

# Proposals for Mixed-Use Innovations in Boston's Maritime Industrial Areas



(Boston Planning & Development Agency, 2018)

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Sponsor: Boston Harbor Now  
Interactive Qualifying Project Report  
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# **Proposals for Mixed-Use Innovations in Boston's Maritime Industrial Areas**

**An Interactive Qualifying Project Report  
Submitted to the Faculty of the Worcester Polytechnic Institute  
In partial fulfillment of the requirements for the  
Degree of Bachelor of Science by:**

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## **Abstract**

Boston is facing conflict along its waterfront with competing options on how to redevelop land along its Inner Harbor Designated Port Areas (DPAs). DPAs are regulated areas intended to protect marine-dependent industries. Thus, permitted development in those areas is very limited. The goal of this project was to provide guidance for implementing beneficial mixed-use developments for the Inner Boston Harbor Designated Port Areas. By exploring options from port cities around the world and combining this information with insights about culture, physical attributes, and community opinions gained through news and journal articles, interviews, and site visits, we prepared a series of case studies and recommendations for Boston Harbor Now about how to utilize vacant land within the Inner Harbor.



# Executive Summary

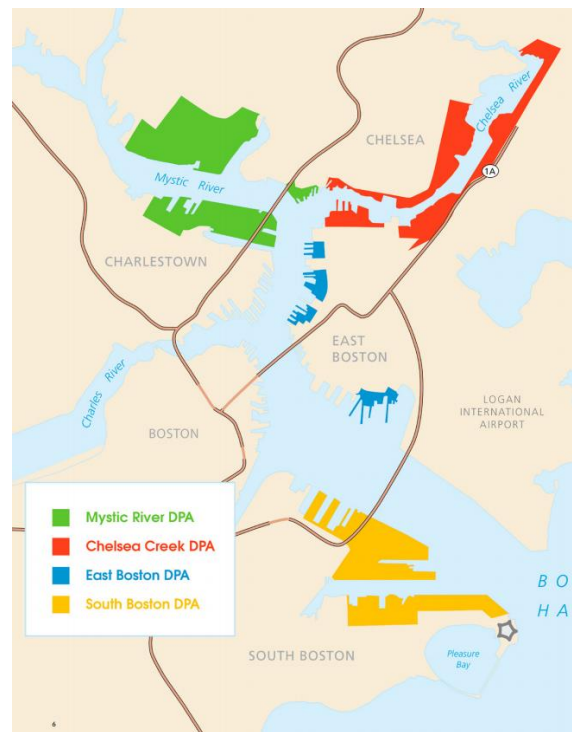
## Introduction and Background

Boston has become a model of urban revitalization (Anzilotti, 2017). Over the last 40 years, Boston’s population has grown 9.8% and the city has seen “nearly a 5 percent increase of office space” (City of Boston, 2018 & Boston Redevelopment Authority, 2014). The stress of this growth is readily apparent on the waterfront. Currently, Boston is facing conflict along the waterfront with competing options on how to redevelop land inside of the Inner Boston Harbor Designated Port Areas (DPAs). More than twelve percent of this land is vacant (Boston Harbor Now, 2018). The vacant spaces offer great opportunities to improve the city-port connection and help spur the creation of a 21<sup>st</sup>-century Boston Harbor. However, not everyone agrees on what should be implemented. Some wish to build public spaces like parks, some want regulations on these areas to be relaxed in order to build hotels or apartments, and some want to preserve the land for water-dependent use (Chesto, 2018).

Tensions about how to best utilize the vacant land can be seen in the planning for development of Dry Dock 4. One option is to build a waterfront park on this land (Reed & Hilderbrand, 2018), while another is to build a “floating hotel” (Peters, A., April 16, 2014), however, there is a resistance to these options from groups that would like to save this space for maritime dependent uses (Boston Globe, Sept. 17th, 2018). There is one big concern no matter what becomes of Dry Dock 4 and that is the effects of climate change. The waterfront areas within Boston harbor will be impacted by high sea level rise by 2070 and be subjected to high risks of flooding (MASSDOT/FHWA, 2018).

To resolve this set of complex problems, mixed-use has been proposed as a solution (Song & Knaap, 2004). Still, mixed-use has both downsides and benefits. The lack of affordable housing for the working and lower class is a common issue seen as a side effect of high-end mixed-use development (Krausse, 1995; Seasons, 2014). Traffic congestion is another common problem that comes along with mixed-use development (Erbil, 2001; Krausse, 1995). On the other hand, mixed-use, more specifically mixing green spaces within other uses in the area, enhance the physical and mental health of individuals who use the space (Astell-Burt, Feng, & Kolt, 2013). Mixed-use could also provide multiple purposes for a singular space which can bring multiple benefits into one area and utilize the space more effectively.

Vacant areas within Boston’s four Inner Harbor Designated Port Areas provide opportunities for innovative mixed-use developments. The four DPAs are labeled in Figure ES.1. However, there are regulations that limit certain types of development and use within the DPAs. DPAs are specially designated to preserve water-dependent industrial uses. Strict regulations lead to the conflict that Boston is facing today of balancing competing



**Figure ES.1: Map of DPA Geography**

preferences for open space, preserving maritime industrial uses, and promoting economic development and tourism.

Boston Harbor Now (BHN), a nonprofit organization, is a leader in promoting a 21st Century maritime economy. Currently, BHN is initiating a conversation about how to add creative mixed-uses in the DPAs that will be able to satisfy multiple stakeholders, not alter the purpose of designated port areas, and promote climate resilience. To assist BHN, we explored innovations that allow for mixed-use in Boston's Inner Harbor, while taking into account community needs.

## Methods

**The goal of this project was to provide guidance for implementing beneficial mixed-use developments in Boston's Inner Harbor Designated Port Areas (DPA).**

To accomplish this goal, we completed the following objectives:

- **Objective 1:** Generated a list of innovative waterfront mixed-use options for urban harbors.
- **Objective 2:** Determined perspectives about the port areas and waterfront uses within communities around the DPAs and obtain knowledge of DPA land and regulations.
- **Objective 3:** Defined and applied a set of criteria to compare different mixed-use options within each DPA.
- **Objective 4:** Developed case studies for implementing mixed-use options.

We used Google Maps to explore nine waterfronts of other cities. We identified what types of business' and public spaces are available, as well as what physical features around the waterfront are like. To understand the opinions of local residents and business owners we contacted ten community groups and conducted semi-structured interviews on the topics of DPAs and mixed-use on the Harbor with representatives from four of the groups. Using these multiple sources of information, we developed eleven criteria to assess opportunities for mixed use options in the four Inner Harbor Designated Port Areas. Some of the criteria included water dependence, climate resilience, amount of space needed, and what supporting services would boost its effectiveness. An Abbreviated Criteria List is shown in Figure ES.2.

Uses	Water vs Non-water	Space Needed	Martime, Supporting, Temporary	Climate Resilient	Public vs. Private
<b>Recreational</b>					
Water-related Escape room	Water	small	Possibly	It can be	Private
Wakeboarding Centre	Water	small	Yes	No	Private
Climate resilient Parks	Non-water	Scalable	None	Yes	Public
Ferris Wheel	Non-water	Large	None	No	Private
Floating Pavilion	Water	Point access	Outside of DPA	Yes?	Public
Paddle Boat Rentals	Water	Medium	Supporting/temporary	No	Private
Sea Pool/Water park	Water	Medium	Supporting/temporary	Possibly	Public
SanAntonio Canal Riverwalk	Water	Large	Supporting/temporary	Possibly	Public
Le Bains Des Docks	Water	Small	None	Possibly	Private
Sugar Beach	Water	Small	Supporting/temporary	It can be	Public
Barretto Point Park Floating Pools	Water	All	Supporting/temporary	Possibly	Public
Smaller Scale Amphicar Tours/Rides	Water	N/A	Yes	No	Public
Ferry (East Boston)	Water	Point Access	Yes	No	Public
Street Food, Paper Island Copenhagen	Non-water	Warehouse	Supporting/Temporary	No	Public
Salt Marshes	Water	N/A	Yes	Yes	Public
<b>Residential</b>					
Empty Warehouses to studios, shared houses (Capsule Hotel)	Non-water	All or part of warehouse	Temporary	No	Private
Floating Houses/Hotel	Water	Point Access	Outside of DPA	Yes	Private

**Figure ES.2: Abbreviated Criteria List**

## Findings

Our analysis resulted in eight findings about climate resiliency, open space, pollution, usage of DPAs and travel concerns due to development:

**Finding 1:** As the City of Boston prepares to release its third neighborhood climate preparedness plan, the implementation of resilient projects along Boston Harbor and its industrial waterfront is a priority for stakeholders.

**Finding 2:** Community groups are aware that DPAs are meant to serve a specific purpose, however, they feel that DPAs are too traditional and that the DPA framework should be modernized.

**Finding 3:** The public is aware that there are vacant parcels in Boston’s Inner Harbor DPAs but they lack the context and understanding of the value of complex DPA regulations to advocate and participate in shaping the working port areas of the waterfront.

