



Repairs to Fort Jefferson Counterscarp and Dredging of Selected Areas

Environmental Assessment

March 2023



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**United States Department of the Interior
National Park Service
Dry Tortugas National Park**

**Repairs to Fort Jefferson Counterscarp and Dredging of Selected Areas
Environmental Assessment**

March 2023

The National Park Service (NPS) proposes to repair damage sustained to Fort Jefferson (“the fort”) on Garden Key at Dry Tortugas National Park (Dry Tortugas NP or “the park”) as a result of damages from Hurricane Irma in 2017 and select damages from Hurricane Ian in 2022. Elements of the proposed project include repairing and rehabilitating the counterscarp and dredging the moat and finger pier slips at the Garden Key waterfront of sediment deposition resulting from the two hurricanes.

NPS prepared this environmental assessment (EA) to evaluate a no-action alternative, which would maintain the existing conditions at Fort Jefferson and one action alternative. The EA describes the environment that would be affected by each alternative and assesses the environmental consequences of implementing each alternative. This EA examines potential impacts on archeological resources; historic/prehistoric structures; wildlife and species of special concern; marine resources; water quality; vegetation; wetlands; human health and safety; and visitor use and experience.

This EA has been prepared in accordance with the National Environmental Policy Act, Council of Environmental Quality implementing regulations (April 20, 2022) [40 Code of Federal Regulations (CFR) 1500–1508] and NPS Director’s Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* (NPS 2011) and its accompanying handbook (NPS 2015a) to assess the alternatives and their impacts on the environment.

Public Review and Comment

This EA will be available for public review for 30 days. If you wish to comment, you are encouraged to submit your comments directly through the NPS Planning, Environment, and Public Comment (PEPC) website: <http://parkplanning.nps.gov>. You may also mail written comments to:

Superintendent, Attn: Fort Jefferson Counterscarp Repairs Project, 40001 State Road 9336, Homestead FL 33034

Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available. While you can ask in your comment to withhold your personal identifying information from public review, NPS cannot guarantee that it will be able to do so.

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CHAPTER 1: PURPOSE AND NEED

INTRODUCTION AND PROPOSED ACTION

The National Park Service (NPS) is proposing to repair damage sustained to Fort Jefferson (“the fort”) at Dry Tortugas National Park (Dry Tortugas NP or “the park”) as a result of damages from Hurricane Irma in 2017 and Hurricane Ian in 2022. Elements of the proposed action include repairing and rehabilitating the damaged counterscarp, which is the historic perimeter wall that protects the fort from the north and west from regular tidal cycles, annual winter storms, ocean energy and wave action, and storm events. Repairs would include the counterscarp and selected placement of rip-rap revetment of layered rocks at the base of the counterscarp to aid in the hardening and prolonging of the counterscarp’s life. In particular, the project would repair three sections of the counterscarp that are missing or collapsed, repair the missing brick fascia on the counterscarp wall, fill the voids from scour below the counterscarp wall and repair the fractures through the counterscarp wall (core failures). Dredging selected areas of accumulated sand and silt is also included in the proposed action. The project would remove sand and silt material that has accumulated within two areas of the moat from the 2017 and 2022 hurricane seasons and dredge the finger pier slips at the Garden Key waterfront. This Environmental Assessment (EA) describes two alternatives, including the no-action alternative and one action alternative, and analyzes the environmental consequences of the two alternatives.

This EA has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA); Council on Environmental Quality (CEQ) implementing regulations effective April 20, 2022 [40 Code of Federal Regulations (CFR) 1500-1508]; and NPS Director’s Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision making* (NPS 2011) and NPS NEPA Handbook (NPS 2015a). Compliance with Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (54 USC 306108), and Section 7 of the Endangered Species Act (ESA) is being conducted concurrently with the NEPA process.

BACKGROUND

Dry Tortugas NP is approximately 68 nautical miles west of Key West, Florida, and consists of roughly 101 square miles at the westernmost extent of the Florida Keys (see **Figure 1**). The park consists of seven keys, including Garden, Loggerhead, Bush, Long, East, Hospital and Middle Keys. The keys are composed of sand and are surrounded by coral reefs, shoals, and open water and situated on the edge of the main shipping channel between the Gulf of Mexico, the western Caribbean, and the Atlantic Ocean. Due to the effects from wind, waves, and storms, these islands are constantly changing in shape, size, and elevation. Historically, hurricanes have caused a few of the smaller keys to disappear and reappear due to sandbar movement.

Fort Jefferson is located on Garden Key. The fort was designated as a National Monument in 1935. The National Monument included 47,000 acres of keys and water and primarily focused attention on the historic fort on Garden Key. In 1970, it was nominated to the National Register of Historic Places (NRHP). In 1983,

Congress expanded the national monument, and in 1992 redesignated it as Dry Tortugas NP. The fort is the park's central cultural feature and is the largest 19th century American masonry coastal fort. Construction began in 1846 by the United States Army Corps of Engineers but was abandoned in 1874 as advances in weaponry made the fort obsolete as a defensive work. Originally built to protect shipping access to the Gulf of Mexico, the fort was used as a military prison during the Civil War, housing Union deserters and four Lincoln assassination conspirators. After 1976, Fort Jefferson was set aside as a quarantine station and used as a Navy coaling station, for which the Navy built coal sheds and docks that survive only as foundation ruins (NPS 2011).

The fort is listed on the NRHP and is one of the main purposes for which the park was established by Congress in 1992. Today, the fort is the primary destination site for people visiting the park and is an iconic example of the permanent Third System coastal defense system. The fort was listed under Criterion A (associated with events that have made a significant contribution to the broad patterns of our history) for its significance as a representation of 19th century military coastal defense systems and under Criterion C (embodies distinctive characteristics of a type, period or method of construction, represents the work of a master, or possesses high artistic values) as an exemplary third tier fortification structure. The rich history of the area of Fort Jefferson goes back to 1513 when the islands were encountered by Ponce de Leon and named the Tortuga Islands. Since the seven low-lying islands had no freshwater, sailors called them Dry Tortugas. The importance of the Dry Tortugas to military interests grew as westward expansion of the country brought more commerce to the Gulf Coast cities. To prevent enemy seizure of the islands and control shipping in the Gulf of Mexico, Fort Jefferson was built. The fort has both structural and archeological components that contribute to its significance. The purpose of the counterscarp was to protect the fort from military invasion, and serve to protect the fort against tidal cycles, wave action and ocean forces and storm events. The counterscarp was also vital in the initial construction process, as it formed a section of a cofferdam that would enable water to be removed and the foundations of the fort itself to be constructed. While there have been extensive repairs to the counterscarp in the past, the general appearance of the original structure as designed has been maintained. Despite the fort's overall high level of integrity, climate change and sea level rise threaten the counterscarp by causing severe undercutting and degradation of its foundations to the point of collapse. Increased storm surge and more frequent major storm events have caused the complete collapse of one section of the counterscarp and have destabilized adjacent sections. Loss of the protections afforded by the counterscarp potentially threatens the scarp walls and other structures within the fort.

The park also protects a rich biodiversity of coastal and marine life, including seagrass beds, diverse fisheries, and high-quality sea turtle and bird nesting habitat. The subtropical coral reefs are some of the most pristine on the continent and possess a full range of Caribbean coral species. The park's designated no-take Research Natural Area protects spawning habitat that supports healthy fish populations and a diversity of other aquatic species that spread to other areas in the Straits of Florida, and beyond, by swimming or by current. Due to its remote location, the park is accessible by commercial ferry boat, chartered seaplane, or private boat. Visitors experience the park through recreational activities such as touring the fort, walking the counterscarp, snorkeling, scuba diving, paddleboarding, sailing, kayaking, camping, bird-watching, boating and recreational fishing. Most of the 70,000 annual visitors arrive by ferry boat or seaplane. The counterscarp is one of the main attractions for nearly all visitors arriving at Garden Key on the park's two transportation concessions, which generate \$1.3 million in annual revenue. From the counterscarp, visitors have the opportunity to see tropical fish and corals while having unobstructed views

of Fort Jefferson's walls and historic viewsheds. Additionally, walking trails and lookouts within the grounds of the fort provide historic views within and outside of the fort.

In September 2017, Hurricane Irma made landfall in Florida as a Category 4 hurricane, with winds at 145 miles per hour (mph) and gusts recorded at significantly higher speeds in impacted areas. The eye of this hurricane passed 75 miles to the east of the fort, and coastal inundation from storm surge and winds resulted in extensive damage to the fort's counterscarp, the low perimeter wall that protects the fort from the north and west from regular tidal cycles, annual winter storms, ocean energy and wave action, and storm events. Damages to the counterscarp include scouring and undercutting of the structure, numerous missing brick veneer, stress fractures and the total collapse of portions of the counterscarp. The project area (see **Figure 2**) includes the fort and Garden Key including the counterscarp, moat, north and south coaling docks, and waterfront including the finger piers and slips and beaches.

One consideration in planning efforts for infrastructure and park management is climate change. The effects of rising temperatures, changing precipitation patterns, stronger storm events and rising sea levels are evident in the national park system. The NPS recognizes the importance of addressing the effects of current and future climate change in planning efforts. On January 19, 2021, the Secretary of the Interior approved a request from the NPS to engineer, design and conduct repairs necessary for hardening the counterscarp against future storm energy and to maintain visitor attraction. The project would be supported by construction funds allocated through Public Law 115-123 for national park units significantly impacted by Hurricanes Harvey, Irma and Maria.

During the preparation of this EA, in September 2022 Hurricane Ian made landfall in Florida as a Category 4 hurricane. The eye of the hurricane passed directly over the fort which caused additional damages to the fort and Garden Key. The proposed action was updated to accommodate additional repairs required as a result of the new damages to the counterscarp including additional loss of brick and concrete, scouring, and stress fractures running parallel to the counterscarp footprint. Repair methodology of the stress fractures is still under consideration, but would include concrete/masonry repair, restoration, and replacement strategies completed from the top side of the counterscarp. Repair to the damages to the finger piers and docks from Hurricane Ian will be evaluated and documented under a separate NEPA process as funding to complete those repairs becomes available.

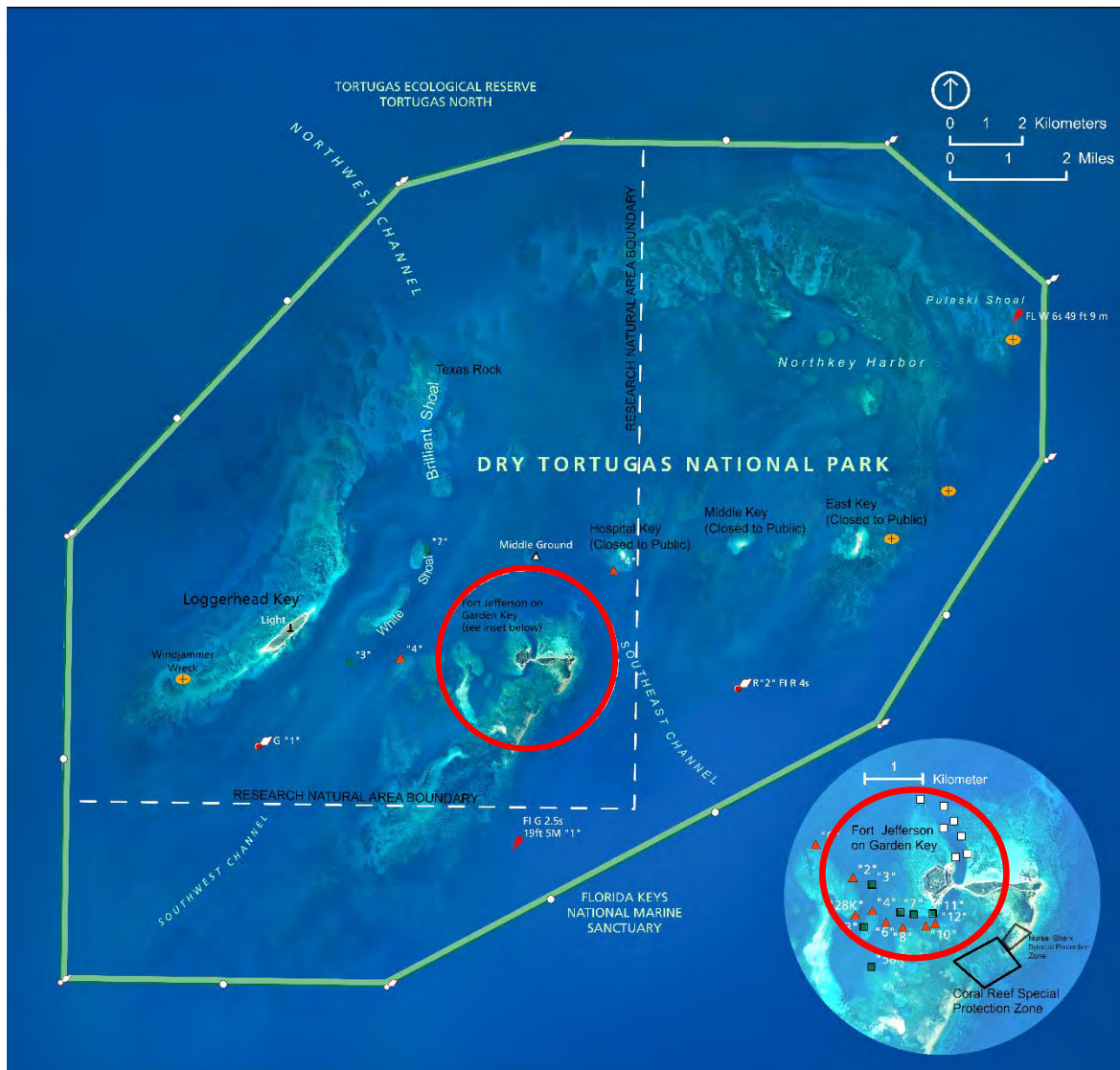


Figure 1. NPS Park Map showing the entirety of the Park along with major points of interests and infrastructure (NPS 2017)

**Figure 2. Project Area Map**

PURPOSE AND NEED FOR ACTION

Purpose of Action

The purpose of this action is to repair hurricane damages to historic Fort Jefferson and restore visitor and NPS staff access to the fort's docks, finger piers and slips and counterscarp.

Need for Action

The need for the proposed project is to restore visitor use and experience and park operations to conditions prior to Hurricanes Irma and Ian and to prevent further damage to Fort Jefferson from future storms and hurricanes. The fort is the primary destination for people visiting the park. Typically, visitors are able to walk around the full perimeter of the counterscarp, a pathway that was historically used for recreation during the period of significance. As a result of Hurricane Irma in 2017, visitor access has been limited due to unsafe conditions with portions of the counterscarp inaccessible. The counterscarp was instrumental in the early construction of the fort and currently prevents wave action from damaging the fort walls, called the scarp. The counterscarp repairs would protect the \$25 million the NPS has previously invested for repairs and fortifications to the scarp. Without the repairs, the fort would continue to deteriorate, exposing the main structural elements of the fort, further restricting pedestrian access. Dredging is needed to restore water circulation within the moat and allow for continued unobstructed park and recreational use of the docks and finger piers and slips. Currently, during daily low tides the boats become grounded causing damage to hulls, and limits the ability for the park to conduct their regular operations and to launch Search and Rescue missions. If the accumulated sediment is not removed, water quality within the moat would continue to degrade, negatively impacting both natural resources as well as the visitor experience.

Objectives in Taking Action

Objectives are more specific statements of purpose that provide additional basis for comparing the effectiveness of alternatives in achieving the desired outcomes of the action (NPS 2015). The alternative carried forward for detailed analysis must meet all objectives to a large degree and must resolve the purpose of and need for action. The following objectives were identified by the planning team for this project:

- Address hurricane damages at Fort Jefferson
- Repair, strengthen and protect the compromised sections of the counterscarp at Fort Jefferson
- Preserve the cultural landscape at Garden Key
- Remove sand and silt material at two locations in the moat surrounding Fort Jefferson
- Dredge adjacent to the docks and within the finger pier slips at the Garden Key Waterfront to allow for continued unobstructed recreational and park use of those areas

ISSUES AND IMPACT TOPICS

The NPS, participating agencies and stakeholders, and members of the public identified specific issues and concerns related to implementing the proposed action during civic engagement, conducted between January 14th and February 14th, 2022. Issues and concerns that were retained for detailed analysis are included in the impact topics discussed in the "Affected Environment and Environmental Consequences" chapter of

this EA. NPS organizes the discussions of the affected environment and environmental consequences by “impact topics,” which are headings that represent the affected resources associated with the issues refined during civic engagement and internal coordination.

Impact Topics Analyzed for Detailed Analysis

As described in the preceding section, this EA analyzes issues and impact topics for the project area. Impact topics are related to the following resources and values: archeological resources; historic/prehistoric structures; wildlife and species of special concern; vegetation; wetlands; marine resources; water quality; human health and safety; and visitor use and experience. Issues analyzed in detail in this EA were identified with support from an interdisciplinary team established for this project.

Impact Topics Considered but Dismissed from Further Analysis

NEPA and the CEQ regulations direct agencies to prepare NEPA documents that are “concise, clear and to the point.” Several issues and impact topics were considered during the development of this EA but ultimately were dismissed from detailed analysis for the following reasons: potential environmental impacts associated with the issue are not central to the proposal or of critical importance and/or a detailed analysis of environmental impacts related to the issue is not necessary to make a reasoned choice between alternatives. In addition, in cases where impacts are not anticipated, or expected to be minimal, the impact topics were dismissed. A rationale for dismissal is provided below.

Air Quality

The NPS is responsible to protect air quality under the Clean Air Act. Dry Tortugas NP is located within a designated attainment area under the Clean Air Act. The proposed action would result in the temporary discharge of greenhouse gas emissions and dust into the atmosphere from construction activities associated with the use of heavy equipment, marine vessel, and vehicle operations. The air emissions from construction activities, while quantifiable at a site-specific level, would not be appreciable. As a result, there would be short-term, temporary impacts during the construction period. However, these impacts would only occur while construction equipment is in use. Therefore, air quality has been dismissed from further analysis in this EA.

Nonnative or Exotic Species

There is the potential for the importation and promotion of nonnative or exotic species during construction activities and mobilization of personnel and equipment from mainland Florida. Restrictions on the introduction and/or spread of nonnative and exotic plant and animal species are discussed under “Mitigation Measures Associated with Alternative B”. With the mitigation measures in place, there is low potential of spread of nonnatives within the project area. Therefore, nonnative and exotic species have been dismissed from further analysis in this EA.

Cultural Landscapes

A cultural landscape is defined by the NPS as “a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values (NPS 2020). Simply put, and in the context of the NPS system, cultural landscapes provide a connection between people and places and provide an understanding of historic events, significant people, and patterns in American history (NPS n.d.). A cultural landscape report was prepared for Garden Key, including Fort Jefferson, which identified significant elements of the landscape and its relationship to the historic development of Garden Key, beginning in 1846 (NPS 2011).

Overall, the Garden Key cultural landscape and viewshed would not be altered as a result of the proposed action as there would be no change to the spatial relationships or viewshed among the historic structures, vegetation, land, and water important to the cultural landscape and its significance. Land-use patterns within the historic fort and Garden Key would be unaltered. The proposed dredging and repairs to the counterscarp would not affect the integrity of the landscape nor impose any new physical or visual impediments to the ability of the landscape to convey its significance. Cultural landscape effects may occur during construction including visual, noise, or vibration, but these effects would be temporary and short-term. The placement of dredge material within the fort would help preserve the parade grounds by restoring the intended level grade. Due to these reasons, cultural landscape and viewshed assessment have been dismissed from further consideration in this EA.

Geological Processes

The park is located on the southwestern edge of the Florida Platform which is described as a carbonate platform partially exposed above sea level with broad, flat characteristics, and consisting of carbonate rocks (dolomite and limestone) greater than 5,000 meters (m) thick (NPS 2015). All of the Florida Keys are underlain by limestone bedrock, while some of the seafloor is partially hardbottom, and more than half the seafloor is covered by unconsolidated sediments. Sediments are easily transported due to flowing water and lack of stabilizing vegetation and coral in many places. The islands that make up the park are constantly changing due to transported sediments which range from gravel to mud.

The selected placement of a rip-rap revetment at the base of the counterscarp would reinstitute the previously existing pre-hurricane conditions of having a protective wall around the fort. The rip-rap would add habitat value and would be colonized by marine organisms. In addition, the rip-rap would help reduce erosion of existing sediments at the base of the counterscarp, thereby providing a long-term beneficial effect to the counterscarp from wave action and scour. The proposed dredging activities would remove and relocate existing sediments. This removal of sediment would increase water circulation around the moat and finger pier slips, causing beneficial, long-term impacts to existing resources. Placement of dredge spoil in the north and south beach areas would nourish the beaches thereby keeping the material within the system, prolonging the life of the beach, and physically building up the shoreline that is constantly eroded by wave action, winds, and storms. This action is anticipated to have a long-term beneficial impact by improving the fort’s resiliency against future shoreline damage and beach loss. Therefore, impacts to geologic resources from spoil placement would be limited in context, beneficial and long-term. Considering the described beneficial and long-term impacts in addition to “Mitigation Measures Associated with Alternative B,” geological processes have been dismissed from further analysis in this EA.

Lightscapes

National Parks are some of the best places to see the night sky. Natural lightscapes in many parks have been diminished by light pollution. In addition to visitor experience, good lighting conditions are important for terrestrial and marine wildlife behaviors and their habitat. Dry Tortugas NP offers a rare and unique opportunity to see the pristine night sky due to its remote location. The proposed action does not include any new or additional lighting and does not include any changes to existing lighting. Construction activities would be limited to daylight hours only to avoid impacts on the park's natural lightscapes. Stipulations on lighting during construction are discussed under "Mitigation Measures Associated with Alternative B". Because there would be no effect to lightscapes with the implementation of the proposed project, lightscapes have been dismissed from further analysis in this EA.

Socioeconomics

Dry Tortugas NP is located approximately 68 nautical miles west of Key West, Florida, outside of any community. Due to its remote location, the park is only accessible by commercial ferry boat, chartered seaplane, or private boat. The proposed action is anticipated to have temporary, short-term, adverse effects to concession operations within the park.

Currently, the dock is available to the concessioners between the hours of 10:00 am – 3:00 pm. Construction activities associated with the proposed action would consist of loading equipment and materials to the site via the docks and dredging in the finger pier slips, which would result in short-term impacts to the accessibility of the docks and finger pier slips to the concessioners, visitors and park staff. The finger pier slips would have limited availability to the commercial use authorizations (CUA) holders and visitors during the finger pier slip dredging activities, which would occur in an approximately one-month time frame. However, the CUA's and visitors would be able to access the dock when the ferry is not at the dock. The loading of equipment and materials to and from the dock would not occur between the hours of 10:00 am – 3:00 pm to reduce impacts to the concessioners. Construction activities would not impact access to and from the ferry.

The snorkeling areas around the counterscarp would be closed during construction. However, the closures would be temporary and to the extent possible partial or limited. Visitation at the park was 73,661 in 2016, reduced to 54,281 in 2017 and increased to 79,200 in 2019. In 2020, visitation reduced to 48,543 and increased to 83,817 in 2021. Economic benefit from spending at the park and through the ferry service are anticipated to return to pre-Hurricane Irma levels once the repairs have been completed. Economic impacts related to the implementation of the proposed action would be a one-time capital cost to the NPS and would be short-term to the local and regional economy. There would be long-term beneficial impacts to concessioners and CUA holders because the proposed action would provide increased resiliency at the fort. Currently, the viability of the concession and CUA operations would be difficult to sustain if the fort continues to degrade. The proposed action would support the long-term continuation of the concession and CUA operations and is anticipated to restore visitation to pre-Hurricane Irma levels; therefore, the proposed action would not discernably affect socioeconomics. See "Visitor Use and Experience" in Chapter 3 for more details on the concession operations at the park.

Floodplains

The proposed action consists of repairing damages to the site from Hurricanes Irma and Ian. The repairs to the counterscarp consist of placing new materials near, or on, the marine benthic substrate, while matching the historic fabric (where possible) and dredging of selected areas to restore access and water flow conditions. There would be no measurable change in the water surface elevations as a result of the proposed improvements. Storm surge protection, floodwater protection and energy dissipation would be improved by the counterscarp repairs.

Through coordination with the NPS' Water Resources Division (WRD), it was determined that a Floodplain Statement of Findings (FSOF) is not required as both dredge and spoil placement are excepted actions for repair and renovation of existing infrastructure under NPS Procedural Manual #77-1: *Wetland Protection*, 4.2.1.7 (NPS 2016). Currently, the center of the parade grounds is topographically depressed with an expected shallow water table. This shallow groundwater may be the result of ongoing surface subsidence due to the lack of natural soil draining, or centuries of soil compaction due to military use of the parade grounds, thereby inhibiting rainwater infiltration. The placement of dredge material in the parade grounds would prevent the parade grounds from exhibiting frequent standing water and patchy lawn conditions from continuing to grow. In addition, the proposed repairs to the counterscarp are considered restoration projects, which are also excepted actions (DO 77-1: 4.2.1.9). According to Procedural Manual 77-2: *Floodplain Management*, repair of historic or archeological structures or sites whose location is integral to their significance are considered excepted actions as well, and do not need to comply with Director's Order 77-2. Because the counterscarp repairs to the NRHP-eligible Fort Jefferson and the dredging activities meets the definition of excepted actions, and a FSOF is not required for this proposed action, the impact topic of floodplains was considered but dismissed from further analysis in this EA.

The proposed action occurs within waters of the United States. The USACE has regulatory jurisdiction over the Gulf of Mexico through Section 404 of the Clean Water Act (CWA). The NPS would coordinate with the USACE to obtain a permit pursuant to the CWA.

Wilderness

Dry Tortugas NP is outside of wilderness boundaries. Therefore, wilderness has been dismissed from further analysis in this EA.

CHAPTER 2: ALTERNATIVES

CEQ implementing regulations for NEPA provide guidance on the consideration of alternatives in an EA. These regulations require the decision-maker (NPS) to consider the environmental effects of the proposed action and a range of alternatives, including no action (40 CFR 1502.14). The alternatives analyzed in this EA are based on the result of internal scoping and civic engagement. NPS explores and objectively evaluates two alternatives in this EA:

- Alternative A (no action)
- Alternative B (proposed action and preferred alternative) – Repairs to Fort Jefferson Counterscarp Including Dredging of the Moat and Finger Pier Slips

ALTERNATIVE A (NO ACTION ALTERNATIVE)

Under Alternative A (no action), no changes or repairs would be made, and the hurricane damages to the fort and waterfront would remain and the structures would continue to deteriorate. Routine grounds maintenance on Garden Key would continue by the NPS. This alternative would ultimately jeopardize the structural integrity of the counterscarp and the fort itself. Damages to the counterscarp include scouring and undercutting of the structure, numerous missing pieces of brick veneer, stress fractures, core failures (fractures through the counterscarp wall) and total collapse of approximately 60 feet (ft) of the wall on the southwest face of the wall, and complete removal of the top 18 inches on the northwest face of the wall. The counterscarp would continue to fail, eventually resulting in the total loss of the counterscarp. With further deterioration and loss of the counterscarp, protection for the fort would decrease, exposing the main structural elements of the fort to ocean energy and wave action. The deterioration of the counterscarp threatens the integrity of the \$25 million investment the park has made in recent years to stabilize the scarp. The hurricane-deposited sand in the moat would remain, which would lead to continued degradation of visitor experience and water quality, including impacts to corals, sponges and other marine life utilizing the moat. Pedestrian access to the counterscarp would continue to be restricted to prevent injury in the event of a sudden collapse of the counterscarp. Over time, visitor access to the counterscarp, an important viewing site, would continue to decrease, therefore minimizing a popular visitor experience at the fort. The No Action Alternative is used as a basis to compare and evaluate the other project alternative.

ALTERNATIVE B (PROPOSED ACTION AND PREFERRED ALTERNATIVE) – REPAIRS TO FORT JEFFERSON COUNTERSCARP INCLUDING SELECT DREDGING OF THE MOAT AND FINGER PIER SLIPS

Under Alternative B (proposed action and preferred alternative), damages from the 2017 and 2022 hurricanes would be addressed. Given the nature and scope of the proposed repairs, the proposed undertaking has multiple components to address specific management concerns. Specific elements to address these goals include: 1) identifying, removing, and relocating endangered corals and other significant benthic organisms prior to the commencement of repairs; 2) repairing, strengthening, and protecting the compromised sections of the counterscarp at Fort Jefferson; 3) removing sand and silt material at two

locations in the moat surrounding Fort Jefferson; and 4) dredging adjacent to the docks and within the finger pier slips at the Garden Key Waterfront to allow for continued unobstructed recreational and park use of those areas; and 5) the placement of fill (dredge spoil) material in a manner that will limit impacts to cultural resources. Each of these proposed actions are discussed in detail below.

1. Identification, removal, and relocation of ESA listed corals and other significant benthic organisms prior to the commencement of repairs.
2. The repairing, strengthening, and protecting of the compromised sections of the counterscarp at Fort Jefferson

Counterscarp repair would consist of rebuilding approximately 60 ft of the western face of the counterscarp that is currently collapsed and replacement of approximately 46 ft of missing cement walkway along the northwest face of the counterscarp. The scoured/undermined sections of the counterscarp would be repaired by filling below-water voids with woven, non-toxic geotextile “bags” to restore stability to the counterscarp. The two core failures on the northeast face of the counterscarp would be repaired, which may include stainless steel and/or epoxy anchors, preformed bracing rods, along with other concrete/masonry repair strategies. The brick fascia that is missing would be repaired on both sides of the northeast, northwest, west and southwest counterscarp walls. New materials that match the historic fabric of the counterscarp would be used for the repairs and rehabilitation to achieve a more durable structure. The non-historic concrete that broke free from the counterscarp and fell into the moat would be removed. The brick that has broken free from the counterscarp and fallen into the moat would be removed and moved to the existing rubble pile on the eastern side of the fort. Dredge spoil material would be used for concrete and/or mortar repair on the counterscarp. Where possible, masonry defects would be patched utilizing existing materials and new materials that are both aesthetically and chemically consistent to match the historic character of the fort. Once repaired, approximately 150 ft of rip-rap revetment, consisting of locally-sourced limestone boulders, would be placed at the oceanside base of the counterscarp; approximately 60 ft would be placed at the southwest face of the counterscarp and approximately 90 ft would be placed on the western face of the counterscarp, equivalent to 150 cubic yards (cy), to aid in hardening and prolonging the counterscarp’s life against future ocean energy, wave action, and scour. The rip-rap revetment extent would be approximately 4 – 6 ft. See **Figure 3** for the design of the counterscarp repairs, and for more details refer to the draft permitting drawings in **Appendix A**.

In addition, accumulated sand and silt material within two areas of the moat from the 2017 hurricane season would be removed by dredging. It is anticipated that dredging would be conducted via mechanical means using an excavator or small crane with a clamshell bucket attachment. Approximately 1,630 cy would be dredged in the northeast portion of the moat to 0 ft Mean Lower Low Water (MLLW). At the southwest portion, approximately 886 cy would be dredged to -1.0 ft MLLW. The material removed from the moat would be placed on the north and south beaches, and along the isthmus connecting Garden and Bush Keys. The proposed dredging would restore water circulation within the moat.

In addition to dredging in the moat, the finger pier slips at the Garden Key Waterfront would be dredged to restore water depth for park and recreational vessels (see **Figure 4**). The area would be dredged to a depth of -10.0 ft MLLW. Approximately 502 cy would be dredged, and the material would be processed for repurposed use within the park, where possible. The material removed from the finger pier slips would be screened for disarticulated cultural material and placed in one of the designated spoil placement areas (see

Figure 5 and **Figure 6**), including within low-quality wetlands in the parade grounds within the fort walls. For more details, see the draft permitting drawings in **Appendix A**.

Construction methods for the counterscarp repairs would likely be completed using a combination of floating equipment, divers, and traditional masons working from above and/or directly adjacent to the existing counterscarp via temporary scaffolding and/or small work floats. Smaller work floats can be secured in place via temporary rope moorings, whereas larger floating equipment (i.e., crane or excavator-mounted barge) would likely utilize spud piles to temporarily secure itself in a safe, fixed position off the face of the counterscarp to avoid additional impacts to the counterscarp on or near the structure.

Staging areas for construction equipment and materials would be located within a fenced 2,700 square foot area on the north coaling dock, a concrete dock that has been used for staging for previous park projects.

The Secretary of the Interior expressed full support of the proposed action in January 2021, as it provides the highest sensitivity for natural and cultural resources and less initial cost.

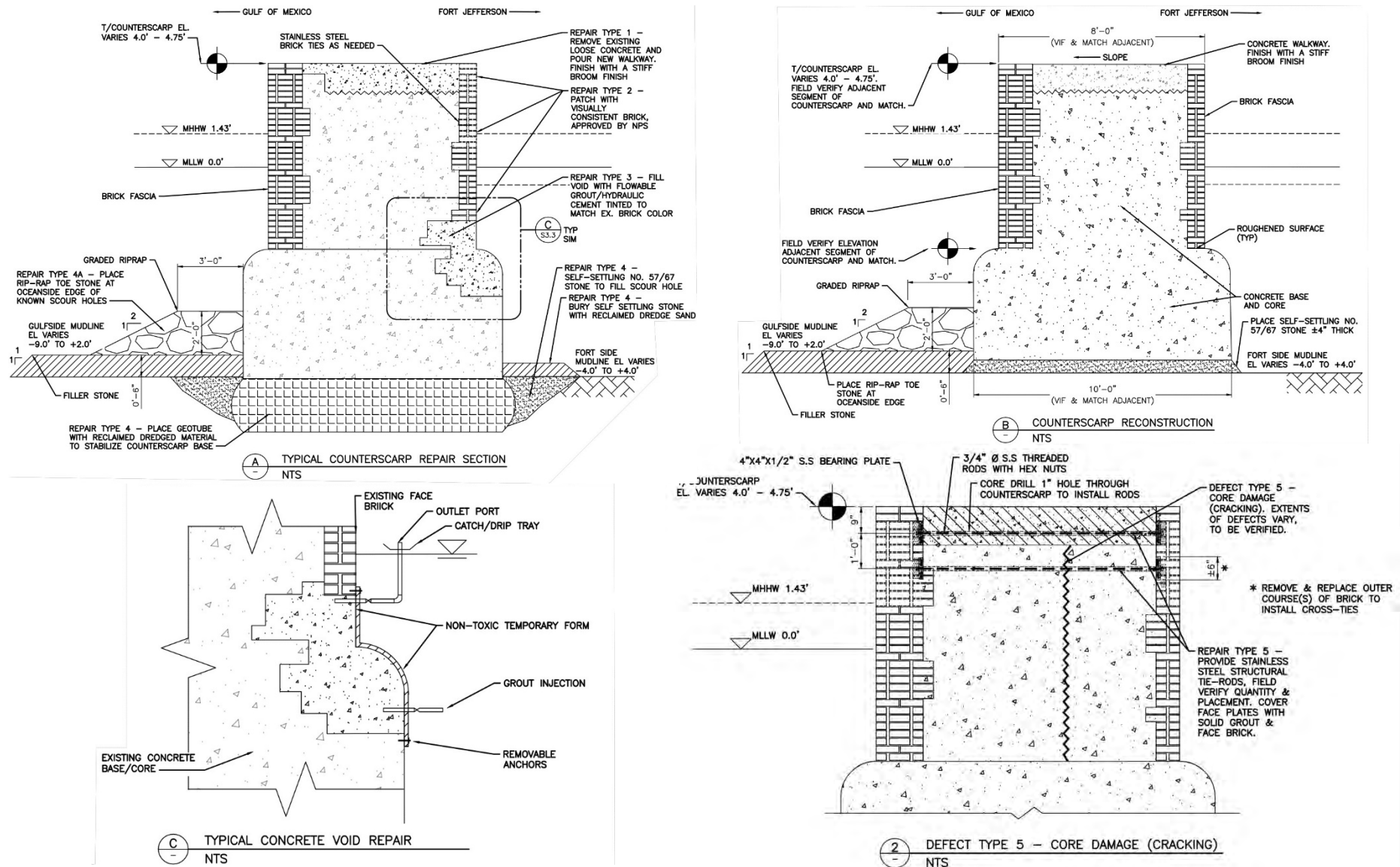


Figure 3. Counterscarp Repair Design



Figure 4. Alternative B Overview

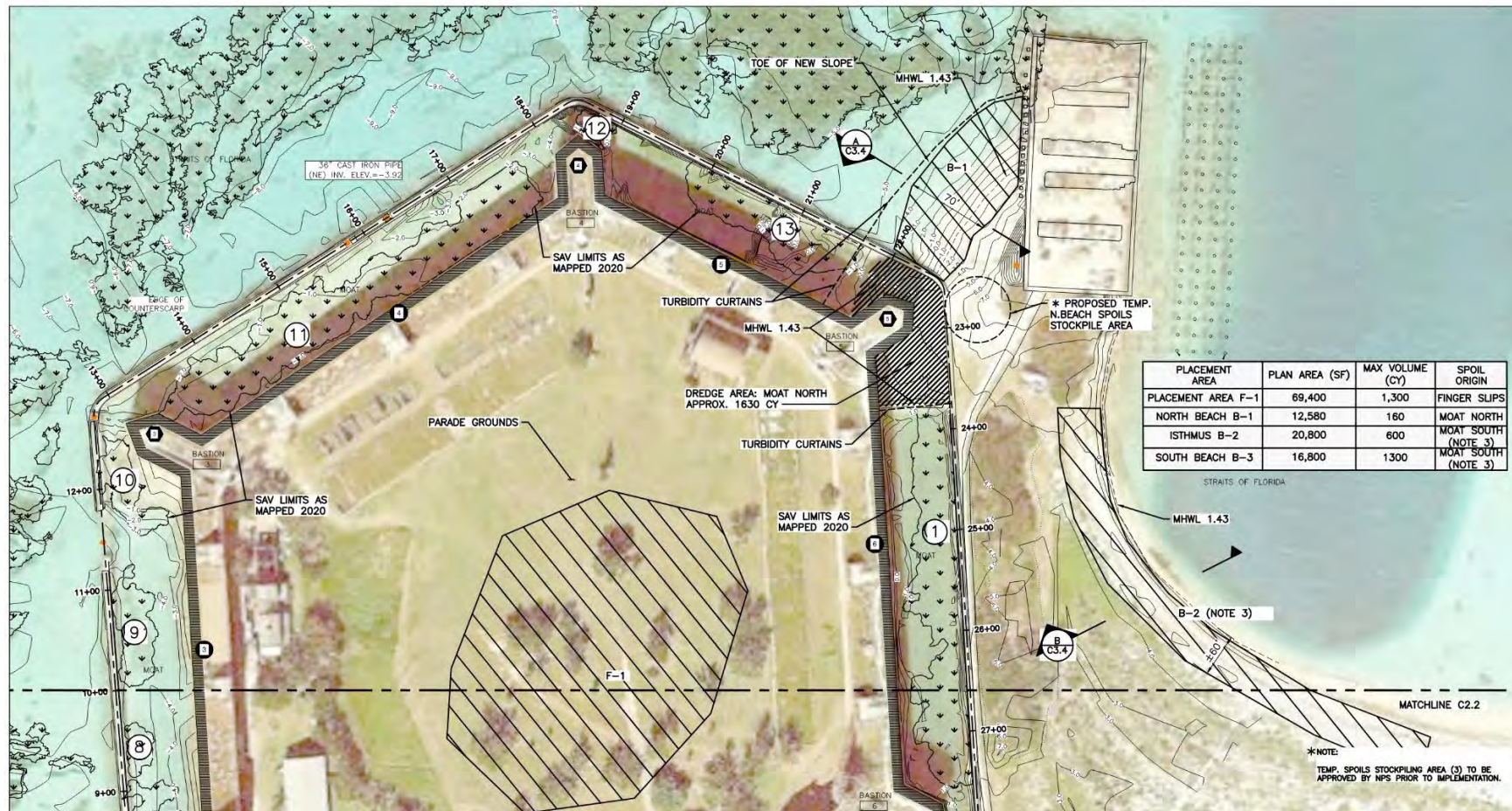


Figure 5. Dredge Spoil Placement (1 of 2) – Alternative B



Figure 6. Dredge Spoil Placement (2 of 2) – Alternative B

MITIGATION MEASURES ASSOCIATED WITH ALTERNATIVE B

NPS places a strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. In order to protect park resources, the following mitigation measures and best management practices (BMPs) would be included for Alternative B. Mitigation measures for visitor and concessioner access and safety are also included. Unless otherwise specified below, the authority for these mitigations comes from the Organic Act and NPS Management Policies.

General Resource Management Protection

- Staging of materials would take place only in designated areas, as shown in **Appendix A**.
- All work areas would be fenced in order to keep construction disturbances within the NPS-defined limits of construction. All workers would be instructed to avoid conducting activities beyond the fenced construction limits.
- Construction employees would be instructed on the sensitivity of the surrounding environment. Activities would be monitored by NPS staff, as needed.
- Construction activities would be phased in a manner to allow visitor access to various features of the site.

Cultural Resource Protection

- In accordance with the 2008 National Park Service Programmatic Agreement Section VI, if cultural resources are discovered during project implementation, all work in that area must stop and the Superintendent, park Archeologist, or Chief of Cultural Resources must be notified immediately.
- While potential is considered low, if unexploded explosive ordnance (UXO) is found during the course of the project, personnel have knowledge of this potential and how to respond if UXO is uncovered. If found, suspected UXO should not be moved or touched. Personnel should mark the location (not the item) and document/describe if possible as well as immediately inform park management including the Superintendent, park Archeologist, or Chief of Cultural Resources. An exclusion area around the location may be established through coordination.
- If items protected by the Native American Graves Protection and Repatriation Act (NAGPRA) are discovered during project implementation, all activity must cease in the area of discovery and immediate notice made to the Superintendent, as well as the appropriate federally recognized Indian Tribes/Organizations and State Historic Preservation Officer (SHPO).
- All work areas would be fenced in order to keep construction disturbances within the NPS-defined limits of construction. All workers would be instructed to avoid conducting activities beyond the fenced construction limits.
- Staging of materials would take place only in designated areas. Staging areas for construction equipment and materials would be located within a fenced 2,700 square foot area on the north coaling dock, a concrete dock that has been used for staging for previous park projects.
- Masonry would be sourced to match the color, composition, hardness, permeability, and inclusion size of the historic materials. All proposed masonry, mortar and related materials would be approved by the NPS prior to construction.

- Fencing, turbidity curtains, signage and plywood barriers would be required to protect brick work from dredging.
- Excavation by hand is required when working in close proximity to masonry.
- Dredge spoil shall be screened for cultural material by the contractors prior to placement within the parade grounds at Fort Jefferson. Disarticulated cultural material removed from disturbed areas shall be placed with other disarticulated material associated with the demolished barracks exterior of Fort Jefferson. This material most often includes brick and mortar rubble but may also include small amounts of glass, iron, or organic material.
- Ground protection mats shall be used in areas where the substrate is loose (sand) or in areas where repetitive trips may cause ruts, erosion, or other degradation.
- A cultural resource monitor and/or fencing may be required for any work near archeological resources as determined by the Chief of Cultural Resources.
- Coordination with the Chief of Cultural Resources, a historic architect, or someone trained in HABS/HAER documentation would occur to document surviving portions of the counterscarp wall and foundations should be taken during demolition/repair of damaged sections to provide the first archeological documentation of this feature.
- Coordination with the Chief of Cultural Resources or park Archeologist shall occur regarding the underwater magnetic anomalies identified during the cultural resource survey that should be avoided by heavy equipment and/or barges.
- Coordination with the Chief of Cultural Resources or park Archeologist shall occur during ground disturbing activities, placement of fill or erosion control measures, and use of heavy equipment to avoid cultural resources.
- The Secretary of the Interior's (SOI) Standards for the Treatment of Historic Properties (36 CFR Part 68, 1995) is to be followed for all repairs to historic properties within the Area of Potential Effect (APE).

Wildlife and Species of Special Concern Protection

- Additional species-specific surveys required by consultation with the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NOAA Fisheries) would be conducted prior to construction.
- Pre-construction surveys of the counterscarp/ in-water spoil placement areas would be completed to confirm locations and limits of protected resources (i.e., corals and seagrass).
- Educational signage regarding protected species would be included on-site for contractors.
- Turbidity barriers would be utilized during construction to prevent the spread of suspended sediments. Turbidity barriers would be inspected and installed in a manner to prevent the entanglement of marine species.
- The USFWS *Standard Manatee Conditions for In-Water Work* would be implemented during construction.
- The NOAA Fisheries Southeast Regional Office *Protected Species Construction Conditions* and *Vessel Strike Avoidance Measures* would be implemented during construction.
- During sea turtle nesting season (May 15th through September 31st) the north and south beaches would be monitored by trained and authorized natural resource park staff and any active nests would be marked for avoidance.

