

# Spurring Maritime Innovation in Annapolis

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## Introduction

In 1987, the City of Annapolis created Maritime Zoning Regulations, delineating four zones along Annapolis' waterfront: Maritime Conservation District, Mixed Maritime District, Maritime Industrial District, and Maritime Eastport. The districts are designed to provide incentives to the maritime industry, while offering flexibility to property owners who wish to implement higher-value uses that would add to the success of the district.<sup>1</sup> With over 250 businesses and organizations related to boat servicing and supplies, boating instruction, brokerage, chartering, insurance, marinas, and other maritime needs,<sup>2</sup> Annapolis remains a major center for recreational boaters along the East Coast. However, the recession of 2007-2009 caused the worst economic decline for Annapolis' maritime industry since 1932. Maritime businesses continue to face rising land costs and rent, resulting in fewer new maritime businesses locating in the City.<sup>3</sup>

The Fall 2016 Community Planning Studio class was tasked with reviewing previous economic studies of Annapolis' maritime industry and updating the studies' recommendations with new approaches. Our Studio class examined ways to revitalize the City's maritime industry, focusing especially on how innovation-driven economic development tools could be applied in Annapolis. The following report synthesizes our research and proposes several recommendations that the City may implement in the short-, medium-, and long-term.

## Background Research

To gain a deeper understanding of Annapolis' maritime industry and possible approaches for its revitalization, students conducted research from both primary and secondary sources on local land use, zoning, economic development, the national innovation economy, the maritime industry, and maritime education.

### Literature Reviews

#### *Land Use and Zoning*

Our review of land use and real estate development in Annapolis demonstrated trends of increasing economic and political challenges for the maritime industry due to a combination of inflexible zoning regulations, rising competition, and market changes, among other factors. A major event that has

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<sup>1</sup> Department of Planning and Zoning, City of Annapolis, "Maritime Zoning and Economic Strategy." November 1986.

<sup>2</sup> List of Maritime Businesses in Annapolis provided by Hollis Minor, September 2016.

<sup>3</sup> Annapolis Economic Development Corporation, "2013 City of Annapolis Maritime Industry Economic Survey."

especially shaped the current maritime industrial context was the passing of the 1986 Maritime Zoning and Economic Strategy. While the strategy initially bolstered the maritime industry by establishing four exclusive maritime districts, it has since limited maritime business competitiveness. From the late 1980s forward, there have been steady declines in gross business incomes and the number of workers employed full-time in the maritime industry, made more challenging by rising property values<sup>4</sup>.

While Maritime Industry Economic Development surveys between 1992 and 2013 have shown continued faith and loyalty on the part of businesses, it has also confirmed the businesses' awareness and experience of industry challenges.<sup>5</sup> Business owners also expressed interest in expanding professional networks and improving workforce development, and in more specialized maritime industry training. Fortunately, Annapolis' 2009 Comprehensive Plan appears to recognize these challenges, and proposes mixed-use corridors, which would provide an important opening for incremental zoning updates that could help maritime businesses adapt to changes in the industry.

### *Local Economic Development*

As we researched local economic development in Annapolis, we found that one objective in the 2009 Annapolis Comprehensive Plan is to “promote Annapolis for maritime business, maritime tourism, and charter and fishing activities as part of Economic Development efforts”<sup>6</sup>. This makes it apparent that the desire to support the maritime industry is present, but we found that the initiatives to support this are lacking.

After some analysis of the current state of the maritime industry in Maryland, it is clear that Anne Arundel County contains the majority of boat dealers, boat builders, and marinas in the state. The county also employs the highest number of workers in these maritime industries and has the highest revenue, presumably due to the large number of boat dealers and marinas. However, it became clear that Annapolis competes with the Eastern Shore to hold onto its maritime industries. When comparing Maryland to the United States, the decline in number of establishments, revenue, and employees for certain maritime industry sectors was significantly higher in Maryland than for the United States. Even so, we see Annapolis as having the potential to grow its maritime industry. Evidence shows changes occurring in the popularity of certain sectors of the maritime industry, reflecting the rising importance of topics like environmental sustainability. This adaptive nature of the maritime industry in Annapolis makes it a strong component of the City's economy that can thrive if given appropriate attention.

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<sup>4</sup> Average annual gross business income fell from \$2,155,498 in 2002 and \$3,487,662 in 2008, down to \$1,558,802 in 2013. The percentage of workers employed full-time in the industry dropped by 44.6% from 2008 to 2013.

<sup>5</sup> In reporting on perceived business conditions in 2013, only about 10% of business owners reported better conditions compared to five years prior, and 57% reported considerably worse conditions.

<sup>6</sup> Annapolis Comprehensive Plan, 2009.

### *National Innovation Economy*

Based on our literature review, innovation can be defined as a highly collaborative, often multidisciplinary and multi-directional process in which new or improved ideas are transformed into new products, services, organizations, and processes<sup>7</sup>. Recent technological advancements have fostered innovation, enabling changes in the workplace. There has been a shift away from the disconnected silos meant to sequester knowledge, to a dynamic ecosystem that depends on collaboration. As a result, incubators, accelerators, co-working spaces and makerspaces have begun to proliferate nationwide, giving rise to innovation districts and innovation clusters.

Regional innovation clusters and local innovation districts are geographically distinguishable concentrations of small to large size companies, specialized suppliers, service providers, research institutions, and industry anchor institutions from related sectors that connect with start-ups, incubators, and accelerators<sup>8</sup>. Public-private partnerships are also present in healthy clusters. An incubator is a facility meant to nurture startup companies which, upon graduation, have the potential to “create jobs, revitalize neighborhoods, commercialize new technologies, and strengthen local and national economies.”<sup>9</sup>. Similar to incubators, accelerators work with young businesses to provide a range of assistance and support services so they can secure early-stage seed funding.

Often used to facilitate these sorts of establishments, co-working spaces have emerged as an alternative to the traditional office model. They are a new typology of workspaces with no walls, no set hours, and community driven spaces. Makerspaces can share similar characteristics and are formed out of the desire to share resources (e.g. space, equipment, and ideas) in a flexible and collaborative way that would enable independent people and small business owners to translate their ideas into physical form.

### *National Maritime Industry and Maritime Education*

Our literature review on the topics of the National Maritime Industry and Maritime Education provided helpful insight into the breadth and depth of the maritime industry, and helped us identify organizations at the forefront of education and innovation. The U.S. maritime industry is vast, comprising multiple subsectors with diverse economic impacts. According to a report produced by the National Working Waterfront Network (NWWN), there are “130,000 ocean-related business establishments, with 2.398

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<sup>7</sup> Wessner, 2013.

<sup>8</sup> Katz and Wagner, 2014

<sup>9</sup> NBIA, 2015

million fulltime and part-time employees, who received \$84.25 billion in wages and benefits [annually.]” Ocean-related jobs pay on average approximately \$35,000 annually.<sup>10</sup>

To look at who could fill these jobs, we considered education in the maritime industry. As boatyards and other marine employers look for ways to carry their businesses into the future, they are likely to seek new employees who have completed educational programs that have better prepared them for success and reduced the likelihood of trial-and-error from simply learning on-the-job, according to *BoatUS Magazine*. As the City of Annapolis seeks ways to bolster and sustain its maritime zones and economy, it should leverage its substantial social capital—knowledge from professional experts and boating enthusiasts—to create educational opportunities that attract younger and older adults seeking new careers in boat-building and marine technology. To this end, we have compiled a list of education centers from across the nation (found in the Appendix) that shows where marine technology and boat-building education exists and what these types of programs look like. With this information, the City may begin to build mutually supportive relationships with education centers whose graduates would benefit from future innovative opportunities in Annapolis’ maritime zones.

### **Visits to Annapolis, Boat Tour, and Interviews**

Our Studio class was able to gain insight and better understand the economic and political challenges described in economic surveys and census reports by making several trips to Annapolis. During our first visit, we met with Hollis Minor, who oversees the City’s Economic Development Division. Minor provided helpful context, and took us on a tour of the City’s Maritime Zones. Next, we attended the 2016 United States Sailboat Show, held on October 6-10 in Annapolis, and talked to many businesses owners and representatives that work in the industry, both in Annapolis and around the world.

Next, we took a boat tour along the Annapolis coastline with the Harbormaster and members of the City’s Maritime Advisory Board. Board representatives described a shift in business types from fishing to recreational boating, with less formal, smaller-scale activities like paddle boating and kayaking presenting challenges in incorporating and balancing these new water uses. Another frequently cited challenge was that of residential-industrial tension. While the renowned maritime character of Annapolis has drawn in new residents and tourism, it has sometimes come at the expense of maritime businesses. The City’s popularity has led to steep increases in property values making it costly to operate businesses, and waterfront residents often oppose critical business development projects.

Interviews revealed the belief that City Council process for approving projects may disadvantage maritime businesses, because the majority of Council representatives do not have a maritime district in their voting district and therefore lack incentive to vote in their favor. Another interesting insight was in regard to the maritime industry’s growing service sector, and its reflection of wider changes in maritime consumers, uses, and business types. While our guides were quick to acknowledge the many unique

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<sup>10</sup> NWWN

advantages of the Annapolis maritime industry, they also very clearly expressed the need for greater support of business growth and adaptation.

Lastly, class members made several follow-up trips to Annapolis, both for general research and to conduct field research on the prospective makerspace site.

Below, are highlights from some of the informal interviews that were conducted, both during the United States Sailboat Show and afterwards.

*Susan Zeller, Executive Director, Marine Trades Association of Maryland (in-person, October 15, 2016, Annapolis, Maryland)*

Zeller confirmed that the establishment of Annapolis' Maritime Zones has played an important role in Annapolis continuing to be a maritime hub, and stated that the boat shows are a distinct reason why some individuals locate their maritime businesses in Annapolis. On the City's maritime industry, she noted that many businesses have passed down the marine trade through generations. The industry's population is aging, while younger generations are seeking post-secondary education elsewhere. Zeller also shared that environmental concerns and a lack of tax incentives discourages boat-building companies from locating in Annapolis, and that Annapolis' true strength is found in boat repair, servicing, and storage.

Additional recommendations by Zeller related to workforce development, current market trends, and business owner networking can be found in this report's Recommendation 2: Education section.

*Mary Ewenson, Owner and Publisher, SpinSheet Magazine (by phone, October 21, 2016)*

Regarding the existing maritime industry in Annapolis, Ewenson spoke of how businesses were again able to hire new, trained employees, after struggling through several years of recession after 2008. Employers throughout the City's Maritime Zones want younger individuals to join the industry but due to the small size and considerable workload of most businesses, they have little to offer new employees in terms of training. She emphasized the need for formal training for technical positions within the maritime industry.

#### *Highlights From Other Interviews*

- It is tough to find people with carpentry skills, according to one business owner.
- One business cited the power of word-of-mouth to build a client base; without advertising, the quality of the work can speak for itself and build a good business.
- Orca Green Marine said that the process of applying for the various certifications required by the Coast Guard and other agencies is costly and could be done more effectively for small businesses if multiple firms were to apply together.

- Many who were interviewed cited Annapolis' history and location as major draws.
- Many who were interviewed also cited the need for affordable space, and the supply and maintenance of skilled labor.
- One business owner cited regulations, primarily local ones, as the biggest problem facing the industry. He called the permitting problem "ungodly."
- One business owner notes that there are many interesting characters that have innovative ideas and good equipment, but they don't have a venue to meet and exchange ideas.
- There are two maritime communities: the makers and the owners.
- Annapolis has a great advantage for the maritime customer service businesses (good customer base, boat owners who lack maintenance skills), as well as being a beautiful city with lots of culture and many educated people.
- Innovative ideas are self-tested and self-funded; there is no financial and organizational system to support innovation.
- One employee of a maritime plastics business called Annapolis "the most recession-proof place in America."
- There is a high development pressure on the land because space is so limited, and property owners would make more money if they sold their land to residential developers. That requires subsidies.
- Interesting new trend: timeshare for boats. There is one in Annapolis.
- Business owners have very little power, because they often don't live in the city and cannot vote. Politicians would be open for new ideas, but some residents don't want the maritime industry to expand.

