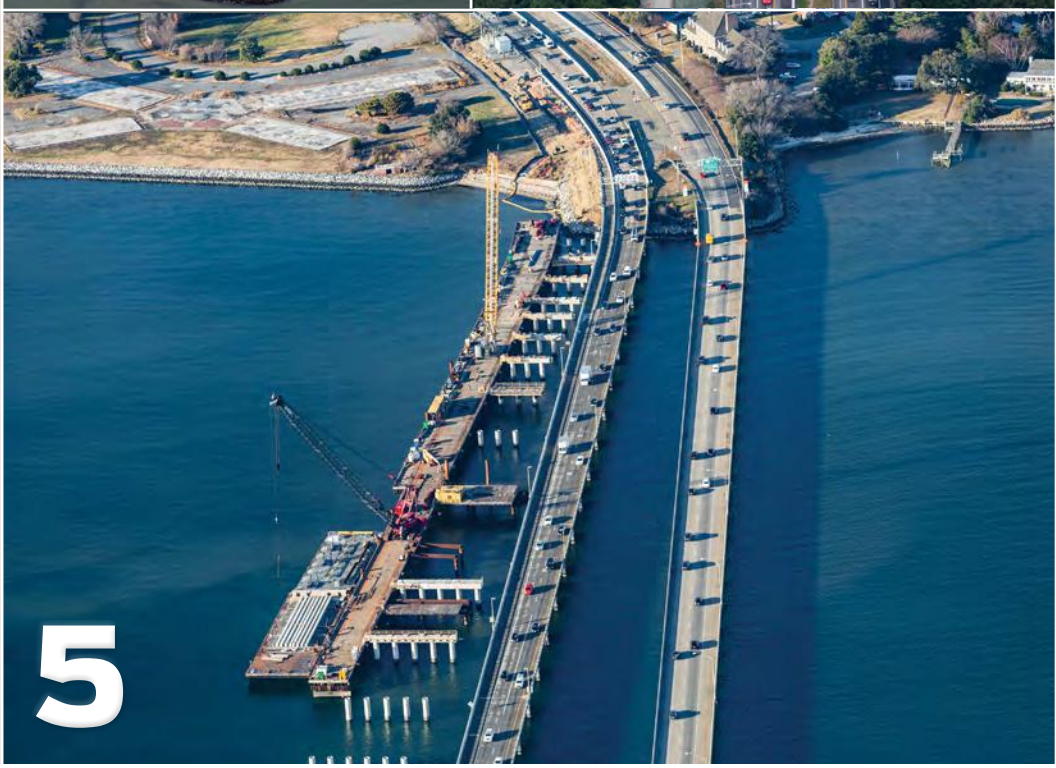
Juan Miguel Pérez has over 34 years of experience in the design and construction of major highway and bridge projects, as well as port and marine facilities and tunnels. His work has included top management responsibilities, international business development, as well as client and stakeholder relations.

Prior to his HRBT Expansion Project assignment in the U.S., Juan Miguel spent 22 years with Dragados, working on major port and infrastructure construction projects in Spain, Portugal, Africa and Israel.

Juan Miguel earned a Master's Degree in Civil Engineering from Polytechnic University of Madrid, Spain. He is professionally registered by, and serves as a member of, the National Society of Civil Engineers (Spain).

The HRBT Expansion Project was featured on the cover of the American DBE Magazine Winter 2022 issue.





South Island Progress – Completion of Tri-Cell Walls, Start of Excavation: 1 An aerial view of the South Island shows extensive construction activity. 9 An aerial view of the excavation of the tri-cell TBM launch pit in progress on the South Island.

North Island Progress – Building an Island: 4 An aerial view of the North Island expansion which was completed in Fall 2021.

Bridge Replacement in Hampton: 2 The south side of the Mallory Street Bridge has been removed to make way for the new bridge.

Bridge Widening in Norfolk: 3 Piles and pile caps form the substructure for the widening of the Willoughby Bay Bridge. 6 An aerial view of the Mason Creek Bridge widening. 7 Girders are now being placed on the pile caps for the Oastes Creek Bridge widening work.

Marine Trestle Bridge Progress – Over 400 Foundation Piles Driven: 5 An aerial view of the piles for the new North Trestle Bridge that connects to the Hampton shoreline. 8 An aerial view of the piles for the new South Trestle Bridge that connects to the Norfolk shoreline.

