

Sunset Harbour Mooring Field Preliminary Analysis

June 2020

TABLE OF CONTENTS

Executive Summary 1

Context 3

Introduction 4

Example Mooring Fields 5

View of Potential Mooring Field in Miami Beach 9

Mooring Field Geometric Considerations 10

Mooring Field Buffer Requirements 11

Establishing the Study Area 12

Phasing Considerations 13

Example Layouts 14

Upland Programming 20

Dinghy Docks 21

Restrooms 22

Sewage Pump Out Facilities 23

Mechanisms for Managing Users 27

Elements of a Management Plan 28

Operation 29

Revenue 30

Regulatory Framework 31

Regulatory Permits Required 33

Opinion of Probable Costs 41

Funding Opportunities 42

Engaging the Public 43

Navigating the Process 44

Appendix A—Historical Imagery

Appendix B—Hydrographic Survey

Appendix C—Opinion of Probable Cost



MIAMIBEACH



EXECUTIVE SUMMARY

The City of Miami Beach (City) has become a popular destination for boaters and has observed an increase in demand for local anchorage. As a result, Sunset Harbour has become a popular unregulated anchorage area. Sunset Harbour is located within Biscayne Bay, an Outstanding Florida Water and a designated Critical **Habitat for Johnson's seagrass**. **The City recognizes that the increase in density of unregulated boat anchoring activity over time is unsustainable.** The increase in anchoring of vessels can exacerbate navigational/safety hazards and impacts on natural resources such as seagrass beds and water quality. The City has elected to take a proactive approach to managing this issue to the satisfaction of its residents, business and boating community, and other stakeholders.

The City adopted a resolution to explore the establishment of a public mooring field in the vicinity of Sunset Harbour. This study was prepared to inform the City of its options and to establish a framework for implementation. The City recognizes the importance of exploring various options and seeking public input into the process of developing an action plan. This study was developed **as a first step in the City's consideration of this important opportunity to serve the public and protect the environment.** The establishment of a managed mooring field offers a means by which the mooring of vessels can be regulated. A mooring field is a legally defined water area that allows vessel to be tied to an anchored mooring buoy. Regulated mooring fields have many benefits, including the following:

- Deter improperly stored, abandoned or derelict vessels,
- Increase general public safety by identifying mooring field users,
- Enhance navigational safety,
- Protect maritime infrastructure and property by providing secure moorings,
- Enrich the local economy by attracting customers to the area and providing a source of revenue for the City,
- Protect the marine environment and seagrass beds from anchor dragging,
- Provide an appropriate buffer between waterfront properties and the anchorage,
- Improve water quality by requiring sewage pump-out and preventing polluting discharges, and
- Ensure appropriate public access to waters of the State.



A mooring field includes a support facility on land that typically incorporates a dinghy dock, a sewage pump-out dock and various other amenities. As part of this analysis, upland programming at the public marina facility at Maurice Gibb Memorial Park was considered as a potential location to provide support to the mooring field.

EXECUTIVE SUMMARY

Environmental regulatory agencies have special permits and guidelines for the establishment and operation of mooring fields. This allows restrictions to be placed on anchorage and vessel movement within and adjacent to that specific area. Concurrently, a Management Plan must be developed that defines the design and operational criteria of the mooring field. The permitting process can take **one to two years due to the area being within designated Johnson's seagrass critical habitat triggering the requirement for formal consultation with the National Marine Fisheries Service.**

Three example conceptual layouts with two phases were developed for this study. Each phase outlined an area of 50 slips with a mix of different sized vessels. Maintaining access to all waterfront property owners, allowing safe access to Sunset Harbour Yacht Club, the boat ramps at Maurice Gibb Memorial Park, avoiding impact to existing navigation patterns and minimizing impact to seagrasses are main considerations to be vetted and incorporated into the design process. Establishment of a formalized channel with proper markings would be part of the mooring field design and permitting process.

The City will need to determine how to manage and fund the mooring field. A preliminary opinion of probable costs for design, permitting and construction was established to be on the order of \$630,000 for one phase of the mooring field and \$970,000 for a harbormaster building.

The City may establish a marina management team and operate the facility with in-house resources or procure a third-party management company (or nearby marina) to operate the mooring. The City can either pay the management firm a fixed annual fee or establish a percentage of the revenue to be provided as compensation. Mobile applications are now available that can limit the staffing required for the management mooring facility. Using current mooring field rates in the Miami-Dade County area and an assumed 70% occupancy with half daily and half monthly customers, the annual gross revenue for 50 slips may be approximately \$250,000.

In addition to the funding that could be available through management, other funding opportunities explored include grants from the Florida Inland Navigation District, the Florida Fish and Wildlife Conservation Commission the Florida Boating Improvement Program and the Florida Department of Environmental Protection. For planning purposes, a design, permitting and construction of a managed mooring field within the City of Miami Beach could be funded 70-80% from external sources.

The City has stated its commitment to engaging the public in the process of considering the establishment of a mooring field. The City will engage the public, including property owners, tenants, business owners and operators, public officials and agencies, facility users, interested individuals, and special interest groups, during the development of the project. Early and continuous public involvement provides a platform for stakeholders to understand project opportunities and limitations and to express their ideas, concerns and support early in the process so they can be considered throughout design phase.

CONTEXT

The City of Miami Beach (City) has become a popular destination for boaters and has observed an increase in demand for local anchorage. As a result, Sunset Harbour, adjacent to Maurice Gibb Memorial Park, located at 1700 Purdy Avenue, has become a popular unregulated anchorage area. This area generally extends from Sunset Harbour south to Lincoln Terrace. The number of boats anchoring in this area has increased substantially over the past several years. A review of historical aerial imagery confirms this trend. In a January 1995 image, only four boats were anchored in this area. The January 2003 image showed over 50 boats and the December 2014 and December 2018 images showed over 70 vessels anchored ([Appendix A](#)). Sunset Harbour is **located within Biscayne Bay, an Outstanding Florida Water and a designated critical habitat for Johnson's seagrass**. The City recognizes that the increase in density of unregulated anchoring of vessels in this area over time is unsustainable. The continued anchoring of vessels can cause navigational/safety hazards and can impact natural resources such as seagrass beds and water quality. The City has elected to take a proactive approach to managing this issue to the satisfaction of its residents, business and boating communities and other stakeholders. The City recognizes the importance of exploring various options and seeking public input into the process of developing a solution.

The Mayor and City Commission of the City adopted Resolution Number 2019-30862 in June 2019 to explore the establishment of a public mooring field in the vicinity of Sunset Harbour. This location was selected based upon its prolific use by boaters. As per the same resolution, the City retained the consulting team of E Sciences, Incorporated and Moffatt & Nichol as consultants to evaluate the steps necessary to establish a managed mooring field and to guide the City through the regulatory permitting process. The City directed the consultants to assess the needs, outline the benefits, determine the regulatory requirements, explore the physical extent of a viable area west of Maurice Gibb Memorial Park, provide example layout concepts based on common vessel sizes and physical extents, present possible options to phase expansions, investigate requirements for upland support facilities and explore management options. This information was compiled to provide a basis to inform initial discussions with the public, City staff and City officials. The preliminary analysis was not intended to determine actual mooring layouts or upland facilities, rather is a basis for the City and stakeholders to begin exploring the effort and potential value of establishing a mooring field.

The study is a first step in starting an informed conversation with stakeholders, staff and elected officials.

INTRODUCTION

The establishment of a managed mooring field offers a means by which the mooring of all vessels can be regulated. Otherwise, local governments are prohibited from regulating the anchoring of most vessels outside the boundaries of marked mooring fields by Florida law (Section 327.60(2)(f), Florida Statutes).

A mooring field is a legally defined area within a water body that is established by local ordinance. It requires a management plan to manage moored vessels and activities. Users are assigned a mooring and then they secure their boat to a permanently anchored buoy. The mooring field provides an organized and secure way to protect boats, adjacent land features and the environment. A mooring field includes a land based support facility that typically incorporates features for users such as a dinghy dock, sewage pump out (either by sewage boat or at a dock), vehicle parking and restrooms. Regulated mooring fields have many benefits, including the following:

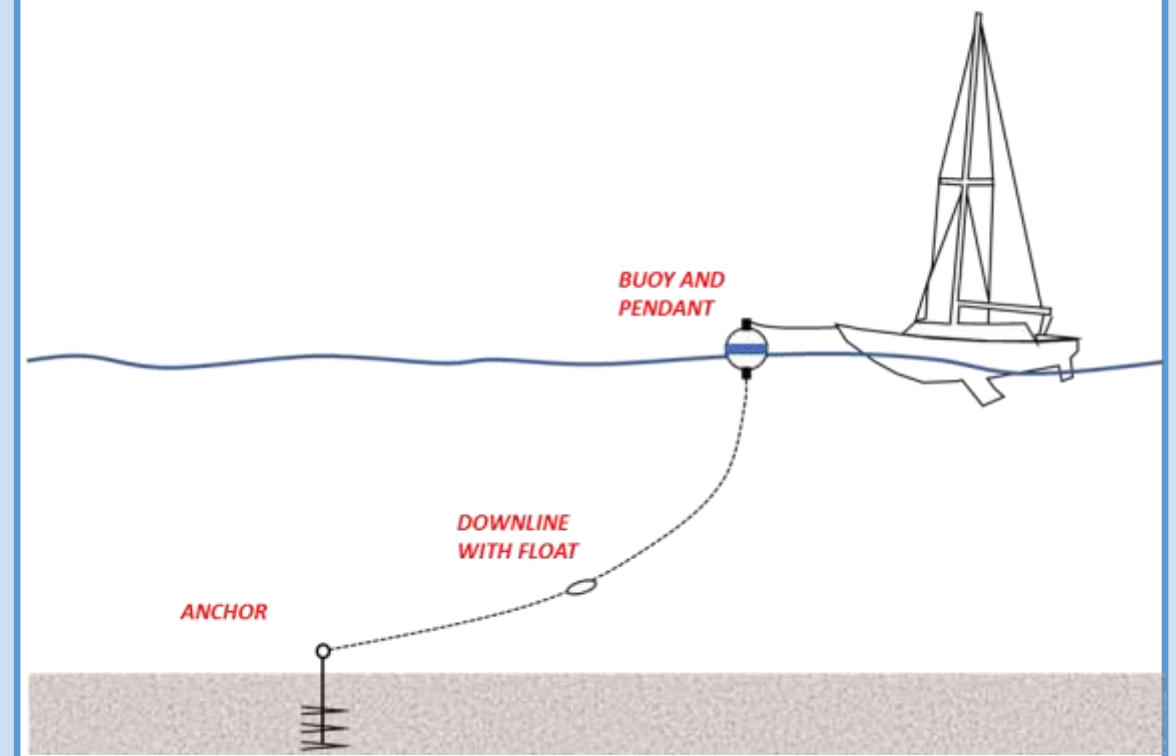
- Deter improperly stored, abandoned or derelict vessels.
- Ensure appropriate public access to waters of the State,
- Increase general public safety by identifying mooring field users,
- Enhance navigational safety,
- Protect maritime infrastructure and property by providing secure moorings,
- Enrich the local economy by attracting users and providing a source of revenue for the City,
- Protect the marine environment and seagrass beds from anchor dragging,
- Provide an appropriate buffer between waterfront properties and the anchorage, and
- Improve water quality by requiring sewage pump-out and preventing polluting discharges.

In order to reduce the impact on the seagrass beds, the team recommends that the City consider using a “conservative mooring” system with the following defining features:

Anchor: In order to minimize impact to benthic resources, galvanized helical anchors can be selected for the anchor system. The parameters of these anchors (embedment length and number and size of auger discs) are given based on the expected maximum load on the system and local soil conditions.

Downline: The downline assembly is composed of a set of shackles, thimbles and swivels that connect the elastic rode with the mooring buoy and the anchor. The elastic rode recommended consists of an elastic rode with varying rated capacities. The braided line that connects the elastic rode with the anchor shackle includes an underwater float to avoid dragging of the line in the seabed.

Buoy and pennant: The floating element generally consists of a 24-inch diameter hard shell white buoy with a pennant with a float to provide a location for the vessel to tie to the buoy.



EXAMPLE MOORING FIELD

Coconut Grove



EXAMPLE MOORING FIELD

Martin County



EXAMPLE MOORING FIELD

Sarasota



EXAMPLE MOORING FIELD

Fort Myers



VIEW OF POTENTIAL MOORING FIELD IN MIAMI BEACH

Sunset Harbour, Miami Beach



SLIP MIX		
SIZE	NO.	%
20'	3	3
30'	23	23
40'	28	28
50'	27	27
60'	19	19
TOTAL	100	100%

This graphic provides an aerial perspective of 100 boats in an established mooring field in Sunset Harbour.

NOTES

1. WATER DEPTHS ARE EXPRESSED IN FEET REFERENCED TO NAVD88.
2. EXISTING NAVIGATION CHANNEL AS DEPICTED IN NAVIONICS INC.
3. BATHYMETRIC SURVEY BY OLIN HYDROGRAPHIC, DATED OCT. 2019, SURVEYED WATER DEPTHS ARE ASSUMED TO BE REPRESENTATIVE OF ENTIRE PROJECT SITE.

