Natural Resources Evaluation Addendum

Town of Bay Harbor Islands

in cooperation with the

Florida Department of Transportation

District 6 and US Coast Guard

Broad Causeway Bridge Replacement PD&E Study

Town of Bay Harbor Islands Project Number: BC-160

Limits of Project: Broad Causeway Bridge from Broad Causeway Island to East of West Broadview Drive

Miami-Dade County, Florida

Financial Management Number: 452428-1-21-01

ETDM Number: 14520

Date: 7/25/2024

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022 and executed by the Federal Highway Administration and FDOT.

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1.0 INTRODUCTION

The Town of Bay Harbor Islands (Town), in cooperation with the Florida Department of Transportation (FDOT) District 6, is conducting a Project Development and Environment (PD&E) Study to evaluate potential bridge replacement alternatives of the existing Broad Causeway bridge which connects the Town of Bay Harbor Islands with the City of North Miami, in Miami Dade County, Florida. The limits of the project are from Broad Causeway Island to East of West Broadview Drive.

On April 30, 2024, the FDOT submitted a *Natural Resources Evaluation (NRE) Report* (dated April 15, 2024) to the US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the Florida Fish and Wildlife Conservation Commission (FWC) for review and concurrence. The *NRE* was prepared in accordance with the FDOT's *PD&E Manual Natural Resources Evaluation Outline and Guidance* (August 2022) and all applicable federal and state laws. The *NRE* was prepared to demonstrate due diligence in accordance with the state and federal regulations regarding wetlands and other surface waters, protected species and habitat, and essential fish habitat. The *NRE* document also summarized measures that will be implemented to avoid and minimize potential impacts, as well as compensatory mitigation requirements.

On May 24, 2024, the FDOT received an email from NMFS indicating that there was a concern that the proposed project blasting (which is required to demolish the existing concrete bascule bridge piers) would likely complicate the expedited informal consultation with the NMFS's Protected Resources Division. Of particular concern to NMFS was that the project *Final Blasting Plan,* which will contain details of the blasting means and methods (including the blasting design, an impact assessment, a mitigation plan, and an *Imperiled Species and Marine Mammal Watch Plan*), is not currently available and will be developed during the design phase of the project. In the email, the NMFS indicated that the existing level of blasting information provided in the *NRE* is currently insufficient to complete the Section 7 Informal Consultation. In this email, the NMFS also indicated that the *NRE* should address the Kemp's ridley sea turtle (*Lepidochelys kempii*) with an effect determination of *may affect, not likely to adversely affect*, and the NMFS also indicated that the NMFS Section 7 Mapper Tool indicated that project area is located within designated critical habitat (CH) for the green sea turtle. This email is provided as an attachment to the NMFS meeting minutes provided in **Appendix A**.

On May 30, 2024, a technical assistance call was conducted with NMFS to discuss their concerns regarding blasting. During the call, the NMFS indicated that the Town should present additional information with regard to the proposed Broad Causeway bridge project blasting in order to provide the NMFS with confidence in the estimated level of impact from the proposed project blasting. Specifically, the NMFS requested that the following be provided: 1) a review of the blasting plans and blasting reports for similar bridge blasting projects in Florida that have been approved/completed, 2) a comparison of these blasting projects to the proposed Broad Causeway Bridge blasting project, and 3) a tentative worst-case scenario for the impact of explosives on listed marine animals for the Broad Causeway Bridge *Conceptual Blasting Plan*. In addition, the NMFS requested that the blasting

commitment in the *NRE* should be modified to state that reinitiation of consultation with NMFS will be required once the *Final Blasting Plan* has been prepared. During the call, it was also discussed that while green sea turtle CH has not yet been officially designated (status is still proposed CH), additional/enhanced seagrass impact avoidance is likely to be required for this project and would be addressed in the Section 7 consultation letter. Meeting minutes are provided in **Appendix A**. Therefore, this *NRE Addendum* is being submitted to supplement and clarify the April 15, 2024 *NRE*.

This *NRE Addendum* summarizes the blasting information associated with the State Road (SR) 679/Pinellas Bayway Structure E and Veterans Memorial Bridge projects, presents a *Conceptual Blasting Plan* for the Broad Causeway Bridge project, and provides a summary comparison between the three bridge blasting projects. The goal of this information is to provide the NMFS with a general approximation of the intensity/impact from the proposed Broad Causeway Bridge blasting project via an analysis of prior blasting projects. This *NRE Addendum* also presents a determination of effect for the Kemp's ridley sea turtle, provides a summary of the anticipated blasting impacts on imperiled species and marine mammals, discusses the measures that will be implemented to minimize blasting impacts to marine animals, and updates the Blasting Plan commitment (Commitment No. 15) that was included in the April 15, 2024 *NRE*. All other findings and conclusions of the April 15, 2024 *NRE* remain the same as stated in the original document.

2.0 SUMMARY OF BLASTING INFORMATION FOR SIMILAR BRIDGE PROJECTS IN FLORIDA

This section provides a summary of the blasting information for two successful bridge blasting projects that have occurred in Florida: SR 679/Pinellas Bayway Structure E (Bridge No. 150049) and Veterans Memorial Bridge (Bridge No. 794198). The blasting information presented in this document is based on the blasting plans, species watch plans, and post-blasting watch plan reports for these two projects. The following documents are provided in **Appendix B1-B6**:

- *SR 679 Bayway Structure E Blast Plan* (December 10, 2020) (**Appendix B1**)
- *SR 679 Bayway Structure E Imperiled Species and Marine Mammal Watch Plan* (December 10, 2020) (**Appendix B2**)
- *Pinellas County Bayway (SR 679) Bridge Structure E Demolition Imperiled Species and Marine Mammal Watch Plan Report* (May 18, 2021) (**Appendix B3**)
- *Veterans Memorial Bridge Blasting Plan* (October 3, 2016) (**Appendix B4**)
- *Veterans Memorial Bridge Marine Species Watch Program* (October 2016) (**Appendix B5**)
- *Veterans Memorial Bridge Demolition Marine Animal Watch Program Post Blast Summary Report* (January 19, 2017) (**Appendix B6**)

It should be noted that attempts to locate the Blasting Contractor's Post-Blasting Reports/Logs (i.e., the field records of the blast explosives) for both projects was unsuccessful. Thus, the information provided below assumes that the blaster adhered to the blasting plans as written and approved.

2.1 SR 679/Pinellas Bayway Structure E Blasting Project

The former SR 679/Pinellas Bayway Structure E Bridge (Bridge No. 875101) was located over Boca Ciega Bay and the Gulf Intracoastal Waterway navigation channel in St. Petersburg, Pinellas County, Florida. According to the December 10, 2020 *SR 679/Pinellas Bayway Structure E Blast Plan* (**Appendix B1**), blasting was required for demolition of the two concrete bascule piers. The NMFS reviewed and approved this blasting project under file SERO-2021-00360.

The bascule piers were demolished to +5 ft elevation above the waterline. A total of 64 holes (2.75-3.5 inches in diameter) were drilled into each bascule pier to a depth of 10-26 feet (ft). The hole spacing was 3.5-4.0 ft. Each of the drill holes were loaded with a 60% nitroglycerine product. Stemming material (3/8-inch angular, crushed, clear stone) was placed on top of the explosives within the holes to contain the blast energy within the piers and to allow for the use of the minimum amount of explosives required to complete the demolition. The stemming length was 2.5-16 ft. The explosives were connected in sequence using non-electric, double-primed Nonel detonators. The minimum delay between any two blast holes was 9 milliseconds (ms). The maximum amount of explosive per delay was 18 pounds (lbs). Wire rope blast mats were positioned over top of the bascule piers to contain the blasting debris/flyrock resulting from the explosion. Both bascule piers were demolished in a single blast event during slack tide. Once the "All Clear" was given following the blasting event, the blast debris was removed from the bay bottom by the construction contractor.

To encourage marine wildlife to depart the blasting area, the SR 679 Bayway Structure E Blast Plan included the use of small fish scare charges (i.e., a series of non-electric blast caps containing 0.01 lbs of explosives) to be detonated within the water column surrounding the bascules pier structures 15-30 seconds prior to the main blast detonation. For the reasons described below, the fish scare was not utilized during the blast event.

According to the *Pinellas County Bayway (SR 679) Bridge Structure E Demolition Imperiled Species and Marine Mammal Watch Plan Report* (**Appendix B3**), the blast event occurred on May 18, 2021. The Watch Program included a total of six marine observers: one aerial observer, two observers stationed on boats, and three observers stationed on the new bridge structure. The aerial observer recorded the presence of several manatees outside of the observation zone during the Watch Program. No other protected species were recorded inside or outside the observation zone. The proposed fish scare was not utilized on the day of the blast event as the marine observers were concerned that the fish scare might startle the documented manatees and any sea turtles to move out of position and becoming hidden from view.

No manatees, smalltooth sawfish, giant manta rays, whales, dolphins, sturgeon, or sea turtles were observed within the observation zone around the blast location. No apparent injuries to protected species (i.e., manatees, smalltooth sawfish, giant manta rays, whales, dolphins, sturgeon, or sea turtles) were documented after the blast was complete. The report also indicated that hand-held radios and aerial communications via aircraft transceiver were useful for on-site blasting communications and that a siting log and map were useful in preparation of the blasting report.

2.2 Veterans Memorial Bridge Blasting Project

The former Veterans Memorial Bridge (Bridge No. 794198) was located over the Halifax River in Daytona Beach, Volusia County, Florida. According to the October 3, 2016 *Veterans Memorial Bridge Blasting Plan* (**Appendix B4**), blasting was required for demolition of the two concrete bascule piers. The NMFS reviewed and approved this blasting project under file SERO-2016-00381.

The concrete bascule piers were removed by conventional demolition to +2.00 ft elevation. The remainder of the pier structures were drilled from +2.00 elevation down to the bottom of seal concrete using PVC casing where the blast hole collar was located below the water level. A total of 30 holes (3.5 inches in diameter) were drilled into each bascule pier to a depth of 8.75-18 ft. The drilled holes were on 5.0 x 6.0-ft spacing. The drill holes were loaded with ammonium nitrate/fuel oil (ANFO) (for collar above water) and Hydromite (emulsion blended with ammonium nitrate) or equivalent (for collar below water). Stemming material (3/8-inch clean, crushed stone) was placed on top of the explosives. The stemming length was five ft (for collar above water) and three ft (for collar below water). The explosives were connected in sequence using non-electric, double-primed Nonel non-electric detonators. The delay between any two blast holes was 25 ms. The maximum amount of explosive per delay was 32.5 lbs. (collar above water) and 14.37 lbs (collar below water). Cloth and wire mesh drape blast mats were positioned over top of the bascule piers to contain the blasting debris/flyrock resulting from the explosion. The bascule piers were demolished in a single blast event (two blasts detonated in succession) on the same day during daylight hours. To encourage marine wildlife to depart the blasting area, small fish scare shots (i.e., a series of non-electric blast caps containing 0.003 lbs of explosives) were detonated within the center of each bascule pier structure.

According to the *Veterans Memorial Bridge Demolition Marine Animal Watch Program Post Blast Summary Report* (**Appendix B6**), the blast event occurred on January 19, 2017. The Watch Program included a total of five marine observers: one aerial observer, two observers stationed on boats, and two observers stationed on land (one located on the new bridge). There were three animals sighted in the watch zone during the pre-blast watch: one manatee, one bottlenose dolphin, and one unidentified sea turtle. Once the aerial observer was able to confirm all three animals were all outside of the watch zone, the Blaster was provided with the final authorization to proceed with blasting. There were no marine animals sighted during the post-blast watch and no apparent injuries to protected species were documented after the blast was complete. This report did not document any problems with the event or suggestions for improvements.

3.0 BROAD CAUSEWAY BRIDGE ANTICIPATED BLASTING INFORMATION

The Broad Causeway Bridge Replacement Project is anticipated to require the blasting of the two concrete bascule piers associated with the original bridge structure. During the May 20, 2024 technical assistance call, the NMFS requested that the Town prepare a tentative worst-case-scenario of blasting impacts for the Broad Causeway Bridge project. A *Conceptual Blasting Plan* was developed for the Broad Causeway Bridge project (**Appendix C**). This section summarizes the information in

the *Conceptual Blasting Plan* and represents the Engineer's best estimate at this phase of the project to address a tentative worst-case scenario for the impact of explosives on marine animals for the proposed bridge demolition project, as requested by the NMFS.

The bascule piers will be demolished to approximately +5 elevation above the waterline. A total of 214 holes (98 for Bascule Pier No. 1; 116 for Bascule Pier No. 2) will be drilled into the bascule piers to appropriate depths (to be determined by the Blasting Contractor). The estimated hole sizes are 2.75-3.5 inches in diameter hole spacing at 4.0 x 4.0 ft. Each of the drill holes will be loaded with a 60% nitroglycerine product. Stemming material (3/8-inch angular, crushed, clear stone) will be placed on top of the explosives within the holes to contain the blast energy within the piers and to allow for the use of the minimum amount of explosives required to complete the demolition. The stemming length will be a minimum of three feet. The explosives will be connected in sequence using non-electric detonators. The minimum delay between any two blast holes will be 9 ms. The maximum amount of explosive per delay will be 18 lbs below the water line. The piers will be covered with blast mats (i.e., cloth and wire mesh or appropriate equivalent) to contain the flyrock.

Both bascule piers will be demolished in a single blast event on incoming tide or slack high tide to maximize visibility of marine protected animals within the water column. To encourage marine wildlife to depart the blasting area, small fish scare charges will be detonated within the water column surrounding the bascules pier structures 15-30 seconds prior to the main blast detonation. These fish scare charges will consist of a series of non-electric blasting caps, each estimated to contain 0.75 grains (0.01 pounds) of explosives, suspended in the water column surrounding the structure to be blasted.

An Imperiled Species and Marine Mammal Watch Plan will be implemented to reduce the risk of injury/mortality to imperiled species and marine mammals. See Section 4.2 and **Appendix C of the *Conceptual Blasting Plan*** for details on the proposed Imperiled Species and Marine Mammal Watch Plan.

Once the "All Clear" is given by the Aerial Observer/Chief Observer following the blasting event, the blast debris will be removed from the benthic substrate by the construction contractor.

4.0 SUMMARY OF ANTICIPATED BLASTING IMPACTS

The blasting design details for the proposed Broad Causeway Bridge Replacement Project will be similar to the details for the SR 679/Pinellas Bayway Structure E Bridge blasting project. **Table 4-1** below presents a comparison of the blasting information for the two example blasting projects and the proposed Broad Causeway Bridge Blasting project. Based upon this information, the anticipated impacts on imperiled and listed species from the Broad Causeway Bridge blasting project are anticipated to be very similar to the impacts from the SR 679/Pinellas Bayway Structure E project.

Table 4-1 Blasting Information Summary

	SR 679/Pinellas Bayway Structure E	Veterans Memorial Bridge	Broad Causeway Bridge
SERO Identification No.	SERO-2018-00207 SERO-2021-00360 (blasting)	SERO-2016-08141 SERO-2016-00381 (blasting)	TBD
FDOT Financial Management No.	410755-2-52-01, 432587-1-52-01, 427143-2-52-01	242172-1-58-01	452428-1-21-01 (PD&E)
Bridge No.	150049	794198	875101
Engineering Firm	American Bridge Company	WSP	AtkinsRéalis
Blasting Contractor	Contract Drilling & Blasting LLC (CDB)	Johnson Bros. Corporation	TBD
Structures to Blast	2 concrete bascule piers	2 concrete bascule piers	2 concrete bascule piers
Bascule Pier Size	25 x 36 ft (approx.)	24 x 40 ft	30 x 56 ft
No. Drill Holes	128 (64 per structure)	60 (30 per structure)	214 (98 for Pier No. 1, 116 for Pier No. 2)
Hole Size Diameter	2.75 - 3.5 in	3.5 in	2.75 - 3.5 in
Hole depth	10 - 26 ft	8.75 - 18 ft	TBD
Hole spacing	3.5 ft & 4.0 ft	5 ft x 6 ft	4 ft x 4 ft
Explosive Type	60% nitroglycerine product (example Unimax 60%) Non-electric detonators	ammonium nitrate/fuel oil (collar above water) Hydromite or Equal (collar below water) Non-electric detonators	60% nitroglycerine product Non-electric detonators
Maximum pounds/delay	18	32.5 (collar above water) 14.37 (collar below water)	18 (below water)
Stemming Material	3/8-in crushed clear stone	3/8-in clean, crushed stone	3/8-in crushed clear stone
Stemming Length	2.5 - 16 ft	5 ft (collar above water) 3 ft (collar below water)	minimum 3 ft
Delay (milliseconds)	Minimum of 9 ms	25 ms	Minimum of 9 ms
Blast Mat	Wire rope	Cloth and wire mesh drape	Cloth and wire mesh blast mat (or equivalent)
Tidal Condition	Slack tide	Not Documented	Incoming tide or slack high tide
Exclusion Zone	1,863 ft	2,160 ft	1,863 ft
Marine Animal Safety Zone	2,163 ft (1,863 ft + 300 ft buffer)	2,160 ft (no additional buffer)	2,163 ft (1,863 ft + 300 ft buffer)
Fish scare	0.01 lb (water column surrounding structures) Non-electric blasting caps	0.003 lbs (center of each structure)	0.01 lb (water column surrounding structures) Non-electric blasting caps

4.1 Potential Blasting Impacts to Imperiled Species and Marine Mammals

As described in the attached *Conceptual Blasting Plan* (**Appendix C**), the following imperiled species and marine mammals have the potential to occur within the blasting area: green sea turtle (*Chelonia mydas*), loggerhead sea turtle (*Caretta caretta*), Kemp's ridley sea turtle, hawksbill sea turtle (*Eretmochelys imbricata*), leatherback sea turtle (*Dermochelys coriacea*), West Indian manatee (*Trichechus manatus*), bottlenose dolphin (*Tursiops truncatus*), giant manta ray (*Manta birostris*), Nassau grouper (*Epinephelus striatus*), and smalltooth sawfish (*Pristis pectinata*). The project area is located within designated CH for the manatee and proposed CH for the green sea turtle. The common bottlenose dolphin is not listed under the Endangered Species Act of 1973; however, they are protected under the Marine Mammal Protection Act. **Table 4-2** presents the imperiled species and marine mammals with the potential to occur within the blasting area (based on potential availability of suitable habitat and known species ranges), along with their listing status and occurrence potential. This information was compiled as a result of a thorough review of existing literature, field surveys, and considerations of suitable habitat availability, along with confirmed sightings or documented home ranges.

Table 4-2 Imperiled Species and Marine Mammals Potentially Occurring within the Project Study Area and Their Associated Effect Determinations

Common Name	Scientific Name	Listing Status[1]	Occurrence Potential	Effect Determination[2]
SEA TURTLES				
Green sea turtle	*Chelonia mydas*	FT	Moderate (PCH)[3]	*May affect, not likely to adversely affect*
Hawksbill sea turtle	*Eretmochelys imbricata*	FE	Moderate	*May affect, not likely to adversely affect*
Kemp's ridley sea turtle	*Lepidochelys kempii*	FE	Low	*May affect, not likely to adversely affect*
Leatherback sea turtle	*Dermochelys coriacea*	FE	Low	*No effect*
Loggerhead sea turtle	*Caretta caretta*	FT	Low	*May affect, not likely to adversely affect*
MAMMALS				
Bottlenose dolphin	*Tursiops truncatus*	Not Listed	Moderate	*N/A*
West Indian manatee	*Trichechus manatus*	FT	High (CH)[4]	*May affect, not likely to adversely affect*
FISH				
Giant manta ray	*Manta birostris*	FT	Low	*May affect, not likely to adversely affect*
Nassau grouper	*Epinephelus striatus*	FT	Low	*No effect*
Smalltooth sawfish	*Pristis pectinata*	FE	Low	*May affect, not likely to adversely affect*

[1]FE = Federally Endangered, FT = Federally Threatened
[2]N/A = Not Applicable
[3](PCH) - the project study area is located within the proposed CH for the green sea turtle
[4](CH) – the project study area is located within designated CH for the manatee

Manatees have a high likelihood of occurrence because they are known to travel through the project study area, the project area is located within the designated CH for the manatee, and suitable seagrass foraging habitat is located north and south of the existing bridge. The green sea turtle, hawksbill sea turtle, and bottlenose dolphin have a moderate likelihood of occurrence based on the

presence of suitable foraging habitat for these species within the project area. The remaining imperiled species have a low likelihood of occurrence based on lack of preferred habitats within the project area and/or life history strategies not supported by the project area. A discussion of the potential blasting impacts and the reasoning for the determination of effect for each of these species are provided below.

4.1.1 Green sea turtle

The green sea turtle is listed as federally threatened. The project study area is located within the proposed CH for the green sea turtle and foraging habitat (seagrass) is located within the project study area. Atlantic populations of green turtles are commonly located in estuarine, marine coastal, and oceanic waters. These turtles are known to nest on sandy Atlantic coastlines spanning from Volusia to Miami-Dade counties. Juveniles are often observed in coastal bays, inlets, lagoons, and offshore reefs. Larger juveniles and adults primarily feed on seagrasses and algae. During the day, green turtles occupy shallow flats and seagrass meadows. In the evening, they return to their sleeping quarters of rock ledges, oyster bars, and coral reefs. The project study area does not contain suitable nesting habitat (i.e., sandy beach habitat) but does contain foraging habitat (i.e., seagrass and algae). During the May 30, 2024 NMFS technical assistance call, NMFS indicated that the Section 7 consultation letter would address any additional/enhanced seagrass impact avoidance required for this project based on the proposed CH status. The *Protected Species Construction Conditions, NOAA Fisheries Southeast Regional Office* and *Vessel Strike Avoidance Measures, NOAA Fisheries Southeast Regional Office* (**Appendix G of the *NRE***) will be implemented during all in-water construction activities. Should any free-swimming turtles be discovered within the project area during construction, the project will adhere to state and federal regulations by providing these animals with the necessary space and time to exit the area safely. While the construction methodologies for demolition of the existing bridge structures have not yet been determined, the use of explosives/blasting will be required for the removal of the two bascule piers.

Blasting pressure waves can injure or kill marine animals, including sea turtles. A *Conceptual Blasting Plan* (**Appendix C**) has been developed to provide general blasting information for the project and proposed measures to minimize and mitigate potential effects on species. The *Conceptual Blasting Plan* includes a *Draft Imperiled Species and Marine Mammal Watch Plan* (*ISMMWP*) (see Section 4.3 and **Appendix C of the *Conceptual Blasting Plan***) which will minimize the risk of injury/mortality to sea turtles. Under the *Draft ISMMWP*, marine observers will be deployed to monitor for the presence/absence of imperiled species and marine mammals within the potential impact area of the blast (Marine Animal Watch Zone). Prior to construction, the Town and their contractor will submit a *Final Blasting Plan* containing details of the blasting (i.e., means and methods, blasting design, impact assessment, mitigation plan) and a *Final ISMMWP* which will be reviewed and approved by the regulatory agencies. The blasting plan will be required to adhere to USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida* (**Appendix G of the *NRE***). Thus, the project determination of effect for the green sea turtle is ***may affect, not likely to adversely affect***.

4.1.2 Hawksbill sea turtle

The hawksbill sea turtle is considered the rarest sea turtle species in Florida and is listed as federally endangered. Hawkbill turtles are known to inhabit reefs in the Florida Keys and along the southeastern Atlantic coast. They are omnivorous (feeding on both plants and other animals), but their preferred food in many areas is sea sponges. They will also eat marine algae, corals, mollusks, tunicates, crustaceans, sea urchins, small fish, and jellyfish. The project study area does not contain suitable nesting habitat (i.e., sandy beach habitat) but does contain foraging habitat (i.e., sponges, algae, corals, invertebrates). The *Protected Species Construction Conditions, NOAA Fisheries Southeast Regional Office* and *Vessel Strike Avoidance Measures, NOAA Fisheries Southeast Regional Office* (**Appendix G of the *NRE***) will be implemented during all in-water construction activities. Should any free-swimming turtles be discovered within the project area during construction, the project will adhere to state and federal regulations by providing these animals with the necessary space and time to exit the area safely.

Blasting pressure waves can injure or kill marine animals, including sea turtles. A *Conceptual Blasting Plan* (**Appendix C**) has been developed to provide general blasting information for the project and proposed measures to minimize and mitigate potential effects on species. The *Conceptual Blasting Plan* includes a *Draft ISMMWP* (see Section 4.3 and **Appendix C of the *Conceptual Blasting Plan***) which will minimize the risk of injury/mortality to sea turtles. Under the *Draft ISMMWP*, marine observers will be deployed to monitor for the presence/absence of imperiled species and marine mammals within the potential impact area of the blast (Marine Animal Watch Zone). Prior to construction, the Town and their contractor will submit a *Final Blasting Plan* containing details of the blasting (i.e., means and methods, blasting design, impact assessment, mitigation plan) and a *Final ISMMWP* which will be reviewed and approved by the regulatory agencies. The blasting plan will be required to adhere to USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida* (**Appendix G of the *NRE***). Thus, the project determination of effect for the hawksbill sea turtle is ***may affect, not likely to adversely affect***.

4.1.3 Kemp's ridley sea turtle

The Kemp's ridley sea turtle is listed as federally endangered. The smallest and most rare species of sea turtle, the Kemp's ridley turtle is known in inhabit marine waters of the Gulf of Mexico and the western North Atlantic Ocean. It is known to nest on beaches in Mexico, Florida, and Texas. Their diet primarily consists of crabs and other crustaceans. Juveniles are found in association with floating oceanic Sargassum algae for the first 1-2 years or until the turtle reaches a length of about 8 inches, after which they migrate to shallow coastal areas. Adult Kemp's ridley turtles primarily occupy nearshore coastal (neritic) habitats that include muddy or sandy bottoms where their preferred prey are found. The project study area does not contain suitable nesting habitat (i.e., sandy beach habitat) but this species could potentially migrate through the project area. The *Protected Species Construction Conditions, NOAA Fisheries Southeast Regional Office* and *Vessel Strike Avoidance Measures, NOAA Fisheries Southeast Regional Office* (**Appendix G of the *NRE***) will be implemented

during all in-water construction activities. Should any free-swimming turtles be discovered within the project area during construction, the project will adhere to state and federal regulations by providing these animals with the necessary space and time to exit the area safely.

Blasting pressure waves can injure or kill sea turtles. A *Conceptual Blasting Plan* (**Appendix C**) has been developed to provide general blasting information for the project and proposed measures to minimize and mitigate potential effects on species. The *Conceptual Blasting Plan* includes a *Draft ISMMWP* (see Section 4.3 and **Appendix C of the *Conceptual Blasting Plan***) which will minimize the risk of injury/mortality to sea turtles. Under the *Draft ISMMWP*, marine observers will be deployed to monitor for the presence/absence of imperiled species and marine mammals within the potential impact area of the blast (Marine Animal Watch Zone). Prior to construction, the Town and their contractor will submit a *Final Blasting Plan* containing details of the blasting (i.e., means and methods, blasting design, impact assessment, mitigation plan) and a *Final ISMMWP* which will be reviewed and approved by the regulatory agencies. The blasting plan will be required to adhere to USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida* (**Appendix G of the *NRE***). Thus, the project determination of effect for the Kemp's ridley sea turtle is ***may affect, not likely to adversely affect***.

4.1.4 Leatherback sea turtle

The leatherback sea turtle is listed as federally endangered. The largest of all sea turtle species, the leatherback turtle is known to inhabit Florida's coastal waters, with a limited number nesting along the Atlantic coast. Their diet primarily consists of soft-bodied creatures like jellyfish. The project study area does not contain suitable nesting habitat (i.e., sandy beach habitat) or foraging habitat for leatherback sea turtles, since they spend their lives in oceanic waters and are not known to enter estuaries in southern waters. The *Protected Species Construction Conditions, NOAA Fisheries Southeast Regional Office* and *Vessel Strike Avoidance Measures, NOAA Fisheries Southeast Regional Office* (**Appendix G of the *NRE***) will be implemented during all in-water construction activities. Should any free-swimming turtles be discovered within the project area during construction, the project will adhere to state and federal regulations by providing these animals with the necessary space and time to exit the area safely. Based on the lack of suitable habitat within the project study area, the project determination of effect for the leatherback sea turtle is ***no effect***.

4.1.5 Loggerhead sea turtle

The loggerhead sea turtle is listed as federally threatened and is typically located in marine coastal and oceanic environments. Hatchlings and juveniles spend the first 7 - 15 years of their lives in the open ocean, after which the migrate to coastal waters to forage. Adult loggerhead sea turtles migrate great distances between their foraging grounds and nesting beaches. Loggerhead turtles are omnivorous and feed on a large variety of prey items (e.g., sponges, corals, algae, fish, worms, anemones, jellyfish, urchins, sea cucumbers), but their main food is bottom-dwelling invertebrates (e.g., gastropods, bivalves, decapods, and horseshoe crabs). The project study area does not contain suitable nesting habitat (i.e., sandy beach habitat) but does contain foraging habitat for juvenile loggerhead sea turtles. The *Protected Species Construction Conditions, NOAA Fisheries Southeast*

Regional Office and *Vessel Strike Avoidance Measures, NOAA Fisheries Southeast Regional Office* (**Appendix G of the *NRE***) will be implemented during all in-water construction activities. Should any free-swimming turtles be discovered within the project area during construction, the project will adhere to state and federal regulations by providing these animals with the necessary space and time to exit the area safely.

Blasting pressure waves can injure or kill sea turtles. A *Conceptual Blasting Plan* (**Appendix C**) has been developed to provide general blasting information for the project and proposed measures to minimize and mitigate potential effects on species. The *Conceptual Blasting Plan* includes a *Draft ISMMWP* (see Section 4.3 and **Appendix C of the *Conceptual Blasting Plan***) which will minimize the risk of injury/mortality to sea turtles. Under the *Draft ISMMWP*, marine observers will be deployed to monitor for the presence/absence of imperiled species and marine mammals within the potential impact area of the blast (Marine Animal Watch Zone). Prior to construction, the Town and their contractor will submit a *Final Blasting Plan* containing details of the blasting (i.e., means and methods, blasting design, impact assessment, mitigation plan) and a *Final ISMMWP* which will be reviewed and approved by the regulatory agencies. The blasting plan will be required to adhere to USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida* (**Appendix G of the *NRE***). Thus, the project determination of effect for the loggerhead sea turtle is ***may affect, not likely to adversely affect***.

4.1.6 Bottlenose dolphin

Bottlenose dolphins are not listed under the ESA of 1973; however, they are protected under the Marine Mammal Protection Act. They are found in both offshore and coastal waters, including harbors, bays, gulfs, and estuaries. Bottlenose dolphins feed on a variety of prey items, including crustaceans, fish, and squid. No observations of bottlenose dolphins were made during the field surveys; however, there is potential foraging habitat available within the project study area. The *Protected Species Construction Conditions, NOAA Fisheries Southeast Regional Office* and *Vessel Strike Avoidance Measures, NOAA Fisheries Southeast Regional Office* (**Appendix G of the *NRE***) will be implemented during all in-water construction activities. If any dolphins (or any other free-swimming mammals) are found within the project area during construction, construction activities will cease and they will be allowed the necessary space and time to leave in accordance with state and federal regulations. The construction methodologies for demolition of the existing bridge structures have not yet been determined; however, explosives/blasting will be required for the removal of the two bascule piers. The use of blasting may have both direct and indirect impacts on protected species (i.e., fish, sea turtles, marine mammals) and their habitats.

Blasting pressure waves can injure or kill marine mammals. A *Conceptual Blasting Plan* (**Appendix C**) has been developed to provide general blasting information for the project and proposed measures to minimize and mitigate potential effects on species. The *Conceptual Blasting Plan* includes a *Draft ISMMWP* (see Section 4.3 and **Appendix C of the *Conceptual Blasting Plan***) which will minimize the risk of injury/mortality to marine mammals. Under the *Draft ISMMWP*, marine observers will be deployed to monitor for the presence/absence of imperiled species and marine mammals within the potential impact area of the blast (Marine Animal Watch Zone). Prior to construction, the Town and their contractor will submit a *Final Blasting Plan* containing details of the blasting (i.e., means and

methods, blasting design, impact assessment, mitigation plan) and a *Final ISMMWP* which will be reviewed and approved by the regulatory agencies. The blasting plan will be required to adhere to USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida* (**Appendix G of the *NRE***).

4.1.7 West Indian manatee

The West Indian manatee (hereafter referred to as the "manatee") is listed as federally threatened. Manatees are large herbivorous marine mammals that inhabit marine, estuarine, and freshwater environments. Manatees often inhabit coastal waters, bays, and rivers. During colder weather, they seek warm-water refuges and can be spotted in groups near cooling facilities. In warmer months, they have a broader range, but in winter, they are limited to warm springs and similar warmer areas. The manatee can occur in any coastal or estuarine waters and it is federally protected under the Marine Mammal Protection Act.

Manatees are known to travel through the project study area; however, no manatees were observed during any of the field surveys. The project study area is located within the designated CH for the manatee and foraging habitat (seagrass) is located within the project study area. The project study area is located within a Florida Manatee Protection Area (Slow Speed Zone – All Year). The project study area is not located within an "Important Manatee Area," a "Warm Water Aggregation Area," or a "No Entry Area" for manatees.

To protect manatees during bridge construction, the *Standard Manatee Conditions for In-Water Work*, the *Protected Species Construction Conditions, NOAA Fisheries Southeast Regional Office,* and the *Vessel Strike Avoidance Measures, NOAA Fisheries Southeast Regional Office* (**Appendix G of the *NRE***) will be implemented during all in-water construction activities. If any manatees (or any other free-swimming mammals) are found within the project area during construction, construction activities will cease and they will be allowed the necessary space and time to leave in accordance with state and federal regulations. To reduce the risk of entrapment and drowning of manatees, manatee exclusion devices (such as grating) shall be installed and maintained over any existing or proposed pipes or culverts greater than eight inches that are submerged or partially submerged and reasonably accessible to manatees. If horizontal or vertical bars are used, no more than 8-inch gaps on center shall be allowed. Grates shall be in place at the accessible end(s) during all phases of the construction process and as a final design element to restrict manatee access.

The construction methodologies for demolition of the existing bridge structures have not yet been determined; however, demolition via the use of explosives/blasting will be required for the removal of the two bascule piers. Blasting pressure waves can injure or kill marine mammals. A *Conceptual Blasting Plan* (**Appendix C**) has been developed to provide general blasting information for the project and proposed measures to minimize and mitigate potential effects on species. The *Conceptual Blasting Plan* includes a *Draft ISMMWP* (see Section 4.3 and **Appendix C of the *Conceptual Blasting Plan***) which will minimize the risk of injury/mortality to marine mammals. Under the *Draft ISMMWP*, marine observers will be deployed to monitor for the presence/absence of imperiled species and marine mammals within the potential impact area of the blast (Marine Animal Watch Zone). Prior to construction, the Town and their contractor will submit a *Final Blasting Plan* containing details of the blasting (i.e., means and methods, blasting design, impact assessment,

mitigation plan) and a *Final ISMMWP* which will be reviewed and approved by the regulatory agencies. The blasting plan will be required to adhere to USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida* (**Appendix G of the *NRE***).

