BTM JV shares the Chesapeake Bay Bridge and Tunnel District’s vision to develop a parallel tunnel beneath the Thimble Shoal Channel.

By any standard, the Parallel Thimble Shoal Tunnel Project is an extraordinary undertaking due to its location in the Bay’s challenging marine environment; the complexity of its combined tunnel, island, and trestle construction; and its strategic location for users of the Thimble Shoal Channel and the Route 13 Corridor.

BTM JV is proud to present a solid team to design and build this extraordinary Project. As detailed in our Statement of Qualifications, we bring proven design and construction experience in both bored tunnels and immersed-tube tunnels. Our team members have worked together extensively on the world’s most challenging tunnel projects in difficult marine and geotechnical environments, successfully delivering new crossings to delight users and owners alike.

Why BTM JV?

- Our companies are culturally aligned with strong commitments to quality, safety, and environmental responsibility.
- We are committed to partnering with the District to ensure stakeholder and community needs are fully met.
- Both the firms and their key personnel have successfully delivered many major civil work projects in the US and internationally and have demonstrated project management expertise on many projects of similar size and complexity.
- Our team members have unique expertise to deliver both immersed tube and bored tunnels without disturbing existing structures.
- With a proven DBE/mentoring program and a solid training track record, we promote a sustainable legacy of local jobs. We will positively shape your community.
- We will bring cost effective and industry-leading solutions to the District, such as proprietary tunnel boring machine technology and innovative immersion equipment.
- We will deliver a 21st century tunnel that achieves all of the District’s objectives.

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The District’s innovative, business-focused approach has structured a true value-creating procurement: from our experience on projects around the world, we recognize that leaving the choice of a bored or immersed tunnel solution to private-sector ingenuity is unprecedented. Our team is fully fluent in both tunneling methods and looks forward to evaluating both alternatives to deliver the best-value solution to the District and the traveling community.

With over 230 years of combined global expertise in delivering bored and immersed-tube tunnels, BTM JV presents an inspired team dedicated to taking on and successfully executing this Project’s challenging design and construction features.

Driving experience across the Chesapeake Bay.
**BTM JV Team**

As demonstrated in Table 1-1, BTM JV is structured as a fully integrated joint venture responsible for the full delivery of the Project including design, construction, and commissioning.

BTM JV will manage the design team and will be fully involved in the development of all technical solutions. This hands-on approach has proven successful on every major design-build project executed by our team members.

Due to the specific nature of immersed tube tunnels, our team has built upon its long standing relationship with Volker Stevin International, one of the most recognized specialist companies for immersion of tunnel elements, who will act as a subcontractor to BTM JV. Our team and Volker Stevin developed strong corporate and personal relationships having successfully worked together on multiple projects including the New Tyne Crossing (UK) and Rostock Tunnel (Germany).

*Figure 1-1: BTM JV Structure*

**Design-Builder/Lead Contractor**

We are a fully integrated joint venture team who will share all roles and responsibilities for all the design and construction aspects of the Project.

Our three core members possess complementary skills and have proven expertise in constructing tunnels, artificial islands, and bridges, with safety records consistently superior to industry averages.

Since 1952, Bouygues Travaux Publics ("Bouygues") has been a leading international specialist in complex sites and large-scale complex civil engineering projects. The firm specializes in underground work, engineering structures, tunneling, earthworks, road, rail and port infrastructures, and public transportation.

Traylor Bros., Inc. ("Traylor") is a family-owned heavy civil contractor founded in 1946. The company provides single-source, comprehensive, cutting-edge construction and design-build services to public works agencies across the US. Traylor is a leader in soft ground, hard rock, and drill and shoot tunneling, as well as large-scale bridge and marine construction.

Manson Construction Co. ("Manson") is an employee-owned company established in 1905 that specializes in heavy civil marine construction including complex bridges, wharves and piers, flood protection, dredging, mechanical, cutter suction and hopper. One of Manson’s distinctive characteristics is its significant fleet of heavy marine equipment, which includes 60 specialized vessels and over 50 barges.

**Specialty Subcontractors**

Volker Stevin, whose history dates to 1854, is a world leader in immersed tube tunnel construction. The company specializes in complex engineering solutions across a wide range of sectors including coastal protection. If BTM JV develops an offer based on an immersed tube tunnel solution, Volker Stevin will be involved from the very early stages as a subcontractor with responsibility for immersion activities.

Established in 2000 and with a long history of tunnel-specific environmental management, Kroner Environmental Services ("Kroner") will lead our environmental compliance efforts. We have worked together closely on many past tunnel projects, and Kroner’s tunnel expertise will be complemented by our local partners’ familiarity with Virginia environmental permitting agencies.
Lead Designer

As the Lead Designer, Arup will manage the design of either tunnel option and has assembled a team of subconsultants who have global and local engineering expertise and previous successful experience working together on large infrastructure projects.