## Overview of Recommendations

To bolster the maritime industry and spur innovative maritime projects, we propose a multifaceted approach. Our research revealed that the networks among those in the maritime industry are mostly loose and informal. An initial focused effort on mapping and strengthening those networks would help implement the remaining recommendations.

There appears to be sufficient interest in boat building (Chesapeake Light Craft, for example) and related marine equipment to pursue the development of a makerspace that would bring industry innovators together to share ideas. Another way to help the industry to evolve is creating a formal education and workforce development system to prepare a future maritime industry workforce. These strategies would help the industry not just grow, but innovate. The Annapolis Maritime Museum may be a proven partner that could lead some initiatives around these strategies.

To support some of the physical development options contemplated herein, as well as those needed to combat address sea level rise, we suggest zoning changes that would allow the City and selected developers to experiment in a limited and controlled way with development solutions that may be unproven or controversial. The City is facing long-term challenges that will require action including



zoning changes that officials and residents would not otherwise consider. Our emphasis is on highly focused and limited zoning changes that will allow planners, officials and residents to test ideas and develop evidence to guide the City's longer-term zoning strategies.

Finally, Annapolis will continue to need substantial and sustained investment in its maritime and marine infrastructure if it is to remain a viable and competitive port city. From the replacement of tanks to maintain environmentally safe and sustainable fuel docks to the revitalization of aging marinas, the associated costs are often too much for small and mid-size businesses to bear alone. As noted in our discussion on regional innovation clusters, public-private partnerships are a key feature of strong and effective clusters. To create and maintain such partnerships for the maritime cluster we recommend that the City create a maritime development authority<sup>11</sup> to help fund these projects.

While these strategies can be implemented separately and still function, we believe it would be most effective to have them working concurrently.

## **Recommendation 1: Maritime Innovation Network and Makerspace**

### **Background/Context**

Our research and interviews have shown that many small businesses and makers in Annapolis have already begun to connect on their own, and there is a small movement towards maritime innovation resulting from those connections. To help build and nurture those connections, our group is proposing an initial effort, perhaps supported by one or two summer interns, to identify and map the formal and informal networks of people, businesses, organizations, institutions and agencies involved in the maritime cluster, both in and around Annapolis. Using a simple network mapping tool like NodeXL, for example, would allow City officials and others to visualize the networks. With further (no cost) assistance from the University of Maryland's EDA University Center to analyze the networks, the City can develop highly targeted strategies to catalyze a more connected, focused and self-sustaining maritime innovation network. Profile sheets like the ones included in the Appendix may be linked to the network nodes, providing ready access to key information. The network model could easily be used as a business retention and expansion tool to aid economic developers in targeting site visits and assistance.

This initial step is relatively low-cost, requiring funding for one or preferably two summer interns, related incidental expenses, and perhaps a nominal software expense. The City may wish to engage additional interns periodically to update and reassess the network model, but there is a good chance that someone in the network may be willing to take that on as a volunteer activity.

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<sup>11</sup> While referred to as a maritime development authority throughout this document, what we are proposing as a practical matter is an industrial development authority that would be focused on maritime industries but not necessarily exclusive to those industries.

We also recommend that city officials and maritime industry leaders consider the creation of a makerspace in the city since, as these small businesses and makers continue to grow, they will at some point need a space to meet, connect and expand. The makerspace we propose can be exactly that. To jump-start community and leadership discussions on a makerspace facility for maritime innovation, education and entrepreneurship, we have developed a concept in partnership with the Annapolis Maritime Museum. This concept is supported by background information and three representative case studies. We wish to emphasize that successful makerspaces are first and foremost active communities, and that the involvement of the Annapolis maritime maker community in the creation of a makerspace is crucial. Our proposed design concept is intended to facilitate the beginning of a dialogue, not the end of the design process.

Based on literature reviews, we are defining innovation as a highly collaborative, often multidisciplinary and multi-directional process in which new or improved ideas are developed into new products, services, organizations and processes<sup>12</sup>. This “create[s] new market demand or cutting-edge solutions to economic, social and environmental challenges”<sup>13</sup> that can result from research, applied sciences, or the manufacturing process itself. Technological advancements have fostered this sense of innovation, thereby enabling a wave of change in the workplace. The new innovation economy “represents a radical departure from traditional economic development”<sup>14</sup>.

There has been a shift away from the secret, disconnected silos that sequester knowledge, to dynamic, “open innovation” ecosystems that strongly emphasize and depend on collaboration, networking, and sharing of equipment, skills and knowledge.

As a result, makerspaces, co-working spaces, incubators, and accelerators have begun to proliferate nationwide, giving rise to innovation districts and innovation clusters.

Makerspaces are formed out of the desire to share resources—space, equipment, and ideas—in a flexible and collaborative way that enables independent people and small business owners to transform their ideas into physical form. Thus, the majority of successful spaces are formed by individuals who strive to create a new, alternative model of a cooperative world allows for more independence. Although the layout and the equipment of makerspaces varies widely based on the scale and purpose of the space, makerspaces can be defined by their availability of equipment and shared work space.

## **Site Overview and Partnerships**

As we researched potential locations for a makerspace in the city and potential partnerships that could help establish one, we learned that one of the City’s anchor institutions—the Annapolis Maritime

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<sup>12</sup> Wessner, 2013

<sup>13</sup> Katz and Wagner, 2014

<sup>14</sup> Katz and Wagner, 2014

Museum (AMM)—recently obtained control of the Ellen O. Moyer Back Creek Nature Park (BCNP), a 12-acre park along Back Creek. AMM plans to expand its campus from its current 2nd Street location by moving its Education Center to BCNP, and plans to revitalize the park, which has fallen into disrepair. Following discussions, meetings, and site visits with AMM, they expressed interest in potentially locating a makerspace on the site as well, and therefore we are proposing AMM as a partner and BCNP as the site for the proposed makerspace.

## **Site Factors**

The site currently features a mile of walking trails, a historic Water Works building constructed in 1935, and a Stormwater Education Experience display funded by the Maryland Department of the Environment and launched in 2009. Given the site's location, history, and the programming that AMM will be launching there shortly, we felt it was the perfect location for the makerspace.

Two practical site factors guided the design decisions for the makerspace:

- **AMM's Site Needs**

AMM plans to increase their current annual student visitors from 6,000 at their current location to 10,000 at the new site, which requires a lot of classrooms and laboratories, both indoors and outdoors.

- **Flooding**

The area between the existing building and the creek is frequently inundated by nuisance flooding. Hurricane Sandy covered the low-lying areas of the site in the same manner as predicted sea level rise levels for 2100. Therefore, all the proposed structures/additions are either built above the 2100 level, can handle inundation, can adapt to it, and/or do not prohibit runoff to leave the site. The same is true for the programmatic use of the spaces and their equipment.

## **Process**

We began our proposal process by leveraging the literature reviews on makerspaces cited earlier in this report (and found in the Appendix), and by conducting the additional case studies reviewed below. Following that, we held a meeting and site visit with AMM, which led us to a first draft proposal in mid-November. We were then fortunate enough to have Garth Rockcastle (an architecture professor at the University of Maryland), Andrea Foertsch (a published expert on workplaces in the innovation economy), and members of AMM offer feedback on the initial proposal. From that feedback, we realized that we needed a better-defined concept, to dream big, and to make sure we address the needs of all parties and users in a harmonious way, which led us to the proposed design detailed below.

## Case Studies

Our group reviewed case studies of three comparable sites, including one that is co-located with a museum, to understand the spatial requirements for both shared and stand-alone makerspaces.

Artisan's Asylum is a large-scale and well-established makerspace, which gave us a clear idea of the various types of studio spaces that could be incorporated into our space. JUMP provided an exceptional vision of how various creative environments can coexist and Open Works offered insights into how a new and innovative local makerspace is operating.

### *Artisan's Asylum - Somerville, Massachusetts (also in Appendix)*

Artisan's Asylum is an example of a large-scale and well-established makerspace that operates more as an office for professionals with the ability to accommodate large-scale production. Its modest origin took place through a series of meetings over a year in the living room of Olin College alumni Gui Cavalcanti. The result of these meetings was a 1,000 square foot space that opened in 2010. Within four months, with the rapid membership growth that totaled 450 people, the space expanded to 10,000 square feet.

Currently, Artisan's Asylum has 31,000 square feet of workspace, which is 20% workshop space and 80% cube space. The workshop space houses fabrication tools and equipment for electronics, robotics, woodworking, jewelry, and metalsmithing. The tools allow for welding, precision machining, rapid prototyping, digital fabrication, fiber arts, screen printing and more. There is also an additional 9,000 square feet of special project space for a super-large scale robotics project.

The cube space provides options to accommodate members' needs: studio workspaces, storage-only spaces, and flex space. Studio workspaces cater to professionals looking for a long-term home base that can also serve as office space. Shelf and storage spaces are for members focused on the use of equipment and just need storage space. Flex spaces are for immediate and short-term needs, thus are more fitted for hobbyists than professionals.

### Funding Sources

The space is funded mainly by membership fees, which are priced by the type of space and the duration of the time. Artisan's Asylum also works with large sponsorships such as the Robert W. Deutsch Foundation, Autodesk, and MathWorks. Individuals can also make donations on the Asylum's website, or serve as volunteers.

This makerspace's large scale allows enough funds to maintain a paid staff that includes shop managers and administrators. This enables the Artisan's Asylum to become a program-driven space where events such as competitions and The Maker's Masquerade help instill a sense of community. It also offers classes which are open to the public and do not require membership to connect and build a wider

community. The result is a well-equipped and organized facility with a sense of community where ideas and creative energy flows freely. One example that comes out of this space is the 3Doodler, which raised \$2.3 million in March 2013.

### *JUMP (Jack's Urban Meeting Place) - Boise, Idaho*

JUMP is a lively community space built in the memory of J.R. "Jack" Simplot, an Idaho entrepreneur. Instead of just making a legacy museum with his collection of vintage tractors, the team at JUMP (which operates as a nonprofit organization and offers programs that are accessible to everyone) provides a space for the community to get together to inspire, grow and innovate.

What stands out about JUMP is the concept of "shared environments." JUMP mixes shared spaces that bring the Boise community together with various opportunities to build a "vibrant, imaginative ecosystem."<sup>15</sup>

The space is designed to include various uses like the Maker Studio, Inspiration Studio, and the Move Studio, which allow "everyone to become inspired, try new things, learn from each other, and expand their imaginations through classes, demonstrations, and play." Another major feature is the 7.5- acre JUMP park that offers a wide array of spaces and activities to promote community building, including an amphitheater, play areas, and slides. JUMP also "showcases 51 vintage steam engines and tractors dating to 1885. These inspiring examples of industrial art and innovation connect agricultural roots to the future of downtown Boise."<sup>16</sup>

The makerspace at JUMP is called the Make Studio and is a 1,500-square foot room for builders, tinkerers, inventors, and creators to work together to design and develop their own creations. The Make Studio provides access to woodworking, soldering and welding equipment, as well as 3-D printers. It also acts as a testing space. Classes are offered frequently and are relatively affordable.

The mission of JUMP has been "creating an environment for inspiring human potential."<sup>17</sup> JUMP has been an organic venture with its spaces evolving and changing based on community needs, and has been successful in connecting the community of innovators and creators while at the same time developing a sense of community.

### Funding Sources

Most funding for JUMP comes from the Simplot family.

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<sup>15</sup> <http://jumpboise.org/>

<sup>16</sup> <http://jumpboise.org/>

<sup>17</sup> <http://jumpboise.org/>

## *Open Works - Baltimore, Maryland*

Open Works, the sixth-largest makerspace in the country, is an \$11 million project of the Baltimore Arts Realty Co-operation (BARCO), a 501(c)(3) development company founded in 2012. It is located in Baltimore, a city that has a strong manufacturing legacy. Open Works is situated in one of the City's manufacturing districts that is a remnant of a bygone industrial era.