**Finding 4:** As the number of vacant and available parcels diminishes, balancing open space waterfront developments and industrial uses becomes more critical.

**Finding 5:** Affordable housing developments for Boston’s residents are not as common as high price housing developments.

**Finding 6:** Toxins from decades of pollution in the harbor still linger in the soil, causing concern for health and safety for the public near the Mystic River DPA in case of flooding or severe storms.

**Finding 7:** Increasing traffic due to over-development in South Boston is negatively affecting the shipping industry in the South Boston DPA

**Finding 8:** Vacant lots are currently being used as parking as opposed to active DPA uses (Figure ES.3).



**Figure ES.3: Chelsea Creek Parking Parcel**

## **Recommendations**

Our recommendations are twofold.

First, we recommend specific mixed-use development for particular parcels. We developed four case studies that match options with vacant parcels in the inner harbor DPAs to:

- Promote tourism by developing a historical site
- Increase recreation and leisure by constructing a beach
- Combat future flood risks by implementing climate resilient infrastructure
- Promote community use and access by building a community center

Second, we identified areas for further research that may benefit the DPAs and surrounding communities:

- Boston Harbor Now and other community groups should work together to investigate the concept of open space or the feeling of open space in areas that feel overcrowded or overdeveloped
- Boston Planning & Development Agency and Coastal Zone Management should evaluate the potential for a new tiered DPA system that allows for less restrictive use and development in some DPAs
- Boston Harbor Now should cooperate with other community groups to look into increasing public awareness of DPA regulations and opportunities

## **Conclusion**

This project examined the issue of what to do with vacant DPA land. The rapid growth of Boston's population, massive amounts of developments in the last decade, and an increasing concern about sea level rise have put stress on the city. This has been partially expressed through conflict on how to utilize the waterfront. DPAs represent a unique part of this issue, as they include vacant or underutilized land that is reserved specifically for marine based industry. DPAs are seen by some as needlessly restrictive, preventing development of something sought by the community such as the waterfront park proposed by the Boston Trustees of Reservation for Dry Dock 4, but as seen in our case studies, DPAs can provide for the community without undesignating parcels or by drafting a modified regulation plan for each DPA, effectively allowing a developer to disregard DPA regulations. The key to modernizing DPAs in parallel with the rest of Boston will be to educate the public on the benefits of DPAs, and to engage the community in conversation about how the DPA can provide for them which still serving its purpose to promote and preserve maritime industrial use.



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Neighborhood of Affordable Housing  
South Boston City Point Neighborhood Association

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## Authorship

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Case Study 3	<b>Tyler Morris</b>	<b>Tom White/Ching Wing Cheng</b>
Case Study 4	<b>Tyler Morris</b>	<b>Tyler Morris/Ching Wing Cheng</b>
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Recommendations	<b>Tom White</b>	<b>All</b>
Conclusions	<b>Tom White</b>	<b>All</b>



## 1.0 Introduction and Background

Boston has become a model of urban revitalization (Anzilotti, 2017). Over the last 40 years, Boston's population has grown 9.8% and the city has seen "nearly a 5 percent increase of office space" (City of Boston, 2018 & Boston Redevelopment Authority, 2014). The stress of this growth is readily apparent on the waterfront. Currently, Boston is facing conflict along the waterfront with competing options on how to redevelop land inside of the Inner Boston Harbor Designated Port Areas (DPAs).

In recent years, an example of such tension can be found in the redevelopment of the Seaport District on the South Boston Waterfront, which is partially in, and is adjacent to the South Boston DPA.

Today, the Seaport District is one of Boston's most vibrant neighborhoods. Before redevelopment, it was a collection of empty and decaying warehouses providing very little to the city and its residents, however, the Seaport now offers restaurants, shops, and residential space (Dirksmeier & Helbrecht, 2012). Despite the benefits that came out of the Seaport District redevelopment, some people believe that this redevelopment was a failure. As South Boston started attracting more business, the area became more gentrified, displacing families that had lived in the area for decades. This is not what was intended but was a severe side effect of the development project. Additionally, with the construction of new buildings, there is even more financial risk when there are floods in the area.

What had originally attracted the Seaport District redevelopment project was the access to the area provided by the newly constructed Central Artery Tunnel Project (the Big Dig) as well as the approximate 1000 acres of underdeveloped land, which presented a chance to revitalize the local economy (ECPA Urban Planning, n.d.). Similarly today, more than twelve percent of the land in Boston's inner harbor DPAs is vacant (Boston Harbor Now, 2018). The underutilized spaces offer great opportunities to improve the city-port connection and help spur the creation of a 21<sup>st</sup>-century Boston Harbor. However, not everyone agrees on what should be implemented. Some wish to build public spaces like parks, some want regulations on these areas to be relaxed in order to build hotels or apartments, and some want to preserve the land for water-dependent use (Chesto, 2018).

The goal of this project was to develop options for implementing beneficial mixed-use developments in Boston's four Inner Harbor DPAs. Our project has emerged out of an interest in innovative mixed-use solutions that have been implemented in other areas locally and internationally.

In this report, we first have a brief discussion about the specifics of our project. This includes the dynamics surrounding the waterfront's development, the pros and cons of the planned developments along the harbor, and explanations of key research material. In the methods section, we describe the steps we took to gather data on current waterfront uses in South Boston, East Boston, Mystic River, Chelsea Creek, and what other waterfronts around the world currently have. Based on these data, we discuss the state of what is already in the DPAs and identify noteworthy physical features, community sentiments, and regulatory observations, both positive and negative. Combining information from background research and our findings, we present case studies of potential uses of vacant parcels for each DPA. We present the list of options that can be implemented in specific parcels of land. In the final section, we use the

support of the findings section to make recommendations for implementing mixed-uses in various parcels throughout the DPAs. We then touch on subjects for further research regarding policy changes, economic implications of redevelopment, and how to educate community members about DPAs as well as draw conclusions from the project as a whole.

## 1.1 Dynamics in Boston Harbor's Development

Over the last 70 years, many developments has been added to Boston Harbor as shown in a before and after image in Figure 1. Currently, there are multiple dynamics involved in the development and usage of land in sections of DPAs within the inner Boston Harbor Waterfront that are traditionally designated for maritime and public usage (Acitelli, Tom., 2018). There are tensions between developers would like to see modern structures, parks, hotels, and other non-public and non-water dependent developments in these areas and nearby residents and other community members are very concerned about the option of losing their public waterfront (WCVB, 2018). These dynamics can be illustrated by the three examples:

1. A 600-foot tower as a redevelopment of the Boston Harbor garage (Logan & Campbell, 2018). Residents are staunchly opposed to that option, that “illegally puts the interests of developers ahead of the public’s rights on the waterfront”, and the community members have filed suit against the development company, Chiofaro (Campbell, 2018).
2. In South Boston, the site of the former Edison Power Plant is currently being developed into a communal area with space for artists and a farmer’s market, however, the plans for this site, which was purchased by developers for \$24 million in 2016, include many new high priced real estate developments and a luxury hotel, which are not for public use (Forbes, 2017).
3. Dry Dock 4, which is not currently being heavily used (Reed & Hilderbrand, 2018). An option that has a large public backing has been to build a waterfront park on this land (Reed & Hilderbrand, 2018). A model of the proposed park is shown in Figure 2. While there is resistance against this option from groups that would like to save this space for maritime dependent uses, this option would allow public access to the water in this currently vacant space (Boston Globe, Sept. 17th, 2018). Another possible use for Dry Dock 4 is a “floating hotel”, which would be a solution to the current lack of accommodations available for the new Boston Convention and Exhibition Center, however, this option does not allow the dock to be used as a public space (Peters, A., April 16, 2014).