CONCEPTUAL DRAWING
NOT TO BE USED FOR CONSTRUCTION

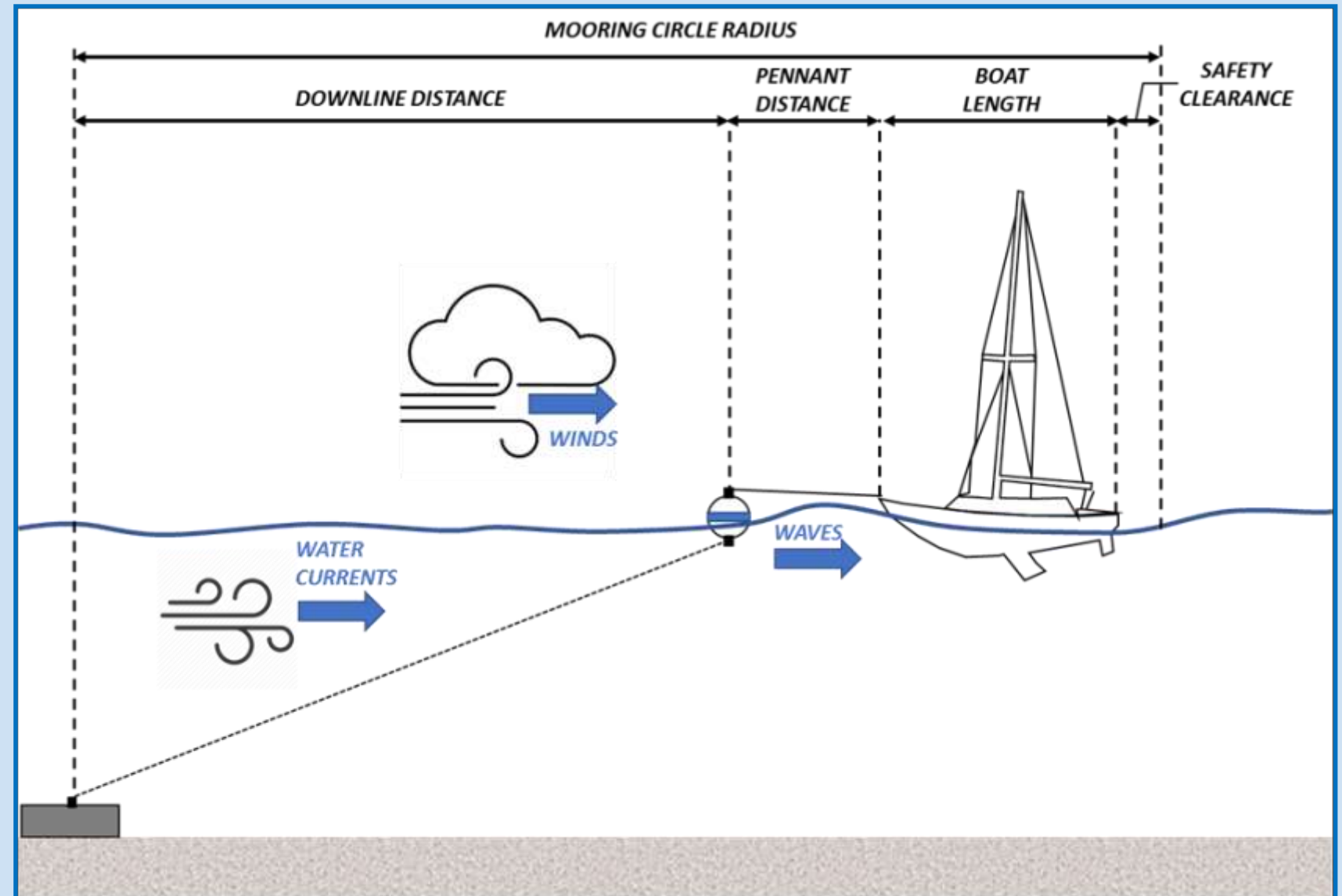


ORIGINAL SHEET SIZE EQUIVALENT (ANSI D) 34" x 22"
DRAWING SCALES ARE BASED ON THIS SHEET SIZE

File: Q:\M04\10761\0500_CAD\Active_Exhibits\1076100R16-007_Plotfile: 11/22/2019 6:31 p.m. by CARRIDO, LEONARDO; Saved: 11/22/2019 6:27 p.m. by CARRIDO

MOORING FIELD GEOMETRIC CONSIDERATIONS

Within the mooring field, the spacing and configuration of the anchorage is based upon the density, size and number of boats to be included in the area. Each boat will have a “mooring circle” radius. In order to understand the internal geometric considerations during design, it is important to understand the concept of these mooring circles. When a vessel is anchored to a mooring buoy, the entire mooring system is exposed to winds, waves and water currents. As a result of these environmental forces the vessel will move, but because it is anchored to a fixed point, the space in which it can move is a circular area. This circular area is defined as the mooring circle. An additional safety distance between mooring circles ensures that there will be no collisions between vessels.



MOORING FIELD BUFFER REQUIREMENTS

Another consideration of a mooring field's boundaries is to anticipate how the mooring field would interact with the surrounding land uses. This is accomplished by reviewing the surrounding land use, established navigational channel, watercraft uses and patterns, navigational hazards and aesthetics. Florida Statutes section 327.4109 *"Anchoring or mooring prohibited; exceptions; penalties"* provides the following limitations on anchoring or mooring:

- Within 150 feet of any marina, boat ramp, boatyard, or other vessel launching or loading facility;
- Within 100 feet outward from the marked boundary of a public mooring field; and
- Within 300 feet of a superyacht repair facility.

Additionally, the US Fish and Wildlife Conservation Commission issued a proposed report of findings and recommendations for an anchoring and mooring pilot program on December 31, 2016. They acknowledged that there is a need to provide additional safety precautions in the immediate vicinity of public mooring fields. They recommended that a universal statewide provision or a revision to the Florida statutes to allow local governments to prohibit anchoring within a 300 foot buffer around public mooring fields. This mechanism for regulation has not yet been enacted.



Mooring field boundaries, layouts, phasing and navigational constraints will be developed during future public involvement activities and design.

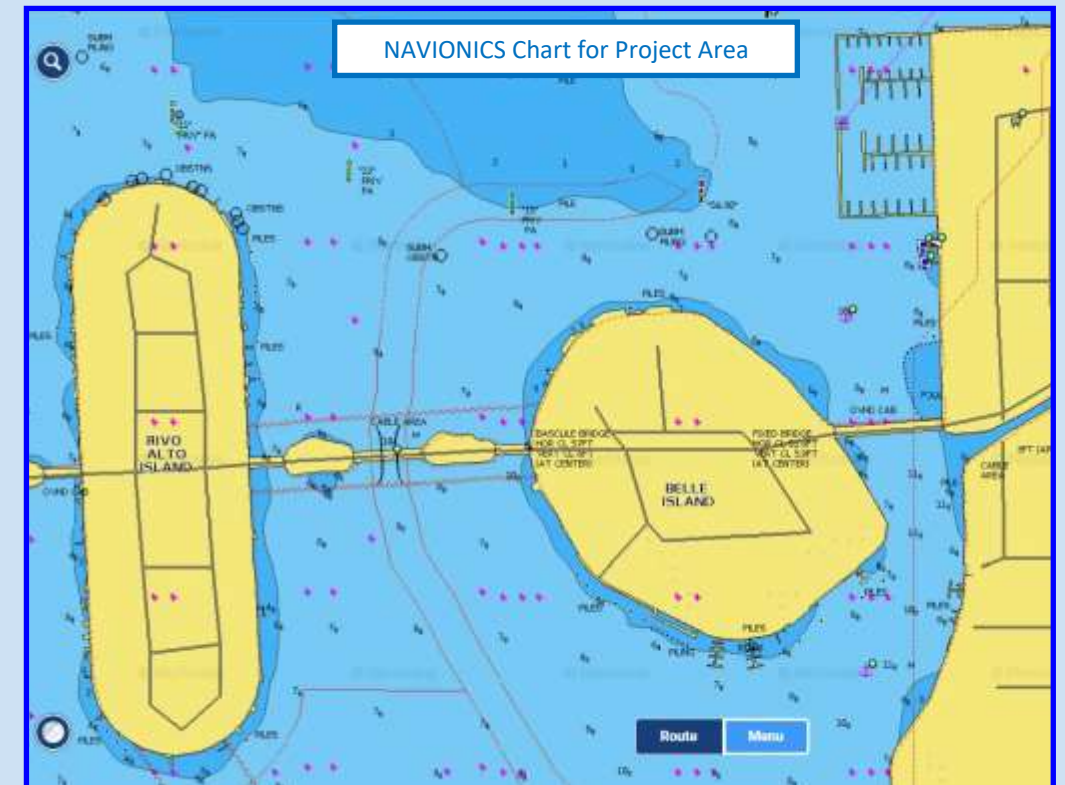
ESTABLISHING THE STUDY AREA

There are a variety of factors to be considered in determining the size and configuration of a mooring field. One of those factors is the geometry of the area. The study area was established to be the unregulated mooring area in Sunset Harbour north of Venetian Causeway based upon the following:

- Water depths were based upon the bathymetric survey (Appendix B) conducted in the project area. Local navigation charts (NAVIONICS) were used to estimate a path of an existing unregulated channel that would surround the anchorage.
- The existing regulated channel was identified on navigation charts.
- Buffers were drawn between the potential anchorage area and shorelines

The following criteria were further considered for establishing the study area:

- Maintaining access to all waterfront property owners via an 80-foot wide navigation channel,
- Allowing safe access to Sunset Harbour Yacht Club via a 110-foot wide navigation channel,
- Avoiding impact to the existing western navigation channel,
- **Allowing safe access to existing Boat Ramp at the City's Marine Patrol Docks,**
- Minimizing impact to the benthic resources (seagrass) by locating longer (deeper draft) vessels in deeper waters to assure a minimum two-foot keel distance between the lowest part of the vessel and the top of the seabed during low water conditions, and
- Limiting mooring anchors to 50 locations per phase.



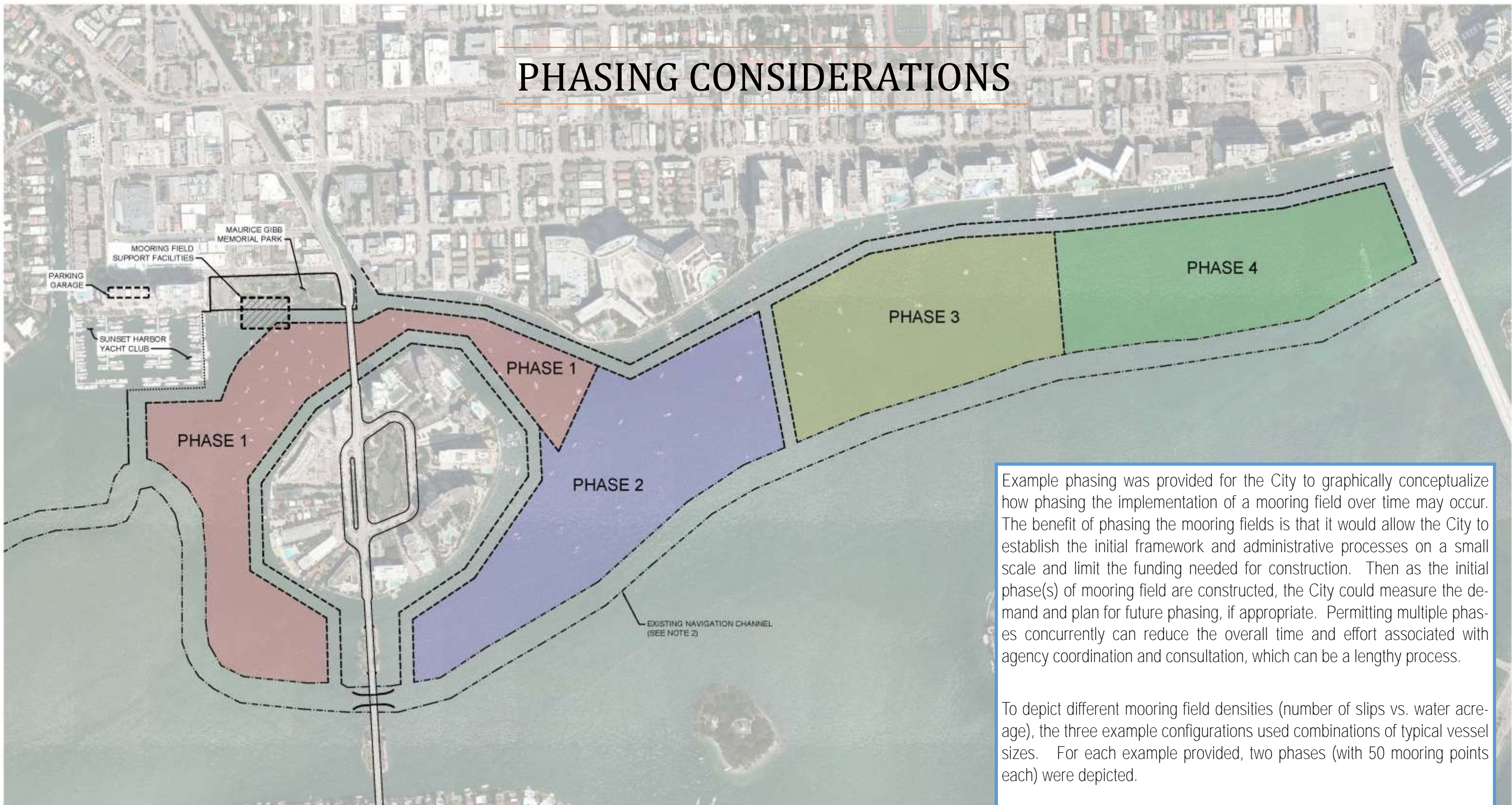
The study area became the theoretical boundary of the mooring field for the purposes of this analysis. The consultant team provided three example configurations with implementation phasing.

In order to satisfy these criteria during design, regulated navigation channels will need to be established via channel markers installation. A variety of sizes and configurations were explored and presented in the three example layouts. The graphic on the next page shows example phasing and is followed by three sets of example anchorage layouts, each with two initial phases.

The actual boundaries and configurations of any mooring field will be coordinated with stakeholders, staff and the Marine Patrol.

Mooring field boundaries, layouts, phasing and navigational constraints will be developed during future public involvement activities and design.

PHASING CONSIDERATIONS



Example phasing was provided for the City to graphically conceptualize how phasing the implementation of a mooring field over time may occur. The benefit of phasing the mooring fields is that it would allow the City to establish the initial framework and administrative processes on a small scale and limit the funding needed for construction. Then as the initial phase(s) of mooring field are constructed, the City could measure the demand and plan for future phasing, if appropriate. Permitting multiple phases concurrently can reduce the overall time and effort associated with agency coordination and consultation, which can be a lengthy process.

To depict different mooring field densities (number of slips vs. water acreage), the three example configurations used combinations of typical vessel sizes. For each example provided, two phases (with 50 mooring points each) were depicted.

[These example layouts are presented on the following pages.](#)

NOTES

1. EACH PHASE IS COMPOSED OF 50 MOORING POINTS REQUIRING APPROXIMATELY 35 ACRES OF WATER AREA.
2. EXISTING NAVIGATION CHANNEL AS DEPICTED IN NAVIONICS INC.