“Making” has been returning to Baltimore in recent years with the growing population of “artists, hackers, micro manufacturers, inventors, students, teachers, entrepreneurs and builders,” and Open Works is aimed at bringing this community together through learning and collaborating.<sup>18</sup>

The building was an adaptive reuse of an existing two-story warehouse in the Station North Arts District of Baltimore. The 34,000-square foot makerspace at Open Works “includes shared micro-studio spaces, computer labs, classrooms, digital fabrication shops (CNC machines for wood, plastic and metal, 3D printing and laser cutters), a wood shop, a metal shop, an industrial sized paint booth, a textile studio and an electronics laboratory, all centered around a multi-use gathering/performance space meant for artistic and entrepreneurial collaboration.” Storage lockers and conference rooms are also available. Floor plans are provided on their website.<sup>19</sup>

All of the facilities can be accessed with memberships that range from \$70/month to \$250/month. Learning opportunities are also provided through various adult and youth classes. Having opened to the public in September 2016, Open Works is in its growing stage. Open Works not only remains a place for makers to gather and work but will also promote workforce development by providing opportunities for job training.

### Funding Sources

In addition to revenues from modest membership fees Open Works is funded through a combination of public and foundation grants, and corporate contributions.

## **Annapolis Maritime Makerspace Design Concept and Theme**

Annapolis' maritime industry and the Chesapeake Bay have two trademarks in common: they are old and have undergone major changes; and they thrive and function because they adapted to changing circumstances. The main goal of the proposed facility is to express and to celebrate what the Annapolis Maritime Museum (AMM) teaches about the ecologies of maritime heritage and the Chesapeake Bay—about their unique maritime and terrestrial communities, their flexibilities and adaptabilities, their needs

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<sup>18</sup> <http://www.openworksbmore.com/>

<sup>19</sup> <http://www.openworksbmore.com/make/our-facilities>

to share limited resources, and their unique interwoven history. In short, its goal is to be a maritime applied learning center for all ages.

The Maritime Applied Learning Center Annapolis (MALCA) will enable visitors, students, and maritime makers and inventors to learn hands-on how the maritime industry functions and how the Chesapeake Bay can continue to adapt to a changing future. It will serve as an innovative ecosystem that nurtures creativity.

Four principles of ecosystems and the unique connected heritage of the maritime history of the Chesapeake Bay guided the proposed floor plan and site design:

#### Togetherness that Nurtures Creativity

An ecosystem is defined as “any place or time where organisms interact with their environment.” In this environment “every organism is influenced somehow by every part of its environment.”<sup>20</sup> Interaction between members is crucial for any ecosystem, and the study of flora and fauna confirms that a system is more vibrant, diverse, and thereby more resilient when it is composed of a network of communities rather than of smaller, isolated entities.<sup>21</sup> These synergistic relationships are not only beneficial in biology and ecology, but also in the economy. Katz and Wagner write, “a synergistic relationship between people, firms, and place (...) facilitates idea generation and accelerates commercialization.”<sup>22</sup> Every space at MALCA is designed to instigate togetherness, networking, the connection of loose ends, and creativity by exchanging and testing ideas.

#### Flexibility that Enables Adaptability

Another important aspect of thriving ecosystems is the ability to learn and adapt accordingly and to be flexible in the development process. The site offers AMM’s students and MALCA’s makers the opportunity to learn and to develop ideas in different indoor and outdoor think tanks comprising workshops and classrooms. The think tanks are designed to allow them to adapt to different needs. Not only do they serve the students and maker community, but they can also support maritime workforce development through a lecture series and peer-to-peer learning workshop opportunities.

#### Sharing Limited Resources

A well-functioning ecosystem is also characterized by the community’s ability to share scarce resources. In the innovation economy literature review, as well as in the studio interviews with Annapolis maritime businesspeople, this topic was a recurring theme. Many start-up firms can’t afford equipment such as plotters or manufacturing tools to test ideas and translate them into marketable products.<sup>23</sup> In Annapolis specifically, affordable space to start a business is a big roadblock for many potential innovators. The

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<sup>20</sup> marinebio, n.d

<sup>21</sup> Hwang and Horowitz, 2012

<sup>22</sup> Katz and Wagner, 2014

<sup>23</sup> Foertsch, 2013

makerspaces and classrooms help overcome these challenges by offering manufacturing equipment and space for an affordable membership fee.

#### Togetherness that Nurtures Resilience

The last important design concept is the unique interwoven history of maritime history and the Chesapeake Bay. The site is a prime location to experience this heritage because it is situated at Back Creek between two marinas, it has historic relics of a former water treatment plant, and it has two hills that allow visitors to overlook the site and its surroundings. The site plan introduces new connections and emphasizes existing ones between water and land by strategically positioning design components that give different vistas over the creek, interact with it, and create a dialogue with the maritime businesses. The plan also proposes ways to adapt to changing water levels through floatable structures. With these features, the site and its components teach visitors what happens in the maritime industry of the Chesapeake Bay. It also builds awareness and instigates discussions, thereby nurturing the resiliency of the maritime industry and the Chesapeake Bay.

#### **Proposed Design Overview**

As noted above, the design intent is to emphasize the relationship between the maritime heritage and the Chesapeake Bay and to foster community building and maritime inventions.

The first concept is translated by the prominent Bay Walk promenade's axis, which is articulated by two unconventional design features that celebrate the site's maritime history: a sculptural Sail Gate positioned where the new, major paths intersect, and the Floating Makerspace Container Workshops that provide a terminus or entrance, depending if whether you approach the site on foot or via boat.

To enhance water access, both for educational and accessibility, a more narrow boardwalk fans out from the Bay Walk promenade. The concept is also indirectly translated by the position of the outdoor classrooms and the amphitheaters, which give visitors different views over the site and Back Creek.

All proposed new features also enable people to interact, which is important for innovation and the community building process<sup>24</sup>. The Driftwood Playscapes interpret the maritime theme in an artistic and interactive way, which was inspired by nature playgrounds and contemporary fine artist Jeffro Uitto's driftwood work entitled Knock on Wood<sup>25</sup>.

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<sup>24</sup> Katz and Wagner, 2014

<sup>25</sup> jeffrouitto, n.d



## *Proposed Building Design and Related Programming*

### 1. Existing Building Renovations - First Floor

#### a. Lobby (344 SF)

A welcome space primarily for Museum Education Center visitors including a receptionist desk, small exhibits, and kitchenette.

#### b. Discovery Room (319 SF)

An environment for open, non-directed learning, facilitating inquiry based exploration and discovery.

#### c. Ecology Lab (462 SF)

Teaching and experimental space geared toward older students, including microscope tables and fish tanks.

#### d. Roof Garden (327 SF)

An area that for outdoor meeting space, assembly space, and lounge space.

#### e. Lecture Room (265 SF)

#### f. Storage (92 SF)

#### g. Restrooms (117 SF)

### 2. Existing Building Renovations - Second Floor

#### a. Office Space (133 SF)

Work station for museum administration, volunteers, or interns.

#### b. Printer/Plotter Area (89 SF)

A shared space for museum administration to print documents and Makerspace users to plot large-scale designs.

#### c. Storage (53 SF)

### 3. Addition to Existing Building

#### a. Makerspace

Shared workspace for tools and equipment, featuring whiteboards, a lounge area and indoor bike storage. The space is flexible and dynamic, facilitating both socializing and networking. Its defining components are its workshops.

##### 1. Micro Studio Space (332 SF)

##### 2. Flex Space (267 SF)

##### 3. CNC Router Room (106 SF)

##### 4. Dirty Workshop (487 SF)

##### 5. Wood Workshop (105 SF)

##### 6. Metal Workshop (105 SF)

##### 7. Overhead Storage Room (212 SF)

##### 8. Conference Room/Flex (215 SF)

An area for both Makerspace and museum users to hold meetings and small gatherings.

#### b. Restroom (66 SF)

- c. Total Building Square Footage with Addition: 4,721 SF
4. Proposed New Buildings
- a. Floating Makerspace Workshop (800 SF)  
Shipping containers stacked on floating platforms to create buoyant structures that will house additional Makerspace workshops in an effort to connect with the aquatic and maritime elements of both the museum and Annapolis overall.
5. Existing Site Renovations
- a. Paths  
Reconfigured path design to lead visitors through the landscape in a meaningful way.
  - b. Amphitheater  
Restoration of the existing amphitheater structure for outdoor instruction and meeting space.
  - c. Signage  
Redesign of existing signage to help educate visitors about the history of the site, the city's maritime heritage, and the bay's past and future.
6. New Site Elements
- a. Outdoor Classrooms (covered with sails)  
Open-air structures for outdoor AMM classes and makerspace lecture series. Flexible sail roofs provide shelter from sun and rain. They also provide different vistas over the site and Back Creek, and could also be used for special events.
  - b. Additional Amphitheatres (wood and stone)  
Additional room for outdoor AMM classes and makerspace lecture series, but only with partial sail coverage. They also provide interesting vistas over the site and the creek.
  - c. Driftwood Playscapes  
Playful elements of the landscape constructed with natural play elements, such as driftwood, if it meets the National Guidelines for Nature Play Areas<sup>26</sup>.
  - d. Baywalk  
A promenade-like boardwalk that emphasizes the connection of the heritage and history of water and land. A smaller boardwalk spins off the main axis through the cove that allows for boat docking, creek explorations, and testing makerspace innovations.
  - e. Sailgate  
This introductory element of the site acts as a gateway to the facility, welcoming visitors and leading them onto the Baywalk for museum and makerspace exploration.

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<sup>26</sup> NWF and NLI, 2014

## List of Precedent Firms

Several local small businesses could serve as strong makers on the site. Profiles for some of these firms can be found in the Appendix: Orca Green Marine, Annapolis Hybrid Marine, Nobeltech.

## Summary

While our proposed design is at the concept level and therefore does not include a launch plan or discuss budget and operating procedures/costs, we hope that it can serve to both provoke discussion and inspire ideas that can help spur innovation in the maritime industry in Annapolis.

## Images

*Image 1: Phase 1 - First Floor Plan*



*Image 2: Phase 1 - Second Floor Plan*



Image 3: Phase 2 - Second Floor Plan



Image 4: Phase 2 - Loft Floor Plan



*Image 5: View of building from driveway*



*Image 6: View of building and Sailgate*



*Image 7: View of Floating Makerspace Workshop*



*Image 8: View of Sailgate and Floating Makerspace Workshop*



*Image 9: View of Floating Makerspace Workshop from the water*



*Image 10: View of site and Floating Makerspace Workshop from inside renovated existing building*



*Image 11: MACLA Concept Site Plan*



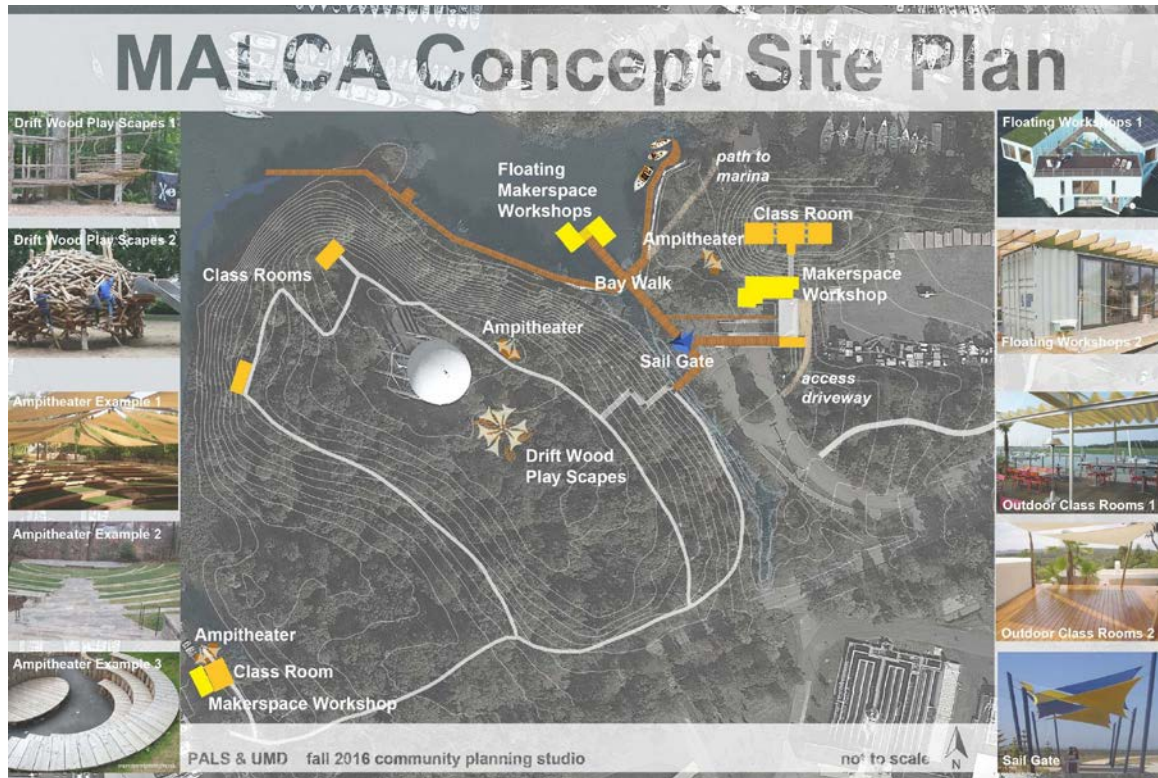


Image 12: Overview of Phase 1 and Phase 2 floor plans



## Recommendation 2: Education

### Background

If the City of Annapolis seeks to spur innovation and economic development in its Maritime Zones, it should leverage its substantial social capital—the knowledge of professional experts and boating enthusiasts—to attract a new generation of the maritime workforce. A powerful way to entice adults seeking careers in boat-building and maritime technology is to provide educational opportunities that prepare them for a seamless transition to the maritime industry in Annapolis. This section focuses on typical maritime education programs in the United States and makes education-related recommendations for Annapolis based on research and interviews conducted with those active in Annapolis’ maritime industry.