- NPS biologists would monitor and report any active sea turtle nests to USFWS and Florida Fish and Wildlife Conservation Commission (FWC).
- NPS biologists would report any sea turtle strandings to USFWS, FWC and NOAA Fisheries.
- Placement of material within critical habitat for the loggerhead sea turtle (north and south beaches) would be prohibited during sea turtle nesting season (May 15th through September 31st).
- All work would only be conducted during daylight hours to minimize disturbance to wildlife. No night work would occur along the north and south beaches during sea turtle nesting season (May 15th through September 30th).
- The use of high intensity artificial lights, such as spot or flood vessel deck lights, stern and underwater illumination (other than handheld dive lights) is prohibited.
- No staging of materials would be allowed within critical habitat for the loggerhead sea turtle (north and south beaches and the isthmus).
- During placement of material within the north and south beaches and the isthmus, the beaches would be monitored by park biologists for the presence of piping plovers. Should this species be observed in an active work area, individuals must be allowed to leave the area without handling, interference or harassment.
- Work within bird nesting habitat (north and south beaches and the isthmus) would be prohibited during nesting bird season (February 1st through September 30th).
- A Protected Species Observer (PSO) will be on board all construction vessels to implement NOAA Fisheries protected species construction conditions and vessel strike avoidance measures.

Nonnative and Exotic Species

- To avoid or minimize the introduction or spread of non-native, invasive plant and animal species to the extent possible, minimally disturbed areas would be allowed to recover naturally. In coordination with the park Botanist, any fill, mulch, reseeding and sod material brought into the park must be free of nonnative, invasive plants and animals and noxious weeds and weed seeds.
- Any equipment, including dive gear, must be free of exotic or nonnative species to prevent introduction and spread onto the project site.
- The NPS would implement the Integrated Pest Management process and adhere to mitigations identified in the DRTM Rat Management Plan during construction to avoid the introduction of rat populations at the site.

Vegetation Protection

- Landscape restoration (i.e., seeding) may occur to restore impacted vegetative communities throughout the site after construction.

Wetland Protection

- Mitigation for unavoidable wetland impacts within the fort walls would be offset through compensatory mitigation, such as wetland restoration in the Flamingo District of Everglades National Park. A mitigation plan would be further developed and finalized in conjunction with, and

as a requirement under Section 404 of the CWA permit process and NPS Procedural Manual #77-1: *Wetland Protection*.

Marine Resource Protection

- Construction vessel operators would be prohibited from allowing an anchor, chain, rope or other mooring device to be cast, dragged or placed as to strike or cause damage to coral formations, seagrass, or submerged cultural resources.
- A certified diver(s) would be present to inspect substrate suitability prior to barge spud placement.
- Surveys will be conducted to determine limits of seagrass prior the installation of turbidity curtains.
- Repairs to the core failures would be conducted from the top-side of the counterscarp subsequent to removal of the existing (damaged) concrete walkway.

Water Quality Protection

- An Erosion and Sediment Control and Stormwater Pollution Prevention Plan (SWPPP) would be developed to comply with the current FDEP National Pollutant Discharge Elimination System (NPDES) requirements and a FDEP NPDES Construction General Permit coverage would be obtained. The SWPPP would be developed to address all stormwater management BMPs.
- Appropriate measures would be employed to prevent and control spills of fuels, lubricants, or other contaminants from entering waterways. Actions would be consistent with state water quality standards and CWA, Section 401 certification requirements.
- Pre-and post-construction sediment and erosion control BMPs would be implemented to minimize stormwater runoff entering the water column and ensuring nephelometric turbidity units (NTUs) are not above ambient levels.
- Erosion and sediment control BMPs would be inspected and maintained on a regular basis and after each measurable rainfall to ensure they are functioning properly.
- Waters within the park boundary are classified as Outstanding Florida Waters (OFWs). Turbidity and siltation from the proposed dredging activities would be minimized, confined to the immediate vicinity of the project work area, and contained through the use of turbidity barriers, which would be installed around the immediate work area during in-water construction activities.
- Water quality monitoring would be conducted throughout construction and dredging activities as required by regulatory agencies through agency consultation and permitting process.
- All BMPs resulting from required by regulatory permits would be adhered to.

Visitor Use and Experience Protection

- Visitors would be informed of construction activities and affected access to the park by on-site signage, and by information posted on the park website, social media, and at visitor centers.
- Construction activities would be avoided or limited during peak visitor-use periods (weekends and holidays) to the extent possible.
- Temporary short-term full closure of areas may be necessary on limited occasions. Such full closures would be for the minimal time required to complete the work activity. To the extent possible, partial and/or limited closures of visitor access would be used.

- Construction fencing/barriers and closure signage would be implemented around construction areas, on land and, if necessary, in the water, to prevent visitors from entering an active construction zone.

Human Health and Safety Protection

- A pedestrian traffic management plan for visitors and marine vessels would be required from the Contractor to reduce the potential impacts on visitors and park operations as a result of construction activities.

ALTERNATIVES CONSIDERED BUT DISMISSED FROM DETAILED ANALYSIS

During early planning, the NPS evaluated a number of alternatives during the Value Analysis in Spring 2020 to consider as part of the project; these alternatives were not presented during civic engagement. These alternatives included minimum in-kind repairs to the counterscarp; repairs including a new breakwater to create a long-term protective barrier for the fort; minimum repairs non-compatible to the historic character (such as temporary walking surfaces/bridge ramps) to maintain visitor access; complete replacement of the counterscarp with materials not reflecting the historic character of the fort; complete replacement of the counterscarp with materials compatible with the historic features; complete in kind replacement that would replace most of the counterscarp with historically appropriate materials; and alternative fortification methods including leaving the counterscarp in as-is condition and protecting the site while maintaining the historic character. These alternatives were dismissed from further analysis due to safety issues, impacts to historic resources, high implementation and/or maintenance costs, impacts to viewsheds, not improving resiliency of the site and/or not meeting the purpose and need of this project. In the future, a breakwater may be considered when funding is available to further protect the fort from storm surge and wave action.

ALTERNATIVE ELEMENTS CONSIDERED BUT DISMISSED FROM DETAILED ANALYSIS

Counterscarp Grouting

Improvements by either chemical or cementitious grout injection to the counterscarp foundation to solidify and strengthen it were considered as part of the proposed action. This technique involves pressurized injection of grout below the base of the counterscarp to solidify and improve containment of the soils beneath the foundation and prevent future scour/collapse of the counterscarp. However, this alternative element was dismissed from further analysis as it was determined that this injection process can be toxic to the environment if the grout were to leak out of the intended repair zone(s). In addition, the construction materials and methods would require a significant amount of space, which is limited on Garden Key due to the size of the island and the nearby and/or adjacent environmental resources. Lastly, the cost consideration of this improvement would exceed the available project funding for a NPS hurricane repair project. While this method of repairs is not proposed as part of this proposed action, the NPS may consider this alternative element for future repairs to the counterscarp when appropriate funding is available, and when this method is deemed viable and necessary.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment, which is intended to document the existing conditions at the park. These descriptions serve as a baseline for understanding the resources that could be impacted by implementation of the proposed action. This chapter also includes an analysis of the environmental consequences or “impacts” of the no action alternative and action alternative, immediately following the affected environment descriptions for each resource topic. The resource topics addressed in this chapter include wildlife and species of special concern; vegetation; archeological resources; historic/prehistoric structures; human health and safety; visitor use and experience; marine resources; water quality and wetlands.

ANALYSIS METHODS FOR ESTABLISHING IMPACTS

The analysis of impacts follows CEQ implementing regulations (40 CFR 1500-1508), Director’s Order 12 procedures (NPS 2011), NPS *NEPA Handbook* (NPS 2015a), and NPS *NEPA Handbook Supplemental Guidance: Preparing Focused and Concise EAs* (NPS 2015b). The intensity of the impacts is assessed in the context of the park’s purpose and significance and any resource-specific context that may be applicable. The methods used to assess impacts vary depending on the resource being considered, but generally are based on a review of pertinent literature and park studies, information provided by on-site experts and other agencies, professional judgment, and park staff knowledge and insight.

The environmental consequences for each resource were identified and characterized based on impact type (adverse or beneficial), area of analysis, intensity, and duration.

In accordance with Council on Environmental Quality regulations finalized in 2022 [40 CFR 1508.1 (g)], effects or impacts are defined as follows:

Effects or impacts means changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives, including those effects that occur at the same time and place as the proposed action or alternatives (direct effects), may include effects that are later in time or farther removed in distance from the proposed action or alternatives, but are still reasonably foreseeable (indirect effects) and may include effects that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions (cumulative effects).

(1) Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic (such as the effects on employment), social, or health effects, whether direct, indirect or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.

(2) A “but for” causal relationship is insufficient to make an agency responsible for a particular effect under NEPA. Effects should generally not be considered if they are remote in time, geographically remote, or the product of a lengthy causal chain. Effects do not include those effects that the agency has no ability to prevent due to its limited statutory authority or would occur regardless of the proposed action.

AREA OF ANALYSIS FOR IMPACTS

Area of analysis refers to the geographic setting within which an impact may occur, such as the affected region. For the purposes of this EA, most impacts are local to the immediate project area unless otherwise noted.

TYPE OF IMPACT

The potential impacts of the alternatives are described using the following terminology:

- *Short-term impacts:* Impacts that would occur as a result of the construction activities of the action alternatives. Depending on impact topic, impacts may be intermittent (days or weeks) or continuous during construction.
- *Long-term impacts:* Impacts that would continue to occur after construction is complete and continue for years or decades.
- *Beneficial:* A favorable change in the condition or appearance of the resource, or a change that moves the resource toward a desired condition.
- *Adverse:* A change that declines, degrades, and/or moves the resource away from a desired condition or detracts from its appearance or condition.

PAST, PRESENT AND REASONABLY FORESEEABLE ACTIONS

NEPA regulations require an assessment of cumulative impacts in the federal decision-making process. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions” [40 CFR 1508.1(g)]. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

To determine potential cumulative impacts, past, present and foreseeable future actions and land uses were identified in or near the project area. Cumulative impacts are considered for the no action alternative and the proposed action, by combining the impacts of the alternatives being considered with other past, present and reasonably foreseeable future actions and are presented at the end of each impact topic discussion, along with the contribution to cumulative impacts from implementation of the considered alternative. See **Table 1** below for related projects at the fort.

Table 1. Related Projects

Project	Project Description	Status
Maintenance Dredging and Shoreline Restoration on Garden Key	The project involved the maintenance dredging of sand from two areas within the moat surrounding the fort at the park: the main dock and finger pier shoreline and the fuel dock slip on Garden Key. Sand dredged from these areas was used to stabilize the shorelines between the South Coaling Dock and the dinghy beach, and between the seaplane ramp and the North Coaling Dock.	Complete (2008)
Repair Finger Piers on Garden Key	The project repaired the finger piers on Garden Key, restoring them to useful service. During repair, the components and configuration of the piers were modified to make them more sustainable, minimizing potential damage from future storm events.	Complete (2008)
Repair Hurricane Damaged Counterscarp at Fort Jefferson	The project involved the repair of eight breaches of the seaward brickwork of the fort counterscarp that were impacted severely by tropical storms and hurricanes in 2005. The breaches varied in length from as long as 50 ft long to as short as 3 ft. The breaches were one to two wythes thick and as much as four courses deep.	Complete (2008)
Coral Removal and Relocation in Support of Proposed Repairs to Fort Jefferson Counterscarp and Dredging of Selected Areas	This project will entail the relocation of approximately 450 corals from the counterscarp and finger piers at Fort Jefferson. This project is anticipated to begin in February 2023 and anticipated to be completed in May 2023.	Winter 2023
Repair Finger Piers and Ferry Dock on Garden Key	This project will entail the repairs to the ferry dock and finger piers which were damaged during Hurricane Ian in 2022.	Anticipated 2023

ARCHEOLOGICAL RESOURCES

Area of Analysis

The area of analysis for archeological resources is the geographic location in which potential effects to archeological resources could occur. The area of analysis is coterminous with the Section 106-defined Area of Potential Effect (APE) which, per 36 CFR 800.16(d), is “...the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking...” The archeological APE, including consideration for both terrestrial and underwater archeological resources that may be affected by the proposed action, encompasses the entire developed area surrounding Fort Jefferson including the parade grounds, scarp, counterscarp, moat, docks, finger piers and slips, and adjacent waters in which there is potential for impacts to archeological resources. The APE includes staging areas, dredge locations and dredge spoil stockpiling locations.

Affected Environment

The park features historic resources set in a subtropical marine environment; a unique feature that is unlike any other park in the national park system. The park is located 68 miles west of Key West, Florida, and includes seven sandy keys including Garden Key on which Fort Jefferson (Florida Master Site File [FMSF] # 8MO229) is located. The construction of the fort began in 1846 but was abandoned in 1874 as hurricanes, illness, and advances in weaponry quickly made the fort obsolete as a defensive work. Within the walls of Fort Jefferson are the archeological remains of the Officers’ quarters and Enlisted Men’s’ barracks, powder magazines, a hot spot furnace, and the remains of other buildings associated with the incomplete fort. After 1876, Fort Jefferson was set aside as a quarantine station and used as a Navy coaling station in the late nineteenth century, for which the Navy built coal sheds and docks that survive only as foundation ruins (NPS 2011). Contributing resources to the fort’s significance are above-ground historic structures as well as archeological components associated with the fort’s construction and operation, as well as resources associated with later nineteenth and twentieth century use. Fort Jefferson was listed on the NRHP in 1976 under NRHP Criterion A for its significance as a nineteenth century coastal military fortification and also under NRHP Criterion C as an excellent example of a three-tiered Third System seacoast fortification structure (NPS 2007, 2020). Fort Jefferson includes approximately six hectares (approximately 16 acres) of land and water including the fort’s structure, terreplein, moat, scarp, counterscarp, parade grounds, and surviving structures and building foundations.

The proposed action would include ground disturbance primarily within the water as a result of dredging activities. However, potential ground disturbance could take place on land at staging areas, dredge fill stockpiling and storage areas, or in locations where access for equipment may be located. To determine if archeological resources were located within the analysis area that could be affected by the proposed action, the NPS undertook a marine archeological survey (NPS 2022) to assess the potential for underwater archeological resources within the analysis area. In addition, a cultural resources desktop review was prepared to assess the potential for terrestrial archeological sites within the analysis area (Janus Research 2022). Most of the terrestrial portions of Garden Key have been recently surveyed either through subsurface testing, archaeological monitoring, or geophysical survey. Given these findings, archeologically sensitive

areas are known to exist within the parade grounds and no additional terrestrial archeological surveys were required.

The marine survey conducted by the NPS in 2021 sought to collect data on potentially submerged archeological resources within the analysis area and to detail the construction and management history of the counterscarp (NPS 2022). This survey was conducted within the APE but also included a geophysical survey in an area outside of the counterscarp extending approximately 100-200 m beyond to assess potential submerged resources. Within the moat, intact portions of the original cofferdam from the counterscarp construction were identified near the mudline; however, most historic materials that were identified within the moat were found in disturbed contexts, due to its history of dredging and the extent of previous disturbances. One new archeological site as well as evidence of numerous possible areas of submerged archeological material were identified within the survey area beyond the moat. Of these, many were determined to be non-historic or were located outside of the proposed APE; however, several anomalies were identified via geophysical survey but not directly examined as excavation was beyond the scope of this limited survey. These anomalies may represent subsurface archeological resources as no visible surface features were identified at these locations. The new site, the archeological remains of a 20th century fishing vessel, were determined to be ineligible for listing on the NRHP. Avoidance of two sensitive locations on the west side of the fort were recommended as a result of the marine survey.

The cultural resources desktop review performed identified that approximately 88% of the terrestrial APE has been previously surveyed or does not require survey for archeological resources (Janus Research 2022). A geophysical survey of most of the fort's interior was conducted, which included ground penetrating radar (GPR), which identified where intact remains, including historic walkways, were most likely to be present (Lawson 2008). Previous surveys have identified numerous archeological features and artifacts across the fort and its surrounding beaches. However, much of the historic material is also out of context, such as that deposited in the rubble piles outside the fort. Additionally, previous work, especially related to utilities installation, and environmental impacts from both storms and bioturbation have created some level of disturbance in many areas. Archeological testing has identified previously placed layers of fill within the fort and archeological resources such as the Audubon Fountain/birdbath, the Italy Grave and the Major Smith Statue have been identified in the parade grounds.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, there would be no repairs to the counterscarp and the moat, and the finger pier slips would not be dredged. The fort and the surrounding grounds would remain as-is and routine maintenance would continue. Under the No Action Alternative, terrestrial and underwater archeological resources would remain in their current states and would be expected to experience natural deterioration over time unless stabilization, rehabilitation, restoration, or preservation measures were applied. There would be no project-related permanent ground disturbance or impacts to archeological resources. Therefore, because of the deterioration of the resource over time, there would be noticeable impacts to archeological resources of a magnitude that would likely result in long-term adverse effects to archeological resources.

Cumulative Impacts

The future coral relocation and finger piers and ferry dock repairs are not anticipated to have adverse impacts because mitigation measures would be in place to avoid and protect archeological resources. Under the No Action Alternative, further deterioration of the counterscarp would take place over time through increasingly large storm events. The No Action Alternative is likely to have an adverse effect on archeological resources due to continued deterioration of the structure. The overall cumulative impact of the No Action Alternative, when added to the past and foreseeable future actions described in **Table 1**, may be adverse to archeological resources at the fort.

Impacts of Alternative B

Under Alternative B, the potential to impact archeological resources exists in those areas identified as requiring significant ground disturbance during construction. The park would prevent ground disturbance in the terrestrial portion of the project area through ground protection measures, such as the placement of plastic or timber mats over areas that would be used for access to the staging area and to prevent ruts in the grassed and landscaped areas from construction equipment/vehicles and foot traffic.

Placement of fill at the fort to raise the parade ground elevations and enlarge the island began in the 1850s, so the proposed action can be understood as the continuation of a process required to maintain the site as viable for human occupation and is now considered a response to the impacts of sea level rise (Lawson 2008:19). Converting nascent wetlands back to dry land within the parade grounds is likely to preserve the historic landscape. In addition, dredging the moat converts the moat to its intended state as well. Due to the history of dredging within the moat, including the depth of previous disturbance and frequency of maintenance dredging following major storms, it is likely that any cultural material dredged from the moat would have been recently deposited during damage sustained to the counterscarp from storms and storm surge and potentially redistributed during previous moat dredging projects.

As intact portions of the original cofferdam and deposits were identified in the moat, during counterscarp repairs and dredging in the moat, documentation of portions of the counterscarp and foundations would be conducted through coordination with the park to record the first archeological documentation of the counterscarp and its foundations.

It is important to ensure that fill placed over archeological sites is devoid of cultural material so that artifacts are not removed from their original contexts or inadvertently introduced. To avoid introducing cultural material dredged from the moat or finger pier slips, contractors would screen the dredged material for archeological, cultural or waste debris prior to use. The cultural sterile dredge spoil would be spread on the beaches and the parade grounds. Within the fort, dredge spoils would be spread throughout the parade grounds; however, previous studies regarding site burial have indicated that this activity should not result in site disturbance or impacts to archeological resources. The spreading of dredge spoils within low-lying areas of the parade grounds would result in the preservation and the continued protection of archeological resources in that area. Additionally, several locations including the Audubon Fountain/birdbath, the Italy Grave, and the Major Smith Statue are recommended for avoidance when placing dredge fill in the low-lying areas of the parade grounds. Disarticulated material removed from dredge spoil would be placed within the demolished remains of derelict structures removed from the fort in the 1960s. The fill would be

placed to avoid sensitive above-ground historic elements, including known gravesites, monuments, ruins, and other ancillary structures. The nature of the fill is non-compressible, chemically and physically similar to the existing soils. Therefore, compression or changes related to soil chemistry or moisture content are not anticipated. Furthermore, the strategic placement of fill may benefit the site by covering surface artifacts and providing temporary shoreline stabilization. The review of past surveys at the fort and of relevant studies and projects at similar sites suggests that placing sterile sand fill over archeological sites has typically not been considered an adverse effect to such resources. Therefore, placing fill on top of portions of the archeological component at Fort Jefferson is anticipated to have no adverse effects on historic properties. The dredging and placement of fill at the fort would benefit the site as covering the surface could bury exposed artifacts. This would result in long-term beneficial effects to terrestrial archeological resources. Means and methods should be carefully considered to avoid compaction or other impacts during construction to preserve and protect archeological resources. Several areas within the fort are recommended for avoidance.

All work and staging areas would be fenced to keep construction disturbances within the defined limits of construction. Several mitigation measures are in place to avoid any adverse effects to the fort from the placement of fill on the parade grounds and beaches, rip-rap, erosion control measures, counterscarp repairs, and the use of heavy equipment during construction. Monitoring would be conducted by park staff during excavation adjacent to the scarp and counterscarp. The underwater magnetic anomalies identified during the underwater survey would be avoided by heavy equipment and/or barges through coordination with the park.

Cumulative Impacts

Alternative B would have no adverse effect to archeological resources because the protection of this resource would be beneficial from the placement of dredge material on the parade grounds and beaches. Alternative B would provide a small incremental impact to the past and foreseeable future actions described in **Table 1** which would overall be a slightly beneficial cumulative impact to archeological resources.

HISTORIC/PREHISTORIC STRUCTURES

Area of Analysis

The area of analysis for historic structures is coterminous with the APE as defined for Section 106 consultation and encompasses the entire developed area surrounding Fort Jefferson including the fort structure, parade grounds, scarp, counterscarp, moat, docks, finger piers and slips, and adjacent waters in which there is potential for impacts to historic structures. The APE includes all staging areas, dredge locations, and dredge fill stockpiling and storage locations.

Affected Environment

The proposed action would take place within the bounds of the NRHP-listed Fort Jefferson. Fort Jefferson comprises a number of historic structures dating to the fort's period of construction and also its later use as a Navy coaling station. The fort includes the defensive works and terreplein, the remains of the Officers' quarters, the remains of the Enlisted Men's barracks, the hot shot furnace, magazine, Engineers Officer's

quarters, the cistern, and the Garden Key lighthouse. Within the fort structure there are gun emplacements, a bakery, and Doctor Samuel Mudd's cell. Also of note is the location of the Italy Grave, the reported burial location of a former lighthouse keeper's wife. Later additions significant to the fort's nineteenth century and twentieth century history are the north and south Navy coaling docks (NPS 2022; Janus Research 2022). The counterscarp and the moat contribute to the overall fort complex.

The counterscarp, the first sections of which were completed in 1849 with construction continuing for several years following, is in need of repair and would be directly impacted by the proposed action. However, the counterscarp has undergone significant repairs starting as early as 1853 when the first cracks were noted. A hurricane struck the area in 1852 removing a considerable amount of sediment from the counterscarp in front of Front 5 (NPS 2022). Damage and repairs were documented periodically throughout the fort's history notably in the 1870s, again in the 1930s, and in the 1960s. A major breach in the counterscarp occurred in the mid-1970s, and between 1977 and 1979 the park took measures to identify an approach to repairing the counterscarp that would withstand the forces without impacting its integrity. Repairs were not completed until 1985. In 2004 and 2005, Fort Jefferson was directly impacted by hurricanes Dennis, Katrina, and Wilma which significantly damaged not only the counterscarp, but also the docks, employees' quarters, and park utilities (NPS 2022). Damages directly related to the proposed action were caused by Hurricane Irma in 2017 and Hurricane Ian in 2022. During the storms, the counterscarp was damaged and large amounts of sediment were deposited into the moat and along the Garden Key Waterfront. Much of the original counterscarp above the water has been replaced with modern materials.

Throughout its history, the counterscarp has experienced repairs and replacement of materials, and over time, many of these repairs have not always used historically sympathetic materials. In essence, the majority of the counterscarp structure has been reconstructed within the last 150 years using a wide variety of techniques and material (Marano 2023). A review of the developmental history of the fort complex was completed to inform the repairs to the counterscarp and ensure treatments would be consistent with those prescribed in the Cultural Resource Report (Janus Research 2022). A geotechnical survey and materials testing of the counterscarp was completed to evaluate the use of brick for rebuilding the portions of the counterscarp (Berg 2022). It was determined that while the counterscarp has been significantly repaired and materials have been replaced over its history, it continues to maintain integrity of location, setting, feeling, and association. The previous repairs have largely compromised the integrity of the materials, workmanship, and design, but the appearance has been mostly maintained (Marano 2023).

There are no prehistoric structures located within the analysis area and no prehistoric cultural resources have been identified within the Dry Tortugas. The lack of fresh water, distance from a convenient and reliable source of fresh water, and the harsh marine environment would preclude the extensive use of the island group by Native American peoples. Native American populations may have visited the location and utilized the area for resource procurement; however, no sites, above or below ground, related to a prehistoric occupation have been identified.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, there would be no repairs to the counterscarp and the moat or finger pier slips would not be dredged. The fort and the surrounding grounds would remain as-is and routine maintenance would continue. Under the No Action Alternative, the existing historic structures, and in particular the counterscarp, would remain in their current states and would be expected to experience natural deterioration over time unless stabilization, rehabilitation, restoration, or preservation measures were applied. There would be no project-related permanent impacts to pre historic or historic resources. Therefore, because of the deterioration of the resource over time, there would be noticeable impacts to historic resources of a magnitude that would likely result in long-term adverse effects to historic resources.

Cumulative Impacts

The future coral relocation project and finger piers and ferry dock repairs are not anticipated to have an adverse effect because mitigation measures would be in place to avoid and protect historic resources. Under the No Action Alternative, further deterioration of the counterscarp would take place over time through increasingly large storm events. The No Action Alternative is likely to contribute an adverse effect on historic resources due to continued deterioration of the fort. The overall cumulative impact of the No Action Alternative, when added to the past and foreseeable future actions described in **Table 1**, may be adverse to historic resources.

Impacts of Alternative B

Under Alternative B, the historic structures associated with the fort complex would be protected against further deterioration and would retain their character, integrity, and data potential, and no new visual impacts on the historic properties would result from the proposed action. The Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR Part 68, 1995) were used as guidance when developing the repairs and rehabilitation. The methods of repair would be conducted in a sensitive manner, and visually and chemically compatible materials would be used. In some cases, modern materials would be utilized where necessary due to the harsh environment and would provide more sustainable repairs over time. The use of modern materials would not result in a notable change in the counterscarp's appearance or function (Marano 2023). Based on the information provided, it appears that the repairs and rehabilitation would have no adverse effect on the counterscarp.

Aside from brick and masonry debris deposited from the damaged counterscarp and some concentrations of historic bottles, very little historic material was identified within the moat, and materials that were identified were found in disturbed contexts, due to the moat's history of dredging. However, intact portions of the original cofferdam from counterscarp construction were identified. Therefore, documentation of surviving portions of the counterscarp wall and foundations would occur during construction activities to provide first documentation of this feature.

For the counterscarp repairs, masonry would be approved by the park and would be sourced to match the color, composition, hardness, permeability, and inclusion size of the historic materials. In order to protect

the brickwork from dredging activities in the moat, only hand excavation would be used when working in close proximity to the masonry.

Above-ground historic features to be avoided during construction activities include the Major Smith Monument, the Audubon Fountain/birdbath, the Italy grave, a cistern opening, and the ruins of two former military housing facilities. Anomalies located during marine survey but not positively identified (subsurface/buried) would also be avoided. These features and a 10 ft buffer surrounding them would be avoided where ground disturbance, fill placement, and use of heavy equipment occurs. Other historic structural components of the site would also be avoided during construction activities.

Through the implementation of mitigation measures and BMPs, there would be no adverse effects to the counterscarp and moat, which are significant physical resources that contribute to the NRHP-listed Fort Jefferson Complex. The repairs and rehabilitation work would take place in a sensitive manner and use compatible materials, when possible. As part of the work, care would be taken to also not affect other resources, features, and elements of the fort. The work would not compromise the remaining integrity of the counterscarp and moat, and the overall fort would continue to convey its significance and will remain eligible for inclusion in the National Register. Ultimately, there would be long-term beneficial impacts to historic resources under Alternative B by preventing further deterioration of the fort and its associated historic features.

Cumulative Impacts

Alternative B would have no adverse effect to historic resources because the protection of this resource would be beneficial through protection from weathering, storm events and erosion. Alternative B would provide a small beneficial incremental impact to historic resources when added to the past and foreseeable future actions described in **Table 1**.

WILDLIFE AND SPECIES OF SPECIAL CONCERN

Area of Analysis

The area of analysis for wildlife and species for special concern includes all terrestrial and in-water habitats within the parade grounds, northern and southern beaches on Garden Key, moat, finger piers and slips and in-water habitat within 250-ft of the counterscarp. These resources were evaluated through online databases and on-site benthic surveys.

Affected Environment

Species of special concern include federally listed species which are designated as threatened or endangered by the USFWS and NOAA Fisheries under the ESA. Habitat for 29 federally listed species (six reptiles, three birds, seven mammals, six fish and seven invertebrates), two state listed birds, and three bird species of special concern is present within the project area. Additionally, the project area includes established critical habitat for one reptile and two invertebrates and proposed critical habitat for five species of invertebrates and one reptile. See **Table 2** for a list of federally listed species, designated critical habitat and proposed effect determinations. These species and/or their associated critical habitat are described below.

Table 2. Federally listed Species Potentially Present in the Project Area

Species	Status	Potential for Occurrence	Designated Critical Habitat	Effect Determination
Reptiles	--	--	--	--
American crocodile (<i>Crocodylus acutus</i>)	FT	Low	No	No Effect
Green sea turtle (<i>Chelonia mydas</i>) – Nesting and Swimming	FT	High	No	MANLAA
Hawksbill sea turtle (<i>Eretmochelys imbricata</i>) – Nesting	FE	High	No	MANLAA
Kemp’s Ridley sea turtle (<i>Lepidochelys kempii</i>) – Nesting	FE	High	No	MANLAA
Leatherback sea turtle (<i>Dermochelys coriacea</i>) – Nesting	FE	High	No	MANLAA
Loggerhead sea turtle (<i>Caretta caretta</i>) – Nesting	FT	High	Yes	MANLAA
Sea Birds	--	--	--	--
Piping plover (<i>Charadrius melodus</i>)	FT	High	No	MANLAA
Red knot (<i>Calidris canutus rufa</i>)	FT	High	No	MANLAA
Roseate tern (<i>Sterna dougallii dougallii</i>)	FT	High	No	MANLAA
Mammals	--	--	--	--
West Indian manatee (<i>Trichechus manatus</i>)	FT	Low	No	MANLAA
Bryde’s whale (<i>Balaenoptera edeni</i>)	FE	Low	No	No Effect
Fin whale (<i>Balaenoptera physalus</i>)	FE	Low	No	No Effect
Humpback whale (<i>Megaptera novaeangliae</i>)	FE	Low	No	No Effect
North Atlantic right whale (<i>Eubalaena glacialis</i>)	FE	Low	No	No Effect
Sei whale (<i>Balaenoptera borealis</i>)	FE	Low	No	No Effect
Sperm whale (<i>Physeter macrocephalus</i>)	FE	Low	No	No Effect
Fish	--	--	--	--
Atlantic sturgeon (<i>Acipenser oxyrinchus oxyrinchus</i>)	FE	Low	No	No Effect
Gulf sturgeon (<i>Acipenser oxyrinchus desotoi</i>)	FT	Low	No	No Effect
Shortnose sturgeon (<i>Acipenser brevirostrum</i>)	FE	Low	No	No Effect
Giant manta ray (<i>Manta birostris</i>)	FT	Low	No	MANLAA
Nassau grouper (<i>Epinephelus striatus</i>)	FT	Moderate	No	MANLAA
Smalltooth sawfish (<i>Pristis 33ectinate</i>)	FE	Moderate	No	MANLAA
Invertebrates	--	--	--	--

Species	Status	Potential for Occurrence	Designated Critical Habitat	Effect Determination
Boulder star coral (<i>Orbicella franksi</i>)	FT	Moderate	No	MANLAA
Elkhorn coral (<i>Acropora palmata</i>)	FT	Moderate	Yes	MANLAA
Lobed star coral (<i>Orbicella annularis</i>)	FT	Moderate	No	MANLAA
Mountainous star coral (<i>Orbicella faveolata</i>)	FT	High	No	MANLAA
Pillar coral (<i>Dendrogyra cylindrus</i>)	FT	Moderate	No	MANLAA
Rough cactus coral (<i>Mycetophyllia ferox</i>)	FT	Moderate	No	MANLAA
Staghorn coral (<i>Acropora cervicornis</i>)	FT	Moderate	Yes	MANLAA

* MANLAA – May effect, not likely to adversely effect

Reptiles

The American crocodile (*Crocodylus acutus*) is listed as federally threatened by the USFWS. This species has a grayish green back with a lighter underside and a narrow jaw. The American crocodile is known to inhabit brackish and saltwater estuaries, mangrove swamps, low-energy mangrove lined bays and inland swamps in South Florida and will nest on coastal shoreline or raised creek beds above the high-water line. While the project includes marine saltwater habitat, the project is located approximately 70 miles from Key West and the mainland of Florida and is outside the range for this species. The project area also includes suitable shoreline nesting habitat, but no nesting has been documented at Garden Key or Bush Key. However, one male inhabited the Garden Key area for approximately 14 years until 2017 when it was relocated for safety concerns and welfare of the individual. This individual crocodile is considered an outlier and this species is not anticipated to migrate through or occur within the project area.

The project area is within range for the five federally endangered or threatened species known to occur within south Florida [Green sea turtle (*Chelonia mydas*), Hawksbill sea turtle (*Eretmochelys imbricata*), Kemp's ridley sea turtle (*Lepidochelys kempii*), Leatherback sea turtle (*Dermochelys coriacea*), and Loggerhead sea turtle (*Caretta caretta*)]. While these species typically inhabit open water habitat, they may forage on submerged aquatic vegetation (SAV) in shallow inshore areas and will come to shore for nesting. The project area includes both marine in-water habitat for swimming sea turtles covered under NOAA Fisheries' jurisdiction and sandy shoreline suitable for nesting sea turtles covered under USFWS jurisdiction.

All five species are known to inhabit the park, but some occur more frequently than others. Kemp's ridley sea turtle occurrences are rare within the park and no nesting has been documented within the park. Leatherback turtles are rarely seen within the park, but documentation of nesting began in 2004 (Grimshaw 2004). Nesting for this species has only been documented on Loggerhead and East Key but not within Garden Key, Bush Key or Long Key. Juvenile and subadult hawksbill sea turtles are commonly observed near Garden Key and nesting activity has been documented on Bush Key and Long Key but not on Garden Key. The park supports the largest green sea turtle rookery (NPS 2008) and loggerhead rookery in Monroe County (Grimshaw 2004). Nesting for both species has been documented on Garden Key, Bush Key and Long Key. While these species are not anticipated to forage within the moat, there is ample SAV habitat surrounding the fort for foraging.

The nearshore waters from the mean high water to one mile seaward are designated as critical habitat (NOAA Fisheries LOGG-N-20 – Dry Tortugas) and the shoreline of Garden Key, Bush Key and Long Key are designated as critical habitat (USFWS LOGG-T-FL-34 – Dry Tortugas) for the loggerhead sea turtle. Additionally, green sea turtle critical habitat is anticipated to be designated in June 2023.

Sea Birds

The project area contains shoreline habitat suitable for foraging and/or nesting for three federally listed, two state listed and three species of special concern shorebird species. The piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*) and roseate tern (*Sterna dougalli dougalli*) are all listed as threatened by USFWS and are known to occur within the project area. The piping plover and red knot do not nest in Florida as they only winter in the state, but the sandy shoreline present on Garden, Bush and Long Key provides suitable foraging habitat for both species. Roseate terns do nest in Florida and have been documented nesting in the park adjacent to the project area on Bush Key or Long Key but have not been documented on Garden Key.

State listed species known to occur in the project area include the American oyster catcher (*Haematopus palliatus*) and least tern (*Sternula antillarum*) and species of special concern include the brown noddy (*Anous stolidus*), sooty tern (*Onychoprion fuscatus*) and magnificent frigatebird (*Fregata magnificens*). The state listed species may forage within the project area but have not been documented nesting in the project area. All three species of special concern are known to nest within the project area with the sooty terns and brown noddy terns nesting in high abundance on Bush Key and the magnificent frigatebird nesting on Long Key.

Marine Mammals

The project area contains potential habitat for the federally threatened West Indian manatee. Due to the presence of marine habitat, the manatee may migrate through the project area. Additionally, shoal grass (*Halodule wrightii*), manatee grass (*Syringodium filiforme*) and turtle grass (*Thalassia testudinum*) were observed within the moat and the waters beyond the counterscarp surround the fort. Therefore, while the manatee is not likely to forage within the moat due to access issues, this species could forage in waters surrounding Garden Key. The project is within the range of six federally endangered whale species [Bryde's whale (*Balaenoptera edeni*), fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaengliae*), north Atlantic right whale (*Eubalaena glacialis*), sei whale (*Balaenoptera borealis*) and sperm whale (*Physeter macrocephalus*)]. However, the project area does not provide water deep enough for these species and they are not anticipated to occur within the project area, even as transient species.

Fish

The project area provides marine habitat suitable for six listed fish species. The Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) is listed as federally endangered, the shortnose sturgeon (*Acipenser brevirostrum*) is listed as federally endangered, and the Gulf sturgeon (*Acipenser oxyrinchus desotoi*) is listed as federally threatened. These sturgeon are anadromous fish (part of their lives are spent in saltwater but spawning occurs in freshwater rivers) found in Florida. Atlantic sturgeon were historically distributed throughout the marine environment on the Atlantic coast and the closest distinct population segment (DPS)

is the South Atlantic DPS. The Gulf sturgeon is typically found from Louisiana to the Suwanee River in Florida, but juveniles and wintering adults can be found in the Gulf of Mexico between 6 and 100 ft deep where the substrate is sandy bottom habitat. While the project area is within the known range and provides suitable habitat for these species, due to the distance from the mainland these species are not anticipated to occur within the project area. The project area provides coastal open water habitat suitable for the giant manta ray (*Manta birostris*), listed as federally threatened. The Nassau grouper (*Epinephelus striatus*) is listed as federally threatened and inhabits the coastal waters of Florida. Adults are unlikely to occur within the project area as they are found primarily on reef habitat in deeper waters. However, the moat and the waters surrounding the fort include SAV and seagrass habitat suitable for juveniles of this species. The project is also within the range of the federally endangered smalltooth sawfish (*Pristis pectinata*). The project area provides suitable shallow water coastal habitat for this species and this species has been observed within the park. Therefore, all listed fish species may occur within the project area.

Corals

The project area is within the range of seven federally threatened coral species [elkhorn coral (*Acropora palmata*), staghorn coral (*Acropora cervicornis*), boulder star coral (*Orbicella franksi*), mountainous star coral (*Orbicella faveolata*), lobed star coral (*Orbicella annularis*), pillar coral (*Dendrogyra cylindrus*), and rough cactus coral (*Mycetophyllia ferox*)]. The project also falls within designated critical habitat for the elkhorn and staghorn coral and the proposed critical habitat for the boulder star coral, lobed star coral, mountainous star coral, pillar coral and rough cactus coral. For additional information on coral affected environment, please refer to the Marine Resources section.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, there would be no repairs to the counterscarp and the moat or finger pier slips would not be dredged. The fort and the surrounding grounds would remain as-is and routine maintenance would continue. Potential disturbance to wildlife and species of special concern and their habitat would likely not occur from general routine maintenance activities. However, the poor water quality within the moat would continue over time which would inhibit coral growth and deter fish and marine mammals. Ultimately, the No Action Alternative would result in adverse impacts to corals and fish from the potential decrease in water quality; however, it is unlikely that the decrease in water quality would result in the loss of species overall. No adverse effects on other wildlife would be likely because no construction activities would occur and no disturbance to wildlife or species of special concern would occur.

Cumulative Impacts

Past and reasonably foreseeable future actions would have adverse impacts on wildlife and species of special concern. Past actions, such as maintenance dredging, shoreline restoration, finger pier repair, and hurricane damage repairs at the fort and Garden Key resulted in minimal short-term, temporary adverse impacts to wildlife and species of special concern resources as a result of construction activities. The future coral removal and relocation project and finger piers and ferry dock repairs could cause similar temporary impacts on the movement of sea turtles, marine mammals and fish species as a result of construction

activities. The No Action Alternative would result in adverse impacts to fish and other marine organisms due to hypoxic water conditions within the moat and is not anticipated to cause impacts to terrestrial species. Therefore, the No Action Alternative would contribute long-term adverse cumulative impacts to wildlife and species of special concern.

Impacts of Alternative B

Reptiles

Impacts to any potentially present crocodiles or sea turtles during construction would include temporarily increased in-water disturbance, noise, and suspended sediments resulting in increased turbidity. Increased construction equipment and vessel traffic in the area would also increase the chance of direct collision/injury. However, any potentially present reptiles are expected to temporarily relocate to immediately adjacent suitable habitat during construction activities and are expected to return to the project area once construction activities are complete. Impacts are therefore expected to be short-term. NPS would implement mitigation measures and adhere to the NOAA Fisheries Southeast Regional Office *Protected Species Construction Conditions* and *Vessel Strike Avoidance Measures* during construction and vessels associated with the project would be required to adhere to speed restrictions while transiting and working in the project area to avoid potential direct injury to reptiles. Turbidity barriers would also be implemented during construction to prevent impacts to water quality from seabed disturbance (increased turbidity) and would be secured to prevent entanglement of marine species. Furthermore, due to the known loggerhead nesting habitat along the north and south shorelines of Garden Key, no work, including staging or placement of dredged materials, would occur during sea turtle nesting season (May 15th-September 30th). Similarly, the project has been designed to avoid impacts to sea turtle required habitat (seagrass) with no impacts to foraging habitat anticipated.

Birds

Dredging activities would create dredge spoil to be placed on shoreline habitats potentially being utilized by foraging and nesting shorebird species. Beaches would be monitored by the park for presence of piping plovers and spoil placement on the beaches would be outside of nesting bird season (February 1st through September 30th). Therefore, impacts to shorebirds in the project area include temporary habitat disturbance due to noise and construction activities that is expected to cause resident birds to relocate to nearby habitat, such as Bush Key and Long Key, where there is ample suitable foraging and nesting habitat. However, the birds are expected to return to beach habitats in the project area on Garden Key after completion of construction, and the beach renourishment would provide long-term beneficial impacts for shorebirds by enhancing and prolonging their available habitat in the project area.

Marine Mammals

Impacts to any resident manatee individuals from the project would be from increased noise and turbidity as a result of in-water work, and an increase in vessel traffic and therefore collision potential in the area. the project avoids impacts to seagrass habitat, and the proposed dredge areas do not contain any seagrass habitat. Furthermore, the counterscarp repairs would likely be completed from floating equipment, divers and traditional masons working from above and/or directly adjacent to the counterscarp from temporary

scaffolding and/or small work floats to avoid impacts from anchoring. Additionally, the USFWS *Standard Manatee Conditions for In-Water Work* would be implemented during construction to reduce potential for impacts to any manatee that may occur within the project area.

No impacts to other marine mammal species are anticipated due to the project. All other marine mammal habitat requirements include deeper water than what is available within the project area, and they are therefore not expected to be present in the area. The only potential impact to other marine mammal species may be due to the temporary increase in vessel traffic to and from the project area. However, NPS would implement mitigation measures and adhere to the NOAA Fisheries Southeast Regional Office *Protected Species Construction Conditions* and *Vessel Strike Avoidance Measures* during construction and vessels associated with the project would be required to adhere to speed restrictions while transiting and working in the project area to avoid potential direct injury to marine mammals.

Fish

Potential impacts to fish species include injury from construction equipment or vessels, increased turbidity, and increased in-water work disturbance and noise. However, fish are highly mobile and could avoid interactions with slow moving dredging equipment and any resident individuals are expected to temporarily relocate to immediately adjacent suitable habitat approximately 800 ft. away near Bush and Long Key during in-water work. Mitigation measures, such as turbidity curtains would also be used to minimize temporary increases in suspended sediments. Lastly, the project would follow the NOAA Fisheries Southeast Regional Office *Protected Species Construction Conditions* and *Vessel Strike Avoidance Measures* to reduce the potential for direct injury to marine species. No population-level impacts to fish species are expected.