According to the USACE and USFWS Effect Determination Key for the Manatee in Florida (April 2013), the proposed project activities would result in a *may affect* determination for the manatee based on the following pathway:

A. Project is not located in open water or salt marsh → *go to B*

B. Project consists of one or more of the following activities, all of which are *may affect*: 1. blasting or other detonation activity for channel deepening and/or widening, geotechnical surveys or exploration, bridge removal, movies, military shows, special events, etc.; → *may affect.*

Because the proposed project will: 1) implement the *Standard Manatee Conditions for In-water Work*, the NMFS *Protected Species Construction Conditions* and the NMFS *Vessel Strike Avoidance Measures* (**Appendix G of the *NRE***) during in-water construction activities; 2) implement BMPs during construction to avoid or minimize unnecessary impacts to seagrasses; 3) mitigate for unavoidable impacts to seagrasses; 4) adhere to the agency-approved *Final Blasting Plan* and *Final ISMMWP* to minimize impacts from the use of blasting/explosives (blasting plan will adhere to the USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida*); and 5) install manatee exclusion devices on any drainage culverts (between eight inches and eight feet in diameter) associated with the proposed project, the project determination of effect for the manatee is ***may affect, not likely to adversely affect***. Furthermore, ***the proposed project will not result in the destruction or adverse modification of manatee CH***. As described in the *NRE*, during the January 12, 2024 technical assistance call, the USFWS indicated that based on the inclusion and implementation of the *Standard Manatee Conditions for In-water Work*, the NMFS *Protected Species Construction Conditions,* the NMFS *Vessel Strike Avoidance Measures,* and the *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida*, these effect determinations for the manatee and manatee CH are supported for the project. The meeting minutes from the January 12, 2024 USFWS meeting are provided in **Appendix B of the *NRE***. The USFWS provided concurrence with these effect determinations on May 2, 2024. The USFWS concurrence is provided in **Appendix D**.

4.1.8 Giant manta ray

The giant manta ray, which is listed as federally threatened, is the world's largest ray with a wingspan of up to 29 feet. The giant manta ray is a filter feeder that consumes zooplankton and exhibits a migratory behavior, with populations scattered across the globe in small and highly fragmented groups. Although giant manta rays primarily inhabit offshore waters, they can also be encountered in productive coastlines, estuarine waters, oceanic inlets, and within bays and intercoastal waterways. The project study area does not contain preferred habitat for the giant manta ray and this species would not be expected to inhabit the project study area; however, individual giant manta rays may travel through the project study area. No giant manta rays were observed during any of the field

surveys. While there is a possibility that this species could migrate through the proposed project area during construction, and the proposed bridge replacement project will involve in-water construction activities, the project will implement the *Protected Species Construction Conditions, NOAA Fisheries Southeast Regional Office* and *Vessel Strike Avoidance Measures, NOAA Fisheries Southeast Regional Office* (**Appendix G of the *NRE***).

Blasting pressure waves can injure or kill marine animals and have the potential to rupture fish swim bladders. Giant manta rays do not have a swim bladder and thus are less prone to mortality or injury from underwater blasting compared to those fish species with swim bladders. A *Conceptual Blasting Plan* (**Appendix C**) has been developed to provide general blasting information for the project and proposed measures to minimize and mitigate potential effects on species. The *Conceptual Blasting Plan* includes a *Draft ISMMWP* (see Section 4.3 and **Appendix C of the *Conceptual Blasting Plan***) which will minimize the risk of injury/mortality to marine animals. Under the *Draft ISMMWP*, marine observers will be deployed to monitor for the presence/absence of imperiled species and marine mammals within the potential impact area of the blast (Marine Animal Watch Zone). Prior to construction, the Town and their contractor will submit a *Final Blasting Plan* containing details of the blasting (i.e., means and methods, blasting design, impact assessment, mitigation plan) and a *Final ISMMWP* which will be reviewed and approved by the regulatory agencies. The blasting plan will be required to adhere to USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida* (**Appendix G of the *NRE***). Thus, project determination of effect for the giant manta ray is ***may affect, not likely to adversely affect***.

4.1.9 Nassau grouper

The Nassau grouper, listed as federally threatened, is a large reef fish found in tropical and subtropical waters in the Caribbean and western North Atlantic, including south Florida. As juveniles, they are found in nearshore shallow waters in macroalgal and seagrass habitats and they then shift to deeper reef habitats (forereef and reef crest) as they grow. Adults consume a diet of fish, while juveniles consume a variety of fish and invertebrates. During the February 21, 2024 technical assistance call, NMFS indicated that the Nassau grouper should be included in the listed species analysis for this project based on recently gathered documentation of this species by NMFS on a nearshore reef in South Florida. The NOAA August 2022 *Nassau Grouper Consultation Framework NOAA Fisheries Southeast Regional Office* document indicates that this species is not believed to be present north of Government Cut and states that "general coastal construction projects occurring in the southeastern United States, with the exception of those in the Florida Keys (including the Dry Tortugas and Biscayne Bay to Government Cut), will have no effect on the species due to the absence of Nassau grouper in these nearshore locations." Thus, the Nassau grouper is expected to be absent from the Broad Causeway Bridge project study area. No Nassau grouper were observed during any of the field surveys. The *Protected Species Construction Conditions, NOAA Fisheries Southeast Regional Office* and *Vessel Strike Avoidance Measures, NOAA Fisheries Southeast Regional Office* (**Appendix G of the *NRE***) will be implemented during all in-water construction activities. Furthermore, just prior to initiating the blast, small fish scare charges (0.01 pounds of explosives) will be detonated in an attempt to minimize injury/mortality to fish by driving fish away from the structure being blasted. The

weight of explosives is minimal and produces low-level, non-lethal impact upon detonation. While Nassau groupers do have a swim bladder that could rupture during blasting, this species is expected to be absent from the project area. Because the Nassau grouper is expected to be absent from the project study area, the project determination of effect for the Nassau grouper is ***no effect***.

4.1.10 Smalltooth sawfish

The smalltooth sawfish, listed as federally endangered, is one of two types of sawfish found in coastal US waters. Sawfish species are year-round residents in peninsular Florida, with most encounters taking place in southwest Florida, spanning from Charlotte Harbor to the Florida Keys. Smalltooth sawfish inhabit shallow coastal waters and estuaries and are often found in sheltered bays, on shallow banks, or in river mouths. They have also been documented within inland river systems. Juvenile smalltooth sawfish typically inhabit shallow coastal waters and estuaries, river mouths, and bays and have been documented in habitat types with unvegetated, muddy and sandy bottoms, especially along red mangrove shorelines, as well as under docks, bridges, and piers. In contrast, adult smalltooth sawfish are usually found in open water habitats. The project study area consists of various benthic habitat types [i.e., macroalgal beds, seagrass, live bottom, seawalls, and scour protection materials (riprap, rubble, and concrete blocks and slabs)], and contains minimal areas of sand and silt. Since the smalltooth sawfish prefers sandy or muddy substrates, it is not likely to inhabit the project study area; however, individual smalltooth sawfish may travel through the project study area. The *Protected Species Construction Conditions, NOAA Fisheries Southeast Regional Office* and *Vessel Strike Avoidance Measures, NOAA Fisheries Southeast Regional Office* (**Appendix G of the *NRE***) will be implemented during all in-water construction activities.

Blasting pressure waves can injure or kill marine animals and have the potential to rupture fish swim bladders. Smalltooth sawfish do not have a swim bladder and thus are less prone to mortality or injury from underwater blasting compared to those fish species with swim bladders. A *Conceptual Blasting Plan* (**Appendix C**) has been developed to provide general blasting information for the project and proposed measures to minimize and mitigate potential effects on species. The *Conceptual Blasting Plan* includes a *Draft ISMMWP* (see Section 4.3 and **Appendix C of the *Conceptual Blasting Plan***) which will minimize the risk of injury/mortality to marine animals. Under the *Draft ISMMWP*, marine observers will be deployed to monitor for the presence/absence of imperiled species and marine mammals within the potential impact area of the blast (Marine Animal Watch Zone). In addition, small fish scare charges (0.01 pounds of explosives) will be detonated just prior to blast detonation to minimize injury/mortality to fish by driving fish away from the structure being blasted. The weight of explosives is minimal and produces low-level, non-lethal impact upon detonation. Prior to construction, the Town and their contractor will submit a *Final Blasting Plan* containing details of the blasting (i.e., means and methods, blasting design, impact assessment, mitigation plan) and a *Final ISMMWP* which will be reviewed and approved by the regulatory agencies. The blasting plan will be required to adhere to USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida* (**Appendix G of the *NRE***). Thus, the project determination of effect for the smalltooth sawfish is ***may affect, not likely to adversely affect***.

4.2 Imperiled Species and Marine Mammal Watch Plan

The project will adhere to an Imperiled Species and Marine Animal Watch Plan to minimize impacts to imperiled species and marine mammals from the proposed blasting. To support the *Conceptual Blasting Plan* and this *NRE Addendum*, a *Draft ISMMWP* has been developed for the project in accordance with in the USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida.* The *Draft ISMMWP* identifies the radius of the Marine Animal Watch Zone as 2,163 ft and proposes a minimum of five marine observers (Watch Team). Details on the Watch Team requirements, environmental conditions for blasting, and required observer activities/documentation are provided in the *Draft ISMMWP* (provided as **Appendix C of the *Conceptual Blasting Plan***). It should be noted that the *Draft ISMMWP* represents the Town's best approximation of the blasting needs at this phase of the project. During the design and permitting phase, the Engineer will develop the *Final ISMMWP* which will contain the final watch program details, including identification of qualified Watch Team personnel. The *Final ISMMWP* will be reviewed and approved by the regulatory agencies during the permitting process.

4.3 Imperiled Species and Marine Mammal Habitat Impacts

The proposed blast event is a localized, transient event lasting only milliseconds and there is no anticipated permanent impact to the water column from the proposed blasting event. With implementation of the *Final ISMMWP* during the blasting event, no permanent impacts to marine mammals, giant manta rays, Nassau groupers, or smalltooth sawfish, or their breeding or foraging habitats, are anticipated in association with the proposed blasting event.

Seagrass provides foraging habitat to manatees and green sea turtles and juvenile nursery habitat for Nassau groupers. There is no documented seagrass habitat within 100 feet of the existing bascule piers. Based on the findings of the 2023 quantitative benthic survey (see the *NRE* for details), the closest seagrass bed is Wetland SO, located approximately 110 ft southeast of Pier No. 1. No permanent impacts to seagrasses are anticipated from the proposed blasting event. During the May 30, 2024 NMFS technical assistance call, NMFS indicated that the Section 7 consultation letter would address any additional/enhanced seagrass impact avoidance required for this project based on proposed green sea turtle CH status.

The existing bascule piers are located immediately adjacent to live bottom habitat and macroalgal beds (see the *NRE* for details). A minimal amount of impact to the invertebrates (i.e., sponges hydroids, and tunicates) within the live bottom habitat may be anticipated from the proposed blast event. A similar, nominal amount of impact may occur within the adjacent macroalgal beds. These communities are likely to recover naturally after the blasting event. The installation of the temporary sheet piles walls will contain the blast debris and minimize the blast pressure wave. As described in the *NRE*, the Town has committed to the relocation of corals and barrel sponges from the project impact area prior to construction. Coral and sponge relocation will be conducted in accordance with

the *Plan for Relocation and Monitoring of Corals, Octocorals, and Sponges* which will be developed and coordinated with the regulatory agencies during the permitting process.

4.4 Minimization of Blasting Impacts

The following measures have been incorporated into the *Conceptual Blasting Plan* (**Appendix C**) and will be implemented to minimize impacts to marine and aquatic species from the proposed blasting:

- The proposed blasting event will use the minimum blast necessary to conduct the work in a manner that is efficient, safe for workers, and protection of aquatic and marine organisms.
- The blasting event will only occur during daylight hours when weather conditions do not hinder visibility.
- The blast will be detonated on incoming tide or slack high tide to maximize visibility of marine animals by the marine observers.
- All explosives will be detonated within confined blast holes. No unconfined or open water blasts will be used.
- All blast holes will be delayed, as required, to maintain charge weight at or below the approved maximum charge weight. The minimum delay will be 9 ms.
- Blasting will be conducted with a maximum of 18 pounds of explosive per delay.
- All blast holes will be stemmed with angular, uniform, crushed clear stone of approximately 3/8 inch. Stemming lengths will be a minimum of three feet.
- To minimize impacts from potential flyrock, a cloth and wire mesh blast mat (or appropriate equivalent) will be positioned over the structure to be detonated.
- Temporary sheet piling will be installed on three sides of each bascule pier (i.e., north side, south side, and side nearest the federal navigation channel) to isolate the blast debris in a controlled perimeter and minimize the blast pressure wave.
- Small Fish Scare Charges (0.01 pounds of explosives, non-electric blasting caps) will be detonated 15-30 seconds prior to the main blast event to drive fish away from the structure being blasted.

Additional details on each of these minimization measures are available in the *Conceptual Blasting Plan* (**Appendix C**).

5.0 COMMITMENTS

Commitment No. 15 in the April 15, 2024 *NRE* has been updated to reflect the current development status of the *Conceptual Blasting Plan* and to specify that reinitiation of consultation with NMFS will be required once the *Final Blasting Plan* has been prepared:

15. A *Conceptual Blasting Plan* to provide general blasting information for the project, including proposed measures to minimize and mitigate potential effects on species, will be developed during the PD&E process. Prior to construction, the Town and their contractor will submit a *Final Blasting Plan* containing details of the blasting means and methods, including the blasting design, an impact assessment, a mitigation plan, and an *Imperiled Species and*

Marine Mammal Watch Plan which will be reviewed and approved by the USFWS, NMFS, USCG, USACE, and FWC. The Town commits to reinitiating consultation with the NMFS during design and permitting once the *Final Blasting Plan* has been prepared. The blasting plan will be required to adhere to the USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida*.

6.0 CONCLUSION

This *NRE Addendum* was prepared to summarize the blasting information for two previous, successful bridge blasting projects in Florida; present a *Conceptual Blasting Plan* for the Broad Causeway Bridge project; and provide a summary comparison between the three bridge blasting projects. The *Conceptual Blasting Plan* attached to this *NRE Addendum* provides a tentative worst-case-scenario for the impact of explosives on listed marine animals for the Broad Causeway Bridge project based on the Engineer's best estimate at this phase of the project. This *NRE Addendum* also addresses potential blasting impacts and measures to minimize blasting impacts to the following imperiled species and marine mammals: green sea turtle, loggerhead sea turtle, Kemp's ridley sea turtle, hawksbill sea turtle, leatherback sea turtle, West Indian manatee, bottlenose dolphin, giant manta ray, Nassau grouper, and smalltooth sawfish. Blasting impacts to manatee CH and green sea turtle proposed CH are also addressed. The NMFS Section 7 consultation letter would address any additional/enhanced seagrass impact avoidance required for this project based on the proposed CH status. The Town has committed to reinitiation of consultation with the NMFS during design and permitting once a Blasting Contractor has been selected and the *Final Blasting Plan* has been prepared.

7.0 APPENDICES

APPENDIX A – NMFS BLASTING COORDINATION

APPENDIX B – SR 679/PINELLAS BAYWAY STRUCTURE E AND VETERANS MEMORIAL BRIDGE BLASTING DOCUMENTS

APPENDIX B1 - *SR 679 Bayway Structure E Blast Plan*

APPENDIX B2 - *SR 679 Bayway Structure E Imperiled Species and Marine Mammal Watch Plan*

APPENDIX B3 - *Pinellas County Bayway (SR 679) Bridge Structure E Demolition Imperiled Species and Marine Mammal Watch Plan Report*

APPENDIX B4 - *Veterans Memorial Bridge Blasting Plan*

APPENDIX B5 - *Veterans Memorial Bridge Marine Species Watch Program*

APPENDIX B6 - *Veterans Memorial Bridge Demolition Marine Animal Watch Program Post Blast Summary Report*

APPENDIX C – CONCEPTUAL BLASTING PLAN

APPENDIX D – USFWS CONCURRENCE

APPENDIX A
NMFS BLASTING COORDINATION

Minutes

Project:	Broad Causeway Bridge Replacement PD&E Study		
Subject:	National Marine Fisheries Service (NMFS) Technical Assistance Call – Section 7 Informal Consultation		
Meeting place:	Teams Meeting		
Date and time:	May 30, 2024 | 9:00 a.m.		
Attendees:	Kurtis Gregg Megan Moore Kimberly Tavares Wendy Lasher Beth Zimmer	Representing:	NMFS FDOT FDOT AtkinsRéalis AtkinsRéalis

MINUTES:

1. Introduction
   a. AtkinsRéalis (hereafter referred to as "Atkins") indicated that the reason for this technical assistance call is to clarify the information in the email sent by NMFS to FDOT on May 24, 2024 in which NMFS indicated that the proposed project blasting is anticipated to complicate the expedited informal consultation process (EXP) with the NMFS Protect Resources Division (PRD).

2. Blasting and Section 7 Expedited Informal Consultation
   b. Atkins noted that the May 24, 2024 NMFS email to FDOT states that NMFS' concurrence with FDOT's *May Affect, Not Likely to Adversely Affect* (MANLAA) determinations for listed species under NMFS' purview cannot occur until the Final Blasting Plan is provided for review.
   c. Atkins summarized that a final blasting plan will not be available until a construction/blasting contractor has been selected and details regarding the proposed blasting materials and methods are known.
   d. Atkins summarized that without NMFS' concurrence on the listed species determination of effect, the proposed project will not be issued the Location and Design Concept Acceptance (LDCA) which allows the project to move forward from the PD&E phase into the Design phase.
   e. NMFS indicated that a Natural Resource Evaluation (NRE) Addendum should be prepared. The NRE Addendum should 1) review the blasting plans and post-blasting reports for similar bridge blasting projects that have been approved/completed, 2) compare these blasting projects to the proposed blasting project, and 3) provide a tentative worst-case scenario for the impact of explosives on fish/wildlife for the Broad Causeway Bridge *Conceptual Blasting Plan* (i.e., explosive type, charge weight, number of charges, blast timing, etc.). This analysis of real-world examples of the intensity/impact of actual blasting events in the NRE Addendum will allow NMFS to estimate the level of impact from the proposed blasting associated with the Broad Causeway Bridge project and proceed with concurrence.
   f. NMFS agreed that the existing commitment in the NRE should be modified to state that reinitiation of consultation with NMFS will be required once the Final Blasting Plan has been prepared.

3. Green Sea Turtle Critical Habitat (CH)
    g. Atkins noted that the May 24, 2024 NMFS email states that the NMFS Section 7 Mapper Tool identified designated CH for the green sea turtle in the project area.
    h. Atkins stated that a review of currently available information has revealed no Final Rule for green sea turtle CH and that the status appears to still be “Proposed CH.”
    i. Atkins inquired whether NMFS was aware of an imminent CH ruling and NMFS indicated that they were not aware of any such ruling but that additional/enhanced seagrass impact avoidance is likely to be required for this project and would be addressed in the Section 7 consultation letter.

Action Items:

- The Town will prepare an NRE Addendum with the requested blasting information analysis.
- The NMFS EXP will address the Kemp’s ridley sea turtle with with a MANLAA determination of effect.
- The Town will include the Kemp’s ridley sea turtle in the Final NRE.

Minutes were provided to all attendees for review. No comments were received.

Zimmer, Beth

Subject: Broad Causeway Bridge (FMN-452428-1-21-01) EFH review, Miami-Dade

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From: Kurtis Gregg - NOAA Federal <kurtis.gregg@noaa.gov>
Sent: Friday, May 24, 2024 3:05 PM
To: Moore, Megan <Megan.Moore@dot.state.fl.us>
Cc: James, Steven C. <Steven.James@dot.state.fl.us>
Subject: Re: Broad Causeway Bridge (FMN-452428-1-21-01) EFH review, Miami-Dade

Hi Megan,

Thank you for the time extension on the EFH consultation. I have also begun the review of the NRE to draft the expedited informal ESA Section 7 consultation request (EXP). The cover letter provides a lot of great information to transfer into the EXP directly (Thank you for that!). The SERO ESA Section 7 mapper was run to make sure all ESA listed species under NMFS' purview are addressed. Based on review of the NRE so far, the EXP will need to include Kemp's ridley sea turtles as NLAA (not addressed in the NRE, but not a problem to include). Also, designated critical habitat for green sea turtles came up in the Section 7 mapper results. This will require seagrass impact avoidance to a greater extent than usually required in our EFH consultations.

The proposed blasting is likely to complicate an expedited informal consultation with PRD. We will need detailed information from the case studies where it has been approved previously (thanks for including those as appendices in the NRE), as well as detailed plans for how blasting will be conducted at Broad Causeway Bridge and how observers will be employed to support the NLAA determinations. The NRE indicates the blasting plan will be developed in later stages of the project design (same with the seagrass impacts and mitigation). I can say with confidence that NMFS' concurrence with FDOT's NLAA determinations will not occur until the final blasting plan is reviewed and details of that plan are included in the NMFS letter of concurrence. That is how it was addressed in the LOC for the USCG consultation for Veterans Memorial Bridge on the Halifax River in Volusia County.

Broad Causeway Bridge is front burner right now. I will email you directly if I need specific details to complete the EXP draft for your review and signature. I suggest we prepare for FDOT to submit the EXP request to get on the clock, but also be prepared for a request for additional information as it relates to the blasting plan and protection of green sea turtle designated critical habitat. Please let me know if you have any questions.

Thanks,

Kurtis

On Fri, May 24, 2024 at 1:53 PM Moore, Megan <Megan.Moore@dot.state.fl.us> wrote:

> Hi Kurtis,
>
> Yes, the extension for Broad Causeway EFH to June 7th is okay with us.
>
> In relation with Broad Causeway, we are concerned with the timeline for Section 7 ESA coordination. Our Public Hearing is scheduled for June 24th and we typically prefer to have our concurrences prior to public hearing.

As the 60 day review has not yet begun, we wanted to follow up on the status of the expedited document for us to be able to submit for Section 7 ESA Expedited Informal Consultation and begin the review period as soon as possible.

Please let us know if there is anything you need from us in this process.

Thank you,

Megan Moore, M.P.S., FCCM

Environmental Specialist III



Florida Department of Transportation - District 6

Planning and Environmental Management Office

Adam Leigh Cann Building

1000 NW 111th Avenue, Room 6109

Miami, Florida 33172

Phone: (305) 470-5405, Fax: (305) 470-5205

E-mail: Megan.Moore@dot.state.fl.us

From: Kurtis Gregg - NOAA Federal <kurtis.gregg@noaa.gov>
Sent: Friday, May 24, 2024 12:21 PM
To: James, Steven C. <Steven.James@dot.state.fl.us>
Cc: Moore, Megan <Megan.Moore@dot.state.fl.us>
Subject: Broad Causeway Bridge (FMN-452428-1-21-01) EFH review, Miami-Dade

EXTERNAL SENDER: Use caution with links and attachments.

Hi Craig,

I hope this email finds you well. I need to request a time extension of the EFH consultation for the Broad Causeway Bridge replacement (FMN-452428-1-21-01, ETDM-14520). Based on my review of the EFH assessment to date, NMFS expects to have conservation recommendations for the project. Given the timing of the 30 day review period ending during a holiday week, NMFS requests an extension of the review period to June 7, 2024. I expect to get our review and letter completed before that date, but wanted to make sure we only send one extension request. Please acknowledge the revised time frame by replying to this email..

Thanks,

Kurtis

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Kurtis Gregg,
Natural Resource Specialist,
NOAA, National Marine Fisheries Service,
Southeast Regional Office, Habitat Conservation Division,
C/O FDOT District 2
2198 Edison Avenue, MS2814
Jacksonville, FL 32204
Office Phone (561) 291-9843

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Kurtis Gregg,
Natural Resource Specialist,
NOAA, National Marine Fisheries Service,
Southeast Regional Office, Habitat Conservation Division,
C/O FDOT District 2
2198 Edison Avenue, MS2814
Jacksonville, FL 32204
Office Phone (561) 291-9843

APPENDIX B

SR 679/PINELLAS BAYWAY STRUCTURE E AND VETERANS MEMORIAL BRIDGE BLASTING DOCUMENTS

APPENDIX B1

SR 679 Bayway Structure E Blast Plan

10 December 2020

Reference: **Pinellas Bayway Bridge / Replacement of Bridge Structure E**
Financial Project ID: 410755-2-52-01, 432587-1-52-01 &427143-2-52-01
Contract No: E7R20
County Road No: Pinellas, SR 679

Subject: **Blasting Plan Submittal for Pinellas Bayway Bridge Bascule across Gulf Intracoastal Waterway**

Please find for approval the following blasting plan for the demolition of the main piers of the Pinellas Bayway Bridge, Structure "E" in St. Petersburg, Florida. Blasting activities are planned for March/April 2021.

A. GENERAL:

1. The purpose of this blast plan is to provide information on the procedures that will be used to explosively demolish the concrete bascule piers of the old Pinellas Bayway Bridge, Structure "E".

2. In preparing this plan, the applicable sections of the following Standards and References were used (where standards between agencies differ, the more restrictive standard will be adhered to):

   a. Florida Department of Transportation Standard Specification for Road and Bridge construction in conjunction with the Special Provisions, Supplemental Specifications and Technical Special Provisions pertaining to this project.

   b. The SWFWMD permit issued for construction of State Road 679 (Pinellas Bayway Structure E) (Permit # 43023803.003). (Attachment C)

   c. The USCG Bridge Permit #10-16-7 dated December 12, 2016 issued for construction of the Pinellas Bayway "E" across the Gulf Intracoastal Waterway (Boca Ciega Bay).

   d. Department of The Army Permit #SAJ-2002-04286-NW dated March 3, 2017.

   e. The plan will be submitted to the National Marine Fisheries Service, Florida Fish & Wildlife Conservation Commission an US Fish & Wildlife Service at least 60 days prior to proposed blasting date for approval.

   f. No blasting will commence until all environmental agencies above approve the blasting proposal.

   g. U.S. Army Corps of Engineers Manual (EM) 1385-1-1 Sec 29.

   h. National Fire Protection Association Code (NPFA)

i. OSHA requirements as applicable.

j. USC Chapter 40 (Explosives and Specification).

k. Codes and Statues: State of Florida, Pinellas County and City of St. Petersburg and St. Petersburg Beach.

l. Imperiled Species and Marine Mammal Watch Plan by Land and Sea Group, Inc (Attachment F)

B. SUBMITTALS:

The following information is being submitted for review, approval, and filing with project records.

a. The resume of Ken Tully of Contract Drilling and Blasting (CDB) who will be the on site supervisor for all explosive operations. Attached in the Blasting Plan his resume will demonstrate his work in controlled explosive demolition.

b. State and federal explosives Licenses held by Ken Tully and his company CBD.

c. Daily Blasting Logs are part of the Blast Plan Attached. (To be filled out after each blast).

d. Drilling and Loading working drawings for all Piers are included for the bascule piers in the Blast Plan.

C. ASSIGNMENTS OF PRIORITIES:

The prioritization and scheduling of the blasting operations will be coordinated with all involved parties as called for by the Engineer responsible for the project, The Florida Department of Transportation (FDOT), Pinellas County, United States Coast Guard, and local law enforcement agencies. Controlling factors in the daily operations, in the order of precedence, are as follows:

a. Safety of on-site personnel associated with or visiting this project, the general public crossing the new bridge, and all commercial mariners or recreational boaters transiting or planning to transit the safety zone. American Bridge Project Engineer will notify the appropriate agencies when blasting operations are to take place and coordinate these operations with the on site marine watch observers.

b. Protection of existing structures, utilities and other improvements within the area of bridge demolition.

c. Protection of Endangered Species including manatees, sea turtles, marine mammals and other marine wildlife.

d. Proper and adequate demolition of substructure members. Balance the need to minimize energy generated from explosive work with need to adequately rubblize concrete. Efficient and rapid removal of post-blast debris from waterway will be given priority. Care will also be taken to avoid the need to re-drill and re-blast irretrievable underwater portions of structure too large to remove with normal excavation equipment.

e. Scheduling of blast activities to minimize impact on parties listed in item a. above. Consideration will be given to the tidal schedule and if possible all shots will be scheduled on the high tide.

D. SAFETY IMPLEMENTATION:

To provide assured safety, the following safety measures, unique to this project, will be implemented.

a. Pre-blast inspections will be conducted prior to any blasting activities. Blast monitoring will be conducted during blast activities. Notifications of blasting activities will be issued as required by the Engineer. A record of all seismic and over pressure (sound) will be maintained at American Bridge office for the Engineer's review.

b. There is a reasonable probability that sea turtles, manatees, and dolphins will be located in the blast area during the blast event. A Safety Zone around the blasting operations will be maintained at a sufficient distance to preclude any possible injury due to "fly rock". The "Danger Zone" is based on the actual explosives loaded in each shot. The calculated exclusion zone is based on the charge weight in TNT equivalency and shall be categorized as an open-water blast.

   An observation buffer zone of 300 additional feet shall be added. An aerial map is included as part of the Blast Plan and Watch Plan to depict the zones.
   No additional listed species' habitat or feeding areas are anticipated to be destroyed by this blasting project.

c. All unauthorized travel into or near the blasting Safety Zone via vehicle, watercraft or any other means will be prevented by signs, roped-off areas, guards, patrol boats or other means necessary to control unauthorized ingress. Prior to detonation of any explosive, the Safety Zone will be secured and cleared. American Bridge with the assistance of local law enforcement where needed, will clear the Safety Zone of all unauthorized spectators. Assistance is anticipated from the Coast Guard Marine Safety Office for waterborne activity controls, and from the local sheriff's office for restricting vehicular traffic near the blasting area. Generally, it will take 5 to 10 minutes to set up traffic stops in the blast area and then another 5 minutes to complete the explosive shot. Immediately after the shot is completed, a post shot inspection will be made by the blaster and if conditions are determined safe, the all clear signal will be sounded and all traffic will be allowed to proceed.

d. Prior to detonation of an underwater blast, a "Fish Scare" charge will be detonated prior to the shot. A nonel detonator suspended in the water column beside the pier will be detonated as described in the Blasting Plan (Attachment A).

e. An audible warning horn will be sounded as follows: Five minutes prior to the blast 3 short air horn blasts, 1 minute prior to the blast 2 short air horn blasts and after the blast an all clear 1 long air horn blast.

Note: The blaster will be in direct radio communications with the Project Engineer and Chief Endangered Species Observer who must give their approval before the shot is fired. The details of these communications procedures will be discussed prior to the shot, and will include communications requirements from each entry control point, both on land and in the waterway.

E. BLASTING PLANS/DAILY BLASTING LOGS (Blast Plan):

Adjustments may have to be made if unexpected conditions are encountered while drilling the Piers. Any changes needed as a result of unknown conditions will be discussed with the Engineer. Any changes will be such that it will not effect the seismic or air blast limits for safe blasting in built up areas.

The Blast Plan contains sketches of the details for drilling and blasting and shows various elevations of piers, location of blast holes, diameters, depth of blast holes and spacing of holes.

F. MITIGATION

To the extent practicable the blasting shall be conducted during slack tide conditions.

The volume and length of all blasting agents, detonation cord, and explosives will be limited to the minimum necessary to conduct the work in a manner that is efficient, safe for workers, and protective of aquatic and marine organisms. Initiation of explosive charges will be conducted with the minimum length of detonation cord possible.

All shock tubes and detonation cord or electric wires will be recovered and removed after each blast.

For any information pertaining to this plan contact Oscar Camacho, Project Engineer, at (412) 760-70-78. Should you require any additional information please advise.

Sincerely,

American Bridge Company.
Oscar Camacho
Project Engineer
Pinellas Bayway Structure “E” Bridge

Attachments: (A) Blasting Plan
(B) Watch Program by Land and Sea Group, Inc.
(C) Southwest Florida Water Management District Permit

Cc: FFWCC
NMFS Southeast Regional Office
U.S. FWS
USCG
Job File

SR 679
Bayway Structure E
Bascule Piers Demolition



Blast Plan

December, 2020

SCOPE OF WORK

Contract Drilling & Blasting LLC (CDB) has been contracted by American Bridge Company to conduct drilling and blasting for the removal of the existing bascule piers of the SR679 Pinellas Bayway Bridge. American Bridge Company will mechanically remove the piers to elevation +5. CDB will then utilize a drill rig placed on a work platform on top of each bascule to drill the bore holes at the designed locations in the piers. Drill templates and casing pipes will be used where required for the drilling of holes in the foundations.The piers will then be loaded with explosives, covered with blast mats and blasted as per scheduled loading days and shot day. The loading will be broken into two consecutive days. The piers will be blasted simutaneuosly in one event. Explosives will be delivered on each blast day, no onsite storage will be required. Once the piers have been blasted American Bridge Company will complete the removal of the debris from the river with their equipment.

Project Key Personnel

Ken Tully.....Blaster-in-Charge

Albert VanNiekerk.....Alternate Blaster-in-Charge

Edward Harvey.....Drilling Superintendant

KENNETH L. TULLY

Geologist / Blasting Specialist / **Drilling Consultant**

ACADEMIC QUALIFICATIONS
Saint Mary's University, Halifax, NS
Bachelor of Science Degree, Major in Geology

CERTIFICATIONS
Federal Explosives License, issued by the ATF
Explosives User's License, State of Florida
Licensed Blaster in the states of AL, AR, FL, SC, VA, NJ, PA, MO, NC, NYC, MD, GA, CA, NH, ME, CT
Licensed Blaster in the province of BC.(Licenses Previously Held in NS, WV,TN)

PROFESSIONAL AFFILIATIONS
International Society of Explosives Engineers, ISEE
National Demolition Association
Founder and 1st President of the first Canadian Chapter of the ISEE

PRESENTATIONS & PUBLICATIONS
Featured in a documentary by the Discovery Channel & in The Journal of Explosives Engineers
Seminar presentations on blasting vibrations and air concussion for Technical University of Nova Scotia
Consulted on the drafting of the current South Carolina blasters exams
Consulted on the drafting of municipal blasting by-laws in Nova Scotia
Drafted TMG Rock Contractors safety policy and manual for Drilling and Blasting Operations
Presentation on the Advantages of Explosives, presented to the Civil Engineers Society of Charleston, SC.
Speaker/presenter at the Georgia Blasters Training Seminar
Presenter at the ISEE 2020 annual conference.