CONSTRUCTION UPDATE

Piles of Progress

Construction progress is evident across the project corridor, from roadway and bridge widening and marine trestle foundations to island expansion and TBM launch pit preparation. With the completion of the walls to support the launch pit on the South Island, crews are now working to excavate down more than 70 feet. The North Island was nearly doubled in size during its expansion, and work has begun there to build the receiving pit for the tunnel boring machine (TBM).

In addition to the continued work to prepare for the TBM on the islands, crews have made extensive progress installing hundreds of piles to support the new marine trestle bridges. All of the existing marine trestle bridges will be replaced with new bridges as part of the HRBT Expansion Project. Hundreds of piles dot the waterway between the Norfolk and Hampton shorelines. These cylindrical piles will form the foundation of the new marine trestle bridges to connect the new tunnels to Norfolk and Hampton.

Along Interstate 64, traffic lanes have been shifted to create safe work zones for crews to work on widening the roadway. HRCP has mobilized cranes to widen the marine bridges including the Mason Creek Bridge, the Oastes Creek Bridge and the Willoughby Bay Bridge in Norfolk. With piles in place, crews are working to build pile caps and add girders to support the new bridge deck for additional lanes on these bridges. On the Hampton side of the project, crews have removed the southern portion of the old Mallory Street Bridge and will soon begin to build its replacement.

TBM UPDATE

HRBT Celebrates the Arrival of "Mary the TBM" with Ceremony

December 14, 2021 was a milestone day for the Hampton Roads Bridge-Tunnel (HRBT) Expansion Project, as we celebrated the arrival of the Tunnel Boring Machine, or TBM, at the Port of Virginia.

It is tradition to give a TBM a female name before it starts boring to bring good luck to the project. The HRBT Expansion Project held a naming contest in the fall of 2020.

The contest was open to middle school students in Hampton Roads. First place was awarded to a team from Saint Gregory the Great Catholic School in Virginia Beach. They chose the name "Mary the TBM" in honor of Mary Winston Jackson of Hampton, VA – mathematician and aerospace engineer at NASA, noted for her pioneering role as an African American woman in the field of science and engineering, and her crucial contributions to the NASA Space Program.

The winning team was in attendance along with dignitaries and regional representatives from the Commonwealth of Virginia, VDOT, Hampton Roads Transportation Accountability Commission (HRTAC), the Port of Virginia and Hampton Roads Connector Partners. All were gathered to welcome Mary to Hampton Roads.

After remarks, a scale model of Mary was unveiled during the ceremony.

Once fully assembled in 2022, Mary will stand 46 feet tall, extend more than 430 feet in length and weigh more than 4,700 tons, or 9 million pounds.


1


2

1 State and regional officials, along with students from St. Gregory the Great, unveiled a model of the TBM.

2 Project Director Jim Utterback shares remarks at the TBM arrival ceremony.

3 The TBM arrived in 170 containers and components and will be reassembled on the South Island.

4 Secretary of Transportation Shannon Valentine poses with students from St. Gregory the Great holding the Hampton Roads flag.

5 Officials admire the model of the TBM. [FROM LEFT] Mayor Donnie Tuck, HRTAC; Michael Hipple, HRTAC; Commissioner Stephen Brich, VDOT; Secretary of Transportation Shannon Valentine; Thomas Shepperd, Jr., HRTAC; Robert Crum, HRTPO.

TUNNEL LINING SEGMENT

Building a Tunnel — One Ring at a Time

While Mary the TBM will be busy living up to her name as a tunnel boring machine, she will also be responsible for building the new tunnel using precast concrete tunnel liner segments.

The precast concrete segments are made by Technopref Industries at a production yard located in Cape Charles. The tunnel lining segments' concrete mix has been specifically formulated to meet the concrete durability requirements of this project – 100 years. At the plant, the mixture is blended with steel fiber, and a steel rebar cage is placed into the mold to provide additional support. The steel molds were custom-fabricated specifically for the HRBT Expansion Project and have extremely precise tolerances to ensure the concrete segments fit together tightly. Each tunnel segment measures 15 feet wide by 6 feet 8 inches long and will be 18 inches thick, weighing 12 tons.

The finished tunnel segments, over 150 at a time, will be transported by barge down the Chesapeake Bay to the South Island. Once on the island, the segments will be transported into the tunnel using specialized vehicles. The segments are fed onto a conveyor inside the TBM where a vacuum erector lifts, turns and fits each segment into place.