### Maritime Technology Education in the United States

Four-year Bachelor of Arts or Bachelor of Science degrees may not be necessary for a career in the maritime industry. Most maritime technology education programs in the United States are one- or two-year degrees or certifications offered by community colleges, accredited certification programs, or trade schools. These programs focus on providing students with specific boat design, building, and repair skills that are directly applicable to employment in the maritime technology industry. Potential jobs for graduates depend on the program, but are likely to be found in boatyard operations, boat design and manufacturing, boat repair and restoration, and similar fields.

According to *BoatUS* magazine’s “The Boat Lovers’ Guide to Marine Trade Schools,” educational programs not only support people starting a new career, but also help improve quality thresholds for “standards-based work across the field.” An entry-level employee trained in the latest technological skills and problem-solving could provide valuable, cutting-edge knowledge to even career technicians with years of experience. Additionally, boatyard and other maritime employers are likely to seek new employees who have completed educational programs that have better prepared them for success and reduced the likelihood of trial-and-error from simply learning on-the-job.

*BoatUS* notes that maritime education programs typically prepare students for one or both maritime sectors: manufacturing or service. The maritime service sector is more likely to retain jobs than the manufacturing sector through economic downturns, so educational programs that promote troubleshooting and problem-solving may be more valuable or sustainable for students. Regardless of program focus, maritime educational programs emphasize the importance of hands-on learning and collaboration among students and industry professionals.

Table 1 summarizes typical programs, courses, and classroom settings found at a few of the country’s most well-known schools for degrees and certifications in maritime technology.

Table 1: Maritime Technology Education in the United States

School	Program/ Typical Courses	Facilities
<p><b>The Landing School</b> <b>Arundel, ME</b></p>	<p><b>Yacht Design:</b> Parametric Study, Structural Design Physics, Statics and Hydrostatics, Drawing Architectural Plans, Materials and Fabrication, Dynamics and Fluid Dynamics, CAD and 3D Modeling, Ergonomics and Aesthetics, Marine Systems and Ventilation</p> <p><b>Wooden Boatbuilding:</b> Professional Shop Practices, Training in both Modern and Traditional Tools, Lapstrake Planking, Joinery and Refitting, Cold Molding Rigging</p> <p><b>Composite Boatbuilding:</b> Professional Shop Practices and Tools, Atmospheric Ovens, Closed-Molding and Vacuum-Infusion, Construction and Repair Techniques, Plugs and Molds, Fabrication Techniques and Material Selection</p> <p><b>Marine Systems:</b> Professional Shop Practices and Tools, Marine Diesel and Gasoline Engines, Composite Repair, Steering and Controls, Propulsion, AC Electricity Marine DC Electrical, Refrigeration and Air Conditioning, Marine Plumbing</p>	<p>Boatbuilding Shop, Design Studio, Systems Laboratory, Composites Shop, Classrooms, Learning Resource Center; not on the waterfront</p>
<p><b>Westlawn Institute of Marine Technology</b> <b>Annapolis, MD</b></p>	<p><b>Yacht and Boat Design:</b> Hydrostatics, Principles of Resistance, Stability, Design Practicum, Marine Drafting, Drawing of Lines, Exterior/Interior Design, Powerboat/Sailboat/Multihull Design, Wooden Boat Construction, Fiberglass Boat Building and Production Methods, Aluminum Yacht Design and Construction, Computer Aided Yacht Design, Marine Engines, Propulsion Systems, Electrical Systems, Systems and Equipment Specifications</p>	<p>Courses are completely online</p>
<p><b>IYRS School of Technology and Trades</b> <b>Newport, RI</b></p>	<p><b>Composites Technology:</b> CNC Machine Operator Training, Vacuum Infusion Processing, Advanced Composites Molding, CAD Software, Composites Restoration Practices, Molding Processes and</p>	<p>Library, Restoration Hall (Teaching and Workspace), Marina, Boat Restoration Facility, on the waterfront</p>

<p><b>IYRS School of Technology and Trades Newport, RI</b></p>	<p>Methods, In-Mold Coating Techniques, CAD/CAM Equipment Operations</p> <p><b>Marine Systems:</b> Electronics and Electrical Systems, Steering, Marine Pumps, Fuel Systems, Diesel and Gasoline Engines, LPG Systems, AC and Refrigeration</p> <p><b>Boatbuilding and Restoration:</b> Woodworking and Tool Use, Hull Shape and Lofting, Joinery, Spar Making, Surveying and Assessment, Drafting, CAD Software, Project Management, Sailing and Boat Handling</p>	
<p><b>Cape Fear Community College</b></p> <p><b>Wilmington, NC</b></p>	<p><b>Boat Service and Manufacture:</b> Marine Spray Finishing, Fiberglass Boat Building, Fiberglass Boat Repairs, Hull and Joinerwork Prep, Engine Install, Boat Electrical Systems, Boat Plumbing System</p> <p><b>Wooden Boat Building:</b> Yacht Joiner Practices, Yacht Repair/ Renovation, Yacht Rigging, Marine Drafting</p> <p><b>Marine Technology:</b> includes Marine Software and Data Networks, Boat Handling/ Seamanship, Industrial Skills, maritime Engines, Marine Navigation, Marine Instrumentation, Marine GIS</p>	<p>Large Laboratory Facilities on the Waterfront</p>
<p><b>Northwest School of Wooden Boatbuilding</b></p> <p><b>Port Hadlock, WA</b></p>	<p><b>Traditional Large and Small Craft or Contemporary Wooden Boatbuilding:</b> Classic Woodworking, Drafting, Lofting, Skiff Construction, Repair and Restoration, Yacht Interiors</p> <p><b>Noncredit Workshops:</b> Boat Design, Diesel Engines, Carving, Marlinspike, Sailmaking, Rigging</p> <p>School day begins with two hours of lecture, followed by working on bench projects, drafting, lofting, and building in the boat shops. Students participate in all aspects of the work of a commercial boat shop. This may include sorting, selecting, and milling lumber; blocking up and moving boats; sanding, painting, and varnishing; and adjusting and servicing tools.</p>	<p>Waterfront Facilities totaling 14,500 sf; includes lumber-milling rooms, large boatshops, library, computer stations, classrooms, offices; Complex contains independently-owned sail loft with sewing machines and hand-work benches where students may attend workshops outside of regular class hours.</p>
<p><b>New England</b></p>	<p><b>Marine Technology:</b> Marine Welding and Cutting,</p>	<p>Computer Labs, Collaborative</p>

<b>Institute of Technology</b>  <b>Warwick, RI</b>	Engine Theory/Lab, maritime Electricity and Electronics Installation, maritime Engine Applications, Outboard Engine Overhaul and Systems Diagnosis, Fuel Systems Theory and EFI Applications, Marine Drive Systems Theory and Service, Diesel Engine Service and Maintenance, Marine Systems, Fiberglass Fabrication and Repair, Marina and Boatyard Management, Marine Surveying, Composites and Fabrication, Custom Air Brush Art, Maritime Industry Safety, Marine Propulsion Systems, Marine Gasoline and EFI Emissions	Work Spaces
<b>Broward College</b>  <b>Davie, FL</b>	<b>Marine Engineering Management:</b> Marine Auxiliary, Marine Diesel Engines, Gasoline Engine Diagnostics and Repair, Marine Corrosion and Prevention, Marine Electricity, Marine Auxiliary Systems, Inboard/Outboard Saildrive and Transmissions, Marine Electronics, Welding	30,000 sf facility

*Data Source: Respective school websites*

Most of these programs include theory courses that introduce students to the foundational concepts of marine technology, such as physics, statics, hydrostatics, fluid dynamics, and electrical systems; marine software and CAD/3D modeling are also courses that are typically taught in classrooms or computer labs. Typical “hands-on courses” include materials and fabrication, joinery and refitting, rigging, lofting, composite molding and repair, refrigeration and air conditioning, plumbing, and diesel and gasoline engines. Instruction for these courses is usually performed in workshop facilities with tools and equipment.

As evident from these college programs and courses, typical maritime technology education lends itself seamlessly to workforce development, as students become technicians trained in a specific skillset that is directly applicable to specific jobs. Given this, a focus on maritime/marine education in Annapolis would be a focus on maritime/marine workforce development.

## Existing Conditions in Annapolis

While Annapolis does not currently have a school that offers maritime technology degrees or certifications,<sup>27</sup> it has ample social capital from which a new generation of the maritime workforce would greatly benefit. In addition to hosting the annual sailboat and powerboat shows, Annapolis is home to 100 boat servicing and supplies businesses, as well as over 150 other boating instruction schools, brokers, recreational charters, finance/insurance/law firms, marinas, and other maritime organizations—each with highly knowledgeable and experienced local employees dedicated to sustaining the City’s maritime industry.

Through the Marine Trades Industry Partnership (MTIP), the Maritime Trades Association of Maryland (MTAM) is undertaking comprehensive efforts to strengthen and sustain Maryland’s maritime industry.

Susan Zeller, the Executive Director of MTAM, describes Annapolis’ established maritime businesses, and the skills required for boat servicing, as mostly being passed down from generation to generation. Though it exists largely behind-the-scenes, this homegrown tradition of long-standing businesses has been integral to supporting the City’s boating culture. However, Zeller notes that business leaders in Annapolis’ maritime industry are aging, while younger generations are frequently pursuing different educational and professional paths.

To attract new and innovative employees and sustain the City’s maritime service/repair/storage industry, there needs to be a revitalized interest in “working with your hands,” as well as education-to-employment (workforce development) opportunities. The network development and makerspace initiatives are intended in part to facilitate this interest.

MTAM recognizes these needs and actually founded MTIP to build a sustainable workforce for Maryland’s maritime trades. The program is composed of MTAM, EARN Maryland (Employment Advancement Right Now), maritime employers, local workforce development professionals, and educators (MTAM, “Partnership Overview for Educators”<sup>28</sup>). MTIP recruits young people to the industry and instructs them through a six-week paid internship; trains the industry’s incumbent workers; matches workers to immediate job openings; and trains employers involved in the internship program. The

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<sup>27</sup> The focus here is on programs providing recreational/commercial boat-design or building education, rather than four-year naval architecture or marine engineering programs at larger universities/research institutions. The latter programs, such as those offered by the Naval Academy, tend to steer graduates to naval or industrial ship-building and transportation, which is not the type of maritime culture that Annapolis seeks to promote through this project.

<sup>28</sup> Marine Trades Association of Maryland. “Marine Trades Industry Partnership & the Role of Education Partners.” ([www.mscaonline.org/.../Partnership%20overview%20for%20Educators](http://www.mscaonline.org/.../Partnership%20overview%20for%20Educators)).

ultimate goal for MTIP is to establish an apprenticeship program for Maryland’s marine and maritime trades.