PROFESSIONAL EXPERIENCE

KT Blasting Specialists LLC (Mt. Pleasant, SC, USA) Owner	2014 – Present
Contract Drilling & Blasting LLC (Jacksonville, FL, USA) Geologist / Blasting Specialist / Vibration Specialist Drilling Specialist	Nov. 2008 - Present
Advanced Blasting Services (Mt. Pleasant, SC, USA) Geologist / Blasting Specialist / Drilling Consultant	Aug. 2005 – Nov. 2008
Independent Blasting Consultant (Parrsboro, NS)	Oct.1998 – July 2005
Advanced Blasting Technologies (Princeton, WV) Superintendent	June 1997 - Sept. 1998
TMG Rock Contractors Ltd. (Kingston, ON) Atlantic Region Manager	Nov. 1995 – June 1997
Rockwork Construction (Dartmouth, NS) Blaster in Charge	April 1995 – Sept. 1995

TMG Rock Contractors Ltd. (Nova Scotia Division) April 1994 – Feb.1995
Blaster in Charge

Risktech Consulting Services (NS) Sept.1989 – Jan.1992
VP, Manager of Seismic Operations

Seistech Blasting Consultants (Windsor, NS) Sept.1987 – Sept.1989
Owner / President

Atlantic Explosives Ltd. (Waverly, NS) Aug. 1984 –Sept.1987
Seismic Technician

Awards

San Francisco Oakland Bay East Span Foudation Removal Project 2013 - 2018
Controlled Blasting Speciailist/Blaster in Charge, CDB - Kiewit/Manson JV CMGC team.
- Associated General Contractors (AGC), 2017 & 2019 Marvin M. Black Partnering Excellence Merit Award
- AGC California, The Construction Awards, 2018 Partnering Excellence Award
- California Transportation Foundation, Transportation Awards Finalist, 2017 Unique Project
- Federal Highways Administration 2017 Environmental Excellence Award
- AGC California, The Construction Awards Finalist, 2016 Meeting the Challenge of a Difficult Job - Heavy Equip.
- World DemolitionAwards, 2016 Collaboration Award
- Caltrans, 2015 Partnering Success in Motion Award

EXAMPLES OF PROJECTS

Demolition / Underwater Projects

Cooper River Bridges & Piers Demolition, Charleston, SC – Testa Corp.
Fuller Warren Bridge Pier Demolition – Jacksonville, FL. – Cashman, Inc.
Combahee River Bridge Pier Demolition – United Constructors
Sanibel River Bridge Piers Demolition – Sanibel, FL. – Testa Corp.
Broad River Bridge & Piers Demolition – Gaffney, NC. – Rae Constructors
Genesee River Bridge Piers Demolition – Rochester, NY – Edward Kramer & Sons
Saskonnet River Train Bridge Piers – Tiverton, RI – Testa Corp
Titan America Smoke Stacks Demolition (250 ft) – Miami, FL. – Testa Corp.
Chickahominy Bridge – Charles City & James City, VA - Advanced Blasting Services LLC
Giant Cement Plant, Smoke Stack (225 ft) and Piers Demolition – Harleyville, SC – ISP Inc.
Mosaic Phosphates Sulphuric Cake Tanks Demolition – Green Bay, FL – DH Griffin
Route 36 Bridge Demolition - Highlands, NJ - JH Reid
Route 25/70 Bridge Demolition – Newport, TN – DH Griffin
Holtwood Power Plant Skimmer Wall Demolition – Holtwood, PA – PPL
Imperial Sugar Furnace Building & Pan House Demolition – Sugar Land, TX – DH Griffin
Carondelet Coke Plant Stack Demolition (165ft)– St. Louis, MO – Environmental Operations Inc.
Max Brewer Bridge Demolition – Titusville, FL – Seaward Marine
Court Street Bridge Piers Demolition – Hackensack, NJ – Creamer/Sanzari
Willis Ave. Bridge Piers Demolition – New York, NY – Kiewit/Weeks JV

KAUT TV Tower Demolition (1400 ft)– Oklahoma City, OK – Midwest Wrecking Co.
Harley Davidson Plant, Smokestack Demolition (135ft) – York, PA - MECO Demoilition
Gorgas Power Plant Boiler Bldg. Demolition – Parish, AL – DH Griffin Wrecking Co.
FMC Corp. Stack Demolition (160 ft)– Baltimore, MD – DH Griffin Wrecking Co.
Exelon Plant Boiler Bldg. Demolition – Fort Worth, TX – DH Griffin of Texas
University of Alabama,Rose Towers Dormitory Implosion(13 story bldg..)–Tuscaloosa, AL–DHG
Jordan Bridge, Gantry Truss Emergency Removal – Chesapeake, VA – Seaward Marine
Holtwood Power Plant, New Pier Removals – Holtwood, PA – Walsh Construction
Cooke's Children's Hospital Demolition (8 story bldg.)– Fortworth, TX – Midwest Wrecking
Six Flags over Texas, Parachute Ride Demolition – Arlington, TX – Dallas Demolition II
Thomas Building Demolition (9 story)- Dallas TX – Dallas Demolition II
NASA Test Stand 4696 – Huntsville AL – Britt Demolition
Rt.3 Bridge Pier Demolition – Clifton, NJ – Creamer / Sanzari JV
Holtwood Power Plant, Closure Wall Demolition - Holtwood, PA – Walsh Construction
AMP Ohio Stack Demolition (360 ft)– Marietta OH - Brandenburg Industrial Service Company
Bayway Pinellas Bridge Pier Demolition – Pinellas FL – Orion Marine Group
FPL Power Plant Boilers & Stacks Demolition (365 ft)– Port Everglades FL – DHG Wrecking Co.
FPL Stack Bases Demolition – Port Everglades FL – DH Griffin Wrecking Co.
Alabama Newsprint Silos Demolition – Monroeville AL- DH Griffin Wrecking Co
Holtwood Power Plant, Bridge B Piles removal – Holtwood PA – Walsh Construction.
SC 5 Catawba Bridge piers demolition – Lancaster Co. SC – United Contractors
DuPont Stack Demolition (235 ft) - Kinston NC – DH Griffin Wrecking Co.
Genesee Towers Demolition (19 story bldg.) – Flint MI – Burnash Wrecking
SC 601 Congaree River Bridge piers demolition- Calhoun Co.SC- United Contractors
Skidaway Narrows Bridge piers demolition - Chatham Co. GA – United Contractors
Scot Towers demolition (15 story bldg.) – Greenville SC – Keys Construction
Port Mann Bridge piers demolition – Coquitlam BC Canada – Kiewit/Flatiron JV
Winkler Hall demolition (11 story dorm) – Appalachian State University, Boone NC – DH Griffin Wrecking
Houston Club Demolition (18 story office building) – Houston, TX – DH Griffin of Texas
Horsehead Stack Demolition (400 ft) – Monaca PA – Brandenburg Industrial Services
499 Sheridan Demolition (two 12 story buildings) – Oklahoma City – Midwest Wrecking
Cliffside Power Plant (boiler demolition) – Duke Energy,Cleveland Co, NC – DH Griffin Wrecking
SFOBB Pier E3 Demolition (submerged bridge pier) – Oakland Bay, CA – Kiewit/Manson JV
McCullom Hall Demolition (10 story dormitory) – University of Kansas, Lawrence,KS – Midland Wrecking
PPL Stack Demolition (350 ft) – Billings MT – Brandenburg Industrial Services
American Airlines Headquarters Demolition – Fort Worth TX – Meco Demolition
BB Comer Bridge Demolition, superstructure & piers – Scottsboro AL – United Demolition
SFOBB Piers E4&5 Demolition (bridge piers) – Oakland Bay, CA – Kiewit/Manson JV
Rt. 9 Great Egg Harbor Bay Bridge pier removal – Egg Harbor, NJ – Rt 52 Constructors
Sarah Mildred Long Bridge pier removals - Portsmouth NH/ Kittery ME - ACD
Gerritsen Inlet Bridge pier removals - Brooklyn NY - China Construction
SC 41 Bridge over the Wando Pier Demolition - Mt. Pleasant SC - Freeland Construction
SFOBB Piers 6 through 22 Demolition (bridge piers) - Oakland Bay - Kiewit/Manson JV
Goethals Bridge Pier C Demolition - New York - R.E. Pierson
US70 E Bridge Piers Demolition - Beaufort, NC - United Demolition/UIG
Cyclopean Wall Demolition-Pier F Port of Long Beach, Long Beach CA - Manson Construction

Underwater Rock Projects

Scott Paper Dock Expansion Project – Liverpool, NS, Canada – Scott Paper Ind. Halifax
Container Pier Expansion – Halifax, NS, Canada – City of Halifax
S-NB-2 Newark Bay – Newark, NJ – Northeast Dredging
South Yard Assembly Plant - Thames River, CT- Electric Boat Company/ General Dynamics

Tunnel & Underground Projects

National Docks Bergen Tunnel Clearance - Jersey City, NJ - RJ Corman Railroad Group
Steubenville Deep Sewer Development – Steubenville, OH – Mid-West Mole Construction.
Bolt Mtn. Coal Mine Face-up – V & G Construction, Beckley, WV

Highway Projects

Wendell Interchange, Wendell, NC – Barnhill Construction
Highway 64 Development – Franklin, TN – TDOT
Staunton Bypass – Staunton, VA – Branch Highways
Highway 102 Widening – Mt. Uniacke, NS, Canada – Municipal Contractors
Superior Construction Co., Inc., Drilling Pier Caps & Installing Dowels, SR9A & SR202 JTB Interchange, Duval County, FL

Site Development Projects

Controlled Blasting Specialist - Port of Long Beach, CA - Manson Construction
Controlled Blasting Specialist – San Francisco/Oakland Bay Bridge – Kiewit/Manson JV
Blasting Consultant - World Trade Center, NY – Tutor / Perini
Roanoke Sewer Treatment Plant Upgrade – City Of Roanoke, VA
LaVergne Industrial Park – Tennessee Excavators – LaVergne, TN
Bayers Lake Industrial Park – Halifax, NS, Canada – Municipal Contractors
Middle Tyger River Sewer Project – Lyman, SC. – Reynolds Construction
Fairview Sewer Upgrade Project – Fairview, NS, Canada, - Dexter Construction
Naval Base Sewer Upgrade & Expansion- CFB Halifax, NS, Canada – Municipal Contracting Clayton Park Residential Housing – Halifax, NS, Canada – Shaw Group

Construction Vibration Monitoring Projects

UNC Harleson Hall Demolition – Raleigh NC – UNC Construction services
Tobacco Bay Reverse Osmosis Plant – Bermuda – Bermuda Ministry of Health
Isle of Palms Marina Bulkhead Replacement – Isle of Palms, SC – Meisner Marine
Strathmere / Sea Isle Beach Re-nourishment – Strathmere, NJ – GGLD
Municipal Contracting Quarry Operations – Halifax, NS
Bayer's Lake Industrial Park – Halifax, NS
Barrington Passage Temporary Quarry – Barrington, NS

Provided blast consulting, blast design for vibration control and vibration monitoring / analysis for numerous projects in Maritime Canada.

ALBERT P VANNIEKERK PhD PE

Blasting Specialist & Blast Monitoring Specialist

ACADEMIC QUALIFICATIONS

Doctor of Philosophy (Explosives Chemistry) 1993
New Mexico Institute of Mining and Technology, USA

Master's Degree (Chemical Engineering) 1991
University of Pretoria, South Africa

Bachelor's Degree (Chemical Engineering) 1988
University of Pretoria, South Africa

CONTINUING EDUCATION

Program in Financial Management and Investments 1998
University of South Africa, South Africa

International High-Tech Seminar on Blasting Technology 1995 / 1997
Blasting Analysis International, USA

Certificate in Industrial Marketing 1995
Rand Afrikaans University, South Africa

Short Course in Technological Innovation, University of South Africa 1994

Various Management Training Courses 1988 - 1999
Sasol Limited, South Africa

International Society of Explosives Engineers 1990 - 2019
Annual Conference & Technical Seminar, Blaster's Training Seminar

PROFESSIONAL QUALIFICATIONS

Professional Engineer (Registration # 20060162) 1991
Engineering Council of South Africa

CERTIFICATIONS

California – Certificate of Eligibility
California Contractor State License Board – General Engineering License
MSHA Surface Mining Safety Training
New Jersey – Public Works Contractor
New York City – Small Business Services Approval
OSHA 10 Safety Training
Port of Long Beach, CA – Small Business Enterprise
US Small Business Administration – Small Business

EXPLOSIVES & BLASTING LICENSES

BATF – Federal Explosives User Permit & Manufacturing License
California – Blaster's License (General Above Ground: Mining & Construction)
Connecticut – Certificate of Blasting Competency
Florida - User License and Blasters Permit
New York City Fire Department (FDNY) – Unrestricted / All Purpose blasting license E10
Massachusetts – Blasting Certificate of Competency
Puerto Rico – License to manufacture and use explosives

AWARDS

San Francisco Oakland Bay Bridge East Span Marine Foundation Removal 2013 – 2018
Drilling, Blasting & Blast Monitoring Subcontractor to Kiewit-Manson JV CMGC team
- Associated General Contractors (AGC), 2017 & 2019 Marvin M. Black Partnering Excellence Merit Award
- AGC California, The Construction Awards, 2018 Partnering Excellence Award
- California Transportation Foundation, Transportation Awards, 2017 Unique Project
- Federal Highway Administration 2017 Environmental Excellence Award
- AGC California, The Construction Awards Finalist, 2016 Meeting the Challenge of a Difficult Job – Heavy Equipment
- World Demolition Awards, 2016 Collaboration Award
- Caltrans, 2015 Partnering Success in Motion Award

Columbia River Channel Improvements Rock Removal (W9127N09C0026) 2009/10
Drilling & Blasting Subcontractor to J.E. McAmis, Inc.
- USACE Certificate of Appreciation
- USACE Construction Performance Evaluation (Outstanding):
- Western Dredging Association 2011 Navigation Dredging Environmental Excellence
- Western Dredging Association 2011 Annual Safety Award

Outstanding Performance - Certificate in Industrial Marketing, Rand Afrikaans University 1995

PROFESSIONAL MEMBERSHIPS

American Institute of Chemical Engineers (AIChE) – Member	2012
Society of American Military Engineers (SAME) – Member	2012
American Chemical Society (ACS) – Member	2011
Society for Mining, Metallurgy & Exploration (SME) - Member	2000
South African Institute of Chemical Engineers (SAIChE) - Member	1987

PROFESSIONAL AFFILIATIONS

Western Dredging Association (WEDA)	2010
National Demolition Association (NDA)	2008
Florida Shore & Beach Preservation Association (FSBPA)	2007
American Shore & Beach Preservation Association (ASBPA)	2007
International Society of Explosives Engineers (ISEE)	1990

PRESENTATIONS & PUBLICATIONS

Speaker – Blowing Things Up in the Bay: Near-field Hydroacoustic Monitoring. 51st Annual Cal-Neva American Fisheries Society Meeting, Eureka, CA 2017
Instructor – WV Blaster Refresher Training 2013
Panelist – ISEE Panel Discussion on Electronic Detonators 2004
Instructor – MSHA Training Seminar, Beckley, WV 2003 / 2004
Speaker – 'Best in the West' ISEE Chapter Meeting 2003 / 2004
Speaker – Great Lakes ISEE Chapter Meeting 1999 / 2003
Instructor – BAI High-Tech Explosives Seminar 1995 / 1997
Speaker – Canadian Mining Conference 1997
Speaker – South African Institute of Mining Engineers Annual Conference 1996
Speaker – South African Institute of Chemical Engineers Annual Conference 1994

Develop "Train-the-Trainer" program for UNI Tronic™ Electronic Blasting System
Master Trainer – UNI Tronic™ Electronic Blasting System

vanNiekerk, A.P & Brower, K.R., "Decomposition of Composite Explosives Containing Ammonium Nitrate by transient adiabatic gas compression", Propellants, Explosives, Pyrotechnics, Volume 20 Issue 5, Pages 273 – 278 (2004)
Development of Graduate Degree level course content: "Explosives Physics & Chemistry"
M.Eng. Thesis: "Optimization of Emulsion Formation in CR-Mixer"
PhD Thesis: "A Study of the Reaction Products from Detonation and Rapid Thermolysis of Emulsion Explosives"
Poster Session presented at ISEE Conference 2004
Paper presented at ISEE Conference 1997
Paper presented at Canadian Mining Conference 1997
Paper presented at South African Institute of Mining Engineers Annual Conference 1996
Paper presented at South African Institute of Chemical Engineers Annual Conference 1994

PROFESSIONAL EXPERIENCE

Contract Drilling & Blasting LLC (Florida, USA) 2007 to Present
President

Sasol North America Inc. (Minnesota, USA) 1999 – 2004
General Manager Operations
Sasol Mining Initiators (Pty) Ltd *2002 – 2004*
Sasol DHB Holdings Inc. (Viking Explosives & Supply, Inc.) *1999 – 2002*
Sasol DHB Holdings Inc. (Continental Nitrogen & Resources Corporation) *1999 – 2001*

Sasol Mining Explosives (Randburg, South Africa) 1998 – 1999
Manager, Bulk & Nitrates Business

Sasol Mining Explosives (Secunda and Witbank, South Africa) 1992 – 1998
Manager, Bulk Business / Manager, Bulk Operations

Center for Explosives Technology Research (CETR) (Socorro, New Mexico) 1990 – 1992
Research Center for Energetic Materials (RCEM) (Socorro, New Mexico)
PhD Researcher

Sasol Mining Explosives (Secunda, South Africa) 1988 – 1990
Process Engineer

EDWARD HARVEY, JR.

Drilling / Blasting Superintendent

ACADEMIC QUALIFICATIONS

Bernardsville High School, Bernardsville, NJ

CERTIFICATIONS

Currently hold or have held explosives licenses in the states of: Indiana, Iowa, Minnesota, New Jersey, Tennessee, Texas, Utah, and Virginia.

PROFESSIONAL AFFILIATIONS

Association of Demolition Contractors
International Society of Explosive Engineers

PROFESSIONAL EXPERIENCE

Contract Drilling & Blasting LLC (Florida, USA) 2007 - Present
General Superintendent - Drilling, Blasting and Rock Stabilization

Contract Drilling & Blasting, Inc. (Florida, USA) 1990 - 2007
General Superintendent - Drilling, Blasting and Rock Stabilization

General Superintendent for drilling, blasting, rock stabilization both on land and in a marine environment.

Affiliation with CDB, Inc. has encompassed both the practical application as well as supervision of many union affiliated general contractors.

Marvic Incorporated 1989 - 1990
Project Superintendent

Specialty Demolition Contractor

Tantra Incorporated 1980 - 1988
Project Superintendent

Specialty Demolition Contractor

PRESENT & PAST PROJECTS

- BBL of Albany, NY,Truss Bridge Removal, Poland, NY
- Traylor Brothers, Bridge Pier, Vilano Beach, St. Augustine, FL
- U.S. 40 Bascule Bridge Removal, Ormond Beach, FL
- R.R. Bridge Removal, Steel and Granite Block Piers, Sioux City, IA
- 32 R.R. Bridges, Milwaukee R.R., Marshaltown, IA
- Highway Bridge Removal, over Snake River, Swan Valley, ID
- Bridge Pier and Ice Break Cell Removal, Illinois River, IL
- Tantra, Inc., R.R. Bridge Removal, Jackson, MN
- Johnson Brothers Construction, Highway Bridge Removal, over Mississippi River, MN
- Great Lakes Dredge & Dock Co. & Don Jon Marine, Bridge Pier Removal, C&O Railroad, Port Newark, NJ
- McKinnen Bridge Company, Highway Bridge Removal, Concrete Piers & Steel, New Johnsonville, TN
- Brown & Root, Bascule Bridge Removal, Steel & Concrete Piers, Clearcreek, TX
- Brown & Root, Bridge Pier Removal, Brasso, TX
- Brown & Root, Bridge Pier Removal, Fort Worth, TX
- Railroad Bridge Removal, Steel and Concrete Piers, Salt Lake, UT
- Anderson Excavating, U.S. 1 Highway Bridge, Woodbridge, VA
- Bean Stuyvesant, SKVK2, Newark Bay Channel, Navigational Improvement 50ft Project, NJ and New York, NY
- American Bridge, Port Manatee, FL & Tampa, FL
- American Bridge, Truman Annex Pier, Key West, FL
- American Bridge, Port of Tampa – Berth 223, Tampa, FL
- Atlantic Dry Dock, Rock Removal for Navy Dry Dock, Jacksonville, FL
- Balfour Beatty Constructors, Bridge Pier Demolition, Cape May, NJ
- Citgo Petroleum, Concrete Removal, Lake Charles, LA
- Crowder Construction, Lake Gaston Water Intake, Lake Gaston, VA
- Durocher Dredge & Dock, Outfall Pipeline, Dominican Republic
- EBY Construction Co., Palm Valley Bridge Removal, Jacksonville, FL
- English Construction Co., CSO-1, City of Richmond, VA
- G.L. Howard Co., CSO-2, City of Richmond, VA
- GLF Construction Corp, Bascule Bridge Pier Removal, Seabreeze Bridge, Daytona, FL
- Great Lakes Dredge & Dock Co., Inner Harbor Spit Removal, Grand Bahamas
- Great Lakes Dredge & Dock Co., Boston Hubline Pipeline, Boston, MA
- Kiewit Constructors Inc., CSO-3, City of Richmond, VA
- Kiewit Constructors Inc., Shell-At-Grade, New Rochelle, NY
- Kiewit/Tidewater, JV, Long Port Bridge, Ocean City, NJ
- Kiewit Constructors Inc., MTA – Queens, Long Island City, NY
- Misener Marine, Port Manatee Navigation Improvement, Port Manatee, FL
- Misener Marine, Freeport Container Port, Freeport, Grand Bahamas
- Northeast Construction Co., East & West Shaft, Bronx, NY
- Recchi-GLF, JV, Sidney Lanier Bridge, Brunswick, GA
- R.W. Harris, Utility Tower, Loganville, GA
- Spinello Companies, Ashburton Plant Bypass, Baltimore, MD
- Tidewater Construction Corp, Bent Removals, I95/St. Mary's Bridge, St. Mary's, GA
- Traylor Brother, Bridge Pier Demolition, Vilano, FL

- USACOE, Wilmington Test Blast Mitigation, Wilmington, NC
- Weeks Marine, Channel Improvements KVK4B, Bayonne, NJ
- Western Summit, Atlanta, GA
- W.L. Hailey, Huguenot Water Main, Richmond, VA
- Carl Tomas Construction, Drilling, Groton, CT
- George Harms Construction Company, Victory Bridge, Bridge / Pier Demolition, Perth Amboy, NJ
- JR Cruz Corporation, Kerrigan Avenue Sewer Replacement, Union City, NJ
- Granite Construction Co., Drilling and Expansion Grout, Jewfish Creek, Key Largo, FL
- Kiewit Constructors, Inc., Castle Village Retaining Wall, New York, NY
- DonJon Marine, Howland Hook Linedrilling, Staten Island, NY
- Marianna Limestone, LLC, Quarry Drilling, Marianna, FL
- Kiewit Constructors, Inc., Verrazano Bridge, Drilling Project, Staten Island, NY
- Parsons Brinkerhoff Construction Services, Fuller Warren Bridge Replacement Project, Jacksonville, FL – Vibration Monitoring
- Kiewit Constructors, Inc., Modifications to Hellgate Line Catenary & Related Facilities, New Rochelle, CT
- George Harms Construction Co., Inc., Route 70 Bridge Removal, Brick, NJ
- Soupcon, Inc., Drilling, Satelite Beach, FL
- Barnhill Construction, Wendell Falls Interchange, Raleigh, NC
- Great Lakes Dredge & Dock Company, New York and New Jersey Harbor Channel Navigation Improvement 50 FT Project, Newark Bay Channels, Contract 4, S-NB-1, NJ
- Southwind Construction, Maintenance Dredging (IWW), Volusia County, FL
- Weeks Marine, Inc., Shore Protection Project, Fernandina Beach Nourishment, Nassau County, FL
- Hayward Construction Group, Walls Duplex Pile Driving, Fernandina Beach, FL
- Superior Construction Co., Inc., Drilling Pier Caps & Installing Dowels, SR9A & SR202 JTB Interchange, Duval County, FL
- Norfolk Dredging Company, Beach Placement, Rockaway Beach, Queens County, New York City, NY
- RW Harris, Inc., Jim Moore Road – Sharon Church 230KV Transmission Line, Auburn, GA
- Advanced Blasting Services LLC, Route 5 Bridge over the Chickahominy River, Charles City & James City, VA
- Great Lakes Dredge & Dock Company, LLC, New York and New Jersey Harbor Channel Improvement 50 FT Project, Kill van Kull Channels, Contract 5, S-KVK-1, NY & NJ
- Weeks Marine, Inc., Shore Protection Project, Ft. Pierce Beach Renourishment 2009, St. Lucie County, FL
- Leware Construction Co., Vibration Monitoring, SR21 Over Black Creek, Middleburg, FL
- Great Lakes Dredge & Dock Company, LLC, 2009 Strathmere, Sea Isle City, Stone Harbor and North Wildwood Beachfill, Cape May County, NJ
- J.E. McAmis, Inc., Columbia River Channel Improvement Project, St Helens, OR
- J.H. Reid General Contractors, Route 36 Bridge At the Shrewsbury River, Monmouth County, NJ
- Southwind Construction, Beach Erosion Control Project, Pinellas County, FL

Insurance, Federal License & Permit

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 7/1/2020

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Texas AGA, a division of Marsh USA, Inc. 1717 Main Street, Suite 4400 Dallas, TX 75201 www.aga-us.com	**CONTACT NAME:** (AGA DAL) Melinda Trevino **PHONE (A/C, No, Ext):** 469-759-1759 **FAX (A/C, No):** 469-709-1303 **E-MAIL ADDRESS:** mtrevino@aga-us.com
INSURED Contract Drilling & Blasting LLC P O Box 51468 Jacksonville FL 32240	**INSURER(S) AFFORDING COVERAGE** / **NAIC #** **INSURER A :** United States Fire Insurance Company 21113 **INSURER B :** Charter Oak Fire Insurance Company 25615 **INSURER C :** StarNet Insurance Company 40045 **INSURER D :** **INSURER E :** **INSURER F :**

COVERAGES **CERTIFICATE NUMBER:** 56352313 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	✓ **COMMERCIAL GENERAL LIABILITY** ☐ CLAIMS-MADE ✓ OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ✓ PRO-JECT ☐ LOC ☐ OTHER:			543-225818-7	7/1/2020	7/1/2021	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 100,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
B	**AUTOMOBILE LIABILITY** ☐ ANY AUTO ☐ OWNED AUTOS ONLY ✓ SCHEDULED AUTOS ✓ HIRED AUTOS ONLY ✓ NON-OWNED AUTOS ONLY			BA2G03703119SEL	9/30/2019	9/30/2020	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
A	✓ **UMBRELLA LIAB** ✓ OCCUR **EXCESS LIAB** ☐ CLAIMS-MADE ☐ DED ☐ RETENTION $ 0			523-811358-9	7/19/2020	7/19/2021	EACH OCCURRENCE AGGREGATE	$ 5,000,000 $ 5,000,000
C	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		SNWC272403	12/31/2019	12/31/2020	✓ PER STATUTE ☐ OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

SAMPLE

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Texas AGA, a division of Marsh USA, Inc.

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U.S. Department of Justice
Bureau of Alcohol, Tobacco, Firearms and Explosives

Federal Explosives License/Permit
(18 U.S.C. Chapter 40)

In accordance with the provisions of Title XI, Organized Crime Control Act of 1970, and the regulations issued thereunder (27 CFR Part 555), you may engage in the activity specified in this license or permit within the limitations of Chapter 40, Title 18, United States Code and the regulations issued thereunder, until the expiration date shown. **THIS LICENSE IS NOT TRANSFERABLE UNDER 27 CFR 555.53.** See "WARNINGS" and "NOTICES" on reverse.

Direct ATF Correspondence To	ATF - Chief, FELC 244 Needy Road Martinsburg, WV 25405-9431	License/Permit Number	**1-FL-031-33-2H-00754**
Chief, Federal Explosives Licensing Center (FELC)	Christopher R. Reeves	Expiration Date	**August 1, 2022**

Name
CONTRACT DRILLING & BLASTING LLC

Premises Address (Changes? Notify the FELC at least 10 days before the move.)
1550 ROBERTS DR
JACKSONVILLE, FL 32250-3222

Type of License or Permit
33-USER OF EXPLOSIVES

Purchasing Certification Statement

The licensee or permittee named above shall use a copy of this license or permit to assist a transferor of explosives to verify the identity and the licensed status of the licensee or permittee as provided by 27 CFR Part 555. The signature on each copy must be an original signature. A faxed, scanned or e-mailed copy of the license or permit with a signature intended to be an original signature is acceptable. The signature must be that of the Federal Explosives Licensee (FEL) or a responsible person of the FEL. I certify that this is a true copy of a license or permit issued to the licensee or permittee named above to engage in the business or operations specified above under "Type of License or Permit."

Mailing Address (Changes? Notify the FELC of any changes.)

CONTRACT DRILLING & BLASTING LLC
P.O. BOX 51468
JACKSONVILLE, FL 32240-1468

Licensee/Permittee Responsible Person Signature	President Position/Title	I certify that this is a true copy of a User Permit issued to me to engage in the specified business or operations.
ALBERT VANNIEKERK Printed Name	08/19/2019 Date	

Previous Edition is Obsolete CONTRACT DRILLING & BLASTING LLC:1550 ROBERTS DR:32250:1-FL-031-33-2H-00754:August 1, 2022:33-USER OF EXPLOSIVES

ATF Form 5400.14/5400.15 Part I
Revised October 2011

Federal Explosives License (FEL) Customer Service Information

Federal Explosives Licensing Center (FELC)
244 Needy Road
Martinsburg, WV 25405-9431

Toll-free Telephone Number: (877) 283-3352
Fax Number: (304) 616-4401
E-mail: FELC@atf.gov

ATF Homepage: www.atf.gov

Change of Address *(27 CFR 555.54(a)(1))*. Licensees or permittees may during the term of their current license or permit remove their business or operations to a new location at which they intend regularly to carry on such business or operations. The licensee or permittee is required to give notification of the new location of the business or operations not less than 10 days prior to such removal with the Chief, Federal Explosives Licensing Center. The license or permit will be valid for the remainder of the term of the original license or permit. **(The Chief, FELC, shall, if the licensee or permittee is not qualified, refer the request for amended license or permit to the Director of Industry Operations for denial in accordance with § 555.54.)**

Right of Succession *(27 CFR 555.59)*. (a) Certain persons other than the licensee or permittee may secure the right to carry on the same explosive materials business or operations at the same address shown on, and for the remainder of the term of, a current license or permit. Such persons are: (1) The surviving spouse or child, or executor, administrator, or other legal representative of a deceased licensee or permittee; and (2) A receiver or trustee in bankruptcy, or an assignee for benefit of creditors. (b) In order to secure the right provided by this section, the person or persons continuing the business or operations shall furnish the license or permit for for that business or operations for endorsement of such succession to the Chief, FELC, within 30 days from the date on which the successor begins to carry on the business or operations.

(Continued on reverse side)

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Federal Explosives License/Permit (FEL) Information Card

License/Permit Name: **CONTRACT DRILLING & BLASTING LLC**

Business Name:

License/Permit Number: **1-FL-031-33-2H-00754**

License/Permit Type: **33-USER OF EXPLOSIVES**

Expiration: **August 1, 2022**

Please Note: Not Valid for the Sale or Other Disposition of Explosives.

Jimmy Patronis
CHIEF FINANCIAL OFFICER

Julius Halas
DIVISION DIRECTOR

Casia Sinco
BUREAU CHIEF

Keith McCarthy
SAFETY PROGRAM MANAGER

FLORIDA DEPARTMENT OF FINANCIAL SERVICES
DIVISION OF STATE FIRE MARSHAL
200 East Gaines Street - Tallahassee, Florida 32399-0342
Tel. 850-413-3644 Fax. 850-410-2467

STATE EXPLOSIVE BLASTERS PERMIT
OFFICIAL COPY

ISSUED TO:	Albert P. VanNiekerk
IDENTIFICATION:	DOB: 01/18/1965 Height: 5"11' Weight: 180 Hair: Gray Eyes: Blue Sex: Male Race: White VALID ONLY WHILE EMPLOYED BY AND FOR PURPOSE AS DESCRIBED ON EMPLOYERS LICENSE
EMPLOYER:	Contract Drilling & Blasting 1550 Roberts Ave JACKSONVILLE BEACH FL 32250
LICENSE #:	EL19-000033

Issue Date:	10/09/2020
Type:	09
Class:	06
County:	Duval
License/Permit #:	EP19-000019
Expiration Date:	09/30/2021
Taxes & Fees	50.00

Chief Financial Officer

RECEIVED

SEP 09 2020

Jimmy Patronis
CHIEF FINANCIAL OFFICER

Julius Halas
DIVISION DIRECTOR

Casia Sinco
BUREAU CHIEF

Keith McCarthy
SAFETY PROGRAM MANAGER

FLORIDA DEPARTMENT OF FINANCIAL SERVICES
DIVISION OF STATE FIRE MARSHAL
200 East Gaines Street - Tallahassee, Florida 32399-0342
Tel. 850-413-3644 Fax. 850-410-2467

STATE EXPLOSIVE LICENSE
USER OF EXPLOSIVES
OFFICIAL COPY

ISSUED TO:	Albert P. VanNiekerk
EMPLOYER:	Contract Drilling & Blasting P.O. Box 51468 Jacksonville FL 32240-1468
PURPOSE:	Construction blasting and quarry blasting
TYPES OF EXPLOSIVES:	Straight Dynamites, Seismograph Explosives, Special Dynamites, Gelatin Dynamites, Prima Cord, Blasting Caps, Two Component, Emulsions, water gels, cast boosters, and deflagrating products
IDENTIFICATION:	DOB: 01/18/1965 Height: 5"11' Weight: 180 Hair: Gray Eyes: Blue Sex: Male Race: White

Issue Date:	10/09/2020
Type:	07
Class:	06
County:	Duval
License/Permit #:	EL19-000033
Expiration Date:	09/30/2021
Taxes & Fees	125.00

Jimmy Patronis

Chief Financial Officer

U.S. Department of Justice
Bureau of Alcohol, Tobacco, Firearms and Explosives

Federal Explosives License/Permit
(18 U.S.C. Chapter 40)

In accordance with the provisions of Title XI, Organized Crime Control Act of 1970, and the regulations issued thereunder (27 CFR Part 555), you may engage in the activity specified in this license or permit within the limitations of Chapter 40, Title 18, United States Code and the regulations issued thereunder, until the expiration date shown. **THIS LICENSE IS NOT TRANSFERABLE UNDER 27 CFR 555.53.** See "WARNINGS" and "NOTICES" on reverse.