As Mary works to excavate the soil, she will place nine precast concrete segments into a ring that becomes the walls of the tunnel. Mary advances by pushing 54 hydraulic thrust jacks against the newly completed ring of precast concrete segments, leaving a perfectly circular tunnel in her wake.

[LEFT]: A fisheye lens captures a view of the demonstration liner, which is comprised of two completed rings each made with nine precast concrete segments.

[BELOW]: 1 Precast tunnel liner segments are being constructed in Cape Charles. 2 Three completed precast tunnel liner segments.

Mary the TBM

Mary will place 21,492 tunnel lining segments, each weighing 12 tons. She will erect each segment one by one to form a total of 2,388 rings of nine segments each, leaving a perfectly circular tunnel in her trail.

TUNNELING OPERATIONS

Meet Mary's Not So Hidden Counterpart — Katherine the Slurry Treatment Plant

Another important component of the HRBT Expansion Project is Mary's partner in progress, Katherine, the Slurry Treatment Plant (STP). The STP is an equally important part of the construction process, ensuring that the sand, clay and other by-products of the tunneling process are removed from the construction area in an efficient, environmentally responsible manner.

You can imagine Mary will excavate a tremendous amount of soil as she digs her way under the seabed. The estimated total volume will be around one and a half million cubic yards of material. This output is often called "spoil" and includes coarser sands, clay and other fine silt materials.

Slurry, an engineered mixture of bentonite clay and water, is added to the excavated material to help facilitate pumping and removal. As the TBM tunnels forward, spoils are pumped to the surface through a 22-inch steel pipe to the STP on the South Island.

At this plant, the excavated soil mixture passes through a series of rotating screen filters (called "trommels" and "cyclones") with progressively smaller mesh sizes to separate particles and finer sands from the slurry. The recovered slurry is reused to feed the TBM, and the remaining spoils are processed through a filter press to squeeze out the residual water.

Katherine, the STP, was named in tribute to the pioneering African-American mathematician Katherine Johnson, whose pivotal contributions to NASA's space-flight program were featured in the "Hidden Figures" movie. Just like their real-life namesakes, Katherine the STP and Mary the TBM are a perfect team.

DID YOU KNOW?

Katherine Johnson was born August 26, 1918, in White Sulphur Springs, West Virginia. She was a brilliant mathematician who calculated and analyzed the flight paths of many spacecraft during her more than three decades with the U.S. space program. Her work helped send astronauts to the Moon.

Johnson spent 33 years working at NASA, during which she paved the way for women of color working in STEM (Science, Tech, Engineering, and Math). During her decades at NASA, she was awarded the NASA Lunar Orbiter Award and three NASA Special Achievement Awards, among others.

In 2015, Johnson received her most prestigious award, the Presidential Medal of Freedom, the United States' highest honor for civilians. "In her 33 years at NASA, Katherine was a pioneer who broke the barriers of race and gender, showing generations of young people that everyone can excel in math and science, and reach for the stars," President Obama stated at the medal ceremony.

The exterior of the STP control room features a tribute to Katherine Johnson.

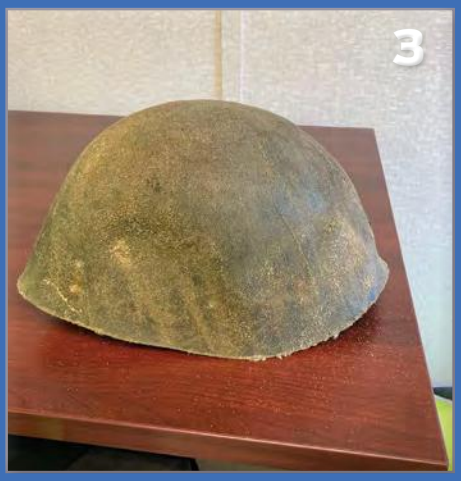
WHAT LIES BENEATH

Discoveries of the HRBT Expansion Project

In an area with roots deep in American history, it is no surprise that construction at the Hampton Roads Bridge-Tunnel would unearth some long-buried artifacts under the surface.

Over the past year and a half of construction, HRCP has found eight iron cannonballs, measuring between 8 and 9 ½ inches in diameter. Most of the cannonballs have been discovered as they became lodged in equipment. The moment a cannonball is found, military explosive experts are called in. For these discoveries, an explosive ordnance disposal team from the Navy or Air Force is brought in to investigate – and construction in the area pauses until experts remove the cannonballs from the project site.