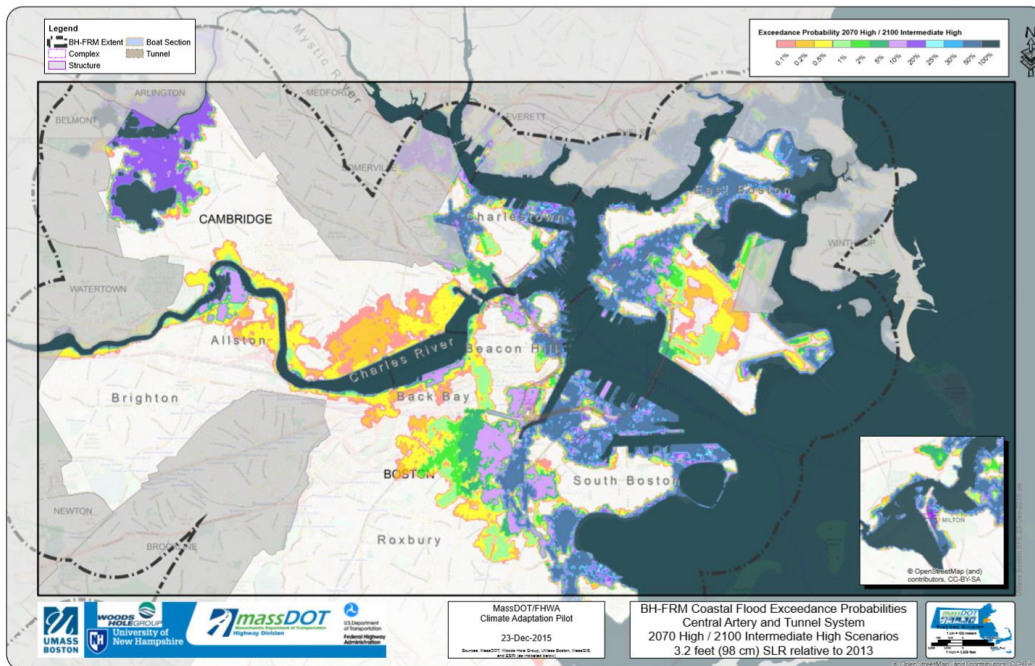
Ultimately, these three examples illustrate that public space is a quality of the waterfront that community members prioritize. Additionally, these waterfront areas will be impacted by high sea level rise by 2070 (MASSDOT/FHWA, 2018). A MASSDOT flood map can be found in Figure 3. Furthermore, research conducted on waterfront public space has found that “to create more successful public areas, it is important to redevelop the waterfront as safe, welcoming, and accommodating for all users”, in other words, waterfronts should be developed for multiple mixed uses (Shaziman & Usman & Tahir, Pg. 349, 2017).



**Figure 1: Boston Harbor (“Flashback Friday”, 2013)**



**Figure 2: Illustration of Proposed Park on Dry Dock 4 (Leung, Shirley, 2018)**



**Figure 3: Boston 2070 Flood Map (MASSDOT/FHWA, 2018)**

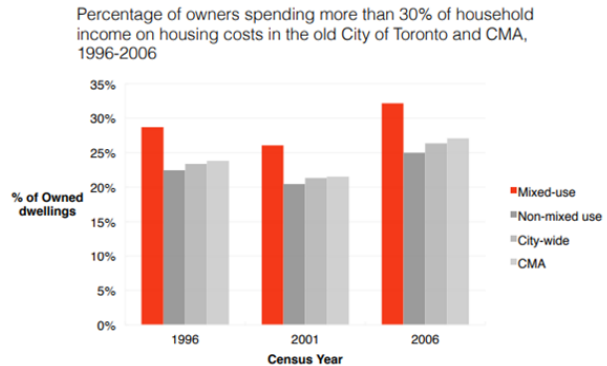
## 1.2 Benefits and Limitations of Mixed-use

Mixed-use has been sought as a solution to the “set of complex problems brought on by urban sprawl” (Song & Knaap, 2004, p. 664). Still, mixed-use has both downsides and benefits. The downsides can include lack of affordable housing and an increase in traffic congestion. The benefits can include improved health quality and multiple purposes for one space. These are discussed in the following subsections below.

### 1.2.1 Downsides

The lack of affordable housing for the working and lower class is a common issue seen as a side effect of high-end mixed-use development. High-end developments result in higher housing costs and these new developments do not satisfy the demand for affordable housing (Krausse, 1995; Seasons, 2014). This issue is shown in the following examples:

- A survey was conducted in Newport RI, on people's opinion of housing supply and the responses were grouped based on high, medium, and low income. 48% of the people with high income stated that there was an excessive housing supply; whereas, 66% of the people with low income claim that housing supply was inadequate (Krausse, 1995).
- The cost of housing in the old City of Toronto is greater in mixed-use areas compared to the rest of the city, as shown in Figure 4 (Seasons, 2014). Seasons (2014) also stated, in his report *Does mixed-use development benefit everyone?* that occupational groups, such as those in the field of education, government, trade, cultural, sales, services, and manufacturing, spend beyond thirty percent of their income on housing.
- Developers in Boston are building condos and hotels for the wealthy instead of accommodating for the demand for affordable housing says Slade (2016). The average living cost in Boston is 39.7 percent over the country's average while the median household income in Boston is on the same level as the rest of the U.S. (Slade, 2016).



**Figure 4: Percentage of Owners spending more than 30% of household income on housing costs (Seasons, 2014).**

Traffic congestion is another common problem that comes along with mixed-use development since new developments bring in more population (Erbil, 2001; Krausse, 1995). Here are some examples that showcase this traffic problem:

- Erbil (2001) stated that Karaköy Harbor, Istanbul, is faced with transportation being one of the main concerns. The mass transportation is overwhelmed by the population of 10-million. Several areas, one being the Karaköy District, is not connected to any major highways nor railways which results in slower traffic (Erbil, 2001).
- In Newport, RI, a survey showed that 85% of the respondents have much dissatisfaction with congestion and high density. In another survey, 75% agreed that traffic had resulted in much more experience with difficulties (Krausse, 1995).

The increase in traffic has contributed to the decrease in “quality of life for residents on the waterfront” (Krausse, 1995). Mixed-use may have generated some problems within the city in some aspects but mixed-use is implemented into many developments because of its benefits.

### 1.2.2 Benefits

Mixing green spaces within other uses in the area, a type of mixed-use, enhances the health quality of individuals who use the space. Green spaces help promote more physical

activity and also improves mental health (Astell-Burt, Feng, & Kolt, 2013). Here are some outcomes of related studies:

- “The experience of nature is one antidote to stress,” Wolf (2017) claims. A group of environmental psychologists conducted a study on the relationship between stress levels and visual exposure to trees, grass, and flowers. They found that visual exposure to nature can effectively reduce stress levels when initial stress levels were high (Wolf, 2017).
- In Australia residents of least green areas were compared to residents within the greenest neighborhoods and found that the latter group was at lower risk of psychological distress and prone to be physically active (Astell-Burt, Feng, & Kolt, 2013).

This shows that green spaces are not just for aesthetics or ‘nice’ to have. Evidence showed that people are less stressed and exercise more from interacting with its surrounding nature.

Mixed-use could also provide multiple purposes for a singular space. The following are some mixed-use spaces:

- The Bent Street Apartments in Adelaide is a mixed-use building for residential, commercial, and parking use. Bent Street Apartments offer benefits such as affordable housing, more pedestrian activity, and job opportunities (Adelaide City Council, n.d.).
- Segment 5, the Hudson River Park in New York, functions both as a park and a climate change resilience infrastructure. It survived Superstorm Sandy with only minor damages to vegetation (“Segment 5, Hudson River Park”, n.d.).
- At the Eastern Salt site in Chelsea, an area of flat land that was mainly used for salt storage was developed into a basketball court for the public use during the offseason (Valdes-Horwood, 2018).

Having mixed-use spaces and buildings can bring multiple benefits into one area and utilize the space more effectively.

### **1.3 Opportunities for mixed-use in Boston’s inner harbor areas**

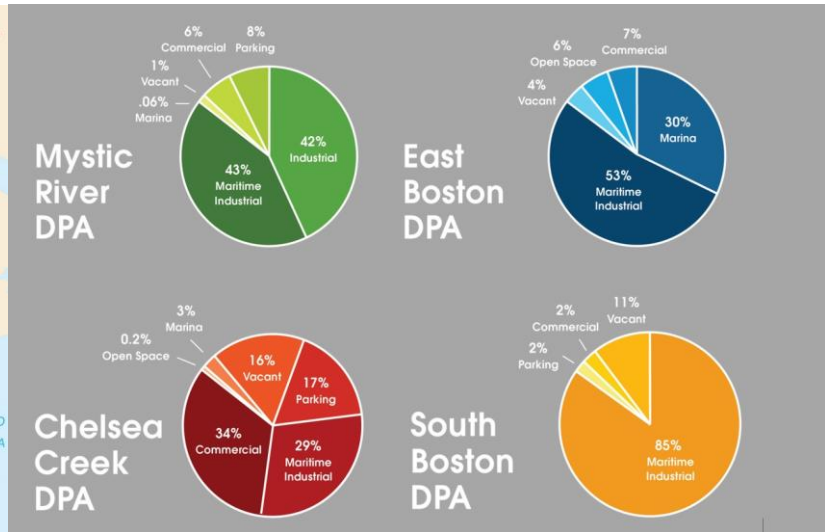
Development along Boston’s waterfront has been increasing, however, there are regulations that limit the kinds of development and use that can occur in many areas along the waterfronts in cities that border the inner harbor. Boston’s Inner Harbor Designated Port Areas (DPA), shown in Figure 5, currently have vacant parcels that have the potential to be converted to some creative and appropriate uses. A more detailed map of Boston’s Inner Harbor can be seen in Appendix A. The vacant areas can host new innovations for enhancing the quality of life for the stakeholders. The percentages of these areas in each of the four DPAs can be seen in Figure 6 (Boston Harbor Now, 2018).

DPAs are special designations by the Massachusetts Office of Coastal Zone Management, CZM, in order to preserve water-dependent industrial uses (Commonwealth of Massachusetts, 2018). The DPAs’ main industrial uses are as shown in Appendix B.