In summary, the construction activities associated with Alternative B could impact federally listed species, state listed birds, birds of special concern, and established and proposed critical habitat for invertebrates and one reptile through the increased turbidity, noise impacts and potential for harm from marine vessel strikes. These impacts would have a slightly noticeable impact on wildlife and species of special concern during construction activities but not of a magnitude that would impact long-term movements and survival of species. Species would relocate temporarily to other nearby areas with suitable habitat. BMPs and mitigation measures would be implemented to ensure that impacts on wildlife and species of special concern are avoided or minimized. Impacts to wildlife and species of special concern would be localized to the project vicinity; however, they are likely to return to the project area after post-construction activities.

Cumulative Impacts

The impacts of past and reasonably foreseeable future actions would have an impact on wildlife and species of special concern. Past actions, such as maintenance dredging, shoreline restoration, finger pier repair, and hurricane damage repairs at the fort and Garden Key would have had short-term adverse impacts to wildlife and species of special concern within and surrounding Garden Key. These actions could result in the temporary displacement to wildlife and species of special concern for the duration of construction activities. The future coral removal and relocation project and finger piers and ferry dock repairs could cause similar impacts on the movement of sea turtles, marine mammals and fish species. Under Alternative B, there would be similar temporary, short term adverse impacts to wildlife and species of special concern during

construction activities. However, Alternative B would provide better suitable habitat for coral growth and recruitment and other marine species by improving water quality within the moat. Therefore, Alternative B would contribute a small beneficial impact to existing cumulative impacts on wildlife and species of special concern.

MARINE RESOURCES

Area of Analysis

The area of analysis for marine resources includes in-water habitat adjacent to or within 250-ft of the counterscarp, moat, and finger piers and slips. For this analysis, marine resources include corals, SAV (including seagrass), invertebrates, and EFH. These resources were evaluated through online databases and on-site benthic surveys and field surveys.

Affected Environment

Corals

Benthic surveys of the moat, counterscarp, and finger piers and slips were completed by Schneider Engineering and Consulting (SEC) in 2019 and 2020. Coral surveys were repeated along the counterscarp and finger piers and slips by park staff on August 24, 2022 and validated the previous surveys conducted by SEC. Additionally, coral colonies within the proposed work offset (50 ft from the counterscarp) were also identified. These surveys identified a total of 4,266 coral colonies (2,517 stony corals and 1,750 soft corals). A total of 18 stony coral species and 17 soft coral species were observed within the counterscarp, and finger piers (see **Table 3**). Of the 35 species observed, the mountainous star coral (*Orbicella faveolata*) was the only listed species occurrence (see **Figure 7**). There were 15 observations of this species, 13 colonies within the counterscarp and two colonies at the finger piers and slips, specifically on the ferry dock and on Slip 1.

While 4,216 coral colonies were observed during the benthic surveys, approximately 450 colonies are located within the exact repair locations of the proposed action. The remainder of the other corals identified during the benthic surveys are not within areas that would be affected by this project. This number includes corals within repair footprints as well as a 30-centimeter (cm) buffer or assumed extension of the work footprint for isolated repair locations, except for the wall breach repairs where a 150 cm buffer was used as work in this location would be more extensive. It should be noted that the majority of corals in the proposed work area are attached to artificial surfaces such as brick, mortar/cement/concrete, sheet pilings, metal and/or treated lumber, and are not attached to hardbottom substrate. The estimated 450 corals in the proposed work area will be relocated between February and April 2023, prior to the proposed action being implemented.

Table 3. Coral Species Observed on the Counterscarp and Finger Piers

Species	Coral Type	Number of occurrences	Species	Coral Type	Number of occurrences
<i>Agaricia agaricites</i>	St	4	<i>Muricea muricata</i>	So	56
<i>Antillogorgia americana</i>	So	178	<i>Oculina diffusa</i>	St	7

Species	Coral Type	Number of occurrences	Species	Coral Type	Number of occurrences
<i>Antillogorgia rigida</i>	So	43	<i>Orbicella faveolata*</i>	St	15
<i>Colpophyllia natans</i>	St	8	<i>Palythoa caribaeorum</i>	So	115
<i>Dichocoenia stokesii</i>	St	8	<i>Plexaurella grisea</i>	So	43
<i>Diploria labyrinthiformis</i>	St	1	<i>Plexaurella nutans</i>	So	79
<i>Eunicea flexuosa</i>	So	725	<i>Porites astreoides</i>	St	63
<i>Eunicea knighti</i>	So	30	<i>Porites porites</i>	St	7
<i>Eunicea palmeri</i>	So	9	<i>Pseudodiploria clivosa</i>	St	2034
<i>Eunicea spp.</i>	So	3	<i>Pseudodiploria strigosa</i>	St	219
<i>Eunicea succinea</i>	So	34	<i>Pseudoplexaura cruscis</i>	So	91
<i>Eunicea tayrona</i>	So	1	<i>Pseudoplexaura porosa</i>	So	1
<i>Favia fragum</i>	St	4	<i>Pseudoplexaura wadenaari</i>	So	1
<i>Gorgonia ventalina</i>	So	331	<i>Pterogorgia anceps</i>	So	10
<i>Leptoseris cucullata</i>	St	1	<i>Siderastrea radians</i>	St	10
<i>Manicina areolata</i>	St	2	<i>Siderastrea sidera</i>	St	1
<i>Meandrina meandrites</i>	St	2	<i>Solenastrea bournoni</i>	St	1
<i>Millepora alcicornis</i>	St	79	--	--	--



Figure 7. *Orbicella faveolata* at Slip 1 of the Finger Piers

Submerged Aquatic Vegetation

SAV, including seagrass habitat, within the project area was also mapped by SEC during the benthic surveys. During the original survey from 2019, 1.94 acres of SAV was mapped within the moat between the fort and the counterscarp (see **Figure 8**). Within the eastern portion of the moat, between the northern and southern dredge areas, 0.87 acres of SAV consisting of shoal grass, manatee grass and turtle grass and various species of macroalgae (*Halimeda discoidea*, *Peniculus capitatus* and *Udotea fabellum*) was observed. Within the western portion of the moat, 1.07 acres of SAV, consisting of the same species as the eastern portion with one additional species of macroalgae (*Gracilaria* spp.) was observed. During the 2020 survey, shifts in the sand deposits within the proposed dredge areas had encroached on existing SAV. These shifts caused a 0.01-acre reduction of SAV; 0.008 acres at the southern dredge area and 0.002 acres at the northern dredge area. Therefore, 1.93 acres of SAV are present within the moat. The 2020 survey also included SAV mapping within the finger piers and slips. While no SAV was observed within the finger piers and slips, a small, isolated patch of turtle grass (0.03 acres) was observed south of the docks. In total, 1.96 acres of SAV are present within the moat and finger piers and slips.



Figure 8. Submerged Aquatic Vegetation Habitat Within the Moat

Essential Fish Habitat

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) established a new requirement to identify and describe in order to protect, conserve and enhance EFH for the benefit of the federally managed fisheries. EFH is defined as waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. Based on a review of the NOAA Fisheries EFH Mapper and associated management reports designated EFH for ten species/management units and one Habitat Area of Particular Concern (HAPC) occurs within the project area (see **Table 4**).

Table 4. Designated EFH Within the Project Area

Species/Management Unit	EFH	Life Stages
Atlantic sharpnose shark (Gulf of Mexico Stock) – <i>Rhizoprionodon terraenovae</i>	Water Column – Gulf of Mexico coastal areas from Florida Keys to Texas out to a depth of 200 m.	Juvenile/Adult
Blacktip shark (Gulf of Mexico Stock) – <i>Carcharhinus limbatus</i>	Water Column – Gulf of Mexico coastal areas out to 100 m depth contour from Florida Keys to Texas.	Juvenile/Adult
Bonnethead shark (Gulf of Mexico Stock) – <i>Sphyrna tiburo</i>	Water Column – Gulf of Mexico coastal areas from Florida Keys to Chandeleur Sound and along Texas	Adult
Caribbean reef shark – <i>Carcharhinus perezi</i>	Water Column – Gulf of Mexico coastal areas along the Florida Keys and Flower Garden Banks National Marine Sanctuary	All Life Stages
Corals – Various species	Wherever corals occur	All Life Stages
Sailfish – <i>Istiophorus platypterus</i>	Water Column – Seaward of the southwester edge of the West Florida shelf.	Juvenile/Adult
Sandbar shark – <i>Carcharhinus plumbeus</i>	Water Column – West Florida Shelf	Adult
Snapper-grouper complex – Various species	Coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs and outcroppings, water column, sargassum, inshore estuarine habitat	All Life Stages
Spiny lobster – <i>Panulirus argus</i>	Nearshore shelf/oceanic waters, shallow subtidal bottom, seagrass habitat, unconsolidated bottom, coral and live/hard bottom, sponges, algal communities, mangrove habitat	All Life Stages
Spiny lobster – <i>Panulirus argus</i>	HAPC – Coral or hardbottom habitat within Dry Tortugas NP.	All Life Stages
Whale shark – <i>Rhincodon typus</i>	Florida Keys, Pelagic Waters of west-central peninsular Florida.	All Life Stages

The designated EFH types and management plans were evaluated for the potential to exist within the project area. Based on the parameters of the project area, including depth, benthic habitat and habitat preferences, all EFH types and management plans with the exception of coral EFH, whale shark EFH, adult sailfish EFH, and spiny lobster HAPC were included for review in this EA. These EFH types and managed fisheries are managed by the Gulf of Mexico Fishery Management Council, South Atlantic Fishery Management Council and by the Office of Sustainable Fisheries – Atlantic Highly Migratory Species Management Division.

Although corals exist in the project area, they are attached to artificial surfaces and not hardbottom substrate. Therefore, designated EFH for corals and designated HAPC for the spiny lobster were not considered to occur within the project area. Due to the shallow depths of the water column within the project area, EFH for the whale shark and adult sailfish were not considered to occur within the project area. The remaining EFH types and associated management plans are described below.

Water Column Habitat

Water column habitat is the most prevalent EFH within the project area and includes the water column surrounding the counterscarp and Garden Key, along the northern and southern side of the isthmus to Bush Key and within the existing moat. The water column within the moat is shallow and provides habitat for juveniles of the snapper-grouper complex. The water column surrounding Garden Key and adjacent to the isthmus, specifically the finger piers and slips, and adjacent area are deeper and provide habitat for juvenile sailfish, juvenile and adult sharks and juveniles and adults of the snapper-grouper complex.

Sand/Shell Bottom Habitat

The substrate and underlying sediments within the moat and the shallow water surrounding Garden Key includes sandy bottom habitat. The substrate in the project area is relatively uniform and consists primarily of silty mud. This substrate is loosely packed and is continually resuspended in the water column and shifted due to wave activity caused by wind or from vessel activity within the area. This habitat provides little structure or relief for shelter; however, it provides habitat for settlement of eggs and larvae of spiny lobster and the snapper-grouper complex.

Submerged Aquatic Vegetation

The seagrass habitat including shoal grass, manatee grass, and turtle grass were mapped within the moat, but outside the proposed footprint for dredging. Additionally, macroalgal communities consisting of *Udotea flabellum*, *Gracilaria* spp., *Halimeda discoidea*, and *Penicullus capitatus* were intermixed within the seagrass. Seagrass habitat was also mapped outside the moat in the waters surrounding the outer edge of the counterscarp and southwest of Pier 6 of small craft docks and finger piers and slips. Seagrass habitat surrounding the counterscarp included dense (2.39 acres) and sparse (3.18 acres) areas of turtle grass with intermixed shoal grass and 1,246 square ft of turtle grass were observed southwest of the small craft docks

and finger pier slips (see **Figure 9**). This habitat provides shelter for the spiny lobster and snapper-groupers complex species and foraging habitat for all life stages of these species.

The observed habitat near the finger pier slips is outside the proposed footprint for dredging and no work is proposed within or near any of the habitat surrounding the counterscarp.

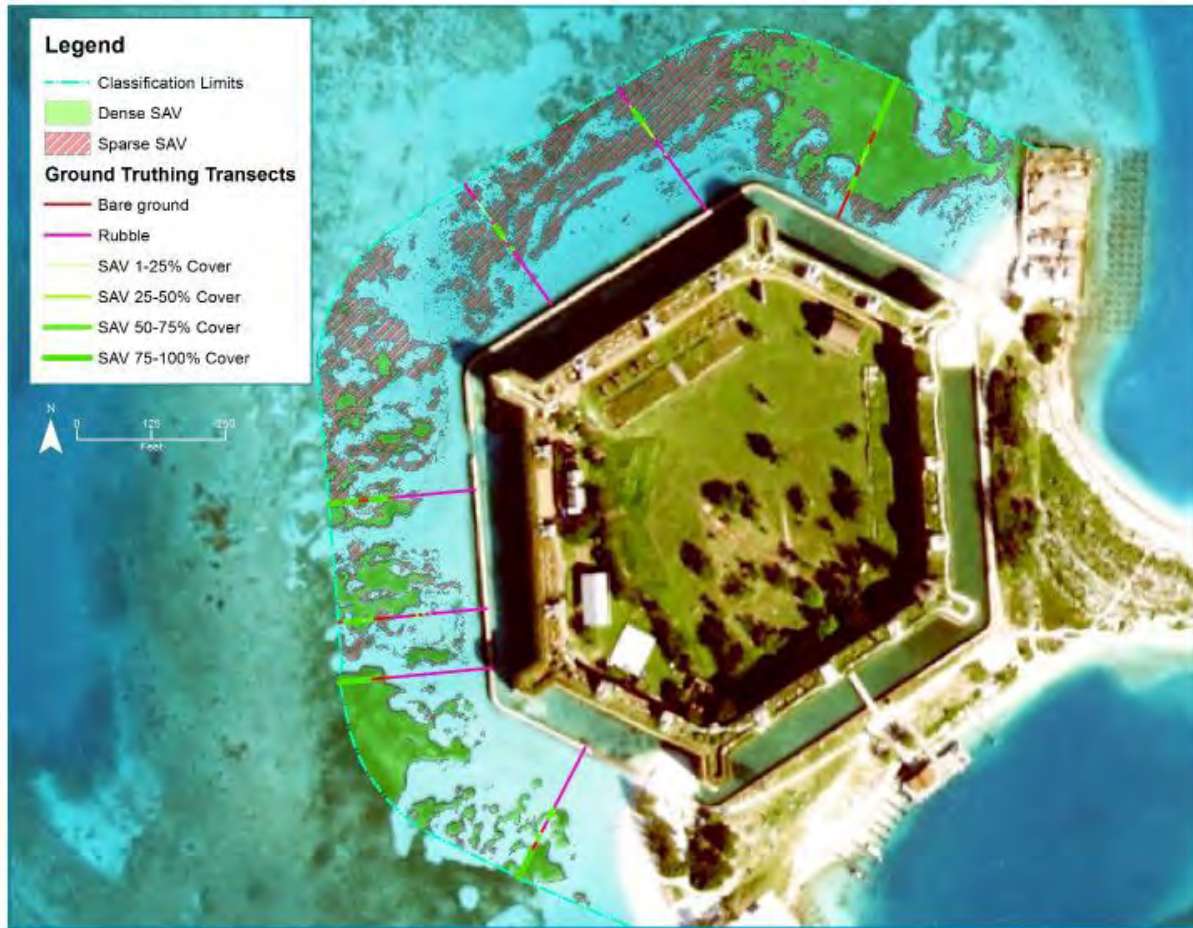


Figure 9. Submerged Aquatic Vegetation Habitat Surrounding the Counterscarp

Environmental Consequences

No Action Alternative

Under the No Action Alternative, there would be no repairs to the counterscarp and the moat or finger pier slips would not be dredged. The fort and the surrounding grounds would remain as-is and routine maintenance would continue. Disturbance to marine resources would likely not occur from routine maintenance activities. However, the poor water quality within the moat would continue to deteriorate over time which could impact corals, SAV and EFH within the moat. This impact is likely of a magnitude that would impact marine resources within the moat in the long-term. In the short term, the proposed improvements under No Action Alternative would not have any adverse impacts on marine resources because there would be no construction activities, However, in the long-term there could be adverse impacts

to habitats such as corals, SAVs, or EFH as a result of the poor water quality; however, impacts would not be of a magnitude that would result in an overall loss of marine resources.

Cumulative Impacts

The past and reasonably foreseeable future actions described in **Table 1** would have impacts on marine resources. Past actions such as maintenance dredging, shoreline restoration, finger pier repair, and hurricane damage repairs at the fort and Garden Key would have had only temporary, short-term adverse impacts to marine habitats such as corals, SAVs, and EFH resources as a result of construction activities. The future coral removal and relocation project would have long term beneficial impacts to corals by relocating approximately 450 corals to an area with better water quality. The coral relocation would also have short-term adverse impacts to corals through the normal incidental mortality associated with relocation, resulting from stress to corals as they are handled and introduced into a new environment; expected mortality is generally <10%. The future finger piers and ferry dock repairs would result in similar short-term, adverse impacts to marine resources during construction activities. The No Action Alternative would have a slightly adverse effect to marine resources as a result of the poor water quality within the moat, which would contribute a small incremental impact to the overall cumulative impacts to marine resources.

Impacts of Alternative B

Corals

No corals are expected to be in the immediate work area due to the anticipated Coral Removal and Relocation Project occurring prior to construction of this project. Corals in the greater project area may experience short-term, adverse impacts due to temporary disturbance and stress from reduced water quality due to increased turbidity from dredging associated with the construction activities; however, this impact is not of a magnitude that would impact survival or recruitment success of corals. Ultimately, the repairs and rehabilitation of the counterscarp would ultimately provide long-term beneficial impacts by providing increased suitable habitat for coral growth as evidenced by current coral presence and abundance on the man-made structure.

If any mountainous star corals are discovered within the work area and/or are imperiled by the proposed improvements during construction, all work would cease until the corals are relocated. Turbidity barriers will be utilized during construction to prevent the spread of turbidity and would be secured. Additionally, the project would follow the NOAA Fisheries Southeast Regional Office *Protected Species Construction Conditions* and *Vessel Strike Avoidance Measures* intended to reduce direct injury to all marine species.

While the proposed project would occur within designated and proposed critical habitat for corals, the project components, including placement of rip-rap along the toe of the counterscarp at locations vulnerable to erosion, would be unlikely to adversely affect the natural substrate necessary for coral attachment and growth. With measures in place to minimize project-related turbidity and maintain water quality, the project may have short-term minor impacts to the essential features of designated and proposed coral critical habitat.

Submerged Aquatic Vegetation

SAV habitat near the finger pier slips is outside the proposed footprint for dredging and no work is proposed within or near any of the habitat surrounding the counterscarp. Turbidity barriers will be utilized during construction to prevent the spread of turbidity and would be secured. Additionally, the counterscarp repairs would likely be completed from floating equipment, divers and traditional masons working from above and/or directly adjacent to the counterscarp from temporary scaffolding and/or small work floats. Equipment would be secured with temporary rope moorings and/or spud piles to avoid impacts to existing marine resources on or near the counterscarp. Therefore, adverse impacts to SAV are unlikely to occur as the proposed work is outside of any SAV.

Essential Fish Habitat

Given the scope of work, direct impacts to EFH would be limited to the benthic substrate consisting of sand/shell bottom associated with dredging within the moat and finger pier slips, and placement of dredged material on the northeast and southwest shorelines near Garden Key, and the north side of the isthmus. A total of 0.57 acres of sand/shell bottom habitat would be impacted as a result of the proposed maintenance dredging. Seagrass provides habitat for settlement of eggs and larvae and foraging potential for later life stages. However, all work has been designed to avoid mapped seagrass habitat within the project area. While the displacement of managed species may occur temporarily during dredging and construction, no changes to these EFH types are anticipated; the conditions of the substrate post dredging would be similar to the current conditions with the exception of a slightly deeper profile. This disturbance and displacement of species is not of a magnitude that would negatively impact survival or reproductive success of any life stage of the managed species or its habitat. Furthermore, the surrounding benthic habitat outside of the project footprint provides similar conditions and similar functionality. Water column impacts would be limited to temporary increases in turbidity within the project area caused by dredging and counterscarp repairs. Turbidity curtains would be utilized in active construction areas to prevent the migration of turbidity plumes offsite. Although temporary displacement of managed species may occur during construction, the post construction conditions would be returned to the current conditions with deeper profiles. Therefore, no permanent adverse impacts to any EFH or associated managed fisheries are anticipated.

Cumulative Impacts

The impacts of past and reasonably foreseeable future actions described in **Table 1** would have impacts on marine resources. Past actions such as maintenance dredging, shoreline restoration, finger pier repair, and hurricane damage repairs at the fort and Garden Key had temporary impacts on marine resources within and surrounding Garden Key as a result of construction activities. The future coral removal and relocation project would have long-term beneficial impacts to marine resources by relocating approximately 450 corals away from the construction areas to an area with better water quality. The future finger piers and ferry dock repairs would result in similar short-term, adverse impacts to marine resources during construction activities. Alternative B would have a slightly adverse impact to marine resources due to construction activities; however, these impacts would be temporary and limited to construction related activities. Post-construction, water quality would be improved thereby enhancing the water column and benthic habitats. Overall, Alternative B would contribute a small incremental impact to the overall beneficial cumulative impact on marine resources.

WATER QUALITY

Area of Analysis

The area of analysis for water quality includes the water surrounding the counterscarp, water within the moat, and water adjacent to the finger piers and slips which would be impacted by dredging and counterscarp repair activities.

Affected Environment

The exterior of the fort is surrounded by waters of the Gulf of Mexico and Caribbean Sea while the moat within the counterscarp boundaries is stagnant with limited to no circulation. Water quality parameters within the Gulf of Mexico and Caribbean Sea, particularly turbidity, fluctuate seasonally and are dependent on constantly changing weather, tides, currents, and climate. The existing interior of the counterscarp may have reduced water quality parameters resulting in a hypoxic environment caused by a decrease in dissolved oxygen and higher temperatures due to reduced circulation. Such reduced water quality may impact natural resources and result in mortality of fishes, corals, and submerged aquatic vegetation. Furthermore, Garden Key is within an Outstanding Florida Waters (OFW) designated waterbody. OFWs are defined as waterbodies “worthy of special protection because of their natural attributes” (FDEP 2021). These waterbodies are protected under Florida Statute Section 403.0601(27) and any discharges proposed within an OFW must not lower background ambient water quality, and/or if activities or discharges would significantly degrade an OFW, a more stringent public interest test must be met.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, there would be no counterscarp repairs or dredging activities within the moat or finger pier slips. Storm events and natural shifting of sediments would continue around the moat causing the moat to have stagnant water with no circulation, and park use at the finger piers and slip would continue to deteriorate with depths too shallow for vessels to dock. The No Action Alternative would have long-term adverse effects to water quality because no dredging activities would occur resulting in a continued hypoxic environment in the moat. Therefore, impacts to water quality would likely be of a magnitude that would permanently impact water quality conditions because conditions would continue to degrade, negatively impacting the survival of corals and other marine organisms. Therefore, the No Action Alternative would have long-term adverse impacts to water quality as current negative conditions within the moat would be anticipated to continue.

Cumulative Impacts

The past and reasonably foreseeable future actions described in **Table 1** would have an impact on water quality. Past actions such as the maintenance dredging, shoreline restoration, finger pier repair, and hurricane damage repairs at the fort and Garden Key and future finger pier and ferry dock repairs would have only temporary, short-term adverse impacts to existing water quality as a result of construction-related activities. The future coral removal and relocation would have no impacts on water quality. The No Action

Alternative would result in long-term adverse impacts to water quality of a magnitude that the moat would continue to degrade over time. Overall, there would be adverse cumulative impacts with the No Action Alternative contributing a negative impact because water quality conditions would continue to degrade.

Impacts of Alternative B

Construction activities are expected to cause slight, short-term increases in sedimentation and resulting turbidity within the immediately adjacent water column due to placement and removal of barge spuds and tugboat propellers during dredging activities. Suspended sediments are expected to settle back to the sea floor within a period of hours, as the dominant sediment type within the project area is sand which settles relatively quickly. However, temporary decreases in water quality could also impact adjacent coral reef health. Turbidity and suspended sediment concentrations cause increased light attenuation and reduce the amount of light available for photosynthesis. Suspended sediments may settle on and smother corals and may even disperse coral pathogens via disturbed sediments. Utilizing BMPs would aid in reducing turbidity levels. Adverse impacts to water quality are expected to be reduced through use of turbidity curtains. Additionally, the Alternative B would provide beneficial, long-term impacts to water quality by improving circulation of the currently stagnant water in the moat.

Impervious surfaces (such as the counterscarp) near maintained, cultivated landscapes can divert storm water runoff and ultimately increase the amount nitrogen, phosphorous, and suspended solids that reach the marine environment, decreasing water quality. However, repairing the counterscarp to its previous undamaged condition is unlikely to contribute substantially to the existing water quality, and construction impacts would be mitigated by implementing BMPs and ensuring nephelometric turbidity units (NTUs) are not above ambient levels. Impacts would be further mitigated through the use of appropriate erosion control measures, such as turbidity curtains and silt fences, to ensure no construction debris or other materials enter the water and adversely impact water quality. While impacts to water quality would be short-term and adverse, the impact would not be of a magnitude that would impact water quality in the long-term which could also affect survival of marine life in the project area. As such, impacts to water quality would be expected to be short-term and limited to the duration of construction-related activities.

Cumulative Impacts

The impacts of past and reasonably foreseeable future actions described in **Table 1** would have an impact on water quality. Previous actions such as the maintenance dredging, shoreline restoration, finger pier repair, and hurricane damage repairs at the fort and Garden Key and future finger pier and ferry dock repairs would have only temporary, short-term adverse impacts to existing water quality as a result of construction-related activities. The future coral removal and relocation would have no impacts on water quality. Alternative B would result in short-term adverse impacts to water quality; however, Alternative B would have an overall beneficial impact when compared to today's condition because of improved water circulation within the moat. Collectively, there would be beneficial cumulative impacts with Alternative B contributing a benefit because of better water circulation within the moat and surrounding project area.

VEGETATION

Area of Analysis

The area of analysis for vegetative resources includes all areas with existing plant communities where dredge spoil would be placed (see **Figure 5** and **Figure 6**), and the areas within and immediately adjacent to proposed construction activities (due to potential construction equipment pathways and/or staging areas).

Affected Environment

Vegetation within the park is heavily influenced by the unique environment, including extreme weather events, harsh maritime conditions (i.e., sun, sand, and salt), and the subtropical climate (NPS 2018). During creation of the fort, the majority of native plant communities were lost (NPS 2009); however, in 2015 the NPS reported that 125 plant species exist in the park, with 81 of those being of exotic origins (NPS 2015). To aid in monitoring existing vegetation within the park, the Dry Tortugas NP Vegetation Inventory Project was initiated. The project included a variety of geospatial and vegetation data products and was completed in 2012 (NPS 2018).

During vegetative surveys on Garden Key (NPS 2009) as a part of the Vegetation Inventory Project, native vegetative communities were documented. However, the vegetation within the parade grounds and atop the fort walls were not mapped as part of this effort. Furthermore, since the 2009 surveys, an isthmus has formed on Garden Key, drastically altering the previously existing vegetation.

In 2017 and 2022, wetland delineations were conducted at the fort. In April 2017, wetlands were delineated on Garden Key, and this work included identifying vegetation both within and outside the fort walls (Stantec 2017). Vegetation identified inside the fort walls included seashore dropseed (*Sporobolus virginicus*), hurricane grass (*Fimbristylis cymose*), and green buttonwood (*Conocarpus erectus*; Stantec 2017). Vegetation identified outside the fort walls included sea purslane (*Sesuvium portulacastrum*), seashore dropseed, railroad vine (*Ipomoea pes-caprae*), prickly pear (*Opuntia*), sea lavender (*Argusia gnaphalodes*), bay cedar (*Suriana maritima*), and scattered ink berry (*Scaevola plumieri*) (Stantec 2017).

Most recently in August 2022, wetlands were delineated during a site visit to Fort Jefferson in support of project planning efforts and to confirm and update the data from the 2017 wetland survey (NPS 2022). Vegetation identified during these surveys included the following species within the parade grounds: St. Augustine grass (*Stenotaphrum secundatum*), hurricane grass, and buttonwood trees (NPS 2022). Along the perimeter of the parade grounds, vegetation includes beach spider lilies (*Hymenocallis latifolia*), Geiger trees (*Cordia sebestena*), and sea grapes (*Coccoloba uvifera*) (NPS 2022).

Environmental Consequences

No Action Alternative

Under the No Action Alternative, there would be no dredging activities or movement of subsequent dredged spoil within the park. The fort and the surrounding grounds remain as-is and routine maintenance would continue. Disturbance to vegetation would not occur. The No Action Alternative would have beneficial

impacts on native vegetative communities because no dredging activities, stockpiling or construction would occur; therefore, there would be no detriment to vegetation on Garden Key.

Cumulative Impacts

The past and reasonably foreseeable future actions described in **Table 1** would have an impact on vegetation. Past actions such as the maintenance dredging, shoreline restoration, finger pier repair, and hurricane damage repairs at the fort and Garden Key would have resulted in only temporary, short-term adverse impacts to vegetation as a result of construction-related activities and would be restored to pre-construction conditions with mitigation measures in place. The future coral removal and relocation project and finger piers and ferry dock repairs would have no impacts on vegetation as this activity is limited to in-water activities. The No Action Alternative would have a beneficial impact to vegetation as no impacts to vegetation would occur and the fort would remain in its current conditions. Overall, there would be beneficial cumulative impacts with the No Action Alternative contributing an incremental benefit because no activities would occur that would impact vegetated communities on Garden Key.

Impacts of Alternative B

Alternative B would involve placing spoil from dredging activities into designated locations, covering any existing vegetation within those locations. This action would cause an adverse impact to existing vegetative communities. However, the dredge spoil locations outside the fort walls are predominantly beach habitats with limited or no vegetative cover. The vegetation that exists in these beach habitats exemplify non-significant plant communities to the overall ecology of the park. Furthermore, the dredge spoil location within the walls of the fort contains vegetation the park deemed insignificant enough to exclude the communities entirely from the latest vegetative survey (NPS 2009). As previously described and per the more recent 2017 and 2022 surveys, biologists noted the dominating presence of seashore dropseed and hurricane grass with some green buttonwood trees also present within the fort walls. Dredge spoil placement is not expected to adversely impact existing green buttonwood trees, and the grasses are expected to revegetate over time with no outside influence; therefore, impacts would be short-term.

Alternative B would also cause adverse impacts to vegetative communities immediately adjacent to construction activities, such as the grasses along the Garden Key Waterfront that are utilized by visitors. Vegetation may be damaged from the movement of construction equipment; however, this damage would not be of a magnitude that would impact the potential for areas to be able to reestablish to pre-construction conditions. In the event that native vegetation is impacted due to adjacency of construction activities, landscape restoration (i.e., seeding) may occur to restore the habitat to pre-existing conditions. Therefore, impacts to vegetative communities would be adverse but for a short term until areas are re-vegetated.

Cumulative Impacts

The past and reasonably foreseeable future actions described in **Table 1** would have impacts on vegetation. Past actions such as the maintenance dredging, shoreline restoration, finger pier repair, and hurricane damage repairs at the fort and Garden Key would have resulted in only temporary, short-term adverse impacts to vegetation as a result of construction-related activities and would be restored to pre-construction conditions due to mitigation measures. The future coral removal and relocation project and finger piers and

ferry dock repairs would have no impacts on vegetation as this activity is limited to in-water activities. Alternative B would have an adverse impact to vegetation but these impacts would be temporary for the duration of construction activities and would not affect the ability for the areas to be restored. Under Alternative B the construction-related activities would contribute to similar temporary impacts to vegetation as past and foreseeable future actions. However, it is not anticipated that Alternative B would add any meaningful incremental impacts to the overall cumulative impacts on vegetation.

WETLANDS

Area of Analysis

The area of analysis for wetland resources includes all wetland habitats and beaches below the Mean High Water (MHW) line where dredge spoil would be placed (see **Figure 5** and **Figure 6**).

Affected Environment

In April 2017, wetlands were identified and delineated on Garden Key, pursuant to NPS Procedural Manual #77-1: *Wetland Protection* (NPS 2016), Chapter 62.340 Florida Administrative Code, and the USACE Standard Wetlands Delineation Manual (Environmental Laboratory 1987). Surveys resulted in the delineation of two wetland polygons on Garden Key: one potentially jurisdictional wetland within the parade grounds and one potentially non-jurisdictional wetland along the northwest side of the Garden Key Waterfront. At the time of the 2017 delineation, the wetland within the parade grounds was determined to be 1.3 acres and was characterized as a palustrine, dominantly emergent wetland (Stantec 2017). Dominant vegetation within this wetland included seashore dropseed with some hurricane grass and several large green buttonwood trees. The parade grounds were noted as being well-drained with no signs of wetland function or hydrology, with the exception of the small low-lying wetland area near the remains of the small brick powder storage facility (Stantec 2017). Rainwater and runoff during storm events likely collects and ponds in this area, causing algal mats and other hydrologic indicators to persist. Based on conditions present at the time of the survey, this wetland was expected to be classified as non-jurisdictional under Section 404 of the CWA.

The wetland delineated along the northwest side of Garden Key Waterfront was approximately 0.7 acres and was designated as a marine, intertidal, unconsolidated shore and wetlands. The wetland was dominated by sea purslane with some seashore dropseed near higher elevations and some prickly pear, sea lavender, seashore dropseed, bay cedar, and ink berry located in lower elevations (Stantec 2017). The high percolation rates and coarse sand present within this wetland likely allows these vegetative species to become dominant, and the areas with sea purslane dominating appear to be low enough to allow water saturation into the root zones during higher tides and storm events (Stantec 2017). This wetland is expected to be classified as jurisdictional under Section 404 of the CWA based on conditions present at the time of the survey.

In August 2022, updated wetland delineations occurred to confirm and update the results of the 2017 surveys. The wetland within parade grounds was reported as being well-established and growing, with the current boundary occupying approximately 2.1 acres (NPS 2022). Frequent standing water and patchy lawn conditions were observed in this area and park staff noted the area growing progressively worse in the last

decade. The center of the parade grounds is located within a topographic depression roughly 12 inches below the surrounding uplands with soil saturation at 8 inches below the surface (NPS 2022).

Despite jurisdictional determinations made by biologists conducting the fieldwork, the ultimate decision on waters of the United States rests with the USACE. As a result, there could be adjustments to boundaries based upon review by a regulatory agency which can vary depending on various factors including, but not limited to, updates to regulatory definitions and regional considerations. In addition, the physical characteristics of the site can change over time, depending on weather, vegetation patterns, or other events.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, dredging activities or movement of subsequent dredged spoil would not occur within the park. The fort and the surrounding grounds would remain as-is and routine maintenance would continue. The moat would continue to have stagnant water with no circulation, storm events and natural shifting of sediments would continue around the moat, and recreational, concessioner and park use of the finger piers and slips would continue to deteriorate with depths too shallow for vessels to dock. If the parade grounds wetland is left as-is, the NPS believes the wetland would likely continue to grow as the lowest elevation areas convert into a saltmarsh-like habitat which could be of a magnitude that would negatively impact future compliance complications and/or yield undesirable facilities and maintenance challenges that may also harm the visitor experience. Therefore, the No Action Alternative would have potentially long-term beneficial impacts to wetland habitats as the existing low-quality wetlands within the fort would be expected to increase in size over time.

Cumulative Impacts

The past and reasonably foreseeable future actions described in **Table 1** would have impacts on wetlands. Past actions such as the maintenance dredging, shoreline restoration, finger pier repair, and hurricane damage repairs at the fort and Garden Key would have resulted in only short-term, temporary adverse impacts to wetlands as a result of construction-related activities. However, if necessary, wetland areas would have been restored to pre-construction conditions with mitigation measures in place. The future coral removal and relocation project and finger piers and ferry dock repairs would have no impacts as these projects are not within or adjacent to wetlands. Under the No Action Alternative, wetlands would remain unchanged from their current conditions. Overall, the No Action Alternative would not contribute any meaningful incremental impacts to the overall cumulative impacts to wetlands at the park.

Impacts of Alternative B

Alternative B would involve placing spoil from dredging activities into areas illustrated in **Figure 5** and **Figure 6**, which includes wetland habitat within the fort walls and beach habitat (where spoil may be below the MHW line) outside the fort walls. Dredge spoil placement within the fort walls would have an adverse impact on the delineated wetland by covering the existing vegetation. However, the vegetation is likely to return over time so the impact would be short-term, and dredge spoil placement is not expected to alter the existing hydrology or soil characteristics. Furthermore, the functionality of the wetland is poor quality and

provides little to no ecological resource benefits (NPS 2022), and if no activity occurs within the fort walls, the existing conditions would deteriorate. Allowing the wetland to continue growing would directly conflict with preservation of the cultural landscape and the associated historic structures of Fort Jefferson. The vegetation would likely continue to grow as the lowest elevation areas convert into a saltmarsh-like habitat which could add to future compliance complications and/or yield undesirable facilities and maintenance challenges and would cause long-term adverse impacts. The filling of this wetland aligns with the desired conditions of the park to protect the natural landscape of the parade grounds. Additionally, the NPS Water Resources Division (WRD) would not recognize the area delineated within the fort as a protected wetland. It is characterized as an incidental wetland, as the wet area most likely results from impoundment of freshwater within the fort combined with sea level rise due to anthropogenic reasons and provides little functional value due to its incidental nature and its position within the maintained landscape inside the fort. It was determined by NPS WRD that the placement of spoil within the fort walls and on the beaches are excepted actions previously implemented under NPS Procedural Manual #77-1: *Wetland Protection*, 4.2.1.7 for maintenance, repair and renovation of existing infrastructure and under 4.2.1.9 for wetland and beach renourishment/restoration. However, under Section 404 the CWA, the placement of dredge spoil within fort walls would have adverse impacts to 2.1 acres of low-quality wetlands within the fort walls as it would prevent further expansion of the wetland habitat. To mitigate for wetland impacts resulting from the placement of dredge material within the fort walls, compensatory mitigation in the form of wetland restoration is proposed within 8.25 acres of degraded and partially filled wetlands in the Flamingo District of Everglades National Park, as required for permitting under the CWA. This includes 0.5 acres of new wetland establishment by removing previously placed limestone fill.

Dredge spoil placement on beaches below MHW would require coordination and permitting with the USACE. The intertidal zone between Mean Higher High Water (MHHW) and MLLW is characterized as a wetland under NPS Procedural Manual #77-1, and the placement of dredged material will occur within these wetlands. However, the placement of dredged material will not affect the wetland function or quantity because the dredged beach sand will only replace the affected intertidal area seaward of the current location; there will be no differences in beach slope or composition. The spoil placement is likely not of a magnitude that would impact the function of the shorelines because this would have long-term beneficial impacts by improving the fort's resiliency against future shoreline damage and beach loss. Therefore, there are no anticipated issues with either the dredging activities or spoil placement, as this project is for maintenance of infrastructure and restoration of degraded habitat. Impacts to beaches from spoil placement below the MHW would be long-term and beneficial by renourishing and restoring the shoreline.

The NPS WRD determined that a Wetland Statement of Findings (WSOF) and FSOE are not required for the dredge spoil placement within the fort walls and on the beaches. As previously discussed, spoil placement along beach habitat and within the fort walls are excepted actions previously implemented by the NPS for maintenance, repair and renovation of existing infrastructure (DO 77-1: 4.2.1.7) and is an action for wetland and beach renourishment/restoration (DO 77-1: 4.2.1.9).

Cumulative Impacts

The impacts of past and reasonably foreseeable future actions described in **Table 1** would have impacts on wetlands. Past actions such as maintenance dredging, shoreline restoration, finger pier repair, and hurricane damage repairs at the fort and Garden Key would have resulted in temporary, short-term adverse impacts

to wetlands as a result of construction-related activities. However, if necessary, wetland areas would have been restored to pre-construction conditions with mitigation measures in place. The future coral removal and relocation project and finger piers and ferry dock repairs would have no impacts to wetlands as it is not occurring within or adjacent to wetlands. Under Alternative B, the placement of dredge spoil material within the parade grounds would have long-term minor adverse impacts to wetlands by filling the existing low-quality wetland and preventing its spread. The placement of dredge spoil material along the beaches would have long-term beneficial impacts by improving the beaches and the fort's resiliency against shoreline damage from wind and storms. However, the proposed compensatory mitigation under Alternative B would have long-term beneficial impacts to wetlands by restoring wetland habitat in the Flamingo District. Overall, it is not anticipated that Alternative B would contribute any meaningful incremental impacts to overall cumulative impacts on wetlands.

HUMAN HEALTH AND SAFETY

Area of Analysis

The area of analysis for human health and safety encompasses the fort and the surrounding areas on Garden Key such as the counterscarp, moat and finger pier slips.

Affected Environment

While recognizing that there are limitations on its capability to totally eliminate all hazards, the park and its concessioners, contractors, and cooperators will seek to provide a safe and healthful environment for visitors and employees (NPS 2006). One of the objectives of this EA is to restore visitor use and experience to conditions prior to Hurricane Irma. Human safety at the fort has been compromised as a result of the 2017 hurricane season. The fort is the primary destination for visitors, with the counterscarp as one of the main attractions for visitors at the park. Typically, visitors are able to walk around the full perimeter of the counterscarp. Since Hurricane Irma, access to the counterscarp has been limited due to unsafe conditions on two sides of the fort, with nearly 550 ft closed to the public. The counterscarp is still accessible to visitors, but visitors can no longer walk the counterscarp in its entirety due to the collapse. Swimming and snorkeling along the counterscarp are also popular activities for visitors. Currently, portions of the counterscarp are damaged or missing as a result of the 2017 hurricane season, limiting visitor, concessioner and staff access to the counterscarp. Even though access to the counterscarp is limited due to safety concerns, the fort is still a popular visitor use area and is active with continued daily and overnight visitors and park operations. In addition, the sedimentation buildup in the moat is currently transitioning into a hypoxic ecosystem that is encouraging both algae and mosquito populations that could cause impacts to human health from potential mosquito-borne diseases, and respiratory or skin irritants from potential bacteria and/or toxins in the algae.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, there would be no repairs to the counterscarp or dredging activities and the site would be maintained in its current condition. The fort and the surrounding grounds would remain

as-is and routine maintenance would continue. The counterscarp would remain in a deteriorated state with limited access which would continue to cause safety issues for visitors, concessioners and park staff. The counterscarp would continue to deteriorate over time. The continual buildup of sedimentation within the moat could increase algal growth and mosquito propagation, which could result in an adverse effect on human health and safety due to the potential to cause illness. Therefore, human health and safety would continue to deteriorate under the No Action Alternative which is likely of a magnitude that would negatively impact human health and safety in the long-term at the fort.

Cumulative Impacts

The past and reasonably foreseeable future actions described in **Table 1** would have impacts on human health and safety. The past actions such as the maintenance dredging, finger pier repair, and hurricane damage repairs at the fort and Garden Key would result in long-term beneficial impacts on human health and safety, so the fort and finger piers could be accessed safely by the park staff and visitors. Human health and safety would remain unchanged from current conditions but continue to deteriorate over time under the No Action Alternative. The future coral removal and relocation project and finger piers and ferry dock repairs would have no impacts to human health and safety as this project would not interfere with the health or safety of visitors, concessioners or park staff. Under the No Action Alternative, human health and safety would remain unchanged from existing conditions but would continue to deteriorate over time. Overall, there would be adverse cumulative impacts with the No Action Alternative contributing an incremental effect in the deterioration of the fort which would further hinder the health and safety of visitors, concessioners and park staff.

Impacts of Alternative B

Under Alternative B, the portions of the counterscarp that are damaged or have collapsed would be repaired. The moat would be dredged which would reduce mosquito propagation and create a healthier environment for visitors, concessioners and park staff. During construction, access to the project area would be temporarily disrupted, as portions of the area on land and in the water would be periodically closed to accommodate construction activities. During counterscarp repairs, the counterscarp would be divided in half and work would be done in two distinct areas, to allow visitors and construction workers safe and separated access. Swimming areas near construction sites and the sections of the counterscarp under repair would be limited.