[HERE]: A portion of a sunken vessel is lifted from the seabed to make way for piles that will form the foundation of the new marine trestle bridge.



Most of the cannonballs were discovered during excavation in preparation for the Tunnel Boring Machine launch pit. The cannonballs were found in the area of the South Island that was expanded in the 1970's, using sand dredged from the nearby Willoughby Bank.

In November 2021, crews discovered a new item on the South Island. According to the Virginia Department of Historic Resources, the newest discovery is likely an M-1 combat helmet liner manufactured between 1942 and 1970.

Crews have also encountered the remnants of several ships on the seabed off Willoughby Spit. These vessels were intentionally placed there decades ago to act as a breakwater, or structure that provides erosion protection to Willoughby Spit.

One of these sunken vessels lies in the path of the new South Trestle Bridge. Crews had to remove portions of the vessel to make way for the new piles that support the new bridge. Although little information is available on the vessel that had to be removed, it was not the *USS Stringham*, a former U.S. Navy steel torpedo ship that is popular with locals. The remnants of the *USS Stringham* remain on the seabed off the Willoughby shoreline, where it is often visible at low tide.

So while we haven't unearthed Blackbeard's hidden treasure yet, we think we've discovered some pretty cool relics so far – and crews still have a lot more digging to do.

[CLOCKWISE]: 1 A large piece of the sunken vessel is lifted onto a barge for removal.

2 The discovered cannonballs measure between 8 and 9.5 inches in diameter.

3 Crews discovered an M-1 combat helmet liner on the South Island.

4 A cannonball is secured for transport to the military base.

5 Cannonballs were discovered on the South Island during the excavation process to build the TBM launch pit.

Connecting Again

After over a year of virtual meetings, the HRBT Expansion Project Team was excited to again connect with the community through in-person presentations and outreach events. At outdoor events, or with masks and social distancing in accordance with current guidelines, throughout the summer and fall, the team safely shared updates on project progress to civic and business associations, as well as the local communities through events such as farmer's markets.

[LEFT TO RIGHT]: 1 Project Director Jim Utterback presents to the Hampton Roads Utility and Heavy Contractor Association.
2 The HRBT Expansion Project communications team conducted outreach at outdoor community events through summer and fall 2021.
3 Technical Deputy Martha Gross discusses the project with attendees at a Women's Transportation Seminar event.

5,000 monthly website visitors

3,100 newsletter signups

6,200 Facebook followers

2,600 LinkedIn followers

Connections by the Numbers

The HRBT Expansion Project utilizes many communications tools to share progress and provide updates to the public. We've seen a huge growth in our networks – from our email database and podcast listeners to our Facebook and LinkedIn followers. As construction continues on the state's largest highway project, we will continue to provide updates and insights on all of our communications platforms.

HRBTEXPANSION.ORG | #HRBTEXPANSION

HRBTinfo@VDOT.Virginia.gov

@HRBTexpansion

Facebook.com/groups/HRBTExpansionProject

linkedin.com/company/hrbt-expansion-project

Connecting with Small Businesses

The HRBT Expansion Project Team is committed to meeting the goals set for small, women and minority (SWaM) businesses, as well as Disadvantaged Business Enterprise (DBE) certified firms.

Hampton Roads Connector Partners (HRCP) has conducted several outreach events to create awareness and to assist small businesses with opportunities on the project. Outreach events are informational and educational and create networking opportunities for small businesses to connect with the prime contractor.

HRCP named Prime Contractor of the Year

The HRCP was named Prime Contractor of the Year at the Virginia Department of Transportation's 2021 DBE Symposium, a signature event sponsored annually by VDOT's Civil Rights Division.

As the prime contractor, HRCP is responsible for the $3.3 billion HRBT Expansion Project.

HRCP received the award recognizing the progress they have made towards HRBT Expansion Project's small business participation goals of 12% DBE and 20% SWaM businesses.

CERTIFIED SWaM Small, Women and Minority-Owned
Supplier Diversity Strengthens the Commonwealth
Virginia Department of Small Business and Supplier Diversity

DBE CERTIFIED

291 DBE/SWaM Agreements Executed

Over $400 Million in Contract Awards

80% Virginia-based DBE/SWaM firms

For more project details visit:

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