**ARUP** Arup was founded in 1946 and has 12,000 employees. The firm offers comprehensive engineering services and was named the Global Tunnel Design Firm of the Year in 2012.

Design Subconsultants

**TEC** Tunnel Engineering Consultants (“TEC”), doing business via its US entity Haskoning, Inc., has been involved in a wide range of challenging and innovative large-diameter bored tunnel projects and 80% of the world’s immersed-tube tunnel projects since its founding in 1988, as well as significant artificial-island and land-reclamation work.

**Michael Baker International** (“Michael Baker”), established in 1940, has over 5,000 employees and a long history of civil and environmental-engineering design excellence in coastal Virginia.

**BTM JV General Qualifications**

In the past 10 years, BTM JV team members have been involved on numerous complex design-build projects, each exceeding $500 million. In addition to our team’s design and management capabilities, the projects identified below feature a number of similarities to the District’s Project, especially with respect to its marine environment.

Table 1-2: Relevant Project Experience

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Relevant Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Port of Miami Tunnel (Bouygues TP)</strong></td>
<td>This $902 million PPP delivered a large-diameter tunnel under a busy navigation channel, a bridge expansion, and significant roadway work.</td>
</tr>
<tr>
<td><strong>Groene Hart Tunnel (Bouygues TP)</strong></td>
<td>This $623 million design-build project in the Netherlands featured a large-diameter tunnel in reclaimed soft ground, with TEC as the designer.</td>
</tr>
<tr>
<td><strong>Queens Bored Tunnels East Side Access (Traylor)</strong></td>
<td>This $777 million rail tunnel was bored in difficult soft-ground conditions in close proximity to existing structures in New York.</td>
</tr>
<tr>
<td><strong>Tappan Zee Bridge - New NY Bridge (Traylor)</strong></td>
<td>This $3.1 billion bridge in New York involves extensive marine work for this 3mi long river crossing. Arup is on the owner’s engineer team and Michael Baker is a design subconsultant.</td>
</tr>
<tr>
<td><strong>SR 520 Evergreen Floating Bridge and Landings (Manson)</strong></td>
<td>This $750 million bridge project extends 1.5mi across Lake Washington in Seattle and is built on floating concrete pontoons.</td>
</tr>
<tr>
<td><strong>Fehmarnbelt Fixed Link (Arup and TEC)</strong></td>
<td>The $7 billion link will deliver a four highway lanes with an emergency lane and a dual-track railway, with a 120-year design life. The immersed-tube tunnel will comprise 80 elements each with a length of 710ft.</td>
</tr>
<tr>
<td><strong>Second Avenue Subway Phase 1 (Arup)</strong></td>
<td>This $4.5 billion project in New York City involved bored tunneling in a range of soil conditions (rock, mixed-face, and soft ground) while minimizing ground movements to protect sensitive existing structures.</td>
</tr>
<tr>
<td><strong>Lake Mead Intake (Arup)</strong></td>
<td>This $507 million water tunnel in Nevada was designed with a prefabricated concrete intake structure immersed in Lake Mead to serve as a docking station at the end of the bored tunnel.</td>
</tr>
<tr>
<td><strong>Brisbane Airport Link (Arup)</strong></td>
<td>This $4.3 billion road tunnel in Australia provided twin 41ft-diameter bored tunnels that are each 8200ft long.</td>
</tr>
<tr>
<td><strong>Crossrail Tunnels (Arup)</strong></td>
<td>This $11.7 billion bored rail tunnel beneath downtown London was designed to minimize impacts on historical structures nearby.</td>
</tr>
</tbody>
</table>
BTM JV Bored Tunnel Qualification

Our team has been delivering bored tunnels in the US since 1950. Major examples, some of which were federally funded, include the Port of Miami Tunnel (Florida), Queens Bored Tunnel (New York), Blue Plains Tunnel (DC), and Lake Mead Intake (Nevada). This track record provides an in-depth understanding of the federal requirements relevant to this Project. Collectively, we have delivered more than 500mi of road and rail tunnels located in all types of geotechnical and hydrostatic pressure conditions, with most of these projects delivered via design-build or public-private partnership (“PPP”). Our team’s experience includes three world records for soft ground, large-diameter bored tunnels: Groene Hart (49ft), Chong Ming (51ft) and Tuen Mun-Chek Lap Kok Link (57.7ft).