Closure areas would include signage and areas be delineated with limited fencing/barriers surrounding the work areas. If necessary, temporary barriers/fencing would be installed in the water to temporarily block swimming in the construction zones. Flaggers would be on site to direct visitors and concessioners away from construction areas for safety. Visitors and concessioners would be excluded from the construction area for safety purposes but would retain access to remaining areas of the fort and water. The emergency access pathway to the helipad on the south coaling dock would be delineated. In addition, redirection of foot traffic through signage and barriers/fencing would be required to and from the ferry and sea plane area to keep visitors safe and out of construction areas. The park would implement a traffic management plan for pedestrians and marine vessels to reduce any potential impacts on visitors and concessioners. In addition, rat bait stations would be deployed on the construction vessels/barges to mitigate the reintroduction of the recently eradicated rat population on the island. Impacts to human health and safety would be limited to the duration of construction activities and would not be of a magnitude that would

impact visitors, concessioners or park staff because measures would be in place to prevent hazardous safety issues. After construction is complete, there would be long-term beneficial impacts to human health and safety as the counterscarp would be repaired and the moat would be dredged, mitigating the hazards currently at the fort caused by the 2017 and 2022 hurricane season.

Cumulative Impacts

The past and reasonably foreseeable future actions described in **Table 1** would have impacts on human health and safety. Past actions such as the maintenance dredging, finger pier repair, and hurricane damage repairs would result in long-term beneficial impacts on human health and safety. The future coral removal and relocation project and finger piers and ferry dock repairs would have no impacts to human health and safety. Under Alternative B, the counterscarp repairs and dredging of the moat would mitigate the safety hazards to visitors, concessioners and park staff that exist today at the fort from the hurricanes. Overall, there would be beneficial cumulative impacts with Alternative B contributing a noticeable incremental beneficial impact to human health and safety at the fort.

VISITOR USE AND EXPERIENCE

Area of Analysis

The area of analysis refers to the geographic setting within which an impact to visitor use and experience may occur. The impacted area encompasses the fort and the surrounding areas on Garden Key such as the parade grounds, counterscarp, moat, docks and finger piers and slips and adjacent waters.

Affected Environment

The vast expanses of open sea and sky, along with the remote location of Dry Tortugas NP, offer unique recreational opportunities and visitor experiences in a subtropical marine environment unlike any other in the NPS. Visitors experience the park through recreational activities such as touring Fort Jefferson, snorkeling, scuba diving, paddle boarding, camping, bird-watching, boating, and recreational fishing (NPS 2017). Enjoyment of park resources and values by the public is a fundamental purpose of the National Park system. NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy national park units (NPS 2006). Fort Jefferson is the focal point for many visitors to the park. The visitor contact station is located within the fort. The project area hosts a dynamic intertidal ecosystem with corals and tropical marine life such as sea turtles, tropical reef fish and sharks. Sea turtles and migratory shore birds nest on the island. These species and ecosystems are a large part of the visitor experience and reason for the site's allure. Camping north of the south coal dock is a popular attraction for visitors. Day and overnight visitors enjoy snorkeling and swimming, fishing, bird watching, walking the counterscarp, picnicking, and viewing the history and culture showcased by the fort. Additionally, the walkway along the counterscarp served as an important historic trail, along with the views along it, that today aid in telling the story of the fort. The combination of natural resources and nationally significant cultural resources in a remote subtropical marine environment affords visitors the unique opportunities to enjoy the solitude, dark skies, and seascapes of the park.

In response to the condition of the counterscarp as a result of the 2017 hurricane season, portions of the counterscarp are limited to visitors. Buildup of sediment and an interruption of tidal flushing in the moat has created a stagnant environment that reduces the visibility of the water for swimmers, limits swimmer access, deters marine life, and creates an unpleasant odor. In addition, sedimentation build up has limited visitors from accessing the finger piers and slips, restricting privately-owned recreational vessel access.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, there would be no repairs to the counterscarp, moat or finger pier slips would not be dredged. The fort and the surrounding grounds would remain as-is and routine maintenance would continue. Further deterioration of the counterscarp would take place over time from storm events under the No Action Alternative. The counterscarp would remain in a deteriorated state and visitors would continue to have limited access to the counterscarp, one of the main attractions of the park. The continual buildup of sedimentation within the moat and waterfront of Garden Key would further deter visitors and reduce the quality of their visit. The use of the finger piers and slips would be of limited availability for private, concessioner and park use. Overnight campers and day visitors would experience the stagnant environment of the moat which contrasts with the pristine environment and marine life the park is known for. Additionally, the moat is currently transitioning into a hypoxic ecosystem that is encouraging both algae and mosquito populations that are not ideal for visitor experience. Under the No Action Alternative, visitor use and experience would remain unchanged from current conditions, but would continue to deteriorate over time. Therefore, the No Action Alternative would contribute to the continued deterioration of the fort of a magnitude that would negatively impact visitor use and experience in the long term.

Cumulative Impacts

The past and reasonably foreseeable future actions described in **Table 1** would have impacts on visitor use and experience. Past actions such as the maintenance dredging, shoreline restoration, finger pier repair, and hurricane damage repairs at the fort and Garden Key would have resulted in long-term beneficial impacts on visitor use and experience by restoring the site to be more accessible to visitors and enhance visitor experience. The future coral removal and relocation project would result in short-term adverse impacts to visitor use and experience by removing some of the corals along the counterscarp, which are an attraction to visitors. The future finger piers and ferry dock repairs would potentially result in short-term, adverse impacts to visitor use and experience by limiting access to the finger piers and ferry dock during construction activities. Overall, the No Action Alternative would contribute adversely to existing impacts from past, present, and reasonably future actions because there would be no repairs to the counterscarp or dredging of the moat, an attraction to visitors that may have limited access over time resulting in long-term adverse cumulative impacts to visitor use and experience.

Impacts of Alternative B

Under Alternative B, the damaged portions of the counterscarp would be repaired, and the moat and finger pier slips would be dredged. During construction, there would be short-term adverse impacts to visitor use and experience. There would be temporary impacts from noise, viewsheds and interaction with contractors

during construction. Construction activities would take place over ten months and would require the finger piers and slips, portions of the counterscarp, parade grounds and areas outside of the fort to be closed to visitors intermittently. In addition, the movement of construction related equipment and materials would limit visitor access to certain areas of the fort. Parts of the swimming areas would be closed due to construction activities and associated marine vessel traffic. Visitors would be excluded from the construction area by flaggers, signage, and barriers/fencing on land, and if necessary, in the water. A pedestrian traffic management plan would be prepared to reduce potential impacts on visitors, as well as the concessioner operations at the fort.

The dredging activities would take place in three distinct, disconnected locations to allow visitors segmented access to the site, rather than closing all three locations at the same time. There would be temporary congestion at finger piers and slips and less availability of private boat space and recreational fishing during construction activities. Physical disturbances associated with dredging activities would deter fish from the area for viewing and recreational fishing. The north and south beaches would be temporarily closed while the dredge spoil is placed on the beaches. In addition, portions of the parade grounds would be closed to visitors during dredge spoil placement activities (see **Figure 5**). During times with higher visitation, the accessible swimming areas or the accessible parts of the counterscarp could become crowded during construction activities.

Following construction, Alternative B would restore depth at the finger piers slips to allow for full use of docks for vessels and fishing. Increased depths may also improve fish habitat and fishing from the slips. Repairs to the counterscarp would restore access to walking entirely around the fort and increase opportunities for viewing the marine habitat, wildlife and seascapes. The restored water circulation of the moat would improve water quality, which would improve swimming and snorkeling conditions and marine habitat and provide better viewing opportunities of the marine habitat from the counterscarp. The dredged moat would reduce mosquito propagation and create a more pleasant environment for visitors. With restored access, new and returning visitors would likely visit Dry Tortugas NP. During construction activities, Alternative B would result in short-term adverse effects to visitor use and experience due to limited access to the fort; however, this disturbance would not be of a magnitude that would prevent or degrade visitor use and experience. Ultimately, after construction is completed there would be long-term beneficial effects to visitor use and experience as the proposed improvements would restore visitor use and experience to levels prior to Hurricane Irma and improve the recreational activities available at the fort.

Cumulative Impacts

The past and reasonably foreseeable future actions described in **Table 1** would have impacts on visitor use and experience. Past actions such as the maintenance dredging, shoreline restoration, finger pier repair, and hurricane damage repairs at the fort and Garden Key would have resulted in long-term beneficial impacts on visitor use and experience by restoring the site to be more accessible to visitors and enhance visitor experience. The future action of the coral removal and relocation project may result in short-term adverse impacts to visitor use and experience by removing some of the corals at the fort which are an attraction to snorkelers; however, not all corals would be removed in the project area. The future finger piers and ferry dock repairs would potentially result in short-term adverse impacts to visitor use and experience by limiting access to the finger piers and ferry dock during construction activities; however, after construction visitor access would be improved. Alternative B would have an overall beneficial impact when compared to

today's condition by providing improved desired conditions at the fort and restoring the site to pre-hurricane conditions. Overall, there would be long-term beneficial cumulative impacts with Alternative B contributing a noticeable incremental beneficial impact to visitor experience at the fort.

CHAPTER 4: CONSULTATION AND COORDINATION

The NPS places a high priority on public involvement in the NEPA process and on giving the public an opportunity to review the proposed action. Consultation and coordination with federal, state, and local agencies was conducted to identify issues and concerns related to natural and cultural resources within the park. This chapter describes the public involvement and agency and Tribal consultation used during the preparation of the Fort Jefferson Counterscarp and Dredging of Selected Areas EA.

PUBLIC INVOLVEMENT

Civic Engagement

Civic engagement was conducted in January and February 2022 to provide the public an opportunity to comment on the repairs and maintenance dredging at Fort Jefferson in Dry Tortugas NP. The NPS issued a press release to local media outlets and outside agencies, and email announcements were prepared and distributed on the NPS' email distribution list on January 15, 2022, and to the Florida State Clearinghouse on January 19, 2022. The NPS posted project information, including the newsletter, on the NPS Planning, Environment and Public Comment (PEPC) website, the park website and social media accounts. The NPS invited the public to provide questions or suggestions on the project electronically, through the PEPC website, or by mailing written comments. No public meetings were held for this project.

Comments were received during the public comment period between January 14th and February 14th, 2022. Comments were received through PEPC. The public raised concerns regarding impacts to threatened and endangered species, wildlife and benthic resources; cultural preservation of the fort; resiliency and climate change and requests for additional components to be added to the proposed action. In general, commenters expressed support for the proposed improvements.

Environmental Assessment Review

This EA will be available for a 30-day public comment period. The public comment period will be announced by press release, posts on the PEPC website, and by electronic mail sent to the park mailing list. Agencies and tribes also will be notified by letter. Hardcopies of this EA will be available for review at Everglades NP headquarters. During this time, the public can provide feedback and questions online at <http://parkplanning.nps.gov> or mail comments to Superintendent, Attn: Fort Jefferson Counterscarp Repairs Project, 40001 State Road 9336, Homestead, Florida 33034. After the close of the public comment period, all public comments will be reviewed and analyzed prior to the release of a NPS decision document.

AGENCY CONSULTATION

NPS initiated consultation with relevant agencies during the preparation of this EA. Consultation efforts, as described in the following section, including the USACE, NOAA Fisheries, USFWS, Florida Department of Environmental Protection (FDEP), SHPO and the Tribes, began during civic engagement and continued through the preparation of this EA. All agencies will be provided with a copy of this EA for review and comment.

ESA and Magnuson-Stevens Fishery Conservation and Management Act Consultation

Section 7 of the ESA and MSFCMA requires federal agencies to ensure that the actions they authorize, fund, or carry out do not jeopardize the continued existence of listed species nor destroy or adversely affect critical habitat and the management of fisheries. The NPS conducted early coordination with the USFWS and NOAA Fisheries on this project. A Biological Assessment is being prepared, and the NPS will complete Section 7 and MSFCMA consultation prior to finalizing the NPS decision document for this plan.

Section 106 of the National Historic Preservation Act Consultation

The NPS is consulting with the State Historic Preservation Officer. NPS will complete the Section 106 consultation process prior to preparing a NPS decision document for this plan.

Tribal Consultation

The NPS is consulting with the Seminole Tribe of Florida, the Seminole Nation of Oklahoma, as well as the Miccosukee Tribe of Indians of Florida. NPS will complete Tribal consultation prior to preparing an NPS decision document for this plan.

CHAPTER 5: PREPARERS AND PLANNING TEAM

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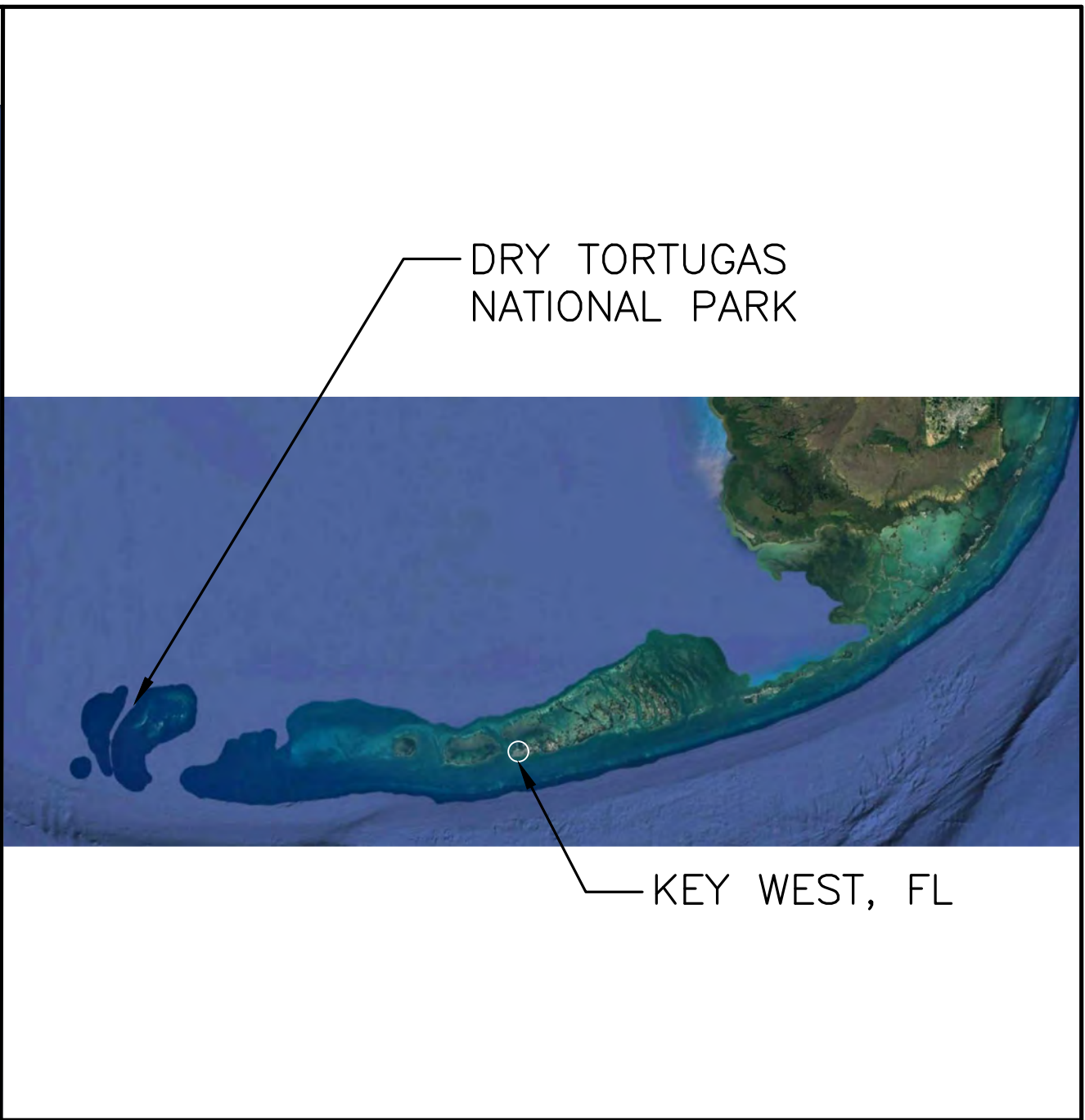
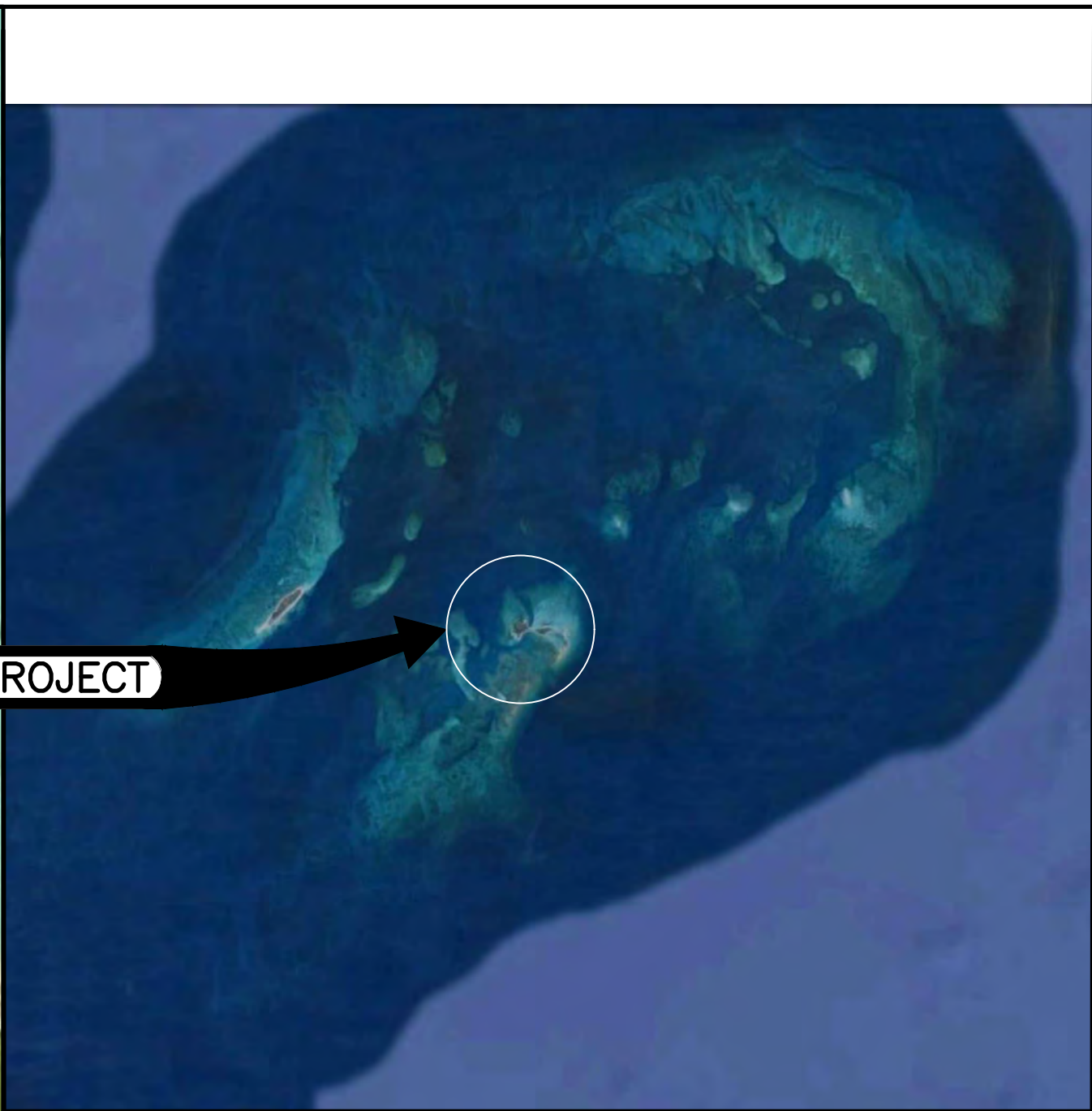
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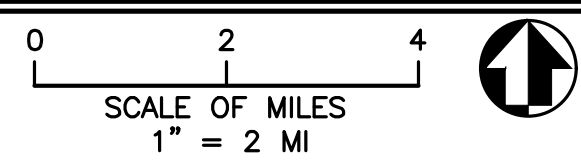
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APPENDIX A – DRAFT PERMITTING DRAWINGS

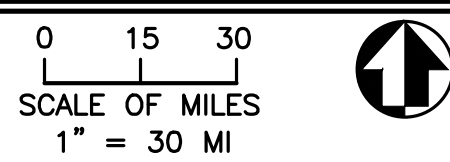
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DRY TORTUGAS
NATIONAL PARK



MONROE COUNTY
FLORIDA



GARDEN KEY, DRY TORTUGAS NATIONAL PARK

PERMIT DRAWINGS
NOT FOR CONSTRUCTION

BASIC DATA:

Mark	Sheet	REVISION	Date	Initial	QUALITY DESIGN CERTIFICATION
		PERMITTING SET	8/24/22	CP	<input type="checkbox"/> Prepared in Accordance with Design Development (Title I) Drawing No. _____ OR <input type="checkbox"/> Variance from Design Development (Title I) Approved by Superintendent on _____ Date _____ OR <input type="checkbox"/> Construction Drawing Not Preceded by Design Development (Title I)
					Project Manager _____ Date _____

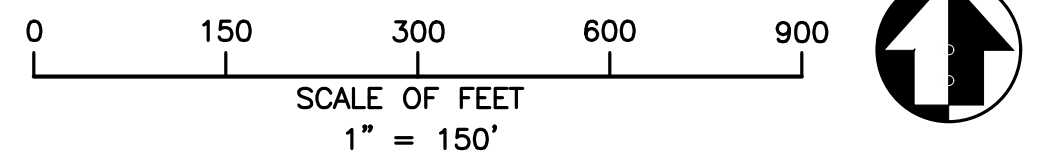


PERMIT DRAWINGS
UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE DENVER SERVICE CENTER

TITLE OF DRAWING REPAIRS TO FORT JEFFERSON COUNTERSCARP & MAINTENANCE DREDGING AT GARDEN KEY WATERFRONT LOCATION WITHIN PARK FORT JEFFERSON NAME OF PARK GARDEN KEY, DRY TORTUGAS NATIONAL PARK REGION COUNTY STATE SOUTHEAST MONROE FLORIDA
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DRAWING NO. 364 149081 PMIS/PKG NO. 244370 & 244372 SHEET 1 OF 19
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PMIS 244370 & 244372



11/4/2022 2:20 PM CHRRPRICE H:\P&H PROJECTS\NPS\NPS_Dry Tortuga (DTRT)\Task Order 5 (C1's)\6.0_CAD_BIM\6.2_Work_in_Progress\5-SHEETS\G1.dwg

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22	C3.4	TYPICAL DREDGE PLACEMENT SECTIONS

ABBREVIATIONS	
(BLK)	BLACK
(WHT)	WHITE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
C TO C	CENTER TO CENTER
CIP	CAST IN PLACE
CJ	CONSTRUCTION JOINT
CL	CENTERLINE
CLR	CLEAR
CONC	CONCRETE
CONT	CONTINUOUS/CONTINUED
CP	CONTROL POINT
EL.	ELEVATION
EQ.	EQUAL
EXIST	EXISTING
EXP	EXPANSION
FT	FEET
GALV.	GALVANIZED
GVWR	GROSS VEHICLE WEIGHT RATING
HDPE	HIGH-DENSITY POLYETHYLENE
HIM	HURRICANE IRMA-MARIA
HMW-PE	HIGH MOLECULAR WEIGHT POLYETHYLENE
ID	IDENTIFICATION
IN.	INCHES
JT	JOINT
LB	LAND BORING
LF	LINEAR FEET
LIC	LINE ITEM CONSTRUCTION
LLV	LONG LEG VERTICAL
MAX	MAXIMUM
MHHW	MEAN HIGHER-HIGH WATER
MIL	0.001 INCHES
MIN	MINIMUM
MLLW	MEAN LOWER-LOW WATER
NAVD 88	NORTH AMERICAN VERTICAL DATUM OF 1988
NTS	NOT TO SCALE
OC	ON-CENTER
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
REIN	STEEL REINFORCING
SF	SQUARE FEET
SS	STAINLESS STEEL
SCH	SCHEDULE
SQ	SQUARE
SSP	STEEL SHEET PILE
STA.	STATION
STD	STANDARD
SWPPP	STORM WATER POLLUTION PREVENTION PLAN
T&B	TOP AND BOTTOM
THWN	THERMOPLASTIC HEAT AND WATER-RESISTANT NYLON COATED
TOC	TOP OF CONCRETE
TYP	TYPICAL
UNK	UNKNOWN
USA	UNITED STATES OF AMERICA
W/	WITH
WP	WORK POINT
WWF	WELDED WIRE FABRIC

DESIGNED: J. LAFASO	SUB SHEET NO. G1	TITLE OF SHEET INDEX OF DRAWINGS	DRAWING NO. 364 149081
CADD C. PRICE			PMIS/PKG NO. 244370 & 244372
TECH. REVIEW: J. BERG			SHEET
DATE: SEP 2022			GARDEN KEY, DRY TORTUGAS NATIONAL PARK MONROE COUNTY, FL
			2 OF 22

8/25/2022 10:28 AM CHRPRICE H:\PAH PROJECTS\NPS\WFS_Dry Tortuga (DRTG)\Task Order 5 (C015)\6.0_CAD_BIM\6.2_Work_in_Progress\5-SHEETS\G2.dwg

CONCRETE (LARGE-SCALE PLAN)

CONCRETE (PLAN AND/OR SECTION)

GRAVEL FILL (PLAN AND/OR SECTION)

EARTH (SECTION)

ROCK (SECTION)

TIMBER (PLAN)

TIMBER DECKING

ARCHITECTURAL

1¹/₈"

8"

5¹/₈"

ENGINEERING

1.04'

0.44'

0.35'

GENERAL SYMBOLOGY

ARROW INDICATES DIRECTION OF PLAN NORTH

TARGET ELEVATION

(XX.XX')

EXISTING ELEVATION

XX.XX'

DESIGN ELEVATION

A

BEAM/BENT IDENTIFIER

X

MISCELLANEOUS IDENTIFIER

KEY NOTE DESIGNATION

KEY NOTE NUMBER

--- --

CENTERLINE

LIMITS OF WORK ZONE

MATCH LINE

X

XX

PLAN

NO SCALE

PLAN TITLE

SECTION LETTER

FLAG INDICATES DIRECTION OF SECTION CUT

X

XX

SHEET WHERE SECTION IS LOCATED

SECTION CUT MARKER

SECTION LETTER

SECTION

NO SCALE

SECTION TITLE

#

XX

DETAIL NUMBER

SHEET WHERE DETAIL IS LOCATED *

DETAIL MARKER

FOR REFERENCING DETAILS INCLUDED IN DRAWING SET.

XXXXXXXXXX

DETAIL MARKER

FOR REFERENCING DETAILS BOUND IN SPECIFICATIONS OR SEPARATE VOLUME.

#

XX

DETAIL NUMBER

SHEET WHERE DETAIL WAS CALLED OUT *

DETAIL

NO SCALE

DETAIL TITLE

#

XX

ELEVATION NUMBER

ARROW INDICATES POINT OF VIEW

SHEET WHERE ELEVATION IS LOCATED *

ELEVATION MARKER

ELEVATION IDENTIFICATION NUMBER

#

XX

ELEVATION

NO SCALE

ELEVATION TITLE

* EXCEPTIONS WHERE THE SHEET NUMBER IS REPLACED BY A DASH (-).

1) FOR COMMON DETAILS, SECTIONS, ELEVATIONS OR DETAILS THAT ARE CUT OR CALLED OUT ON MULTIPLE SHEETS.

2) SECTIONS, ELEVATIONS OR DETAILS THAT ARE LOCATED ON THE SAME SHEET THEY ARE CUT OR CALLED OUT ON.

1. PROJECT GENERAL NOTES:

A. ALL DETAIL DIMENSIONS ARE IN FEET AND INCHES, UNLESS OTHERWISE NOTED. PLANS AND ENLARGED PLANS ARE IN DECIMAL FEET.

B. ALL ELEVATIONS ARE IN DECIMAL FEET UNLESS OTHERWISE NOTED.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS, NOT IDENTIFIED AS "GOVERNMENT-PROVIDED" PERMITS, BONDS AND INSURANCE REQUIRED FOR THE PROJECT.

D. CONTRACTOR SHALL NOT COMMENCE ANY CONSTRUCTION OPERATIONS UNLESS IT IS VERIFIED THAT RELEVANT CONSTRUCTION PERMITS HAVE BEEN ACQUIRED.

E. CONTRACTOR SHALL PREVENT DEMOLITION AND CONSTRUCTION DEBRIS FROM ENTERING THE ADJACENT WATER BODY.

F. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, DIMENSIONS, ELEVATIONS AND INFORMATION INDICATED ON THE CONTRACT DOCUMENTS PRIOR TO COMMENCEMENT OF SITE WORK. THE CONTRACTING OFFICER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES FOUND ON THE CONTRACT DOCUMENTS OR FOUND TO EXIST BETWEEN THE FIELD CONDITIONS AND THE CONTRACT DOCUMENTS.

G. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE SIGNED AND SEALED CONSTRUCTION DOCUMENTS. ANY DEVIATION FROM THE APPROVED CONSTRUCTION DOCUMENTS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO UPDATE/REPLACE ANY DEFICIENT MATERIAL/EQUIPMENT NECESSARY TO BRING THE FINAL PRODUCT TO THE STANDARDS OF THE SIGNED AND SEALED CONSTRUCTION DOCUMENTS.

H. THE LOCATION OF UTILITIES SHOWN ON THE DRAWINGS ARE FROM INFORMATION PROVIDED BY ATKINS NORTH AMERICA, INC. AND HAVE NOT BEEN VERIFIED BY SURVEY OTHER THAN WHAT WAS VISIBLE AT THE SURFACE AT THE TIME OF THE SURVEY. THE CONTRACTOR SHALL RETAIN A UTILITY LOCATOR TO INVESTIGATE THE PROJECT WORK AREA TO IDENTIFY EXISTING UTILITIES. IF CONDITIONS DIFFER CONTACT THE CONTRACTING OFFICER IMMEDIATELY BEFORE PROCEEDING WITH CONSTRUCTION.

I. THE CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTION TO VERIFY UTILITY LOCATIONS, SHOWN OR NOT SHOWN IN THE PLANS PRIOR TO EXCAVATION AND TAKE ALL MEASURES TO PROTECT UTILITIES DURING CONSTRUCTION. PROTECTION SHALL INCLUDE VERIFYING BURIED UTILITY LOCATIONS AND PHYSICALLY MARKING SAID LOCATIONS WITH FLAGGING APPROVED BY THE CONTRACTING OFFICER FOR THE DURATION OF THE WORK. SHOULD ANY UTILITY LINE OR COMPONENT BECOME DAMAGED OR REQUIRE RELOCATION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CONTRACTING OFFICER.

J. THE CONTRACTOR SHALL PROTECT EXISTING UTILITIES, SURVEY MARKERS, MONUMENTS, ETC. DURING CONSTRUCTION, EXCEPT AS NOTED FOR DEMOLITION/REMOVAL. THE CONTRACTOR SHALL RESTORE/REPLACE ANY DAMAGE DUE TO CONSTRUCTION ACTIVITIES.

K. ALL UTILITIES SHALL BE PROTECTED IN PLACE, AT NO EXPENSE TO THE OWNER, UNLESS INDICATED OTHERWISE IN THE DRAWINGS. CONTRACTOR MAY, AT HIS COST, RELOCATE OR REMOVE AND REPLACE UTILITIES TO FACILITATE CONSTRUCTION. ALL UTILITY INTERRUPTIONS AND/OR OUTAGES MUST BE COORDINATED WITH AND APPROVED BY THE CONTRACTING OFFICER. ANY PERMANENT CONSTRUCTION SHALL BE CLEARLY AND FULLY DIMENSIONED IN RECORD DRAWINGS.

L. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES CAUSED BY HIS OPERATIONS.

M. THE CONTRACTOR SHALL NOTIFY THE CONTRACTING OFFICER 48 HOURS PRIOR TO INITIATING ANY EXCAVATION ACTIVITIES, OR AS OTHERWISE REQUIRED BY THE CONTRACTING OFFICER.

N. THE CONTRACTING OFFICER SHALL BE GIVEN A MINIMUM 48 HOURS NOTICE OF ALL MEETINGS AND OR TESTING MEASURES RELATED TO SAID PROJECT.

O. PROVIDE ADDITIONAL NOTICE WHERE REQUIRED IN SPECIFICATION AND CONTRACT.

P. THE CONTRACTOR IS RESPONSIBLE FOR CLEARLY

IDENTIFYING THE AREA OF CONSTRUCTION AND SAFELY ROUTING ALL VEHICULAR AND PEDESTRIAN TRAFFIC AROUND THE CONSTRUCTION AREA. THE CONSTRUCTION AREA SHALL BE CLEARLY MARKED AT ALL TIMES.

Q. THE CONTRACTOR SHALL PERFORM WORK IN COMPLIANCE WITH ALL OSHA REQUIREMENTS. WHERE NECESSARY PER OSHA REQUIREMENTS.

R. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS, PREPARED IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS, OF ALL STRUCTURES AND TEMPORARY WORKS AND PROVIDE REQUIRED EQUIPMENT AND MATERIAL SUBMITTALS TO THE CONTRACTING OFFICER FOR REVIEW PRIOR TO THE PURCHASE AND/OR INSTALLATION OF ANY STRUCTURES, EQUIPMENT, AND/OR MATERIAL.

S. SURVEY MONITORING CONTROLS:

1.) THE CONTRACTOR SHALL PERFORM AND PROVIDE A SIGNED AND SEALED POST-CONSTRUCTION SURVEY OF THE WORK PERFORMED USING PROJECT STATIONING. TOPOGRAPHIC SURVEY ELEVATIONS SHALL BE TAKEN ON A MAX 25-FOOT BY 25-FOOT GRID. SURVEY SHALL EXTEND TO A PERIMETER 50 FEET BEYOND THE WORK LIMITS.

a. RECORD ALL FEATURES AND STRUCTURES WITHIN THE WORK LIMITS.

b. RECORD ALL TIE-IN POINTS WITH EXISTING FEATURES.

2. CIVIL WORKS GENERAL NOTES:

A. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED IF DEEMED NECESSARY BY THE CONTRACTING OFFICER.

B. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MEANS AND METHODS NECESSARY TO FACILITATE CONSTRUCTION OF COMPLETED CIVIL WORKS. THESE MEANS AND METHODS SHALL INCLUDE, BUT NOT BE LIMITED TO: INSTALLATION AS NECESSARY TO PROTECT THE INTEGRITY OF THE WORK SITE, THE CONTRACTOR AND THE PUBLIC.

C. ALL CONSTRUCTION EXITS SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF DIRT/DEBRIS ONTO ADJACENT PROPERTY OR ANY PUBLIC RIGHT-OF-WAY. ALL MATERIALS SPILLED, DROPPED, WASHED OR TRACKED ONTO ADJACENT PROPERTY OR INTO STORM DRAINS SHALL BE PROMPTLY REMOVED BY CONTRACTOR AT CONTRACTOR'S EXPENSE.

D. THE CONTRACTOR SHALL PRESERVE AND PROTECT ALL GROUND SURFACES AND EXISTING HARDSCAPE FEATURES WITHIN THE CONSTRUCTION LIMITS FOR THE DURATION OF THE WORK. AT MINIMUM, THE CONTRACTOR SHALL PROVIDE GROUND PROTECTION MEASURES (E.G. HDPE PLASTIC MATS, OR TIMBER CRANE MATS AS APPROVED BY THE CONTRACTING OFFICER) OVER GRASSES AND LANDSCAPED AREAS THAT WILL BE USED FOR ACCESS BETWEEN THE STAGING AREAS AND THE CONCRETE APRON, AND OVER AREAS THAT WILL BE USED FOR MATERIAL AND EQUIPMENT LAYDOWN. GROUND PROTECTION MEASURES SHALL PREVENT THE OCCURRENCE OF RUTS IN THE GRASSED AND LANDSCAPED AREAS. VEHICLES AND FOOT TRAFFIC ARE PROHIBITED ON GRASSED OR LANDSCAPED AREAS OUTSIDE THE LIMITS OF CONSTRUCTION WITHOUT CONTRACTING OFFICER APPROVAL, AND INSIDE THE LIMITS OF CONSTRUCTION WITHOUT APPROVED GROUND PROTECTION MEASURES IN PLACE. THE CONTRACTOR SHALL INSPECT THE CONDITION OF THE GROUND PROTECTION MEASURES ON A DAILY BASIS AND SHALL REPAIR OR REPLACE SAID MEASURES AS NEEDED THROUGHOUT THE WORK. THE CONTRACTOR SHALL REPLACE GRASSED LANDSCAPED AREAS WITH SOD/VEGETATION TO MATCH THE SURROUNDING AREAS UPON REMOVAL OF THE GROUND PROTECTION MEASURES. THE CONTRACTOR SHALL ESTABLISH SOD/VEGETATION FOR 60 DAYS FOLLOWING INITIAL PLACEMENT. FINAL ACCEPTANCE SHALL BE DETERMINED BY THE CONTRACTING OFFICER. REJECTED VEGETATION SHALL BE REPLACED AND ESTABLISHED FOR ANOTHER 60 DAYS AT NO EXPENSE TO THE GOVERNMENT.

3. SEDIMENT AND EROSION CONTROL NOTES:

A. CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE ENVIRONMENTAL PROTECTION AGENCY (EPA) AND THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES).

B. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE ENVIRONMENTAL AND REGULATORY REQUIREMENTS, AS REQUIRED BY AGENCIES WITH JURISDICTIONAL POWERS. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING A SWPPP WITH EROSION AND SEDIMENT CONTROL AND FOR PROVIDING NECESSARY AND ADEQUATE MEASURES FOR PROPER CONTROL OF EROSION DUE TO RUNOFF FROM THE SITE PRIOR TO INITIATING CONSTRUCTION OPERATIONS IN A PARTICULAR AREA. ALL SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO START OF CONSTRUCTION. FIELD ADJUSTMENTS WITH RESPECT TO LOCATIONS AND DIMENSIONS MUST BE MADE AS REQUESTED BY THE CONTRACTING OFFICER.

C. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AT LEAST WEEKLY AND AFTER EACH RAIN FOR DAMAGE AND GENERAL EFFECTIVENESS. ANY DAMAGED OR INEFFECTIVE CONTROLS SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

D. EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES.

E. TEMPORARY AND PERMANENT MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

F. ALL TEMPORARY SEDIMENT CONTROL DEVICES SHALL BE LEFT IN PLACE AND MAINTAINED UNTIL THE CONSTRUCTION HAS BEEN COMPLETED. AFTER CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL REMOVE DEVICES AND COLLECTED SEDIMENT FROM THE WORK AREA.

4. STRUCTURAL DESIGN NOTES:

A. DESIGN LIFE: 40 YEARS

B. BUILDING CODE: INTERNATIONAL BUILDING CODE (IBC), 2015 VERSION

C. ACI 318-14: BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE

D. DETAILED SPECIFICATIONS FOR STRUCTURAL MATERIAL AND INSTALLATION REQUIREMENTS ARE PROVIDED IN A SET OF STAND-ALONE TECHNICAL SPECIFICATIONS.

5. SURVEY CONTROL NOTES:

A. SURVEY COLLECTED BY ATKINS NORTH AMERICA, INC. IN MARCH 2019.

B. VERTICAL CONTROL WAS REFERENCED TO MEAN LOW LOWER WATER (MLLW) FROM TIDAL BENCHMARK 872-4697, NOAA CHART 11438, USGS QUADRANGLE MAP: DRY TORTUGAS. REFERENCE BENCHMARK 872-4697 F TIDAL WG WAS USED AS A STARTING POINT AS IT WAS SET ON A SECTION OF THE WALL THAT APPEARED LESS SUBJECT TO SETTLEMENT. BY WAY OF IDENTIFICATION, THE BENCHMARK IS A BRASS DISC STAMPED "F ELV. 4.754 ABOVE MLLW." BENCHMARKS H, M, AND E WERE ALSO OBSERVED.

C. HORIZONTAL CONTROL WAS REFERENCED TO NAD83(1990) FOR RECOVERED NATIONAL OCEAN SERVICE STATION FORT PI-TZ4834. BY WAY OF IDENTIFICATION, THE STATION CONSISTS OF A BRASS DISC STAMPED "FORT 1991" SET ATOP A RAMPART.

D. THE SURVEY WAS CONDUCTED BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE WITH A PROJECT SCALE FACTOR OF 1.00038520.

E. SEE NATIONAL PARK SERVICE MONUMENT RECORDS FOR MORE INFORMATION REGARDING THE SURVEY CONTROL BENCHMARKS.

NUMBER	NORTHING	EASTING	EL. MLLW	DESCRIPTION
1	111,910.6200	33,991.7600	48.45	FORT/PID TZ4834, BRASS DISC
2	111,910.6200	33,941.9030	4.58	872 4697 E TIDAL, BRASS DISC
3	111,910.6200	34,108.7280	4.75	872 4697 F, BRASS DISC
4	111,910.6200	34,133.5850	4.72	872 4697 H, BRASS DISC
5	111,910.6200	34,267.2620	4.41	872 4697 M, BRASS DISC

DESIGNED:

J. LAFASO

C. PRICE

TECH. REVIEW:

J. BERG

DATE:

SEP 2022

SUB SHEET NO.

G2

TITLE OF SHEET

PROJECT LEGEND AND GENERAL NOTES

GARDEN KEY, DRY TORTUGAS NATIONAL PARK
MONROE COUNTY, FL

DRAWING NO.

364
149081

PMIS/PKG NO.