Direct ATF Correspondence To: ATF - Chief, FELC 244 Needy Road Martinsburg, WV 25405-9431	License/Permit Number: **1-SC-003-33-3H-00234**
Chief, Federal Explosives Licensing Center (FELC) Shawn Stevens	Expiration Date: **August 1, 2023**

Name
KT BLASTING SPECIALISTS LLC

Premises Address (Changes? Notify the FELC at least 10 days before the move.)
431 BEAVER DAM RD
AIKEN, SC 29805-

Type of License or Permit
33-USER OF EXPLOSIVES

Purchasing Certification Statement

The licensee or permittee named above shall use a copy of this license or permit to assist a transferor of explosives to verify the identity and the licensed status of the licensee or permittee as provided by 27 CFR Part 555. The signature on each copy must be an original signature. A faxed, scanned or e-mailed copy of the license or permit with a signature intended to be an original signature is acceptable. The signature must be that of the Federal Explosives Licensee (FEL) or a responsible person of the FEL. I certify that this is a true copy of a license or permit issued to the licensee or permittee named above to engage in the business or operations specified above under "Type of License or Permit."

Mailing Address (Changes? Notify the FELC of any changes.)

KT BLASTING SPECIALISTS LLC
431 BEAVER DAM RD
AIKEN, SC 29805-

Licensee/Permittee Responsible Person Signature	Position/Title: Owner
Printed Name: Kenneth Tully	Date: 12/08/20

This is a true copy of the issued Permit.

Previous Edition is Obsolete KT BLASTING SPECIALISTS LLC:431 BEAVER DAM RD:29805:1-SC-003-33-3H-00234:August 1, 2023:33-USER OF EXPLOSIVES

ATF Form 5400.14/5400.15 Part I
Revised October 2011

Federal Explosives License (FEL) Customer Service Information

Federal Explosives Licensing Center (FELC)
244 Needy Road
Martinsburg, WV 25405-9431

Toll-free Telephone Number: (877) 283-3352
Fax Number: (304) 616-4401
E-mail: FELC@atf.gov

ATF Homepage: www.atf.gov

Change of Address *(27 CFR 555.54(a)(1))*. Licensees or permittees may during the term of their current license or permit remove their business or operations to a new location at which they intend regularly to carry on such business or operations. The licensee or permittee is required to give notification of the new location of the business or operations not less than 10 days prior to such removal with the Chief, Federal Explosives Licensing Center. The license or permit will be valid for the remainder of the term of the original license or permit. **(The Chief, FELC, shall, if the licensee or permittee is not qualified, refer the request for amended license or permit to the Director of Industry Operations for denial in accordance with § 555.54.)**

Right of Succession *(27 CFR 555.59)*. (a) Certain persons other than the licensee or permittee may secure the right to carry on the same explosive materials business or operations at the same address shown on, and for the remainder of the term of, a current license or permit. Such persons are: (1) The surviving spouse or child, or executor, administrator, or other legal representative of a deceased licensee or permittee; and (2) A receiver or trustee in bankruptcy, or an assignee for benefit of creditors. (b) In order to secure the right provided by this section, the person or persons continuing the business or operations shall furnish the license or permit for for that business or operations for endorsement of such succession to the Chief, FELC, within 30 days from the date on which the successor begins to carry on the business or operations.

(Continued on reverse side)

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Federal Explosives License/Permit (FEL) Information Card

License/Permit Name: **KT BLASTING SPECIALISTS LLC**

Business Name:

License/Permit Number: **1-SC-003-33-3H-00234**

License/Permit Type: **33-USER OF EXPLOSIVES**

Expiration: **August 1, 2023**

Please Note: Not Valid for the Sale or Other Disposition of Explosives.

Ken Tully’s renewed Florida State Explosive Blasters Permit will be submitted when received, prior to project start-up.

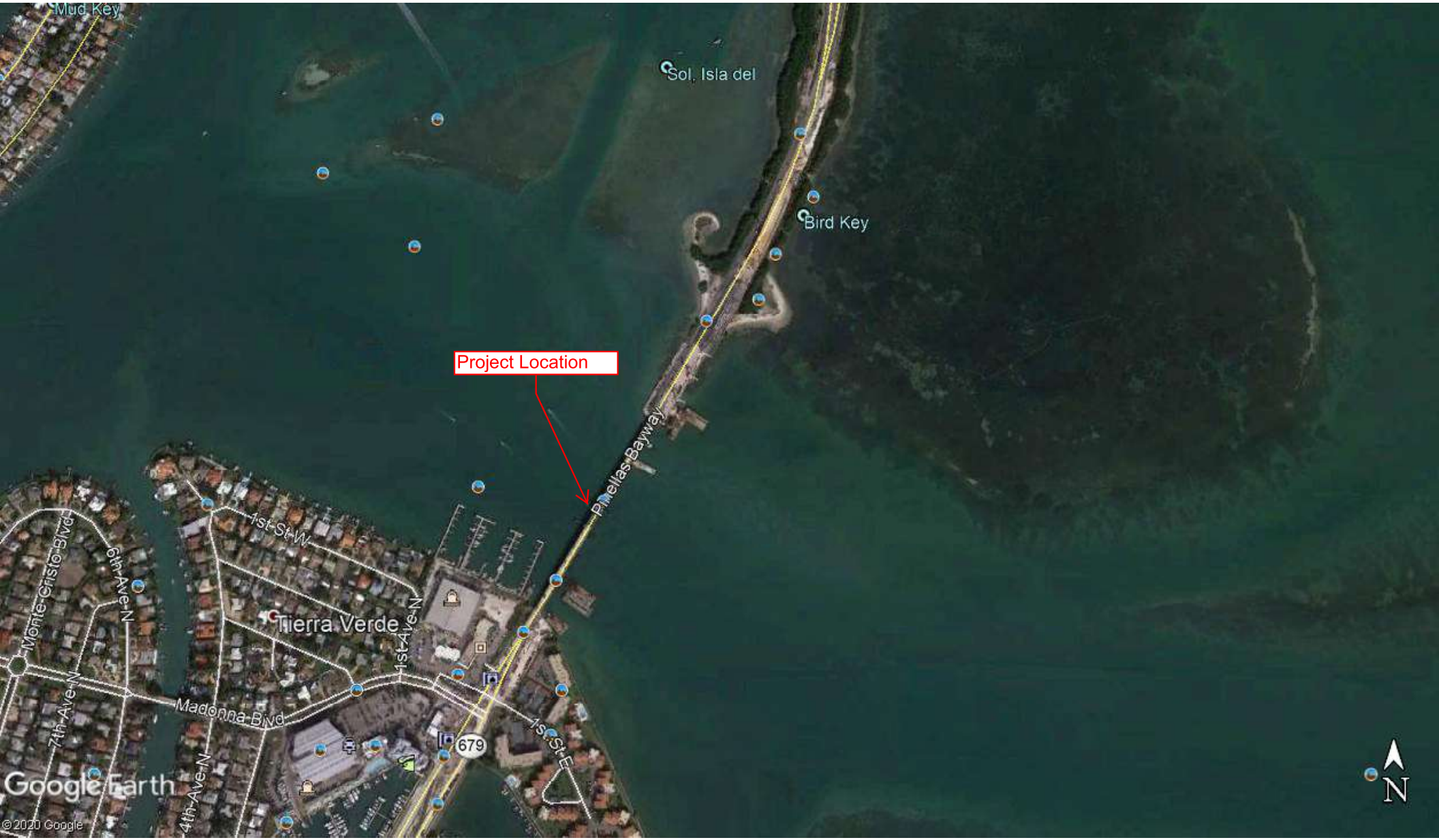
Blast Design

Design Considerations

The following site conditions have been taken into consideration while developing the blast designs;

1) The condition of the existing piers.
2) The proximity of any utilities.
3) The proximity of the new bridge.
4) Water depths.
5) The river bottom elevations and limits of removal.
6) The proximity of other structures in the area.
7) Marine life in the immediate area.
8) Environmental concerns.

The blast designs have addressed these factors and blast hole patterns and weight of explosives detonated per delay have been designed to minimize any detrimental impact and while providing sufficient fragmenting of the concrete for removal.


Mud Key
Sol, Isla del
Bird Key
Project Location
Pinellas Bayway
1st St W
6th Ave N
Monte Cristo Blvd
Tierra Verde
1st Ave N
7th Ave N
Madonna Blvd
679
1st St E
4th Ave N
Google Earth
© 2020 Google
N

FED. ROAD DIV. NO.	STATE	PROJECT NO.	FISCAL YEAR
3	FLA.	1520-175	

INDEX OF SHEETS

SHEET NO. 1	KEY SHEET
2	HYDRAULIC EMBANKMENT — SUMMARY OF QUANTITIES
3	GUARD RAIL FOR BRIDGES
"	STRUCTURE "E" — MAIN CHANNEL INTRACOASTAL WATERWAY
E-1	GENERAL PLAN & ELEVATION — BORING LOGS ✓
E-2	GENERAL NOTES, ESTIMATED BRIDGE QUANTITIES, AND SLOPE PROTECTION DETAILS ✓
E-3 & 3A	BULKHEADS ✓
E-4	PRECAST CONCRETE SHEET PILES (7" x 30") ✓
E-5	FENDER DETAILS
E-6	20" x 20" PRECAST CONCRETE PILES ✓
E-7	END BENTS Nos. 1 & 2
E-8	BENTS 1, 2, 6, 7, 9, 10, 11, 12 & 13
E-9	BENTS Nos. 3, 4 & 5
E-10	BENT No. 8
E-11	PIERS Nos. 1, 2, 3 & 6
E-12	PIERS Nos. 4 & 5
E-13	PIER No. 7
E-14	TRUNNION PIERS — GENERAL LAYOUT
E-15	TRUNNION PIERS — GENERAL LAYOUT
E-16	TRUNNION PIERS — REINFORCING DETAILS
E-17	TRUNNION PIERS — REINFORCING DETAILS
E-18	TRUNNION PIERS — BILL OF REINFORCING STEEL
E-19	CONCRETE CONTROL HOUSE
E-20	BASCULE SPAN — FRAMING PLAN, GIRDER GEOMETRY AND STRESS SHEET
E-21	BASCULE SPAN — SECTIONS AND BRACING
E-22	BASCULE SPAN — MAIN GIRDER
E-23	BASCULE SPAN — TRUNNION AND RELATED DETAILS
E-24	COUNTERWEIGHT — GENERAL DETAILS
E-25	CENTER LOCK ASSEMBLY AND LIVE LOAD SHOES
E-26	BUFFER DETAILS
E-27	BASCULE SPAN — MACHINERY LAYOUT
E-28	BASCULE SPAN — MACHINERY SUPPORTS
E-29	BASCULE SPAN — WIRING DIAGRAM
E-30	BRACKET DETAILS FOR SAFETY GATES AND TRAFFIC LIGHTS
E-31	STEEL FLANKING SPAN
E-32	48 FOOT PRESTRESSED SPAN — DECK REINFORCING
E-33	48 FOOT PRESTRESSED SPAN — GIRDER DETAILS
E-34	48 FOOT PRESTRESSED SPAN - TYPE "C" ALTERNATE
E-35	72 FOOT PRESTRESSED SPAN - DECK REINFORCING
E-36	72 FOOT PRESTRESSED SPAN — GIRDER DETAILS
E-37	HANDRAIL DETAILS

STRUCTURE "F" — BUNCES PASS CROSSING

F-1	GENERAL PLAN AND ELEVATION — BORING LOGS ✓
F-2	GENERAL NOTES, ESTIMATED BRIDGE QUANTITIES, AND SLOPE PROTECTION DETAILS ✓
F-3	BULKHEAD — GENERAL LAYOUT ✓
F-4	PRECAST CONCRETE SHEET PILES (7" x 30") ✓
F-5	NAVIGATION LIGHTS AND FENDER DETAILS ✓
F-6	20" x 20" PRECAST CONCRETE PILES ✓
F-7	END BENTS Nos. 1 & 2 ✓
F-8	INTERMEDIATE BENTS ✓
F-9	TOWER BENTS ✓
F-10	PIERS ✓
F-11	48 FOOT PRESTRESSED SPAN — DECK REINFORCING
F-12	48 FOOT PRESTRESSED SPAN — GIRDER DETAILS
F-13	48 FOOT PRESTRESSED SPAN — TYPE "C" ALTERNATE
F-14	72 FOOT PRESTRESSED SPAN — DECK REINFORCING
F-15	72 FOOT PRESTRESSED SPAN — GIRDER DETAILS
F-16	HANDRAIL DETAILS

CONVENTIONAL SIGNS

COUNTY LINE		TRAVELED WAY	
TOWNSHIP LINE		CULVERTS	
SECTION LINE		BRIDGES OVER 20 FT. SPAN	
UNFENCED PROPERTY		POWER POLE	
CITY LINE		TELEPHONE POLE	
FENCE LINE		MARSH	
RIGHT OF WAY LINE		GROUND ELEV.	
BASE OR SURVEY LINE		GRADE ELEV.	
RAILROADS		R. R. MILE POST	

GOVERNING SPECIFICATIONS: STATE OF FLORIDA, STATE ROAD DEPARTMENT, STANDARD SPECIFICATIONS, DATED JULY 1970, DATED FEB 1, 1971 SUPPLEMENT NO.

APPROVED BY BUREAU OF PUBLIC ROADS - DATE

STATE OF FLORIDA
STATE ROAD DEPARTMENT

PLANS OF PROPOSED

STATE HIGHWAY

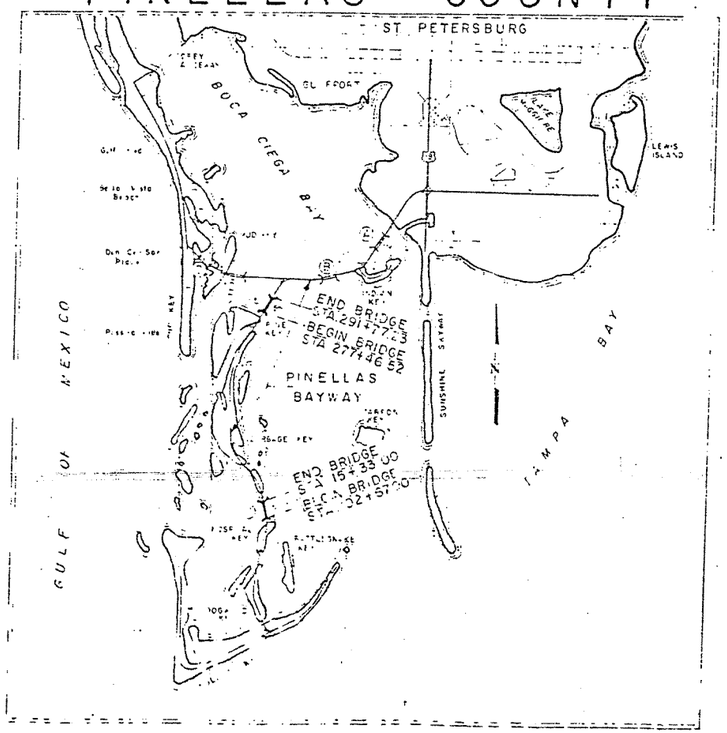
STATE PROJECT NO. 1520 - 175

PINELLAS BAYWAY

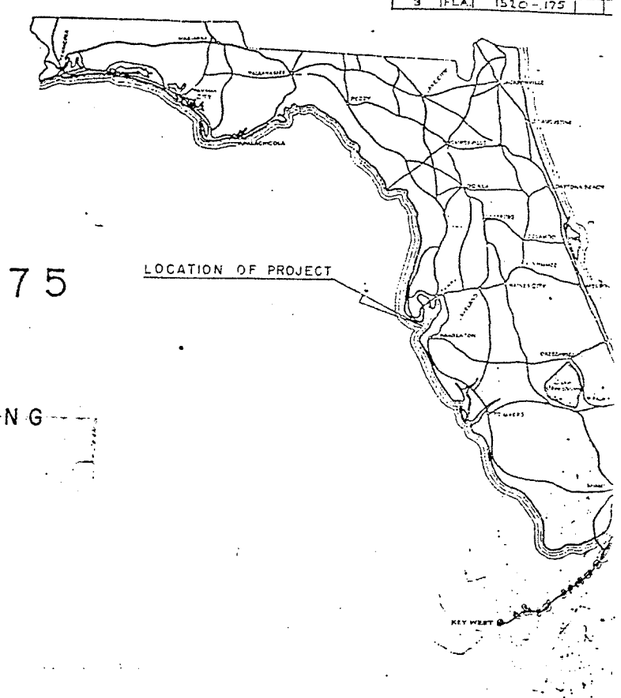
150049 STRUCTURE "E" MAIN CHANNEL INTRACOASTAL WATERWAY

150048 STRUCTURE "F" BUNCES PASS CROSSING

PINELLAS COUNTY



NET LENGTH OF PROJECT = 2,690.46'



PLANS PREPARED BY

J. E. GREINER COMPANY, INC.
ENGINEERS - ARCHITECTS
TAMPA, FLORIDA

150049

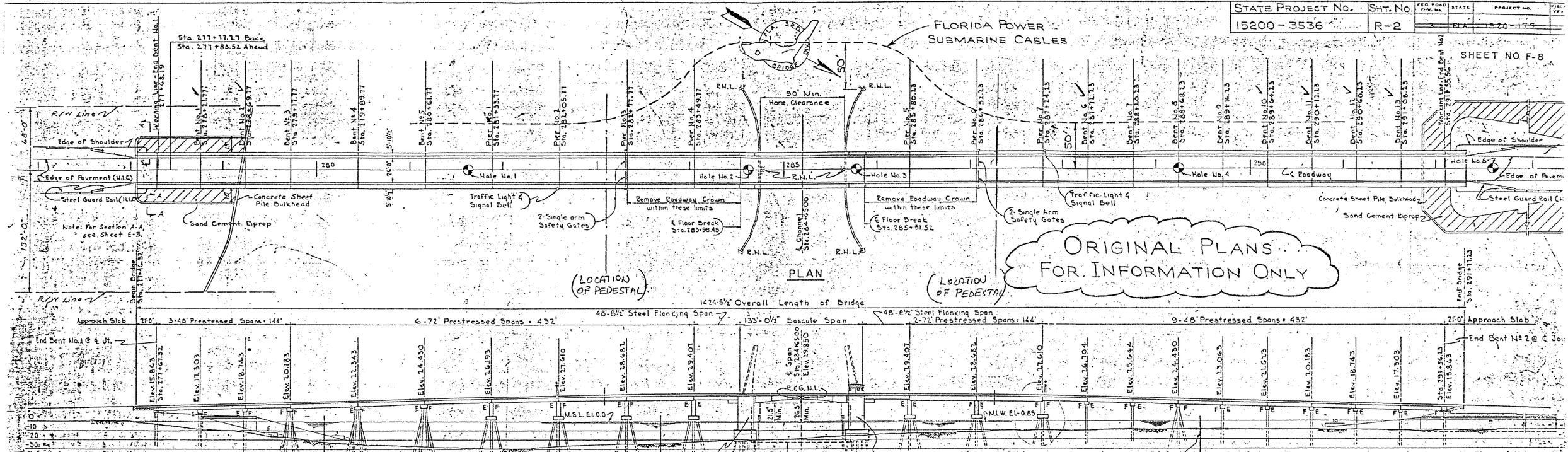
SUBMITTED BY

STATE HIGHWAY ENGINEER

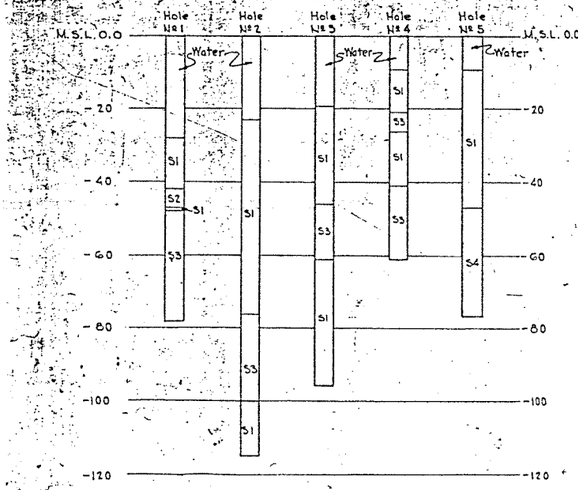
DISTRICT ENGINEER
BUREAU OF PUBLIC ROADS

STATE PROJECT NO.	SHT. NO.	FED. ROAD DIV. NO.	STATE	PROJECT NO.
15200-3536	R-2	3	FLA.	1520-175

SHEET NO. F-8



ORIGINAL PLANS
FOR INFORMATION ONLY



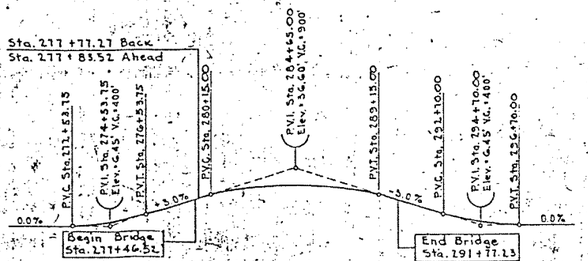
BORING LOGS

Note: A copy of the detailed Log of Borings is available for the inspection of the Contractor at the State Road Department in Tallahassee.

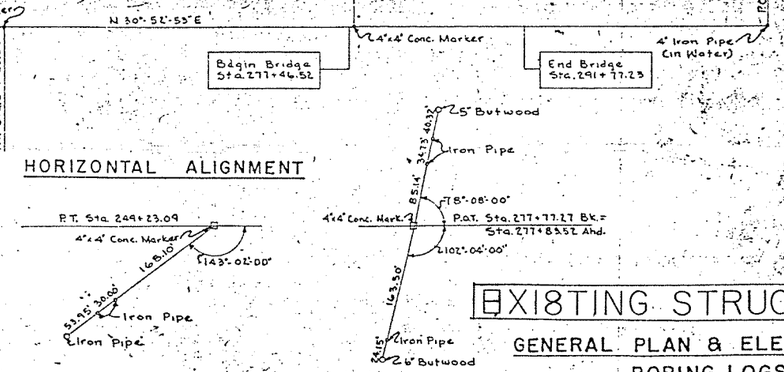
LEGEND

STRATA	DESCRIPTION
S1	Light fine sand, some shell.
S2	Sandy shell.
S3	Dark fine marly sand, some shell.
S4	Dark fine sand, some marl and organic silt.

ELEVATION



VERTICAL ALIGNMENT



EXISTING STRUCTURE

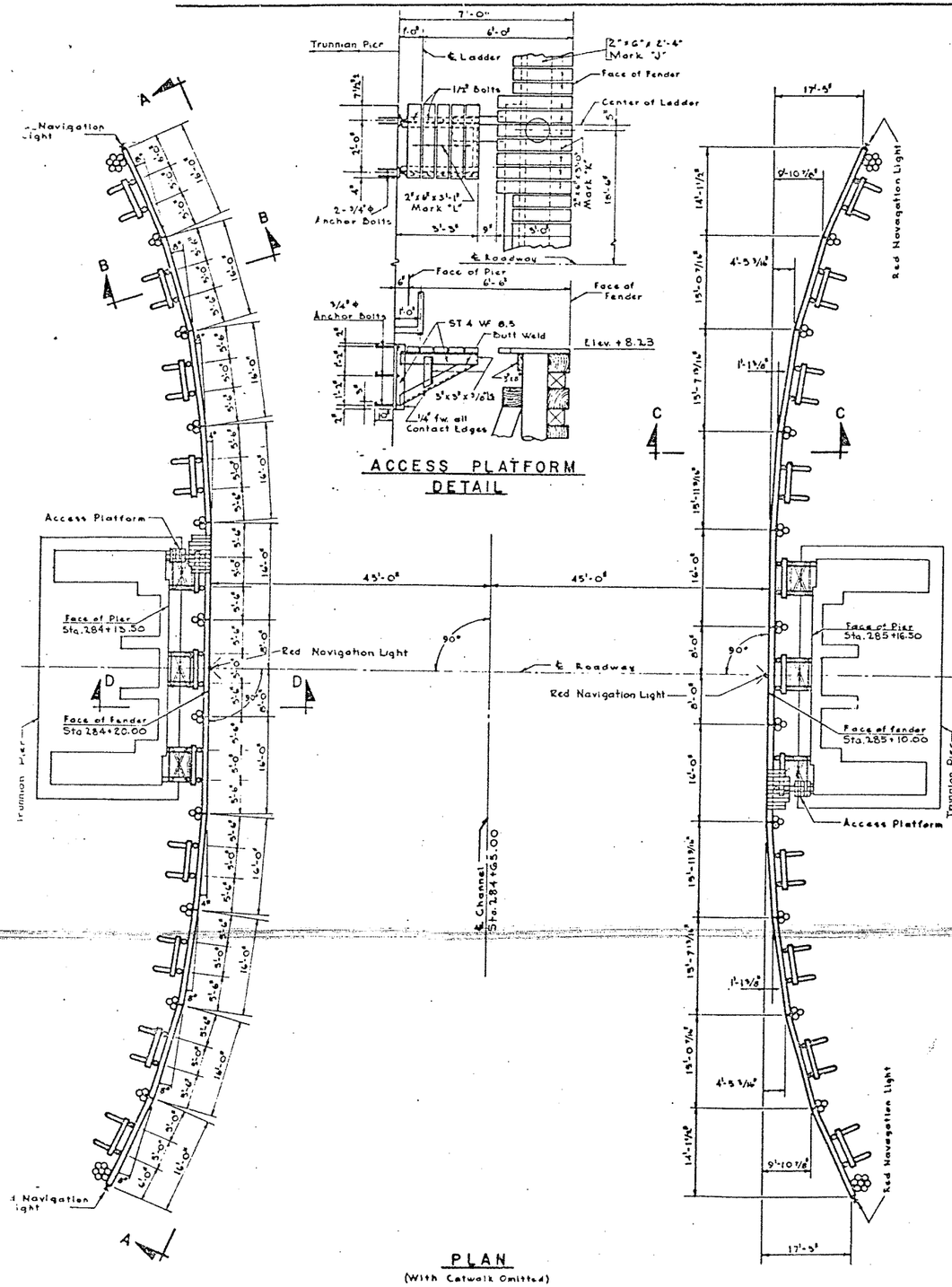
GENERAL PLAN & ELEVATION
BORING LOGS

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

STRUCTURE "E"
MAIN CHANNEL INTRACOASTAL WATER

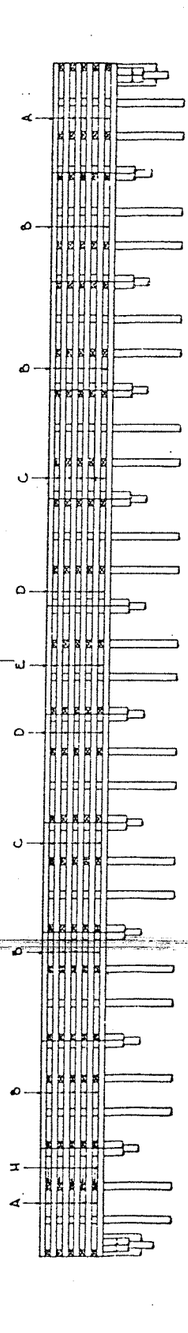
REVISIONS		ROAD NO.	COUNTY		PROJECT NO.
Dates	Descriptions		PINELLAS		1520-175
8-60	Fixed and Exp. Ends of Spans.		Names	Dates	APPROVED BY
		Detailed by	W.B.	10-57	
12-60	Riprap & Bulkhead South End of Bridge.	Checked by	L.H.S.	10-57	
		Quantities by			
		Checked by			Drawing No. / Index
		Traced by	W.B.	10-57	1 of 57 / 4155

FED. ROAD DIV. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.	1520-175		E-5

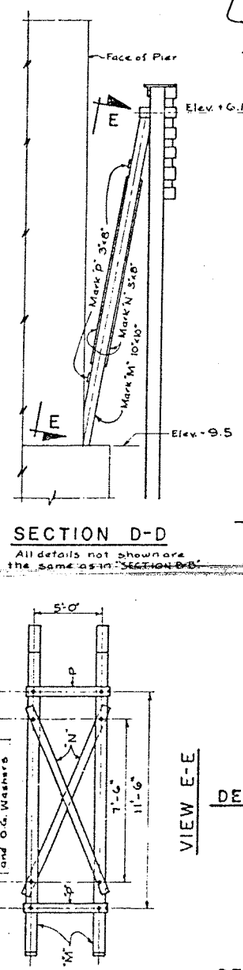


PLAN
(With Catwalk Omitted)

ACCESS PLATFORM DETAIL

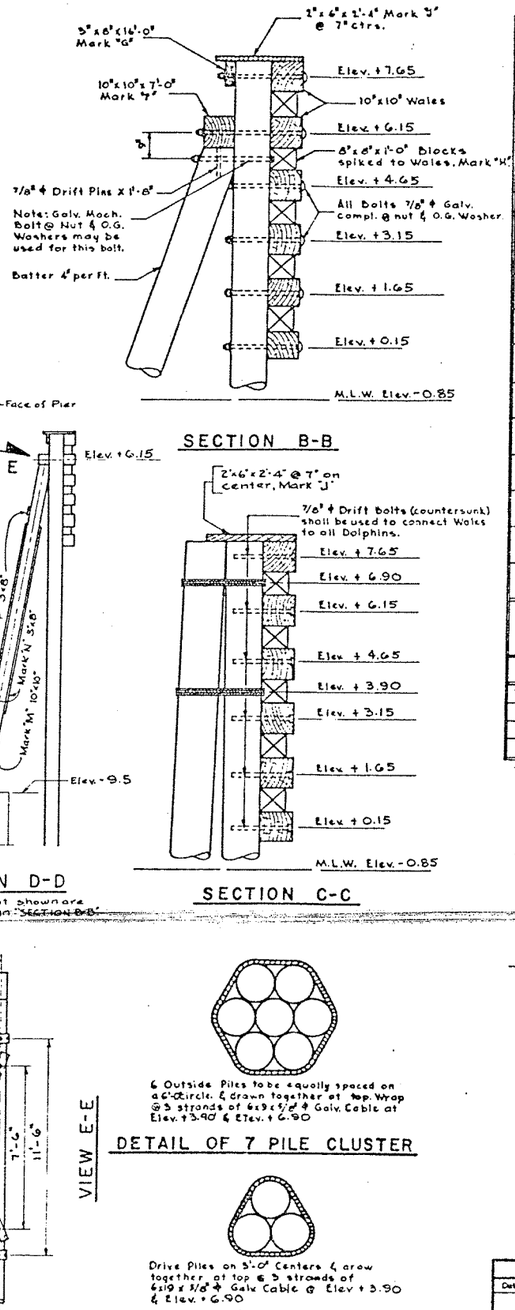


ELEVATION A-A



SECTION D-D

All details not shown are the same as in SECTION B-B



SECTION B-B

SECTION C-C

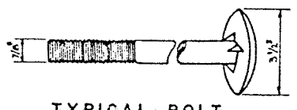
BILL OF TREATED STRUCTURAL TIMBER FOR TWO FENDERS

MARK	SIZE	LENGTH	NO. REQ.	F.B.M.	CUTTING DIAGRAM
A	10" x 10"	16'-0"	24	3200	16' — 4'-0"
B	10" x 10"	16'-0"	48	6400	4'-0" — 12' — 4'-0"
C	10" x 10"	16'-0"	24	3200	4'-0" — 16' — 2'-0"
D	10" x 10"	16'-0"	24	3200	2'-0" — 16'
E	10" x 10"	16'-0"	12	1600	16'
F	10" x 10"	7'-0"	22	1283	7'
G	3" x 8"	16'-0"	22	704	16'
H	8" x 8"	1'-0"	220	1173	1'-0"
J	2" x 6"	2'-4"	590	1377	2'-4"
K	2" x 6"	3'-0"	14	42	3'-0"
L	2" x 8"	3'-1"	10	31	3'-1"
M	10" x 10"	16'-6"	12	1650	16'-6" Cut ends in field to fit
N	5" x 8"	11'-0"	12	264	11'-0"
P	5" x 8"	6'-0"	12	144	6'-0"

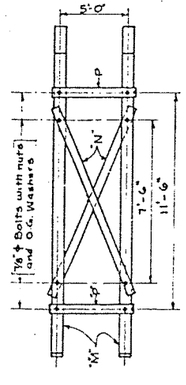
ESTIMATED QUANTITIES FOR TWO FENDERS

ITEM	UNIT	QUANTITY
Treated Structural Timber (12# Treatment)	M.F.B.M.	24.268
Treated Timber Piling †	Lin. Ft.	1,380
Structural Steel (Steel Flanking Spans)	Lb.	420

† 164 Piles 45' Long



TYPICAL BOLT



VIEW E-E

6 Outside Piles to be equally spaced on a 6'-0" circle & drawn together at top. Wrap @ 3 strands of 6x9 x 5/16" ϕ Galv. Cable at Elev. + 3.90 & Elev. + 6.90

DETAIL OF 7 PILE CLUSTER

Drive Piles on 5'-0" Centers & draw together at top @ 3 strands of 6x19 x 5/8" ϕ Galv. Cable @ Elev + 3.90 & Elev. + 6.90

DETAIL OF 3 PILE CLUSTER

NOTES

1. Bolts: All bolts shall be Lewis Scaltite Guardrail (Dome Head) Bolts (or equal) 7/8" ϕ @ one O.G. Washer Galv. (as mfg. by Lewis Bolt & Nut Co., Minneapolis, Minn.) except as noted. Special forged nut equal to diameter of O.G. Washer may be used in lieu of O.G. Washer.
2. Access Platforms: Anchor Bolts & 1/2" ϕ Bolts (Round Head) shall be Galv. & shall be paid for as Structural Steel (Steel Flanking Spans).
3. Treatment: All Timber shall be given 12# Treatment.
4. Pile Head Coverings: See Specifications.
5. Timber: All Timber shall be Rough.
6. Hardware, Cables, etc. shall be included in the Contract Unit Price for Treated Structural Timber (12# Treatment).
7. For General Notes see Sheet E-2

FENDER DETAILS

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

STRUCTURE "E"
MAIN CHANNEL INTRACOASTAL WATERWAY

REVISIONS		ROAD NO.	COUNTY	PROJECT NO.
Date	Description		PINELLAS	1520-175

	Names	Date
Detailed by	S.F.J.	9-57
Checked by	J.E.S.	9-57
Quantities by	L.M.S.	10-57
Checked by	J.E.S.	10-57
Traced by	S.F.J.	9-57

APPROVED BY

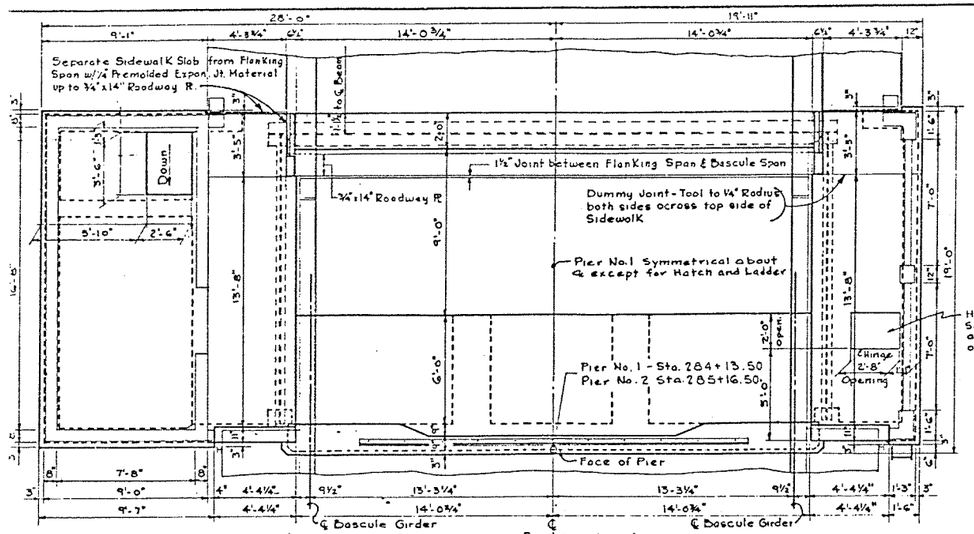
Engineer of Bridges

Drawing No. 5 of 37

Index No. 453

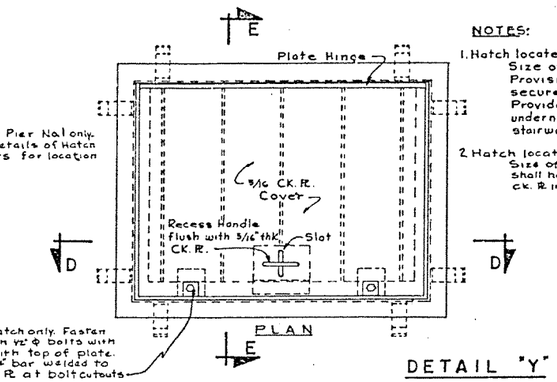
E-14 thru E-28 ✓

FED ROAD DIV. No.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.	1520-175		E-14



HALF PLAN OF PIER NO 1

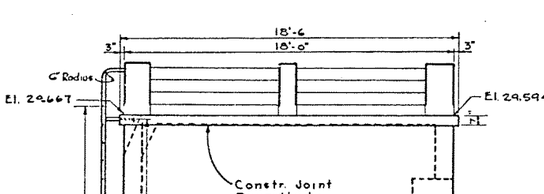
PLAN OF PIER NO 2



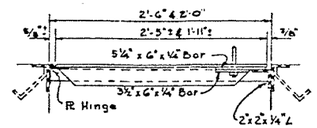
DETAIL "Y"

NOTES:

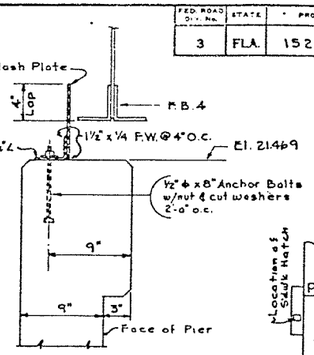
1. Hatch located in Control House. Size of Slab opening 3'-6" x 2'-6". Provision shall be made to hold cover securely while in open position. Provide 1½" ϕ Std. pipe and weld to underneath side and align with stairway rail below.
2. Hatch located in Sidewalk of Pier No. 1. Size of Slab opening 2'-8"x2'-0" and shall have 4 - 5½"x2" bars welded to CK. R. instead of 5 as shown.