**Figure 5: Map of DPA Geography (Boston Harbor Now, 2018)**



**Figure 6: DPA Land Usage Charts (Adam, K., 2018, January 24)**

Developments on DPA land must follow particular regulations (Commonwealth of Massachusetts, 2018). DPAs are governed primarily by two documents: Chapter 91 and DPA Regulations (Massachusetts Department of Environmental Protection [MassDEP], 2017a, 2017b). Chapter 91 is a set of regulations founded on the option that the waterfront is a common resource that all are entitled to use. Generally, DPAs fall under Chapter 91 due to their location close to or on the waterfront. The summary of Chapter 91 regulations is as follow:

- Businesses need to obtain a license to use the land
- The license is limited to a span of up to 10 years
- Businesses are required to provide public access and varying amenities such as public restrooms, public WiFi, and open space to congregate (MassDEP, 2017a).

DPA Regulations take the options expressed in Chapter 91 and add more stringent restrictions to preserve the current and future availability of land that maritime industry would need in order to operate. These strict regulations lead to the controversy that Boston is facing today of building for what the community prioritizes, open space, or what the state prioritizes, preserving the maritime industrial uses.

Boston Harbor Now (BHN) is researching into adding creative mixed uses that will be able to satisfy all associated stakeholders and not alter the purpose of designated port areas, which are meant to preserve the water-dependent industry. To assist BHN, we explored innovations that allow for mixed-use in Boston’s Inner Harbor while taking into account community needs.

## 2.0 Methodology

The goal of this project was to develop options for implementing beneficial mixed-use developments in Boston's four Inner Harbor DPAs. To accomplish this goal, we completed the following objectives:

**Objective 1:** Generated a list of innovative waterfront mixed-use options for urban harbors.

**Objective 2:** Determined perspectives about the port areas and waterfront uses within communities around the DPAs and obtained knowledge of DPA land and regulations.

**Objective 3:** Defined and applied a set of criteria to compare different mixed-use options within each DPA.

**Objective 4:** Developed case studies for implementing mixed-use options.

### 2.1 Objective 1: Generated a list of innovative waterfront mixed-use options for urban harbors.

We compiled a list of mixed-use options that had been implemented in other cities and also developed our own options of what can be implemented in Boston DPAs. We used Google Maps to explore the waterfronts of other cities. We identified these cities by researching cities of similar size and industry. We sought examples from cities that were analogous in these ways to Boston in order to have a direct relevance to our project. A list of these cities can be found in Appendix C. Google Maps provided a way of understanding the physical attributes of these areas (Patterson, 2007). The knowledge obtained from observations helped us identify which types of business' and public spaces are available, as well as what physical features around the waterfront are like.

This portion of the study had certain limitations with how information was gathered and analyzed. We were not able to examine details such as history and pros and cons of development, as we were trying to implement options that would benefit communities around DPAs. Additionally, we were limited by the information available on Google Maps, both by the businesses' and locations registered with Google, as well as how recent the images were taken.

### 2.2 Objective 2: Determined perspectives about the port areas and waterfront uses within communities around the DPAs and obtain knowledge of DPA land and regulations.

We learned about the viewpoints of community groups around the DPAs on the harbor and any changes these community groups would like. With the assistance of Boston Harbor Now's connections, we contacted ten groups. Four community group members responded back to our emails, agreeing to interviews. We conducted thirty minute, semi-structured interviews on the topics of DPAs and mixed-use on the Harbor with representatives from each community group. All information gathered during the interviews was kept confidential.

All interview data was then coded to pinpoint common viewpoints, concerns, and what the community groups were seeking on Boston's waterfront. Coding is an organization method to sort out collected information and to pinpoint the overall concept (Bryman & Burgess, 2004). By analyzing the coded data, we were able to understand the general concerns and the community groups' aspirations for the DPA. Since the community groups were ones that our

sponsor often worked with, the interview data could potentially have been biased as the groups may have similar outlooks to that of our sponsor.

Gaining a good understanding of DPA regulations and parcels was essential when assessing mixed-use options. We reviewed DPA maps, DPA usage charts, Chapter 91, and visited some of the DPAs on a water taxi and by foot to help us comprehend the land space, allowed use, current infrastructures, and their limitations. We used Google maps to label the four DPAs, parking parcels, and vacant areas.

### **2.3 Objective 3: Defined and applied a set of criteria to compare different mixed-use options within each DPA.**

We analyzed interviews and our research data on other mixed-use options, DPA regulations, and DPA physical features, and coded this information into criteria to evaluate mixed-use options. The criteria gave us a way we could compare the parcels of land and make note of unique attributes. We got feedback about the criteria from our sponsor and adjusted our criteria appropriately. We then created a chart to determine which sets of criteria each mixed-use option did or did not fulfill. We included requirements such as water vs. non-water dependant, maritime vs. supporting use, public vs. private use, and other requirements. The full list of criteria can be seen in Appendix D. The chart was our preferred method to organize the criteria because it allowed us to view the information in parallel and make an easy determination of which options satisfied which criteria.

By accomplishing this objective, we were able to visually assess (by looking at the completed chart) which options would satisfy each set of regulations and community groups. This was completed by filling out the chart for each mixed-use option and we then determined five case studies to focus on.

Because there were specific stakeholders that we were able to interview and others who we were not, the criteria that we decided upon was not able to contain every possible opinion, however, we worked to ensure that the criteria included represented many of the opinions and regulations that we had researched.

### **2.4 Objective 4: Developed proposals for implementing mixed-use options.**

We produced five case studies for Boston Harbor Now. Case Studies add strength and experience to research and analysis, which is why these studies were a good method of presenting our analysis work (Soy, 2006). We found that our criteria (Appendix D) encompassed three main themes: climate resilience, open space, and water-dependent use. We chose our case studies based on these three themes. After filling out the chart, we were able to look at the satisfied criteria for each option being assessed and determine some options that satisfied at least two of these three themes for our first four case studies. Next, for our fifth case study, at our sponsor's request, we chose an option that did not satisfy any of these three themes, to demonstrate why certain developments are not meant for DPAs. Once these were complete, the case studies were submitted to our sponsor at Boston Harbor Now, who included them in BHN's Working Port Report and proposal plan.

## 3.0 Findings

*In order to preserve confidentiality, any names mentioned in this chapter are pseudonyms created for the purpose of this report. Additionally, the interviewees were asked questions that applied generally to all Inner Harbor DPAs. As such, any comments related to specific DPAs are not attributed to community groups operating in that neighborhood, unless explicitly stated.*

The goal of the project was to identify innovative mixed-use options for the DPAs. The analysis of our interview data led us to the following findings that we present in these two categories:

1. General Finding across all four DPAs
2. Specific Finding within individual DPAs

### 3.1 General Findings Across All Four DPAs

**Finding 1: As the City of Boston prepares to release its third neighborhood climate preparedness plan, the implementation of resilient projects along Boston Harbor and its industrial waterfront is a priority for stakeholders.**

One key concern among the community groups we interviewed was the effects of climate change such as flooding, storms, and sea level rise. Interviewees stated that the DPAs were vulnerable to flooding and also mentioned the issue of the rising sea level. These are unavoidable issues in Boston's waterfront since nearly all of it will be flooded by 2070 (MASSDOT/FHWA, 2018). This is shown in Figure 3 from Chapter 1 of this report. One interviewee's concern was if their area becomes flooded, where would the people go, what would they do, and how would they recover? To address these issues, the interviewees stated that they would like to see more climate resilient work that would offer protection to these flood-prone neighborhoods. Climate resiliency is a long-term investment over multiple generations. However, as another interviewee questioned, who would pay for these climate resilient projects, claiming that there is "almost no overlap between what is economically viable and what is flood resilient." From the interviews, we know that climate resiliency is something that many prioritize and would like to see incorporated into mixed-use developments in the DPAs.

**Finding 2: Community groups are aware that DPAs are meant to serve a specific purpose, however, they feel that DPAs are too traditional and should be modernized.**

During our interviews, one common theme was that the current DPA regulations and Chapter 91 are written in a way that focuses on Boston as a port city rather than the city's current maritime uses such as research, fish packaging and small-scale transportation (ferries and water taxis). One of our interviewees mentioned how DPAs have good intentions but did not know how useful they are today. Another interviewee took it a step further and contested that there need to be two tiers of DPAs, Modern DPAs and Industry focused DPAs and even mentioned that perhaps some DPA land should be "swapped" with public land to ensure land usage in these areas. Based on this data, it is clear that some community members are not aware of modern maritime uses. Furthermore, while modern maritime industry exists, many still think of the term "water-dependent uses" as relating to worldwide shipping, from the days when Boston used to be primarily a port city.

**Finding 3: The public is aware that there are vacant parcels in Boston’s Inner Harbor DPAs but they lack the context and understanding of the value of these complex DPA regulations to advocate and participate in shaping the working port areas of the waterfront.**

We asked our interviewees a series of questions relating to the DPA in their neighborhood. One of these questions was if they were aware of projects that were trying to be built on vacant land, or if anyone in the community had proposed an option on how to use the vacant land. All of the interviewees responded that they were unaware of any such conversations. Each of the interviewees had options that they were willing to talk about for this land, but they did not see value in preserving vacant areas for maritime industrial uses. One interviewee said, “I don’t know what the value is for access to the water for these heavy maritime industrial uses so when people talk about converting them to other activities I’m generally in favor of them” The interviewee also mentioned that unless there were more maritime industrial uses “that [were] clamoring to get into the harbor,” less industrial heavy areas should gradually fade out. As a result, in some cases, community members were not aware of the value of their local DPAs.