244370 & 244372

SHEET

3 OF 19

6/23/2022 8:56 AM CHRPRICE H:\P&H PROJECTS\NPS\NPS_Dry Tortuga (DRTD)\Task Order 5 (C0's)\6.0_CAD_BIM\6.2_Work_in_Progress\5-SHEETS\C3.dwg

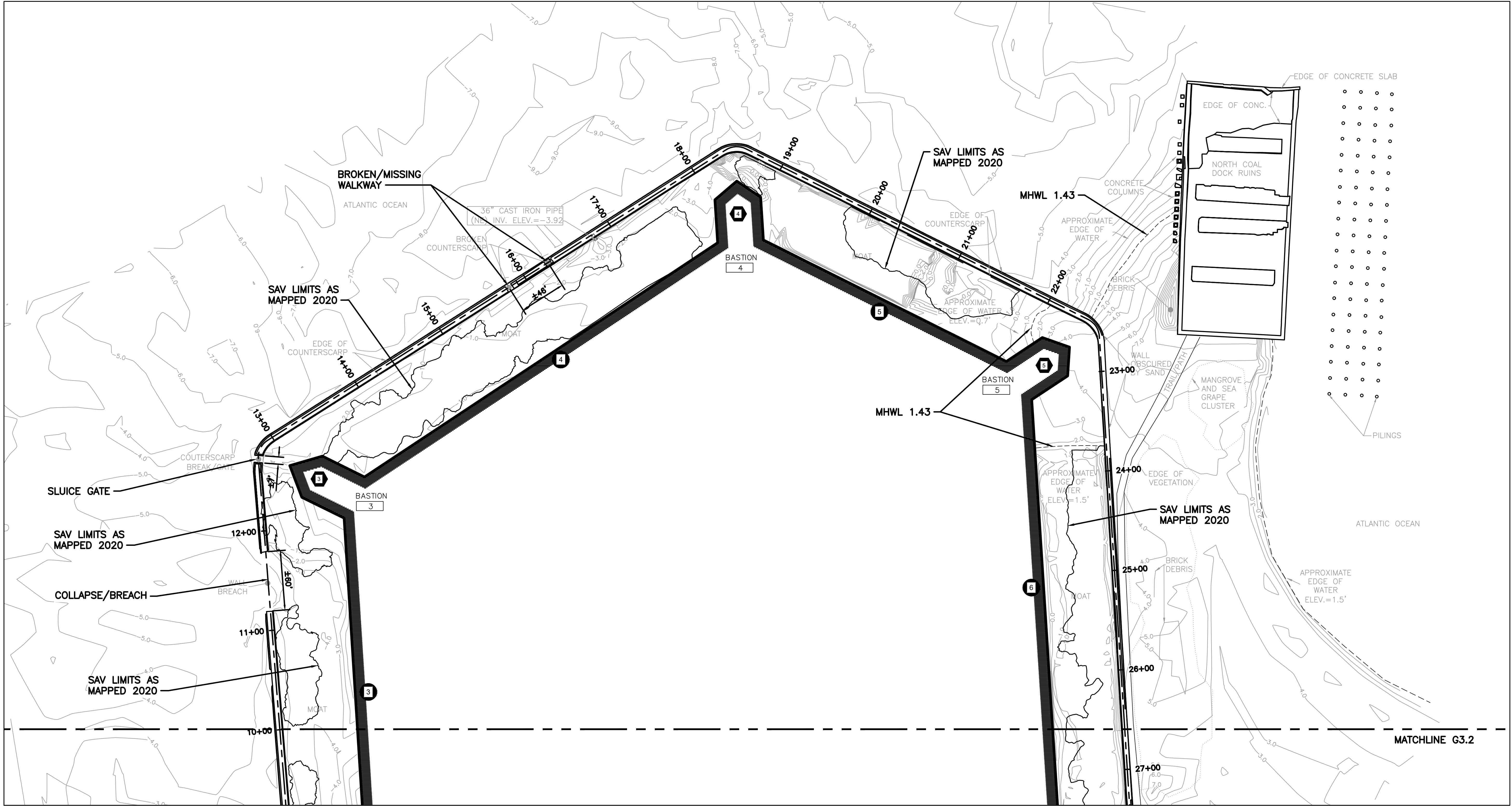


ELEVATIONS OF TIDAL DATUMS		
MEAN HIGHER HIGH WATER	MHHW	1.75 FT
MEAN HIGH WATER	MHW	1.43 FT
MEAN LOW WATER	MLW	0.31 FT
MEAN LOWER LOW WATER	MLLW	0.00 FT

- # FRONT IDENTIFIER
- # BASTION IDENTIFIER

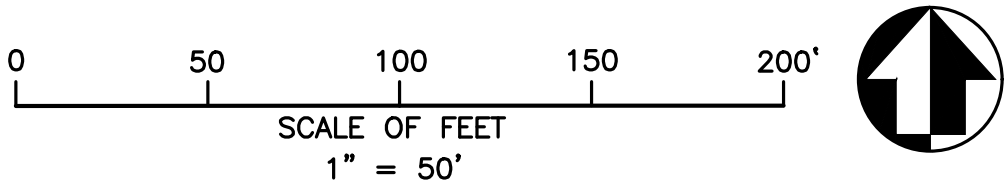
DESIGNED: J. LAFASO CADD	SUB SHEET NO. G3	TITLE OF SHEET OVERALL SITE PLAN GARDEN KEY, DRY TORTUGAS NATIONAL PARK MONROE COUNTY, FL	DRAWING NO. 364 149081
C. PRICE			PMIS/PKG NO. 244370 & 244372
TECH. REVIEW: J. BERG			SHEET
DATE: SEP 2022			4 OF 19

6/23/2022 10:13 AM CHRPRICE H:\PAH PROJECTS\WPS_Dry Tortuga (DRTU)\Task Order 5 (C01s)\6.0_CAD_BIM\6.2_Work_in_Progress\5-SHEETS\G3.1.dwg



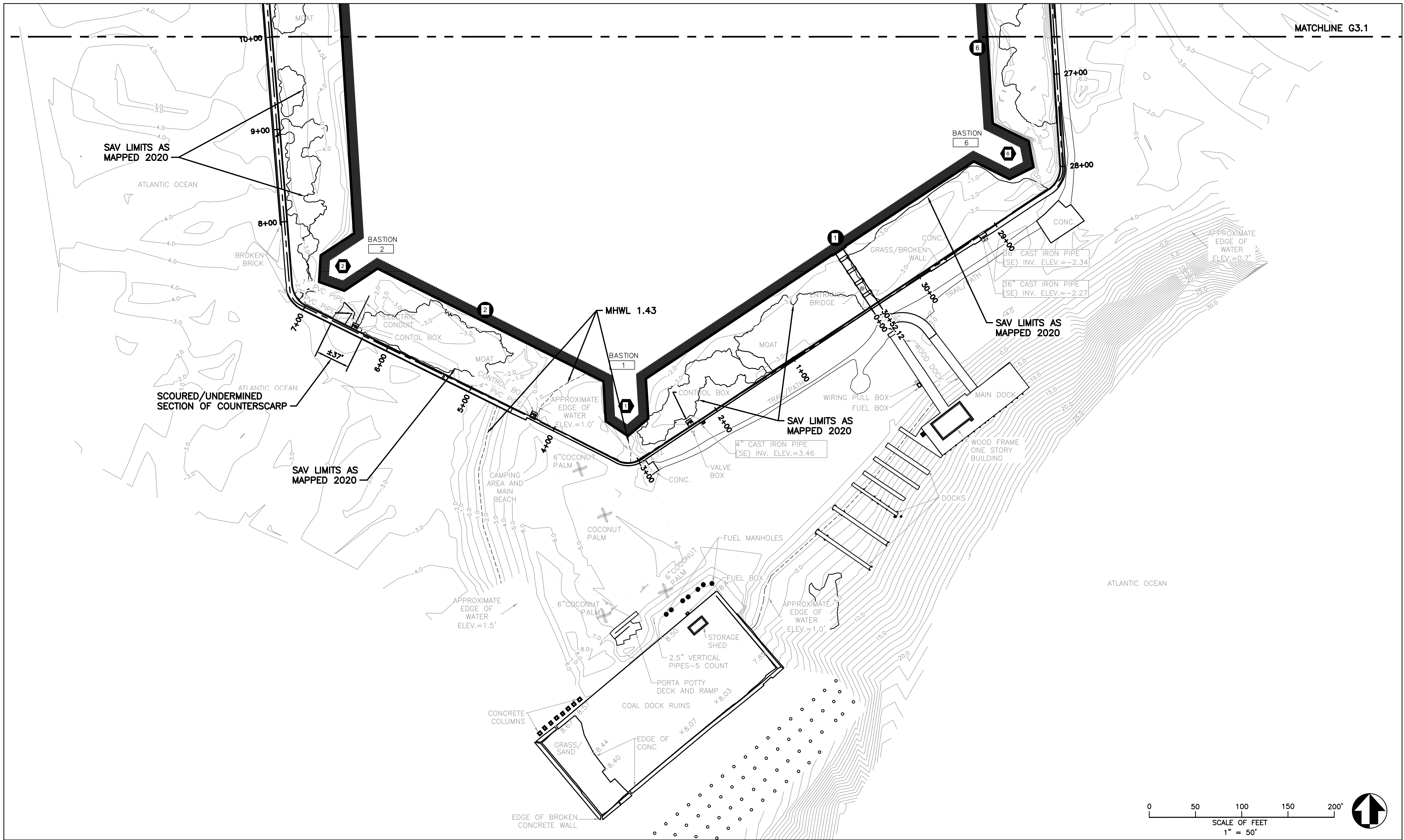
ELEVATIONS OF TIDAL DATUMS		
MEAN HIGHER HIGH WATER	MHHW	1.75 FT
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MEAN LOW WATER	MLW	0.31 FT
MEAN LOWER LOW WATER	MLLW	0.00 FT

- # FRONT IDENTIFIER
- # BASTION IDENTIFIER



DESIGNED:	SUB SHEET NO. <div>G3.1</div>	TITLE OF SHEET EXISTING SITE PLAN (1 OF 2) GARDEN KEY, DRY TORTUGAS NATIONAL PARK MONROE COUNTY, FL	DRAWING NO. 364 149081
J. LAFASO			PMIS/PKG NO. 244370 & 244372
CADD			
C. PRICE			SHEET
TECH. REVIEW:			5 OF 19
J. BERG			
DATE:			
SEP 2022			

6/23/2022 10:30 AM CHRPRICE H:\PAH PROJECTS\WPS_Dry Tortuga (DRTU)\Task Order 5 (C0's)\6.0_CAD_BIW 6.2_Work_in_Progress\5-SHEETS\G3.2.dwg

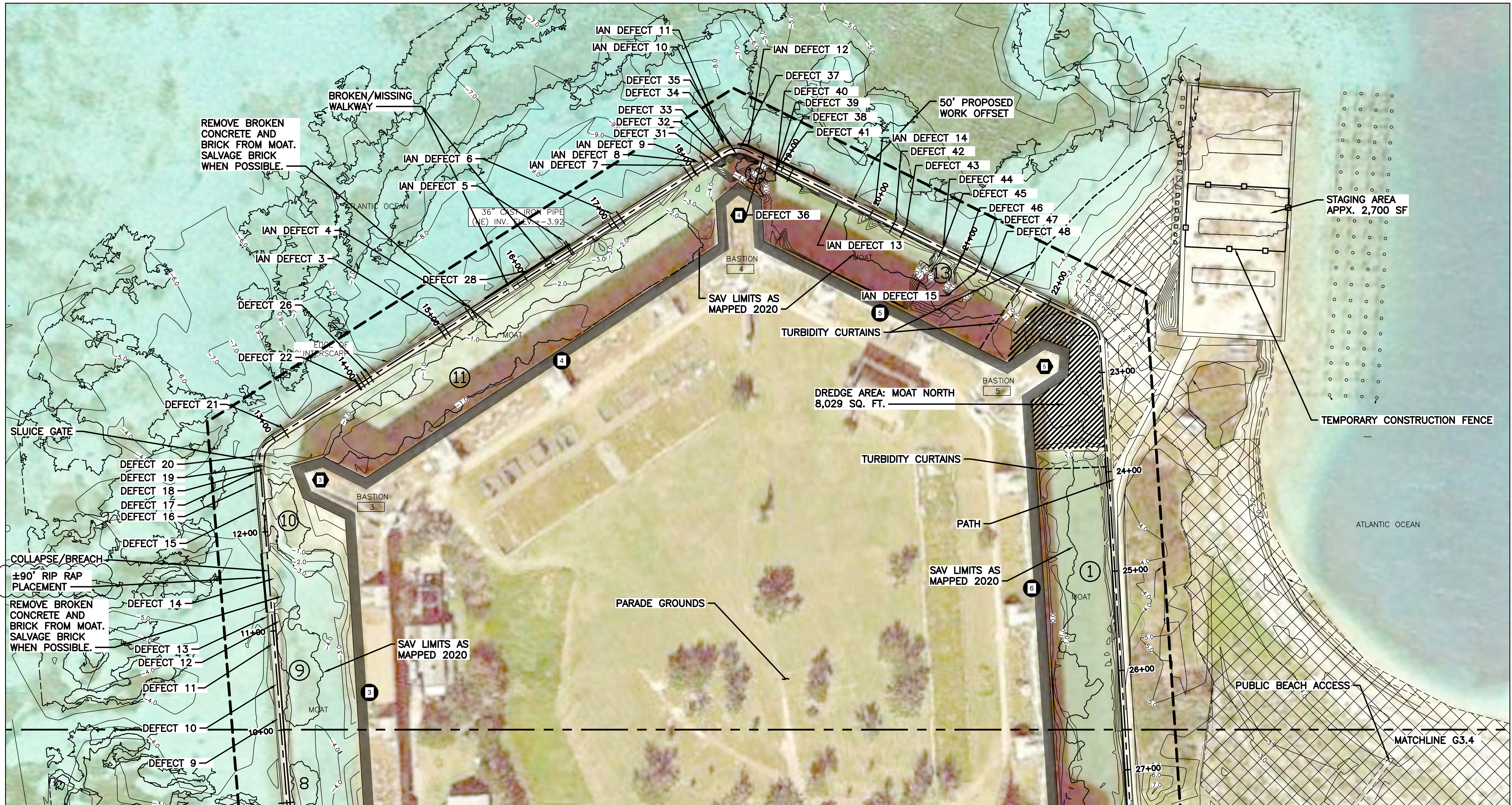


ELEVATIONS OF TIDAL DATUMS		
MEAN HIGHER HIGH WATER	MHHW	1.75 FT
MEAN HIGH WATER	MHW	1.43 FT
MEAN LOW WATER	MLW	0.31 FT
MEAN LOWER LOW WATER	MLLW	0.00 FT

- # FRONT IDENTIFIER
- # BASTION IDENTIFIER

DESIGNED: J. LAFASO	SUB SHEET NO. <div>G3.2</div>	TITLE OF SHEET EXISTING SITE PLAN (2 OF 2)	DRAWING NO. 364 149081
<div>649D</div>			PMIS/PKG NO. 244370 & 244372
C. PRICE			SHEET 6 OF 19
TECH. REVIEW: J. BERG			
DATE: SEP 2022			
		GARDEN KEY, DRY TORTUGAS NATIONAL PARK MONROE COUNTY, FL	

6/23/2022 10:39 AM KELMIR \\lar-srv3\p&h\PROJECTS\NPS\NPS_Dry Tortugas (ORTO)\Task Order 5 (01's)\6.0_CAD_BIM\6.2_Work_in_Progress\5-SHEETS\G3.3.dwg



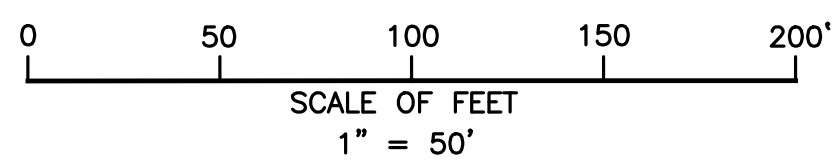
ELEVATIONS OF TIDAL DATUMS			
MEAN HIGHER HIGH WATER	MHHW	1.75	FT
MEAN HIGH WATER	MHW	1.43	FT
MEAN LOW WATER	MLW	0.31	FT
MEAN LOWER LOW WATER	MLLW	0.00	FT

NOTES:

1. CONTRACTOR SHALL AVOID IMPACTS TO SAV AND HISTORIC STRUCTURES WHEN DEPLOYING TURBIDITY CURTAINS AND ENVIRONMENTAL CONTROLS.
2. SEE SHEET S6.3 FOR SAV DESIGNATIONS AND DESCRIPTIONS

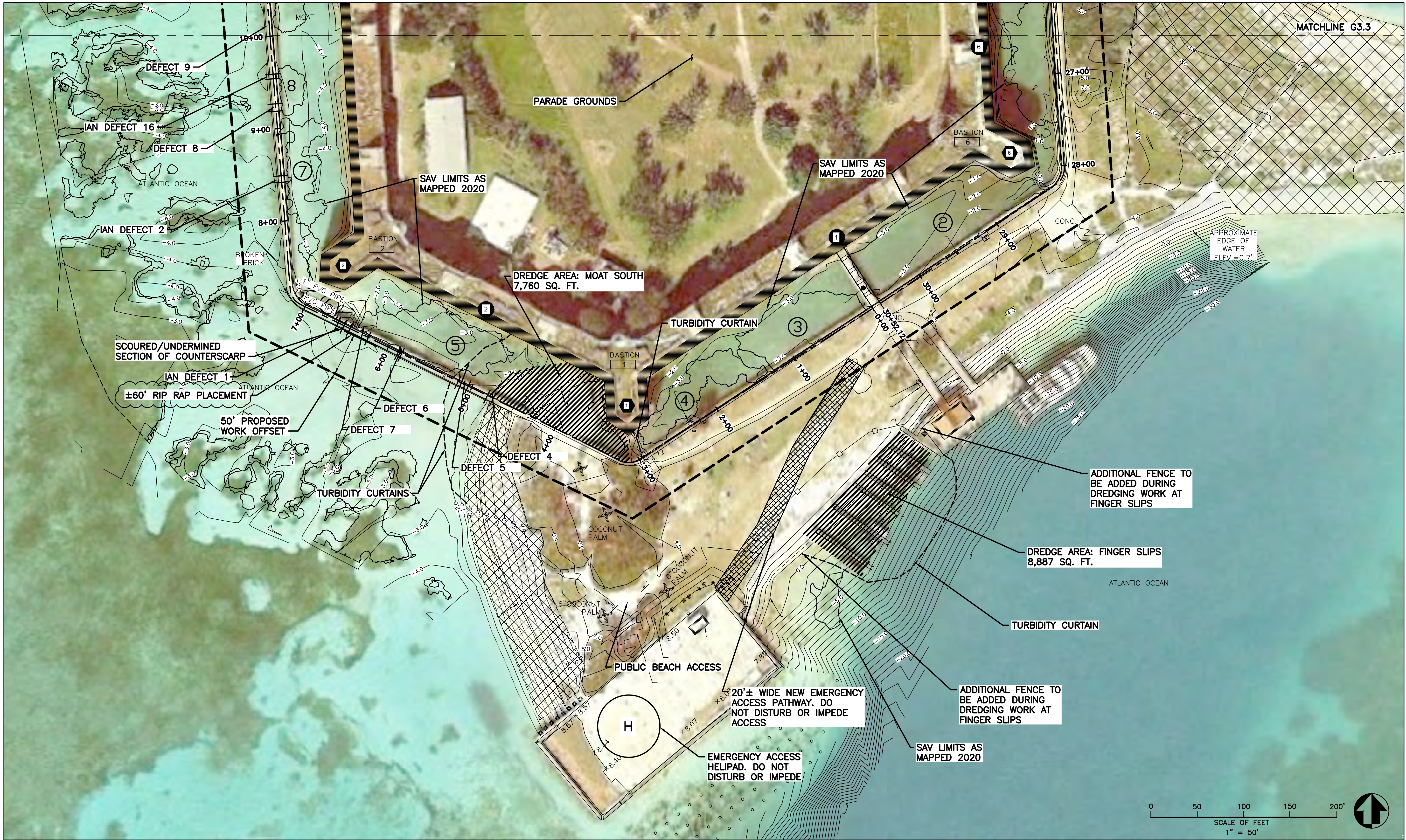
- # FRONT IDENTIFIER
BASTION IDENTIFIER
SAV IDENTIFIER

LOGGERHEAD SEA TURTLE DESIGNATED CRITICAL HABITAT
EXISTING VEGETATION



DESIGNED: J. LAFASO	SUB SHEET NO. G3.3	TITLE OF SHEET CONSTRUCTION LIMITS (1 OF 2)	DRAWING NO. 364 149081
C. PRICE			PMIS/PKG NO. 244370 & 244372
TECH. REVIEW: J. BERG			SHEET 7 OF 22
DATE: SEP 2022		GARDEN KEY, DRY TORTUGAS NATIONAL PARK MONROE COUNTY, FL	

6/23/2022 11:19 AM KELMIR \\lar-sm3\p&h\p&h PROJECTS\NPS_Dry Tortugas (ORTO)\Task Order 5 (00's)\6.0_CAD_BIM\6.2_Work_in_Progress\5-SHEETS\G3.4.dwg



ELEVATIONS OF TIDAL DATUMS		
MEAN HIGHER HIGH WATER	MHHW	1.75 FT
MEAN HIGH WATER	MHW	1.43 FT
MEAN LOW WATER	MLW	0.31 FT
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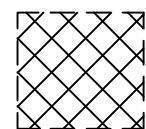
NOTES:

1. SEE SHEET S6.3 FOR SAV DESIGNATIONS AND DESCRIPTIONS

FRONT IDENTIFIER

BASTION IDENTIFIER

SAV IDENTIFIER



LOGGERHEAD SEA
TURTLE DESIGNATED
CRITICAL HABITAT

DESIGNED:
J. LAFASO
C. PRICE
TECH. REVIEW:
J. BERG
DATE:
SEP 2022

SUB SHEET NO.

G3.4

TITLE OF SHEET

CONSTRUCTION LIMITS (2 OF 2)

GARDEN KEY, DRY TORTUGAS NATIONAL PARK
MONROE COUNTY, FL

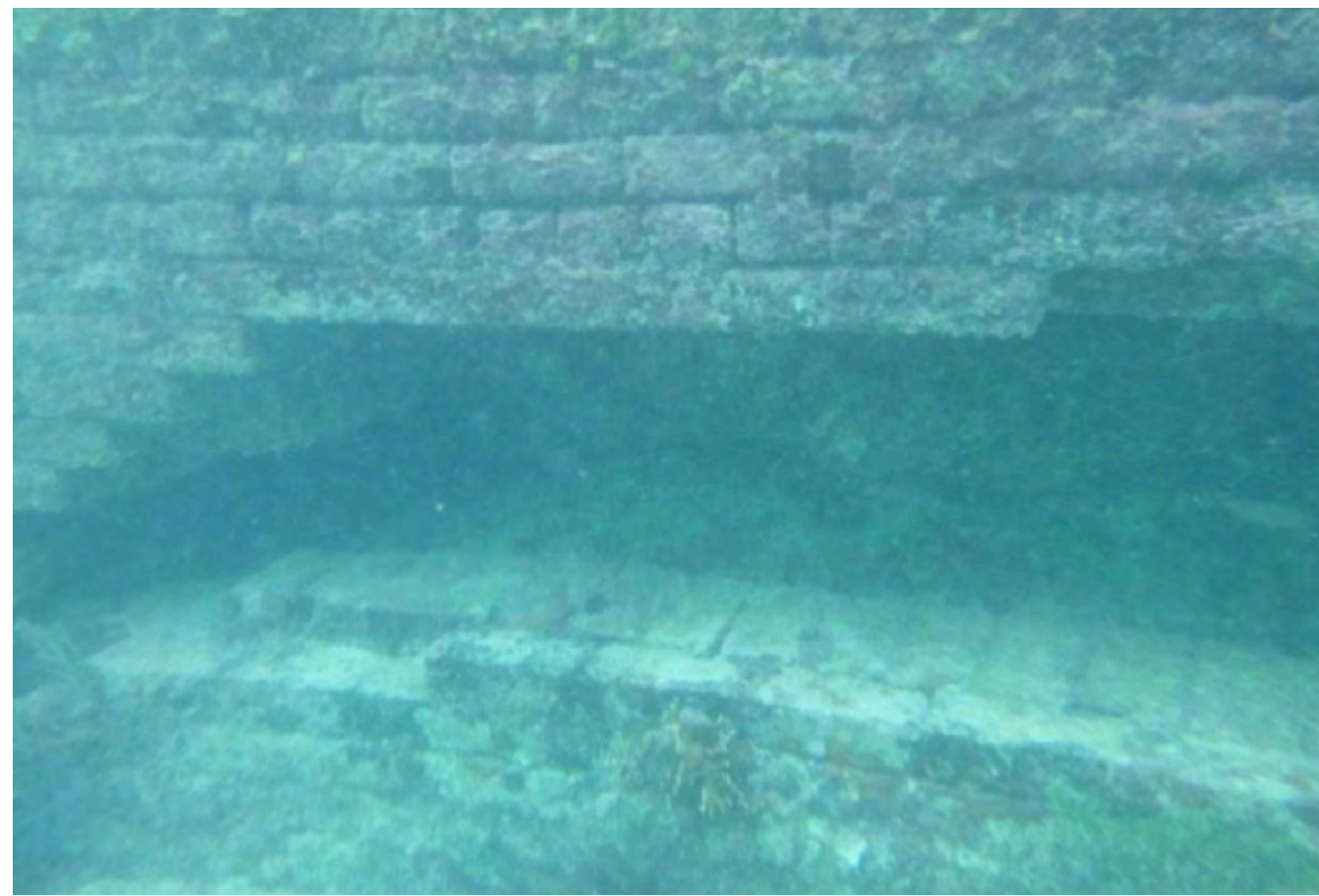
DRAWING NO.
364
149081
PMIS/PKG NO.
244370 & 244372
SHEET
8 OF 22



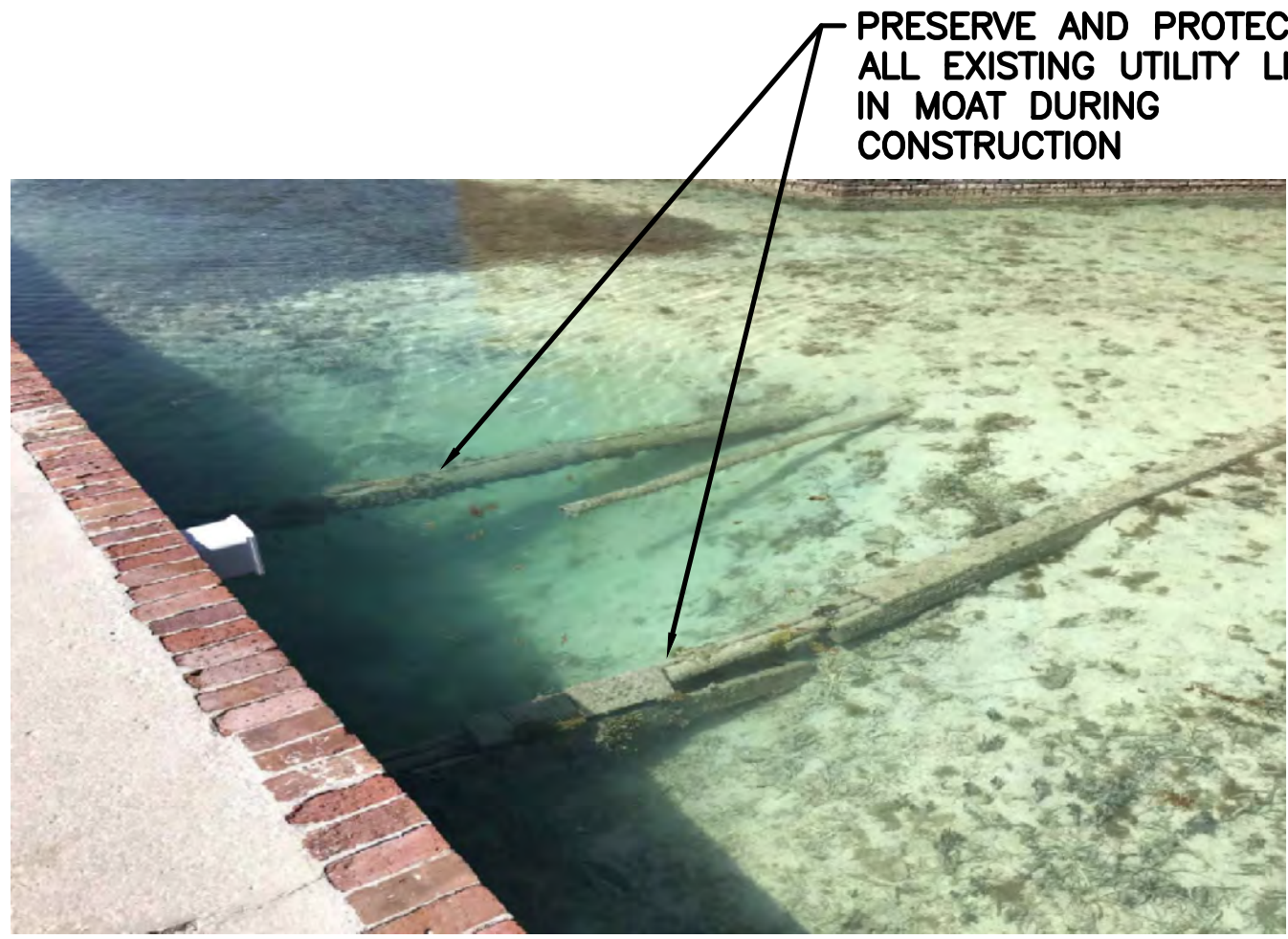
1 DEFECT TYPE 1 – LOSS OF WALKWAY CONCRETE
NTS



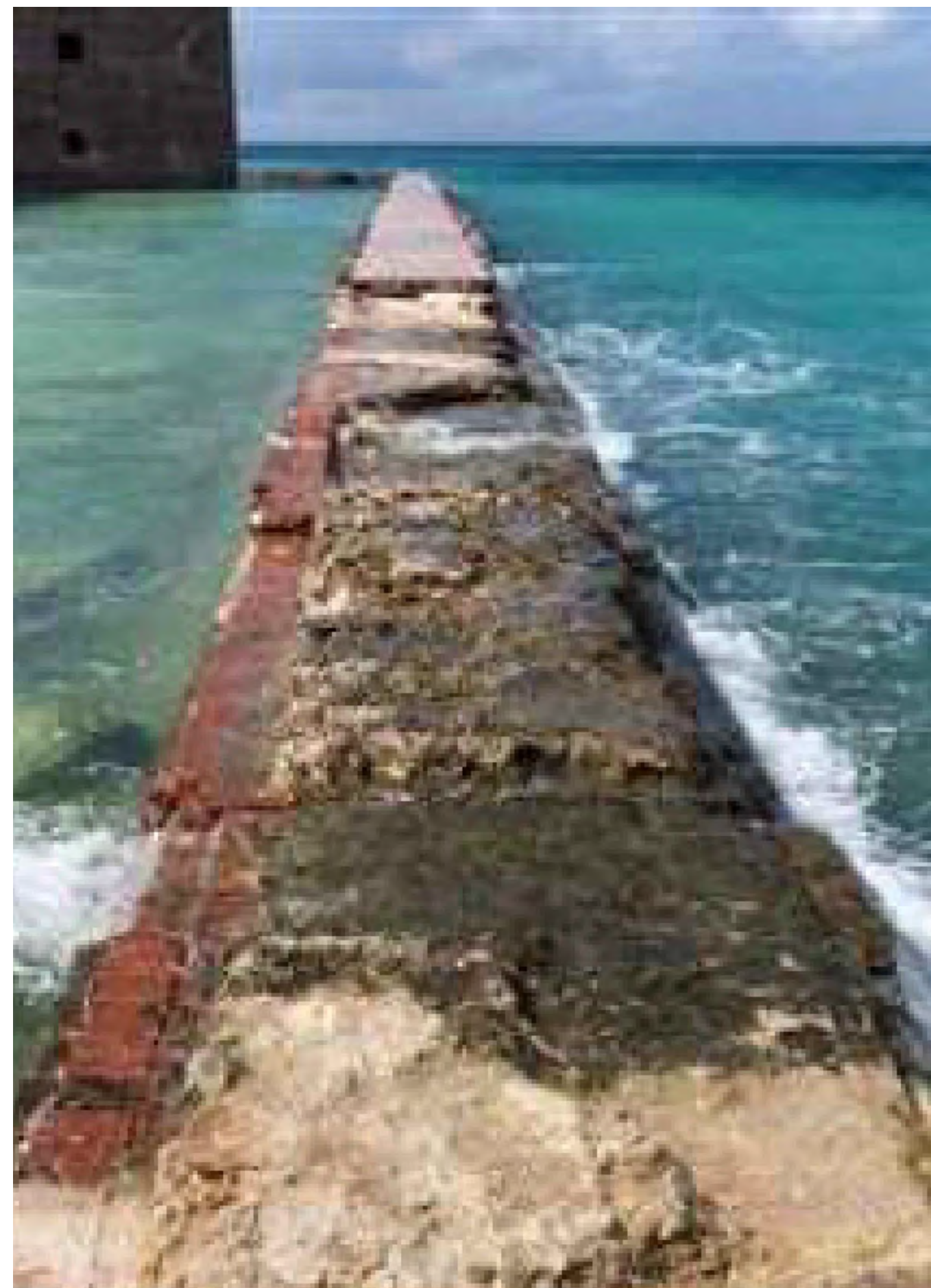
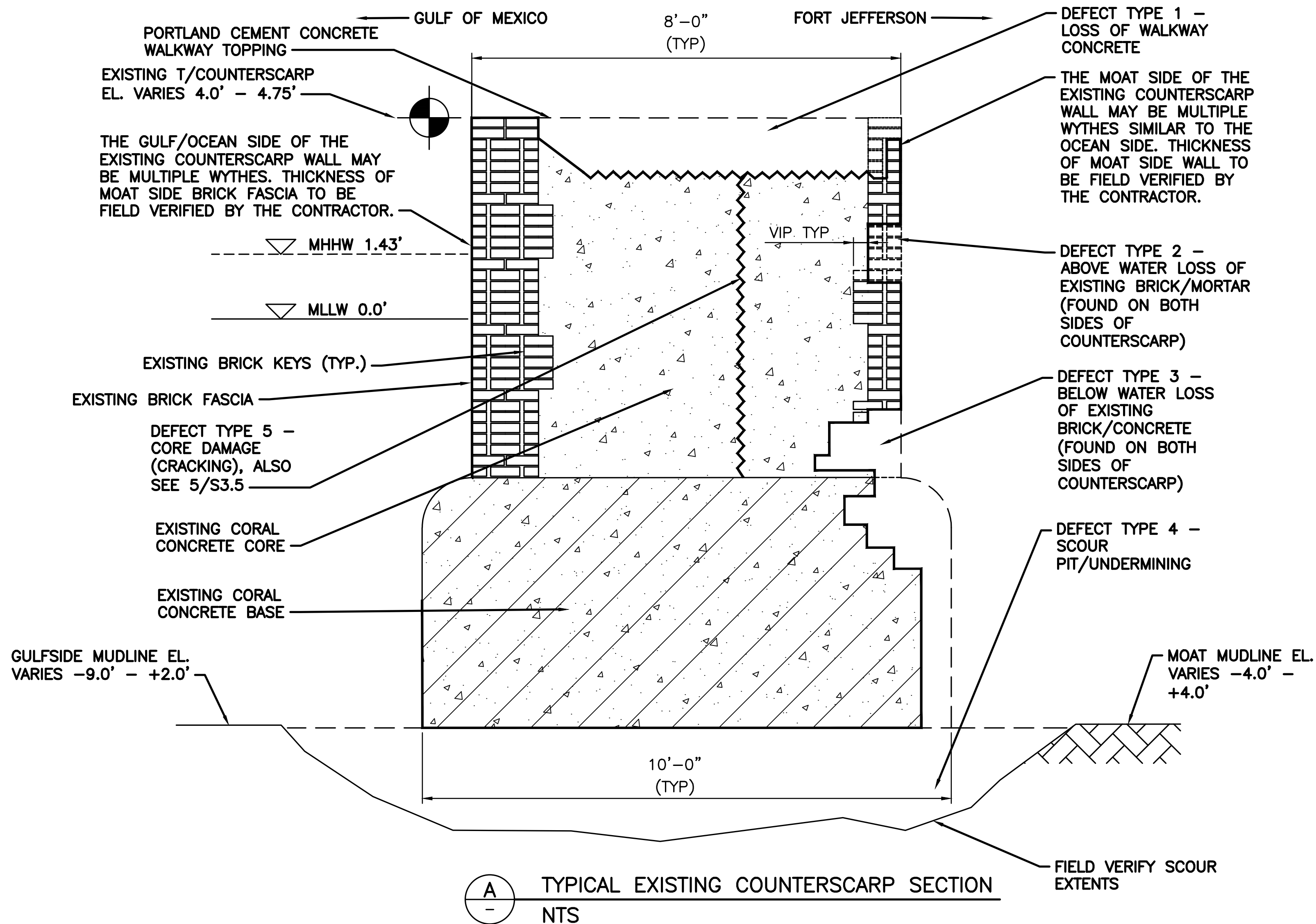
2 DEFECT TYPE 2 – ABOVE WATER LOSS OF BRICK/MORTAR
NTS



3 DEFECT TYPE 3 – BELOW WATER LOSS OF BRICK/CONCRETE
NTS



4 DEFECT TYPE 4 – SCOUR PIT/UNDERMINING
NTS



5 DEFECT TYPE 5 – CORE DAMAGE (CRACKING)
NTS

NOTES:

- DEFECT TYPES 1 THRU 4 PER "UNDERWATER INSPECTION SECTION REPORT" – COLLINS ENGINEERING, INC. MARCH 2019 AND "FORT JEFFERSON COUNTERSCARP DETERIORATION" – BHATE GEOSCIENCES. FEBRUARY 2022
- DEFECT TYPE 5 PER "FY23 DRTO INCIDENT DAMAGE SURVEY, FORT JEFFERSON, FORTIFICATIONS, COUNTERSCARP" – NPS. OCT 2022.

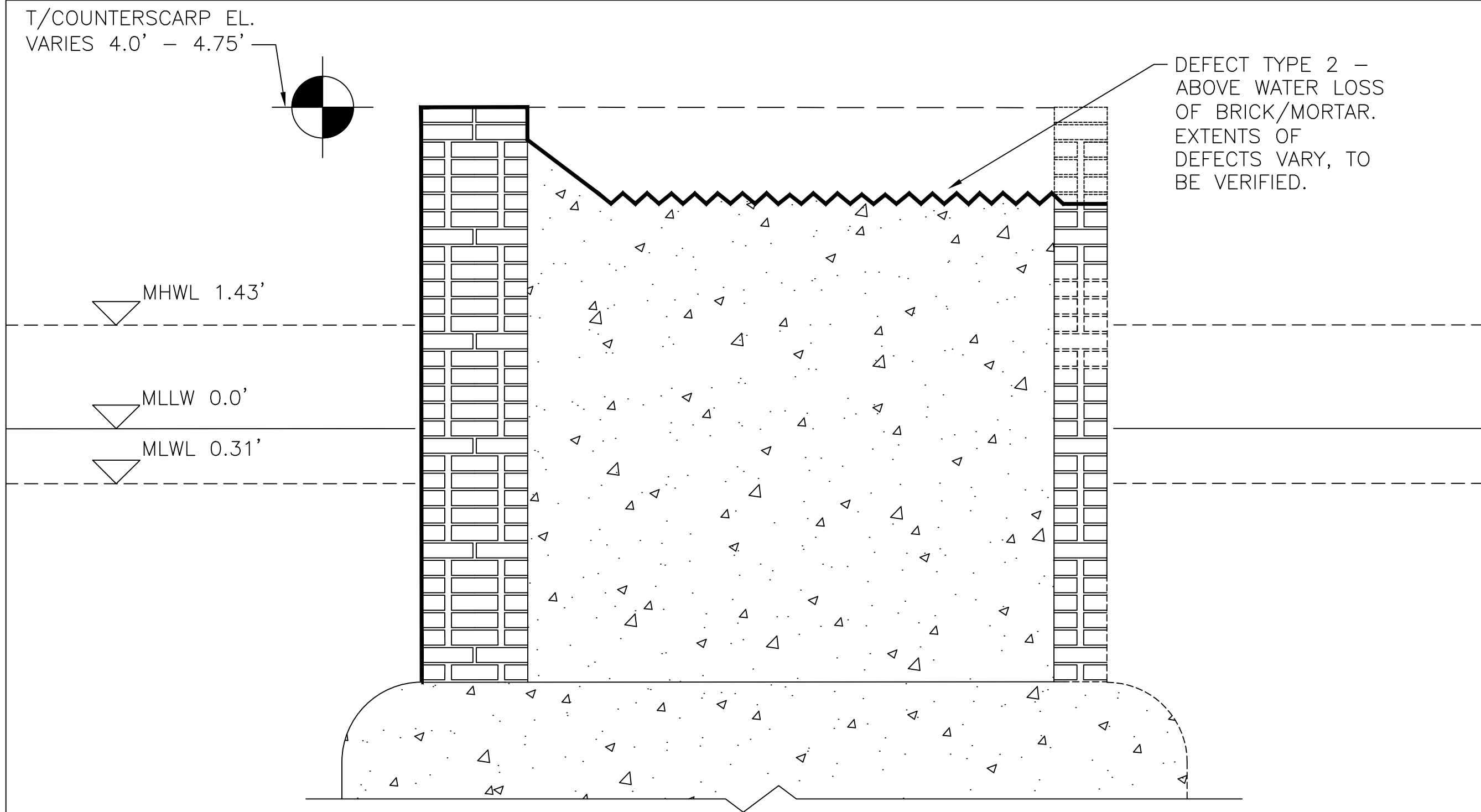
DESIGNED: J. LAFASO	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
K. ELMIR		EXISTING SECTION AND TYPICAL DEFECTS	364 149081
TECH. REVIEW: J. BERG			PMIS/PKG NO. 244370 & 244372
DATE: FEB 2023			SHEET 11 OF 30

NOTES:

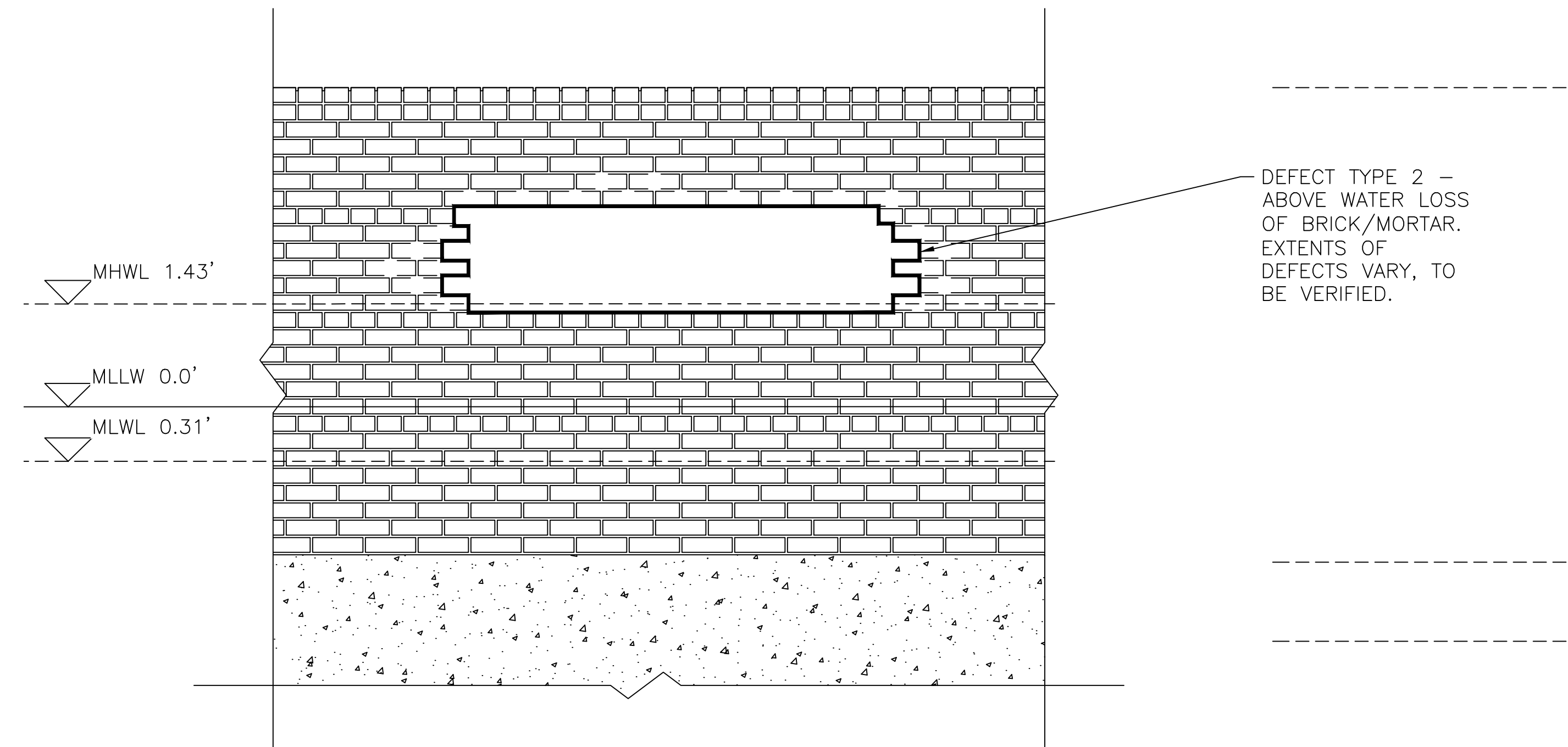
- SITE SPECIFIC CONDITIONS OVER THE LENGTH OF THE COUTNERSCARP VARY, CONTRACTOR IS TO VERIFY CONDITIONS IN FIELD.
- EXISTING WALL HEIGHT VARIES FROM 7'-4" TO 11'-9"
- DEFECTS SHOWN ARE DIAGRAMMATIC AND DO NOT NECESSARILY ALL OCCUR AT CONCURRENT LOCATIONS.