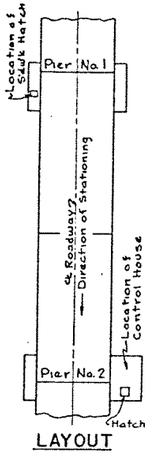
SECTION D-D



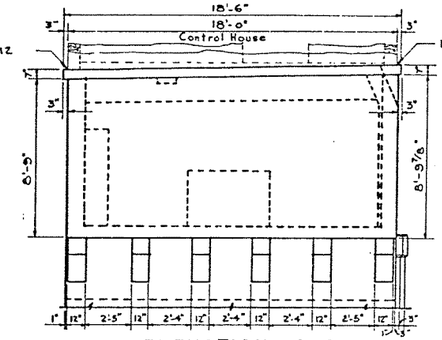
SECTION E-E



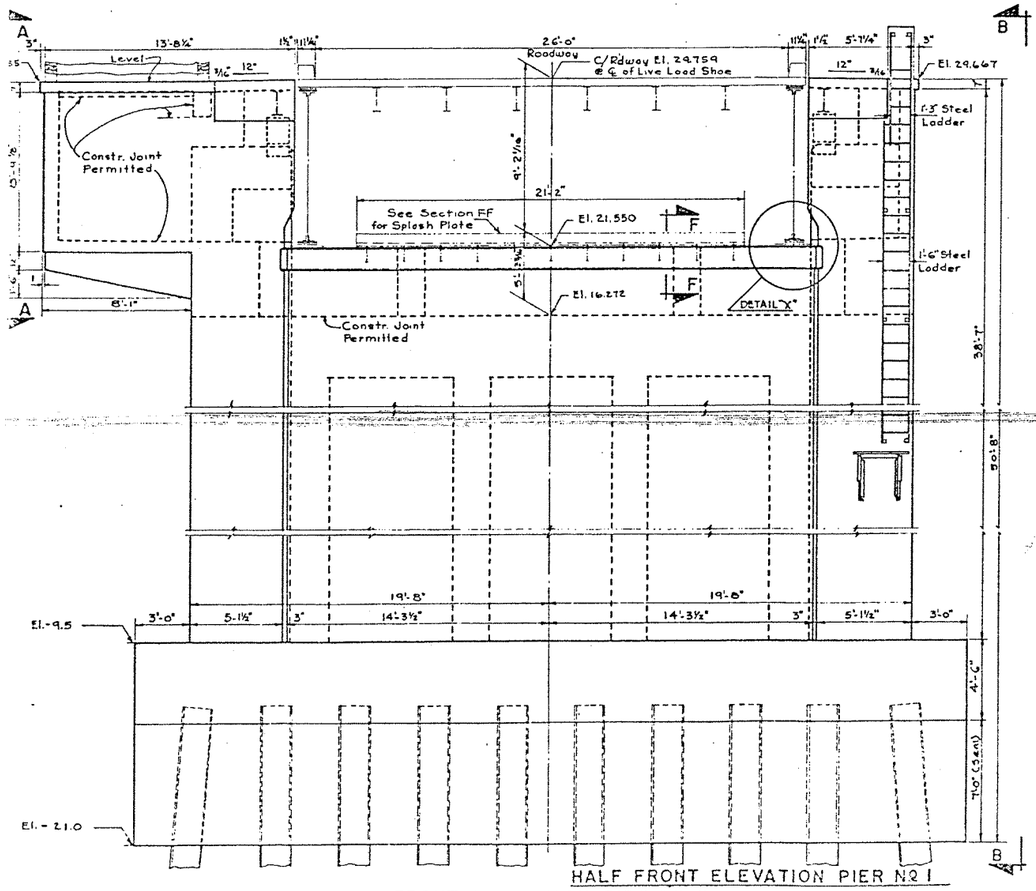
SECTION F-F



LAYOUT OF PIERS

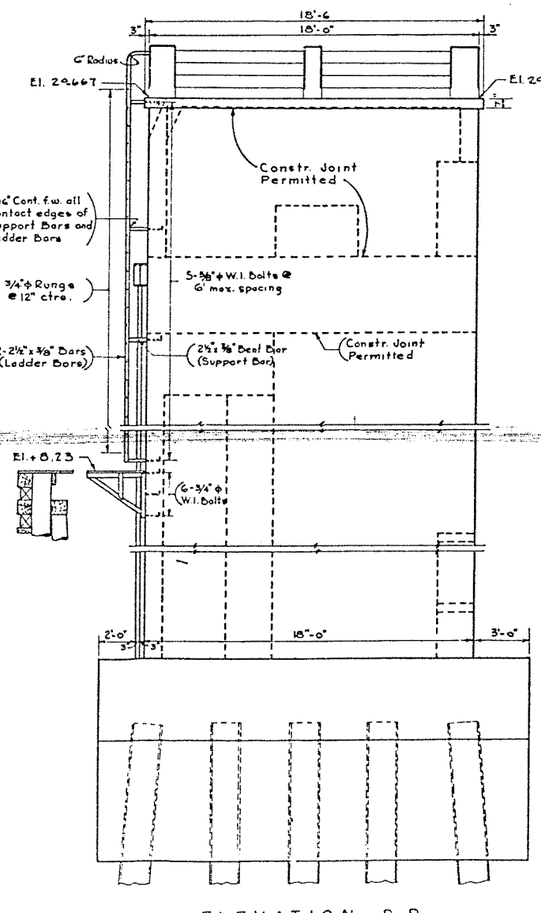


ELEVATION A-A

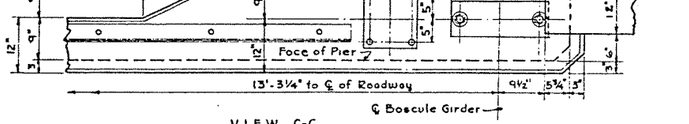


FRONT ELEVATION PIER NO 2

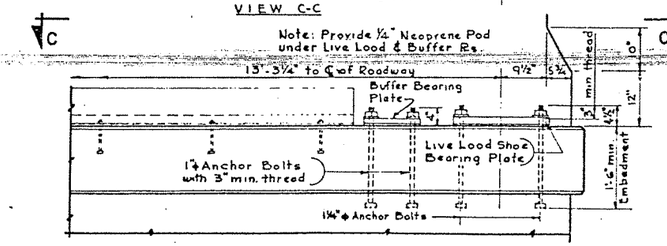
HALF FRONT ELEVATION PIER NO 1



ELEVATION B-B



VIEW C-C



DETAIL "X"

TRUNNION PIERS - GENERAL LAYOUT

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

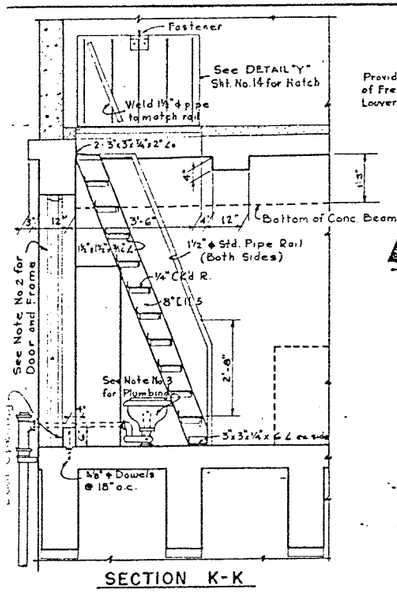
STRUCTURE "E"
MAIN CHANNEL INTRACOASTAL WATERWAY

REVISIONS		ROAD NO.	COUNTY	PROJECT NO.
Dates	Descriptions		PINELLAS	1520-175

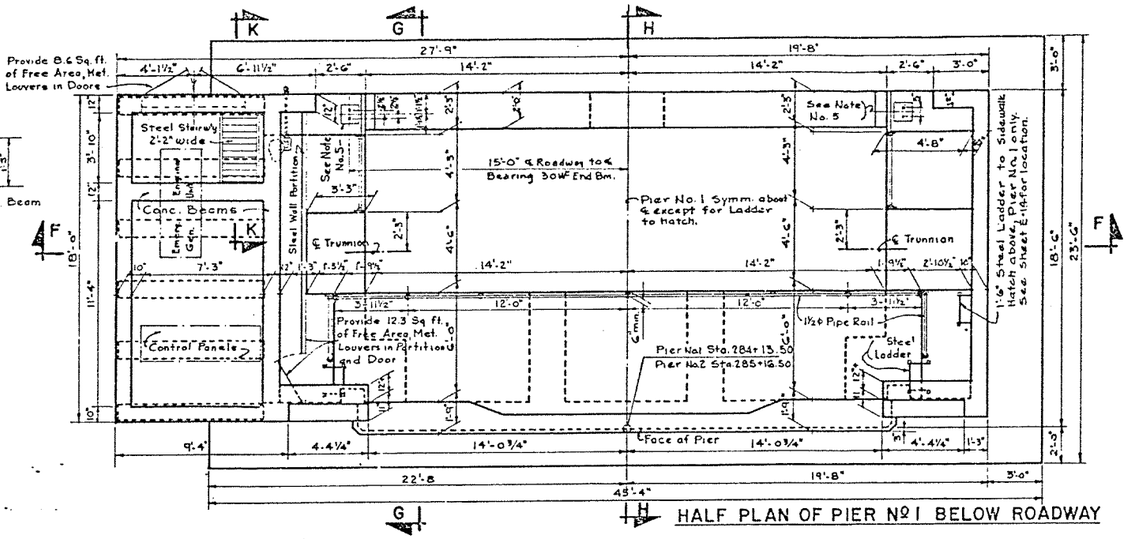
	Names	Dates	APPROVED BY
Detailed by	S.F.J.	6-57	
Checked by	L.H.S.	6-57	
Quantities by	L.H.S.	10-57	
Checked by	N.B.	10-57	
Traced by	S.F.J.	6-57	

Drawing No. 14 of 37 | Index No. 4153

FED. ROAD DIV. No.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.	1520-175		E-15

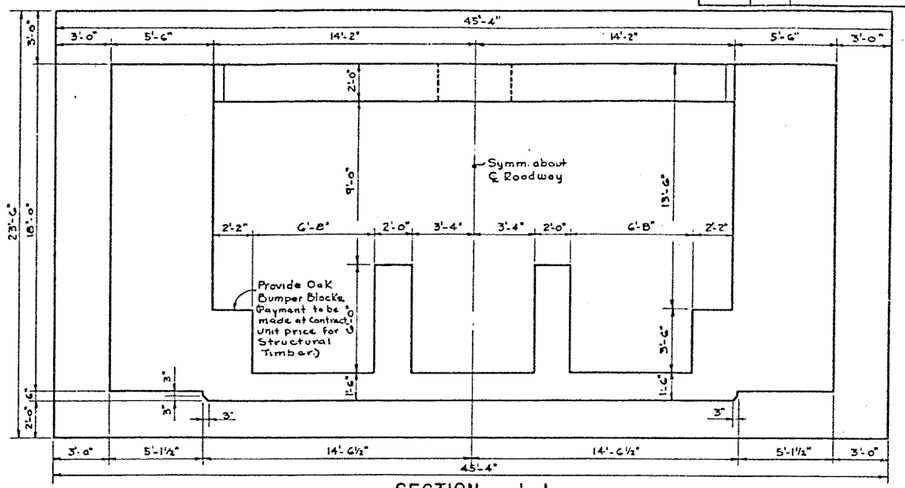


SECTION K-K

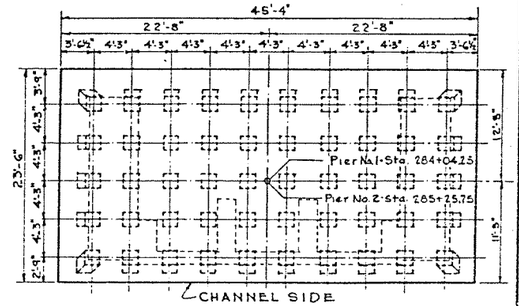


PLAN OF PIER Nº 2 BELOW ROADWAY

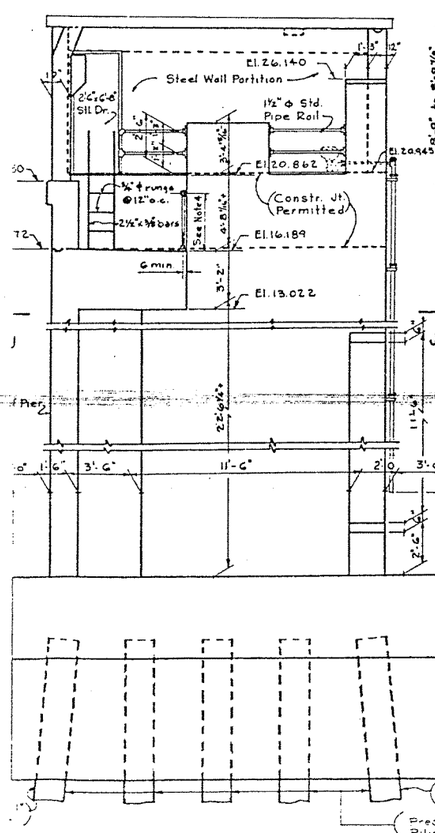
HALF PLAN OF PIER Nº 1 BELOW ROADWAY



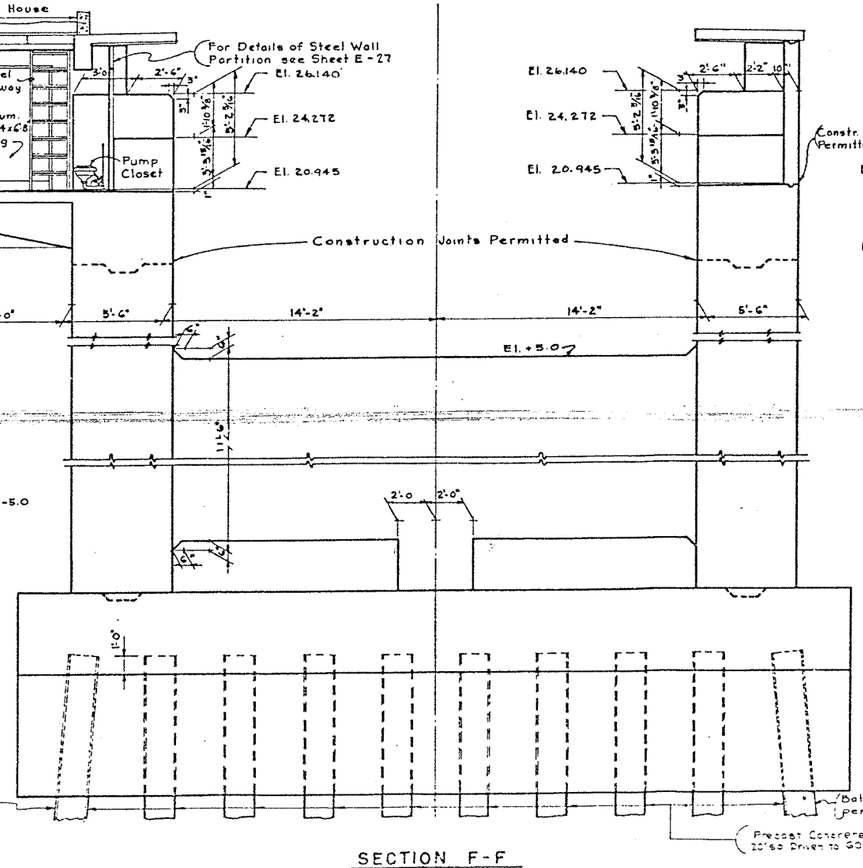
SECTION J-J
(REVOLVED 90°)



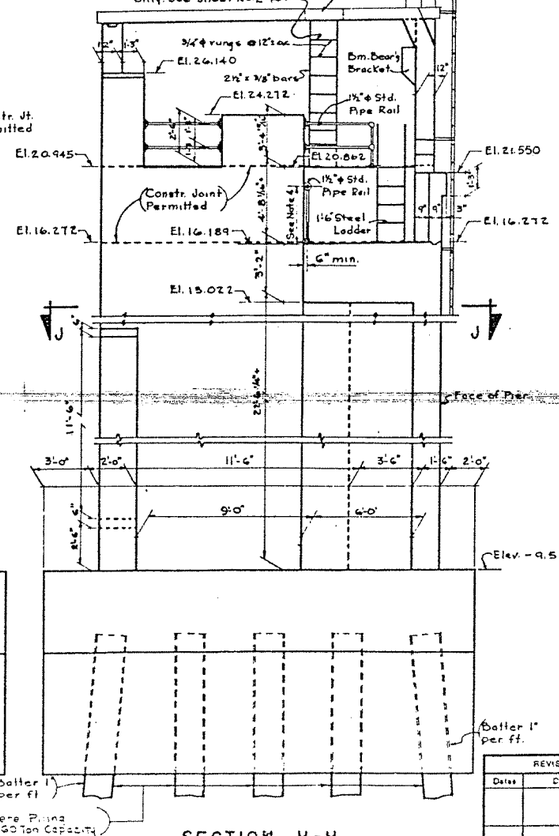
PILE PLAN



SECTION G-G



SECTION F-F



SECTION H-H

1. For General Notes see Sheet E-2.
2. Double Aluminum Door, 5'-4"x6'-8" (Ludman Corporation of Miami or equal) equipped with inside lock and safety chain. Provide metal louvers as called for on PLAN. Door and Frame shall be of 63-ST5 Aluminum alloy, and hardware shall be according to Manufacturers specifications for use over salt water. Doors shall be hinged to swing out. Provide door with interlocking metal weatherstrip. Cost of Door, safety chain, weatherstrip and metal louvers shall be included in the Contract Lump Sum Price for Control House.
3. Install Water Closet: Cost of installation shall be included in the Contract Lump Sum Price for Control House. The Water Closet shall be a Crane Co., 3M-484 Navigator, salt water fitted, or equal.
4. Center 24'-0" of pipe rail on Machinery Platform to be 3'-0" high, remaining 3'-11½" on each side to be 2'-0" high to clear Rack.
5. 30 WF 210 End Girder Bearing Plates to be provided with 2-1" ϕ Anchor Bolts with 3" min. Thread, 1'-6" min. embedment and with 9" min. Extension above top of concrete.
6. The Elevations shown on Pier Drawings for Machinery Supports and Trunnion Bearing may be changed after Machinery and Main Girder are detailed.

TRUNNION PIERS - GENERAL LAYOUT

STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

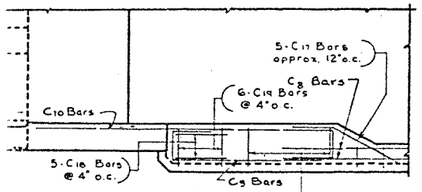
STRUCTURE "E"
MAIN CHANNEL INTRACOASTAL WATERWAY

REVISIONS		ROAD NO.	COUNTY	PROJECT NO.
Dates	Descriptions		PINELLAS	1520-175

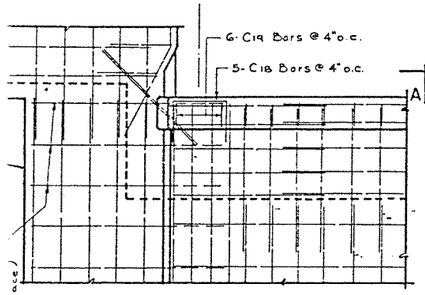
	Name	Date	APPROVED BY
Detailed by	S.F.J.	6-57	
Checked by	L.H.S.	6-57	
Quantities by	L.H.S.	6-57	
Checked by	N.R.	10-57	
Traced by	S.F.J.	6-57	

Drawing No. 15 20 57 — Sheet No. 4159

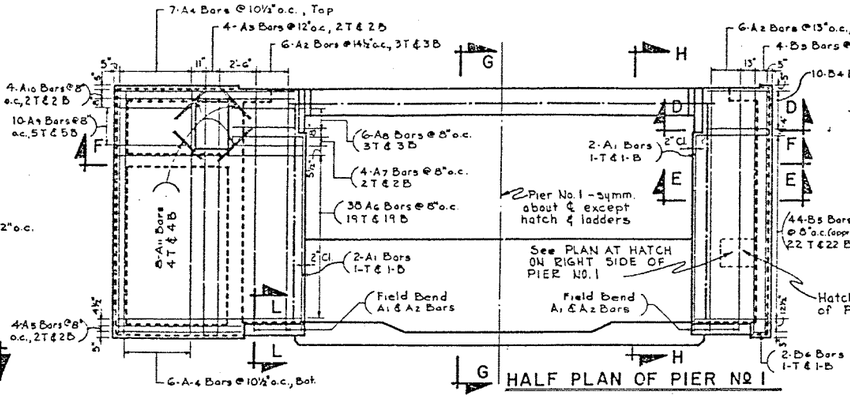
FED. ROAD DIV. No.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.	1520-175		E-16



PLAN A-A



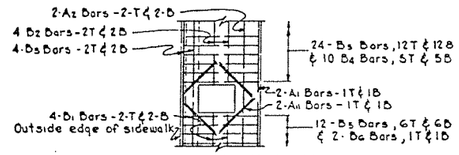
ELEVATION AT LIVE LOAD SHOE



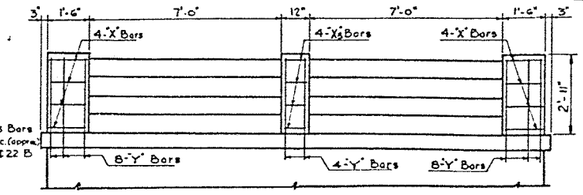
HALF PLAN OF PIER Nº 1

PLAN OF PIER Nº 2 SHOWING TOP SLABS

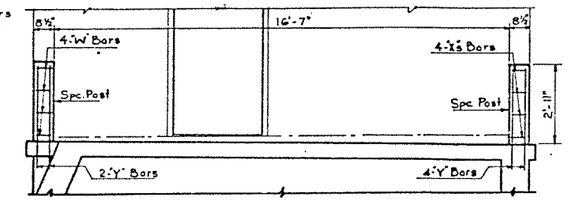
NOTE: For SECTIONS F-F, G-G, H-H & L-L; See Sht No. E-17



PLAN AT HATCH ON RIGHT SIDE OF PIER Nº 1



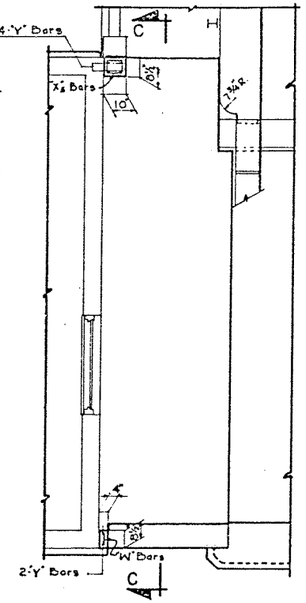
ELEVATION B-B



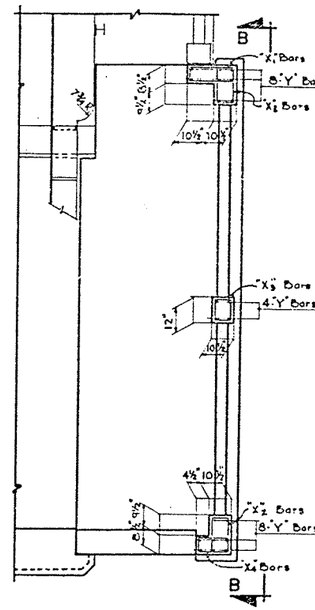
ELEVATION C-C

Handrail Notes:

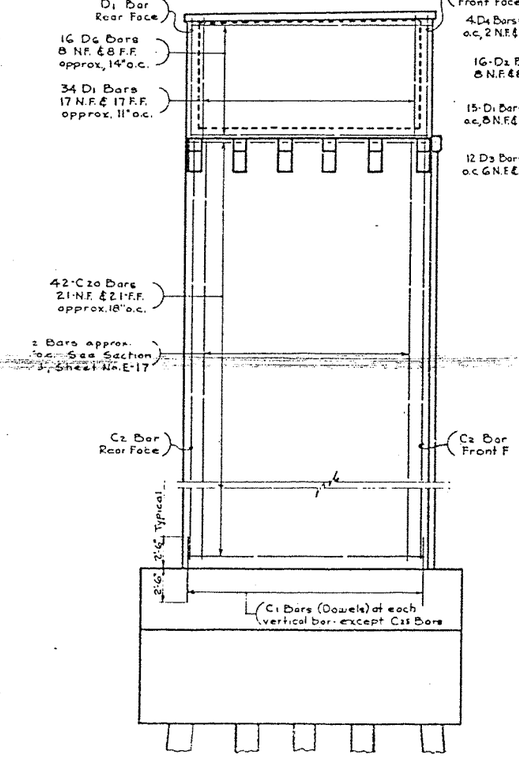
1. All handrail and handrail posts on Trunnion Pier, including special posts of Control House, will be included in contract unit for Concrete Handrail, Bid Item No. 74.
2. For details of handrail not shown, see Sheet E-37



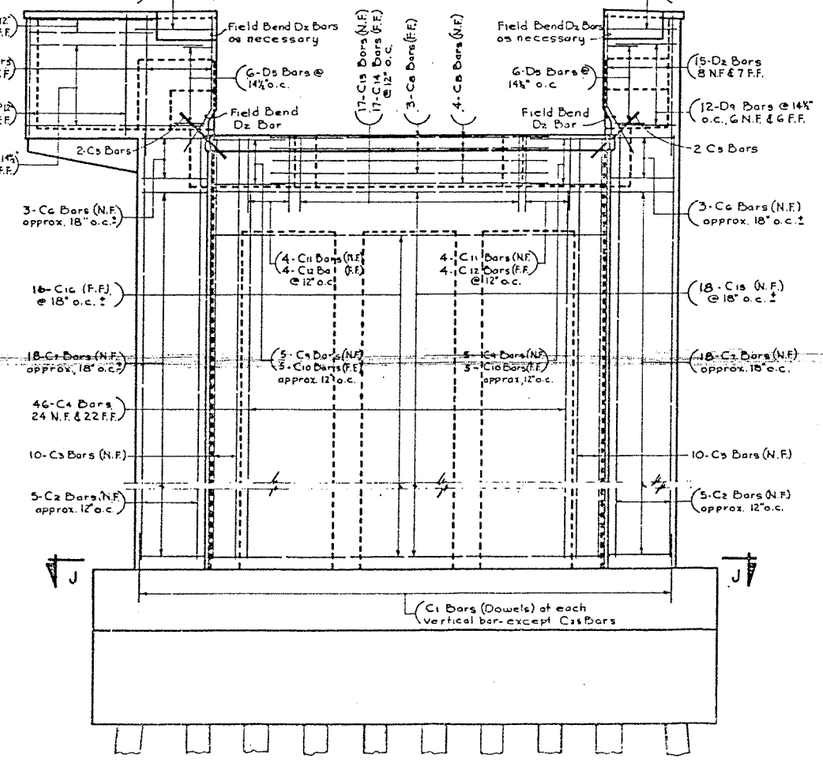
PLAN SPECIAL POSTS



PLAN HANDRAIL POST



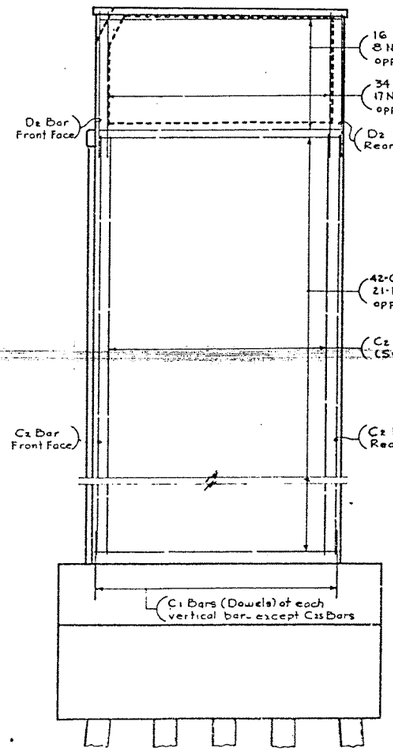
LEFT SIDE ELEVATION



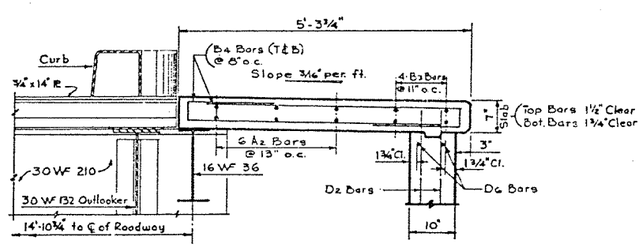
HALF FRONT ELEV. PIER Nº 1

FRONT ELEVATION PIER Nº 2

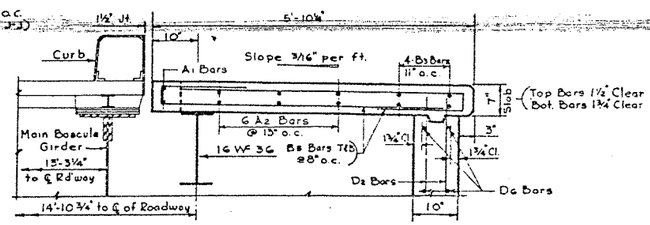
NOTE: For SECTION J-J, see Sht No. 17



RIGHT SIDE ELEVATION



SECTION D-D



SECTION E-E

TRUNNION PIERS - REINFORCING DETAILS

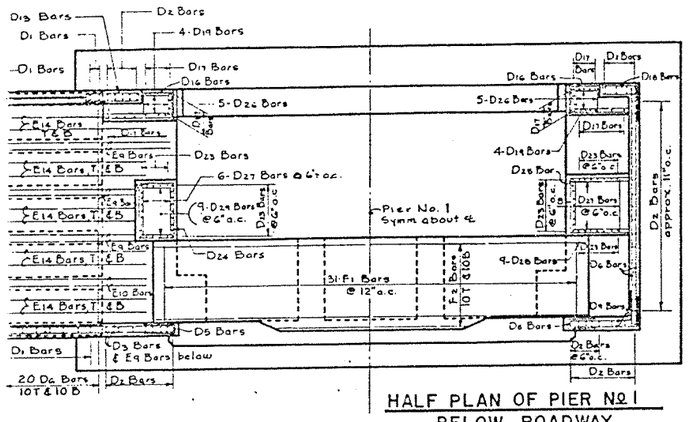
STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