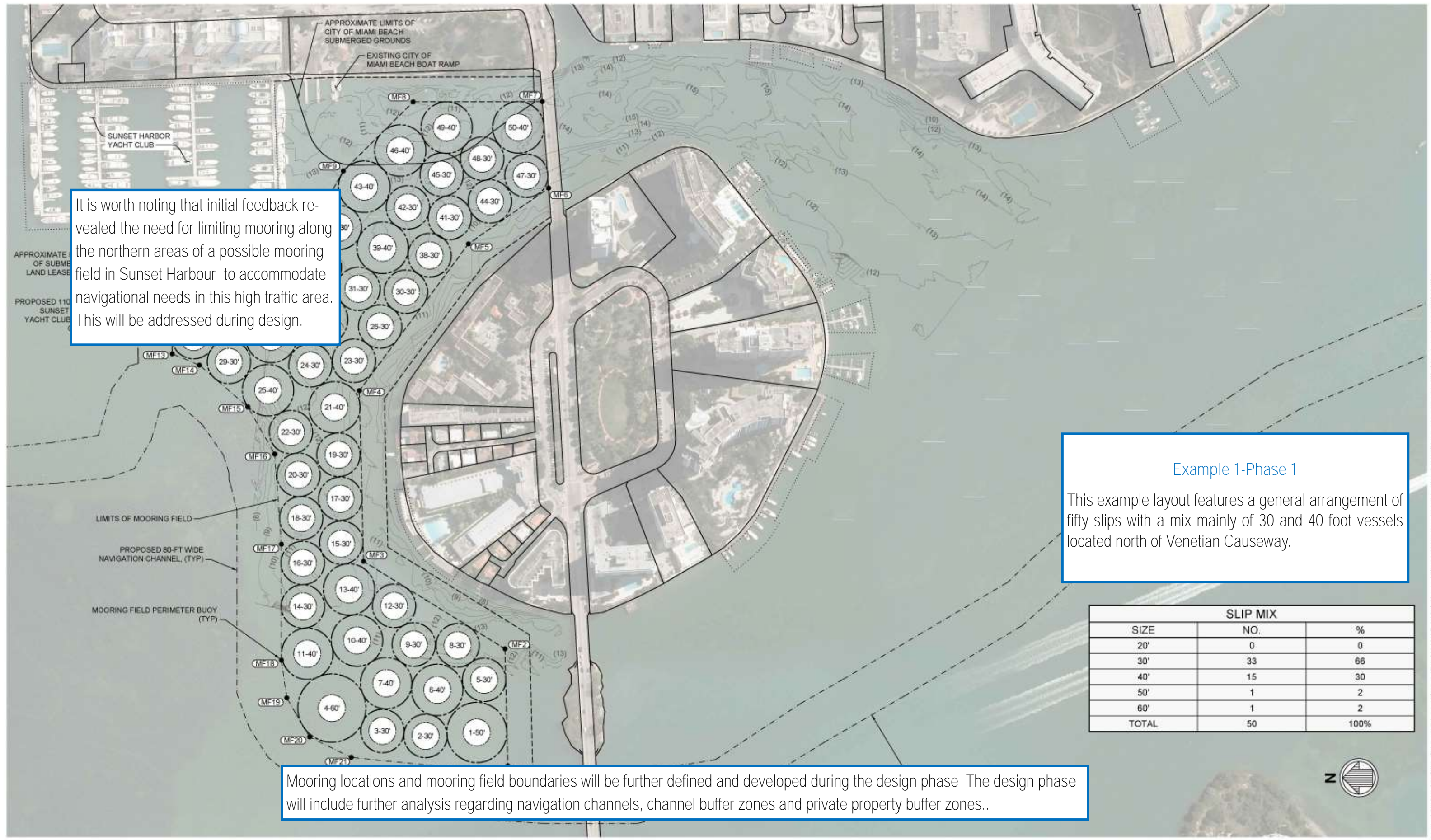
CONCEPTUAL DRAWING
NOT TO BE USED FOR CONSTRUCTION

It is worth noting that initial feedback revealed the need for limiting mooring along the northern areas of a possible mooring field in Sunset Harbour to accommodate navigational needs in this high traffic area. This will be addressed during design.

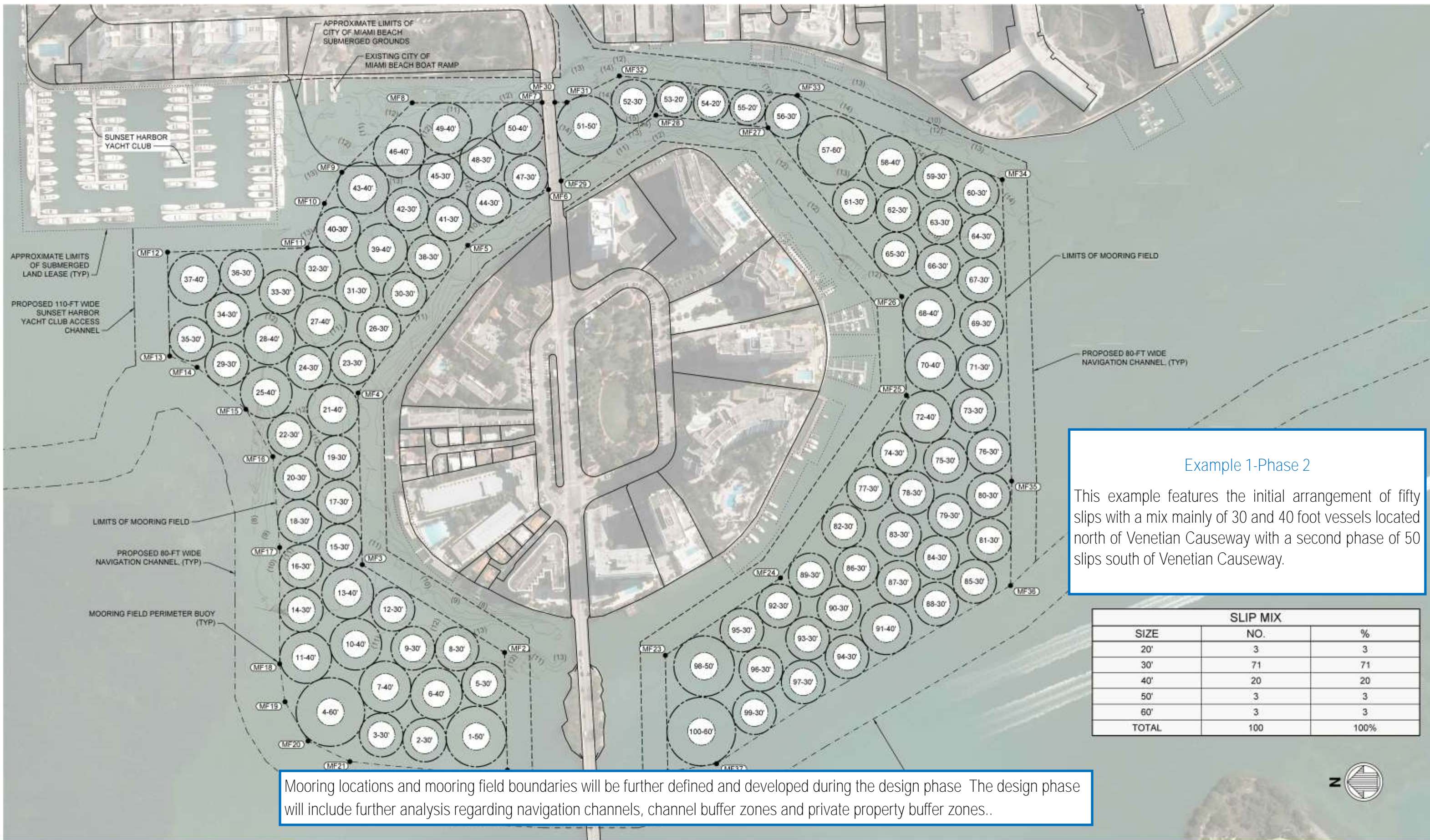
Example 1-Phase 1
 This example layout features a general arrangement of fifty slips with a mix mainly of 30 and 40 foot vessels located north of Venetian Causeway.

SLIP MIX		
SIZE	NO.	%
20'	0	0
30'	33	66
40'	15	30
50'	1	2
60'	1	2
TOTAL	50	100%

Mooring locations and mooring field boundaries will be further defined and developed during the design phase. The design phase will include further analysis regarding navigation channels, channel buffer zones and private property buffer zones..



File: G:\MIA\10781\0500_CAD\Active\Embs\1078100910-001_Ported: 11/22/2019 2:47 p. m. by GARRIDO, LEONARDO; Saved: 11/22/2019 1:10 p. m. by LGARRIDO



Example 1-Phase 2

This example features the initial arrangement of fifty slips with a mix mainly of 30 and 40 foot vessels located north of Venetian Causeway with a second phase of 50 slips south of Venetian Causeway.

SLIP MIX		
SIZE	NO.	%
20'	3	3
30'	71	71
40'	20	20
50'	3	3
60'	3	3
TOTAL	100	100%

Mooring locations and mooring field boundaries will be further defined and developed during the design phase. The design phase will include further analysis regarding navigation channels, channel buffer zones and private property buffer zones..

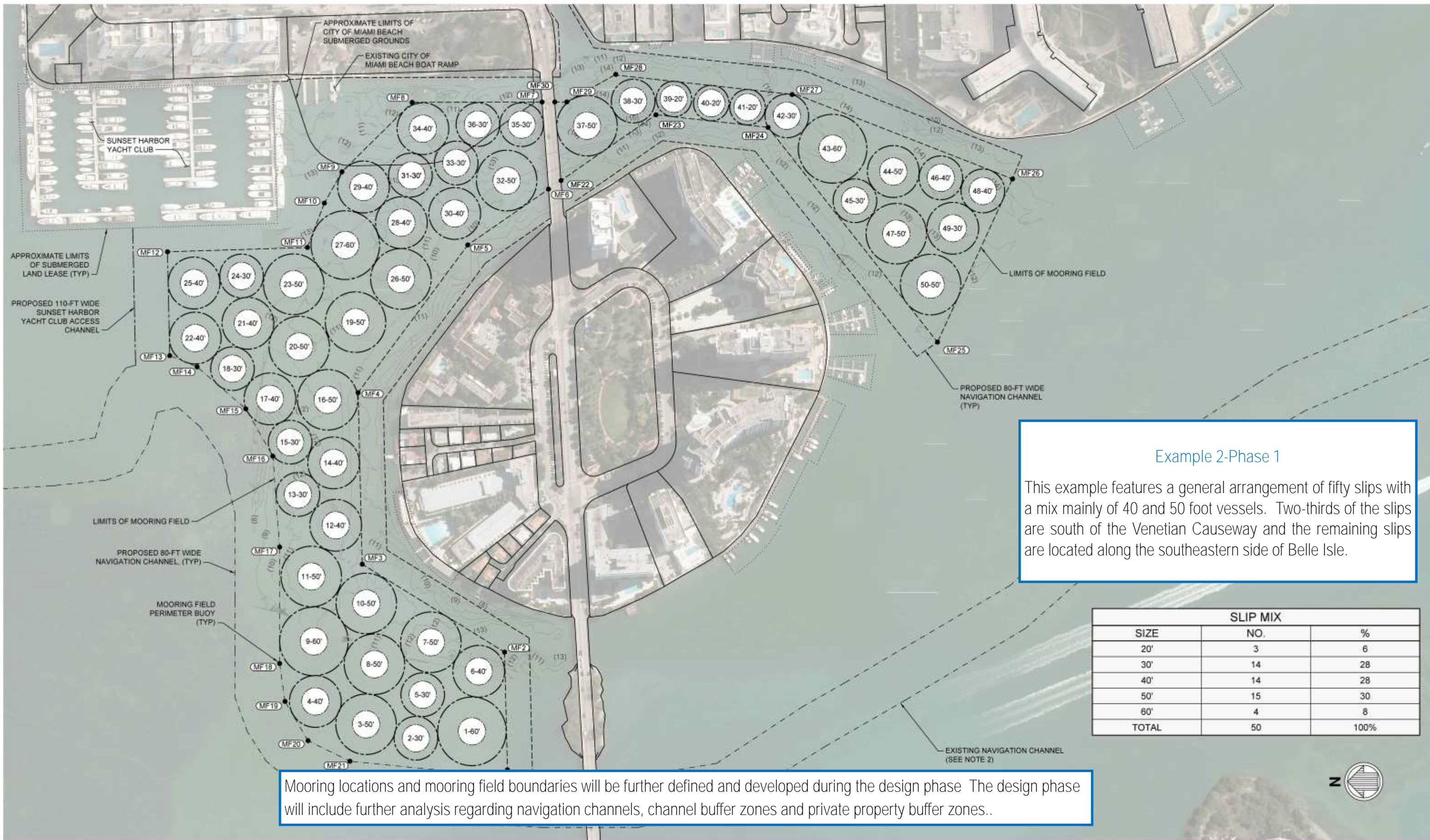
NOTES

1. WATER DEPTHS ARE EXPRESSED IN FEET REFERENCED TO NAVD88.
2. EXISTING NAVIGATION CHANNEL AS DEPICTED IN NAVIONICS INC.
3. BATHYMETRIC SURVEY BY OLIN HYDROGRAPHIC, DATED OCT. 2019, SURVEYED WATER DEPTHS ARE ASSUMED TO BE REPRESENTATIVE OF ENTIRE PROJECT SITE.

**CONCEPTUAL DRAWING
NOT TO BE USED FOR CONSTRUCTION**



File: G:\MIA\107961\0502_CAD\Active\Exhibits\10796100RFG-002_Plotfile: 11/22/2019 6:33 p. m. by GABERDQ, LEONARDO; Saved: 11/22/2019 6:08 p. m. by LCAFRDQ



Example 2-Phase 1

This example features a general arrangement of fifty slips with a mix mainly of 40 and 50 foot vessels. Two-thirds of the slips are south of the Venetian Causeway and the remaining slips are located along the southeastern side of Belle Isle.