12/20/2022 3:27 PM KELMIR \\jax-srv3\p&h\PROJECTS\NPS\Dry Tortugas (DRTO)\Task Order 5 (CD's)\6.0 CAD_BIM\6.2 Work_in_Progress\5-SHEETS\S3.1.dwg
\\jax-srv3\p&h\PROJECTS\NPS\Dry Tortugas (DRTO)\Task Order 5 (CD's)\6.0 CAD_BIM\6.2 Work_in_Progress\5-SHEETS\S3.1.dwg

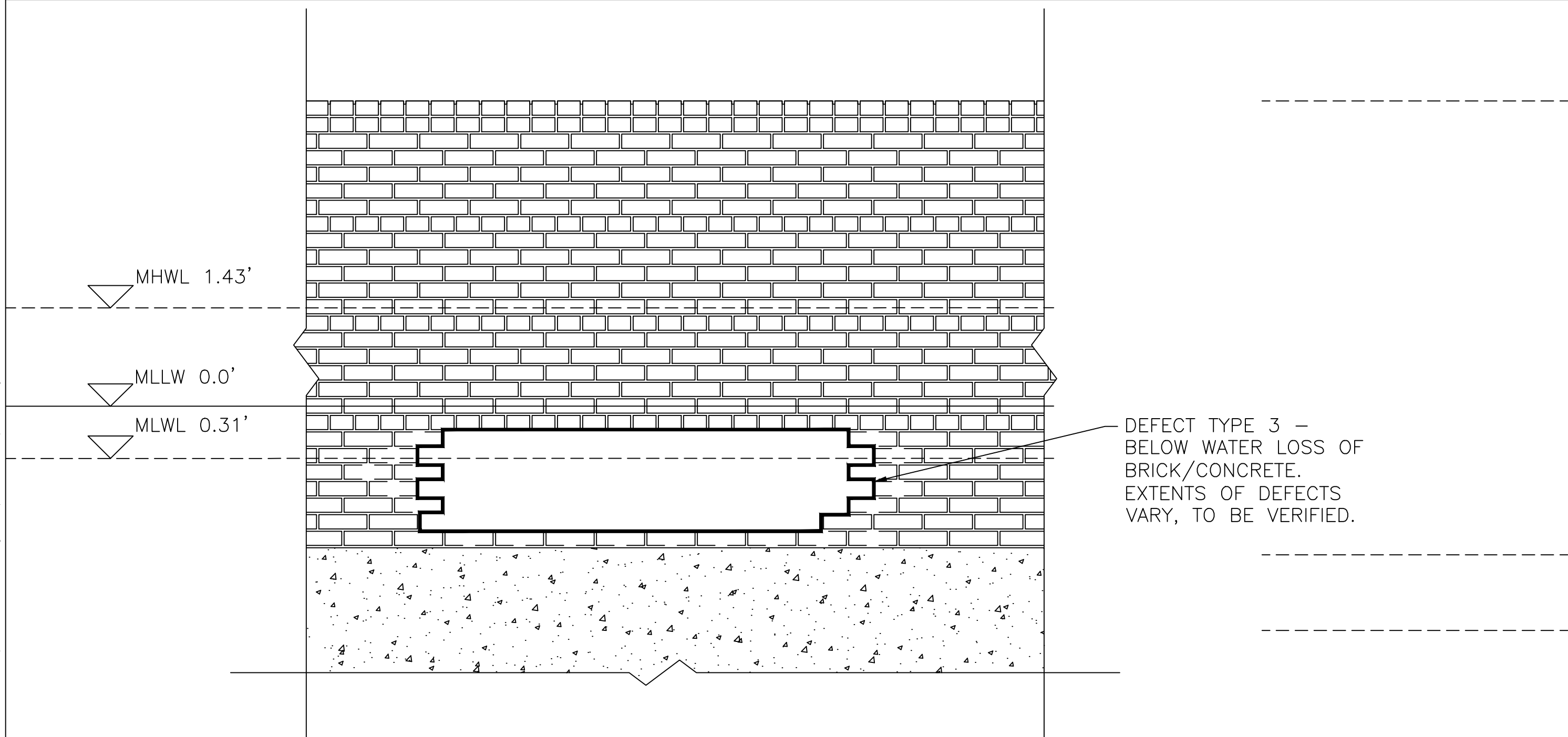
6/23/2022 11:53 AM TGL\SWHER H:\Task Order 5 (COT's)\6.0 CAD_BIM\6.2 Work_in_Progress\5--SHEETS\S3.2.dwg



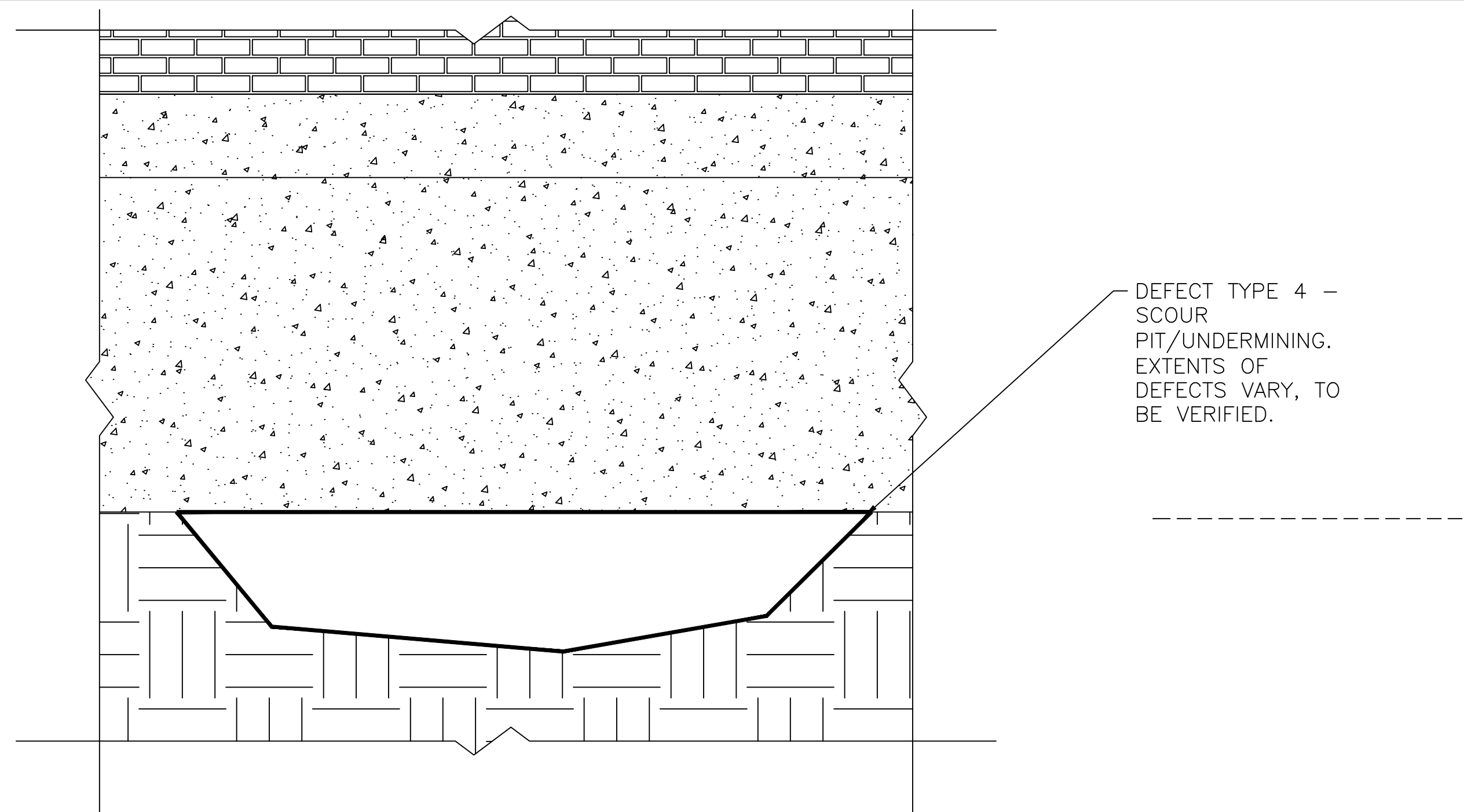
1
- DEFECT TYPE 1 - LOSS OF WALKWAY CONCRETE
NTS



2
- DEFECT TYPE 2 - ABOVE WATER LOSS OF BRICK/MORTAR
NTS



3
- DEFECT TYPE 3 - BELOW WATER LOSS OF BRICK/CONCRETE
NTS



4
- DEFECT TYPE 4 - SCOUR PIT/UNDERMINING
NTS

- GENERAL NOTES:
1. SITE SPECIFIC CONDITIONS OVER THE LENGTH OF THE COUNTERSCARP VARY, CONTRACTOR IS TO VERIFY CONDITIONS IN FIELD.
 2. REPAIRS ARE TO MATCH EXISTING CHARACTER OF COUNTERSCARP WHICH VARY OVER ITS LENGTH. CONTRACTOR TO SURVEY THE CHARACTER OF EXISTING WORK ADJACENT TO AREAS WITHIN SCOPE

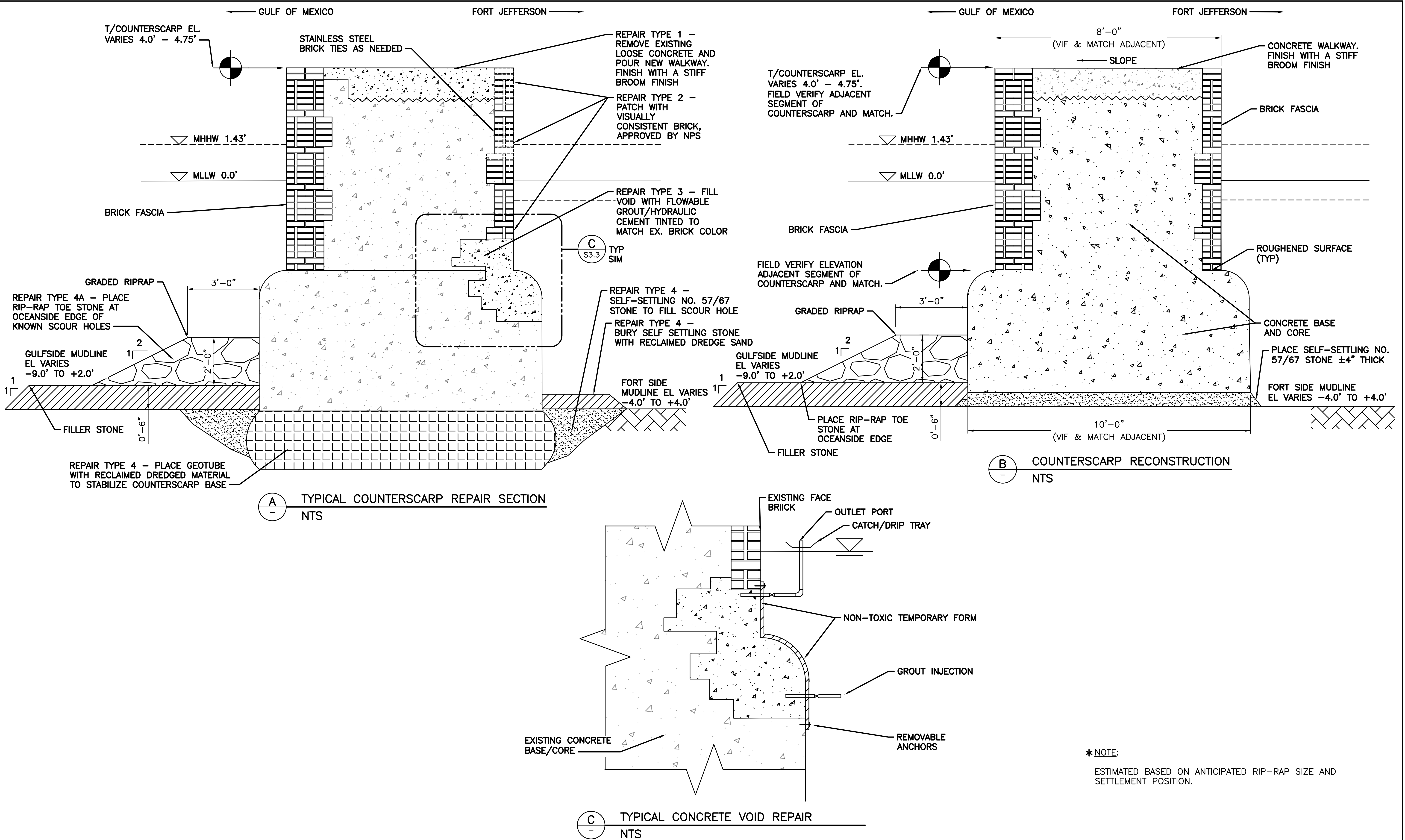
OF REPAIR(S) AND TAKE MEASURES TO, IN THE CASE OF MINOR DEVIATIONS, MATCH ITEMS SUCH AS BRICK TYPE/SIZE, BOND, PLACEMENT, JOINT SIZE, DETAILS OF JOINT STRIKE/FINISH OF EXISTING/ADJACENT BRICKWORK/FLATWORK, AND IN THE CASE OF MAJOR DEVIATIONS, STOP WORK IN THE IMMEDIATE AREA OF DEVIATION & NOTIFY CONTRACTING OFFICER FOR FURTHER INSTRUCTION ON HOW TO PROCEED WITH WORK.

3. SALVAGED & CLEANED BRICK SHOULD BE USED FOR FACE BRICK REPLACEMENT/REPAIRS.
4. GC TO SUBMIT SHOP DRAWINGS FOR FULL EXTENT OF REPAIRS WITHIN PROJECT SCOPE AREA. PROVIDE ELEVATIONS, PLANS, SECTIONS, & DETAILS AS REQUIRED TO ILLUSTRATE SCOPE OF REPAIRS.

DESIGNED: J. LAFASO	SUB SHEET NO. S3.2	TITLE OF SHEET TYPICAL DEFECTS DETAILS	DRAWING NO. 364 149081
CADD			PMIS/PKG NO. 244370 & 244372
C PRICE			
TECH. REVIEW: J. BERG			
DATE: SEP 2022			
GARDEN KEY, DRY TORTUGAS NATIONAL PARK MONROE COUNTY, FL			SHEET 9 OF 19

\\nasv01p04hp01\PROJECTS\NPS\NPS_Dry Tortugas (DRT)\Task Order 5 (CD's)\6.0 CAD_BIM\6.2 Work_in_Progress\5-SHEETS\S3.3.dwg 6/23/2022 12:54 PM KLMIR

\\nasv01p04hp01\PROJECTS\NPS\NPS_Dry Tortugas (DRT)\Task Order 5 (CD's)\6.0 CAD_BIM\6.2 Work_in_Progress\5-SHEETS\S3.3.dwg 6/23/2022 12:54 PM KLMIR



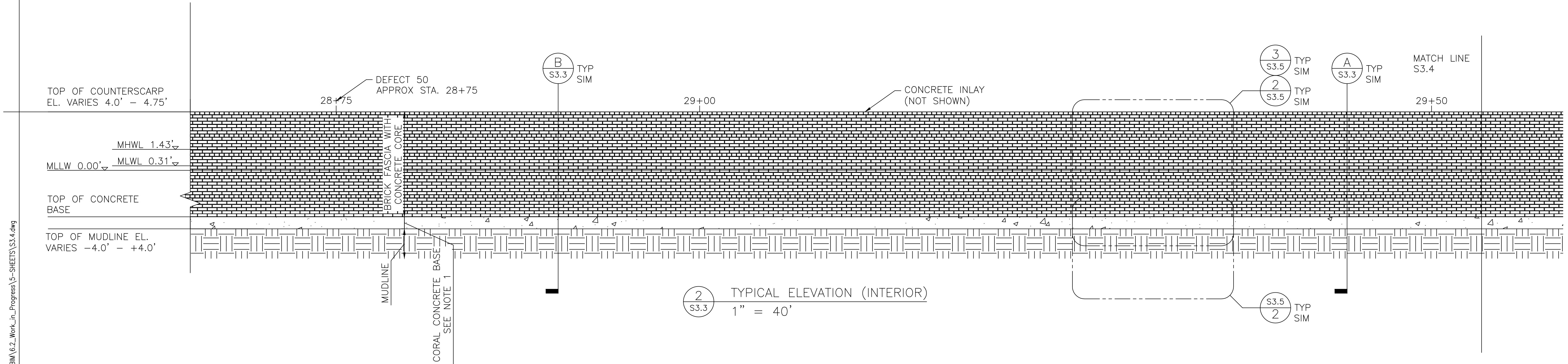
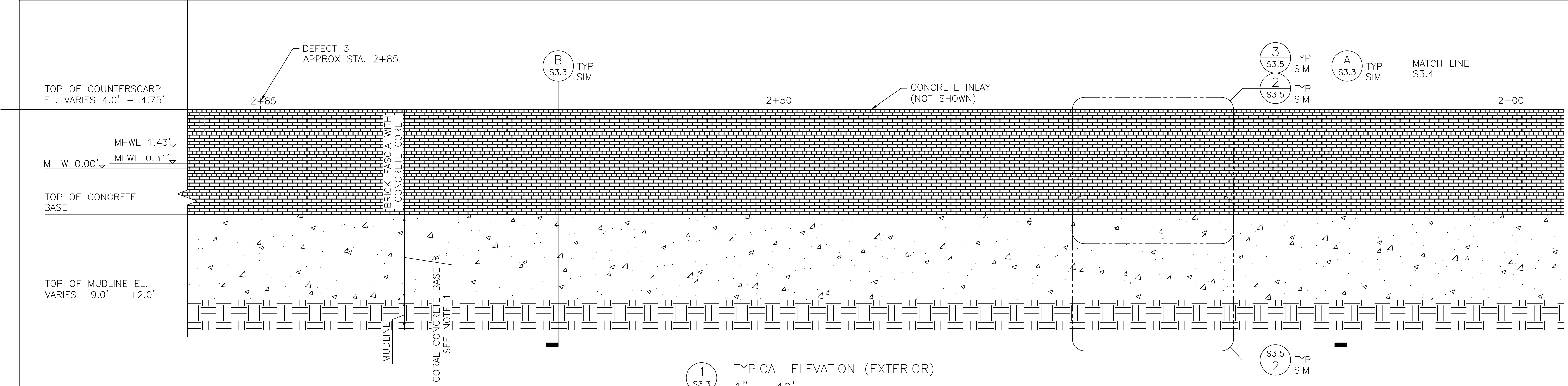
* NOTE:
ESTIMATED BASED ON ANTICIPATED RIP-RAP SIZE AND SETTLEMENT POSITION.

GENERAL NOTES:
1. SITE SPECIFIC CONDITIONS OVER THE LENGTH OF THE COUTNERSCARP VARY, CONTRACTOR IS TO VERIFY CONDITIONS IN FIELD.
2. REPAIRS ARE TO MATCH EXISTING CHARACTER OF COUNTERSCARP WHICH VARY OVER ITS LENGTH. CONTRACTOR TO SURVEY THE CHARACTER OF EXISTING WORK ADJACENT TO AREAS WITHIN SCOPE

OF REPAIR(S) AND TAKE MEASURES TO, IN THE CASE OF MINOR DEVIATIONS, MATCH ITEMS SUCH AS BRICK TYPE/SIZE, BOND, PLACEMENT, JOINT SIZE, DETAILS OF JOINT STRIKE/FINISH OF EXISTING/ADJACENT BRICKWORK/FLATWORK, AND IN THE CASE OF MAJOR DEVIATIONS, STOP WORK IN THE IMMEDIATE AREA OF DEVIATION & NOTIFY CONTRACTING OFFICER FOR FURTHER INSTRUCTION ON HOW TO PROCEED WITH WORK.

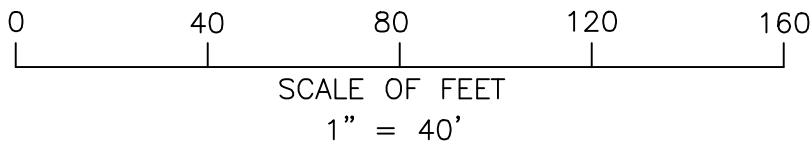
3. SALVAGED & CLEANED BRICK SHOULD BE USED FOR FACE BRICK REPLACEMENT/REPAIRS.
4. GC TO SUBMIT SHOP DRAWINGS FOR FULL EXTENT OF REPAIRS WITHIN PROJECT SCOPE AREA. PROVIDE ELEVATIONS, PLANS, SECTIONS, & DETAILS AS REQUIRED TO ILLUSTRATE SCOPE OF REPAIRS.

DESIGNED: J. LAFASO K. ELMIR TECH. REVIEW: J. BERG DATE: FEB 2023	SUB SHEET NO. S3.3	TITLE OF SHEET TYPICAL REPAIR DETAILS GARDEN KEY, DRY TORTUGAS NATIONAL PARK MONROE COUNTY, FL	DRAWING NO. 364 149081 PMIS/PKG NO. 244370 & 244372 SHEET 13 OF 30
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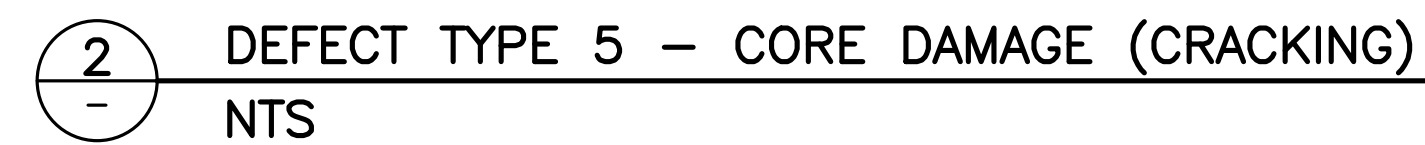
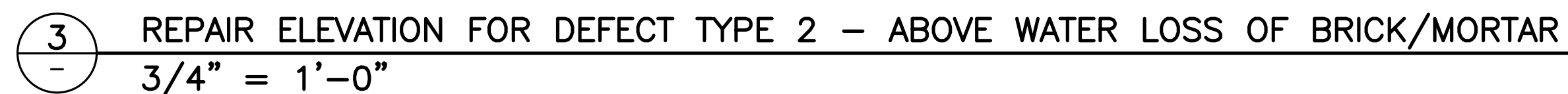


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NOTES:
1. CORAL CONCRETE BASE EXTENDS BELOW MUDLINE. NOT SHOWN FOR CLARITY



DESIGNED: J. LAFASO	SUB SHEET NO. S3.4	TITLE OF SHEET COUNTERSCARP TYP. ELEVATION VIEW GARDEN KEY, DRY TORTUGAS NATIONAL PARK MONROE COUNTY, FL	DRAWING NO. 364 149081
C .PRICE			PMIS/PKG NO. 244370 & 244372
TECH. REVIEW: J. BERG			SHEET 10 of 19
DATE: SEP 2022			



DRAWING NO.
364
149081

PMIS/PKG NO.
244370 & 244372

SHEET
15 OF **30**

DEFECT 5	EASTING	NORTHING
PORITES PORITES	33654.96	111100.64
PORITES PORITES	33651.53	111102.28

DEFECT 7	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33538.89	111158.90

DEFECT 8	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33451.33	111393.77
PSEUDODIPLORIA CLIVOSA	33451.17	111395.76
PSEUDODIPLORIA CLIVOSA	33451.08	111396.76
PSEUDODIPLORIA CLIVOSA	33451.00	111397.76

DEFECT 10	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33440.13	111522.32

DEFECT 12	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33434.97	111584.10

DEFECT 13	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33433.39	111603.04
PSEUDODIPLORIA CLIVOSA	33432.97	111608.02
PSEUDODIPLORIA CLIVOSA	33433.35	111609.00
PSEUDODIPLORIA CLIVOSA	33433.35	111609.00
PSEUDODIPLORIA CLIVOSA	33433.35	111609.00

DEFECT 14	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33430.02	111648.86
PSEUDODIPLORIA CLIVOSA	33429.35	111656.83
PSEUDODIPLORIA CLIVOSA	33429.35	111656.83
PSEUDODIPLORIA CLIVOSA	33429.35	111656.83
PSEUDODIPLORIA CLIVOSA	33429.27	111657.83
PSEUDODIPLORIA CLIVOSA	33428.93	111661.82
PSEUDODIPLORIA CLIVOSA	33428.93	111661.82
PSEUDODIPLORIA CLIVOSA	33428.85	111662.81
PSEUDODIPLORIA CLIVOSA	33428.68	111664.81
PORITES ASTREOIDES	33428.60	111665.80
PSEUDODIPLORIA CLIVOSA	33428.52	111666.80
PSEUDODIPLORIA CLIVOSA	33428.52	111666.80
PSEUDODIPLORIA CLIVOSA	33428.35	111668.79
ORBICELLA CAVERNOSA	33428.27	111669.79
PSEUDODIPLORIA CLIVOSA	33428.27	111669.79
PSEUDODIPLORIA CLIVOSA	33428.18	111670.79
PSEUDODIPLORIA CLIVOSA	33427.60	111677.76
PSEUDODIPLORIA CLIVOSA	33427.35	111680.75
PSEUDODIPLORIA CLIVOSA	33427.27	111681.75
PSEUDODIPLORIA CLIVOSA	33427.19	111682.74
PSEUDODIPLORIA CLIVOSA	33427.02	111684.74
PSEUDODIPLORIA CLIVOSA	33427.02	111684.74
PSEUDODIPLORIA CLIVOSA	33427.02	111684.74
PSEUDODIPLORIA CLIVOSA	33426.85	111686.73
PORITES ASTREOIDES	33426.77	111687.73
PSEUDODIPLORIA CLIVOSA	33426.77	111687.73
PSEUDODIPLORIA CLIVOSA	33426.69	111688.72
PSEUDODIPLORIA CLIVOSA	33426.69	111688.72
PSEUDODIPLORIA CLIVOSA	33426.60	111689.72
PSEUDODIPLORIA CLIVOSA	33426.52	111690.72
PSEUDODIPLORIA CLIVOSA	33426.44	111691.71
PSEUDODIPLORIA CLIVOSA	33426.35	111692.71
PSEUDODIPLORIA CLIVOSA	33425.52	111702.67
PSEUDODIPLORIA STRIGOSA	33425.52	111702.67
PSEUDODIPLORIA STRIGOSA	33425.52	111702.67
PSEUDODIPLORIA CLIVOSA	33425.44	111703.67

DEFECT 16	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33422.91	111729.55

DEFECT 21	EASTING	NORTHING
ORBICELLA CAVERNOSA	33439.03	111777.14
PSEUDODIPLORIA CLIVOSA	33440.72	111778.21
PSEUDODIPLORIA CLIVOSA	33440.72	111778.21

IAN DEFECT - 1	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33523.90	111166.50
PSEUDODIPLORIA CLIVOSA	33522.47	111167.22
PSEUDODIPLORIA CLIVOSA	33518.01	111169.48
PSEUDODIPLORIA CLIVOSA	33513.64	111171.69
PSEUDODIPLORIA CLIVOSA	33512.75	111172.15
PSEUDODIPLORIA CLIVOSA	33511.14	111172.96
PSEUDODIPLORIA CLIVOSA	33509.98	111173.55

IAN DEFECT - 2	EASTING	NORTHING
PORITES ASTREOIDES	33457.57	111319.03
PSEUDODIPLORIA STRIGOSA	33457.24	111323.02

IAN DEFECT - 16	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33449.15	111432.72
PSEUDODIPLORIA CLIVOSA	33449.15	111432.72

DEFECT 22	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33515.50	111825.87
PSEUDODIPLORIA CLIVOSA	33515.67	111825.97
PSEUDODIPLORIA CLIVOSA	33515.84	111826.08
PSEUDODIPLORIA CLIVOSA	33516.01	111826.19
PSEUDODIPLORIA CLIVOSA	33516.18	111826.29
PSEUDODIPLORIA CLIVOSA	33516.34	111826.40
PSEUDODIPLORIA CLIVOSA	33516.51	111826.51
PSEUDODIPLORIA CLIVOSA	33516.68	111826.62
PSEUDODIPLORIA CLIVOSA	33516.85	111826.72
PSEUDODIPLORIA CLIVOSA	33517.02	111826.83
PSEUDODIPLORIA CLIVOSA	33517.18	111826.94
PSEUDODIPLORIA CLIVOSA	33517.35	111827.04
PSEUDODIPLORIA CLIVOSA	33517.52	111827.15
PSEUDODIPLORIA CLIVOSA	33517.69	111827.26
PSEUDODIPLORIA CLIVOSA	33517.86	111827.37
PSEUDODIPLORIA CLIVOSA	33518.02	111827.47
PSEUDODIPLORIA CLIVOSA	33518.19	111827.58
PSEUDODIPLORIA CLIVOSA	33518.36	111827.69
PSEUDODIPLORIA CLIVOSA	33518.53	111827.79
PSEUDODIPLORIA CLIVOSA	33518.70	111827.90
PSEUDODIPLORIA CLIVOSA	33518.86	111828.01
PSEUDODIPLORIA CLIVOSA	33519.03	111828.12
PSEUDODIPLORIA CLIVOSA	33519.20	111828.22
PSEUDODIPLORIA CLIVOSA	33519.37	111828.33
PSEUDODIPLORIA CLIVOSA	33519.53	111828.44
PSEUDODIPLORIA CLIVOSA	33519.70	111828.54
PSEUDODIPLORIA CLIVOSA	33519.87	111828.65
PSEUDODIPLORIA CLIVOSA	33520.04	111828.76
PSEUDODIPLORIA CLIVOSA	33520.21	111828.87
PSEUDODIPLORIA CLIVOSA	33520.37	111828.97
PSEUDODIPLORIA CLIVOSA	33520.54	111829.08
PSEUDODIPLORIA CLIVOSA	33520.71	111829.19

DEFECT 26	EASTING	NORTHING
PSEUDODIPLORIA STRIGOSA	33528.10	111833.90
PSEUDODIPLORIA STRIGOSA	33528.27	111834.01
PSEUDODIPLORIA STRIGOSA	33528.44	111834.11
PSEUDODIPLORIA STRIGOSA	33528.60	111834.22
PSEUDODIPLORIA STRIGOSA	33528.77	111834.33
PSEUDODIPLORIA STRIGOSA	33528.94	111834.44
PSEUDODIPLORIA STRIGOSA	33529.11	111834.54
PSEUDODIPLORIA STRIGOSA	33529.28	111834.65
PSEUDODIPLORIA STRIGOSA	33529.44	111834.76
PSEUDODIPLORIA STRIGOSA	33529.61	111834.86
PSEUDODIPLORIA STRIGOSA	33529.78	111834.97
PSEUDODIPLORIA STRIGOSA	33529.95	111835.08

IAN DEFECT - 3	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33600.75	111879.76
PSEUDODIPLORIA CLIVOSA	33600.75	111879.76
PSEUDODIPLORIA STRIGOSA	33600.75	111879.76
ORBICELLA CAVERNOSA	33603.28	111881.38
PSEUDODIPLORIA CLIVOSA	33603.28	111881.38

IAN DEFECT - 4	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33628.74	111897.61
PSEUDODIPLORIA CLIVOSA	33628.97	111897.76
PSEUDODIPLORIA CLIVOSA	33629.19	111897.91
PSEUDODIPLORIA CLIVOSA	33629.42	111898.05
PSEUDODIPLORIA CLIVOSA	33629.88	111898.34
PSEUDODIPLORIA CLIVOSA	33630.11	111898.49
PSEUDODIPLORIA CLIVOSA	33629.89	111898.20
PSEUDODIPLORIA CLIVOSA	33630.09	111898.33
PSEUDODIPLORIA CLIVOSA	33630.29	111898.46
PSEUDODIPLORIA CLIVOSA	33630.49	111898.58
PSEUDODIPLORIA CLIVOSA	33630.68	111898.71
PSEUDODIPLORIA CLIVOSA	33630.88	111898.83
PSEUDODIPLORIA CLIVOSA	33631.27	111899.08
PSEUDODIPLORIA CLIVOSA	33631.47	111899.21

DEFECT 28	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33646.07	111908.52
PSEUDODIPLORIA STRIGOSA	33646.76	111908.96
PSEUDODIPLORIA STRIGOSA	33648.24	111909.91
PSEUDODIPLORIA STRIGOSA	33650.61	111911.42
PSEUDODIPLORIA STRIGOSA	33650.97	111911.65
PSEUDODIPLORIA STRIGOSA	33652.78	111912.80
MEANDRINA MEANDRITES	33654.34	111913.80
PSEUDODIPLORIA CLIVOSA	33657.32	111915.70
PSEUDODIPLORIA STRIGOSA	33657.72	111915.95
PSEUDODIPLORIA CLIVOSA	33659.68	111917.21
PSEUDODIPLORIA STRIGOSA	33661.09	111918.10
PSEUDODIPLORIA CLIVOSA	33661.85	111918.59
PSEUDODIPLORIA CLIVOSA	33664.22	111920.10
ORBICELLA CAVERNOSA	33665.30	111920.79
PSEUDODIPLORIA CLIVOSA	33666.59	111921.61
PSEUDODIPLORIA CLIVOSA	33668.56	111922.87
PSEUDODIPLORIA CLIVOSA	33670.93	111924.38
PSEUDODIPLORIA STRIGOSA	33672.89	111925.63
PSEUDODIPLORIA CLIVOSA	33673.30	111925.89
PSEUDODIPLORIA STRIGOSA	33673.73	111926.17
PSEUDODIPLORIA CLIVOSA	33673.73	111926.17
PSEUDODIPLORIA CLIVOSA	33675.66	111927.40
PSEUDODIPLORIA CLIVOSA	33677.64	111928.66
PSEUDODIPLORIA CLIVOSA	33680.00	111930.17
PSEUDODIPLORIA CLIVOSA	33682.17	111931.55
PSEUDODIPLORIA CLIVOSA	33684.54	111933.06
PSEUDODIPLORIA CLIVOSA	33686.71	111934.45
PSEUDODIPLORIA STRIGOSA	33688.07	111935.31
PSEUDODIPLORIA STRIGOSA	33688.07	111935.31
PSEUDODIPLORIA CLIVOSA	33689.08	111935.96
PSEUDODIPLORIA CLIVOSA	33691.25	111937.34
PSEUDODIPLORIA STRIGOSA	33693.62	111938.85
PSEUDODIPLORIA CLIVOSA	33695.98	111940.36
PSEUDODIPLORIA CLIVOSA	33698.15	111941.74
PSEUDODIPLORIA STRIGOSA	33699.87	111942.84
PSEUDODIPLORIA CLIVOSA	33700.32	111943.13
PSEUDODIPLORIA CLIVOSA	33702.49	111944.51
PSEUDODIPLORIA CLIVOSA	33704.86	111946.02
PSEUDODIPLORIA STRIGOSA	33704.93	111946.07
PSEUDODIPLORIA CLIVOSA	33707.23	111947.53
PSEUDODIPLORIA CLIVOSA	33709.40	111948.92
PSEUDODIPLORIA CLIVOSA	33711.57	111950.30
PSEUDODIPLORIA CLIVOSA	33713.74	111951.69
ORBICELLA CAVERNOSA	33715.41	111952.68
PSEUDODIPLORIA STRIGOSA	33715.41	111952.68
PSEUDODIPLORIA CLIVOSA	33715.41	111952.68
PSEUDODIPLORIA CLIVOSA	33715.67	111952.85
PSEUDODIPLORIA CLIVOSA	33717.86	111954.24
PSEUDODIPLORIA STRIGOSA	33719.63	111955.37
PSEUDODIPLORIA STRIGOSA	33719.63	111955.37
PSEUDODIPLORIA CLIVOSA	33720.28	111955.79
PSEUDODIPLORIA CLIVOSA	33722.47	111957.18
PSEUDODIPLORIA STRIGOSA	33723.84	111958.06
PSEUDODIPLORIA STRIGOSA	33723.84	111958.06
PSEUDODIPLORIA CLIVOSA	33724.65	111958.58
PSEUDODIPLORIA STRIGOSA	33725.53	111959.14
PSEUDODIPLORIA STRIGOSA	33725.53	111959.14
PSEUDODIPLORIA CLIVOSA	33726.84	111959.97
DMANICINA AREOLATA	33728.90	111961.29
PSEUDODIPLORIA STRIGOSA	33728.90	111961.29
PSEUDODIPLORIA CLIVOSA	33729.27	111961.52
PSEUDODIPLORIA CLIVOSA	33731.21	111962.76
DICHOCENIA STOKESII	33731.43	111962.90

IAN DEFECT - 6	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33772.97	111989.40
PSEUDODIPLORIA CLIVOSA	33773.22	111989.55
PSEUDODIPLORIA CLIVOSA	33773.46	111989.71
PSEUDODIPLORIA CLIVOSA	33773.70	111989.86
PSEUDODIPLORIA CLIVOSA	33773.94	111990.02
PSEUDODIPLORIA CLIVOSA	33774.19	111990.17
PSEUDODIPLORIA CLIVOSA	33774.43	111990.33
PSEUDODIPLORIA STRIGOSA	33774.43	111990.33
PSEUDODIPLORIA STRIGOSA	33774.43	111990.33
PSEUDODIPLORIA CLIVOSA	33774.67	111990.48
PSEUDODIPLORIA CLIVOSA	33774.92	111990.64
PSEUDODIPLORIA CLIVOSA	33775.16	111990.79
PSEUDODIPLORIA CLIVOSA	33775.40	111990.95
PSEUDODIPLORIA CLIVOSA	33775.64	111991.10
PSEUDODIPLORIA CLIVOSA	33775.89	111991.26
PSEUDODIPLORIA CLIVOSA	33776.13	111991.41
PSEUDODIPLORIA CLIVOSA	33776.37	111991.57
PSEUDODIPLORIA CLIVOSA	33776.62	111991.72
PSEUDODIPLORIA CLIVOSA	33776.86	111991.88
PSEUDODIPLORIA CLIVOSA	33777.10	111992.03
PSEUDODIPLORIA CLIVOSA	33777.34	111992.19
PSEUDODIPLORIA CLIVOSA	33777.59	111992.34
PSEUDODIPLORIA CLIVOSA	33777.83	111992.50
PSEUDODIPLORIA CLIVOSA	33778.07	111992.65
PSEUDODIPLORIA CLIVOSA	33778.31	111992.80
PSEUDODIPLORIA CLIVOSA	33778.56	111992.96
PSEUDODIPLORIA CLIVOSA	33778.80	111993.11
PSEUDODIPLORIA CLIVOSA	33779.04	111993.27
PSEUDODIPLORIA CLIVOSA	33779.29	111993.42

DEFECT 31	EASTING	NORTHING
PSEUDODIPLORIA STRIGOSA	33865.45	112048.46
PSEUDODIPLORIA CLIVOSA	33865.89	112048.74
COLPOPHYLLIA NATANS	33867.98	112050.07
PSEUDODIPLORIA CLIVOSA	33872.56	112053.00
PSEUDODIPLORIA CLIVOSA	33903.83	112068.24
PSEUDODIPLORIA STRIGOSA	33873.88	112053.84
MEANDRINA MEANDRITES	33874.72	112054.38
PSEUDODIPLORIA STRIGOSA	33878.10	112056.53

IAN DEFECT - 7	EASTING	NORTHING
ORBICELLA CAVERNOSA	33848.59	112037.71
PSEUDODIPLORIA CLIVOSA	33848.92	112037.92
PSEUDODIPLORIA CLIVOSA	33849.53	112038.30
PSEUDODIPLORIA CLIVOSA	33850.13	112038.69
PSEUDODIPLORIA CLIVOSA	33850.74	112039.08
PSEUDODIPLORIA STRIGOSA	33851.12	112039.32
PSEUDODIPLORIA CLIVOSA	33851.35	112039.46
PSEUDODIPLORIA CLIVOSA	33851.95	112039.85
PSEUDODIPLORIA CLIVOSA	33852.56	112040.24
PSEUDODIPLORIA CLIVOSA	33853.16	112040.62

IAN DEFECT - 10	EASTING	NORTHING
PSEUDODIPLORIA CLIVOSA	33882.12	112059.72
PSEUDODIPLORIA CLIVOSA	33882.70	112060.08
PSEUDODIPLORIA CLIVOSA	33883.27	112060.45
PSEUDODIPLORIA CLIVOSA	33883.81	112060.79
PSEUDODIPLORIA CLIVOSA	33884.42	112061.18
PSEUDODIPLORIA CLIVOSA	33884.65	112061.33
PSEUDODIPLORIA CLIVOSA	33884.99	112061.55
PSEUDODIPLORIA CLIVOSA	33886.14	112062.28

6/23/2022 1:18 PM CHRPRICE H:\P&H PROJECTS\NPS\NPS_Dry Tortuga (BRTD)\Task Order 5 (C01)\6.0 CAD_BIM\6.2 Work_in_Progress\5-SHEETS\C1.dwg



ELEVATIONS OF TIDAL DATUMS		
MEAN HIGHER HIGH WATER	MHHW	1.75 FT
MEAN HIGH WATER	MHW	1.43 FT
MEAN LOW WATER	MLW	0.31 FT
MEAN LOWER LOW WATER	MLLW	0.00 FT

FRONT IDENTIFIER

BASTION IDENTIFIER

DESIGNED:
J. LAFASO
C. PRICE
TECH. REVIEW:
J. BERG
DATE:
SEP 2022

SUB SHEET NO.

C1

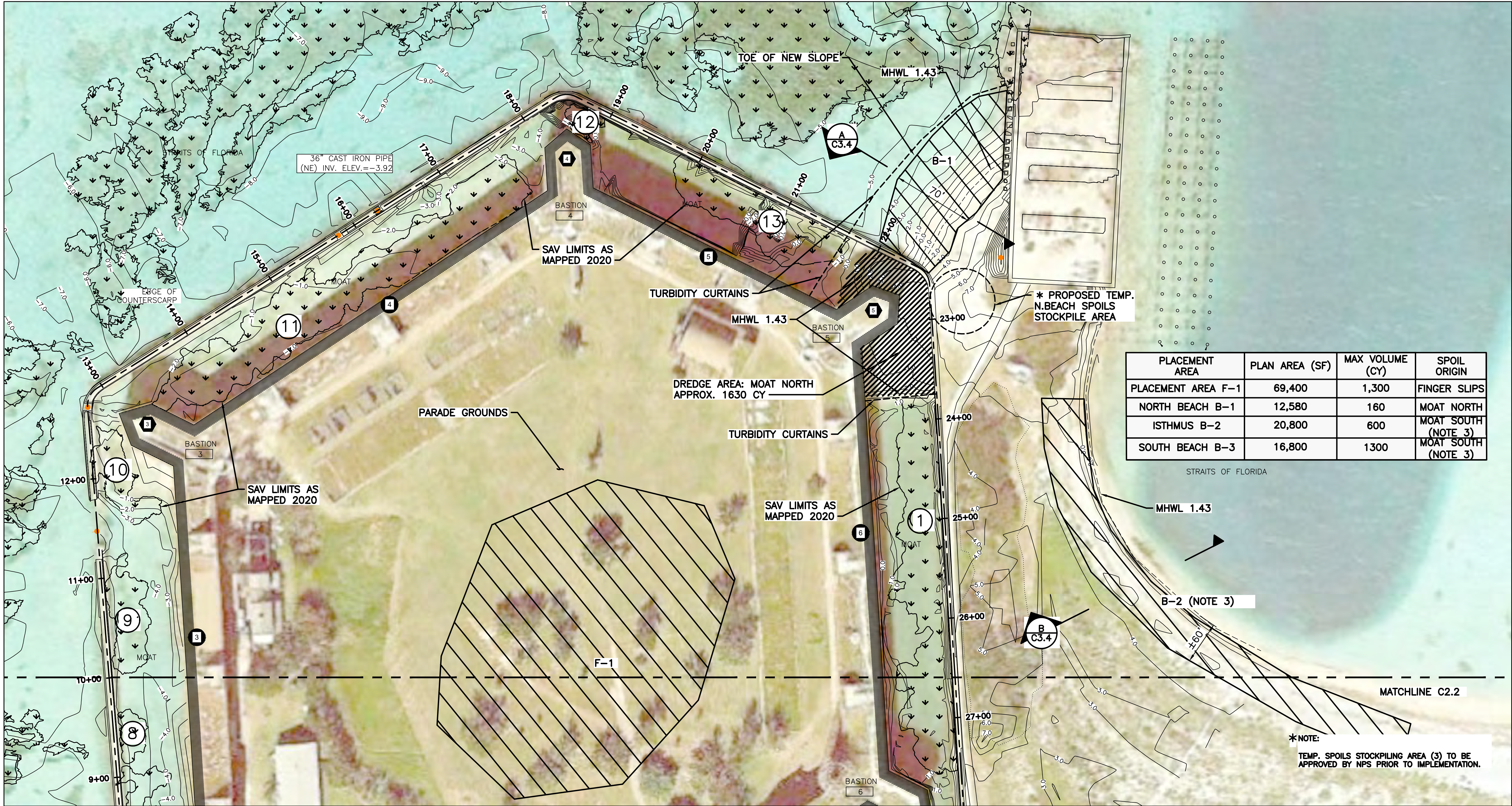
TITLE OF SHEET
OVERALL DREDGING PLAN

FORT JEFFERSON
MONROE COUNTY, FL

DRAWING NO.
364
167786
PMIS/PKG NO.
244370 & 244372
SHEET
13 OF **19**

\\nasv01p8hp8\PROJECTS\NPS\Dry Tortugas\Task Order 5 (C0's)\6.0_CAD_BIM\6.2_Work_in_Progress\5-SHEETS\C2.1.dwg, C2.1, 2/21/2023 4:30:04 PM, KELMIR

6/23/2022 1:35 PM, KELMIR, \\jor-sv3\p8hp8\PROJECTS\NPS\Dry Tortugas\Task Order 5 (C0's)\6.0_CAD_BIM\6.2_Work_in_Progress\5-SHEETS\C2.1.dwg, C2.1, 2/21/2023 4:30:04 PM, KELMIR



PLACEMENT AREA	PLAN AREA (SF)	MAX VOLUME (CY)	SPOIL ORIGIN
PLACEMENT AREA F-1	69,400	1,300	FINGER SLIPS
NORTH BEACH B-1	12,580	160	MOAT NORTH
ISTHMUS B-2	20,800	600	MOAT SOUTH (NOTE 3)
SOUTH BEACH B-3	16,800	1300	MOAT SOUTH (NOTE 3)

NOTES:

1. TOTAL CUT VOLUME IS APPROXIMATELY 3,010 CY

2. VOLUMES SHOWN REPRESENT MAXIMUM STORAGE PER INDICATED LOCATION.

3. B-2 IS AN ALTERNATIVE/OVERFLOW PLACEMENT AREA. MATERIAL SHALL BE DEPOSITED IN OTHER DESIGNATED LOCATIONS FIRST. PRIOR TO MATERIAL PLACEMENT, CONTRACTOR SHALL QUANTIFY THE REMAINING DREDGE MATERIAL FOR THE GOVERNMENT TO DETERMINE IF REMAINING MATERIAL SHOULD BE PLACED IN B-1, B-3, OR F-1

A. PLACEMENT AREA B-2 ASSUMES DREDGE MATERIAL WILL BE PLACED ABOVE MHW ELEVATION.

B. SHORELINE PLACEMENT AT B-2 IS APPROXIMATELY 500 LINEAR FEET.

C. MATERIAL PLACED AT B-2 WILL BE DEWATERED BEFORE PLACEMENT WITH NO RETURN WATER.
4. SOURCE OF BEACH PLACEMENT MATERIAL WILL BE FROM MOAT ONLY

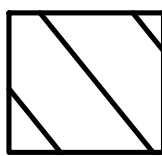
5. PRIOR TO PLACEMENT IN LOCATION F-1, ALL MATERIAL MUST BE SCREENED/SIFTED FOR INTRUSIVE MATERIAL OR DEBRIS. PLACEMENT OF MATERIAL WILL NOT COVER/DAMAGE TREE ROOTS. PLACEMENT AREA F-1 IS ONLY ACCESSIBLE BY SALLY PORT BRIDGE. REFER TO NOTES ON G3.