### **Recommendations for Annapolis**

Recommendations emphasize using the proposed makerspace to attract a talented new workforce, support the existing workforce, and grow an innovation-driven maritime economy in Annapolis.

The Maker City book<sup>29</sup> draws a connection between a successful Maker City—in Annapolis’ case, an innovation-driven maritime economy—and the presence of talented, skilled, and educated individuals. It suggests seven education/training-related mechanisms that would lay a foundation for a sustainable innovation economy, a few of which are especially applicable to Annapolis.

- **Build Skills by Focusing on New Forms of Vocational Education.** Use the proposed makerspace as a place for elective vocational education. For example, Vocadoemy, located in Riverside, California, offers tools, workshops, and classes for members looking to hone specific skills. The makerspace is also used by local high schools and community colleges that seek hands-on training opportunities for their students. Annapolis could draw both local individuals and students from Anne Arundel Community College to use the makerspace to further their skill development and boost their resumes.
- **Create New Forms of Apprenticeships and Internships around Making.** Annapolis should further support MTAM’s efforts to connect students/trainees with existing employees. Funding for these efforts could be underwritten by the Maritime Development Authority.
- **Organize existing Annapolis business leaders who are interested in developing a young, new maritime workforce for the City.** This organization could operate independently or as an Annapolis-focused sub-group of MTAM’s Marine Trades Industry Partnership. The group should capitalize on extensive knowledge and experience to host the recurring workshops on foundational theory or skills-development at the makerspace.
- **Develop an online portal to promote the “one stop shop” nature of the existing maritime industry in Annapolis.** The portal should aggregate websites of all maritime businesses in Annapolis, and allow potential customers to clearly view the range of services provided. The portal should also include a forum for business leaders to network and connect to their customers. Identification of the appropriate partner(s) to develop and maintain the online portal could be included in the intern’s scope of work, but we do not recommend that the City take on responsibility for the portal. Rather, it could be an early project for the emerging innovation network that would use it to build working

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<sup>29</sup> Hirshberg, Peter, Dale Dougherty and Marcia Kadanoff. “Maker City: A Practical Guide for Reinventing Our Cities.” (<https://makercitybook.com/chapter-5-workforce-development-51226b58a1cc#.cqb1twwgp>)

relationships and social capital along with a web portal. Students from University of Maryland's I-School might be tasked to provide technical support.

- Seek partnerships with local institutions, such as the American Boat and Yacht Council (ABYC), Annapolis School of Seamanship, Chesapeake Light Craft, and Anne Arundel Community College. These institutions have a vested interest in attracting a talented new maritime workforce to Annapolis, and may offer instruction or equipment for use at the makerspace. Additionally, stakeholders should seek advice from the Landing School and the IYRS-adjacent Tinker | Bristol makerspace on how to effectively implement maritime education and a makerspace in Annapolis' existing industry. Depending on the level of interest, one or more of the institutions profiled in Table 1 might be open to an active role or franchise arrangement. For example, the Landing School has a strong modular program centered on power boats and yacht design at its Arundel, Maine campus. Opening an Annapolis school centered on sailboats and sailing yacht design might have some appeal.

### Recommendation 3: Zoning

#### Background

The Maritime Advisory Board consists of seven members who represent the maritime industry for the City of Annapolis. This board would be essential in providing expert and informed analysis of the maritime industry, and could provide significant support for recommended makerspace and Maritime Development Authority. Under the *Annapolis Code of Ordinances (15.16.030)* the Port Warden currently will not approve any application for a license or permit involving the placement, erection, or construction of structures in the water beyond the harbor lines<sup>30</sup> for temporary or permanent use. This could complicate development of any maritime innovation space on the water. Annapolis' current zoning is shown in Map 1.

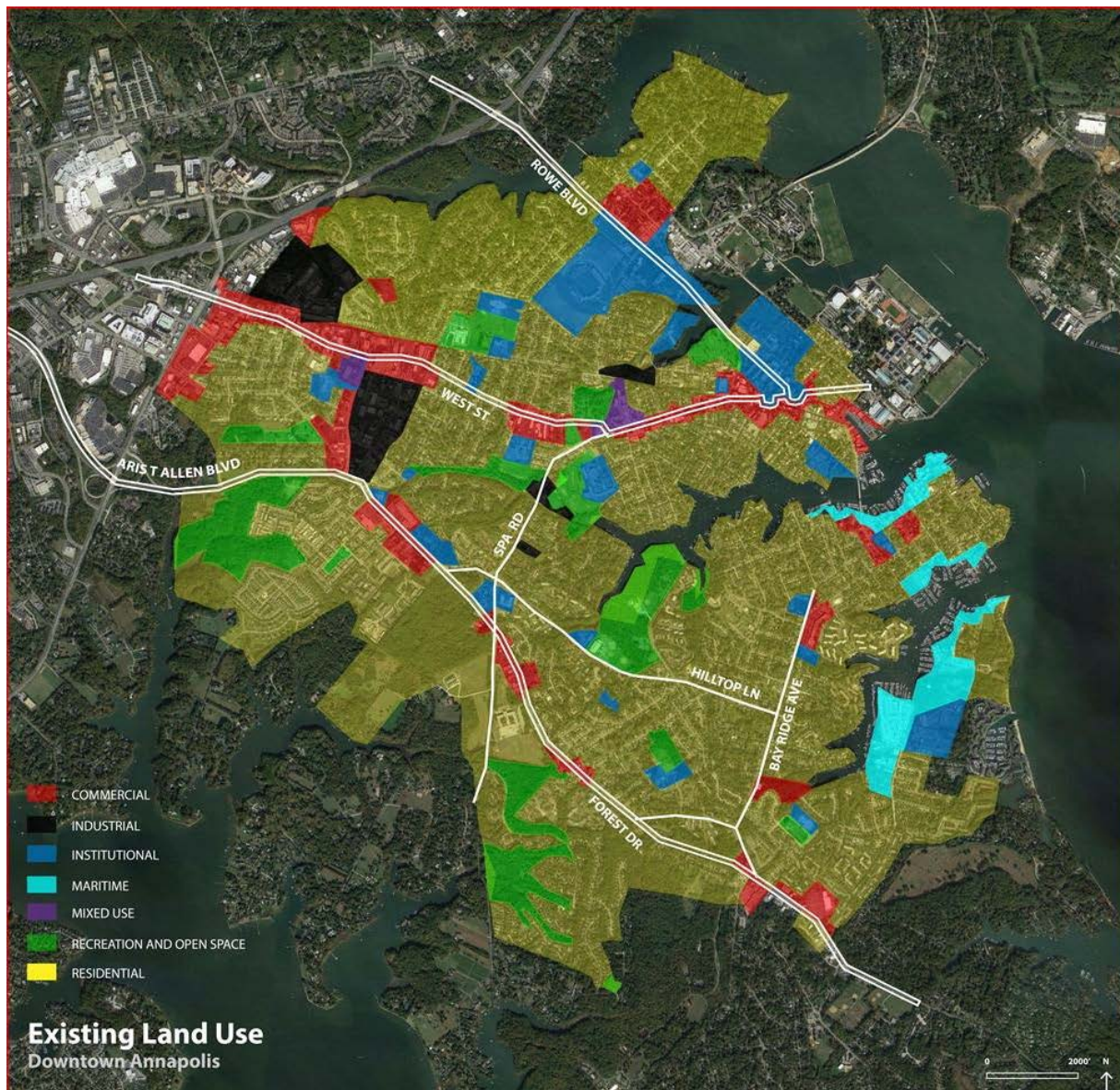
The *Annapolis Code of Ordinances* also includes stringent rules against the development of commercial regions in Maritime Zones; therefore, we suggest the incremental placement of overlay and floating zones that would enable the development of a makerspace and a gradual expansion of an innovation district.

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<sup>30</sup> "The *harbor lines* in the waterways are located at a distance from the shoreline depending on the location of lawfully installed piers, mooring pilings, wharves and bulkheads, the configuration of the shoreline and the zoning of the land at the shoreline" *Annapolis, Maryland Code of Ordinances 15.18.020*



Map 1: Existing Land Use of Downtown Annapolis



Data Source: Annapolis 2030 Comprehensive Plan

Maritime Zones of Annapolis that could be considered for implementing a new zoning code include Waterfront Maritime Industrial (WMI), Waterfront Mixed Maritime (WMM), and Waterfront Maritime Eastport (WME). Each district has different requirements and restrictions on what can and cannot be built in the area. Under *Title 21: Planning and Zoning in the Annapolis Code of Ordinances*, there is no building or tract of land to be dedicated to any other use than those listed by the zoning district's requirements, such as percentage of land cover by buildings, with the exception of uses lawfully established before or on the date of the zoning code adoption. The Code does include community design uniformity codes, such as an established front yard. This limits the diversity of housing and business structures that can be established and limits the space that would be available for a makerspace community.

The WMI zone would be optimal for an innovation district because it represents the backbone of Annapolis' maritime industry and includes businesses that would be key candidates for developing a makerspace. According to the *Code of Ordinances*, within the WMI district, non-water dependent building structures and parking are permitted within the 100-foot maritime use setback if building structures are set back 100 feet for at least 50% of the lot width. The total gross open area contiguous to the waterfront and continuous on the site must equal square footage 100 times the lineal shoreline frontage of the zoning lot. Restricted uses in the WMI zone include restaurants, laundrettes, and general maritime office and research, which might limit development. The current WMI zone restricts the amount of growth allowable and could limit the success of a maritime makerspace with already limited resources.

There are also cases within the WMM district, where if parking is provided within or beneath a structure, all exterior views of the structure should resemble a working facade consistent with the neighborhood's aesthetics. Housing in the area is limited to mostly single-family attached and detached with some two-family attached homes. These structures may be expanded for residential use but must meet the requirements of the *R2-NC Single Family Residence Neighborhood Conservation District*.

In the WME, no multi-dwelling structures of five units or less can be allowed unless they were established before August 1987. Multi-dwelling structures built after August 1987 are considered nonconforming, though bed and breakfast inns are acceptable under R2-NC.

The areas zoned WME and WMM are busy maritime centers and are already popular maritime spaces. This fact could support and complement the development of makerspaces however, the stringent zoning code limits commercial and residential development and would stifle innovative growth.

To the extent that physical redevelopment is necessary for the revitalization of the Annapolis' maritime industry, these codes would have to be altered, with some recommendations from the Maritime Advisory Board, to allow for the diverse community needs of a makerspace and other innovative land uses.

## **Challenges**

Annapolis is a historic city with development restrictions that must follow historic designs. The *Code of Ordinances* limits what developments are allowed within harbor lines as well as the adjacent neighborhoods. For a maritime community to flourish, there must be designated space and room for expansion. If the makerspace is to be developed anywhere else in Annapolis, it would require changing the zoning to allow commercial development focused on maritime consumers and gathering spaces that would increase maritime amenities. The makerspace would need flexibility to program, both within the building space and throughout the site. If a planned use does not fit the existing zoning code, then recommendations for changes to the zoning code should be made.

## **Opportunities**

Current maritime companies and manufacturers in Annapolis are located on the coast and inland. It may seem like a problem for businesses to be inland; however, many inland businesses have been successful with boat part manufacturing and repair. This indicates that ready access to water is not a requirement for building the maritime community. Businesses that are located along the coastline are also heavily industrial and surrounded by space with potential for expansion. Unfortunately, these areas are also limited in development by the current *Code of Ordinances*. There would be greater opportunity to expand and develop the resources needed for a Makerspace if the development of public and private amenities were allowed in industrial areas.

## **Incremental Zoning**

We recommend that the City of Annapolis take an incremental zoning approach to implementing either an overlay zone or floating zone in areas already defined as maritime industrial areas. Under the current *Code of Ordinances*, maritime industrial areas are allowed to develop only industrial uses that have already been identified. This limit could challenge the development of a vibrant makerspace and innovation district.