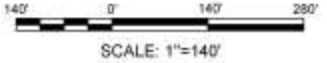
SLIP MIX		
SIZE	NO.	%
20'	3	6
30'	14	28
40'	14	28
50'	15	30
60'	4	8
TOTAL	50	100%

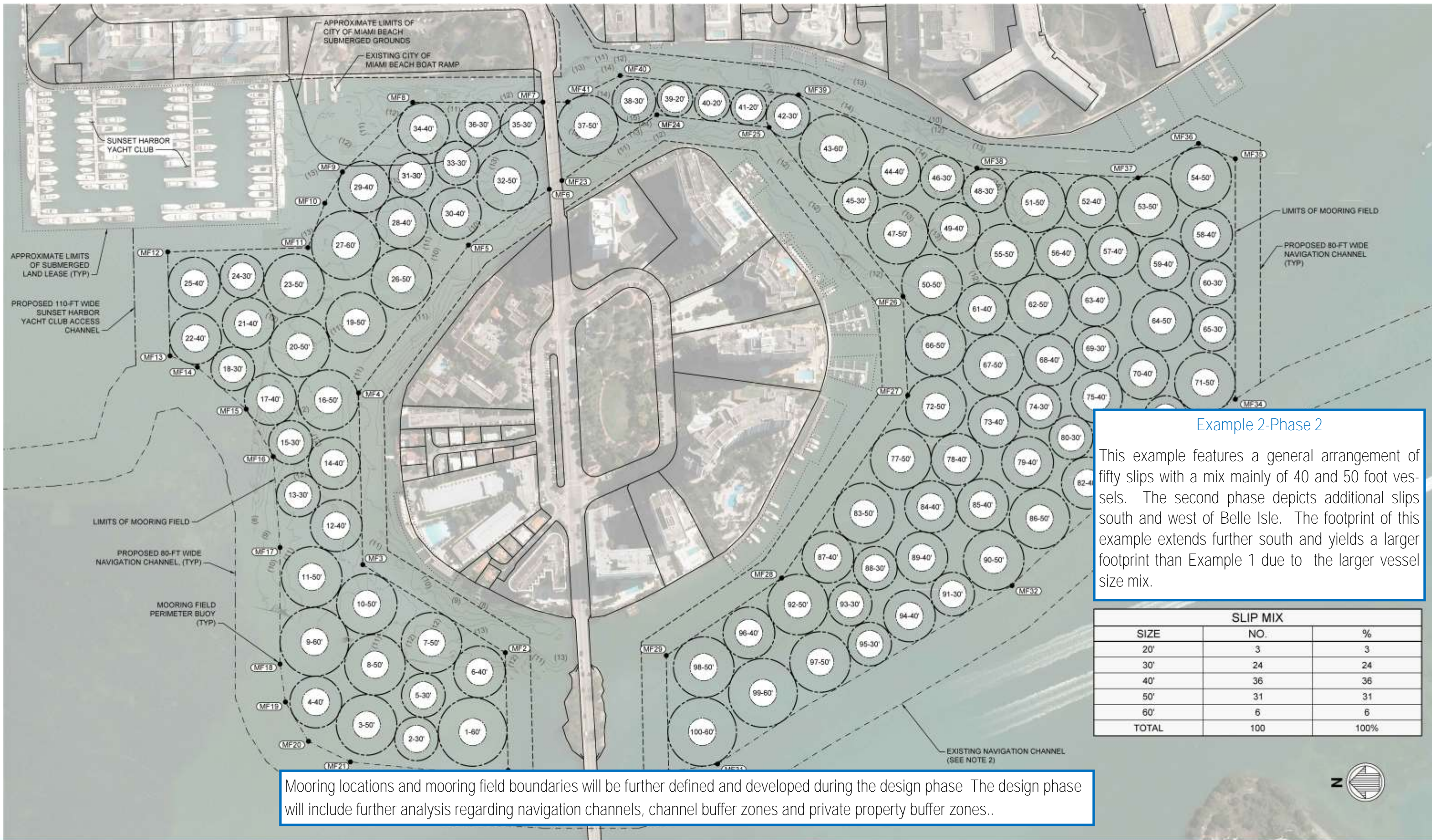
Mooring locations and mooring field boundaries will be further defined and developed during the design phase. The design phase will include further analysis regarding navigation channels, channel buffer zones and private property buffer zones..

NOTES

1. WATER DEPTHS ARE EXPRESSED IN FEET REFERENCED TO NAVD88.
2. EXISTING NAVIGATION CHANNEL AS DEPICTED IN NAVIONICS INC.
3. BATHYMETRIC SURVEY BY OLIN HYDROGRAPHIC, DATED OCT. 2019, SURVEYED WATER DEPTHS ARE ASSUMED TO BE REPRESENTATIVE OF ENTIRE PROJECT SITE.

**CONCEPTUAL DRAWING
NOT TO BE USED FOR CONSTRUCTION**





Example 2-Phase 2

This example features a general arrangement of fifty slips with a mix mainly of 40 and 50 foot vessels. The second phase depicts additional slips south and west of Belle Isle. The footprint of this example extends further south and yields a larger footprint than Example 1 due to the larger vessel size mix.

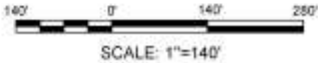
SLIP MIX		
SIZE	NO.	%
20'	3	3
30'	24	24
40'	36	36
50'	31	31
60'	6	6
TOTAL	100	100%

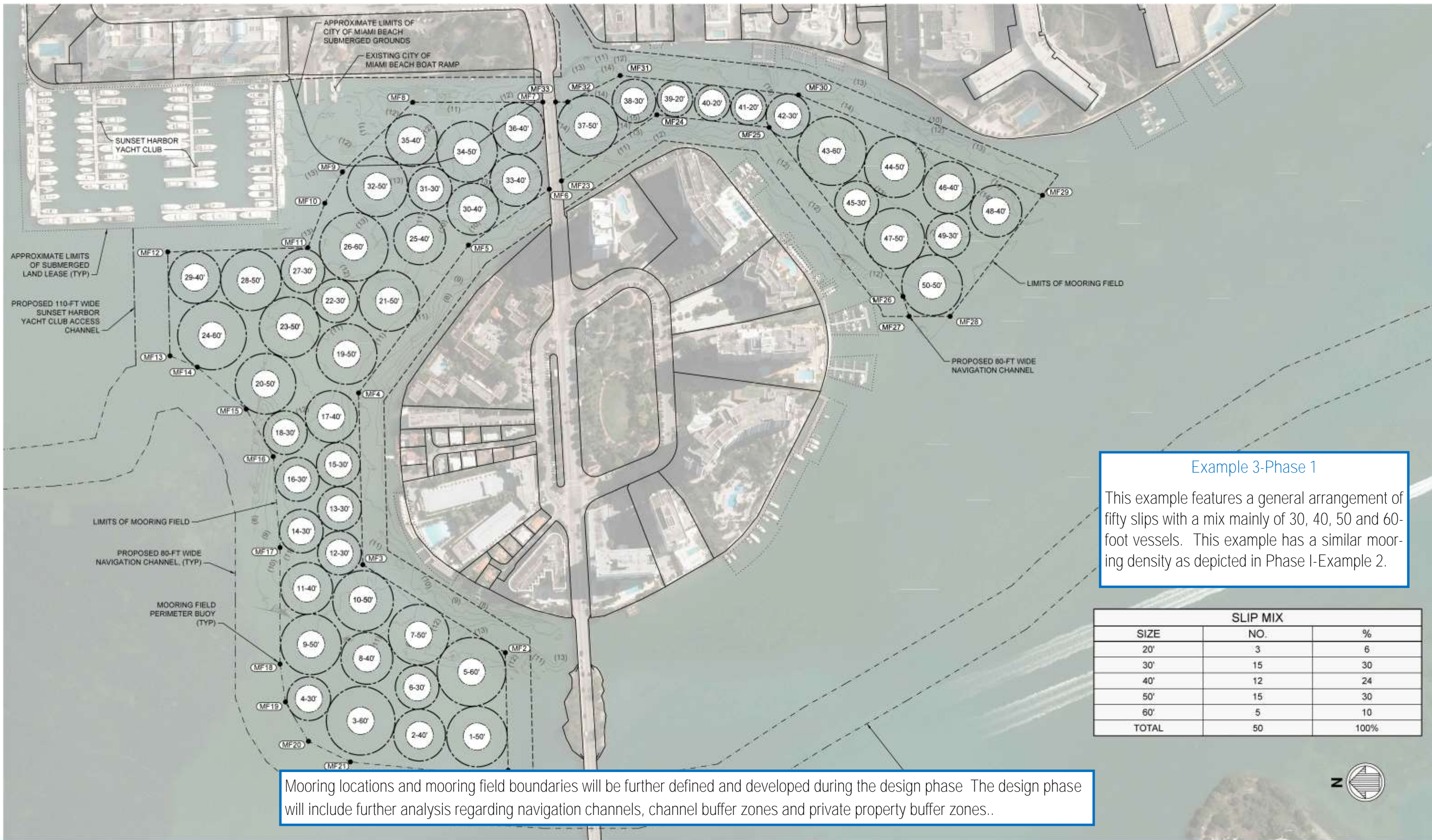
Mooring locations and mooring field boundaries will be further defined and developed during the design phase. The design phase will include further analysis regarding navigation channels, channel buffer zones and private property buffer zones..

NOTES

1. WATER DEPTHS ARE EXPRESSED IN FEET REFERENCED TO NAVD88.
2. EXISTING NAVIGATION CHANNEL AS DEPICTED IN NAVIONICS INC.
3. BATHYMETRIC SURVEY BY OLIN HYDROGRAPHIC, DATED OCT. 2019, SURVEYED WATER DEPTHS ARE ASSUMED TO BE REPRESENTATIVE OF ENTIRE PROJECT SITE.

**CONCEPTUAL DRAWING
NOT TO BE USED FOR CONSTRUCTION**





Example 3-Phase 1

This example features a general arrangement of fifty slips with a mix mainly of 30, 40, 50 and 60-foot vessels. This example has a similar mooring density as depicted in Phase I-Example 2.

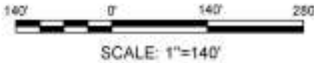
SLIP MIX		
SIZE	NO.	%
20'	3	6
30'	15	30
40'	12	24
50'	15	30
60'	5	10
TOTAL	50	100%

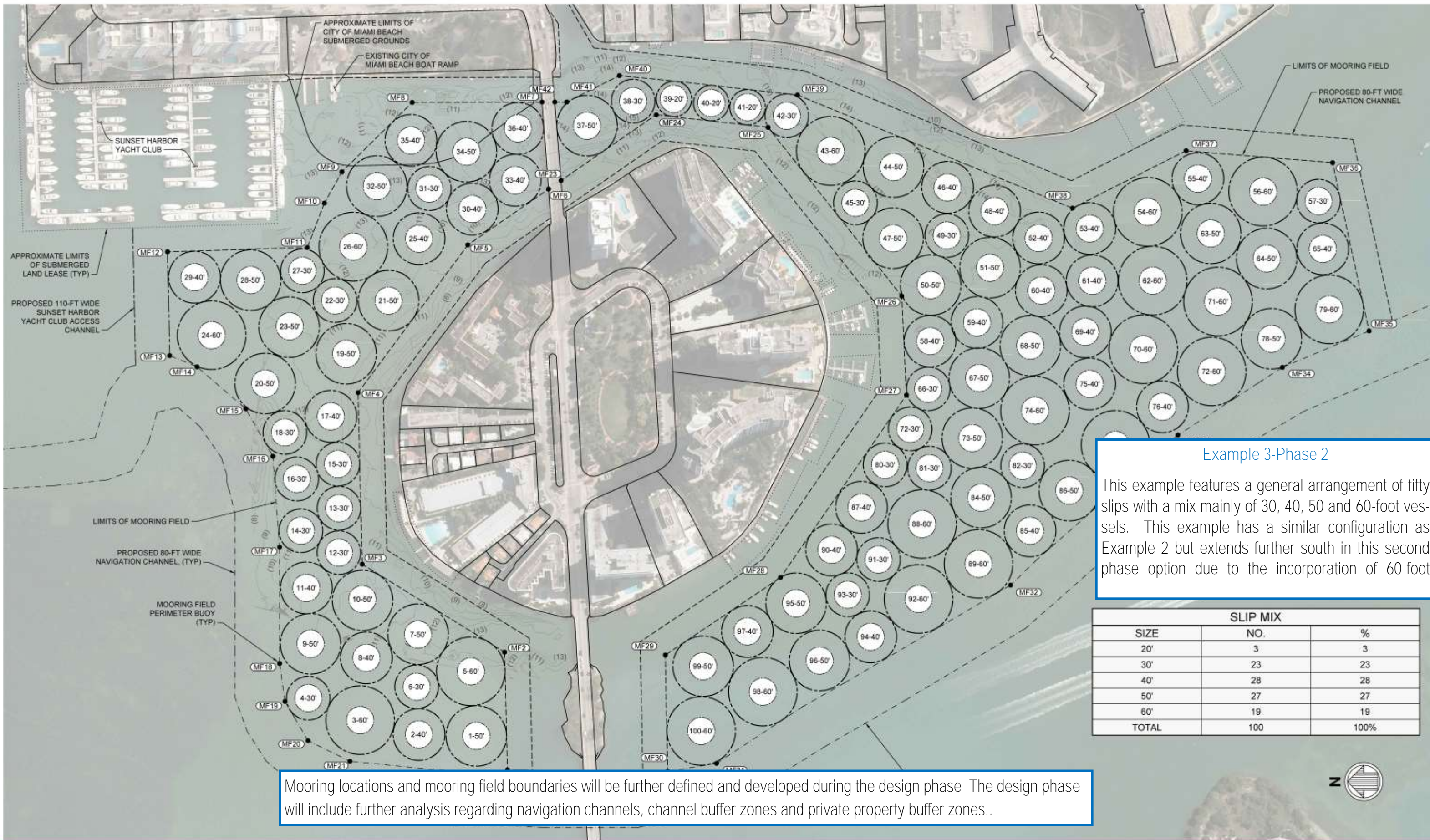
Mooring locations and mooring field boundaries will be further defined and developed during the design phase. The design phase will include further analysis regarding navigation channels, channel buffer zones and private property buffer zones..

NOTES

1. WATER DEPTHS ARE EXPRESSED IN FEET REFERENCED TO NAVD88.
2. EXISTING NAVIGATION CHANNEL AS DEPICTED IN NAVIONICS INC.
3. BATHYMETRIC SURVEY BY OLIN HYDROGRAPHIC, DATED OCT. 2019, SURVEYED WATER DEPTHS ARE ASSUMED TO BE REPRESENTATIVE OF ENTIRE PROJECT SITE.