**Finding 4: As the number of vacant and available parcels diminishes, balancing open space waterfront developments and industrial uses becomes more critical.**

The most prevalent theme throughout our interviews was the desire for open spaces. All of the community groups that we spoke to mentioned, in some way, that people they represent would like to see more open space in general, not just in DPAs. In response to a question about what is needed in these DPAs, one of the interviewees stated "Open space, open space. It's so needed here because of the overdevelopment. That's what we're looking at that would be needed, that's needed". In support of the same, another interviewer stated that the East Boston Waterfront has a disappearing view because of construction of high rise developments. A problem that is unique to the East Boston DPA is the fragmented land. There is little public land available for making open spaces.

**Finding 5: Affordable housing developments for Boston’s residents are not as common as high price housing developments.**

One common problem mentioned about East Boston from interviews was the issue of increasing housing cost. One interviewee stated that there need to be about two to three times more affordable housing around the East Boston area. Much to the same point, another interviewee in the East Boston area talked about many high end-developments and how housing costs are too high. This issue is a concern for all neighborhoods of Boston and not just specific to the East Boston neighborhood. Boston’s median monthly rent is \$2,497 per month which means, for a household to live comfortably, an annual household income of \$100,000 per year should be achieved. However, the median wage of Boston residents only \$35,273 (Stribling, 2016). Based on this data, while there are housing developments being built along the harbor, there is a lack of affordable housing being built, as the majority of these developments are high-cost residential developments, designed for people who are willing to pay a premium to live by the harbor and have waterfront views.



### **3.2 Specific Findings within individual DPAs**

#### **Finding 6: Toxins from decades of pollution in the harbor still linger in the soil, causing concern for health and safety for the public near the Mystic River DPA in case of flooding or severe storms.**

Some of the interviewees have brought up the topic of toxins and pollution around the Mystic River DPA. One interviewee suggested that DPAs should invest in more clean energy and “move out” these toxins. It was also mentioned that, if the Mystic River were to flood, the toxins left by the industry could potentially cause pollution in the water. Plus, if the land is vacant, the flood could cause the soil to cave in and cause structural failures. The interviewee had also mentioned that the Mystic River DPA is not a safe space for the public to access.

#### **Finding 7: Increasing traffic due to over-development in South Boston is negatively affecting the shipping industry in the South Boston DPA**

In South Boston’s DPA, there has been quite an increase in residential and commercial developments constructed recently. These developments are causing major traffic problems and were identified as the “number one problem ... in South Boston, all of South Boston” by one of our interviewees. Additionally, the interviewee also mentioned that there are safety hazards that come with increased traffic. As a result, commuter travel, as well as travel by local residents, has become quite a long endeavor during most days. Many cars that sit in traffic result in an increase in the amount of pollution spread in this area. Currently, many who work and live around the city use ride-sharing services and public transit because of how bad the traffic has become (Turner, 2018).

#### **Finding 8: Vacant lots in Chelsea’s DPA are currently being used as parking as opposed to active DPA uses.**

Currently, much of Chelsea DPA’s surface area is being used for parking. Approximately 49.24 acres of DPA land is currently being used by businesses and shuttle services such as Logan airport, Enterprise Truck Rental, Park Shuttle & Fly, and a few other services. This takes up an enormous amount of land for vacant by single occupancy vehicles. A significant portion of land could be opened up by constructing parking garages, allowing for more land to be used for more active DPA uses.

## 4.0 Recommendations and Conclusions

The underlying sentiment behind our project goal is to increase usage of land in the Inner Harbor DPAs with options that benefit the community surrounding these areas but also still allow preservation of maritime industrial uses. Since its implementation, the DPA system has been used as a conservation mechanism for maritime industries that require access to water and uses that can support those who work in the industry. Our recommendations exist to guide the implementation in improving the usage of the land that the DPAs currently occupy and the areas around the DPA. Most of the recommendations do not serve to further the development of maritime the industries exclusively. These recommendations aim to also benefit members of the community near the DPA.

### 4.1 Proposals for Mixed Uses in the Boston Inner Harbor DPAs

Our first set of recommendations is a series of case studies that match researched options with vacant parcels in the Inner Harbor DPAs. More detail on each of these recommendations can be found in Appendix E.

#### 4.1.1 Promote tourism by developing a historical site

The Golden Stairs is a historical entry point for immigrants, located in East Boston (Lynds, 2011). They were known as the Golden Stairs “because they represented the final climb to golden opportunity in America for countless Europeans” (Lookbackward, 2010). The stairs lead to a green area known as the Golden Stairs Terrace Park (Lynds, 2011). Building a rapid water transport stop with a historic set piece nearby would encourage people to travel to East Boston. This would also make it easier for residents of East Boston to connect to the central city. The ferry stop is the portion of this project that would be located adjacent to the DPA, and is water-dependent, thus it would still serve the interest of a DPA. We recommend a company invested in water transit such as Boston Harbor Cruises repair one of the wharfs near Piers Park in East Boston that leads to the Golden Stairs as a historical tourist attraction. This will add a walking element to mimic the experience of immigrants arriving off the boat (Lynds, 2011) and provides more area for informational signage and will also provide a nearby passageway to get to this section of East Boston’s DPA, which currently contains the ICA Watershed. The proximity of this proposal to the DPA provides an opportunity to remediate findings 2 and 3, which generally have to do with public awareness of DPAs and a lack of engaging resources to learn about them.



(Lynds, 2011)

#### 4.1.2 Increase recreation and leisure by constructing a beach

Sugar Beach is an urban handmade beach located in Toronto, Canada. It is built on top of an old parking lot and has a color palette reminiscent of candy, with granite rocks brought to the beach to better emulate a natural beach. As a result, even though Sugar Beach is located in the city, it has the same aesthetic appeal and relaxing feel as a real, natural made beach. This type of beach, or a beach in general, would provide a few things for the community. Mostly, this would be an open space in an area that is very congested. There are a number of areas that this could be relocated to if the parcels are needed for maritime industry. This would allow us to utilize some space that is currently being used as makeshift parking, addressing finding 8. Additionally, findings 3, 4, and 7 are addressed by bringing people into the DPA and giving them an open space to escape from the city.



(Louise, 2017)

#### 4.1.3 Combat future flood risks by implementing climate resilient infrastructure

After speaking with community members, we found that a common desire was for more open space around underutilized DPAs. Wanting to contribute to climate change resiliency, we researched water absorbent concrete, which is currently being used at Yellowstone National Park (Ludacer, 2017). This concrete can absorb 50 lbs of water per minute (Ludacer, 2017).



(Ludacer, 2017)

Constructing new, and upgrading current, infrastructure with this material would protect against future flooding. This can contribute to open space, public access, and climate resilience. A park could be constructed with the material as the foundation and on its edges. It would be easily accessible from the street if placed at this parcel. Additionally, due to the construction methods of the park, future flooding would be dealt with by the “thirsty concrete”, which would diminish flooding to neighboring areas in the city. This does not qualify as a temporary use as there would be too much construction involved in this project. As a result, DPA regulations would have to be adjusted to allow for this development. We recommend that Coastal Zone Management start requiring this concrete in high flood risk areas when distributing licenses for DPA parcels. If CZM were to do this it would contribute to the solution of the problem explored in finding 6, as storm surge could disturb the soil containing these toxins and

flooding would carry them inland. This would also directly contribute addressing concerns from finding 1.

#### 4.1.4 Promote waterfront entertainment

Portbound ferris wheels are tourist attractions that provide high views of adjacent water while riding and. These are commonly placed near shopping areas on ports. Examples of these can be found in San Francisco, Seattle, and Hong Kong. However, this is not a plan that we can recommend. While this attraction would be very appealing to tourists and community members looking for exciting entertainment, it has many disadvantages. The ferris wheel is not a water-dependent use and is also not climate resilient. Furthermore, this attraction would cost a significant financial investment and does not add any benefit to the community.



(Tripsavvy, 2017)

#### 4.1.5 Promote community use and access

Research conducted on waterfront public space has found that “to create more successful public areas, it is important to redevelop the waterfront as safe, welcoming, and accommodating for all users” (Shaziman & Usman & Tahir, Pg. 349, 2017). A waterfront community center would allow for local residents to gather along the water, converse, and learn about DPAs and climate resilience, all of which are currently being offered at the Genoa Community Port Center (“Genoa Port Center”, n.d.). We highly recommend this option, as the community educational port center would provide a space for collaboration, engaging educational materials on DPAs, and open space, and a place to hold community events. This recommendation blends together a solution for findings 2, 3, and 4.



(“Genoa Port Center”, n.d.)