STRUCTURE "E"
MAIN CHANNEL INTRACOASTAL WATERWAY

REVISIONS		ROAD NO.	COUNTY	PROJECT NO.
Dates	Descriptions		PINELLAS	1520-175

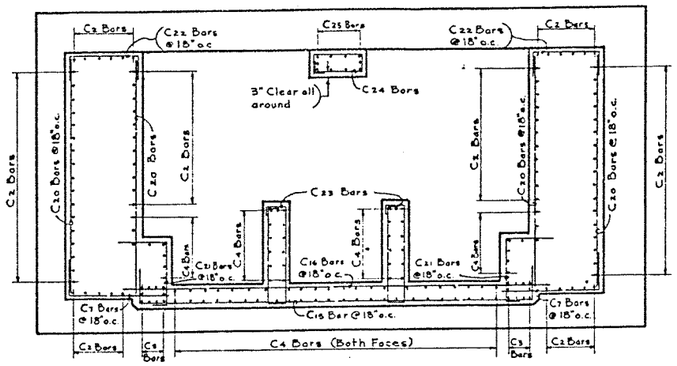
	Names	Dates	APPROVED BY
Detailed by	S.F.J.	6-57	
Checked by	L.H.S.	6-57	
Quantities by	L.H.S.	10-57	
Approved by	N.B.	10-57	
Traced by	S.F.J.	6-57	Drawing No. 16 of 37 — Index No. 1655

FED. ROAD DIV. No.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.	1520-175		E-17



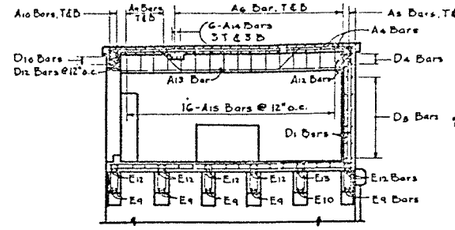
HALF PLAN OF PIER № 1
BELOW ROADWAY

PLAN OF PIER № 2 BELOW ROADWAY

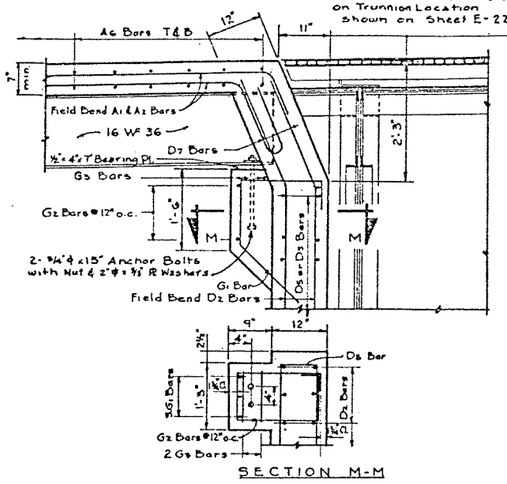


SECTION J-J

NOTE: For location of SECTION J-J, see Sht. No. E-16



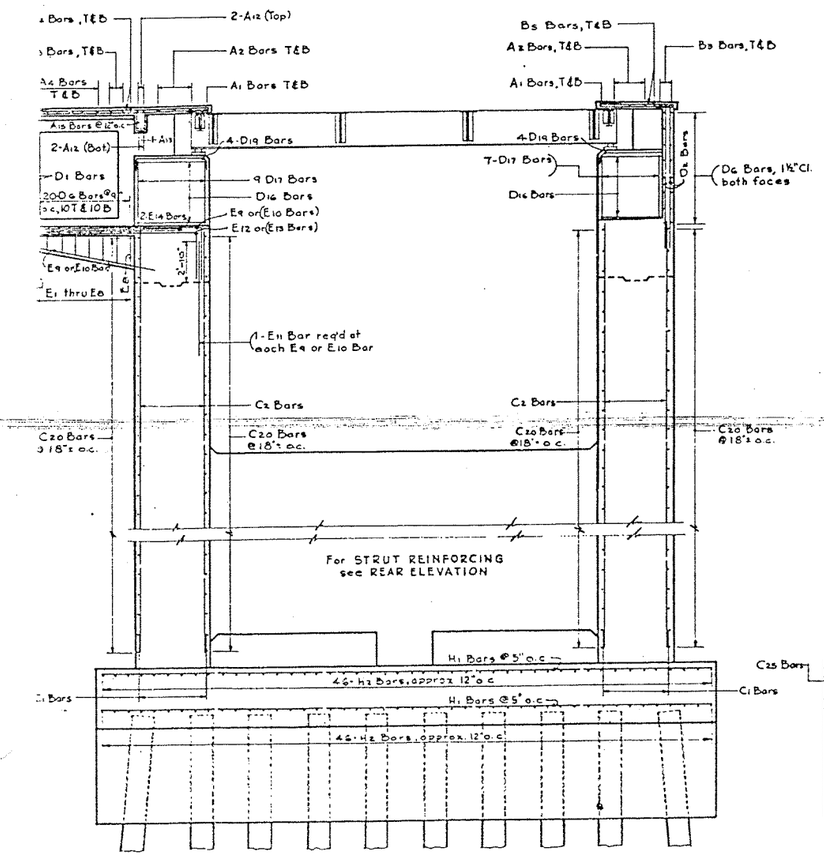
SECTION K-K



SECTION M-M

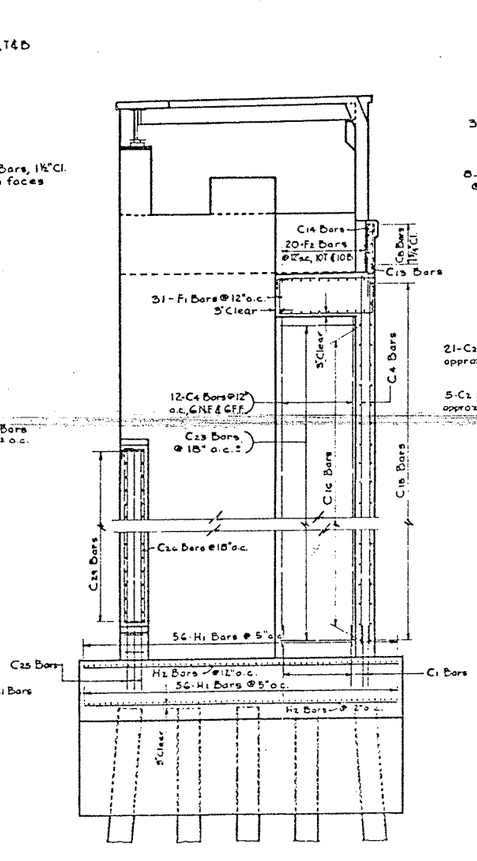
SECTION L-L

NOTE: For location of SECTION L-L, see Sht No. E-16



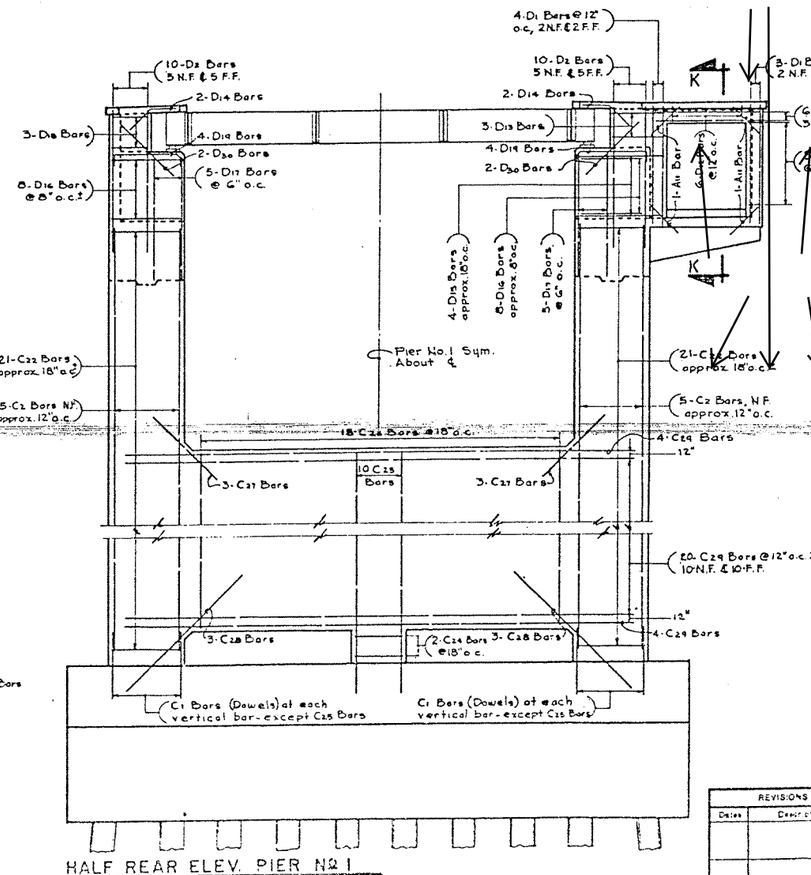
SECTION F-F

NOTE: For location of SECTION F-F, see Sht No. E-16



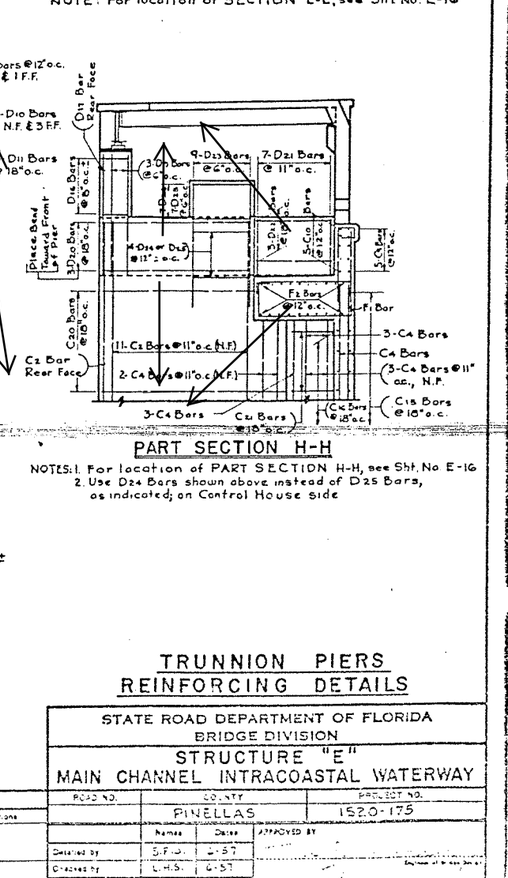
SECTION G-G

NOTE: For location of SECTION G-G, see Sht No. E-16



HALF REAR ELEV. PIER № 1

REAR ELEVATION PIER № 2



PART SECTION H-H

NOTES: 1. For location of PART SECTION H-H, see Sht. No E-16
2. Use D24 Bars shown above instead of D25 Bars, as indicated on Control House side

TRUNNION PIERS
REINFORCING DETAILS

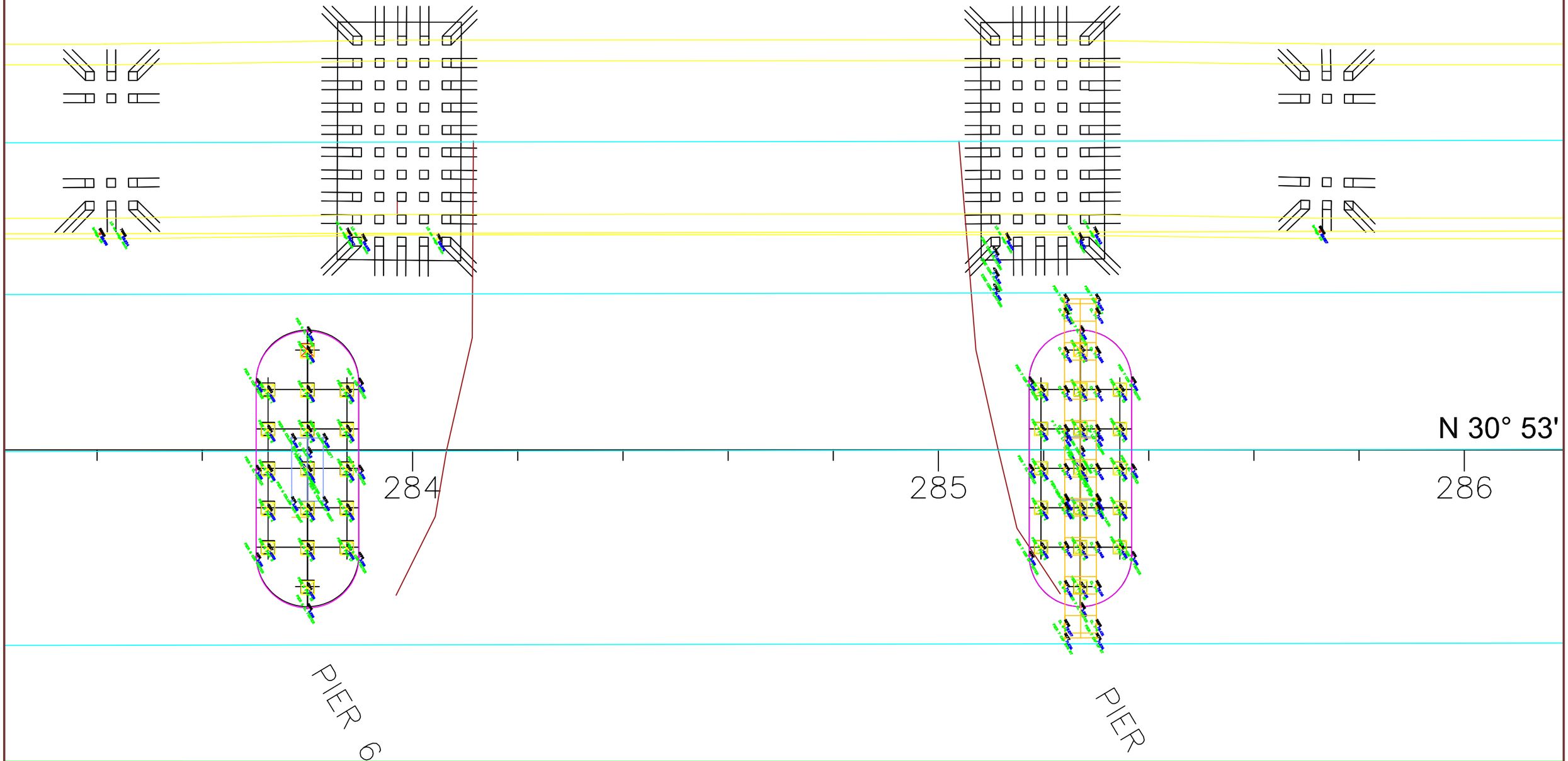
STATE ROAD DEPARTMENT OF FLORIDA
BRIDGE DIVISION

STRUCTURE "E"
MAIN CHANNEL INTRACOASTAL WATERWAY

REVISIONS		ROAD NO.	COUNTY	FED. PROJECT NO.
Dates	Descriptions		PINELLAS	1520-175

	Names	Dates	APPROVED BY
Detailed by	S.F.D.	6-57	
Checked by	L.H.S.	6-57	
Quantities by	L.H.S.	6-57	
Checked by	N.S.	10-57	
Traced by	S.F.D.	6-57	

SHEET NO. 17 OF 37 SHEETS



STATE OF FLORIDA D.O.T.
FINANCIAL PROJECT ID 410755-2-52-01
PINELLAS COUNTY (15200)
STATE ROAD NO. 679 (PINELLAS BAYWAY)
STRUCTURE E INTERCOASTAL WATERWAY

STATE	COUNTY
FL	PINELLAS

		Drawn	Date	Check	Date	Description
6						
5						
4						
3						
2						
1						

Revisions

Office: PITTSBURGH
Design By: OC
Drawn: OC
Checked:
Date: 12/2/2020
Date: XX/XX/XX

Pier 6 and 7 Layout
DETAIL DRAWING

In Charge Of: JON YATES

American Bridge

Region: SOUTHEAST

AB Job Number	Rev
482710	0

Sheet Number: WP00X

PIER REMOVAL

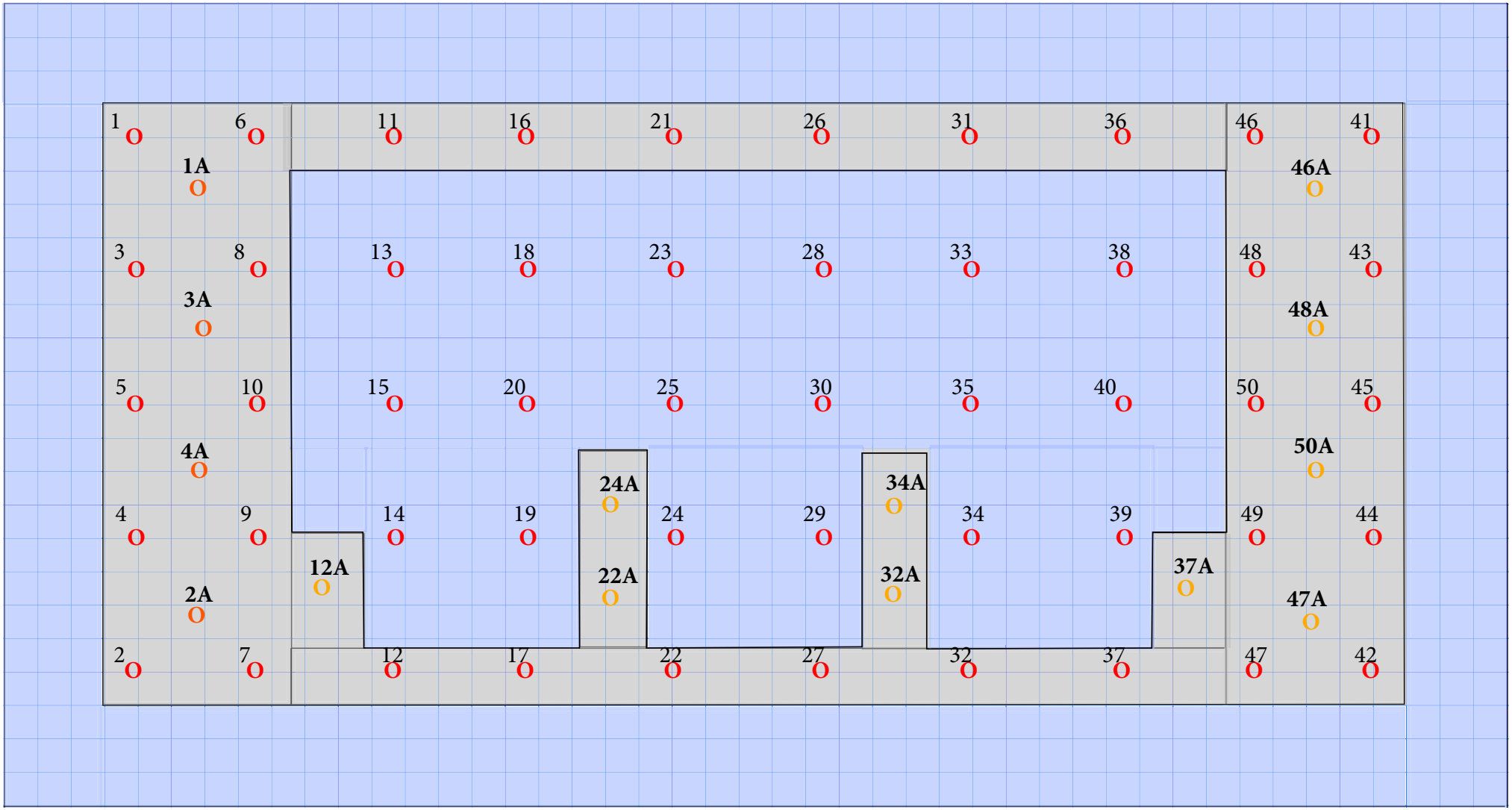
The existing trunnion piers will be drilled vertically with a rock drill rig placed work platforms on the structures to drill vertical holes where required. Holes will be drilled on the designed pattern and will be 2.75 to 3.5 inches in diameter. The drilling of the foundation will require the use of casing pipes and a template to ensure the location of the hole is correct and to ensure no debris falls in the hole after it is drilled. Once drilled the holes will have hole plugs inserted in the top of each to prevent foreign material from going down the hole.

Once the drilling of both piers is complete a blast date and time will be scheduled. Explosives will be brought to the site by our explosives distributor at an adequate time ahead of the scheduled blast time to allow for the loading of explosives in the piers. All holes to be loaded will be checked for depth and obstructions the day prior to the explosives delivery. Transfer/transport of the explosives to the piers will be coordinated with the Fire Dept., Police Dept, and USCG and conducted in accordance with regulations. Loading of the piers will be conducted by Florida licensed blasters and once completed all unused explosives will be returned to the distributors truck and taken back to their magazine site. There will be no onsite storage of explosives. Once loading is complete the hole to hole connections will be made in the proper sequence as per the approved plan. The pier will then be covered with wire rope blast mats. On the scheduled blast day the the connection from pier to pier will be made in preparation for detonation of the blast.

The blast will be detonated at slack high tide under the direction of the Blaster and once all safety measures have been adhered, the blast zone is cleared of people and vehicles and is secure, the marine safety zone is clear of marine traffic and the marine Mammal watch zone has been deemed clear by the Observers. A post detonation inspection will be conducted by the Blaster and the All Clear will be issued at his direction.

To minimize impacts to the new bridge, surrounding structures on the water/shorelines and the marine environment the blasts have been designed with low pounds of explosive per delay but maintaining sufficient powder factors to adequately fragment the piers while confining the debris to a small footprint. The explosive to be used will be 60% NG product, such as Unimax 60%. This product has proven to be very effective at fragmenting concrete at low powder factors and separating the concrete from reinforcing steel and has very good water resistance. Each column of explosives will be primed with two non-electric detonators for redundancy. Proper stemming material, 3/8 inch angular crushed clear stone, will be used for all decking and stemming of the collar of each loaded hole to ensure the explosives energy is contained in the structure to achieve maximum work of the energy in breaking the concrete. Proper collar stemming lengths will be used to prevent blow outs at the top of hole and reduce air overpressure levels.

Hole layout and firing sequence



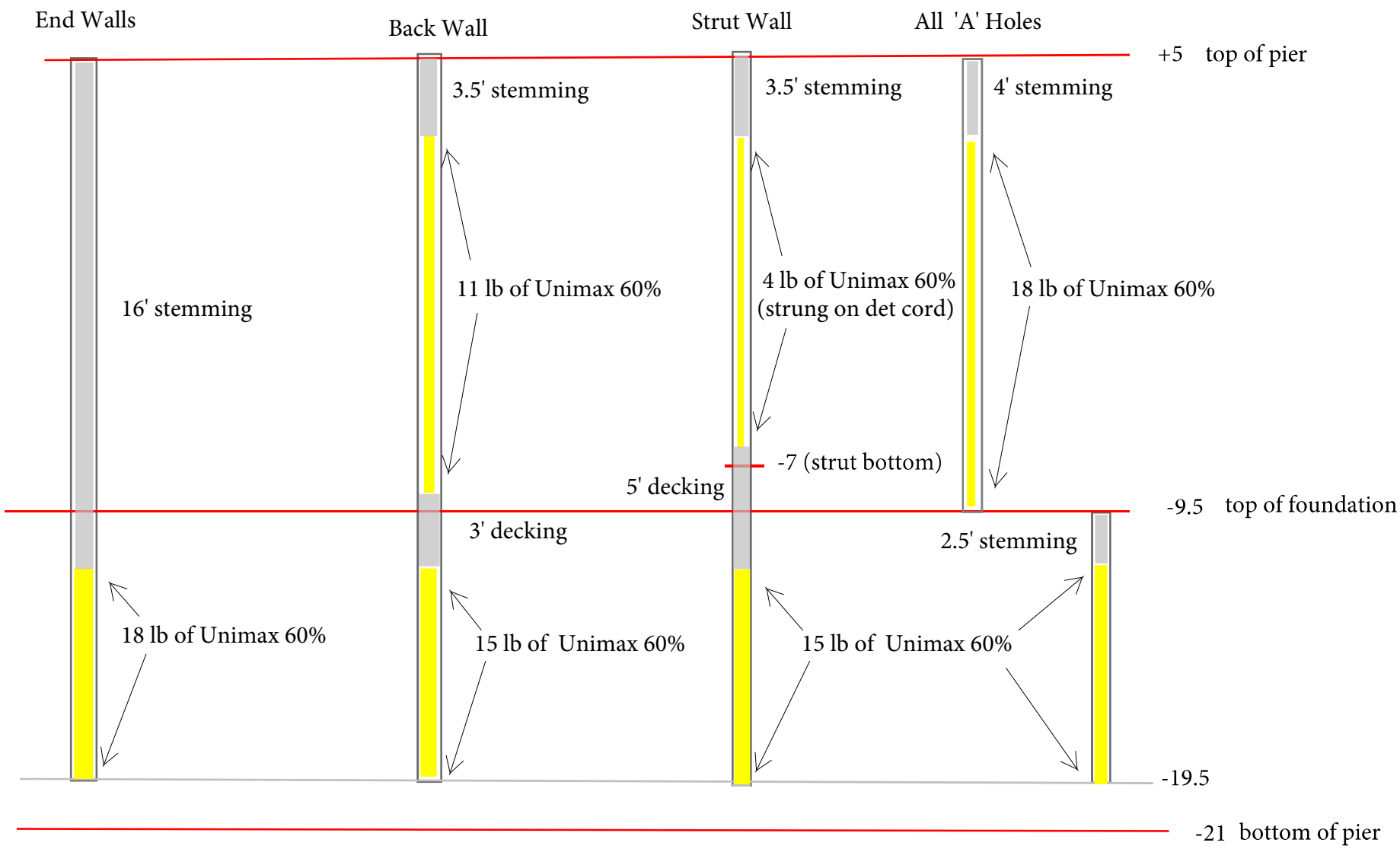
foundation below water

walls extending from foundation to above water

Hole diameter = 2.75" - 3.5"
Hole depths = 10' - 26'
Spacing = 3.5' and 4'
Burden = 3.5' and 4'
Number of holes = 64
Delays = 9ms minimum
Maximum lb/delay = 18

new bridge

Explosive Column Loads



Each deck of explosive will be double primed with nonel detonators with 9ms minimum delay between each detonation.

Bayway structure E timing

Hole #	ms	Hole #	ms	Hole #	ms	Hole #	ms	Hole #	ms	Hole #	ms	Hole #	ms	Hole #	ms	Hole #	ms	Hole #	ms
1	0	6	81	10	126	16	180	21	234	26	288	31	342	36	405	46	513	41	468
1A	45															46A	558		
3	18	8	99	13	153	18	207	23	252	28	306	33	369	38	423	48	531	43	486
3A	63															48A	576		
5	36	10	117	15	171	20	225	25	279	30	333	35	396	40	441	50	549	45	504
4	27	9	108	14	162	19	216	24	261	29	315	34	378	39	432	49	540	44	495
4A	72							24A	270			34A	387			49A	585		
2	9	7	90	12	135	17	189	22	234	27	297	32	351	37	414	47	522	42	477
2A	54			12A	144			22A	243			32A	360	37A		47A	567		

*There will be a 250ms delay between the two piers, i.e. the second pier will initiate at 835ms.

Safety & Transportation of Explosives

PROTECTION OF THE PUBLIC

General

The blast designs have taken into consideration the proximity of buildings in the area, the new bridge, waterways, and adjacent work areas. All explosives will be handled, transported, used and stored in accordance with all State and Federal Regulations. All on site workers will be notified of the activities and instructed to stay clear of the blast area. Signs will be posted to indentify the blast area to other workers on the site. Only those authorized by the Blaster will be permitted in this area. All unused product will be returned to the Explosives Distributor's delivery truck prior to detonating the blast. The structures will be covered with blasting mats to reduce air blast and prevent any flying debris. Prior to detonation the Blaster will ensure that a 250' minimum radius Blast Zone is clear of all people and vehicles and secured by guards, and the Marine Safety Zone of 1500' has been secured as well. This will be accomplished by designated persons stationed at designated locations on the site and safety boats at designated locations on the adjacent waterway. The waterway way will be secured 10 minutes prior to the scheduled shot time and will remain secured until the blaster gives the "All Clear". All persons involved with securing the blast zone will be equipped with radios. When it is confirmed the zone is clear and the Blaster is comfortable with the conditions he will sound the 5 minute warning, check with stationed personnel to ensure the area is still clear, fire the shot, check the post shot conditions and give the All Clear signal.

State Police, Local Police, Local Fire Departments and the Coast Guard will be made aware of the blasting schedules and any changes in the schedule in advance. Should a circumstance arise that prevents the firing of any loaded explosives at the scheduled time a security person will "guard" the shot until the blast is fired at a new shot time. No structures loaded with explosives will be left unattended. Local Police, Fire Departments and Coast Guard will be notified of the situation.

Warnings and Signals

The Blaster will warn all employees on the job site of an impending blast through communication with the General Contractor's Superintendent and the use of warning signals. The warning signals will be posted and all employees onsite will be advised of the schedule of warning signals. The warning signals to be used are as follows:

5 minute warning – three 3 second blasts of the air horn.
1 minute warning – two 3 second blasts of the air horn.
All Clear – one 10 second blast of the air horn.

After the blast is over, there will be an All Clear signal sounded so all in the area understand that all blasting operations are finished. The signal is a prolonged horn or siren following the inspection of the blast area to indicate that all blasting has ceased.

Pre-Blast Notifications

All required agencies will be notified 48 hours before any blast to coordinate with the Blaster in Charge to determine the proper time for the blasting. A two hour notification will be given to the General Contractor's Superintendant. A blast will not be fired until communication with the Guards at the perimeter of the secured Danger Area and visual inspection of the Danger area confirm it is clear and the observers confirm the Exclusion zone is clear.

Guarding Before a Blast

The Blaster in Charge will identify the perimeter of the Danger Area prior to commencing loading any explosives in the planned blast. The contractor will place guards around the Blast Area, when instructed to do so by the Blaster in Charge, to ensure no unauthorized people enter while a blast is being detonated. Sufficient guards must be in place to see all approaches to the area. The guards must be in radio communication with the blaster and able to stop the blast if necessary.

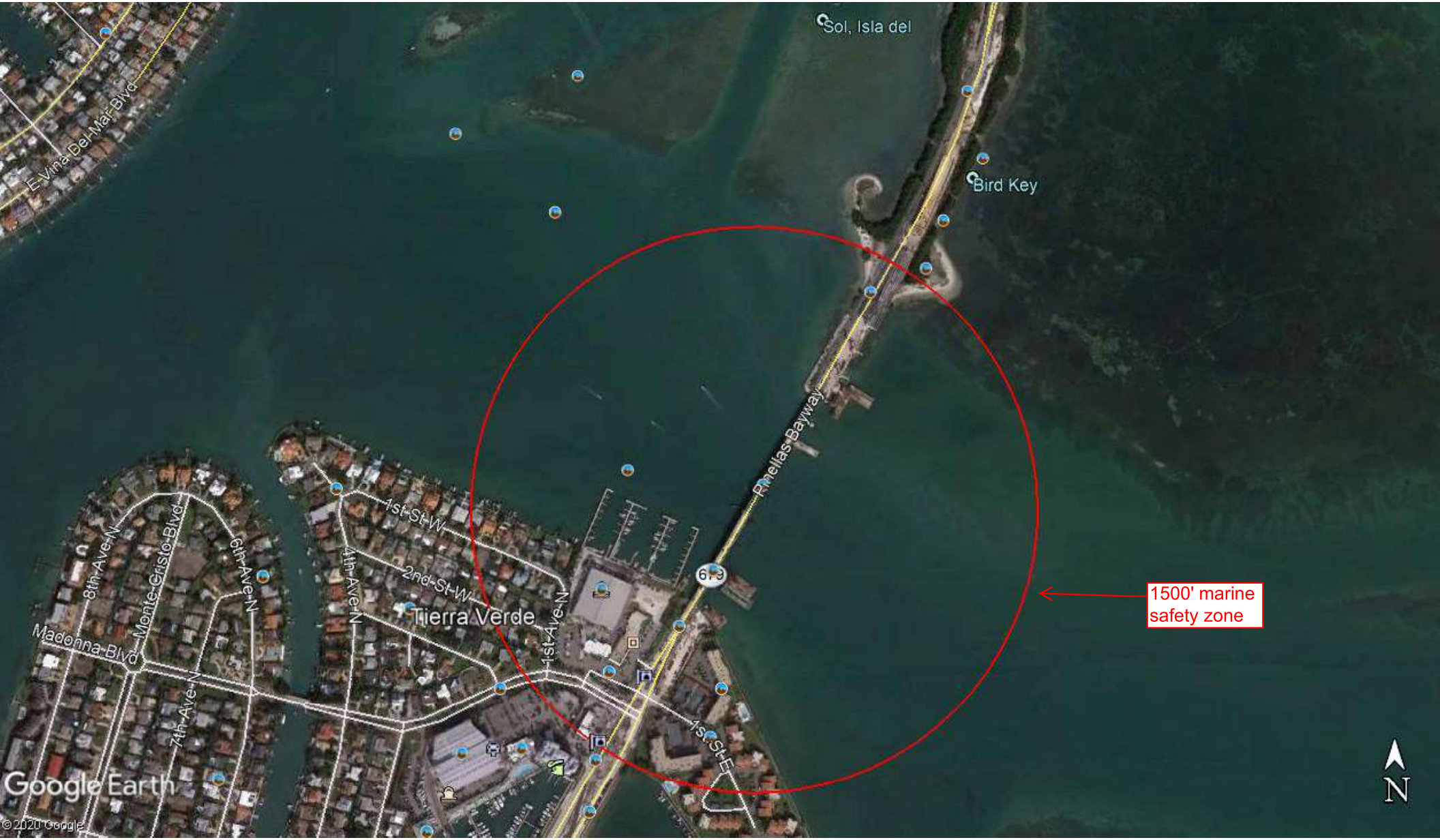
Control of Blast Debris

The structure to be blasted will be covered with approved blasting mats or other acceptable cover material. When deemed neccesasry by the Blaster in Charge the adjacent new bridge piers will be covered as well.

Blast Zone


Pinellas Bayway
679
Pinellas Bayway S
1st St W
2nd St W
250' blast zone
Google Earth
© 2020 Google
N

Marine Safety Zone



PROTECTION OF EXISTING STRUCTURES

General

The blast designs have taken into consideration the proximity of the new bridge piers, commercial/residential structures and utilities. Pounds of explosives per delay have been designed to produce minimal negative impacts on these structures.

Each blast will be covered with wire-rope blast mats prior to detonation to prevent any flying debris. Sand bags will be placed on top of the structure to be matted to protect the shock tubes of the detonators from damage by the mats.

Seismographs will be setup at the closest structures to record the resulting ground vibrations and air overpressures. Each blast event will be monitored and recorded.

Pre-Condition Surveys

When required the Contractor shall arrange for a pre-blast survey of any nearby buildings, structures, or utilities which may potentially be at risk from blasting damage. The pre-blast surveys must contain drawings of each wall of the structure and photographs of existing damage. The survey method used shall be acceptable to the Contractor's insurance company. The pre-blast survey records shall be made available to the Engineer for review. Occupants of local buildings shall be notified prior to the commencement of blasting.