6. SEDIMENT PLACEMENT AT SITE B-1 SHALL START AT NORTHERN AREA LIMITS AND PROGRESS SOUTH. SEDIMENT PLACEMENT AT SITE B-2 SHALL START AT THE SOUTHERN AREA LIMITS AND PROGRESS NORTH.

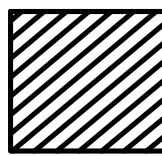
7. COORDINATE SEDIMENT PLACEMENT IN AREA F-1 WITH ONSITE PARK STAFF. DO NOT COVER OR DAMAGE TREE ROOTS DURING PLACEMENT. INSTALL SILT FENCE AS SHOWN ON C3.4 AROUND VEGETATION PER ONSITE STAFF DIRECTION. PLACEMENT THICKNESS NOT TO EXCEED SIX INCHES.

1 FRONT IDENTIFIER

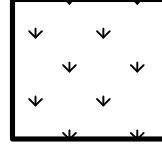
2 BASTION IDENTIFIER



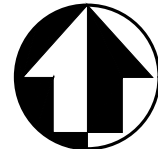
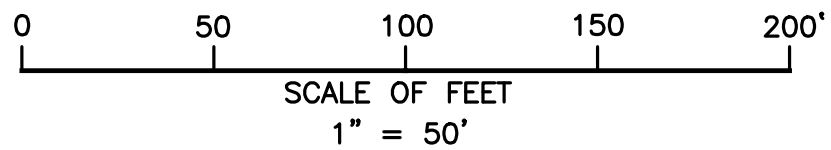
PLACEMENT AREA



DREDGE AREA



SUBMERGED AQUATIC VEGETATION (SAV)



DESIGNED:
J. LAFASO
K. ELMIR
TECH. REVIEW:
J. BERG
DATE:
FEB 2023

SUB SHEET NO.

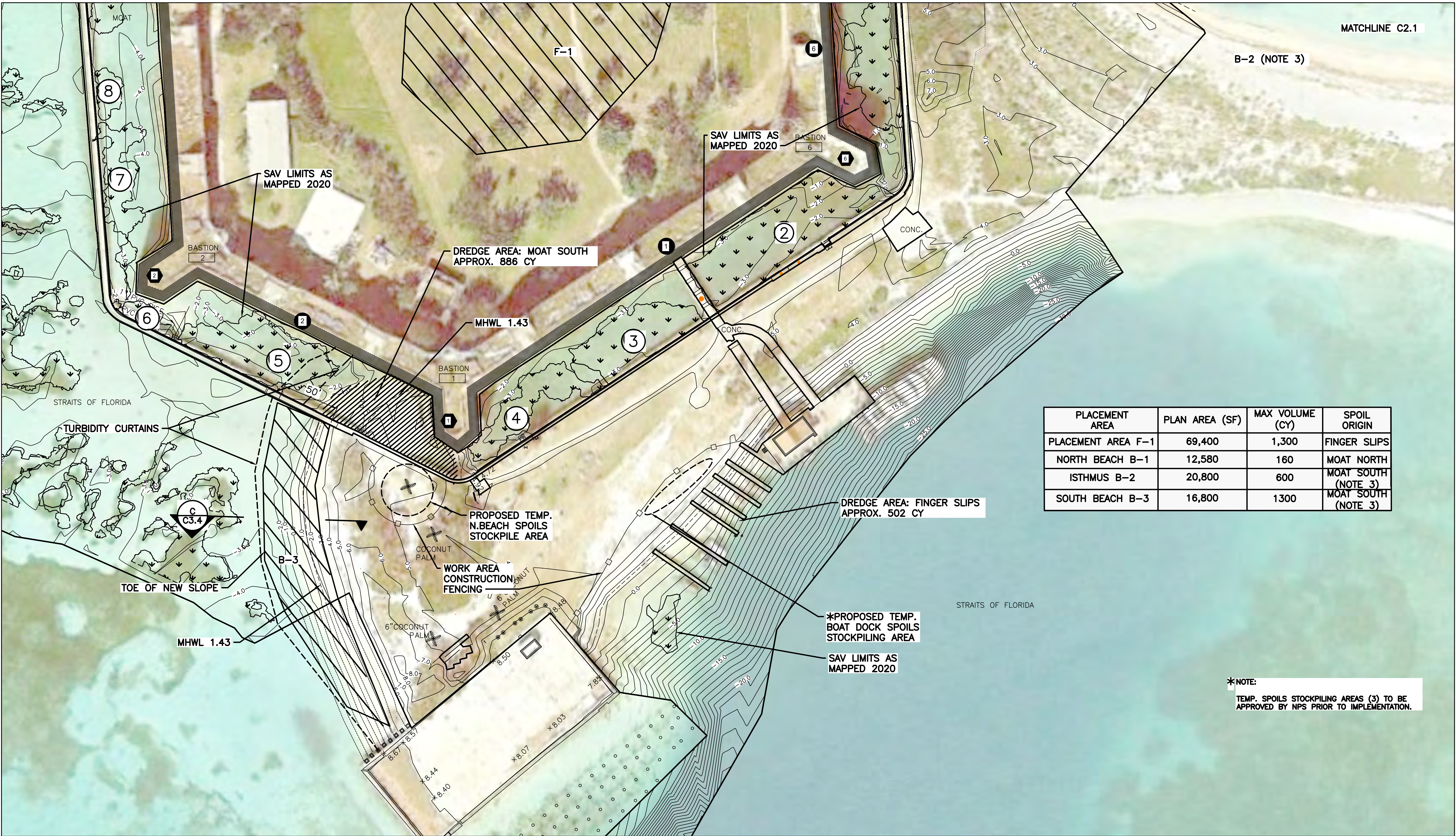
C2.1

TITLE OF SHEET
**DREDGE SPOIL
PLACEMENT PLAN
(1 OF 2)**
GARDEN KEY, DRY TORTUGAS NATIONAL PARK
MONROE COUNTY, FL

DRAWING NO.
364
167786
PMIS/PKG NO.
244370 & 244372
SHEET
23 OF **30**

\\nasv01p4h\p4h\PROJECTS\NPS\NPS-Dry Tortugas (DRTG)\Task Order 5 (CD's)\6.0_CAD_BIM\6.2_Work\in_Progress\5-SHEETS\C2.2.dwg 6/23/2022 2:29 PM KLMIR

6/23/2022 2:29 PM KLMIR \\nasv01p4h\p4h\PROJECTS\NPS\NPS-Dry Tortugas (DRTG)\Task Order 5 (CD's)\6.0_CAD_BIM\6.2_Work\in_Progress\5-SHEETS\C2.2.dwg 6/23/2022 1:16:10 PM KLMIR



PLACEMENT AREA	PLAN AREA (SF)	MAX VOLUME (CY)	SPOIL ORIGIN
PLACEMENT AREA F-1	69,400	1,300	FINGER SLIPS
NORTH BEACH B-1	12,580	160	MOAT NORTH
ISTHMUS B-2	20,800	600	MOAT SOUTH (NOTE 3)
SOUTH BEACH B-3	16,800	1300	MOAT SOUTH (NOTE 3)

*NOTE:
TEMP. SPOILS STOCKPILING AREAS (3) TO BE APPROVED BY NPS PRIOR TO IMPLEMENTATION.

NOTES:

- TOTAL CUT VOLUME IS APPROXIMATELY 3,010 CY
- VOLUMES SHOWN REPRESENT MAXIMUM STORAGE PER INDICATED LOCATION.
- B-2 IS AN ALTERNATIVE/OVERFLOW PLACEMENT AREA. MATERIAL SHALL BE DEPOSITED IN OTHER DESIGNATED LOCATIONS FIRST. PRIOR TO MATERIAL PLACEMENT, CONTRACTOR SHALL QUANTIFY THE REMAINING DREDGE MATERIAL FOR THE GOVERNMENT TO DETERMINE IF REMAINING MATERIAL SHOULD BE PLACED IN B-1, B-3, OR F-1
 - PLACEMENT AREA B-2 ASSUMES DREDGE MATERIAL WILL BE PLACED ABOVE MHW ELEVATION.
 - SHORELINE PLACEMENT AT B-2 IS APPROXIMATELY 500 LINEAR FEET.

- MATERIAL PLACED AT B-2 WILL BE DEWATERED BEFORE PLACEMENT WITH NO RETURN WATER.
- SOURCE OF BEACH PLACEMENT MATERIAL WILL BE FROM MOAT ONLY
- PRIOR TO PLACEMENT IN LOCATION F-1, ALL MATERIAL MUST BE SCREENED/SIFTED FOR INTRUSIVE MATERIAL OR DEBRIS. PLACEMENT OF MATERIAL WILL NOT COVER/DAMAGE TREE ROOTS. PLACEMENT AREA F-1 IS ONLY ACCESSIBLE BY SALLY PORT BRIDGE. REFER TO NOTES ON G3.
- SEDIMENT PLACEMENT AT SITE B-1 SHALL START AT NORTHERN AREA LIMITS AND PROGRESS SOUTH. SEDIMENT PLACEMENT AT SITE B-2 SHALL START AT THE SOUTHERN AREA LIMITS AND PROGRESS NORTH.

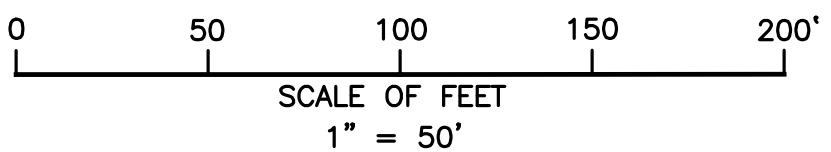
FRONT IDENTIFIER

BASTION IDENTIFIER

PLACEMENT AREA

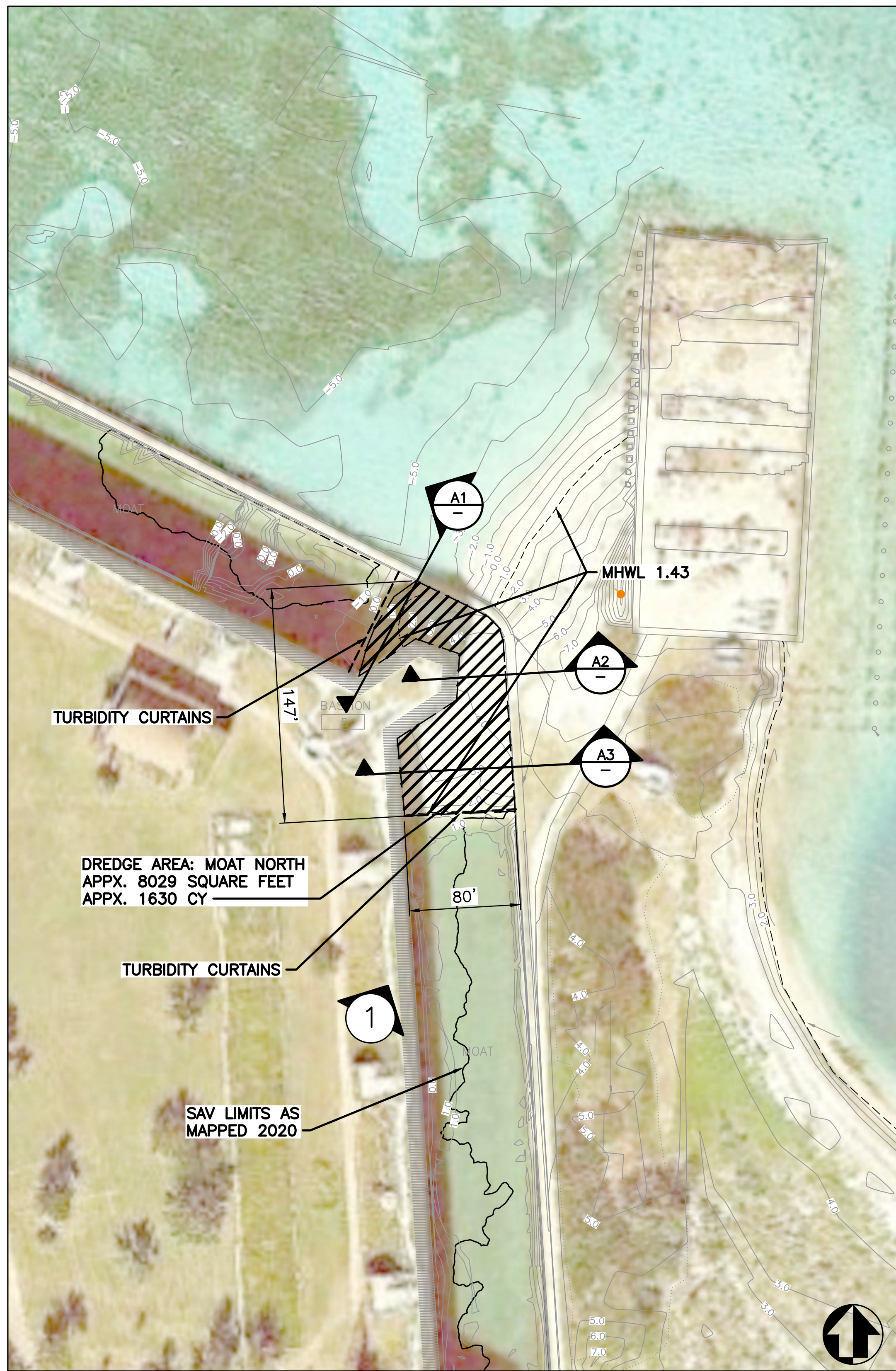
DREDGE AREA

SUBMERGED AQUATIC VEGETATION (SAV)



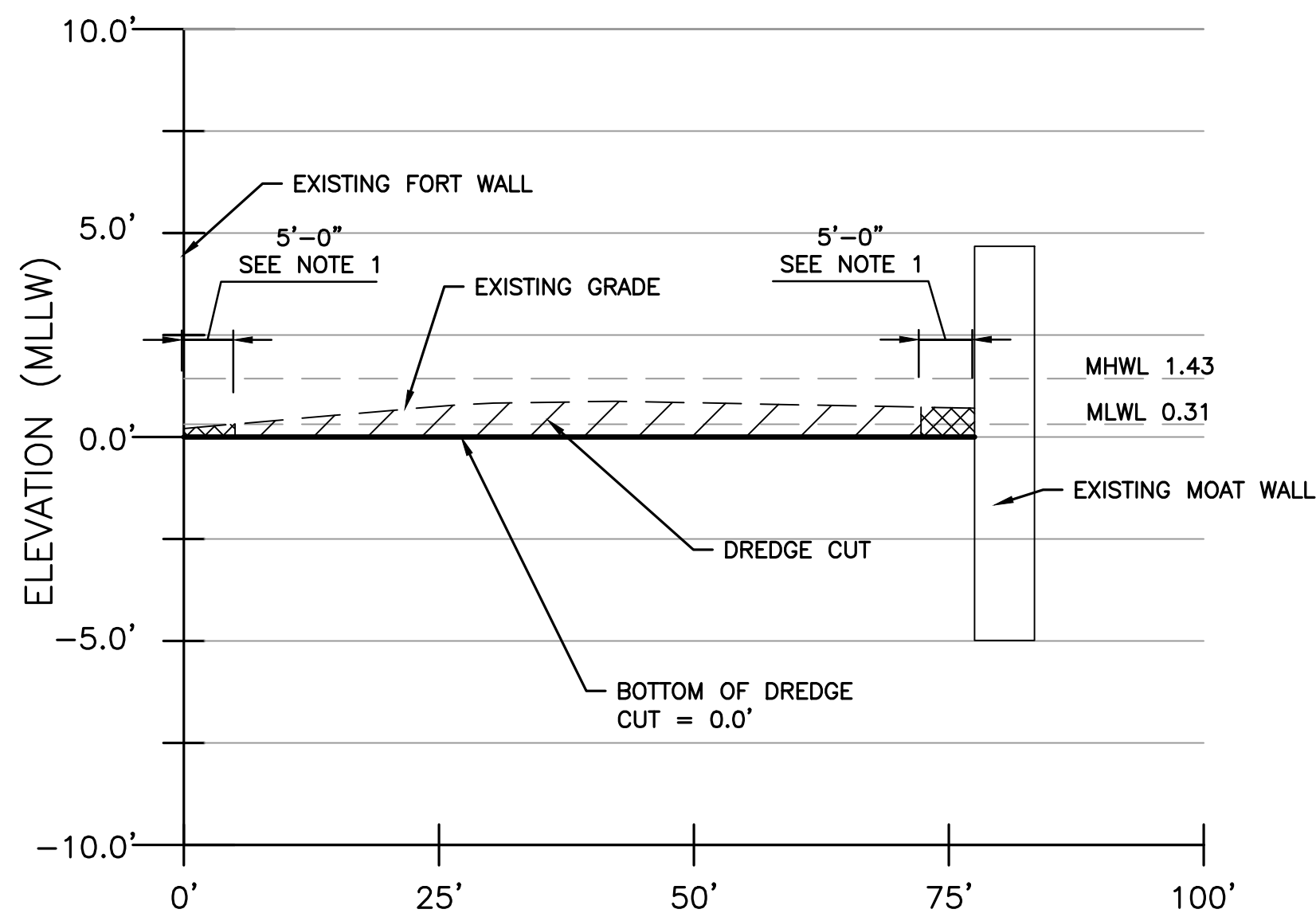
DESIGNED: J. LAFASO	SUB SHEET NO.	TITLE OF SHEET DREDGE SPOIL PLACEMENT PLAN (2 OF 2)	DRAWING NO. 364 167786
TECH. REVIEW: K. ELMIR			PMIS/PKG NO. 244370 & 244372
J. BERG			SHEET
DATE: FEB 2023			24 OF 30

6/24/2022 2:58 PM CHRPRICE H:\P&H PROJECTS\NPS\NPS_Dry Tortugas (DRTO)\Task Order 5 (C01s)\6.0 CAD_BIM\6.2 Work_in_Progress\5-SHEETS\C3.1.dwg

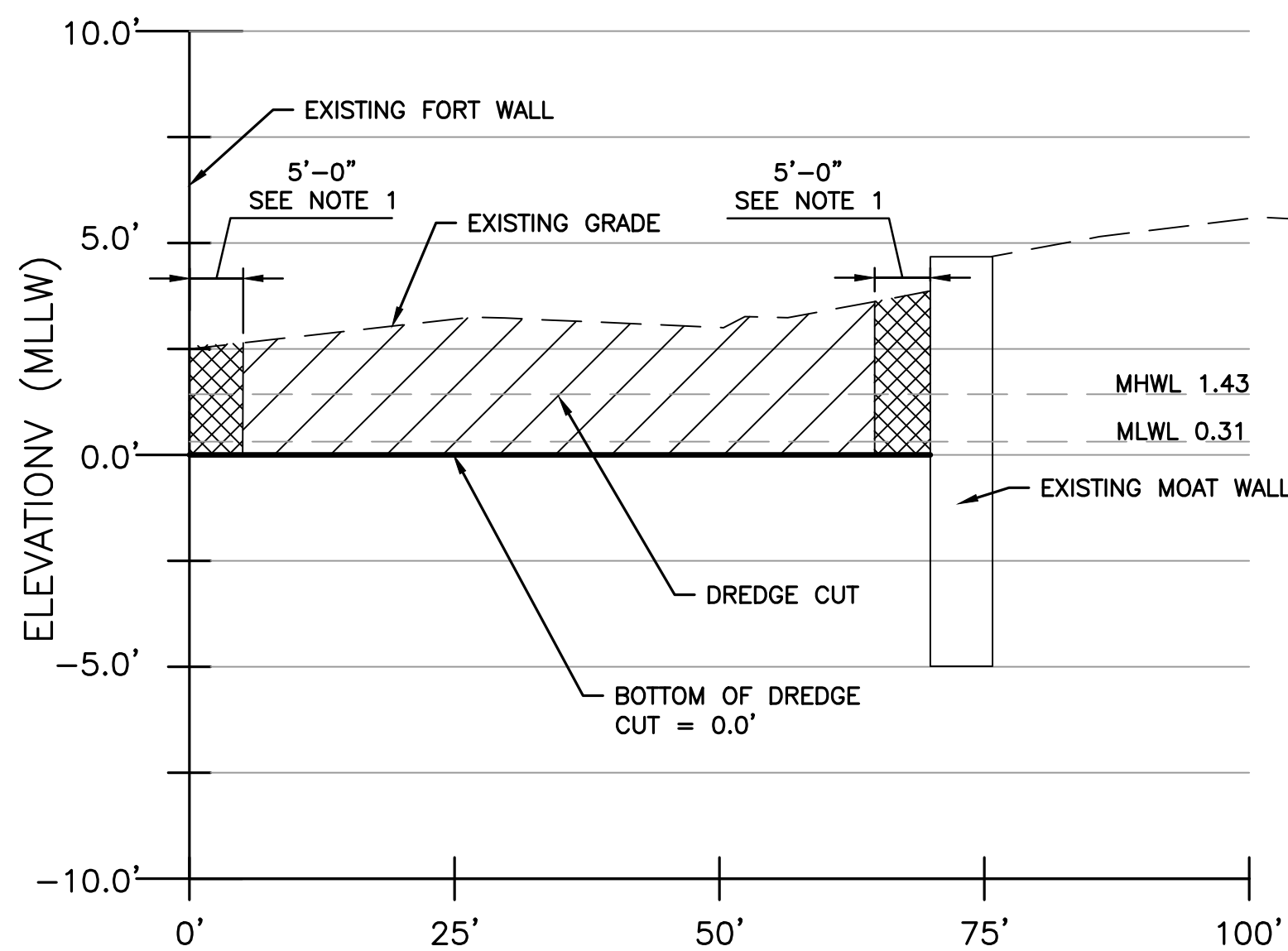


0 50 100 150 200
SCALE OF FEET
1" = 50'

ELEVATIONS OF TIDAL DATUMS		
MEAN HIGHER HIGH WATER	MHHW	1.75 FT
MEAN HIGH WATER	MHW	1.43 FT
MEAN LOW WATER	MLW	0.31 FT
MEAN LOWER LOW WATER	MLLW	0.00 FT



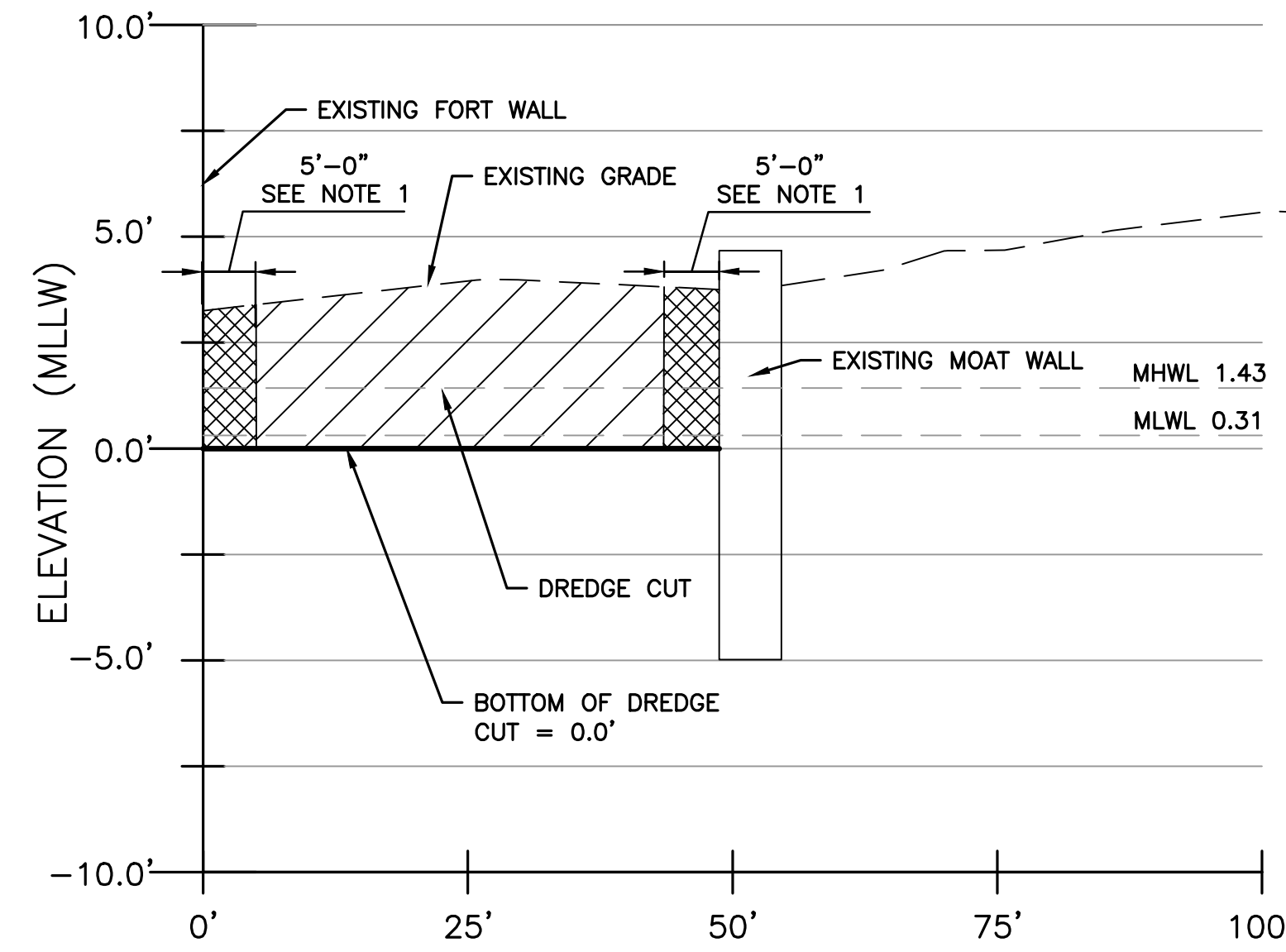
A1 TYPICAL SECTION
HORIZONTAL SCALE 1"=15'; VERTICAL SCALE: 1" = 5'



A3 TYPICAL SECTION
HORIZONTAL SCALE 1"=15'; VERTICAL SCALE: 1" = 5'

NOTE:

1. PROTECTIVE WORK BUFFER – DREDGE WITH HAND / SUCTION METHODS TO PREVENT DAMAGE TO MASONRY.
2. DREDGING TO DAYLIGHT AT EXISTING ELEVATION 0.0'



A2 TYPICAL SECTION
HORIZONTAL SCALE 1"=15'; VERTICAL SCALE: 1" = 5'

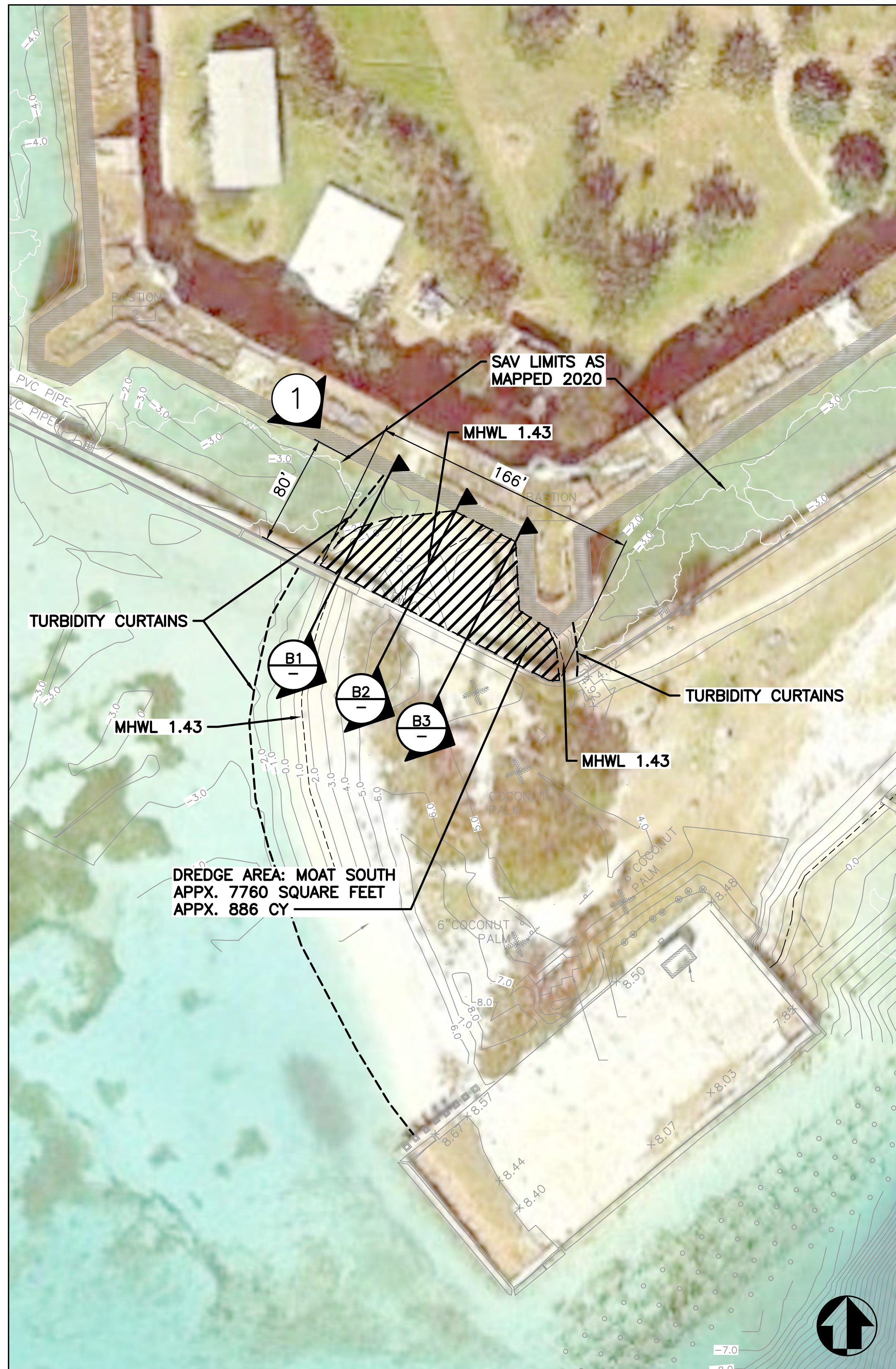


1 DREDGE AREA LOOKING NORTHEAST

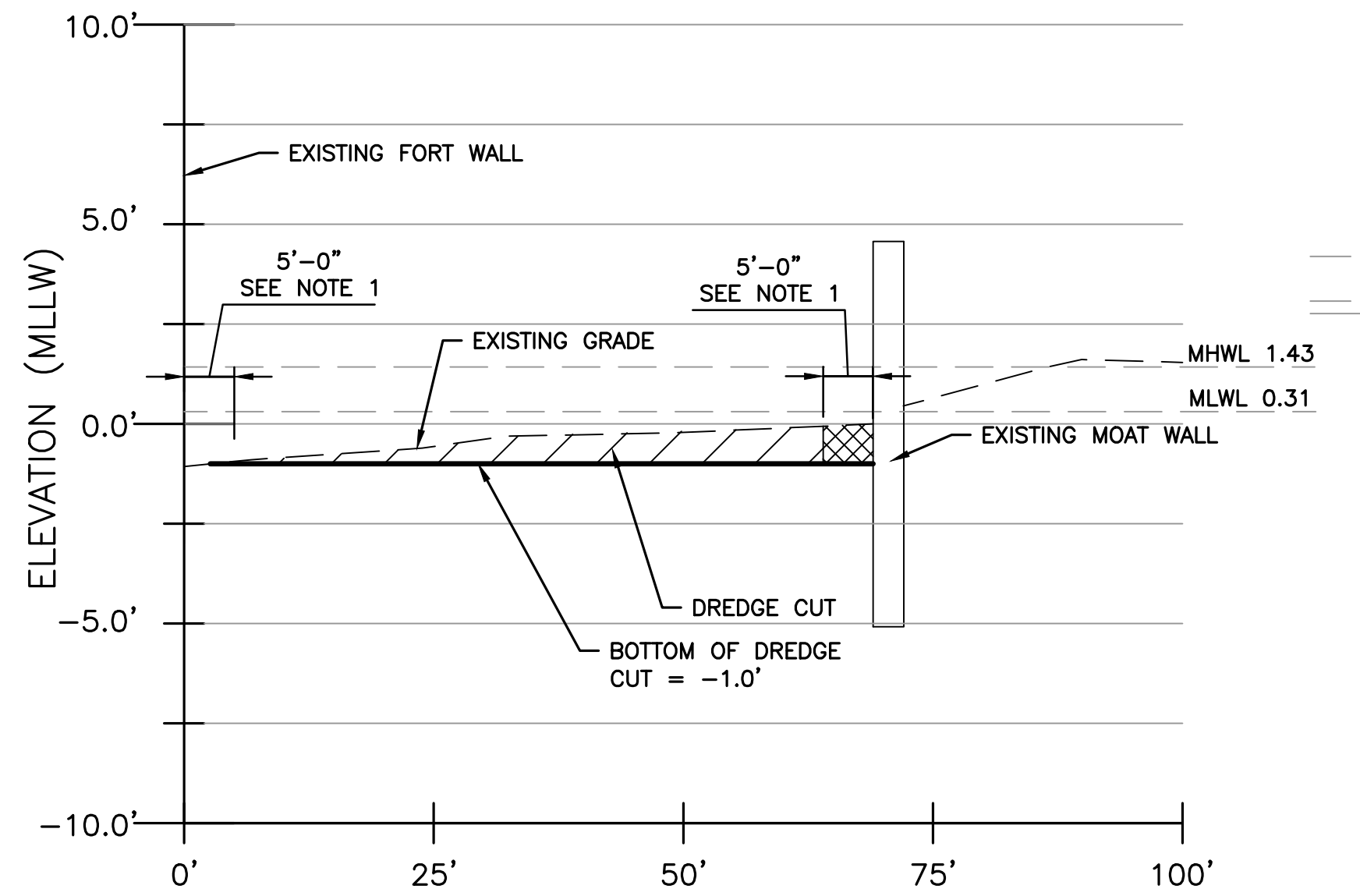
0 50 100 150 200
SCALE OF FEET
1" = 50'

DESIGNED: J. LAFASO C. PRICE TECH. REVIEW: J. BERG DATE: SEP 2022	SUB SHEET NO. C3.1	TITLE OF SHEET DREDGE AREA MOAT NORTH GARDEN KEY, DRY TORTUGAS NATIONAL PARK MONROE COUNTY, FL	DRAWING NO. 364 167786 PMIS/PKG NO. 244370 & 244372 SHEET 16 OF 19
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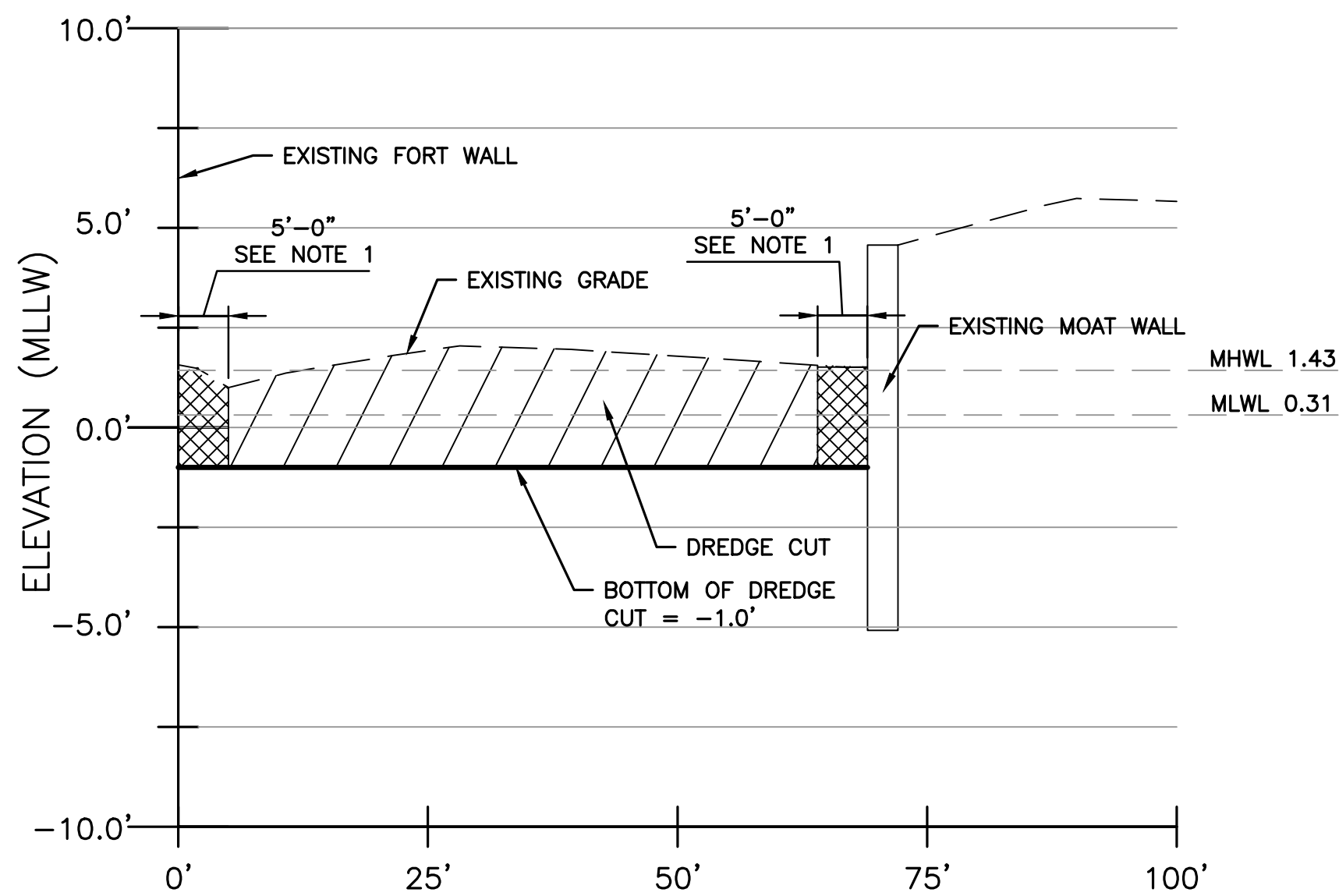
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ELEVATIONS OF TIDAL DATUMS		
MEAN HIGHER HIGH WATER	MHHW	1.75 FT
MEAN HIGH WATER	MHW	1.43 FT
MEAN LOW WATER	MLW	0.31 FT
MEAN LOWER LOW WATER	MLLW	0.00 FT



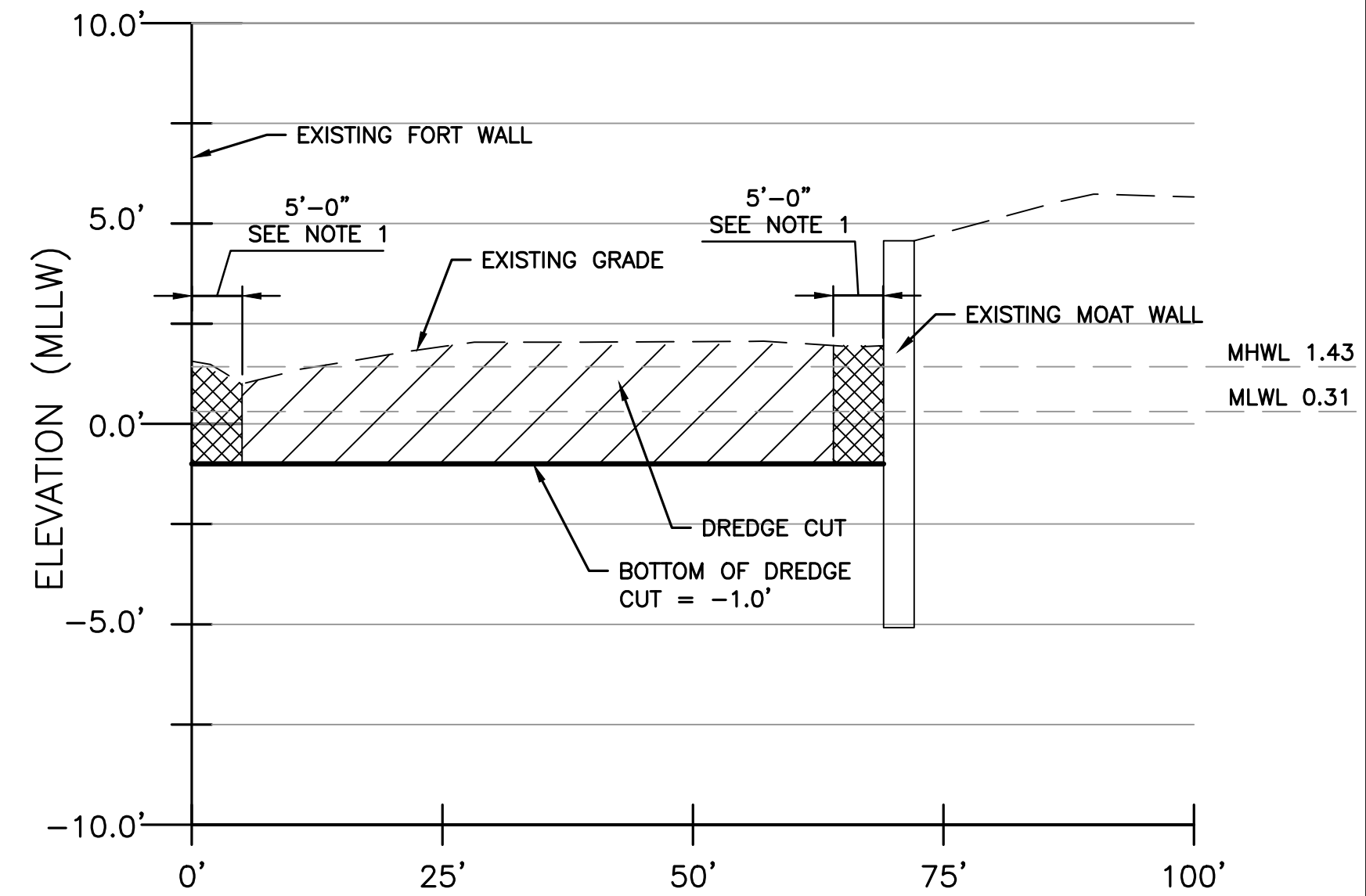
B1 TYPICAL SECTION
HORIZONATAL SCALE 1"=15'; VERTICAL SCALE: 1" = 5'