## 4.2 Recommendations for further research

Recommendation #1: Boston Harbor Now and other community groups should work together to investigate the concept of open space or the feeling of open space in areas that feel overcrowded or overdeveloped

We recommend that Boston Harbor Now work with other community groups to increase physical or perceived open space in densely developed DPA areas.

- In South Boston, the amount of development boomed with the introduction of Mayor Menino’s option of making this area the ‘Innovation District’ in 2010 (ICMA, 2015). According to an interviewee, South Boston has felt like a parking lot due to all the development from the Innovation District. To address this specific problem, we recommend reserving a small part of the DPA that is away from construction, for open-

air public meeting space such as a fountain or a reflecting pool. This open space is a place such as South Boston can be built with resilience in mind to aid in protecting the residential areas behind it from flooding. Additionally, to entice people to visit this location in the DPA, we recommend attempting to work with private business owners in the area to take advantage of the empty vertical space available. A path lined with water features or gardens can also be used to guide visitors to the meeting space.

- In East Boston, the DPA is fragmented. There are clusters of industry and privately developed land in between and the development of high rise apartment buildings is slowly obstructing the view of the water for residents, the view being a former benefit of living in the neighborhood. We recommend the option explored in *Case Study #1: "Golden Stairs" Historical Site* in combination with increasing visibility of the Harborwalk in the area in order to give the residents the perception of more open space.
- As noted in Finding 4, the community would like more open space. What form this will take should differ between each DPA as the communities that surround them have different needs. We have suggested plans for more open space, but recommend that further research is done to identify what would be most beneficial to each area.

Recommendation #2: Boston Planning & Development Agency and Coastal Zone Management should evaluate the potential for a new tiered DPA system that allows for less restrictive use and development in some DPAs

Through our interviews, we heard the concept of different kinds of DPAs was brought up multiple times. The premise of this option is to allow for some parts of, or entire DPAs, to have less restriction on what can be developed within their boundaries. We recommend that Boston Planning & Development Agency and Coastal Zone Management consider this concept and conduct further studies. Areas that we have identified as potential changes include:

- *Allow for Long-Term Non-Maritime Uses* - There is a 10-year time limit on any temporary use. Further research into the economic impact of allowing longer leases on the land for temporary use can be conducted.
- *Allow More Supporting Uses* - Current DPA regulations require that non-maritime industrial or supporting uses be limited to twenty-five percent of DPA land. As a result, this limits the potential number of uses that could be implemented in empty parcels of land. We recommend that this percentage is re-examined to see if increasing the percentage will encourage businesses to apply for use of the vacant space.
- *Staggered Parcel Licensing* - If a DPA has relaxed regulations placed on its land, we foresee a situation where a maritime use is found, however, there is no available land. A potential solution for this would be staggering the parcel licensing. We propose the following process to be examined and researched: There could be a threshold of total vacant acreage that cannot be dipped below unless the land is being licenced for a maritime use. Additionally, there should be a consideration for when licenses will be expiring. The years that land usage licenses expire should be strategically timed so that there is new land potentially becoming available frequently.

As a result of our findings on DPA land being more lenient with its uses, which we acquired in our interviews, we propose the following zones show in Table 1 below.



**Table 1: Proposed DPA Zones**

<b>Traditional DPA</b>	<b>New DPA Type</b>
South Boston	East Boston
Chelsea River	Mystic River

There are potential downsides to this transition associated with changing the economics surrounding the land through regulation.

- If all of the land in the East Boston and Mystic River suddenly became available for new uses, it may have an adverse effect on the economy in the neighborhood. To combat this, we recommend gradually allowing parcels to transition to this new class of regulation. This solution should also be an effective countermeasure to the business interruptions experienced due to a shift in the surrounding industry.
- There will need to be changes to the regulations. This will require consulting with state legislature and the office of Coastal Zone Management.

There are also upside of this transition. The problem of affordable housing raised in finding 5 would have an avenue to be addressed with a tiered DPA system. The land would remain as state-owned, and could be licensed by the state for the purpose of affordable housing that combines a public use component in order to benefit the surrounding community.

Recommendation #3: Boston Harbor Now should cooperate with other community groups to look into increasing public awareness of DPA regulations and opportunities

Representatives from the community groups that we interviewed were aware of DPAs, but not very knowledgeable about these areas of land. When asked about if the residents and business owners of the neighborhoods they represent were aware of DPAs, their responses indicated that they were not. In differing amounts per area, DPAs offer access to the waterfront and currently vacant land that can be used to host events, which can be of use to the community. To encourage public utilization, we recommend that Boston Harbor Now do the following:

1. Create a public information campaign
2. Work with community groups to host events in vacant parcels

An effective public information campaign has four main tasks to complete: capture the right audience, deliver a credible message that audiences understand, deliver a message that influences the audience, and create social contexts that lead toward desired outcome (Weiss & Tschirhart, 1994). Table 2 illustrates how these steps should be applied to this context.

**Table 2: Steps for Effective Public Information Campaign**

<p><b>Capture the right audience</b></p>	<p>The target of this campaign would be those who live around the DPAs. The specific strategy per DPA should change to fit the prevailing culture in the neighborhood. It is imperative that the information presented to the audience captures their attention to make it as relevant as possible will be beneficial. Research will have to be done to identify what would work in each neighborhood.</p>
<p><b>Deliver a credible message that audiences understand</b></p>	<p>The most important part of the message is delivering accurate information that the audience understands. The message may be more credible the spokesperson is an organization such as Boston Harbor Now instead of the state because Boston Harbor Now doesn't have an economic interest in the DPAs (Weiss &amp; Tschirhart, 1994). We recommend fitting the message into what is already known about the DPAs in order to build off a base knowledge.</p>
<p><b>Deliver a message that influences the audience</b></p>	<p>By providing more information about the importance of DPAs (from a credible source and that fits within the audience's framework) public opinion can be persuaded more effectively. If there are frequent enough messages about the subject, it is intended that people will interpret it as more important. This will not always change their opinion, but it is intended to cause them to think or discuss the issue more.</p>
<p><b>Create social contexts that lead toward the desired outcome</b></p>	<p>By making connections with other topics that are important to communities surrounding the DPAs, these people will gain a better understanding of the importance of DPAs.</p>

In order to get direct feedback about what the community wants in the vacant parcels, we recommend that Boston Harbor Now and Coastal Zone Management facilitate open forum discussions in each of the neighborhoods. Hosting these forums will provide an opportunity to educate the public about the benefits of the DPAs as well.

### 4.3 Conclusions

This project examined the issue of what to do with vacant DPA land. We explored mixed-use options that have been implemented in port cities around the world, as well as potential innovations that had been researched by our sponsor at Boston Harbor Now. We found that members of the community groups that abut the DPAs are not aware of the details and regulations governing these areas. While community members are aware of the vacant land in DPAs, they do not know what uses are allowed and there have been few organized discussions of what the vacant lots could be used for. This makes it difficult to recommend new development that would benefit these communities but does expose important areas for future research. To address this, we recommend that research is done on the impact of a tiered DPA system, deeper research into what type of development each specific neighborhood would benefit from being conducted, and that effort be made to increase public knowledge about DPAs. Further research and implementation of some of these options could lessen the conflict or create a compromise between groups with different viewpoints on how DPA land should be developed.

The rapid growth of Boston's population, massive amounts of developments in the last decade, and an increasing concern of sea level rise have put stress on the city that has seen conflict on how to utilize the waterfront. DPAs represent a unique part of this issue, as they encompass vacant or underutilized land that is reserved specifically for industry. DPAs are seen by some as needlessly restrictive, preventing development of something sought by the community such as the waterfront park proposed by the Boston Trustees of Reservation for Dry Dock 4, but as seen in our case studies, DPAs can provide for the community without undesignating parcels or by drafting a modified regulation plan for each DPA, effectively allowing a developer to disregard DPA regulations. The key to bringing DPAs into the modern era with the rest of Boston will be to educate the public on the benefits of DPAs, and to engage the community in conversation about how the DPA can provide for them which still serving its purpose to promote and preserve maritime industrial use.