The opportunities created by overlay zoning would allow current zoning practices to continue and change as needed. There will be no pressure placed on landowners to make changes, and instead incentives will be provided for developers and landowners. Floating zones could be implemented over time as the speed and success of development is determined. It is recommended that zoning amendments and rezoning happen every ten years, and after assessment of the area's viability. There should be a plan to increase the amount of area under the overlay or floating zone, if there is consistent and growing development.

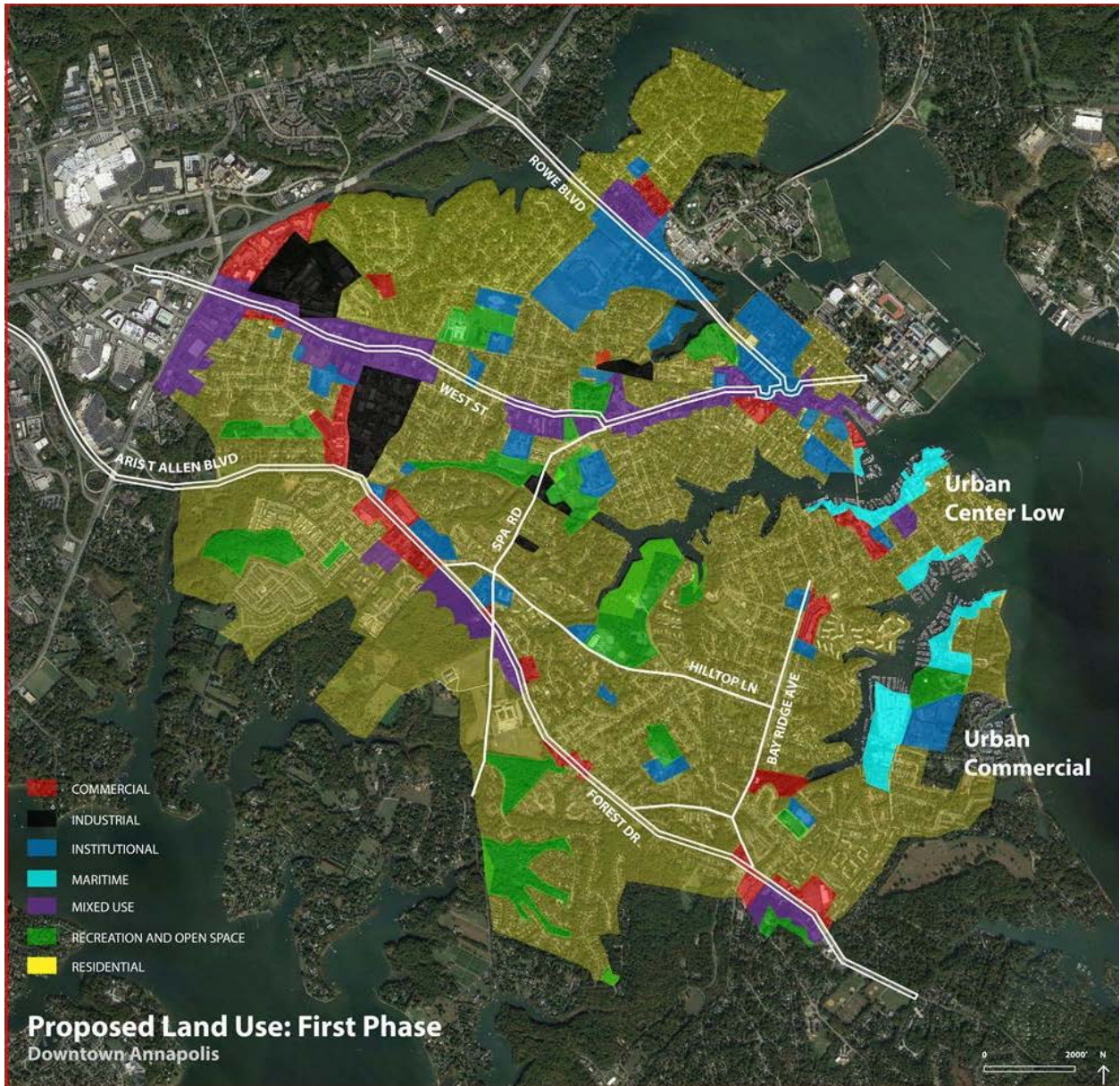
The zoning recommendations are incremental, consisting of three phases to be implemented by 2045 with fifteen-year benchmark periods. The first phase follows the *Annapolis Comprehensive Plan* recommendation for mixed-use zoning. The City of Annapolis has identified “Opportunity Areas” based on the character of expected and desired development. The comprehensive plan includes the redevelopment of targeted areas with characteristics that fit descriptions of “Urban Commercial,” “Urban Center,” and “Urban Center Low”.<sup>31</sup> An Urban Commercial area is defined as containing mixed commercial uses, including retail, offices, and service activities. An Urban Center area is defined as a large-scale mixed-use area of retail, office, entertainment, lodging, and residential activities. An Urban Center Low area is similar to Urban Commercial areas in character and building heights, but allows for a mix of land uses similar to Urban Centers. The Plan based these designations on extensive background research to ensure that the selected areas were prime for proposed new residential and commercial development. Each development area also includes plans for pedestrian- and bicycle-oriented development. We support the effort to increase mixed-use development at different density standards (Map 2). The *Comprehensive Plan Generalized Proposed Land Use Map* recommends land use changes that provide opportunities for amending the zoning code to allow multiple amenities and services not previously allowed. There is already projected growth for these areas, which leads to the second phase of incremental zoning.

The second phase targets three specific areas that have the best potential for a makerspace to flourish. Similar to the “Urban Center Low” development proposed in the Annapolis comprehensive plan, we recommend applying overlay zoning to maritime areas that can be the most influential and catalytic in creating an innovation district. The overlay would allow some commercial development including food service, as well as mixed-used educational/work space, and some residential development. For this document we shall refer to it as the Makerspace Overlay Zone. Starting with one area at a time, as identified on Map 3, small changes to the zoning code would allow for the emergence of a makerspace.

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<sup>31</sup> Annapolis Comprehensive Plan Chapter 3 - Land Use and Economic Development pages 23-25  
[http://www.annapolis.gov/Government/Departments/PIZon/CompPlan/Ch3\\_LandUse\\_EconDev.pdf](http://www.annapolis.gov/Government/Departments/PIZon/CompPlan/Ch3_LandUse_EconDev.pdf)

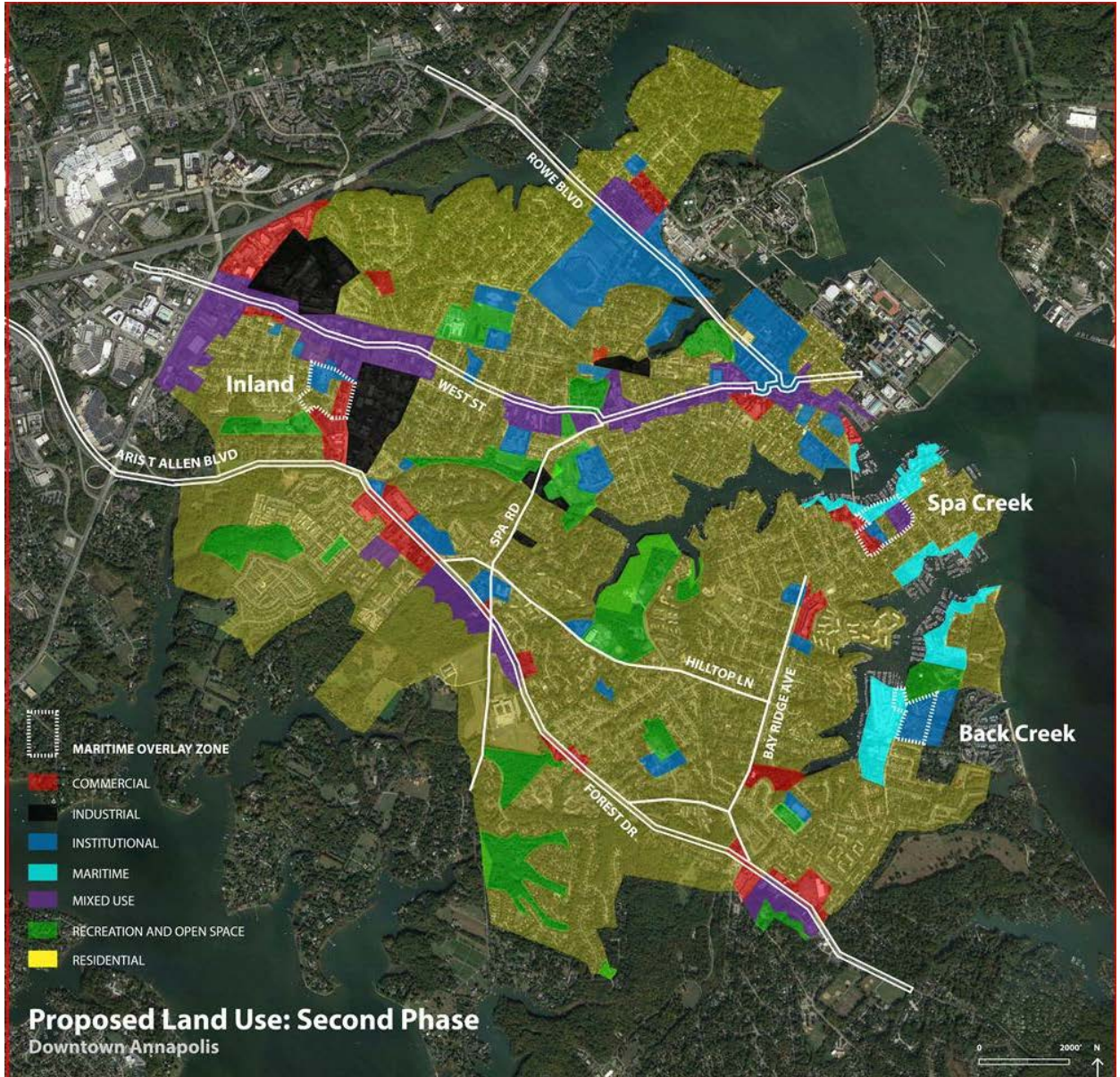
Map 2: First Phase of Proposed Land Use in Annapolis



Data Source: Annapolis 2030 Comprehensive Plan

Three areas—Spa Creek, Back Creek, and Inland—have been identified as the areas that most likely for a successful makerspace. Each area, shown on Map 3, provides a variety of characteristics that would encourage different aspects of development in an innovation district. Each could be successful in Annapolis but the model should be determined by the maritime community.

Map 3: Second Phase of Proposed Land Use in Annapolis



Data Source: Annapolis 2030 Comprehensive Plan

### Spa Creek Details

#### Pros:

- Near already established maritime zoning on the water and has established docking (near water/ bay)
- Already has a mix of institutional, residential, and commercial uses
- Already has an established vibrant commercial area
- Surrounded by residential land uses that will provide residents easy access to the makerspace and establish the space as community asset

Cons:

- Surrounded by residential land use and might face neighborhood resistance to anticipated traffic increases
- Land might be the most expensive of the three proposed sites
- Relatively difficult for people outside Annapolis to access the site

*Back Creek Details*

Pros:

- There's already an interest for a makerspace; and this reports proposed a makerspace in this maritime-zoned area
- Zone accommodates industrial uses
- Land may not be as expensive
- Small residential presence might result in less neighborhood resistance

Cons:

- Land use not varied (no commercial)
- Small residential presence would limit its role as a resource for the residential community as well as the maritime community
- Located far from a main roadway, which may limit building a social community

*Inland Details*

Pros:

- Extremely diverse land use (industrial, institutional, residential, commercial, recreational and open space)
- Accessible open space that might be used
- Less residential land use nearby would allow for less residential resistance
- Located along a commercial corridor and main Annapolis access route.