Vibration Control and Monitoring

When blasting near buildings, structures, or utilities which may be subject to damage from blast induced ground vibrations, the ground vibrations shall be controlled by the use of properly designed delay sequences and allowable charge weights per delay. Allowable charge weights per delay shall be based on vibration levels which will not cause damage. The allowable charge weights per delay shall be established through industry standard prediction equations and constantly checked through seismograph monitoring of the blast generated ground vibration levels for each blast.

Every blast will be monitored using approved seismographs located, as approved, between the blast and the closest structure subject to blast damage. The seismographs will be capable of recording particle velocity for three mutually perpendicular components of vibration in the range generally found with controlled blasting.

Data recorded for each shot shall be furnished to the Blaster in Charge and the Engineer prior to the next blast and shall include the following:

1. Identification of instrument used.
2. Name of equipment operator.
3. Distance and direction of recording station from blast area.

4. Type of ground at recording station and material on which the instrument is sitting.
5. Maximum particle velocity in each component.
6. Peak particle velocity.
7. Frequency, in hertz, of the maximum particle velocity in each component.
8. A dated and signed copy of records of seismograph readings.

The accepted conservative safe limits for blast vibration are given in Table 1 below.

TABLE 1

Safe Vibration Levels

Structure Type	Maximum PPV (inches per second)
Standard Construction (Timber, Frame, Brick, and Concrete Buildings)	**2.0 (frequency >40)**
Reinforced Concrete Structures	**4.0**
Steel Structures	**4.0**
Buried Utilities	**4.0**
New Bridge	**20.0**

Vibration Level for New Bridge

The majority of new bridges are designed to withstand an earthquake impact in the range of 7.3 on the Richter scale. This is approximately equivalent to a peak particle velocity of 28 inches per second at a one hertz earthquake frequency or 56 inches per second for a 0.5 hertz earthquake frequency.

The allowable ground vibration level of 20 ips for blast design purposes is considered conservative. An earthquake would impact the entire bridge for seconds at these Richter levels where a blast is a localized, transient, high frequency event lasting only milliseconds.

The predicted ppv at the closest new bridge pier for a maximum weight of explosives per delay of 18 pounds is well below this conservative threshold value.

Lewis L. Oriard has shown through his extensive research that the following levels are required to cause damage to massive concrete;

Damage	Strain (μin/in)	PPV (ips)
Static	140	20
grout spall	700	100
Skin spall	1300	200
Cracking	2400	375

(Lewis L. Oriard, "Construction Vibrations and Geotechnology", Explosives Engineering Chapter 11, pages 415-416, 420-422, 474-454.)
(David E Siskind, "Vibrations from Blasting", International Society of Explosives Engineers, Cleveland OH (2000) pages 63-64.)

Predicted ground vibrations generated by pier blasts

Strucutre	Distance	lb/delay	PPV (in/sec)
new piers	18'	18	2.39
marina	662'	18	0.007

Air Blast and Noise Control

Appropriate blast hole patterns, detonation systems, stemming material and blast mats will be used to prevent venting of blasts and to minimize airblast and noise levels produced by the blasting operations. The peak overpressure recorded for each blast will be included on the Blast Report.

PROTECTION OF MARINE LIFE

In-water blasts have been designed to minimize the impact on marine life in the area through confinement of explosives in the concrete of the structures, using adequate stemming lengths, controlling the weight of explosives detonating at a given time (pounds of explosives per delay), and utilizing a fish scare charge.

Different marine species react differently to the same fish scare technique. Some species may be deterred from the area by one type of scare while others may be attracted by it. Scare charges are a widely used technique, cost effective and easily deployed prior to a blast. The weight of explosives is minimal and produces low level, non-lethal impact upon detonation.

Prior to initiating a in-water blast fish scare charges will be detonated. These fish scares will consist of a series of non-electric blasting caps, each containing 0.75 grains (0.01 pounds) of explosives, suspended in the water column surrounding the structure to be blasted. The scare charges will be detonated 15 to 30 seconds prior to the main blast.

The location of the scare charges is based on past experience and the intent to drive fish away from the structure being blasted. Placing the charges at further distances, even if delayed, may potentially drive fish back towards the structure.

In addition to the use of scare charges a Marine Mammal Watch Program will be conducted to ensure the required Exclusion Zone is clear of mammals immediately prior to the detonation of the blast. The Exclusion Zone radiuis has been determined using the equation cited in the FWS " Guidelines for the Protection of Marine Animals During the Use of Explosives In the Waters of the State of Florida, May 2006 Draft;

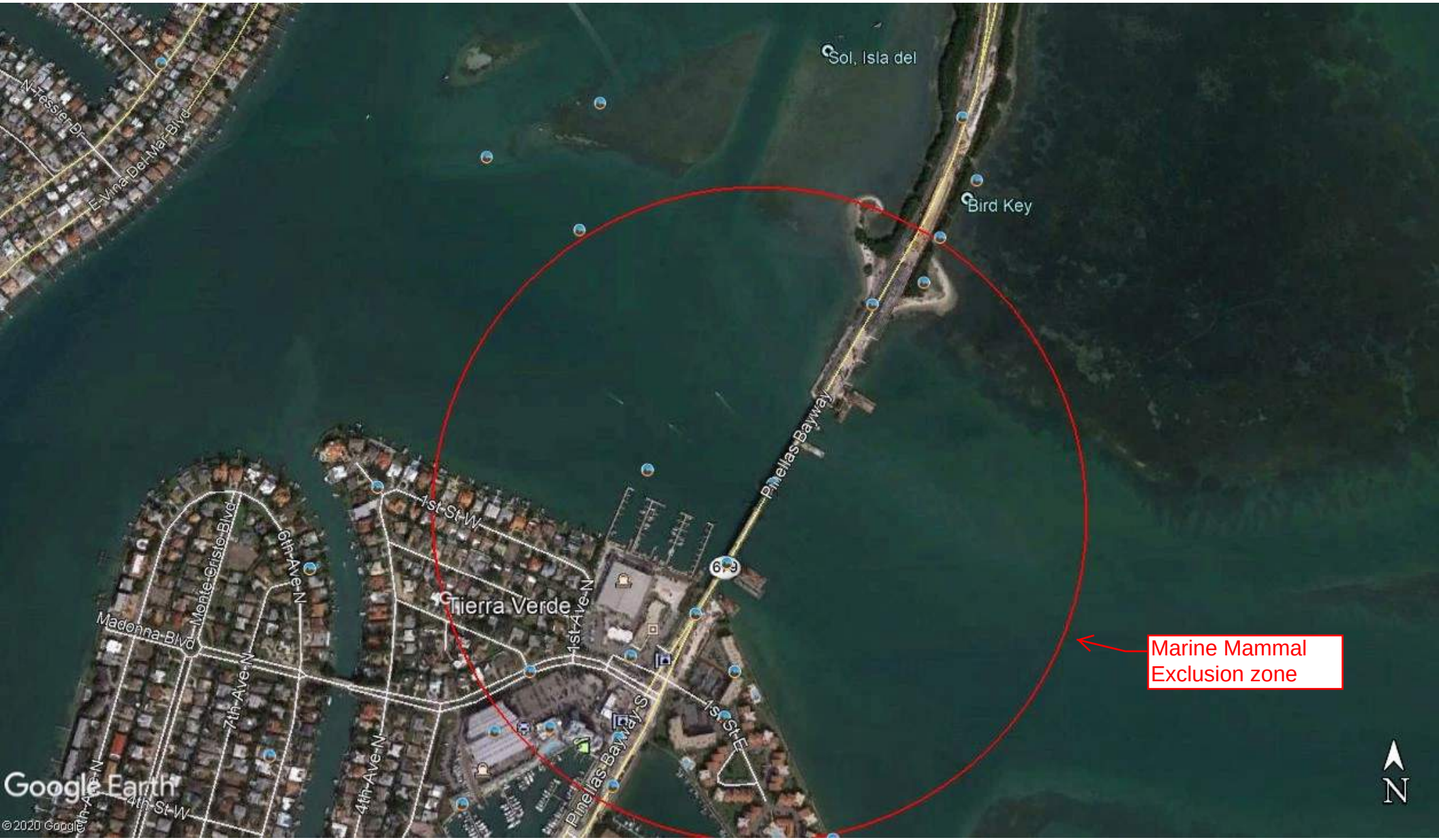
$$EZow\ (feet) = (520\ w1/3) + 500\ feet$$

For a maximum pounds per delay of 18 we get;

$$EZow(feet) = (520 \times 18^{1/3}) + 500$$
$$= (520 \times 2.6) + 500$$
$$= 1863\ feet$$

Details of the Mammal Watch Program will be submitted under a seperate cover.

Note: The SR 679 Bayway Structure E Imperiled Species and Marine Mammal Watch Plan is included under Appendix B2 of the Broad Causeway Bridge NRE Addendum.


Sol, Isla del
Bird Key
N Tessier Dr
E Vina Del Mar Blvd
Pinellas Bayway
1st St W
Tierra Verde
1st Ave N
6th Ave N
Monte Cristo Blvd
Madonna Blvd
7th Ave N
4th Ave N
4th St W
1st St E
Pinellas Bayway S
Marine Mammal Exclusion zone
Google Earth
© 2020 Google
N

Transportation and Storage of Explosives

The explosives will be delivered to the site by the explosives distributor by an approved truck licensed for the transportation of explosives. It will be brought to a location pre-approved by the USCG as for explosives off-load in BATF licensed magazines. The magazines will then be transferred to a barge, also pre-approved by the USCG for the transport of explosives over water, and under a USCG 4260 permit will be taken to pier to be loaded. Explosives will be taken out of the magazines on an as needed basis and will be attended all times. Once loading is complete all unused explosives will be returned to the delivery truck for transport back to the distributor's magazine site.

There will be no unattended on-site storage of explosives.

DEPARTMENT OF HOMELAND SECURITY

U.S. Coast Guard

APPLICATION AND PERMIT TO HANDLE HAZARDOUS MATERIALS

(See instructions on Page 2)

Form Approved
OMB No. 1625-0005

1. TO: CAPTAIN OF THE PORT U.S. COAST GUARD _____	2. FROM: *(Name, Business address and postal code)*

3. CARGO BY UN NUMBER, PROPER SHIPPING NAME AND EX NUMBER *(if included)*	4. HAZARD CLASS, DIVISION AND COMPATIBILITY GROUP	5. STOWAGE LOCATION *(Vessel Only)*	6. WEIGHT *(Net Pounds)*

7. ☒ ONLOAD ☐ OFFLOAD	8. TOTAL FOR NET EXPLOSIVE WEIGHT:

	VESSEL OR BARGE	WATERFRONT FACILITY
9. NAME, VESSEL IMO OR ID#, LOCATION, POINT OF CONTACT *(name and phone #)*		
10. NAME, ADDRESS, AND POSTAL CODE OF OWNER		
11. NAME, ADDRESS, AND POSTAL CODE OF LESSOR OR CHARTERER		
12. DATE(S) AND TIME(S) OF OPERATION		

I UNDERSTAND and will comply with current safety laws, rules and regulations of the United States, the State, County, City and Port Authority while handling hazardous materials. *(See Page 2.)*

13. DATE	14. TITLE	15. APPLICANT'S SIGNATURE

PERMIT *(COAST GUARD USE ONLY)*

The above request is: ☐ Approved ☐ Approved with the following conditions ☐ Disapproved

EXCEPTIONS/CONDITIONS

DATE	SIGNATURE: *(Captain of the Port, U.S. Coast Guard)*

VESSEL/FACILITY REPRESENTATIVE ACKNOWLEDGMENT

I have read and understand the conditions of this permit.

DATE	VESSEL RESPONSIBLE PERSON SIGNATURE:	
DATE	FACILITY REPRESENTATIVE POSITION:	SIGNATURE:

TRANSPORTATION OVER WATER INSPECTION CHECKLIST

SUBAQUEOUS BLASTING ACTIVITY

Contractor: _____ Date of Inspection: _____

Project: _____ Activity Inspected: _____

Location: _____ Approved By: _____

Phase/Area: _____ Inspected By: _____

Contract No: _____

DATE	TOPIC	Y	N	N/A
	33 CFR 6.12 SUPERVISION AND CONTROL OF EXPLOSIVES OR OTHER DANGEROUS CARGOES.			
	6.12-1 GENERAL SUPERVISION & CONTROL			
	The Captain of the Port may supervise and control the transportation, handling, loading, discharging, stowage, or storage of hazmat on board vessels as covered by the regulations in 49 CFR Parts 170-189, 46 CFR 150-156, 46 CFR parts 170-189, 46 CFR 150-156, 46 CFR Parts 146-148 and the regulations governing tank vessels (46 CFR Parts 30-39)			
	33 CFR 126.16 CONDITIONS FOR DESIGNATING A "FACILITY OF PARTICULAR HAZARD"			
	(a) BASIC REQUIREMENTS. The facility shall comply with all the conditions in 33 CFR 126.15 except where specifically waived by 33 CFR 126.11.			
	(b) WARNING ALARMS. Warning alarms shall be installed at the waterside facility to warn approaching or transiting water traffic of immediate danger in the event of fire or cargo release. Warning alarms shall be of the siren type, or the emergency rotating flashing light type, and be sufficient intensity to be heard, or seen, a distance of 1 mile during normal facility working conditions. The alarm signal shall not conflict with local municipal prescription.			
	46 CFR 25.30 FIRE EXTINGUSHING EQUIPMENT			
	(a) The provisions of this subpart with the exception of 25.30-90, shall apply to all vessels contracted for on or after November 19,1952. Vessels contracted for or prior to that date shall meet the requirements of 25.30-90.			
	25.30-10			
	(b) All required portable and hand held extinguishers shall be of the BRAVO type; i.e. suitable foe fighting fires involving flammable liquids.			
	25.30-15			
	(a) When a fixed fire extinguishing system is installed, it shall be of an approved carbon dioxide type.			
	25.30-20			
	(b) MOTOR VESSELS. All motor vessels shall carry at least the minimum number of hand held portable extinguishers as set forth in Table 25.30-20 (b) (1) of 46 CFR 25.30			
	33 CFR 175.201 VENTILATION			
	No person shall operate a boat built after July 31,1980, that has a gasoline engine for electrical generation, mechanical power, or propulsion unless it is equipped with an operable ventilation system.			

	49 CFR 176.60 "NO SMOKING" SIGNS			
	When smoking is prohibited during the loading, stowing, storing, transportation, or unloading of hazmat by this part, the carrier and the master of the vessel are jointly responsible for posting "NO SMOKING" signs in conspicuous locations.			
	SUBPART G- DETAILED REQUIREMENTS FOR EXPLOSIVES			
	49 CFR 176.100 PERMIT FOR CLASS "A"			
	Before a shipment of class A explosive may be discharged from, loaded, handled, or restored on board a vessel at any place in the U.S.A., it's territories, or it's possessions (except for the Panama Canal Zone). The carrier must obtain a permit from the Captain of the Port or his authority's representative.			
	49 CFR 176.105 LOADING AND UNLOADING OF EXPLOSIVES			
	(a) In any particular port, Class A or Class B explosives (except special fireworks), may not be loaded on a vessel until all other cargo has been loaded on board a vessel. No explosives may be loaded or unloaded at the same time that other cargo is being handled.			
	(b) All explosives must be handled carefully. Packages of explosives may not be thrown, dropped, rolled, dragged, or slid over each other or over the deck.			
	(c) Packaged Class A explosives must be loaded and discharged from a vessel by using a chute as provided for in 49CFR 176.163 or by a mechanical pallet, skipboard, tray or pie pallet, fitted with a cargo net or sideboards. A stuffed mattress at least 4 feet wide by 6 feet long and at least 4 inches thick, or a heavy hemp or jute mat of these dimensions, must be used for depositing explosives lifted by mechanical means or slide down a chute. The maximum load handled in a pallet, skipboard, tray, or pie plate may not exceed 2,640 pounds. A rope net sling with a pallet, skipboard, pie plate or similar base must be loaded so that a minimum displacement of items occurs when it is lifted; the cargo net must completely encompass the cotton and sides of the load. Not more than one third dimension of any package may extend above the sideboard of a tray. (A landing mattress and cargo net are not needed for palletized Class A explosives)			
	(d) Detonators, detonating primers, detonating fuses, fulmate or mercury, and other initiating or priming explosives defined in this subchapter constitute distinct types of explosives. They must be handled with extreme care. A chute and mattress may not be used when loading or discharging this type of explosive.			
	(e) A "can" hook may not be used for raising or lowering a barrel, drum, or other container of explosives.			
	(f) A fire hose of sufficient length to cover the area of the loading operation and connected with adequate water supply must be laid out and read for use.			
	49 CFR 176.110 CONDITION OF PACKAGE			
	A package of explosive which is damp, moldy, stained, or in any condition that indicates leakage may not be transported by vessel. The shipper must substantiate any claim that a stain is due to accidental contact with grease, oil, or similar substance. In case of doubt, the package may not be transported.			
	49 CFR 176.115 ON DECK STORAGE OF EXPLOSIVES			
	(a) The following requirements apply to the stowage of explosives on deck:			
	(1) An explosive may not be stowed on or under a bridge deck.			

	49 CFR 176.115 ON DECK STORAGE OF EXPLOSIVES Continued			
	(2) An explosive may not be stowed nearer than 25 feet in a horizontal plane to the crews quarters.			
	(b) Explosives being transported on deck on a vessel between receiving points within the same harbor, bay, sound, lake, or river including explosive anchorages must be covered with a fire resistant or flame-proof tarpaulin securely lashed in place.			
	49 CFR 176.120 PREPERATION OF DECKS, GANGWAYS, HATCHES, AND CARGO PORTS			
	(a) All decks, gangways, and hatches over or through which explosives must be freed of all loose material and must be swept broom clean before loading and unloading.			
	(b) All hatches and cargo ports opening into a compartment which any explosive are stowed must be kept closed, except during loading or unloading of the compartment. After loading, hatches must be securely closed against weather. If tarpaulins are used, They must be securely battened.			
	49 CFR 176.130 SECURING AND DUNNAGING OF PACKAGEING OF EXPLOSIVES			
	(a) Each package of explosives must be secured and dunnaged to prevent movement in any direction. Vertical restraints are not required if the shape of the package and the stuffing pattern precludes shifting of the load.			
	(b) Each keg of black powder must be stowed in an upright position with the bungs up and each tier must be completely dunnaged.			
	(c) Each package of explosives must be braced and dunnaged so that it is not likely to be pierced by the dunnaging or crushed by any superimposed weight.			
	33 CFR 126.19 ISSUANCE OF PERMITS FOR HANDLING DESIGNATED DANGEROUS CARGO			
	(a) Upon the application of the owners or operators of a designated waterfront facility or of their authorized representatives, the Captain of the Port is authorized to issue a permit for each transaction of handling, loading, discharging, or transporting designated dangerous cargo at such waterfront facility provided the following requirements are met:			
	(1) The facility shall comply in all respect with the regulations in this subchapter.			
	(2) The quantity of designated dangerous cargo, except military explosives shipped by or for the Armed Forces of the United States, on the waterfront facility and vessels moored thereto shall not exceed the limits as to maximum quantity, isolation and			
	46 CFR 67.45 FAILURE TO HAVE CERTIFICATE ONBOARD			
	(a) The person in command of a documented vessel must have on board that vessel the Certificate of Documentation.			
	46 CFR 25.25 PERSONAL FLOTATION DEVICES			
	(a) No person may operate a vessel to which this subpart applies unless it meets the requirements of this subpart.			
	(b) Each vessel not carrying passengers for hire, less than 40 feet in length must have at least one life preserver (Type I PFD), buoyant vest (Type II), or marine buoyant intended to be worn (Type III PFD) for each person on board.			

	(c) Each vessel carrying passengers for hire and each vessel 40 feet in length or longer not carrying passengers for hire must have at least one life preserver for each person aboard.			
	46 CFR 25.35-1 BACKFIRE FLAME CONTROL			
	(a) Every gasoline engine installed in a motorboat and motor vessel after April 25, 1940 shall be equipped with an acceptable means of backfire control.			
	(b) Installations made before November 19, 1952 need not meet the requirements of this subpart.			
	(e) The following are acceptable means of backfire flame control:			
	(1) An arrester built in accordance with Subpart 162.041 of Subchapter Q.			
	(2) An engine air and fuel induction system which provides adequate protection from propagation of backfire equal to an approved flame control.			
	(3) Any attachment to the carburetor or location of the engine air induction that disperses flames in such a manner as not to endanger the vessel.			
	(4) Vessels having an integrated engine-vessel design shall be tested and labeled in accordance with the specifications contained in Subpart 162.043 of Subchapter Q and shall be specifically approved by Commandant.			
	33 CFR 155.450 PLACARD			
	(a) A ship, except a ship of less than 26 feet in length must have a placard of at least 5 by 8 inches made of a durable material, fixed in a conspicuous place in each machinery space or at the bilge and ballast pump control station.			
	33 CFR 151.59 PLACARDS			
	(b) The master of each ship shall ensure that one or more placards meeting the requirements of this section are displayed in prominent locations.			

SAFETY AND ACTIVITY HAZARD ANALYSIS

PRINCIPAL STEP	POTENTIAL HAZARD	RECOMMENDED CONTROLS
TRANSPORTATION OF EXPLOSIVE MATERIALS	Fire	Vehicles transporting explosive materials shall be equipped with one or more fire extinguishers of a type listed by a nationally recognized test laboratory.
	Fire	Persons engaged in the transportation, handling, or other use of explosive materials shall not smoke, carry matches, firearms, ammunitions, or flame producing devices.
	Poor Visibility	Display all placards, lettering, or numbering required.
	Premature Detonation	Explosives shall not be transported with any other materials, cargoes, or crew members.
	Premature Detonation	Blasting caps shall not be transported in the vehicle with other explosives.
	Premature Detonation	No other items shall be carried in the bed or body of any vehicle transporting explosive materials.
	Premature Detonation	Transportation of explosives from land to a watercraft shall be done in certified and approved magazines and shall be supervised by the licensed blaster.
	Theft of Product	Vehicles transporting explosive materials shall not be left unattended. All magazines are to be kept locked except during the transfer. In the event of loss or theft of product Contractor shall report all incidents with details to the BATF and police.
	Vehicle Accident	In case of an accident, Notification Instructions and Procedures on Securing an Accident Scene will be kept in the vehicle at all times**.**
	Vehicle Failure	Vehicle shall not be loaded beyond rated capacity and the products shall be secured to prevent shifting. Vehicles will be inspected and found satisfactory for transportation of explosive materials.
	Vehicle Failure	Operators of the vehicles shall be physically fit, careful, reliable, and able to read, write, and understand instructions in the English language.
	Vehicle Failure	Vehicles transporting explosive materials shall be in good repair.
	Vehicle Failure	Only the authorized driver and his/her helper shall be permitted to ride on any truck carrying explosive materials.
HANDLING OF EXPLOSIVE MATERIALS	Fire	Magazines used for the storage of detonators shall be separated from magazines storing other explosive materials by the appropriate distance or approved barrier.
	Fire	Smoking matches, firearms, open flames, or any flame producing device shall not be permitted within 50 feet of any magazine.
	Fire	Smoking will be allowed only in a designated smoking area.
	Premature Detonation	Only authorized and qualified persons shall be allowed to handle and use explosives.
	Premature Detonation	Containers shall be opened only with non-sparkling tools or instruments.
	Premature Detonation	Explosive materials shall be removed from containers only as they are needed for use.
	Premature Detonation	Explosive materials and/or primers shall be separated and taken to the blasting area in their original containers.

SAFETY AND ACTIVITY HAZARD ANALYSIS

PRINCIPAL STEP	POTENTIAL HAZARD	RECOMMENDED CONTROLS
	Premature Detonation	Primers shall not be made up in excess of immediate need for holes to be loaded.
	Premature Detonation	Primers should be made up at the "site specific" Pier Location.
	Premature Detonation	Detonators, primers, or other initiators shall not be stored in the same magazine with explosives, or blasting agents.
	Premature Detonation	Magazines in which explosive materials are stored shall not be used for any other purposes.
	Theft of Materials	After loading a blast, all excess explosive materials and detonators shall be returned to the magazine day storage box. Inventory records shall be updated at the close of business each day.
DAILY INVENTORY JUSTIFICATION	Theft of Materials	Explosive materials and related materials shall be stored in approved containers.
	Theft of Materials	Magazines are to be kept locked at all times and the keys in the possession of the Licensed blaster or the explosives delivery truck driver.
DRILLING AND BLASTING	Drilling into Loaded Holes	Drilling and loading of holes shall not be carried on in the same immediate areas.
	Personal Injury	Personnel unnecessary for the operation are not allowed in the Blast Area.
	Personal Injury	Trained individuals under the "direct" supervision of a qualified person shall perform drilling and loading.
	Personal Injury	Safety glasses and hearing protection shall be worn while in a drilling environment.
	Personal Injury	The walking surface from the magazines to the Blast Area shall be free of trip hazards and obstructions.
	Personal Injury	Standard audible signals shall be used to warn of a blasting operation (see Warning Signs).
	Personal Injury	Explosive materials shall not be transported during crew changes.
	Personal Injury	In the event of a thunderstorm, loading of charges shall cease. Continuous monitoring for potential/actual thunderstorms shall be ongoing.
	Premature Detonation	Explosive materials shall only be removed from their containers for immediate intended use.
	Premature Detonation	Primers shall not be made up in or near magazines and shall be made up on an “as needed basis.”
	Product Failure	All drill holes shall be of a greater diameter than the cartridges.
	Product Failure	Magazines shall be kept clean and dry at all times.
	Product Failure	Explosive materials shall be arranged so the oldest stock will be used first.

SAFETY AND ACTIVITY HAZARD ANALYSIS

PRINCIPAL STEP	POTENTIAL HAZARD	RECOMMENDED CONTROLS
LOADING FOR BLASTING	Product Failure	Explosive materials shall be stored in their original containers lying flat.
	Personal Injury	Explosives will be delivered directly to the site by explosives distributor..
	Personal Injury	The Blast Area shall be kept free of any equipment, operations, or persons not essential to the loading process.
	Personal Injury	Tamping shall be done with an approved non-sparking loading pole.
	Personal Injury	Primers shall not be tamped.
	Personal Injury	Cartridges or boosters shall be primed only in the number required for a single round.
	Personal Injury	No detonator shall be inserted in explosive materials without a cap well or without first making a hole in the cartridge with a non-sparking tool of proper size.
	Personal Injury	No explosive material or loaded hole shall be left unattended.
	Personal Injury	No holes shall be loaded except those to be fired in the designated blast. The blast shall not be detonated until all personnel are accounted for.
	Premature Detonation	Holes will not be loaded in the prospect of thunderstorms indicated by the National Weather Service, Coast Guard, or static electricity detected by the lightning detector.
	Vibration Control	Loaded holes or charges shall be verified and documented on the Drill Log and Blast Report before firing.
	Vibration Control	Loaded holes shall be stemmed to the collar with non-combustible materials as designed.
FIRING		
	Misfire	The person attaching the lead-in connections shall fire the shot.
	Personal Injury	Prior to the firing of the shot, all persons in the Blast Area shall be warned of the blast.
	Personal Injury	The blast shall not be fired until it is certain that everyone has retreated to a safe position and are accounted for.
	Personal Injury	All blasting operations shall use signals as stated in the blast plan.
	Personal Injury	Prior to each shot, security shall be posted at designated locations.
INSPECTION	Premature Detonation	Accidental detonation is avoided by strict adherence to safe blast procedures.
	Personal Injury	Immediately after the blast has been fired, the lead-in shall be disconnected from the blast machine.
	Personal Injury	An inspection of the tattletale shall be made by the blaster to determine that all charges have been detonated.
MISFIRE	Personal Injury	Other persons shall not be allowed to return to the Blast Area until an All Clear is given.

SAFETY AND ACTIVITY HAZARD ANALYSIS

PRINCIPAL STEP	POTENTIAL HAZARD	RECOMMENDED CONTROLS
	Detonation Failure	Misfires shall be handled under the direction of the Licensed blaster.
	Detonation Failure	No other work is to be done except that which is necessary to correct the hazard of the misfire.
SPECIFIC HAZARDS		
	Loss/Injury to Eyesight	Eye protection is available for grinding, brazing, welding and drilling operations.
	Loss/Injury to Hearing	Hearing protection shall be worn in identified noise hazard areas.
	Personal Injury	Eyewash stations and proper protective gear will be available at all times.
	Personal Injury	Employees are required to wear hard hats, safety glasses, safety boots at all times. PFD's will be worn when within 6 feet of open water.
	Respiratory Failure	Respiratory protection is issued for specific hazards.

CONCLUSION:
Hazards and preventative measures are not limited to this plan. Continuous efforts will be made to observe for hidden hazards and correct them with immediate and proper action.

CONTINGENCY PLAN

The blast designs, explosive product selection and the choice of using nonelectric detonators all lend to the blasting of the piers being successful. Weather can not be controlled. Lightning detection equipment will be used during the entire time that explosives are on site at Piers. When an electrical storm is detected and presents a hazard to the safety of personnel the following procedure shall be followed;

1) Notify the Project manager of the potential hazard.
2) Terminate all loading of explosives into boreholes and return explosive to the magazines.
3) Clear the 250' blast zone of all vessels and personnel.
4) The lightning detection equipment shall be taken with the personnel to continuosly monitor the conditions.
5) The blast zone shall be vissually monitored to ensure no vessels or personnel have re-entered the danger zone while the hazard still exists.
6) Resume operations only after all potentail hazard has passed. All other applicable safety requirements shall be implemented in addition to those required above.

A misfire is highly unlikely with the type of detonators being used for the blasting of Piers due to the ability of the blaster to identify "bad" connectons prior to the blast and correct the problem before firing the shot. The redundant use of detonators (two per deck/hole) also ensures the detonation of explosives will occur. In the event of a misfire, the blaster in charge will notify the Project manager and take the following actions.

1) The blaster will maintain the secure 250' blast zone while he conducts an inspection to determine conditions and cause.
2) If the inspection indicates only that the lead line has malfunctioned, a new lead line will be installed and the shot re-fired.
3) If the inspection indicatesthat a portion of the shot missed fired, hence a cut-off has occurred, the following procedure shal be implemented;
   a) The blaster will maintain the blast zone and restrict enry for ½ hour.
   b) The blaster and only personnel authorized by him will re-enter the blast area to rectify the problem.
   c) If all downlines are intact where a surface connection failed, a new connection will be made, all zones re-secured and the shot re-fired.
   d) If the misfire cannot be safely re-energized and re-fired the blaster will maintain security of the 250' blast zone and contact the technical representative of the explosives manufacturing company to consult on how to best handle the situation. Once the contingency plan has been confirmed the blaster will advise the Project manager of the procedure.
4) When the misfire has been corrected, the blaster will notify the Project manager of an "all clear".

Explosive Products

Data Sheets

&

MSDS

UNIMAX®

Technical Information

Extra Gelatin Nitroglycerin Dynamite



Product Description

UNIMAX is an extra gelatin dynamite formulated to consistently deliver high detonation velocity and excellent water resistance. UNIMAX is designed to satisfy the vast majority of explosive applications in hard rock and may be used as the main explosive charge where high density and energy is required or as a primer for ANFO.

Application Recommendations

- UNIMAX is an excellent primer for Dynomix (ANFO), Dynomix-WR (WR ANFO) or other detonator sensitive packaged product and can be used as a secondary primer in hard seams or at the top of the explosive column.
- Minimum diameter is 25 mm (1 in).
- Minimum detonator is No. 8 strength.
- Storage at elevated temperatures and/or high humidity for 1 to 6 months can reduce the performance of Unimax depending on the diameter. Consult your Dyno Nobel representative for specific recommendations.
- Dynamites are susceptible to sympathetic detonation when applied in very wet conditions where boreholes are closely spaced and/or where geological conditions promote this effect. Consult your Dyno Nobel representative for recommendations where these conditions exist.

Properties

MSDS #1019

Density	(g/cc) Avg	1.51
Energy[a]	(cal/g)	1,055
	(cal/cc)	1,510
Relative Weight Strength[a]		1.20
Relative Bulk Strength[a,b]		2.10
Velocity[c]	(m/s)	5,300
	(ft/s)	17,400
Detonation Pressure[c]	(Kbars)	106
Gas Volume[a]	(moles/kg)	32
Water Resistance		Excellent
Fume Class		IME1 & NRCan1[d]

[a] All Dyno Nobel Inc. energy and gas volume values are calculated using PRODET™ the computer code developed by Dyno Nobel Inc. for its exclusive use. Other computer codes may give different values.
[b] ANFO = 1.00 @ 0.82 g/cc
[c] Unconfined @ 50 mm (2 in) diameter.
[d] Approved by Natural Resources Canada as Fume Class 1.



Hazardous Shipping Description
Explosive, Blasting, Type A, 1.1D, UN 0081 II

See Product Disclaimer on page 2

DYNO Dyno Nobel
Groundbreaking Performance™

UNIMAX®

Technical Information

Transportation, Storage and Handling

- UNIMAX must be transported, stored, handled and used in conformity with all applicable federal, state, provincial and local laws and regulations.
- For maximum shelf-life, dynamite must be stored in cool, dry and well-ventilated magazines. Dynamite inventory should always be rotated by using the oldest materials first. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives.

Diameter x Length		Qty / Case	Case Type	Nominal Case Weight	
mm	in			kg	lbs
25 x 200	1 x 8	140	DA	21	47
29 x 200	1 1/8 x 8	100	DA	20	45
32 x 200	1 1/4 x 8	88	DA	21	47
32 x 400	1 1/4 x 16	44	DA	21	47
40 x 200	1 1/2 x 8	60	DA	20	45
40 x 300	1 1/2 x 12	40	DA	21	47
45 x 200	1 3/4 x 8	40	DB	18	40
50 x 200	2 x 8	34	DB	20	45
50 x 400[a]	2 x 16[a]	17	DB	20	45
60 x 400[a]	2 1/4 x 16[a]	14	DB	19	42
65 x 400[a]	2 1/2 x 16[a]	10	DB	20	44
70 x 400[a]	2 3/4 x 16[a]	9	**	**	**
75 x 200	3 x 8	16	DE	21	47
75 x 400[a]	3 x 16[a]	8	DE	21	47

[a] Avaliable in spiral tube shell with tapered end. • Note: all weights are approximate.

**Available upon request. Check with your Dyno Nobel representative should you have any questions.

- Product density is 1.50 g/cc for package diameters less than 50mm (2 in). Use cartridge count to determine actual explosive charge weight.
- UNIMAX is available in a wide variety of sizes. Custom sizes are subject to surcharge and may require longer than usual lead times.