Table 1-3: Bored Tunnel Project Experience

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port of Miami Tunnel (Bouygues TP)</td>
<td>This project featured twin 40ft-diameter bored tunnels through multiple soil layers including coralline limestone, which required significant ground improvements. This project is the largest soft-ground bored tunnel completed in the US.</td>
</tr>
<tr>
<td>Groene Hart Tunnel (Bouygues TP)</td>
<td>This bored tunnel set world records with its 49ft diameter and 23,000ft length. It was constructed through soft ground with limited soil cover.</td>
</tr>
<tr>
<td>Express Rail Link Tunnels (Arup)</td>
<td>Arup was responsible for the design of this bored tunnel, constructed by Bouygues TP, that included 30ft diameter rail tunnels bored in soft ground below Hong Kong’s water table.</td>
</tr>
<tr>
<td>Brisbane Airport Link (Arup)</td>
<td>The approach roadways for these two 2-lane bored tunnels required particularly complex geometry to meet site constraints. With a diameter of 41ft, the tunnel-boring machines project were the largest ever used in Australia.</td>
</tr>
</tbody>
</table>

We are proposing a core project team of senior experts to deliver the bored tunnel option. The Design-Build Project Manager, Louis Brais, brings over 30 years of experience in heavy civil construction and project management.

BTM JV Immersed Tube Tunnel Qualifications

We have collectively delivered 23 immersed tube tunnels, most of which are design-build and/or public-private partnerships. As a result, we have developed a deep understanding of the design, construction, maintenance, and service life of immersed tube tunnels. Our design team members have been involved in 80% of the newly constructed immersed tunnels since 1988, including such iconic projects such as Oresund Link between Sweden and Denmark (2.2mi), Busan Geoje Fixed Link in South Korea (2.2mi), and the Hong Kong - Zhubhai - Macau Link in China (~ 4mi). Our ability to deliver large road or rail immersed tunnels in comparable geotechnical environments is illustrated on the following list of immersed tube tunnels.

Table 1-4: Immersed Tube Tunnel Project Experience

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Tyne Crossing Tunnel (Bouygues TP)</td>
<td>This PPP project safely twinned an existing two-lane immersed tunnel with a new immersed tube very close to the existing crossing. Bouygues TP, Volker Stevin, Arup, and TEC worked together to successfully deliver this challenging project.</td>
</tr>
<tr>
<td>Rostock Tunnel (Bouygues TP)</td>
<td>As the first PPP in Germany, this immersed tube tunnel was delivered jointly by Bouygues TP, Volker Stevin, and TEC.</td>
</tr>
<tr>
<td>Fehmarnbelt Fixed Link (Arup)</td>
<td>The design of this immersed tunnel between Denmark and Germany features an innovative ventilation solution to enable the tunnel’s 11mi world-record length, with five separate tubes per segment for road, rail, and emergency traffic.</td>
</tr>
<tr>
<td>Busan Geoje Fixed Link (TEC)</td>
<td>This project features a 2mi long immersed concrete tunnel in 130ft of water, making it one of the deepest immersed tubes in the world, located in difficult soils that required extensive ground improvements.</td>
</tr>
</tbody>
</table>
We are proposing a core project team of senior experts to deliver the immersed tube tunnel option for the Project. For example, the Design-Build Project Manager, Nicolas Caille, brings over 25 years of experience delivering complex tunnel construction, geotechnical, and civil engineering projects across Europe and Asia. He has worked with multinational teams on complex projects such as the Chernobyl New Safe Confinement Shelter (Ukraine), New Tyne Crossing Tunnel (UK), and Mont Blanc Tunnel Rehabilitation (France).

**BTM JV Understands Hampton Roads**

In addition to our global experience, the BTM JV team also has a significant presence in the mid-Atlantic region and more specifically in Hampton Roads. Michael Baker has worked in Virginia for decades, with Manson having also recently completed land reclamation for the Craney Island Eastward Expansion in Portsmouth and Arup having served as lender’s technical advisor for the Downtown/Midtown Tunnel linking Norfolk and Portsmouth. Our local knowledge covers numerous disciplines ranging from highway pavement to dredging and marine work, as well as our strong design capabilities. This provides assurance that we will coordinate closely with project stakeholders, efficiently manage the permitting application process, and satisfy Disadvantaged Business Enterprise requirements to deliver the Project successfully.

**BTM JV Understands the District’s Objectives**

Our creativity is inspired by the District’s flexible approach in simultaneously considering immersed and bored tunnel solutions for the Project. Building on our technical expertise assessing and delivering both options, we will share with the District our experience from previous instances where these dual approaches were compared.

In addition to our experience delivering tunnels in close proximity to existing structures, BTM JV has frequently designed and constructed artificial islands that place significant fill loads on the surrounding areas. Accordingly, we understand the risks of these operations and the importance of minimizing impacts on neighboring structures. We are familiar with mitigation measures—such as ground improvement, instrumentation, and monitoring—that may be appropriate for the Project to ensure the new work does not unduly impact Islands 1 and 2, and more generally to ensure safe and uninterrupted operation of the existing Thimble Shoal Tunnel throughout construction.

*In summary, BTM JV has the capacity and experience to commit significant resources to achieve and exceed the District’s objectives. We look forward to partnering with the District to create innovative solutions and to deliver value.*