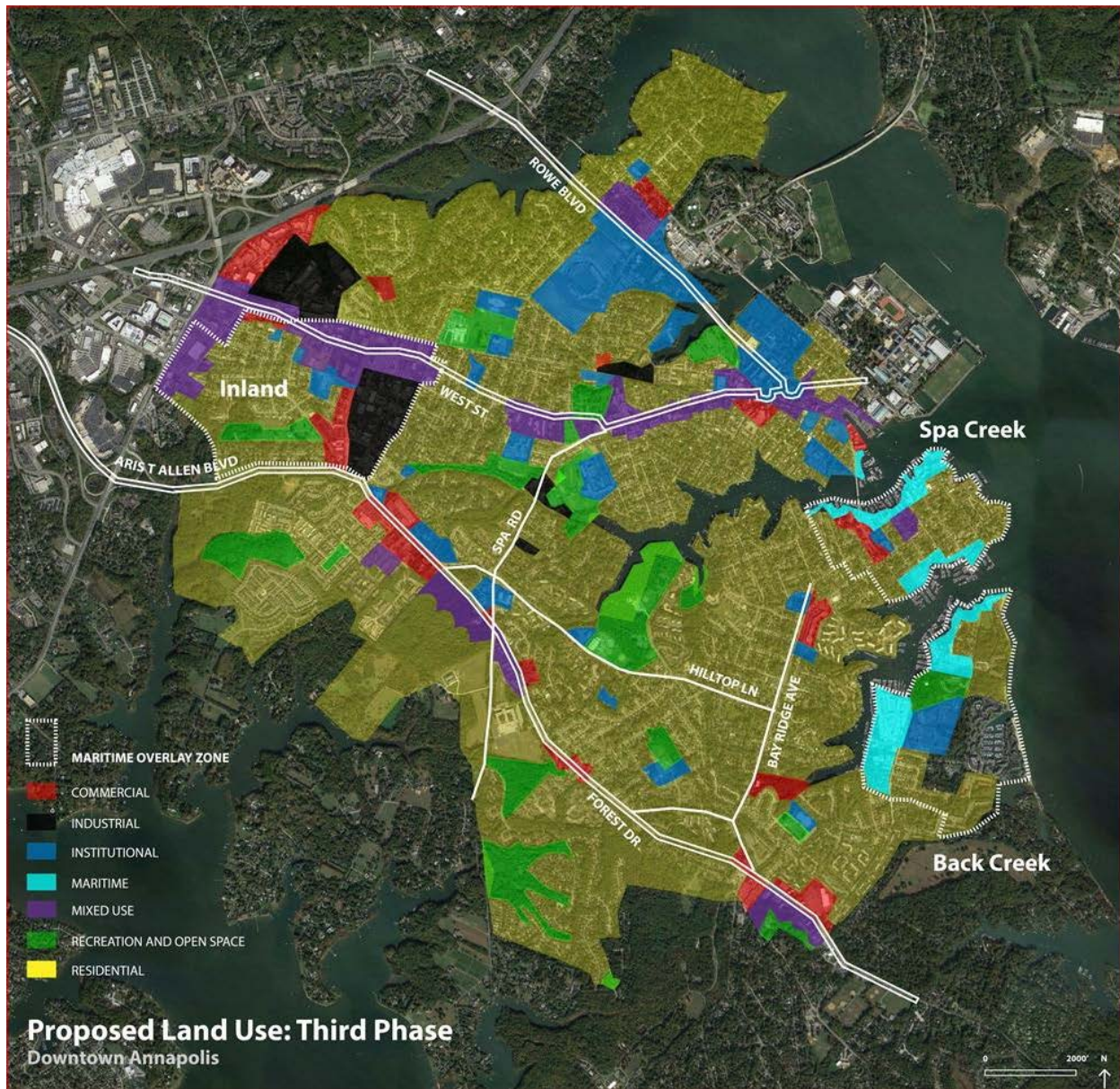
Cons:

- Land might be expensive
- Far from the water
- No maritime zoning nearby.

The third phase, shown on Map 4, expands the Makerspace Overlay Zone to promote community investment and development into additional makerspaces and other uses that support the innovation culture.

A note on floodplain-related zoning is included in the report's Appendix.

Map 4: Third Phase of Proposed Land Use in Annapolis



Data Source: Annapolis 2030 Comprehensive Plan

### Recommendation 4: Maritime Development Authority



## Background

The maritime industry in Annapolis could benefit greatly from the creation of a Maritime Development Authority. A development authority is an organization created by a local or state government that uses both financial and non-financial means to promote the economic development of a city, county, or state. These include loans for new and expanding businesses, tax incentives for businesses looking to relocate, or the construction of shared facilities that can be used by start-ups and other small businesses. Development authorities also connect the business community to state and federal funding sources. All these instruments and others could support both current maritime industry businesses as well as promote innovation by funding new players.

Other types of organizations can support economic development while remaining outside of the government structure, like nonprofits or business leagues. However, the advantage of a development authority is the ability to issue bonds for projects. When bonds are tax-exempt, they typically reduce financing costs up to 30 percent annually, meaning they can charge lower interest rates while still maintaining high yields for investors.<sup>32</sup>

Nationally, development authorities are quite common. Several Maryland municipalities, including Anne Arundel and Howard Counties, have development authorities. However, a Maritime Development Authority would be a relatively novel innovation, both locally and nationally because it will focus on just one industry. Many areas, including the New York area, have port authorities, but those are generally set up to operate seaports and are not designed to incubate an innovation economy or support small businesses. Port authorities are also usually self-financing, while development authorities usually rely on some form of outside capital. Our research could not find any development authorities that were meant to be specific to certain industries and not general enough to cover all industries.

While we could find no perfect analogues to a proposed Maritime Development Authority, we analyzed the development authorities in three cities similar to Annapolis to better understand what sort of services these organizations could offer and how they could help the maritime community in Annapolis.

## Case Studies

The **San Diego Economic Development Corporation (EDC)** has been a successful tool for the City of San Diego to serve local businesses. The EDC fosters community partnerships, gives companies access to data and research for decision-making, and helps maximize investments and opportunities. The EDC leverages business networks to work with local government and to link businesses and trade associations. The EDC works with elected officials, universities, and other policymakers to strengthen the area's workforce, infrastructure, transportation, and housing.

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<sup>32</sup> <http://ida.lacity.org/benefits.html>

This type of partnership could be beneficial in the City of Annapolis by connecting community leaders to the maritime industry. San Diego is also a waterfront city, with over 70 miles of coastline and a strong Navy presence. Because of this, San Diego has emerged as a hub for maritime technology, drawing in government and academic researchers who use local firms for equipment and software. The maritime industry plays a vital role in Annapolis and an entity like the EDC could help it grow and innovate. One current EDC initiative is Operation San Diego, which supports the region’s military infrastructure. They also played a major role in creating Innovate78, an initiative to bring together County assets to “retain, expand, and attract talent, companies, and investment.”

The following elements of this case study are applicable to Annapolis:

- Create community connections to and within the maritime industry
- Attract university involvement in the region
- Draw in innovation for the maritime industry

The **Alexandria Economic Development Partnership (AEDP)**, funded by the City of Alexandria, is a public-private partnership organized as a 501(c)(6). This tax status allows them to maximize flexibility as a business advocacy organization. They are led by an independent board of directors and are able to work closely with city officials. AEDP promotes Alexandria as an ideal business by capitalizing on its assets that include multiple Metro stations, historical character, and a riverfront location to enhance the city’s tax revenue and increase employment opportunities.

Annapolis could have similar successes with a maritime-based development authority given its similarities to Alexandria: historical character, waterfront location, and proximity to the nation’s capital. One of AEDP’s initiatives includes working with businesses and organizations to give instruction on state and local taxes and on available incentive programs, something that could be beneficial to the City of Annapolis. This brings important financial knowledge to the community’s businesses to help them succeed. In addition, AEDP publishes year-end reports that provide information on topics such as development, office market trends, retail forecasts, economic indicators, and residential updates. This provides area information to Alexandria businesses and keeps them well-informed.

The following elements of this case study are applicable to Annapolis:

- Help businesses decipher state and local tax incentives
- Provide city and regional updates on the business climate, specifically maritime

The **Howard County Economic Development Authority (HCEDA)** is a public-private partnership located in Columbia, MD. This example is important because it demonstrates the ability of a development authority to operate under Maryland code. Its mission is to be a catalyst for economic growth and sustainability in Howard County to ensure a sufficient tax base for the county. Their methods for economic growth include supporting existing businesses, relocating businesses to the county, and helping to build new

businesses. Supporting existing businesses, relocating businesses, and building new businesses are also important to Annapolis' maritime industry.

HCEDA also serves as a liaison between public and private development and planning organizations. They have structured their organization in three areas: business development, marketing, and the Maryland Center for Entrepreneurship. This has allowed HCEDA to successfully maintain, grow, and attract businesses to Howard County. In Annapolis, a similar authority would allow the maritime industry to grow and prosper by supporting businesses as well as bringing in new businesses. HCEDA hosts different types of events to support area businesses, including roundtable discussions, forums, and meetings. This creates an environment conducive to collaboration and support. Within HCEDA is the Maryland Center for Entrepreneurship, which helps launch and grow businesses by providing resources and networks for, support during the most vulnerable stages of business development.

The following elements of this case study are applicable to Annapolis:

- Support the start of new, innovative maritime businesses
- Create networks and support systems within the maritime industry
- Help bring maritime businesses to Annapolis from other maritime economies

### **Benefits to the Annapolis Maritime Industry**

#### *Creating Momentum*

Annapolis would benefit from the creation of a maritime development authority because by reinvigorating the maritime industry, the City as a whole is reinvigorated. The maritime industry has been instrumental to the City's economy. It also represents a primary activity and experience around which Annapolis' cultural identity has been formed, promoted, and preserved. A maritime development authority would create multiple new financial mechanisms that would enable maritime businesses to operate more efficiently and as a result help Annapolis be more competitive with other coastal cities.

#### *Uniting Stakeholders*

By bringing together disparate community leaders and stakeholders, formalizing partnerships and associations, and building a more connected community, a development authority will encourage innovation and create opportunities for cross-sector exchange and collaboration. The maritime development authority would also be another voice for the maritime industry and help grow political clout, as not all City Council members have maritime activity in their jurisdictions so the industry's success is not their priority, and many maritime business owners do not live in the City so their voices are not represented.

#### *Bridging the Industrial-Residential Divide*

Many residents have chosen to live in Annapolis because of its maritime culture, but they sometimes oppose economic development measures that would enable maritime businesses to thrive. Residents sometimes fear that new development or changes to existing industry will increase traffic, bring undesired uses, or physically alter the character of their neighborhoods. A maritime development authority will help mediate the conflict between maritime industry and residents.

### *Accessing Capital*

By facilitating public-private partnerships, a development authority can attract and procure the capital needed for critical updates to facilities and services needed by maritime businesses. A development authority is eligible and better equipped to apply for state and federal funding. Instead of each individual maritime development project needing City Council approval, a development authority could address multiple projects at once. Maritime businesses on their own are also generally unable to finance infrastructure improvements needed to make their businesses more competitive. A maritime industrial development authority could serve as a vehicle for gaining greater political and economic leverage.

## **Establishment of the Maritime Development Authority**

### *Legislate the Authority*

The Annapolis Maritime Development Authority should operate like an Industrial Development Authority as outlined in the economic development section of the *Maryland Code*, specifically §12-105. Annapolis will need to establish the Maritime Development Authority in its own charter and code to give local authorization for its activities.

### *Establish Priorities and Create Guidelines*

When establishing the Authority, Annapolis will need to delineate what qualifies for funding under the Maritime Development Authority and if there are only specific areas of the City where the funding can be applied. Will only projects located within the maritime districts be funded? Will associated industries like restaurants and retail stores be allowed to receive funding? Trying to clarify these types of questions from the beginning may be helpful in making funding decisions in the future, but shouldn't be so restrictive that only a few projects qualify. We suggest that priority funding go to businesses located in or wanting to locate in the maritime zones, but allowing for exceptions to this as needed, such as a business needing a unique space that is not available in a maritime zone but is directly connected to the industry. While defining what type of business should be eligible for Authority support, a direct connection to maritime industry should be considered. A restaurant would not add to maritime industry innovation, but

if it makes Annapolis more appealing to boaters and maritime businesses, it helps keep the maritime industry going and should be considered.