**CONCEPTUAL DRAWING
NOT TO BE USED FOR CONSTRUCTION**





Example 3-Phase 2

This example features a general arrangement of fifty slips with a mix mainly of 30, 40, 50 and 60-foot vessels. This example has a similar configuration as Example 2 but extends further south in this second phase option due to the incorporation of 60-foot

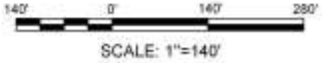
SLIP MIX		
SIZE	NO.	%
20'	3	3
30'	23	23
40'	28	28
50'	27	27
60'	19	19
TOTAL	100	100%

Mooring locations and mooring field boundaries will be further defined and developed during the design phase. The design phase will include further analysis regarding navigation channels, channel buffer zones and private property buffer zones..

NOTES

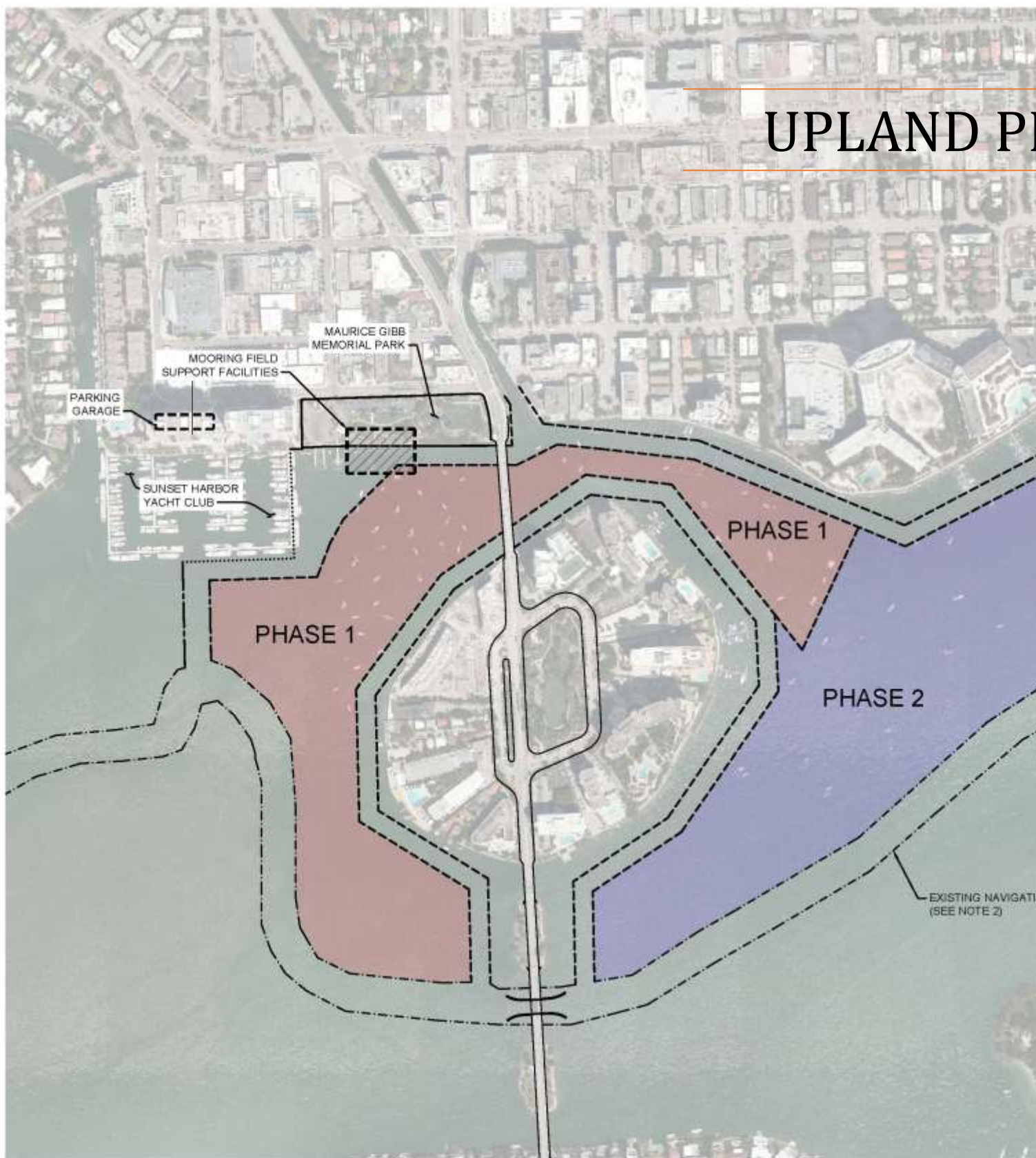
1. WATER DEPTHS ARE EXPRESSED IN FEET REFERENCED TO NAVD88.
2. EXISTING NAVIGATION CHANNEL AS DEPICTED IN NAVIONICS INC.
3. BATHYMETRIC SURVEY BY OLIN HYDROGRAPHIC, DATED OCT. 2019, SURVEYED WATER DEPTHS ARE ASSUMED TO BE REPRESENTATIVE OF ENTIRE PROJECT SITE.

**CONCEPTUAL DRAWING
NOT TO BE USED FOR CONSTRUCTION**



File: Q:\M06\10781\0500_CAD\Active_Examples\107810001G-006_Plot.mxd; Plotter: 11/22/2019 6:36 p. m. by GARRIDO, LEONARDO; Saved: 11/22/2019 6:08 p. m. by LCARRIDO

UPLAND PROGRAMMING



Mooring fields require the following upland facilities to support operations but also to provide amenities for monthly or daily customers:

- Dinghy dock for access to upland facilities
- Sewage pump out/pump out vessel and landing platform

The following upland facilities are recommended to provide amenities to customers:

- Potable Water
- Restrooms - Recommendations for number of restrooms is provided on page 22,
- Parking - For wet slips, the requirement is one space per two slips. Sufficient parking would be provided with 30-40 spaces for up to 100 moorings, as many of the moorings would be for daily use (not likely have a car). The Purdy Avenue garage would fulfill this requirement if a drop off zone is established. The City would promote alternative transportation with ride sharing, bicycles, and shuttles.

Amenities that could encourage longer term customers include the following

- Showers—Recommendations for number of showers is provided on page 22.
- Laundry facilities

A harbor master office is ordinarily provided unless technology supported management is used in lieu of on-site staffing. The Future Phasing and Upland Facilities figure includes an area within Maurice Gibb Memorial Park to serve as an upland support facility for the initial phase, along with potential future phases, of the mooring field. The park houses a boat ramp on the north portion of the property. The property features a public dock and boat ramp and two docks dedicated to the Miami Beach Marine Patrol. Both vehicle and boat trailer parking, a small restroom and office space for the Marine Patrol are also within this portion of the park. A building to service the mooring field, with an approximate square footage of 1,000 to 1,500 that could support 100-150 slips is desired.

Design of upland facilities will be developed and informed by public involvement activities.

NOTES

1. EACH PHASE IS COMPOSED OF 50 MOORING POINTS REQUIRING APPROXIMATELY 35 ACRES OF WATER AREA.
2. EXISTING NAVIGATION CHANNEL AS DEPICTED IN NAVIONICS INC.

**CONCEPTUAL DRAWING
NOT TO BE USED FOR CONSTRUCTION**

File: G:\MMA\10787\0500_CAD\Active_Exhibits\107870070-008_Plot02 2/10/2020 4:53 PM by SMITH, ANTHONY R.; Saved: 2/10/2020 4:52 PM by ARSMITH

DINGHY DOCKS



Dinghy docks can accommodate several dinghies because they do not require individual slips like regular boat docks.

Dinghy docks provide users with access to shore and upland support facilities.

RESTROOMS

According to industry guidelines (ASCE Manual 50), for planning-level purposes these are the number of recommended restrooms fixtures based on the number of anchorages.

RECOMMENDED NUMBER OF RESTROOM FIXTURES BASED ON NUMBER OF ANCHORAGES				
Number of Anchorages	Toilets and Urinals		Showers	
	Men	Women	Men	Women
≤ 25	1	1	1	1
26-50	2	2	1	1
51-80	2-3	2-3	2	2
81-125	3	3	2-3	2-3
126-200	4	4	3	3
>200	1 for every 50 anchorages		2 for every three toilets	

The restrooms at Maurice Gibb Park can be used to support a Mooring Field.

SEWAGE PUMP OUT FACILITIES

The City could elect to have a stationary sewage pump out facility or operate a sewage pump out boat. This table shows other how other Miami-Dade County facilities are handling their pumpout needs.

Pumpout Facilities in Miami-Dade County		
Facility	Type	Cost
Miamarina at Bayside	Stationary	\$5/pumpout
Dinner Key Mooring Field	Stationary is out of service since Hurricane Irma	
	Pumpout Boat available 3 times/week	Free
Coconut Grove Sailing Club Mooring Field	Stationary	\$25 for 15 minutes at dock (including water) or free to members
Pelican Harbor Marina	Stationary	\$5/pumpout

SEWAGE PUMP OUT FACILITIES



These photographs show examples of stationary sewage pump out facilities. These are located (from left to right) at City of Hallandale Beach, Mariner Cay in Martin County, Titusville and Saint Augustine.

SEWAGE PUMP OUT FACILITIES



This photograph shows an example of a sewage pump out system that was funded by the Florida Inland Navigation District. The center of the photo shows a mobile cart that is used to connect the boat to the municipal sewer line. The influent line is run along the dock down to the boat to be pumped. Then the effluent line runs from the cart to the sewer line, is connected on the left to the sewage disposal line.

SEWAGE PUMP OUT FACILITIES



This photo shows an example of a sewage pump out boat. These boats pump sewage from moored vessels and pump the sewage to a land-based station for disposal.

MECHANISMS FOR MANAGING USERS

Other local governments in Florida have elected to regulate user behaviors of their mooring fields through language in their ordinances, Mooring Field Management Plan and user agreements such as the following:

- Noise
- Rowdy Conduct
- Hanging Laundry
- Repairing vessels
- Advertising or Soliciting
- Leashing Pets
- Operational Hours for Noise & Machinery
- Grilling
- Fishing in designated areas, or not at all
- Swimming
- Feeding Wildlife



It is recommended that the City develop a management plan and a mooring field user agreement and as necessary enact ordinances or codes to specifically regulate activities in the mooring field.

Staff would work with City attorney, harbormaster and Marine Patrol to establish mechanism to manage and control users.

ELEMENTS OF A MANAGEMENT PLAN

A Mooring Field Management Plan is necessary in order to obtain a state permit. Because this is a condition of the permit, the following operational criteria, at a minimum, must be included in the Management Plan:

- The City must operate and maintain the mooring field and support facility for the life of the facility in accordance with applicable rules and regulations,
- Occupied vessels must have their holding tanks pumped out at least every seven days,
- The City must provide for the regular collection of solid waste, sewage, and recyclable goods,
- The City must provide information to users explaining ways to minimize discharges of grey water, including use of land-based support facilities,
- Prohibition of major boat repair or maintenance, fueling activities and boat hull scraping or painting,
- Identification of educational information, brochures or signs (kiosks) that will be provided to users regarding:
 - The operational provisions and restrictions associated with use of the mooring field and land-based facility,
 - Navigational ingress and egress to the mooring field and support facility,
 - Location and availability of sewage pumpout facilities and procedures,
 - Prohibitions on discharging trash, sewage and hazardous wastes into the water,
 - Seagrasses, corals and other natural resources in the area, their importance to water resources and avoidance of impacts, and
 - Manatee Speed Zones and manatee protection.

OPERATION

The City will need to determine how to manage the mooring field with the initial phase and with potential future phases. Options to consider for management of the mooring field are presented below.

- The City may establish a marina management team and operate the facility with in-house resources.
- The City may procure a third-party management company to operate the mooring field for 10 years (or more), with options to extend. The City can either pay the management firm a fixed annual fee or establish a percentage of the revenue to be provided as compensation.
- The City may contract with another nearby marina to operate the facility. This arrangement would be similar to the third-party management approach.

Mobile applications are now available that can limit the staffing required for the management mooring facility. Patrons can reserve and pay for slips by using the app. Access to the upland amenities can also be provided through the app. A harbormaster is required to manage the facility and to assist mooring field customers generally during business hours. The number of management staff is dependent on the number of slips, and one harbormaster is sufficient for 50-100 moorings. An assistant would be recommended for up to another 100 moorings, and a seasonal deckhand is also recommended. The app would facilitate mooring field and amenities management off hours, and could also allow for a part-time harbor-master.

REVENUE

Current mooring field rates in the Miami-Dade County area range from \$24.20 to \$27.75 per day for daily customers and \$211.75 to \$376 per month for longer term customers. Using the higher rates and an assumed 70% occupancy with half daily and half monthly customers, the annual gross revenue for 50 slips may be approximately \$250K. If future phases are constructed to 150 slips, using the same ratios the gross revenue is approximately \$750K. The following typical mooring rates in Miami-Dade County:

The City has the flexibility to set its own rate schedule

Mooring Rates in Miami-Dade County		
Facility	Type	Cost
Miamarina at Bayside	Annual – non-liveaboard	\$23.00 per ft./month
	Annual – commercial	\$25.00 per ft./month
	Short Term – overnight	\$5.00 per ft./night
	Short Term – monthly	\$42.00 per ft./month
Dinner Key Marina	Annual – non-liveaboard	\$23.00 per ft./month
	Annual – liveaboard	\$24.00 per ft./month
	Annual – commercial	\$25.00 per ft./month
	Short Term – overnight	\$5.00 per ft./night
	Short Term – monthly	\$42.00 per ft./month
Dinner Key Mooring Field	Overnight	\$27.75/night
	Monthly	\$376/month
Coconut Grove Sailing Club Mooring Field	Monthly mooring rates	\$70 FOM* fee + \$9.25/ft.
	Short Term Moorings	\$1.00 per ft./day
Pelican Harbor Marina	Daily short term	\$1.00 per ft./day
	Monthly short term – daily	\$24.20 per day
	Monthly	\$582.62 per month

REGULATORY FRAMEWORK

State and Federal agencies require special permits and adherence to regulatory guidelines for the establishment of mooring fields. In concert, they define the mechanisms by which a mooring field may be created and governed. The City will need to pass a resolution designating an area as a mooring field. This allows restrictions to be placed on anchorage and vessel movement within and adjacent to that specific area. Concurrently, a Management Plan must be developed that defines the design and operational criteria of the mooring field.

Considerations for the design and operation of a mooring field include siting of mooring buoys and land-side support facilities, determining the number and size of vessels to be moored, designing the mooring system to be installed, designating locations for navigational markers and signs, and developing environmental education media, solid waste and recyclable collection, and sewage pumpout methods and operations.