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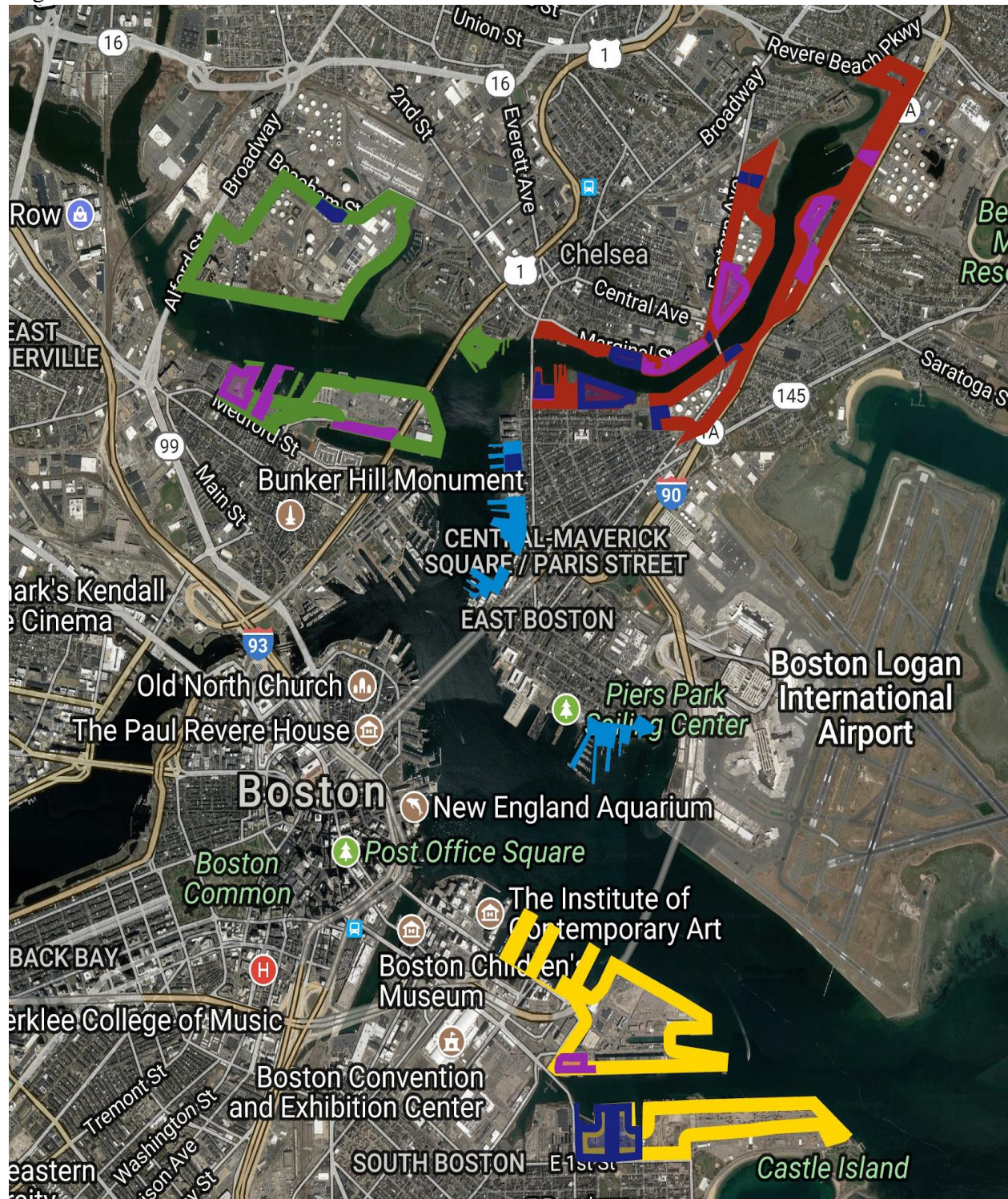
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# Appendix A: Map of Boston's DPA and Its Vacant and Parking Parcels

Green: Mystic River DPA      Red: Chelsea Creek DPA      Purple: Parking Parcels  
 Light Blue: East Boston DPA      Yellow: South Boston DPA      Dark Blue: Vacant Parcels



## Appendix B: Main Uses in Each Inner Harbor DPA

**Table 1: Use of DPAs (Boston Harbor Now, 2018)**

DPA	Main Uses
Mystic River	Mainly private port facilities Transporting and storing bulk cargo
Chelsea Creek	Mainly private port facilities Transporting and storing bulk cargo
East Boston	Shipyard and Tugboat Companies
South Boston	Massport and Boston Planning and Development Agency (BPDA) land: <ul style="list-style-type: none"> <li>● Raymond L. Flynn Marine Park</li> <li>● Flynn Cruiseport Boston</li> <li>● Conley Terminal</li> <li>● Seafood processors</li> <li>● Dry Dock 3 - where ships are constructed and repaired</li> </ul>



## Appendix C: List of Port Cities Explored

- Liverpool
- Long Beach
- San Francisco
- Seattle
- Baltimore
- Hong Kong
- Portland
- Toronto
- New York

# Appendix D: Criteria

Uses	Water vs Non-water	Space Needed	Martime, Supporting, Temporary	Climate Resilient	Public vs. Private	Construction	Access	Matching Service	Cost	Changes to DPA regulation/Zoning	Water Proximity
<b>Recreational</b>											
Water-related Escape room	Water	small	Possibly	It can be	Private	Some of DPA	Specifically Built		High	Maybe	On the Harbor
Wakeboarding Centre	Water	small	Yes	No	Private	Minimal	Specify built				
Climate resilient Parks	Non-water	Scalable	None	Yes	Public	Landscaping	From Road		High		
Ferris Wheel	Non-water	Large	None	No	Private	A lot	From Road		High		
Floating Pavilion	Water	Point access	Outside of DPA	Yes?	Public	All of it	Specify built	None	High	None	In the water
Paddle Boat Rentals	Water	Medium	Supporting/temporary	No	Private	Minimal	Small dock		High for initial investment	Maybe	Shoreline
Sea Pool/Water park	Water	Medium	Supporting/temporary	Possibly	Public	All	Inside DPA	None	High	Depends On If Water Dependent	On The Shore
SanAntonio Canal Rivenwalk	Water	Large	Supporting/temporary	Possibly	Public						
Le Bains Des Docks	Water	Small	None	Possibly	Private	All					
Sugar Beach	Water	Small	Supporting/temporary	It can be	Public	Bring in sand and rocks	Walking/road	shops	Medium		Near the water
Barretto Point Park Floating Pools	Water	All	Supporting/temporary	Possibly	Public	Construction & Lanscaping	Roads	Ferry's/Water Taxi	High		
Smaller Scale Amphicar Tours/Rides	Water	N/A	Yes	No	Public	Minimal					
Ferry (East Boston)	Water	Point Access	Yes	No	Public	Minimal	Build ferry stop				
Street Food, Paper Island	Non-water	Warehouse	Supporting/Temporary	No	Public	None	From road			None	
Copenhagen	Water	N/A	Yes	Yes	Public	Landscaping				None	
Salt Marshes	Water	N/A	Yes	Yes	Public					None	
<b>Residential</b>											
Empty Warehouses to studios, shared houses (Capsule Hotel)	Non-water	All or part of warehouse	Temporary	No	Private	Some changes inside the warehouses	Road	Parking	High	None	Independent
Floating Houses/Hotel	Water	Point Access	Outside of DPA	Yes	Private	All		Parking	High	None	In the water

Option Criteria (Above)

DPA	Description	Water Proximity	2030 Flooding Risk	Acre	Dock/Pier	Structures	Surrounding Area
<b>South Boston</b>							
1	Vacant	Next to Water	Medium	24.1	Yes	Some	Park and baseball field
2	Vacant: Redgate Development	Next to Water	Medium	24.6	Yes	Half	School, Park, baseball field, buisnesses
3	Parking: BPDA parcel: part of RFMP	Next to Water	Low	8.36	Yes	One large	BPDA, Dunkin, government office, ship repair, cruise terminal, Boston Design Center, Park
<b>East Boston</b>							
4	Vacant: Storage Space, Owned by Boston Towing & Transportation	Next to Water	High	3.09	Yes	Lots and Warehouses	Fishing Gear, Mario Umana Academy, resident areas, Shore Plaza
<b>Mystic River</b>							
8	Vacant: Engle LNG	~ 0.44 mi inland	None	5.95	No	None	Fuel? Tanks
5	Parking: City of Boston	Next to Water	Low	6.5	No	None	Massport
6	Parking: Massport land	Next to Water	Very Low	10.3	Yes	One small	William Zeke Marsden Playground,
7	Parking: Schrafft Center LLC	Next to Water	Very Low	19.28	Yes	One large	Doherty Palygorund, Haley & Aldrich, Residential
<b>Chelsea River</b>							
9	Vacant: Fairfield Exeter Inc.	Next to Water	Medium	9.24	Yes	Little	High School, Automobile shops
10	Vacant	Next to Water	Very High	19.36	No	None	High School, Automobile shops
11	Vacant	Next to Water	High	1.47	Yes	One small	Park, metal fabrication, Boys & Girls Club,
11	Vacant	Next to Water		0.79			
11	Vacant: Mostly Water; Dock	Next to Water		4.84			
12	Vacant	Next to Water	Low	4.37	No	None	Sports Facilities, park, fuel containers, restaurants
13	Vacant	Next to Water	Low	0.84	No	One small	Park
13	Vacant	Next to Water		0.13			
14	Vacant	Next to Water	Medium	2.45	No	Couple	Storage Facility, performance center, office buildings
15	Vacant	Next to Water	Low	1.63	No	Few	Park, fuel containers, elementary school
16	Vacant	Next to Water	Low	5.24	No	None	Park, fuel containers, elementary school
17	Parking: Nay street	Next to Water	No	0.95	No	N/A	High School, Automobile shops
19	Parking: Airport parking	Next to Water	Low	6.37	No	None	Park, metal fabrication, Boys & Girls Club,
18	Parking: Enterprise	Next to Water	Medium	3.98	No	None	Park, metal fabrication, Boys & Girls Club,
20	Parking: Logan; Enterprise Truck Rental	Next to Water	High	20.71	No	None	Park, fuel containers, elementary school
21	Parking: Park Shuttle & Fly	Next to Water	Very Low	15.2	No	Couple	Hotel, Community center, Car Rental
22	Parking: Hertz Car Sales Boston; Thrifty Parking Boston	Next to Water	Medium High	2.98	Yes	None	Oil Terminal, Hotel, Car Rental

Parcel Criteria (Above)

## Appendix E: Case Studies

### Case Study 1: “Golden Stairs” Historical Site (East Boston)

#### Background

The Golden Stairs is a historical entry point for immigrants, located in East Boston (Lynds, 2011). They were known as the Golden Stairs “because they represented the final climb to golden opportunity in America for countless Europeans” (Looknbackward, 2010). The stairs lead to a green area known as the Golden Stairs Terrace Park (Lynds, 2011).