### *Create a Board and Identify Stakeholders*

Along with creating the Authority comes decisions about its structure—which stakeholders will be involved and who will staff it. It will be critical to identify and engage diverse stakeholders who bring fresh perspectives and a range of skills. This will include local maritime businesses, marinas, and maritime industry-oriented associations, such as the Marine Trades Association of Maryland, Annapolis Maritime Advisory Board, and Annapolis Working Waterfronts. The stakeholders must also come from other sectors and at different governance levels. Partners who can provide funding should be engaged, groups like the Anne Arundel Economic Development Corporation, Maryland Industrial Development Financing Authority (MIDFA), and the Maryland Economic Development Assistance Authority and Fund (MEDAAF). Other possible stakeholders include the Maryland Department of Commerce’s manufacturing office and the Maryland Department of Labor’s Licensing and Regulation (DLLR).

### *Alternative Option for Structure*

An alternative to Annapolis creating its own Maritime Development Authority is to instead become a branch of the Anne Arundel Economic Development Corporation’s (AAEDC). The AAEDC already does bond financing and funding. Because the AAEDC’s activities are not specific to maritime industries, the City could partner with them to help grow this part of their work by funding an additional staff person through a memorandum of understanding who works for both the AAEDC and the City. This eliminates the need to pass separate legislation or have startup money. If a more informal partnership is desired, the City could also use the AAEDC as advisors who may have already faced some of the same challenges facing Annapolis and may know of funding sources the City can tap into.

## **Funding Opportunities**

Startup and seed funding for the Authority to begin could come from the Maryland Economic Development Assistance Authority and Fund (MEDAAF), a Department of Commerce program that supports this type of economic development initiative. Additional seed/startup funding might come from the U.S. Department of Commerce and other federal agencies with an interest in maritime development and marine innovation.

Sustaining operating funds for Industrial Development Authorities (IDAs) typically come from bond fees, developer fees, and proceeds from the sale or lease of completed projects. Done right, the creation of a

maritime industry development authority could become self-sustaining relatively quickly with minimal financial support required from the City.

Not all projects funded by the Authority need to be about development in a narrow sense. The Authority could apply for grants from federal, state, or private foundations to help with workforce development, land acquisition, growing small businesses, encouraging innovation, or to address growing environmental concerns due to sea level rise. For example, Wise, VA's Industrial Development Authority received a \$2.2 million grant from the White House's Partnerships for Opportunity and Workforce and Economic Revitalization program for workforce development to support Virginia's Emerging Drone Industry Cluster Project.

The ability to raise bond funding for capital improvement projects is the perhaps the biggest and certainly the best-known advantage of industrial development authorities as opposed to, say, 501(c)(3) organizations. However successful IDAs are also adept at identifying multiple sources of public and private funds, tax credits, and methods for layering complex financing deals needed by many public-private partnership projects. Layering bonds, federal and state grants, tax credits, equity, soft loans and other sources is a powerful tool for infrastructure and other maritime projects. For example, the Industrial Development Authority in Harlan County, Kentucky received a \$2.5 million grant from the United States Department of Interior Office of Surface Mining and paired it with \$10.5 million from a private investment firm to build a wood pellet manufacturing plant.

Some financing tools like Tax Increment Financing (TIF) can be onerous for cities if undertaken as "one-off" projects that must be managed by regular city finance staff. An authority would include staff with expertise in these types of projects that could assist and advise regular finance staff with complex financing projects. Depending on how the City chooses to set it up, the authority could handle all or most of the administrative burden associated with such projects.

### **Maritime Development Authority Activities in Practice**

#### *Financing Capital Improvement Projects*

The Authority issuing bonds would significantly aid local maritime businesses in updating or improving facilities and services. For example, in our interviews, one cited example was a marina's struggle to replace an aging fuel tank and comply with state environmental regulations. While the marina was more than interested in replacing the fuel tank, the cost was so high that the owner found she "would not be able to make back the money spent in her lifetime."<sup>33</sup> Without financial help the fuel dock will likely shut down when the tank permit expires, impacting hundreds of Annapolis boat and business owners and visitors. In this example, the fuel dock primarily serves Spa Creek, with the only other fuel dock at City dock, a location which is inconvenient and time consuming for Spa Creek boaters. While the fuel dock has always operated as a private service, the environmental sustainability requirements along with other

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<sup>33</sup> Interview with owner of a Back Creek marina

factors suggest a rationale for considering the fuel dock as a valuable public good<sup>34</sup> that, if lost, would disproportionately impact the wider maritime industry.

Under a maritime industrial development authority, there are several ways the deal might be structured as a public-private partnership. For example, the partnership might own the entire fuel system, from tank to pump. The partnership would lease the land and/or necessary easements from the property owner and then lease back the fuel system to the marina business. That lease could be for a fixed rent, a percentage-of-sales rent, or some combination of the two. There could also be back-end buyout provisions. The key is to negotiate a structure that works for all parties<sup>35</sup>.

### *A Strategy for Strengthening Community Networks*

An Authority could also help the maritime industry develop as a community, and bring together maritime businesses with other influential stakeholders in ways that encourage greater collaboration and innovation. While maritime businesses are currently loosely associated with one another, their connections are relatively weak and ineffective, and they don't currently represent a strong or united force in the face of political and economic challenges. Formalizing the maritime business process and networks will enable newcomers to more easily enter into the industry, help all maritime entities to connect with one another, and help the industry generate and share innovative ideas.

Maritime businesses are also generally siloed from stakeholders with similar or parallel interests. A special effort should be made to identify multi-sector "keystones" or community leaders who successfully navigate professional and social circles and are able to bridge different communities to one another (p.10). They can increase opportunities for diverse groups to come together, leading to greater "promiscuous" collaboration, experimentation, and ultimately innovation (p. 71).<sup>36</sup> Keystones could be identified through social network analysis with Microsoft Excel's NodeXL software that helps visualize the number, strength, and types of connections among maritime industry stakeholders. The University of Maryland's Economic Development Center could be brought in to support these efforts. A greater understanding of the existing maritime network would enable the Authority and others to develop a more clear and pointed strategy for engaging the keystones and forging the critical connections necessary for building a stronger community.

### *Makerspace*

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<sup>34</sup> According to Investopedia, public goods are characterized as "nonrivalrous and nonexcludable", meaning that such a good can be consumed by many without reducing the quality or availability of the product to others; <http://www.investopedia.com/terms/p/public-good.asp>

<sup>35</sup> If the City does not form the maritime development authority a similar strategy might work with a co-op as the patient funding source rather than the authority.

<sup>36</sup> Concepts from Hwang, Victor W. and Horowitz, Greg (2012). *The Rainforest: The Secret to building the next Silicon Valley*. Los Altos Hills, California.

The designation of a physical space for maritime business development, community building, and training could help consolidate currently disparate efforts. If based in the centrally located and well-known Annapolis Maritime Museum, people from outside the maritime industry could become involved, which enhances the odds for cross-sector exchange and innovation. Consolidating equipment and support for product testing and certification within a makerspace/business center would greatly benefit small businesses looking to get new products approved for use on the water. The location of the Annapolis Maritime Museum and the maritime districts on the waterfront is ideal and would enable a hands-on, rapid development cycle.

## **Summary**

We propose that the City of Annapolis establish a Maritime Development Authority that operates like an Industrial Development Authority.

### *Purpose*

- Honor Annapolis' rich maritime history by helping the maritime industry grow, innovate, and thrive
- Unite stakeholders and increase political clout
- Support the existing maritime business community and incubate small businesses and entrepreneurs looking to get started in the industry
- Bond capital projects for improvements to the maritime industry's physical entities
- Make Annapolis' maritime industry more competitive with other coastal cities
- Help form a culture of maritime industry innovation in Annapolis that makes it the place to be for innovation in the industry.

### *Benefits of an Authority*

- Ability to provide bond financing
- Can apply for grants from a variety of sources for workforce development, growing small businesses, addressing environmental concerns, and improving physical infrastructure
- Formal organizing mechanism can unite stakeholders who currently operate in silos
- Projects will not have to compete with other Annapolis capital improvement projects for funding
- Would be solely focused on improving the maritime industry.

## **Roadmap**



While each of the four recommendations would require varying levels of effort for full implementation, and parts of each proposal may be more useful for generating further ideas than for actual implementation, our group did scope the following roadmap that breaks prospective implementation into three phases.

### **Short-Term Implementation (up to 1 year)**

- Identify community leaders who support the creation of the Maritime Development Authority, including the search for a Board of Directors.
- Support community building in the early stages of the Maritime Development Authority.
- Assess the area surrounding the proposed makerspace site for compatibility with a floating zone that could allow for other amenities supporting the makerspace, including commercial or residential facilities.
- Recruit maritime business leaders to advance Annapolis' needs within the Marine Trades Industry Partnership.
- Complete renovations on the Waterworks Building to accommodate the makerspace's microstudio space and rooftop workshop.

### **Mid-Term Implementation (1 to 5 years)**

- Establish the Maritime Development Authority and gain City Council approval. Define its structure, and identify and obtain funding sources.
- Establish an MTAM apprenticeship program that uses makerspace lecture and studio spaces.
- Finish the makerspace campus site plan and begin fundraising for long term goals.

### **Long-Term Implementation (5 to 10 + years)**

- Consider additional sites for maritime innovation that don't overtake current neighborhood characteristics and that support innovating business that may not be able to relocate.
- Solidify funding mechanisms for the Maritime Development Authority into a concrete process.
- Begin the Maritime Development Authority's work to support capital improvements, including the proposed makerspace, and its support of the overall expansion of the maritime industry while expanding the investor base.
- Establish an Annapolis-based degree/certification program for maritime trades that uses makerspace lecture, studio, and workshop spaces.
- Complete construction on the floating makerspace structure and on the addition to the existing makerspace building, and fully outfit all facilities with tools and furniture.
- Launch an annual benchmark analysis report of zoning progress.

## Conclusion

In proposing the makerspace, increased maritime trades education, zoning changes, and a Maritime Development Authority, we believe Annapolis' maritime industry can thrive. However, there is a common thread through all these proposals that is required for them to work: the maritime community needs to unite.

The existing networks of those involved in maritime need to formalize and work together. Stakeholders need to create synergy by pooling resources and sharing ideas if they want the industry to adapt, expand, and innovate. If the maritime industry presents itself as a united front, they will have better leverage to convince the citizens, city government, and elected officials that making a concerted effort to support maritime initiatives will benefit the entire City of Annapolis.

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## Appendix

The following appendixes provide supplemental and background information developed or collected by students during the semester-long studio. Much of this information has been synthesized into the final report. Students prepared the appendixes as topical background studies and here in their original form with minimal editing.

### Appendix - Floodplain Zoning

#### **Floodplain Zoning**

According to the Maryland State DFIRM Outreach on flood risk, a large portion of Main Street, Annapolis and the adjacent marina are in a 100- and 500-year floodplain. All the marinas that surround Annapolis are within 100-year floodplains, but most disturbing is that a large portion of the historic commercial district is in the 500-year floodplain. The community's flood risk is assessed by the FEMA Flood Insurance Study, which considers river flow, storm tides, rainfall, and other coastal storm surges. This information is created for Flood Insurance Rate Maps by the National Flood Insurance (NFIP) for floodplain management and insurance purposes. These maps can help determine what areas of Annapolis need the most attention to prepare for flood mitigation and sea level rise.

Based on research by Whitney, Bailey, Cox, & Magnani LLC and on maps by the Maryland Department of Planning, the Historic Annapolis District is looking at 5-10 feet inundation of sea level rise. Large parts of Eastport are also within 5-10 feet inundation. According to the "Flood Mitigation Strategies for the City of Annapolis" study, current flooding at City Dock is caused by high tides and storm surges. Storm drains in the district start to back up when the water elevation reaches almost two feet. The structure of the storm drains and the fact that they have not been updated in decades causes frequent flooding. The study shows that from January 1 to September 30, 2010 high tides were recorded between 3.5 and -1.85 feet. The report makes many structural and nonstructural recommendations. Some of the structural recommendations include new seawalls, pumping stations, and portable cofferdams. Nonstructural

recommendations include elevation, reconstruction, and relocation. These recommendations were made to the City of Annapolis with the consideration of what the City can handle. The City has assembled city officials, business owners, and residents to discuss the situation and the decisions to be made to address impending sea level rise.

## Appendix - Company Profiles

Appendix - Literature Reviews