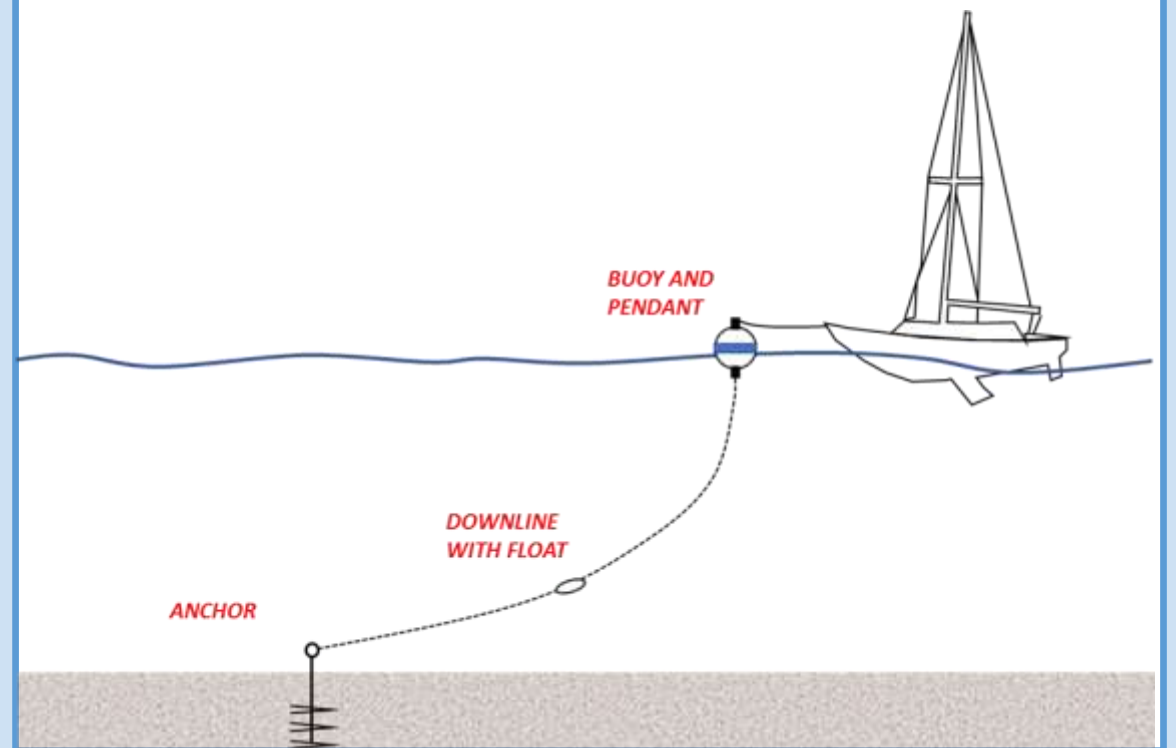
Although mooring fields are deemed to be beneficial to the environment as compared to unregulated anchoring, acquisition of environmental permits from State, Federal and County regulatory agencies will be necessary. A reconnaissance survey of the area for submerged protected natural resources confirmed the presence of seagrass in the potential mooring field area.

In order to reduce the impact on the seagrass beds, the team recommends that the City consider using a “conservative mooring” system with the following defining features:

Anchor: In order to minimize impact to benthic resources, galvanized helical anchors can be selected for the anchor system. The parameters of these anchors (embedment length and number and size of auger discs) are given based on the expected maximum load on the system and local soil conditions.

Downline: The downline assembly is composed of a set of shackles, thimbles and swivels that connect the elastic rode with the mooring buoy and the anchor. The elastic rode recommended consists of an elastic rode with varying rated capacities. The braided line that connects the elastic rode with the anchor shackle includes an underwater float to avoid dragging of the line in the seabed.

Buoy and pennant: The floating element generally consists of a 24-inch diameter hard shell white buoy with a pennant with a float to provide a location for the vessel to tie to the buoy.



REGULATORY FRAMEWORK

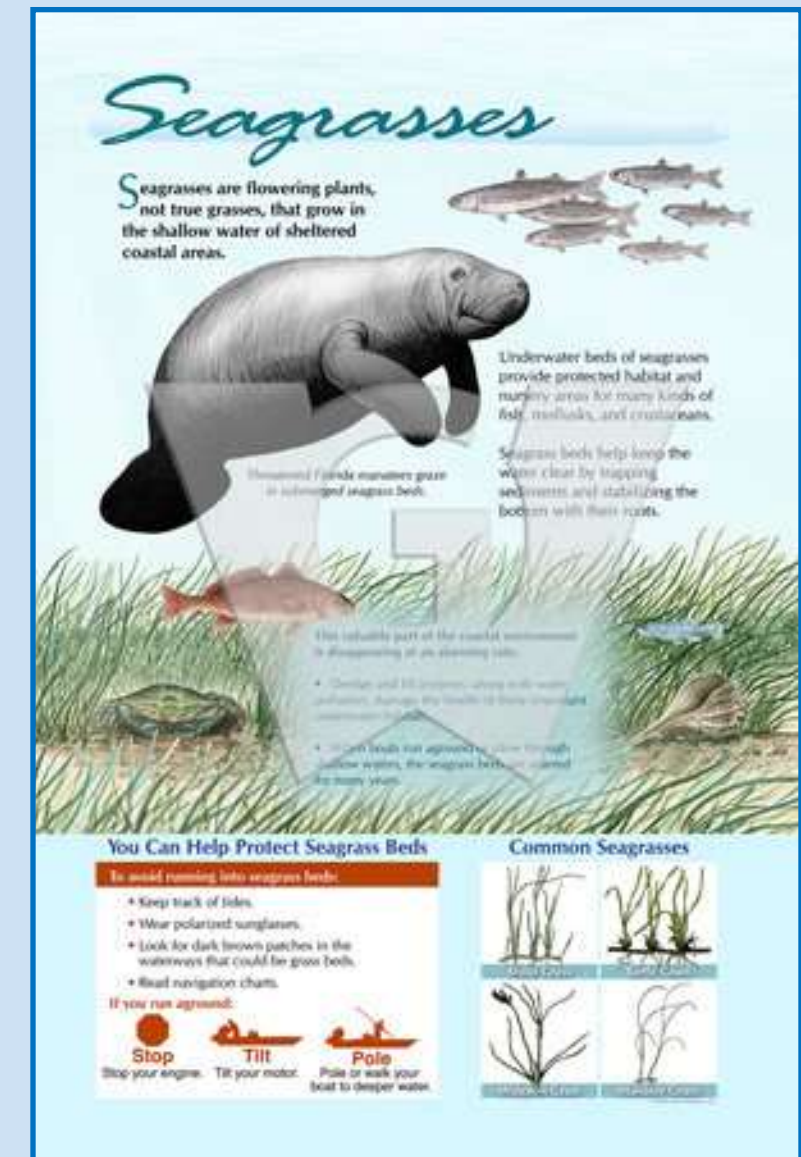
The permits and their respective authority include the following:

- [General Environmental Resource Permit \(ERP\)](#) – Florida Department of Environmental Protection (FDEP);
- [Florida Uniform Waterway Markers \(FUWM\) Permit](#) – Florida Fish and Wildlife Conservation Commission (FWC), Division of Law Enforcement, Boating and Waterways Section;
- [Nationwide Permit \(NWP\)-9](#): Structures in Fleeting and Anchorage Areas and [NWP-1](#): Aids to Navigation, US Army Corps of Engineers (USACE);
- [Private Aids to Navigation \(PATON\) Permit](#) – U.S. Coast Guard; and
- [Class I Coastal Construction Permit](#) – Miami-Dade County Department of Regulatory and Economic Resources (RER).

The above permits are reliant on review and approval by commenting agencies or other departments within their own agency and can therefore take one to two years to obtain. Therefore, the following authorizations are also particularly relevant to this project:

- The FDEP ERP is contingent on Sovereignty (State-owned) Submerged Lands Proprietary Authorization.
- The USACE will require consultation with the National Marine Fisheries Service (NMFS) because Sunset Harbour is located in designated Johnson’s seagrass Critical Habitat. NMFS will also consult with their Navigation Section in Jacksonville.

These permits and authorizations are discussed in more detail in the Regulatory Permits Required section.



REGULATORY PERMITS REQUIRED

As mentioned previously, there are a number of Federal, State and County environmental permits required to construct and operate a mooring field. The following outlines the different permitting criteria that would apply to this project.

[Florida Department of Environmental Protection \(FDEP\) General Environmental Resource Permit](#)-Under Rule 62-330.420 Florida Administrative Code (F.A.C.), a general permit is granted to any local government to construct, operate, and maintain a public mooring field for up to 100 vessels, including a dinghy and sewage pumpout dock directly supporting the mooring field. To gain authorization for this permit, a Notice of Intent to Use a General Environmental Resource Permit is submitted to the FDEP, preferably online through the FDEP Business Portal (<https://www.fldepportal.com/go/>). The additional information to be submitted with the Notice of Intent includes the following:

- Mooring Field Management Plan;
- scaled bathymetry plan of the mooring field, channels and shore-side docks;
- benthic resources inventory; and
- support drawings, documents and details of the proposed mooring field, upland-based support facility and in-water navigational signs and markers.

There are siting criteria for the location of the mooring field and upland support facility depending on the number, type and size of vessels. This siting criteria was taken into account during the development of the conceptual alternatives for this study.



REGULATORY PERMITS REQUIRED

Design and operational criteria are described in the Rule and are to be incorporated into the Management Plan. Design criteria include the following:

- A limit of 100 vessels;
- Mooring systems that can withstand tropical storm force winds, at a minimum, and do not scour the bottom;
- A landing platform or dinghy dock for users to access the support facility;
- A dock for a fixed sewage pumpout or for mooring a pumpout vessel;
- Markings of the outside boundaries of the mooring field (discussed below);
- No additional dredging except for installation of mooring field appurtenances; and
- Conformance with the State-approved Manatee Protection Plan.

The duration of a General ERP is five years to construct from the date the Agency verifies compliance with the terms and conditions of the general permit. Operation and maintenance continue in perpetuity after construction is completed. A permit modification can be obtained if the management plan needs to be updated or changed.

Commenting Agencies-The FDEP may also consult with the FWC Imperiled Species Management Section regarding the effects of the project on the West Indian manatee and other listed threatened and endangered species. The FDEP will also request comments **from the Division of Historical Resources on the projects' potential effects on historic resources in the vicinity of the project.** Miami Beach has many historic districts, linear resources and structures; however, this project is not anticipated to have an effect on historic resources.



REGULATORY PERMITS REQUIRED

Sovereignty Submerged Lands Lease-Concomitant with the FDEP General Permit application process, the FDEP will process a sovereignty submerged lands lease for any area of the mooring field that is now owned by the City. The City already owns approximately 4.4 acres of submerged lands adjacent to Maurice Gibb Memorial Park conveyed by Board of Trustees of the Internal Improvement Trust Fund of the State of Florida Deed Number 25150(2329-13). A lease will be required for the remaining area(s) proposed as a mooring field pursuant to Chapter 18-21.005 (1)(d)(8). Requirements for the land lease application include the location and description of the proposed activity, two prints of a professional survey of the lands, including a computation of total square footage, the names and addresses of all property owners within a 500-foot radius of the proposed boundary in mailing label format and the Billing Information Form, which is simply contact information and sales tax information. FDEP will notify property owners within 500 feet of the project boundary. If 90% of the mooring slips are maintained for rent to the public on a first-come, first-served based, the term for a Standard Lease is 10 years (rather than five years).

Any proposed mooring field by the City of Miami Beach will be in Biscayne Bay Aquatic Preserve and is, therefore, subject to Rule 18-18, F.A.C. Therefore, in order to obtain a submerged land lease, the project must be compatible with the intent and provisions of the Rule and affirmatively demonstrate that it is in the public interest. As per the General Permit (62-330.420 F.A.C.), the Management Plan for the proposed mooring field shall be referenced in the lease if it is located over sovereignty submerged lands. Project-specific annual lease fees are determined based on the area of submerged lands to be leased and anticipated revenues associated with the project. The City may receive discounts on the annual lease if the mooring field is designated under the Florida Clean Marina Program.



This graphic, provided by FDEP, depicts the area of submerged lands currently owned by the City.

REGULATORY PERMITS REQUIRED

Save Sea Turtles, Sawfish, and Dolphins

While Fishing, Following These Tips:

- Report injured, entangled, hooked, or stranded dolphins and sea turtles to the 24-hour hotline:

1-877-942-5343

Download the Dolphin & Whale 911 app on your iPhone or Android for reporting marine mammals.

- Never cast towards dolphins, sea turtles, or sawfish.
- Change location or reel in your line if a dolphin, sea turtle, or sawfish shows interest in your bait or catch.
- Release catch away from dolphins when and where possible without violating any state or federal fishing regulations.
- Do not feed or attempt to feed wild dolphins or sea turtles - it's harmful and illegal.
- Do not dispose of leftover bait or cleaned fish remains in water.
- Use circle or corrodible (non-stainless steel) hooks to reduce injury.
- Use recycling bins for fishing line and do not throw trash or unwanted line in the water.
- If you hook a **SEA TURTLE**, immediately call the 24-hour hotline at **1-877-942-5343** and follow response team instructions.



If you cannot reach a response team, follow these guidelines to reduce injuries:

- 1) If possible, use a net or lift by the shell to bring the turtle on pier or land. Do NOT lift by hook or line.
- 2) Cut the line close to the hook, removing as much line as possible.
- 3) Release turtle.

- If you hook a **SAWFISH**:

- 1) Do not remove the fish from the water.
- 2) Cut the line close to the hook.
- 3) Release it as quickly as possible.
- 4) Report it immediately to **1-941-255-7403**.



Florida Fish and Wildlife Conservation Commission (FWC)- Florida Uniform Waterway Marker Permit-As per Chapter 327.40 of the Florida Statutes and the General Permit, governmental entities must apply for a Florida Uniform Waterway Marker (FUWM) Permit to the Boating and Waterways Section of the FWC to place any safety, regulatory, informational, and/or navigation marker in, on, or over the waters or of the State of shores thereof. The criteria for approval of markers and specifications for markers, including mooring buoys, are detailed in Chapter 68D-23 F.A.C and the associated FUWM Permit Application Checklist. The permit ensures that the markers meet the U.S. Aids to Navigation System (Part 62 of Title 33, Code of Federal Regulations) and the US Coast Guard (USCG) standards. The permit application must include the following:

- A regulatory instrument, such as an ordinance, of the regulation or restriction on the speed or operation of vessels for which the regulatory markers are proposed.
- A statement of whether the mooring field will be designated by the USCG as a special anchorage area.