#### Concept

The option is to establish a Ferry stop at East Boston that leads to the Golden Stairs as a historical tourist attraction. The attraction will have signs and guides that lead visitors through the history of immigration.

#### Recommended Location

We recommend repairing one of the wharfs near Piers Park to use as a ferry stop. This will add a walking element to mimic the experience of immigrants arriving off the boat and provides more area for informational signage.

#### Pros

- Access to water transportation
- Teaches about historic landmarks
- Vicinity to open space park

#### Cons

- Not Climate Resilient and is vulnerable to flooding



(Lynds, 2011)

#### Recommendations

As we heard in our interviews, the residents of East Boston can feel like they live in a sequestered neighborhood. Building this rapid water transport stop with a historic set piece nearby would encourage people to travel to East Boston. This would also make it easier for residents of East Boston to connect to the central city. The ferry stop is the portion of this project that would be located in the DPA, and is water-dependent. The service could be run by a private company, such as Boston Harbor Cruises, who has already invested in water transit. The Golden Stairs site should have signage repaired and historical plaques written and placed along the sidewalk leading up to it.

## Case Study 2: Sugar Beach

### Background

Sugar Beach is an urban handmade beach located in Toronto, Canada. It is built on top of an old parking lot and it has a color palette reminiscent of candy, with granite rocks brought to the beach to better emulate a natural beach. As a result, even though Sugar Beach is located in the city, it has the same aesthetic appeal and relaxing feel as a real, natural made beach.

### Recommended Locations

**South Boston, Parcel 1** (see Appendix G). South Boston is proceeding with lots of developments and construction. Adding a sugar beach will give the people some open space to break away from all of the development and construction.

**East Boston Parcel 4** (see Appendix G). The empty warehouses in Parcel 4 could be used and set up for temporary businesses such as food vendors and selling beach related products.

**Chelsea Creek Parcel 19** (see Appendix G). Parcel 19 is adjacent to the Chelsea River and a small section of that parking lot can be converted temporarily into a beach similar to Sugar Beach. Highland Park is located less than 400 ft away from Parcel 19 so it is accessible to the public.

### Pros

- Open Space
- Attracts families
- Easily removed or relocated

### Cons

- Can't be placed too far into DPA
- Susceptible to flooding



(Louise, 2017)

### Recommendations

This type of beach, or a beach, would provide a few things for the community. Mostly, this would be an open space in an area that is very congested. There are a number of areas that this could be relocated to if the Parcels are needed to be used for maritime industry.

On a side note, there is not an attractive view from Parcel 19. The view across the river is of these gigantic fuel tanks. To resolve this issue, a similar option to the Fuel Tank Facelift, with graphics projecting on the tanks in order to blend them into the surrounding environment can be done.

## Case Study 3: Climate Change Resilient Infrastructure

### Background

After speaking with community members, we found that a common desire was for more open space around ~~vacant~~~~underutilized~~ DPAs. Wanting to contribute to climate change resiliency, we researched water absorbent concrete, which is currently being used at Yellowstone National Park (Ludacer, 2017). This concrete can absorb 50 lbs of water per minute (Ludacer, 2017).

Constructing new, and upgrading current, infrastructure with this material would protect against future flooding.

### Recommended Location

**South Boston, Parcel 1** (see Appendix G). In South Boston, parcel 1 is directly adjacent to the water, which would allow the “thirsty concrete foundation” at the edge of the parcel to collect water during flooding. In addition, South Boston is a place with much development and the need for open space. Most importantly, as demonstrated by the “Boston 2070 Flood Map” in Figure 2 of the background section, South Boston is the most prone area to flooding and this climate resilient infrastructure park would provide some assistance in this future problem (MASSDOT/FHWA, 2018).

### All Parcels in Severe Flood Zones

#### Pros

- Climate Resilient
- Public Access

#### Cons

- Not Water-Dependent
- Non Maritime Use



(Ludacer, 2017)

### Recommendations

This can contribute to open space, public access, and climate resilience. A park could be constructed with the material as the foundation and on the edges. It would be easily accessible from the street if this was placed in South Boston parcel 1. Additionally, due to the construction methods of the park, future flooding would be dealt with by the “thirsty concrete”, which would diminish flooding to neighboring areas in the city. This does not qualify as a temporary use and, however, as there would be too much construction involved in this project and, as a result, DPA regulations would have to be adjusted to allow for this.

## Case Study 4: Ferris Wheel

### Background

Portbound ferris wheels are a tourist attraction that provides a high view of the adjacent water while riding and. These are commonly placed near shopping areas on ports. Examples of these can be found in San Francisco, Seattle, and Hong Kong.

### Pros

- Tourist Attraction
- Economic Benefit

### Cons

- Significant construction and maintenance
- Not climate resilient
- Not water dependent
- Not temporary
- High Cost
- Hinderance to Waterfront view



(Tripsavvy, 2018)

### Recommendations

This is not a plan that we can recommend. While this attraction would be very appealing to tourists and community members looking for exciting entertainment, it has many disadvantages. The ferris wheel is not a water-dependent use and is also not climate resilient. Furthermore, this attraction would cost a significant financial investment and it is not allowed to be in a DPA, or a Chapter 91 area, as it does not add any benefit to the community.



## Case Study 5: Community Center

### Background

Research conducted on waterfront public space has found that “to create more successful public areas, it is important to redevelop the waterfront as safe, welcoming, and accommodating for all users” (Shaziman & Usman & Tahir, Pg. 349, 2017). A waterfront community center would allow for local residents to gather along the water, and converse, and learn about DPAs and climate resilience, all of which are currently being offered at the Genoa Community Port Center (“Genoa Port Center”, n.d.). Being built within a DPA, this community center would be the perfect place to teach information about DPAs to the local community members about DPAs through discussion and through interactive displays.

### Recommended Location

**South Boston, Parcel 1** (see Appendix G)  
South Boston is the most active DPA and also has an incredible amount of high-end developments with little open space. A community center here would allow a much-needed place for local residents to converse and learn.



(“Genoa Port Center”, n.d.)

### Pros

- Educational
- Raises DPA Awareness
- Provides Communal Engagement
- Public access

### Cons

- Not a direct maritime use
- Not climate resilient unless incorporated into the construction of this center

### Recommendations

We highly recommend this option, as the community center is something that would inform the public about DPAs and its why they are important. This would address current community members who are not aware of DPA regulations as well as teaching about modern maritime uses and the value of preserving DPAs for these uses why these areas are important. Ultimately, the community educational port center would allow a space for local residents to converse and to learn.



## Appendix F: Interviewing Community Groups

### Preamble:

Thank you for participating in our project. We are Worcester Polytechnic Institute (WPI) students working on a partial graduation requirement: the Interactive Qualifying Project. The goal of this interview is to gauge the needs of the communities surrounding Boston's working waterfronts, specifically Designated Port Areas.

Information gathered in this interview will be confidential. Participation in this survey is voluntary. You may choose to stop at any time. You may choose not to answer any question without consequence.

Would you be okay with us recording this interview for personal note-keeping purposes?

### Interview Questions

1. What does [insert community group] do and what is its purpose/goal?
2. What is your role within \_\_\_\_\_?
3. We heard you have done \_\_\_\_\_ project on/around the harbor, can we hear a little more about it?
4. Are you familiar with the term Designated Port Areas (DPAs)?
5. Were you aware that (insert currently underused area of land) is currently vacant or used for parking? What are your opinions on that?
6. Are there any physical and/or psychological barriers that prevent people from accessing sections of the DPA that have public access?
7. How would you describe the Boston Waterfront/DPA in a few sentences? How much does the community understand about it?
8. Is it possible for a waterfront to be overdeveloped? If you could prioritize N number of things to change about the harbor, what would they be?
9. Would you recommend any other community groups we should get in touch with?

*N.B. Questions were added ad-lib if an interviewer had raised a point of interest to the project while answering another question.*

# Appendix G: Recommended Parcel Locations

## Case Study 2 Recommended Locations



**Case Study 3 Recommended Location**