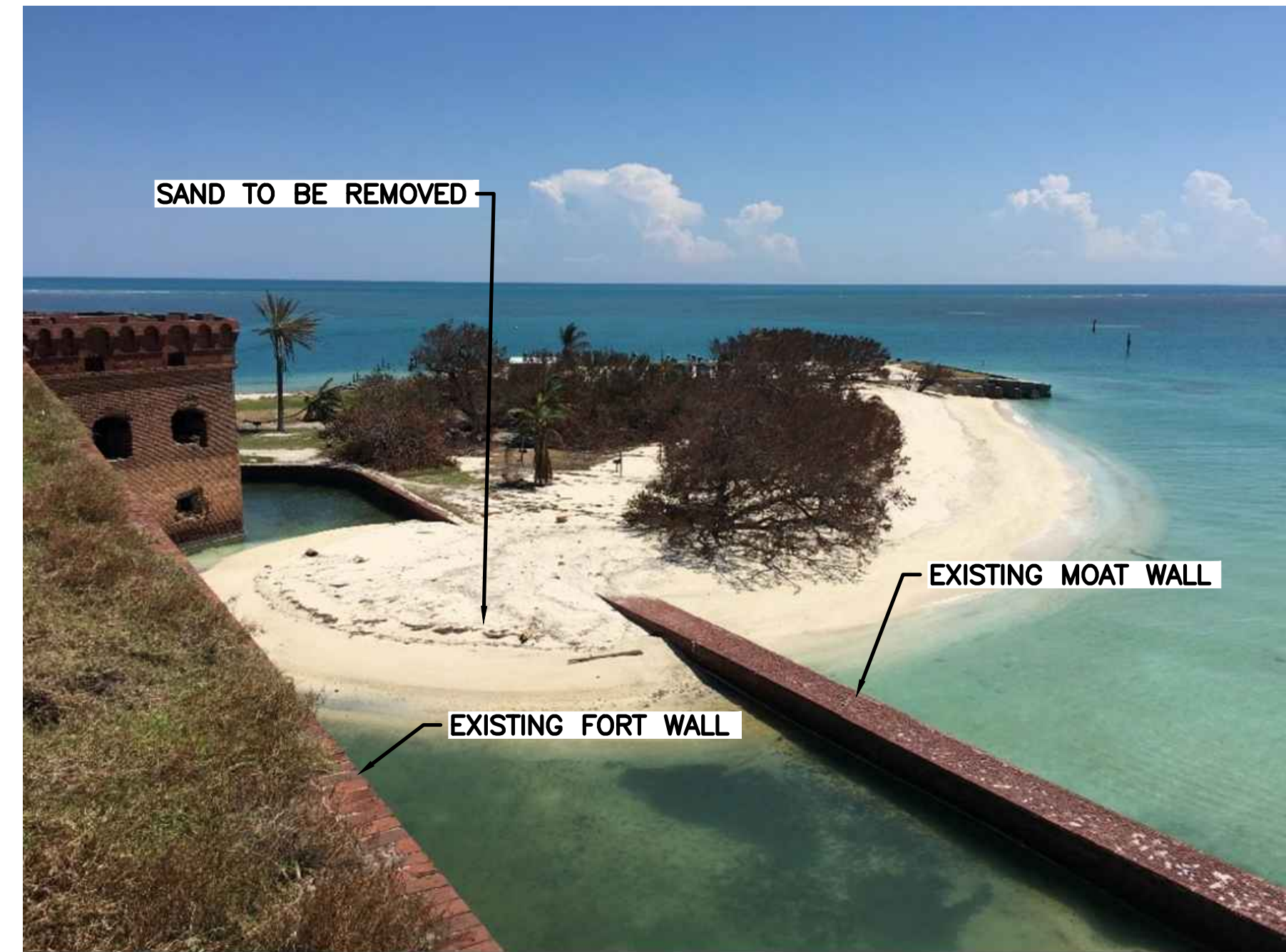
B3 TYPICAL SECTION
HORIZONATAL SCALE 1"=15'; VERTICAL SCALE: 1" = 5'

NOTE:

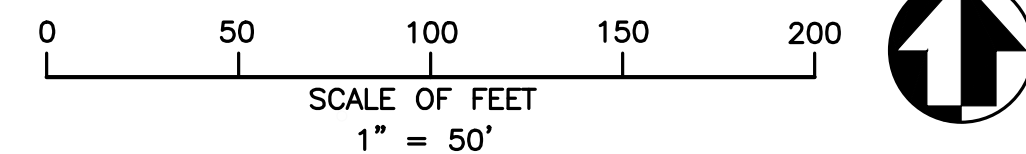
1. PROTECTIVE WORK BUFFER – DREDGE WITH HAND / SUCTION METHODS TO PREVENT DAMAGE TO MASONRY..
2. DREDGING TO DAYLIGHT AT EXISTING ELEVATION 0.0'



B2 TYPICAL SECTION
HORIZONATAL SCALE 1"=15'; VERTICAL SCALE: 1" = 5'

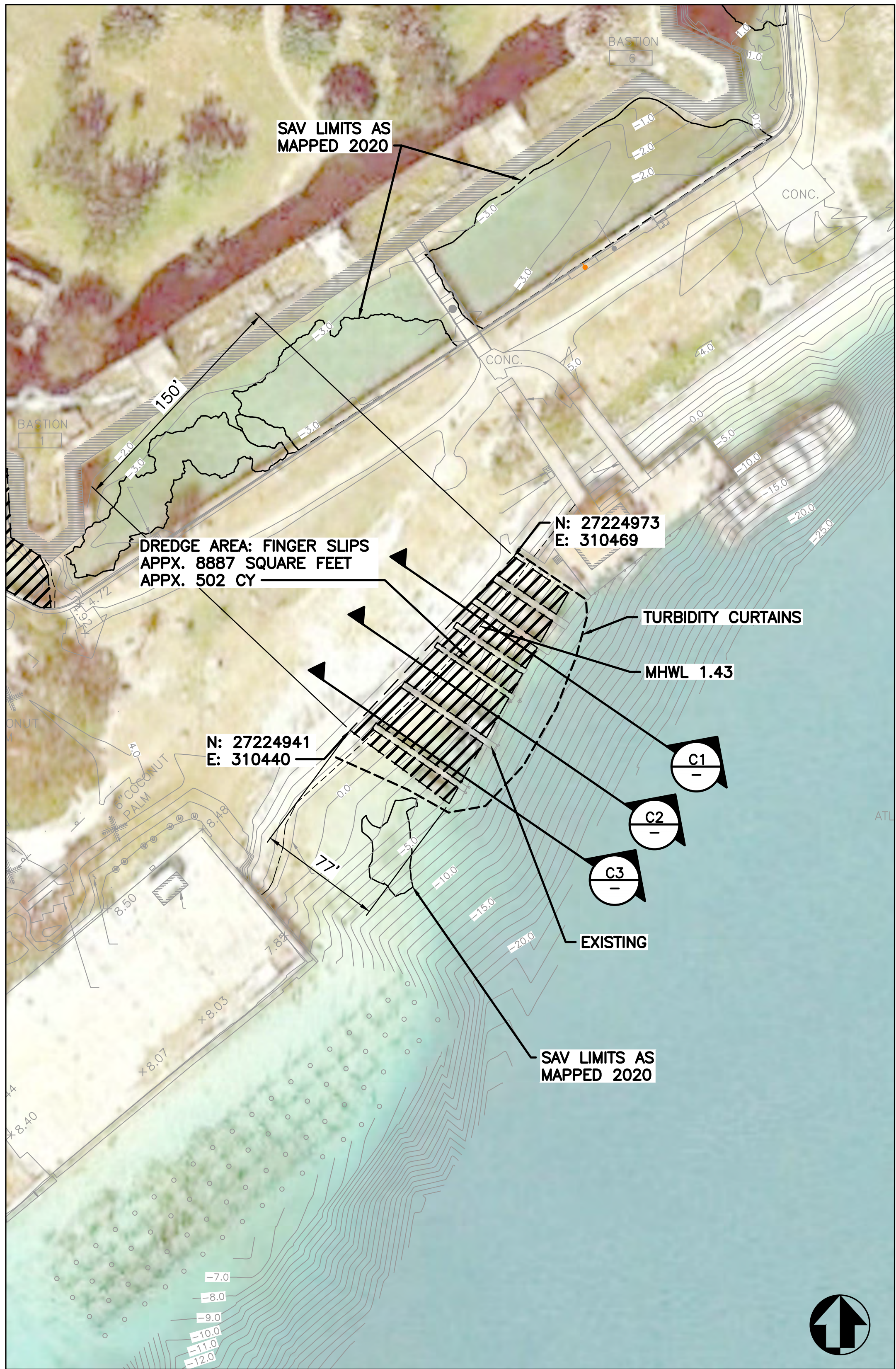


1 DREDGE AREA LOOKING SOUTHEAST



DESIGNED: J. LAFASO C. PRICE TECH. REVIEW: J. BERG DATE: SEP 2022	SUB SHEET NO. C3.2	TITLE OF SHEET DREDGE AREA MOAT SOUTH GARDEN KEY, DRY TORTUGAS NATIONAL PARK MONROE COUNTY, FL	DRAWING NO. 364 167786 PMIS/PKG NO. 244370 & 244372 SHEET 16 OF 18
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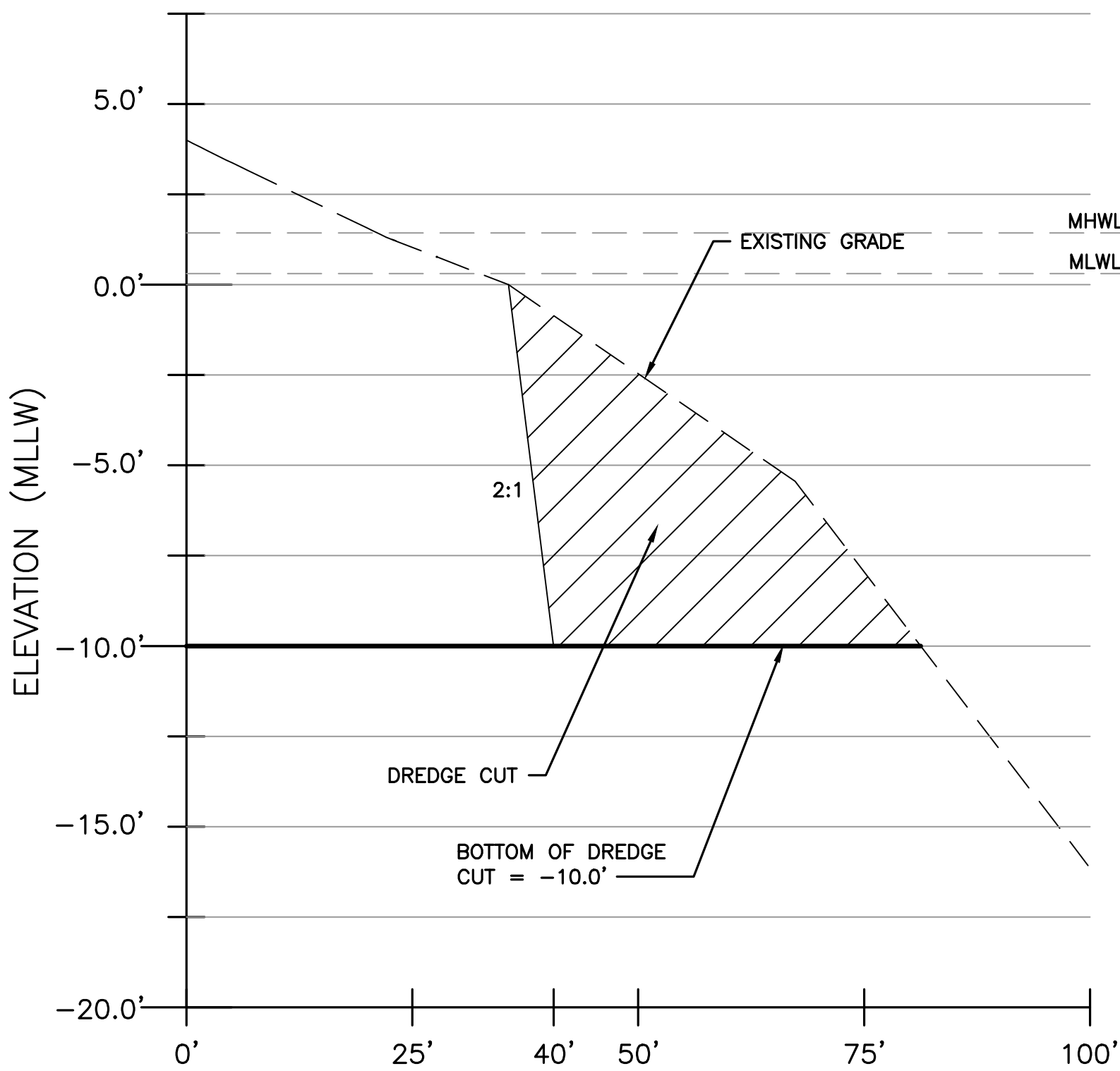
6/24/2022 4:38 PM CHPRICE H:\P&H PROJECTS\NPS\NPS_Dry Tortuga (DRTD)\Task Order 5 (C0's)\6.0 CAD_BIM\6.2 Work_in_Progress\5-SHEETS\C3.3.dwg



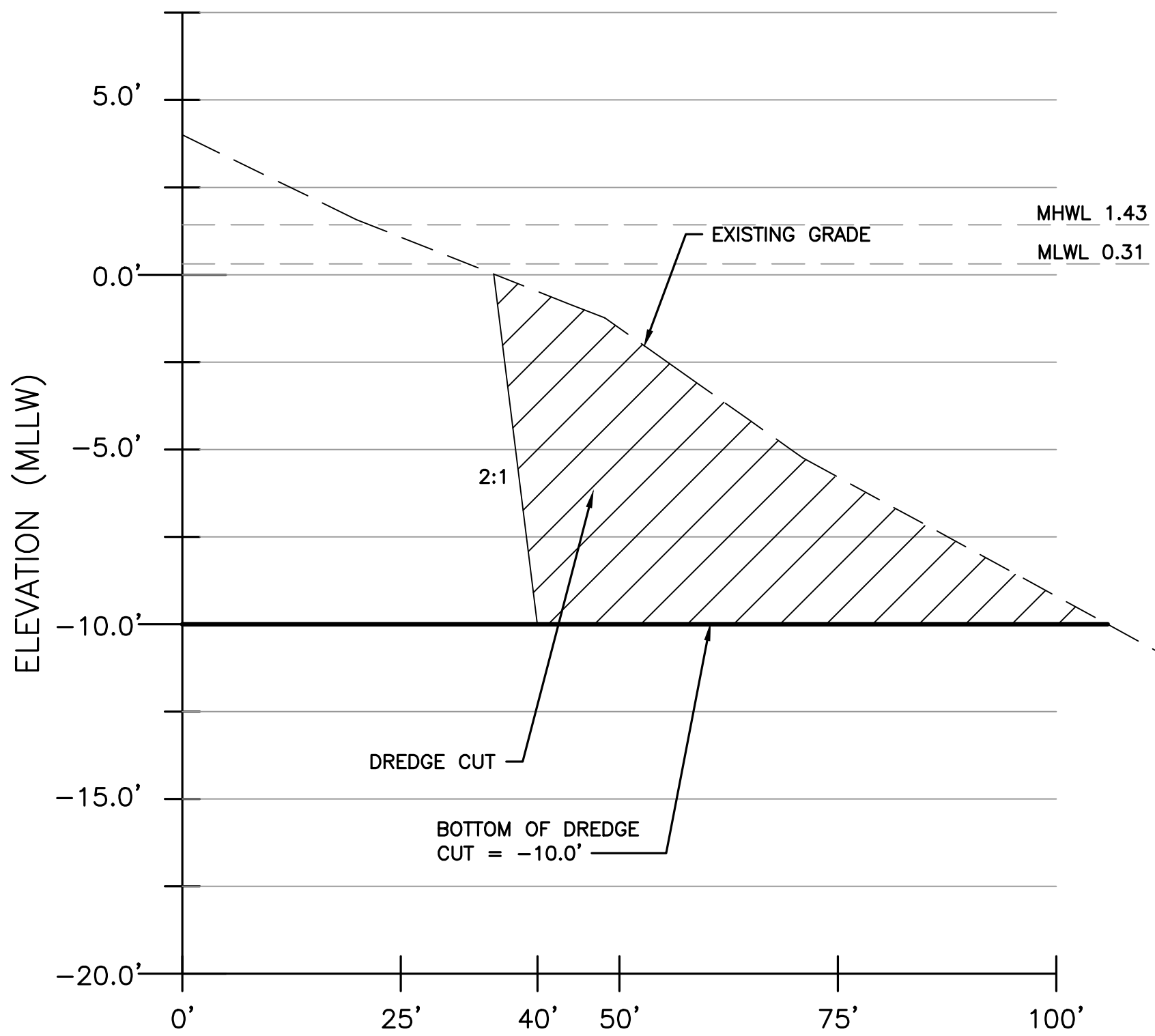
ELEVATIONS OF TIDAL DATUMS		
MEAN HIGHER HIGH WATER	MHHW	1.75 FT
MEAN HIGH WATER	MHW	1.43 FT
MEAN LOW WATER	MLW	0.31 FT
MEAN LOWER LOW WATER	MLLW	0.00 FT

NOTE:

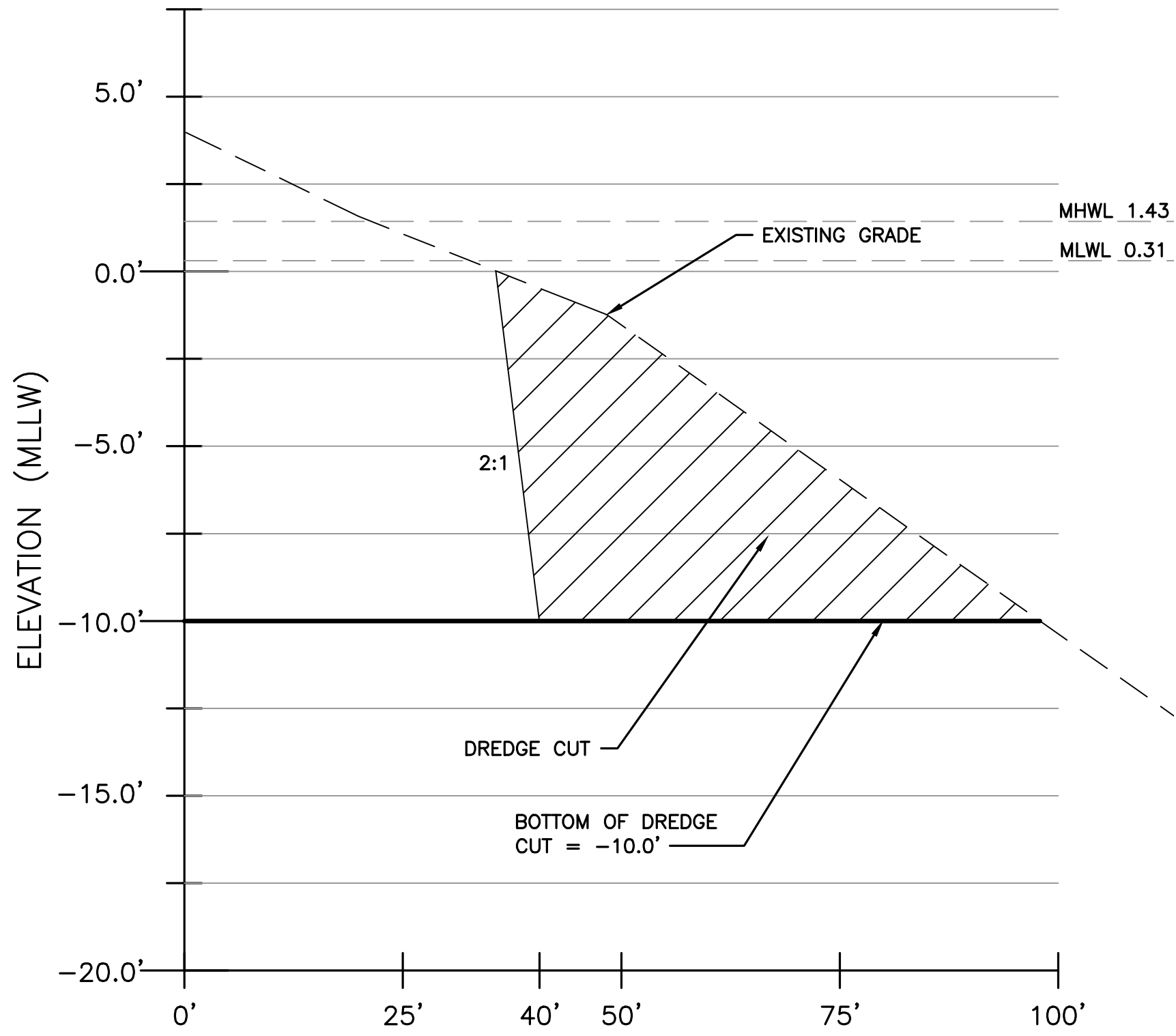
- ALL SPOILS FROM FINGER PIER DREDGING WILL BE STOCKPILED AND UTILIZED AT FORT.
- NO BEACH PLACEMENT IS PROPOSED FOR FINGER SLIP MATERIAL.



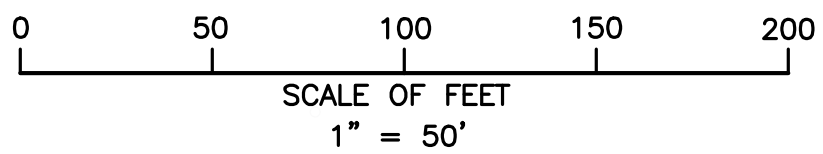
C1 TYPICAL SECTION
HORIZONATAL SCALE 1"=15'; VERTICAL SCALE: 1" = 5'




C2 TYPICAL SECTION
HORIZONATAL SCALE 1"=15'; VERTICAL SCALE: 1" = 5'

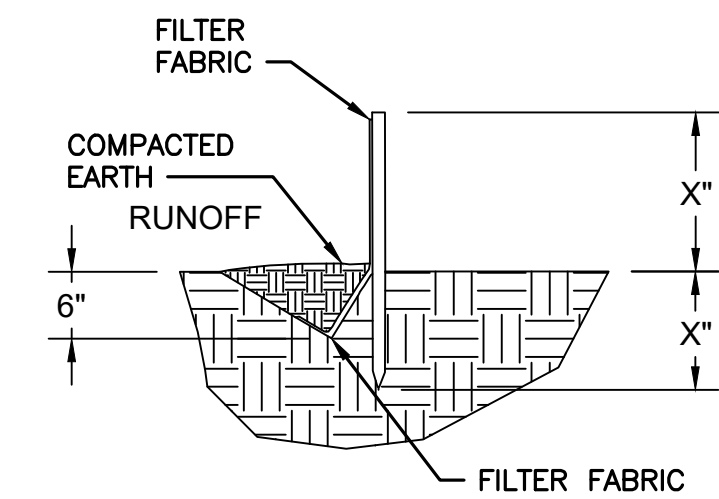
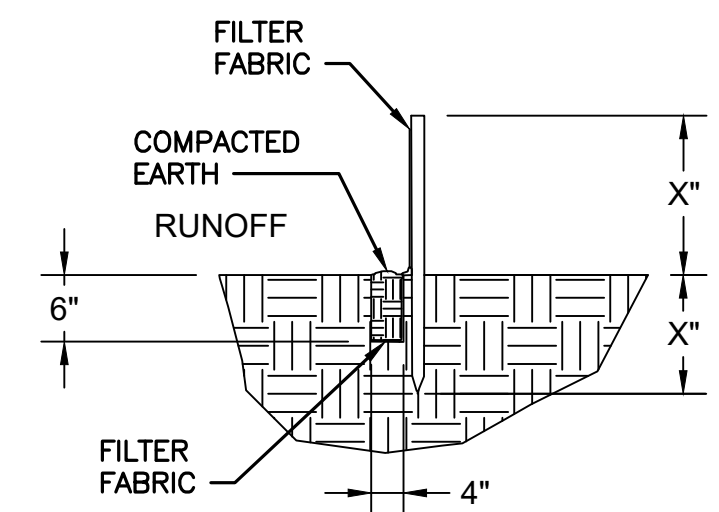
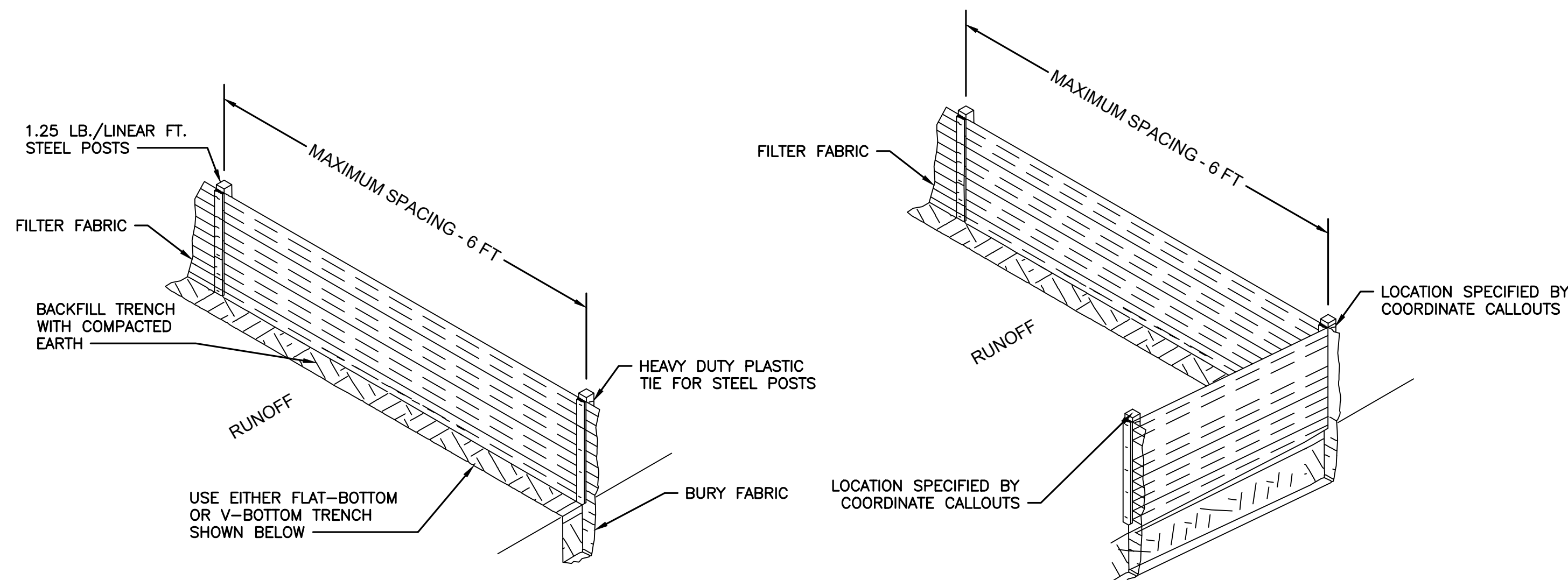
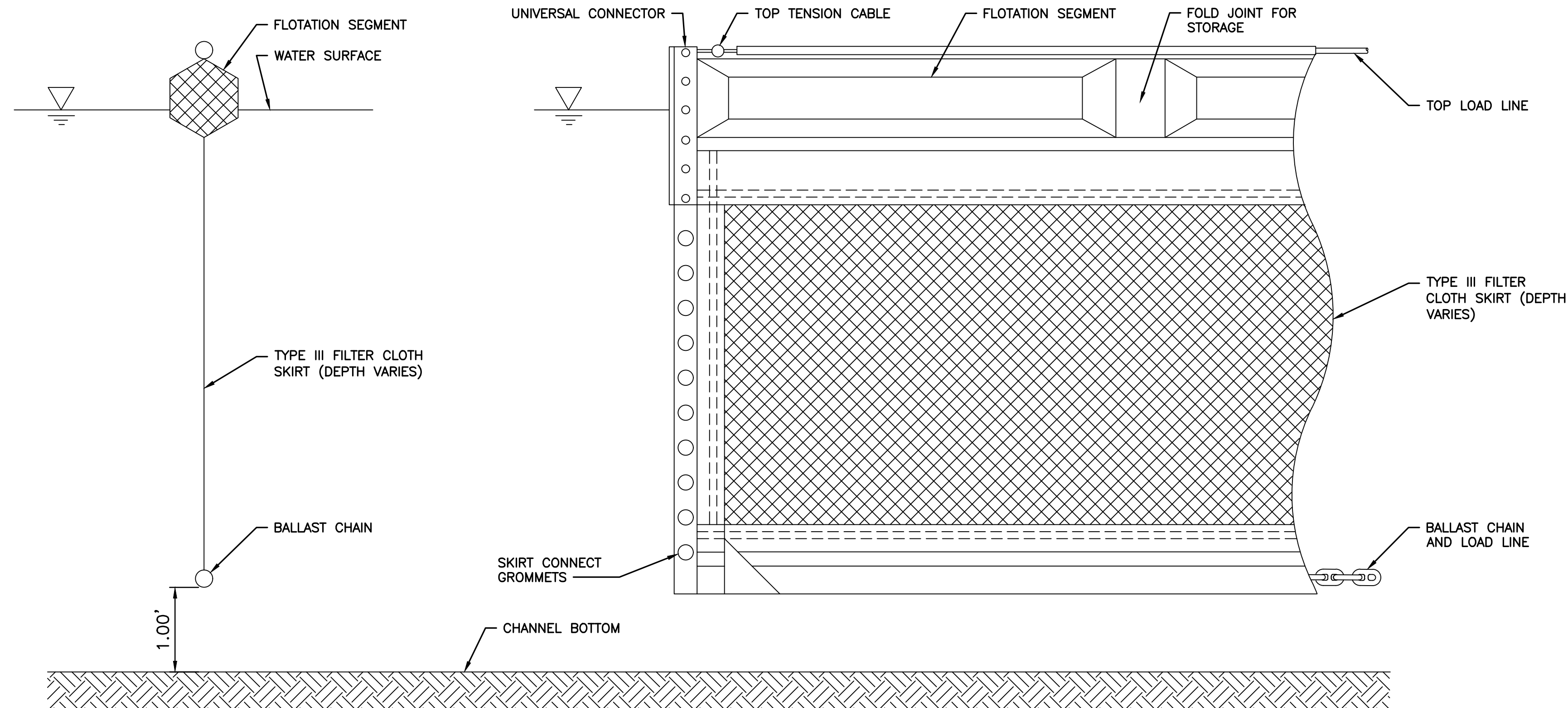
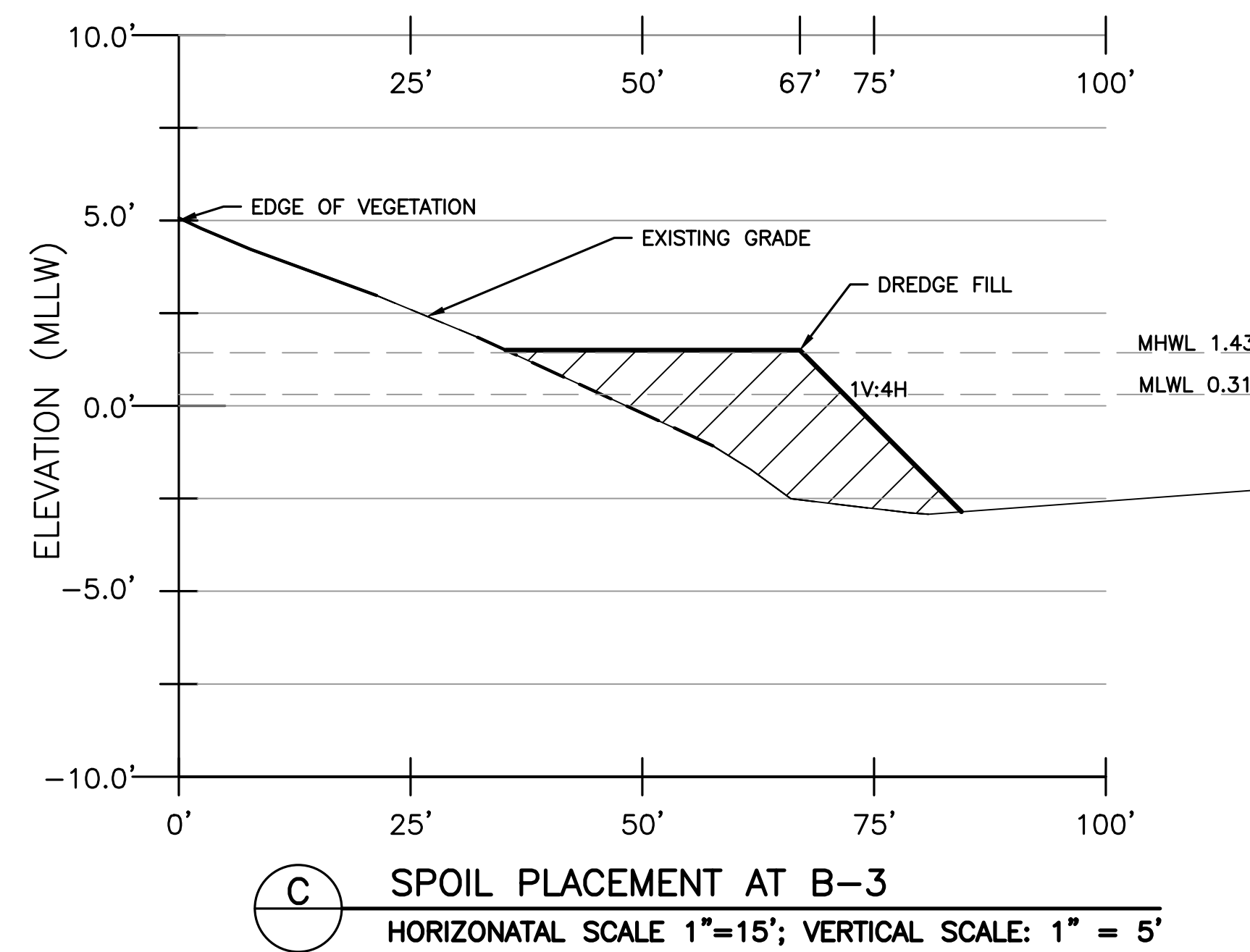
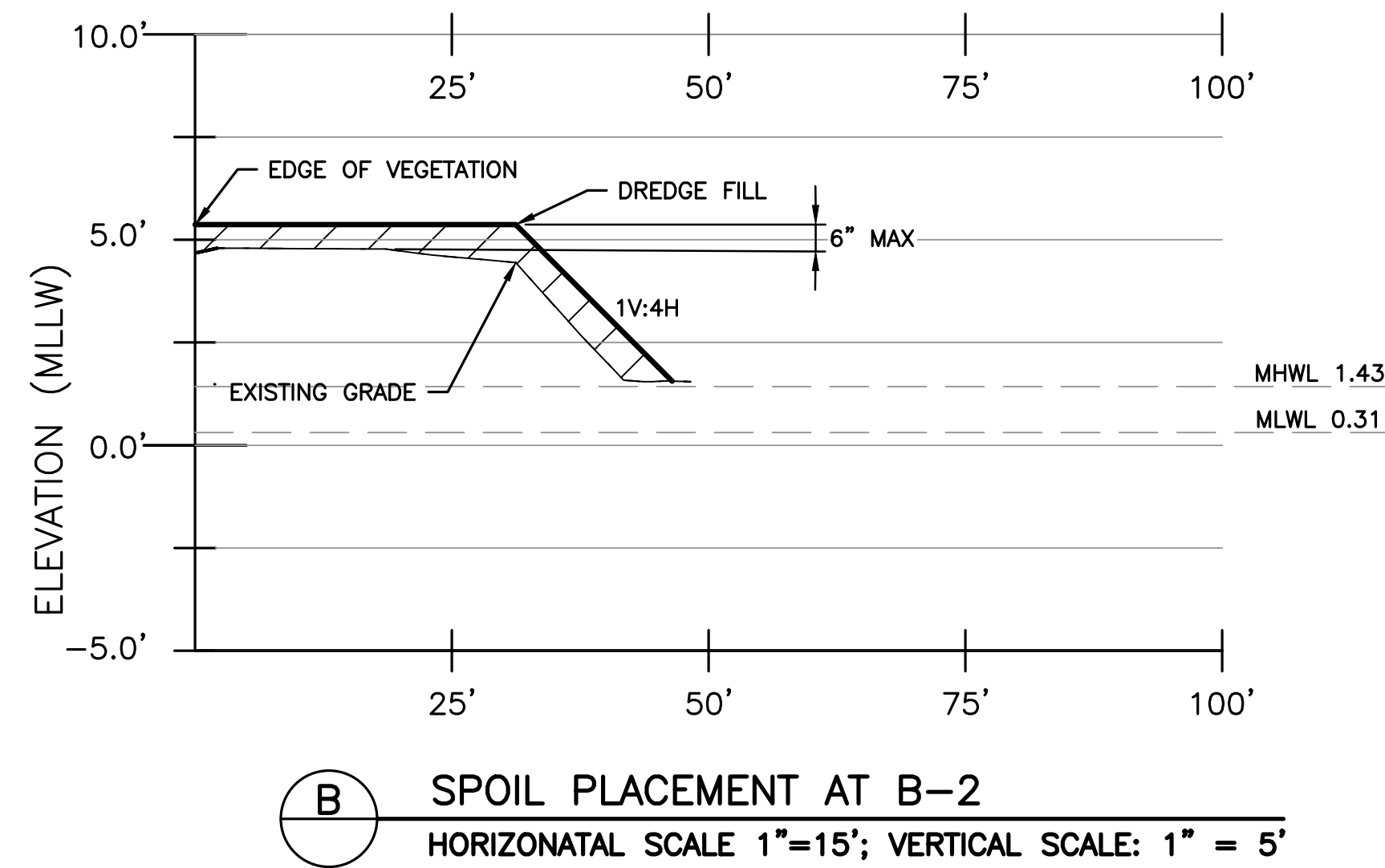
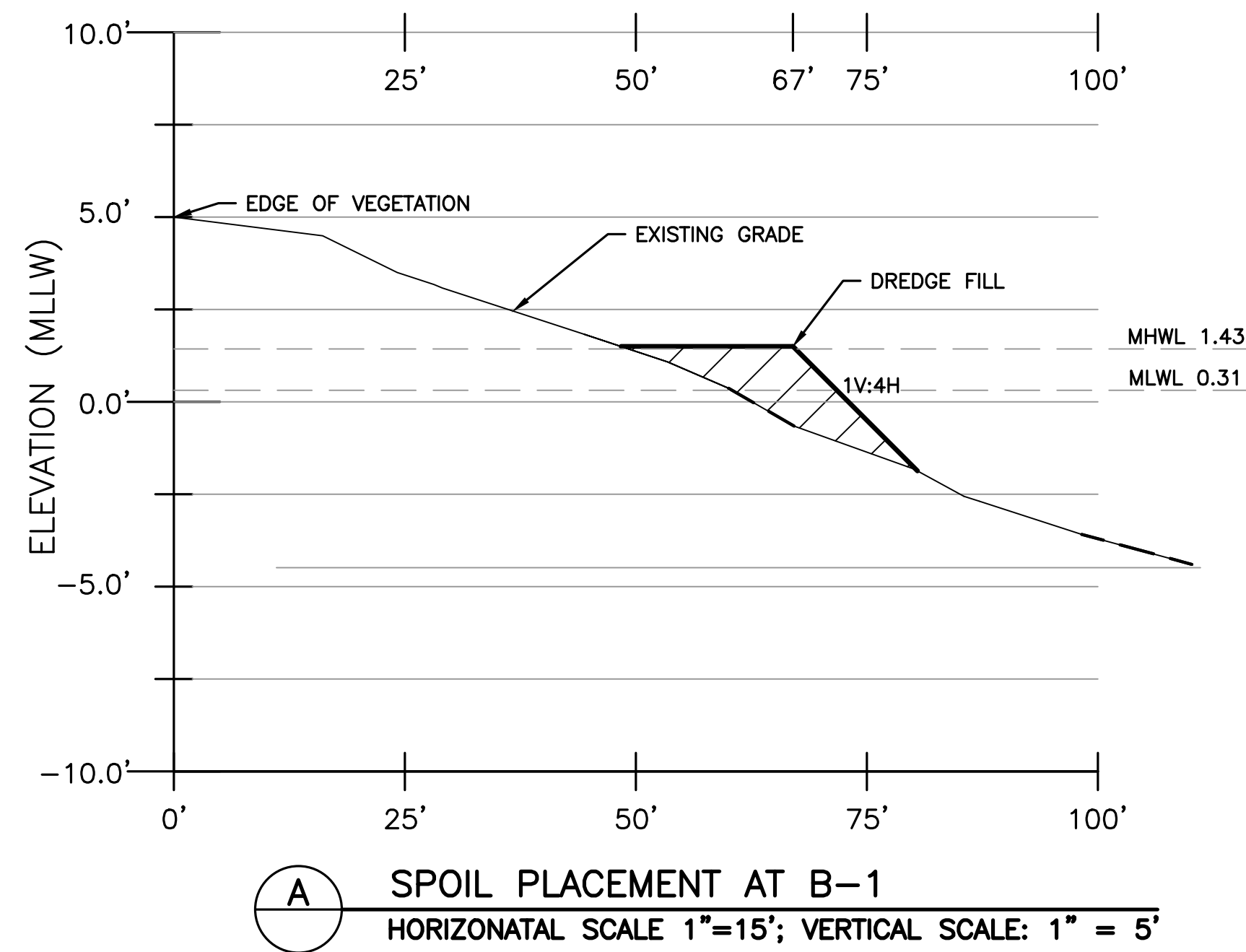


C3 TYPICAL SECTION
HORIZONATAL SCALE 1"=15'; VERTICAL SCALE: 1" = 5'



DESIGNED: J. LAFASO 	SUB SHEET NO. C3.3	TITLE OF SHEET DREDGE AREA FINGER SLIPS GARDEN KEY, DRY TORTUGAS NATIONAL PARK MONROE COUNTY, FL	DRAWING NO. 364 167786
C. PRICE			PMIS/PKG NO. 244370 & 244372
TECH. REVIEW: J. BERG			SHEET
DATE: SEP 2022			18 of 19

6/27/2022 7:30 AM CHRRICE H:\P&H PROJECTS\NPS_Dry Tortuga (DRTD)\Task Order 5 (C0's)\6.0 CAD_BIM\6.2 Work_in_Progress\5-SHEETS\C3.4.dwg



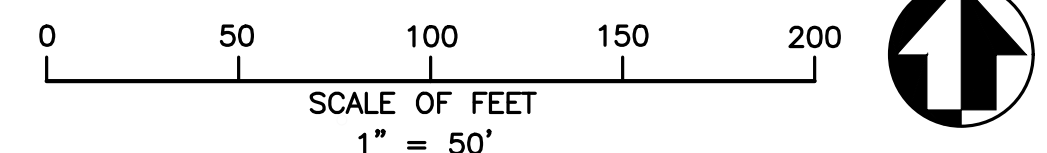
SILT FENCE INSTALLATION

SILT FENCE TIE BACK INSTALLATION

E SILT FENCE
NTS

ELEVATIONS OF TIDAL DATUMS		
MEAN HIGHER HIGH WATER	MHHW	1.75 FT
MEAN HIGH WATER	MHW	1.43 FT
MEAN LOW WATER	MLW	0.31 FT
MEAN LOWER LOW WATER	MLLW	0.00 FT

DESIGNED: J. LAFASO CADD C. PRICE TECH. REVIEW: J. BERG DATE: SEP 2022	SUB SHEET NO. C3.4	TITLE OF SHEET TYPICAL DREDGE PLACEMENT SECTIONS GARDEN KEY, DRY TORTUGAS NATIONAL PARK MONROE COUNTY, FL	DRAWING NO. 364 167786 PMIS/PKG NO. 244370 & 244372 SHEET 19 OF 19
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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under US administration.

US Department of the Interior – National Park Service