This optional designation would allow moored vessels in a special anchorage area to not display their anchor lights. A FUWM Permit is a perpetual permit. All markers must be maintained in serviceable condition and inspected every three years to conform to the permit requirements.

REGULATORY PERMITS REQUIRED

[U.S. Army Corps of Engineers \(USACE\) Federal Dredge and Fill Permit](#)-Under Section 10 of the Rivers and Harbors Act, the USACE issues a Nationwide Permit (NWP) 9 for structures, buoys and other devices placed in anchorage or fleeting areas established for those purposes. The NWP-9 may be dovetailed with a NW-1 for Aids to Navigation if navigational markers for channels are required to delineate the mooring field, as would be the case for this proposed mooring field in Sunset Harbour. The USACE would also consult with their Navigation Section to ensure that the design does not conflict with or obstruct navigation.

NWPSs authorize a specific activity that has been determined to have a minimal individual and cumulative adverse effect on waters of the US. If the conditions of the category of NWP are met, the USACE issues a verification letter for construction of that activity pursuant to the applicable NWP, in this case, NWP-9 and NWP-1. The NWPs are authorized in five-year periods and the current NWPs were issued in 2017 and expire on March 18, 2022. Permitting for the Sunset Harbour Mooring Field may coincide with the expiration of the NWPs; however, the City can seek reauthorization for this project prior to expiration if construction is not complete.



MIAMIBEACH

REGULATORY PERMITS REQUIRED

National Marine Fisheries Service (NMFS) - **Johnson's Seagrass Critical Habitat**-The National Marine Fisheries Service, under the U.S. Department of Commerce National Oceanic and Atmospheric Administration (NOAA), issued the U.S. Army Corps of Engineers Jacksonville District's Programmatic Biological Opinion (JaxBO) for the effects from 10 categories of minor in-water activities on endangered species in accordance with Section 7 of the Endangered Species Act (ESA). The JaxBO allows the USACE to issue permits that conform to specific design criteria without the need for consultation with NMFS. If a project does not conform to the design criteria for that type of activity, for instance, anchored buoys, then consultation with NMFS is required.

This project is located in Johnson's seagrass (*Halophila johnsonii*) Critical Habitat. Under the JaxBO, mooring buoys are classified as a pile-supported structure because an anchor is installed on the sea floor. However, because there is no permanent structure above the anchor, the design criteria are limited to the number of buoys and the depth of water. **To avoid consultation with NMFS, mooring fields in the range of Johnson's seagrass are limited to waters deeper than 13 feet.**

Based on a preliminary bathymetric survey conducted for this area, the depth of water is less than 13 feet throughout much of the area ([Appendix B](#)). Also, based on the reconnaissance benthic survey conducted, **Johnson's seagrass is present in the proposed mooring field area. Therefore, consultation with NMFS will be required in order to acquire a permit from the USACE and specific surveys and plans may be required to avoid Johnson's seagrass. NMFS will determine whether or not the mooring field will threaten or jeopardize the continued existence of Johnson's seagrass given the water depths, locations of mooring anchors and sizes of vessels to be moored.** The invention and use of anchoring systems that do not scour the bottom and have minimal impact upon installation will aid in a favorable outcome from NMFS.

It is important to note that consultation with NMFS typically takes six months to one year, with an average of eight months. NMFS has 135 days to prepare a Biological Opinion after they have received all of the information requested.

REGULATORY PERMITS REQUIRED

[US Fish and Wildlife Service \(USFWS\) – West Indian Manatee Effects Determination](#)-The USFWS also regulates the West Indian manatee under the Endangered Species Act but may defer to the FWC and the County to ensure protection measures are implemented. West Indian manatees are common in Biscayne Bay and Miami-Dade County has an approved Manatee Protection Plan. Based on the 2013 Effect Determination Key for the Manatee in Florida and inclusion of the Standard Manatee Conditions for In-Water Work (USFWS, 2011) in the construction documents, a determination of may affect, not likely to adversely affect (MANLAA) can be made for the West Indian manatee. Therefore, consultation with USFWS will not be required.

[US Coast Guard \(USCG\) Private Aids to Navigation Permit](#) - A Private Aids to Navigation (PAtoN) Permit from the USCG is contingent upon receipt of the FUWM Permit from FWC. Similar to the FUWM permit, the USCG application involves listing the attributes of each marker to be placed in navigable waters of the U.S. The permit is also contingent upon issuance of the USACE Aids to Navigation NW-1 Permit. PAtoNs are verified by the USCG every three years and are inspected every year. They are subject to inspection by the USCG at any time without prior notice. They must be maintained in proper operating condition and discontinuance or removal requires authorization.



REGULATORY PERMITS REQUIRED

Miami-Dade County Class I Coastal Construction Permit-The Coastal Resources Section of the Miami-Dade County Department of Regulatory and Economic Resources (RER) issues a Class I Permit for any work in, on, or over tidal waters. The installation, repair or replacement of mooring buoys, when it is determined that the proposed work will not present a hazard to navigation, qualifies for a Short Form Permit Application, which does not require a public hearing. The required items for a Class I Permit are similar to those required for the FDEP and USACE permits. RER will also review the project for submerged lands approval. As a condition to submerged lands lease approval, RER will review the project for conformance to the Miami-Dade County Manatee Protection Plan, which specifies sites for new or expanded marine facilities.

A portion of this area is located in a zone designated for “commercial marinas, dry storage, transitory docks, boatyards or boat ramps” and partially within “motorboat density and various – water dependent uses as determined by existing zoning or environmental regulations”. It is anticipated that RER will require an elevated level of review and require justification for the placement of the mooring field. In addition to the plans and sketches required by the other regulatory agencies, RER also requires zoning and structural approval from the City. Class I Construction Permits are valid for a duration of two years.



OPINION OF PROBABLE COSTS

The consultant team prepared preliminary opinions of probable costs for design, permitting and construction of a 50-slip mooring field such as those presented as Phase I alternatives in this study. A preliminary opinion of probable costs for design, permitting and construction was established to be on the order of \$630,000 for one phase of a mooring field and \$970,000 for a harbormaster building. A breakdown of item descriptions and order of magnitude costs is included in [Appendix C](#).



FUNDING OPPORTUNITIES

Funding from a variety of sources is available for the design and construction of managed mooring fields. One of the criteria for some funding is that a facility must be open to the public and subject to “first come, first serve” basis. Possible sources of outside funding include the following:

- [Florida Inland Navigation District \(FIND\)](#) – FIND may fund up to 50% of the project cost including design, permitting and construction. The City has completed many FIND-funded waterfront improvement projects in the past.
- [Boating Infrastructure Grant Program \(BIGP\)](#) – This program is administered through the FWC, this program provides funding for Tier 1 Projects such as this one up to \$200K. There are currently 11 projects in Florida that have been supported by this grant program including, one mooring field.
- [Florida Boating Improvement Program \(FBIP\)](#) – A managed mooring field in Martin County received \$275K in Fiscal Year 2018-19 from this program. A total of 15 projects were funded.
- [Clean Vessel Act Program](#) – This program provides funding administered through the FDEP and has provided grants to marinas across the state to install pumpout facilities and to purchase pumpout vessels.



For planning purposes, a design, permitting and construction of a managed mooring field within the City of Miami Beach could be funded 70-80% from external sources.

ENGAGING THE PUBLIC

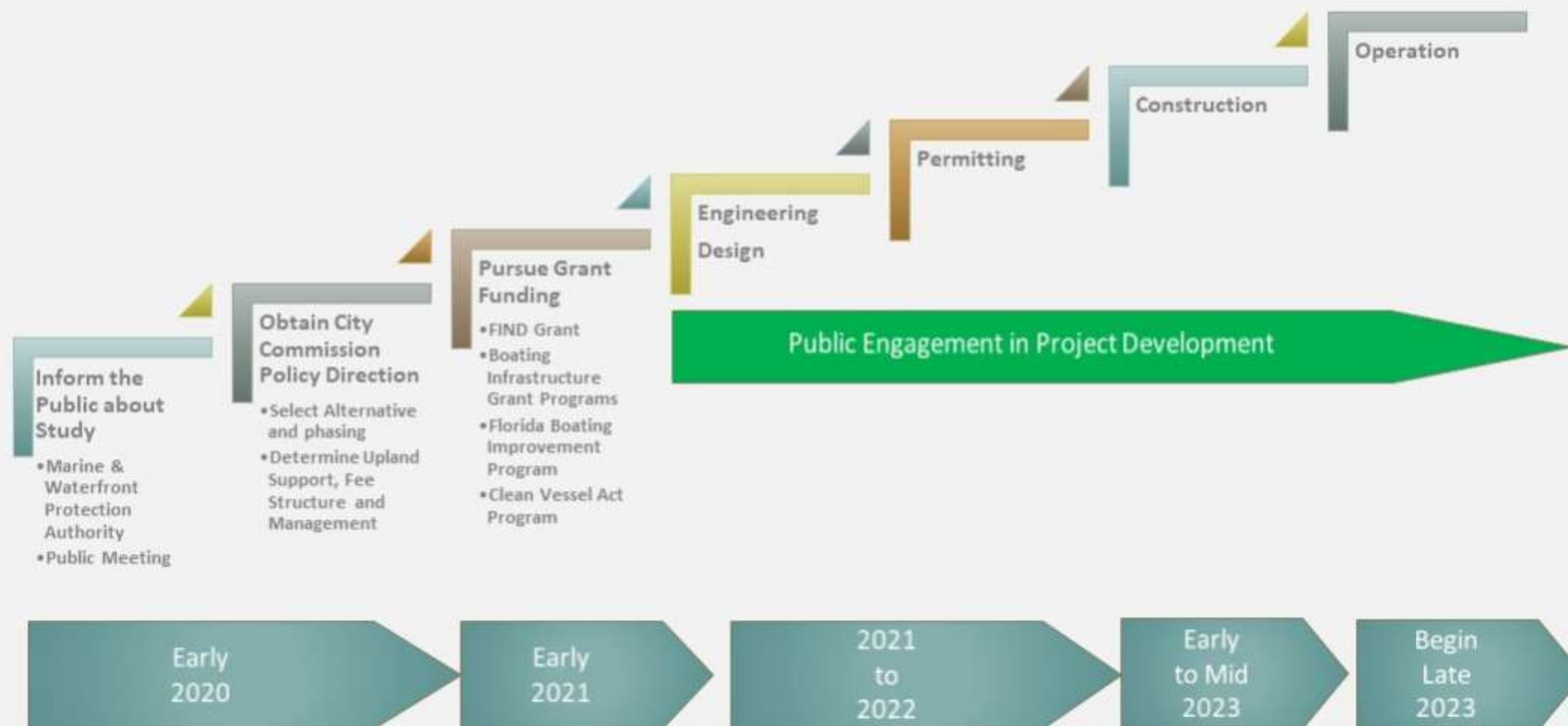
The City has commitment to engaging the public in the process of determining the preferred alternative for establishing a mooring field. The City will engage the public, including property owners, tenants, business owners and operators, public officials and agencies, facility users, interested individuals, and special interest groups, throughout the development of the project. Early and continuous public involvement provides a platform for stakeholders to understand project opportunities and limitations and to express their ideas, concerns and support early in the process so they can be considered prior to the final design phase. For this project, the federal permits and the sovereignty submerged lands lease will require noticing of property owners within 500 feet of the mooring field.

To inform and obtain feedback from project stakeholders, the City initially met with the Marine Waterfront Protection Authority on January 14, 2020. A public meeting was also held on February 11, 2020 to inform the public that the City had engaged a consultant to start the exploration process and frame up considerations for the City as it evaluates the possibility of establishing a mooring field. The City will continue to the public engagement process and seek meaningful and productive input during the design phase. Engagement will continue beyond design to keep the public informed of the progress.



NAVIGATING THE PROCESS

Sunset Harbour Mooring Field Roadmap



APPENDIX A

Historical Imagery

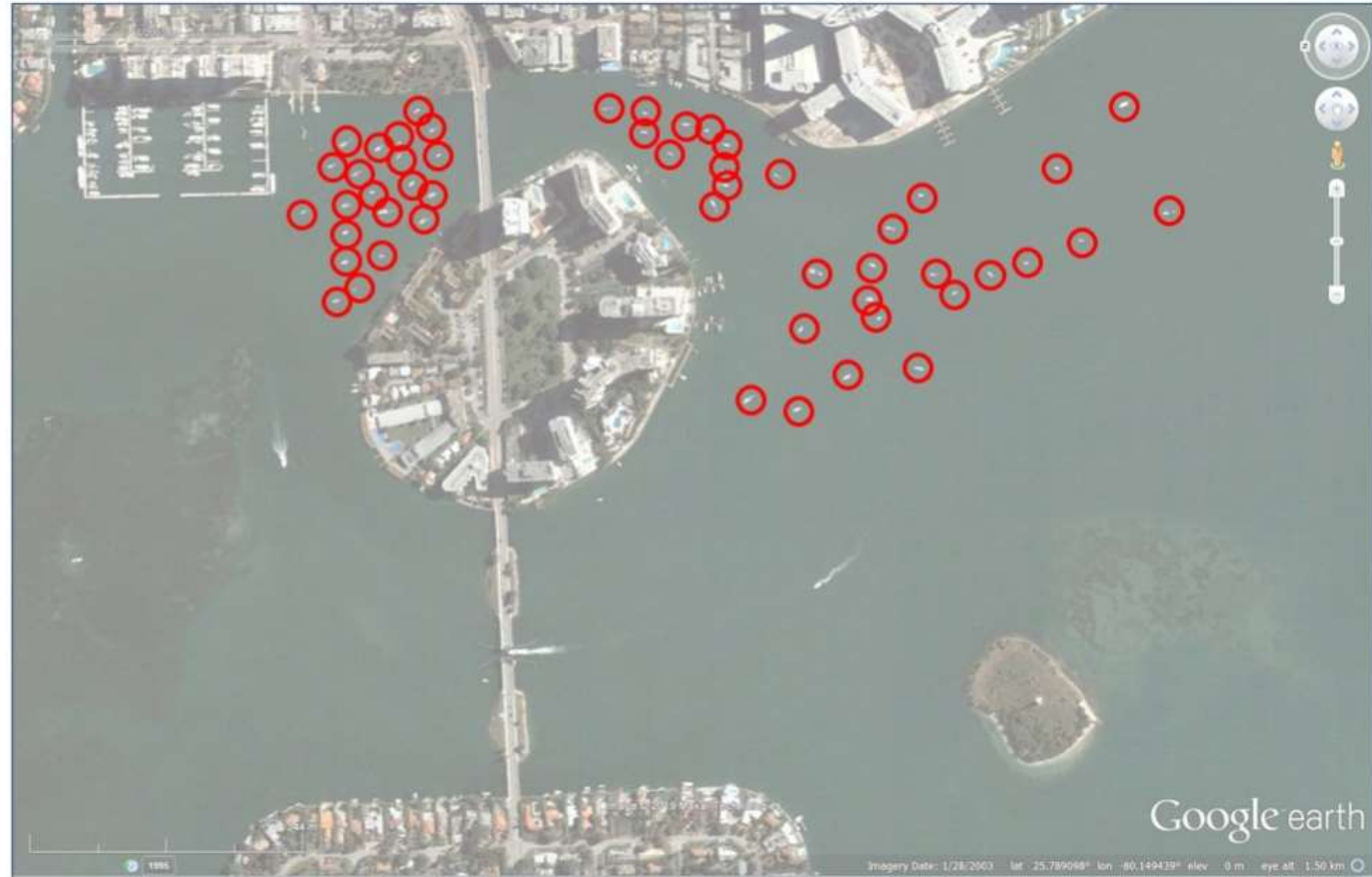
City of Miami Beach Mooring Field – Review of Aerial Imagery

January 1995
4 moorings



City of Miami Beach Mooring Field – Review of Aerial Imagery

January 2003
51 moorings



City of Miami Beach Mooring Field – Review of Aerial Imagery

December 2014
73 moorings



City of Miami Beach Mooring Field – Review of Aerial Imagery

December 2018
74 moorings



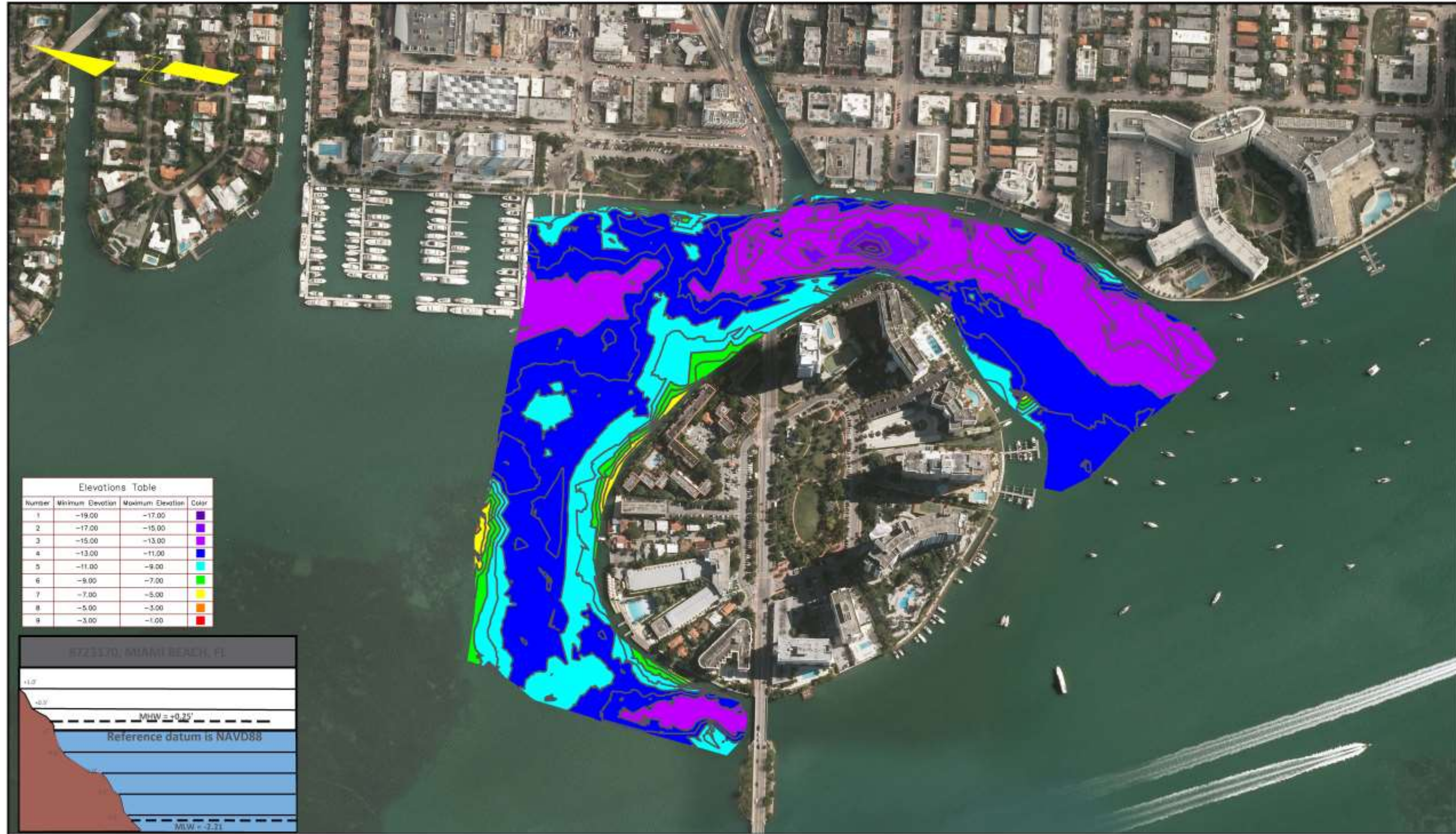
APPENDIX B

Hydrographic Survey

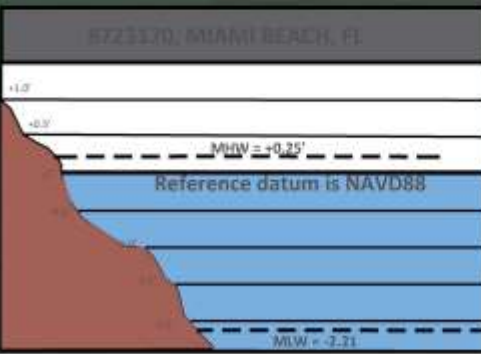


MIAMI BEACH





Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	-19.00	-17.00	Red
2	-17.00	-15.00	Orange
3	-15.00	-13.00	Yellow
4	-13.00	-11.00	Light Green
5	-11.00	-9.00	Green
6	-9.00	-7.00	Light Blue
7	-7.00	-5.00	Blue
8	-5.00	-3.00	Dark Blue
9	-3.00	-1.00	Purple



GRAPHIC SCALE
 0 10 20 30 40 50
 (IN FEET)
 1 inch = 100 ft.

Client:
MOFFATT & NICHOL

Surveyors Certification: I hereby certify that to the best of my knowledge and belief that the attached "Specific Purpose Survey" is true and correct. I further certify that this survey meets the Standards of Practice set forth by the Florida Board of Professional Surveyors and Mappers, set forth in Chapter SJ-17 of the Florida Administrative Code, pursuant to Section 472.027 of the Florida Statutes.

OPERATOR / CONDITIONS	
SURVEY DATE:	10-01-2019
ENGINEER / SURVEYOR:	TP
SURVEY VESSEL:	GHS EXPRESS
VESSEL OPERATOR:	MH
WEATHER:	Clear
TEMPERATURE:	87°F
WIND:	S-10 E
SEA:	CALM

SURVEYOR'S NOTES:

1. SURVEY PERFORMED ON 10/01/2019.
2. THE HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM OF 1983 EPOCH 2011 - NAD83 "US-lev" Florida East Zone.
3. THE VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 - NAVD88.
4. CONTROL POINT NAME = M021091HD EASTING = 845376.05 NORTHING = 532860.22 ELEVATION = 0.504'
5. THE INFORMATION SHOWN HEREON REFLECTS CONDITIONS AS THEY EXISTED ON THE DATE SHOWN AND CAN ONLY BE CONSIDERED INDICATIVE OF THE SITE CONDITIONS AT THAT TIME.
6. THE LOCATION OF UTILITIES/FOUNDATIONS OR STRUCTURES, IF ANY, BENEATH THE SURFACE HAVE NOT BEEN DETERMINED.
7. THE SPECIFIC PURPOSE OF THIS SURVEY IS TO SHOW THE EXISTING WATER DEPTHS AT THE SITE.
8. ADJUSTMENTS FOR TIDES = RKN TIDES
9. SURVEY PERFORMED USING SONAR'S TRANSDUCER, TRIMBLE RTK.
10. CONTOURS CONTAINED HEREON ARE COMPUTER GENERATED BASED ON SURVEY DATA AND PREPARED AT A 1' INTERVAL.
11. SOURCE OF AERIAL IMAGE = MR. SD 2017.

PROJECT DETAILS	
HORIZONTAL DATUM:	NAD 83
LOCAL GRID:	FLORIDA EAST ZONE
VERTICAL DATUM:	NAVD88
UNITS HORIZ. / VERT.:	FEET
SURVEY/PROJ. CONTROL POINT:	X= 845376.05 Y= 532860.22 Z= 0.504
SURVEY/PROJ. BENCH MARK:	X= same as above Y= same as above Z= same as above
TIDE STAFF LOCATION:	RKN TIDES

Olin Hydrographic Solutions, Inc.
 2900 Calusa St, Miami, Florida 33133
 16334 Port Dickinson Dr, Jupiter, FL 33477
 Consulting Engineering, Surveying & Mapping, and Environmental Services
 Phone: 305-419-2800 Fax: 305-980-4411
 C# 2005 LB 7289

PROJECT WEST AVENUE MOORING FIELD

TITLE/SURVEY TITLE Hydrographic Survey


APPENDIX C


Opinion of Probable Costs



MIAMIBEACH



		OPINION OF PROBABLE COST		DATE PREPARED	
				05/04/20	
City of Miami Beach Mooring Field <i>Preliminary Assessment</i>		ESTIMATED BY		Moffatt & Nichol	
		JOB ORDER NUMBER		10761	
City of Miami Beach Mooring Field - (50 slips)		STATUS OF DESIGN		Schematic Concept Design	
ITEM DESCRIPTION	QUANTITY		ENGINEERING ESTIMATE		
	NUMBER	UNIT	UNIT COST	TOTAL	
Debris sweep removal and disposal	1	LS	\$ 50,000.00	\$ 50,000	
Mooring Buoy Assembly	50	EA	\$ 4,500.00	\$ 225,000	
Mooring Field Regulatory Buoy Assembly	20	EA	\$ 4,000.00	\$ 80,000	
Turbidity Control & Monitoring	1	LS	\$ 15,000.00	\$ 15,000	
Endangered Species Monitoring	1	LS	\$ 15,000.00	\$ 15,000	
			TOTAL	\$ 385,000	
Mobilization	20%			\$ 77,000	
Contingency	20%			\$ 77,000	
OPINION OF PROBABLE CONSTRUCTION COST				\$ 540,000	
Soft Costs (<i>Engineering, permitting, geotechnical information</i>)	35%			\$ 189,000	
OPINION OF PROBABLE PROJECT COST				\$ 730,000	

		OPINION OF PROBABLE COST		DATE PREPARED	
				05/04/20	
City of Miami Beach Mooring Field <i>Preliminary Assessment</i>		ESTIMATED BY		Moffatt & Nichol	
		JOB ORDER NUMBER		10761	
City of Miami Beach Mooring Field - (50 slips)		STATUS OF DESIGN		Schematic Concept Design	
ITEM DESCRIPTION	QUANTITY		ENGINEERING ESTIMATE		
	NUMBER	UNIT	UNIT COST	TOTAL	
Notes:					
Pricing is based on Contractor's unencumbered access to the site					
Pricing is in 1st quarter 2019 US dollars					
No site specific geotechnical information is available at the time of this report					
Capacities have not been harmonized					
It was assumed that no underwater utilities are present at the site					
When reviewing the above estimated costs it is important to note the following:					
1. The costs have been developed based on historical and current data using in-house sources, information from previous studies as well as budget price quotations solicited from suppliers and contractors.					
2. A contingency amount has been included to cover undefined items, due to the level of engineering carried out at this time. The contingency is not a reflection of the accuracy of the estimate but covers items of work which will have to be performed, and elements of costs which will be incurred, but which are not explicitly detailed or described due to the level of investigation, engineering and estimating completed today.					
3. Third party indirect costs (project management, owner's overhead, third party QA/QC) are not included					
4. This cost estimate is an 'Opinion of Probable construction Cost' made by a consultant. In providing opinions of construction cost, it is recognized that neither the client nor the consultant has control over the cost of labor, equipment, materials, or the contractor's means and methods of determining constructability, pricing or schedule. This opinion of construction cost is based on the consultant's reasonable professional judgement and experience and does not constitute a warranty, expressed or implied, that contractor's bids or negotiated prices for the work will not vary from the client's.					



OPINION OF PROBABLE COST

DATE PREPARED

06/19/20

City of Miami Beach Mooring Field
Preliminary Assessment

ESTIMATED BY
Moffatt & Nichol

JOB ORDER NUMBER
10761

City of Miami Beach Mooring Field - Dockmaster Building

STATUS OF DESIGN
Programming

ITEM DESCRIPTION	QUANTITY		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL
Site Preparation	1	LS	\$ 30,000.00	\$ 30,000
Utility Connection	1	EA	\$ 40,000.00	\$ 40,000
Foundation (elevated piles - AE 8' Zone)	1	LS	\$ 220,000.00	\$ 220,000
Elevator	1	LS	\$ 60,000.00	\$ 60,000
Dockmaster Building - 1,500 sf	1500	sf	\$ 240.00	\$ 360,000
			TOTAL	\$ 710,000
Mobilization	3%		\$	21,300
Contingency	20%		\$	142,000
OPINION OF PROBABLE CONSTRUCTION COST			\$	880,000
Soft Costs (Engineering, permitting, geotechnical information)	20%		\$	90,000
OPINION OF PROBABLE PROJECT COST			\$	970,000