Case Dimensions

DA	45 x 34 x 17 cm	17¾ x 13⅜ x 6⅜ in
DB	45 x 34 x 15 cm	17⅞ x 13⅜ x 5⅞ in
DE	45 X 34 X 17 cm	17⅝ x 13 5/16 x 6¾ in

Product Disclaimer Dyno Nobel Inc. and its subsidiaries disclaim any warranties with respect to this product, the safety or suitability thereof, or the results to be obtained, whether express or implied, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND/OR OTHER WARRANTY. Buyers and users assume all risk, responsibility and liability whatsoever from any and all injuries (including death), losses, or damages to persons or property arising from the use of this product. Under no circumstances shall Dyno Nobel Inc. or any of its subsidiaries be liable for special, consequential or incidental damages or for anticipated loss of profits.

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Material Safety Data Sheet

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FOR 24 HOUR EMERGENCY, CALL **CHEMTREC (USA) 800-424-9300**
CANUTEC (CANADA) 613-996-6666

MSDS # 1019
Date 09/16/10

Supercedes
MSDS # 1019 08/25/10

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s):

D-GEL™ 1000
DYNOSPLIT® D
DYNOSPLIT®: D-1
DYNOMAX PRO™
EXTRA GELATIN: 40%, 75%
GELAPRIME® F
IP: 724, 738
Oil Well Explosive 80%
RED H®A
RED H®B
STONECUTTER™
UNIGEL®
UNIMAX®
VIBROGEL®: 1, 3
Z POWDER™
60% Hi-Pressure Gelatin

Product Class: Dynamites and Blasting Gelatins
Product Appearance & Odor: Powdery to gelatinous solid, light tan to dark brown color. Faint, waxy odor.
DOT Hazard Shipping Description: Explosive, blasting, type A 1.1D UN0081 II
NFPA Hazard Classification: Not Available (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

			Occupational Exposure Limits	
Ingredients:	**CAS#**	**% (Range)**	**ACGIH TLV-TWA**	**OSHA PEL-TWA**
Nitroglycerin (NG)	55-63-0	3-30	0.05 ppm	0.05 ppm
Ethylene Glycol Dinitrate (EGDN)	628-96-6	5-50	0.05 ppm	0.05 ppm
Nitrocellulose	9004-70-0	0-6	None	None
Ammonium Nitrate	6484-52-2	0-75	None	None
Sodium Nitrate	7631-99-4	0-50	None	None
Sulfur[1]	7704-34-9	0-4	None	None

[1] This ingredient is not found in most of the products listed above.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable
Vapor Density: Not Applicable
Percent Volatile by Volume: Not Applicable

Evaporation Rate (Butyl Acetate = 1): Not Applicable

Vapor Pressure: Not Applicable
Density: 0.8-1.48 g/cc
Solubility in Water: Ammonium and sodium nitrates are completely soluble. NG and EGDN are very slightly soluble.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable **Flammable Limits:** Not Applicable
Extinguishing Media: (See Special Fire Fighting Procedures section.)
Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.
Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

Eyes: May cause irritation, redness and tearing.
Skin: Contact may result in headache, nausea and blood vessel dilation.
Ingestion: May result in headache, nausea, intestinal upset and blood vessel dilation.
Inhalation: May result in headache, nausea and blood vessel dilation.
Systemic or Other Effects: None known.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.
Skin: Remove contaminated clothing. Wash with soap and water.
Ingestion: Seek medical attention.
Inhalation: Remove to fresh air. If irritation persists, seek medical attention.
Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions. May explode when subjected to fire, supersonic shock, or high-energy projectile impact, especially when confined or in large quantities.
Conditions to Avoid: Keep away from heat, flame, ignition sources and strong shock.
Materials to Avoid (Incompatibility): Corrosives (mineral acids, bases, strong acids).
Hazardous Decomposition Products: Carbon Monoxide (CO), Hydrogen Sulfide (H_2S), Nitrous Oxides (NO_X), and Sulfur Oxides (SO_X).
Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate area not less than 2,500 feet in all directions. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State, and local spill reporting requirements. Contact of this product with water may result in a reportable release.

Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

Material Safety Data Sheet

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Forced ventilation may be necessary where natural ventilation is limited. Magazines containing NG and/or EGDN based explosives must be ventilated before entry.
Respiratory Protection: None normally required.
Protective Clothing: Chemical resistant (nitrile) gloves are suggested.
Eye Protection: Safety glasses are recommended.
Other Precautions Required: Inhalation and skin contact should be minimized to avoid headaches, nausea, and blood vessel dilation. Protective clothing should be changed daily, more often if contaminated.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State, and local regulations. Keep away from heat, flame, ignition sources, and strong shock.
Precautions to be taken during use: Avoid breathing the fumes or gases from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.
Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

SECTION X - SPECIAL INFORMATION

Chemical Name	CAS Number	% By Weight
Nitroglycerin	55-63-0	3-40

The reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372 may become applicable if the physical state of this product is changed to an aqueous solution. If an aqueous solution of this product is manufactured, processed, or otherwise used, the nitrate compounds category and ammonia listing of the previously referenced regulation should be reviewed.

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PRIMACORD®

Technical Information

BOOSTERS • CORDS

Detonating Cord



Properties

MSDS #1126

See Page 2 for PRIMACORD Detonating Cord properties

Product Description

PRIMACORD detonating cords are flexible linear explosives with a core of PETN explosive encased in a textile outer jacket. PRIMACORD detonating cord detonates along its entire length at a velocity of approximately 7,000 m/s (23,000 ft/s). PRIMACORD detonating cords are designed for use as trunklines and/or downlines in various mining, quarrying and construction applications.

Application Recommendations

- **ALWAYS** cut detonating cord with a sharp, non-sparking knife.
- **NEVER** attempt to cut detonating cords by abrasion or with a blow from a sharp or blunt object.
- **ALWAYS** use square knots to extend/join detonating cords that will propagate self-to-self. When connecting downlines to trunklines, always use a clove hitch knot and keep incoming and outgoing cords at right angles to avoid possibility of cut-offs.
- **NEVER** join PRIMACORD 1, 2 and 3 together with knots because it will not propagate self-to-self.
- **ALWAYS** use a detonating cord product, such as PRIMACORD 4Y or 4R or detonating cord with a greater explosive coreload as a trunkline to initiate PRIMACORD 1, 2 or 3.
- **ALWAYS** use a double wrap clove hitch knot to connect PRIMACORD 1, 2 and 3 detonating cord to the trunkline cord.
- **NEVER** allow trunklines and/or downlines to cross.
- Minimum recommended initiating detonator is a No. 8 strength.
- Minimum recommended cord initiator is a 3.6 g/m (18 gr/ft) detonating cord, such as PRIMACORD 4Y or 4R, or another detonating cord with an equal or greater explosive coreload.

Transportation, Storage and Handling

- PRIMACORD must be transported, stored, handled and used in conformity with all federal, state, provincial and local laws and regulations.
- For maximum shelf life (5 years), PRIMACORD must be stored in a cool, dry, well ventilated magazine. Explosive inventory should be rotated. Avoid using new materials before the old. For recommended good practices in transporting, storing, handling and using this product, see the booklet “Prevention of Accidents in the Use of Explosive Materials” packed inside each case and the Safety Library publications of the Institute of Makers of Explosives.

Hazardous Shipping Description

Cord, Detonating, 1.1D, UN 0065, II EX 1992020035



PRIMACORD®

Technical Information

BOOSTERS • CORDS

Packaging

Product	PETN Coreload		Outside Diameter		Tensile Strength		Color / Counter	Weight / Case		Spools / case	Length / Spool		Net Explosives Content (NEC) / 1000 ft	
	g/m	gr/ft	mm	in	kg	lbs		kg	lbs		m	ft	kg	lbs
PRIMACORD 1	1.5	7.5	3.18	0.125	68	150	Yellow / 5 Black	9	20	2	610	2000	0.5100	1.0720
PRIMACORD 2.5	2.4	12.5	2.8	0.110	27	60	Orange / 4 Black	12	25	2	610	2000	0.8117	1.7857
PRIMACORD 3	3.2	15	3.66	0.144	113	250	Red / 1 Black & 1 White	13	29	2	610	2000	1.0200	2.1440
PRIMACORD 4Y	3.6	18	3.61	0.142	68	150	Yellow / 1 Black	6	14	2	305	1000	1.2200	2.5720
PRIMACORD 4R*	3.6	18	3.61	0.142	68	150	Red	4	8	2	610	2000	1.2200	2.5720
PRIMACORD 5	5.3	25	3.99	0.157	68	150	Red / 1 Black	11	25	2	458	1500	1.7000	3.5730
PRIMACORD 8	8.5	40	4.47	0.176	90	200	Red / 2 Black	11	24	2	305	1000	2.7200	5.7160
PRIMACORD 10	10.8	50	4.70	0.185	90	200	Yellow / 2 Black	12	27	2	305	1000	3.4000	7.1450

* Pull-out Box

NOTE: Higher coreload detonating cords are available. Please contact your Dyno Nobel representative for details.

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Material Safety Data Sheet

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CANUTEC (CANADA) 613-996-6666

MSDS # 1126
Date 09/16/10

Supercedes
MSDS # 1126 08/13/08

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): PRIMALINE®
PRIMACORD®
PRIMASHEAR™
OPTICORD®
GEOSEIS®
LOW FLEX™
FIRELINE CORD

Product Class: Detonating Cord

Product Appearance & Odor: Flexible cord of woven textile with a protected explosive core of PETN (white crystalline powder) and covered by a white or colored plastic or textile jacket. May have a waxed finish. No odor.

DOT Hazard Shipping Description: UN0065 Cord, Detonating 1.1D II

NFPA Hazard Classification: Not Applicable (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

			Occupational Exposure Limits	
Ingredients	**CAS#**	**%**	**OSHA PEL-TWA**	**ACGIH TLV-TWA**
Pentaerythritol tetranitrate (PETN)	78-11-5	-----*	None[1]	None[2]

[1] Use limit for particulates not otherwise regulated (PNOR): Total dust, 15 mg/m^3 ; respirable fraction, 5 mg/m^3.
[2] Use limit for particulates not otherwise classified (PNOC): Inhalable particulate, 10 mg/m^3 ; respirable part., 3 mg/m^3.
Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).
* Core powder is 100% PETN. The approximate amount of PETN in a given grade of cord is expressed as that number of grams of PETN per linear meter of cord. Range is from 1 to 280 gram/meter. Example: PRIMALINE® 5 contains approximately 5 grams PETN per meter of cord. (1 gram/meter = 4.7 grains/foot)

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable (PETN decomposes at melting point, about 141°C)
Vapor Pressure: Not Applicable
Vapor Density: (Air = 1) Not Applicable
Percent Volatile by Volume: Not Applicable
Solubility in Water: Insoluble.

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SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Extinguishing Media: (See Special Fire Fighting Procedures section.)
Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe, distant location. Allow fire to burn unless it can be fought remotely or with fixed extinguishing systems (sprinklers). For transportation fires involving large quantities of detonating cord, such as a trailer load, evacuate no less than 2,500 feet in all directions.
Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning or detonating material may produce toxic vapors.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

This is a packaged product that will not result in exposure to the explosive core material under normal conditions of use.

Eyes: May cause irritation, redness and tearing.
Skin: PETN is not known as a skin irritant or sensitizer.
Ingestion: PETN is moderately toxic if ingested. See systemic effects below.
Inhalation: See systemic effects below.
Systemic or Other Effects: PETN is a known coronary vasodilator, and ingestion or inhalation may result in a lowering of blood pressure, headache or faintness, and a decreased tolerance for grain alcohol. Repeated over-exposure may result in chest pains in the absence of exposure. Systemic effects by ingestion include dermatitis.
Carcinogenicity: No constituents are listed by NTP, IARC or OSHA.

Emergency and First Aid Procedures

Eye: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.
Skin: Wash with soap and water.
Ingestion: Seek medical attention.
Inhalation: Remove to fresh air. If symptoms persist, seek medical attention.
Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.
Conditions to Avoid: Keep away from heat, flame, ignition sources, impact, friction, electrostatic discharge and strong shock.
Materials to Avoid (Incompatibility): Corrosives (strong acids and strong bases or alkalis).
Hazardous Decomposition Products: Nitrogen Oxides (NO_X), Carbon Monoxide (CO)
Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate all personnel to a safe distant area and allow to burn or fight fire remotely. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If explosive powder is spilled from damaged detonating cord, remove all other explosives from the spill area. Wet down and clean spilled powder using a damp sponge or rag, avoid applying friction or pressure to the explosive, and place in a (Velostat) electrically conductive bag. Contamination of this material with sand, grit or dirt will render the material more sensitive to detonation. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other

clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State, and local spill reporting requirements.
Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Not required for normal handling.
Respiratory Protection: None normally required.
Protective Clothing: Work gloves and work clothing that reduce the possibility of skin abrasion and that would prevent contact with spilled explosive powder is suggested.
Eye Protection: Safety glasses or goggles are recommended.
Other Precautions Required: None.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State and local regulations. Only properly qualified and authorized personnel should handle and use explosives. Keep away from heat, flame, ignition sources, impact, friction, electrostatic discharge and strong shock.
Precautions to be taken during use: Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death. Avoid breathing the fumes or gases from detonation of explosives. Detonation in confined or unventilated areas may result in exposure to hazardous fumes or oxygen deficiency.
Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

SECTION X - SPECIAL INFORMATION

This product contains the following substances that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Chemical Name	CAS Number	% By Weight
None		

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NONEL® EZ DET® 1.1B

Technical Information

Nonelectric Blast Initiation System



Product Description

NONEL® nonelectric delay detonator EZ DET® units consist of a length of orange shock tube with a surface detonator attached to one end and an in-hole, High Strength, detonator on the other. The surface detonator is inside a color-coded plastic EZ™ Connector block to facilitate easy connections to up to 6 shock tube leads. Easy-to-read, color-coded delay tags display the delay number and nominal firing time prominently.

NONEL EZ DET units can be easily connected to one another to satisfy basic blast design requirements in construction, mining, and quarry operations. They can also be used in combination with NONEL MS, NONEL EZTL™ and/or NONEL TD detonators to satisfy complex blast design requirements and minimize inventory of initiation system components.

Application Recommendations

For detailed application recommendations, **ALWAYS** request a copy of Dyno Nobel's *Product Manual: NONEL® and PRIMACORD®* from your Dyno Nobel representative.

- **ALWAYS** select a NONEL EZ DET unit having more than enough tubing length to extend from the planned primer location in the borehole to the collar of the next hole.

Properties

MSDS #1122

Net Explosive Content per 100 units 0.1125 kg
0.1782 lbs

Nominal Time (msec)	Nominal Time (msec)	Nominal Time (msec)	Connector Block Color
17 / 350	17 / 500	17 / 700	Yellow
25 / 350	25 / 500	25 / 700	Red
42 / 350	42 / 500	42 / 700	White
25 / 375			Red

Hazardous Shipping Description

Detonator assemblies nonelectric,
1.1B, UN 0360 PG II



See Product Disclaimer on page 2.

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NONEL® EZ DET® 1.1B

Technical Information

Application Recommendations (continued)

- **ALWAYS** protect the plastic EZ Connector block and all shock tube leads from impact or damage during the loading and stemming operations. Use care when placing blasting mats and cover material on top of the blasting circuit. The EZ Connector block contains a detonator and is subject to detonation caused by abuse such as impact. Shock tube which has been cut, ruptured or damaged may cause misfires.
- **ALWAYS** be sure that the shock tube(s) are securely inserted, one at a time, into the EZ Connector block. The head of the EZ Connector block should rise to accept the shock tube and return to a closed position with an audible click.
- **ALWAYS** ensure that individual shock tubes remain aligned side by side in the connector channel and do not cross one over the another on insertion.
- **NEVER** use NONEL EZ DET units with detonating cord. The low strength surface detonator will not initiate detonating cord and may cause misfires.
- **NEVER** attempt to disassemble the delay detonator from the plastic EZ Connector block or use the detonator without the connector.
- **NEVER** place more than 6 shock tube leads into the plastic EZ Connector block. Misfires may result.
- **NEVER** pull, stretch, kink or put tension on shock tube such that the tube could break.
- **NEVER** splice NONEL EZ DET shock tube together to extend between holes.
- **NEVER** connect NONEL EZ DET units together until all holes have been primed, loaded and stemmed and the blast site has been cleared.

Transportation, Storage and Handling

- NONEL EZ Det must be transported, stored, handled and used in conformity with all federal, state, provincial and local laws and regulations.
- For maximum shelf life (3 years), NONEL EZ Det must be stored in a cool, dry, well ventilated magazine. Explosive inventory should be rotated. Avoid using new materials before the old. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives.

Packaging

Length		Case Type	Quantity/ Case	
m	ft		case	subpack
3.5	12	D	200	100
4.5	16	D	180	90
7	24	D	140	70
9	30	DC	120	--
12	40	DC	120	--
15	50	DC	90	--
18	60	DC	90	--
24	80	DC	50	--
30	100	DC	40	--
37	120	DC	30	--

- Length rounded to nearest one-half meter.
- Case weight varies by length & delay; see case label for exact weight.

Case Dimensions

Detpak Case (DC)	48 x 45 x 26 cm	18 ¾ x 17 ¾ x 10 ¾ in
Detpak (D)		
subpack	44 x 22 x 25 cm	17 ½ x 8 ¾ x 10 in
strapped case	44 x 45 x 25 cm	17 ½ x 17 ⅝ x 10 in

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NONEL® MS 1.1B

Technical Information

Nonelectric Millisecond Delay Detonator



Product Description

NONEL® nonelectric delay detonator MS 1.1B units consist of a length of orange shock tube with a High Strength detonator attached to one end and the other end sealed. A white J-hook is affixed near the sealed end, providing easy means of connection to detonating cord. Easy-to-read, color-coded delay tags display the delay number and nominal firing time prominently.

NONEL MS is designed to provide in-hole time for underground (non-coal) and surface blast applications in the mining, quarry and construction industries and can be used in combination with a detonating cord trunkline, NONEL EZTL™, NONEL EZ DET® and/or NONEL TD detonators for maximum timing flexibility.

Application Recommendations

For detailed application recommendations, **ALWAYS** request a copy of Dyno Nobel's *Product Manual: NONEL® and PRIMACORD®* from your Dyno Nobel representative.

- **ALWAYS** use the plastic J-hook when using a detonating cord trunkline to initiate a NONEL MS unit. A minimum 3 g/m (15 gr/ft) detonating cord qualified for surface use is required for use with the J-hook.
- **ALWAYS** make sure the shock tube is connected to the J-hook and leads back to the hole collar at right angles to the detonating cord trunkline.

Properties

MSDS #1122

Net Explosive Content per 100 units 0.0885 kg
0.1947 lbs

Delay Time (msec)	Delay Tag Color	Delay Time (msec)	Delay Tag Color	Delay Time (msec)	Delay Tag Color
0	Orange	225	White	450	Orange
25	Red	250	Red	475	White
50	Tan	275	White	500	Purple
75	Green	300	Tan	525	White
100	Blue	325	White	600	Gray
125	Orange	350	Green	700	Lt Blue
150	Purple	375	White	800	Red
175	Gray	400	Blue	900	Tan
200	Lt Blue	425	White	1000	Green

Hazardous Shipping Description
Detonator assemblies, nonelectric,
1.1B, UN 0360 PG II



See Product Disclaimer on page 2.

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NONEL® MS 1.1B

Technical Information

Transportation, Storage and Handling

- NONEL MS must be transported, stored, handled and used in conformity with all federal, state, provincial and local laws and regulations.
- For maximum shelf life (3 years), NONEL MS must be stored in a cool, dry, well ventilated magazine. Explosive inventory should be rotated. Avoid using new materials before the old. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives.

Packaging

Length		Case Type	Coil Type	Quantity / Case
m	ft			
3.5	12	DC	Detpak	300
4.5	16	DC	Detpak	240
6	20	DC	Detpak	180
9†	30	DC	Detpak	150
12†	40	DC	Detpak	120
15†	50	DC	Detpak	90
18†	60	DC	Detpak	90
24†	80	DC	Detpak	50
30†	100	DC	Detpak	40
37†	120	DC	Detpak	30
40††	130	L	Spool	30
46††	150	L	Spool	30
55††	180	L	Spool	30
61††	200	L	Spool	30

- Length rounded to nearest one-half meter.
- Case weight varies by length & delay; see case label for exact weight.
- 2.5 to 24 meter product, in 500 & 1000 ms delays, is also available with HD tube.

† Available in Super Tube. †† Super Tube only.

Case Dimensions

L	56 x 27 x 32 cm	22 x 10 ½ x 12 ½ in
Detpak Case (DC)	48 x 45 x 26 cm	18 ¾ x 17 ¾ x 10 ¼ in

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NONEL® EZTL™

Technical Information

Nonelectric Trunkline Delay Detonators



Product Description

NONEL® nonelectric delay detonator EZTL™ units consist of a length of yellow shock tube, with a surface detonator attached to one end and the other end sealed. The detonator is housed in a plastic EZ Connector block which facilitates easy connection to shock tube. A white J-hook is affixed near the sealed end. Easy-to-read, color-coded delay tags display the delay number and nominal firing time prominently.

EZTL detonators are designed for use with NONEL MS and EZ DET® units to provide effective and accurate surface timing between blastholes and/or rows of blastholes in surface and underground blasting designs.

Application Recommendations

For detailed application recommendations, **ALWAYS** request a copy of Dyno Nobel's *Product Manual: NONEL® and PRIMACORD®* from your Dyno Nobel representative.

- **ALWAYS** be sure that the shock tube(s) are securely inserted, one at a time, into the plastic EZ connector. The head of the connector block should rise to accept the tube, and return to a closed position with an audible click.
- **ALWAYS** ensure that the individual shock tubes remain aligned side by side in the EZ connector channel and do not cross over one another during insertion.
- **ALWAYS** protect the plastic EZ connector and all shock tube leads from impact or

Properties

MSDS #1122

Net Explosive Content per 100 units 0.0240 kg / 0.0529 lbs

Delay Time (msec)	Connector Block Color
9	Green
17	Yellow
25	Red
33	Green
42	White
67	Blue
100	Black
109	Black

Hazardous Shipping Description

Detonator assemblies nonelectric, 1.4B, UN 0361 PG II



See Product Disclaimer on page 2.

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NONEL® EZTL™

Technical Information

Application Recommendations (continued)

damage. Use care when placing blasting mats and cover material on top of the blasting circuit. The EZ connector contains a detonator and is subject to detonation caused by abuse such as impact. Shock tube which has been cut, ruptured or damaged may cause misfires.

- **NEVER** use NONEL EZTL detonators with detonating cord. The low strength surface detonator will not initiate detonating cord.
- **NEVER** attempt to disassemble the delay detonator from the EZ connector block or use the detonator without the connector.
- **NEVER** place more than 6 shock tube leads into an EZ connector block. Misfires may result.
- **NEVER** tie-in NONEL EZTL units until all holes have been primed, loaded, stemmed and the blast site has been cleared.

Transportation, Storage and Handling

- NONEL EZTL must be transported, stored, handled and used in conformity with all federal, state, provincial and local laws and regulations.
- For maximum shelf life (3 years), NONEL EZTL must be stored in a cool, dry, well ventilated magazine. Explosive inventory should be rotated. Avoid using new materials before the old. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives.

Packaging

Length		Case Type	Quantity / Case	
m	ft		case	subpack
2.5	10	D	180	90
3.5	12	D	180	90
6	20	D	150	75
9	30	D	120	60
12	40	D	100	50
15	50	D	90	45
18	60	D	70	35

- Length rounded to nearest one-half meter.
- Case weight varies by length & delay; see case label for exact weight.

Case Dimensions

Detpak (D)

subpack	44 x 22 x 25 cm	17½ x 8¾ x 10 in
strapped case	44 x 45 x 25 cm	17½ x 17⅝ x 10 in

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NONEL® Starter

Technical Information

Nonelectric Shock Tube & Detonator Assembly



Product Description
NONEL STARTER is a nonelectric detonator consisting of a spooled length of yellow shock tube with a Standard (#8) detonator attached to one end and the other end sealed. The detonator is housed in a plastic bunch block which facilitates easy connection to both shock tube and detonating cord.

NONEL STARTER is designed to provide controlled, nonelectric initiation of surface and underground blast rounds.

Application Recommendations
For detailed application recommendations, **ALWAYS** request a copy of Dyno Nobel's *Product Manual: NONEL® and PRIMACORD®* from your Dyno Nobel representative.

- **ALWAYS** trim excess lengths of detonating cord from bunch block. Detonating cord tails lying across outgoing trunkline can interfere with normal function.
- **ALWAYS** use NONEL Lead Line to splice onto the NONEL Starter unit to make up a custom length nonelectric starter assembly whenever the length of NONEL STARTER unit is not sufficient to position the blaster safely.
- **ALWAYS** use the plastic connector sleeves packaged in each NONEL Lead Line case to make a reliable splice connection to NONEL STARTER unit.

Properties

MSDS #1122

Net Explosive Content per 100 units	0.0570 kg 0.1254 lbs

Hazardous Shipping Description
Detonator Assemblies nonelectric, 1.4B,
UN 0361 PG II



See Product Disclaimer on page 2.

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Groundbreaking Performance™

NONEL® Starter

Technical Information

Application Recommendations (continued)

- **ALWAYS** hook the NONEL STARTER bunch block to the blast round after all equipment and non-essential personnel are clear of the blast area.
- **ALWAYS** unspool NONEL STARTER unit by hand if the bunch block has been attached to the blast round.
- **ALWAYS** place the bunch block so the lid is face down and cover the bunch block with drill cuttings or other inert material to help prevent shrapnel cut-off after attaching the bunch block to detonating cord or shock tube.
- **NEVER** attempt to initiate more than eight (8) NONEL shock tubes or one (1) detonating cord trunkline with the bunch block. Misfires may result.
- **NEVER** place detonating cord and shock tube in the same NONEL STARTER bunch block. Misfires may result.
- **NEVER** attach the NONEL Starter bunch block to the blast round until after the NONEL STARTER shock tube deployment is complete whenever a NONEL STARTER unit is to be unspooled by any method other than by hand.
- **NEVER** run over NONEL STARTER detonators with equipment. This may damage the shock tube and may cause a misfire. **ALWAYS** replace the NONEL STARTER if it is damaged.
- When using NONEL STARTER detonators with a detonating cord trunkline, **ALWAYS** place the detonating cord in the bunch block parallel to the detonator with the detonator pointing in the desired direction of initiation.

Transportation, Storage and Handling

- NONEL STARTER must be transported, stored, handled and used in conformity with all federal, state, provincial and local laws and regulations.
- For maximum shelf life (3 years), NONEL STARTER must be stored in a cool, dry, well ventilated magazine. Explosive inventory should be rotated. Avoid using new materials before the old. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives.

Packaging

Length		Case Type	Spools / Case	Weight / Case	
m	ft			kg	lbs
61	200	N	8	5	10
153	500	NL	8	10	21
305	1000	NL	4	9	19

- Length rounded to nearest one-half meter.

Case Dimensions

N	27 x 27 x 25 cm	10 ¾ x 10 ¾ x 9 ¾ in
NL	43 x 43 x 18 cm	17 x 17 x 7 ¼ in

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Material Safety Data Sheet

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CANUTEC (CANADA) 613-996-6666

MSDS # 1122
Date 06/13/12

Supercedes
MSDS # 1122 12/15/11

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s):
NONEL® MS
NONEL® MS ARCTIC
NONEL® LP
NONEL® SL
NONEL® TD
NONEL® MS CONNECTOR
NONEL® TWINPLEX™
NONEL® STARTER
NONEL® EZ DET®
NONEL® EZTL™
NONEL® EZ DRIFTER ®
NONEL® SUPER

Product Class: NONEL® Non-electric Delay Detonators

Product Appearance & Odor: Aluminum cylindrical shell with varying length and diameter of attached colored plastic tubing. The detonator may be enclosed in a plastic housing, and an assembly may contain two detonators. Odorless.

DOT Hazard Shipping Description: UN0029 Detonators, non-electric 1.1B II
-or- UN0360 Detonator assemblies, non-electric 1.1B II
-or- UN0361 Detonator assemblies, non-electric 1.4B II

NFPA Hazard Classification: Not Applicable (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

		Occupational Exposure Limits	
Ingredients	**CAS#**	**OSHA PEL-TWA**	**ACGIH TLV-TWA**
Pentaerythritol Tetranitrate (PETN)	78-11-5	None[1]	None[2]
Lead Azide	13424-46-9	0.05 mg (Pb)/m^3	0.05 mg (Pb)/m^3
Lead	7439-92-1	0.05 mg (Pb)/m^3	0.05 mg (Pb)/m^3
Silicon	7440-21-3	15 mg / m^3 (total dust) 5 mg / m^3 (respirable fraction)	10 mg / m^3
Selenium	7782-49-2	0.2 mg/m^3	0.2 mg/m^3
Red Lead (Lead tetroxide)	1314-41-6	0.05 mg (Pb)/m^3	0.05 mg (Pb)/m^3
Titanium dioxide	13463-67-7	15 mg/m^3	10 mg/m^3
Barium Chromate	10294-40-3	1 mg (CrO_3)/10m^3 (ceiling) 0.5 mg (Ba)/m^3	0.01 mg (Cr)/m^3 0.5 mg (Ba)/m^3
Lead Chromate	7758-97-6	0.05 mg (Pb)/m^3 1 mg (CrO_3)/10m^3 (ceiling)	0.15 mg (Pb)/m^3 0.012 mg (Cr)/m^3
Barium Sulfate	7727-43-7	0.5 mg (Ba)/m^3	10 mg/m^3
Potassium Perchlorate[3]	7778-74-7	None[1]	None[2]
Silica (crystalline)	61790-53-2	See Note Below	0.05 mg/m^3 (resp frac)

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Molybdenum	7439-98-7	None[1]	None[2]
Tungsten	7440-33-7	None[1]	5 mg/m^3 (TWA) 10 mg/m^3 (STEL)
Aluminum	7429-90-5	15 mg/m^3 (total dust) 5 mg/m^3 (respirable fraction)	5 mg/m^3
Antimony	7440-36-0	0.5 mg/m^3	0.5 mg/m^3
Cyclotetramethylene Tetranitramine (HMX)	2691-41-0	None[1]	None[2]
Diazodinitrophenol	4682035	No value established	No value established

[1] Use limit for particulates not otherwise regulated (PNOR): Total dust, 15 mg/m^3 ; respirable fraction, 5 mg/m^3 .
[2] Use limit for particulates not otherwise classified (PNOC): Inhalable particulate, 10 mg/m^3 ; respirable part., 3 mg/m^3 .
Note: The OSHA PEL for crystalline silica is calculated as follows:
Quartz, respirable: 10 mg/m^3 [e] / % SiO_2 + 2 Quartz, total dust: 30 mg/m^3 / % SiO_2 + 2
[3] Not all delay periods contain perchlorate. Those that do contain between from about 4 to a maximum of about 60 mg perchlorate per detonator.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable
Vapor Density: Not Applicable
Percent Volatile by Volume: Not Applicable
Evaporation Rate (Butyl Acetate = 1): Not Applicable
Vapor Pressure: Not Applicable
Density: Not Applicable
Solubility in Water: Not Applicable

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable **Flammable Limits:** Not Applicable
Extinguishing Media: (See Special Fire Fighting Procedures section.)
Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe, distant location. Allow fire to burn unless it can be fought remotely or with fixed extinguishing systems (sprinklers).
Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

This is a packaged product that will not result in exposure to the explosive material under normal conditions of use. Exposure concerns are primarily with post-detonation reaction products, particularly heavy metal compounds.

Eyes: No exposure to chemical hazards anticipated with normal handling procedures. Particulates in the eye may cause irritation, redness, swelling, itching, pain and tearing.
Skin: No exposure to chemical hazards anticipated with normal handling procedures. Exposure to post-detonation reaction products may cause irritation.

Ingestion: No exposure to chemical hazards anticipated with normal handling procedures. Post-detonation reaction product residue is toxic by ingestion. Symptoms may include gastroenteritis with abdominal pain, nausea, vomiting and diarrhea. See systemic effects below.

Inhalation: Not a likely route of exposure. See systemic effects below.
Systemic or Other Effects: None anticipated with normal handling procedures. Repeated inhalation or ingestion of post-detonation reaction products may lead to systemic effects such as respiratory tract irritation, ringing of the ears, dizziness, elevated blood pressure, blurred vision and tremors. Heavy metal (lead) poisoning can occur.
Carcinogenicity: ACGIH classifies Lead as a "Suspected Human Carcinogen" and insoluble Chromium VI as "Confirmed Human Carcinogen". NTP, OSHA, and IARC consider components contained in this detonator carcinogenic.

Perchlorate: Perchlorate can potentially inhibit iodide uptake by the thyroid and result in a decrease in thyroid hormone. The National Academy of Sciences (NAS) has reviewed the toxicity of perchlorate and has concluded that even the most sensitive populations could ingest up to 0.7 microgram perchlorate per kilogram of body weight per day without adversely affecting health. The USEPA must establish a maximum contaminant level (MCL) for perchlorate in drinking water by 2007, and this study by NAS may result in a recommendation of about 20 ppb for the MCL.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.
Skin: Wash with soap and water.
Ingestion: Seek medical attention.
Inhalation: Not applicable.
Special Considerations: None

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact.
Conditions to Avoid: Keep away from heat, flame, ignition sources, impact, friction, electrostatic discharge and strong shock. Do not attempt to disassemble.
Materials to Avoid (Incompatibility): Corrosives (acids and bases or alkalis).
Hazardous Decomposition Products: Carbon Monoxide (CO), Nitrous Oxides (NO_x), Sulfides, Chromates, Lead (Pb), Antimony (Sb) and various oxides and complex oxides of metals.
Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate all personnel to a safe distant area and allow to burn or fight fire remotely. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. If loose explosive powder is spilled, such as from a broken detonator, only properly qualified and authorized personnel should be involved with handling and clean-up activities. Spilled explosive powder is extremely sensitive to initiation and may detonate. Follow applicable Federal, State, and local spill reporting requirements.

Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: None required for normal handling. Provide enhanced ventilation after use if in underground mines or other enclosed areas.

Respiratory Protection: None required for normal handling.

Protective Clothing: Cotton gloves are recommended.

Eye Protection: Safety glasses are recommended.

Other Precautions Required: None.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State, and local regulations. Only properly qualified and authorized personnel should handle and use explosives. Keep away from heat, flame, ignition sources, impact, friction, electrostatic discharge and strong shock.

Precautions to be taken during use: Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death. Avoid breathing the fumes or gases from detonation of explosives. Detonation in confined or unventilated areas may result in exposure to hazardous fumes or oxygen deficiency.

Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

Material Safety Data Sheet

ECTION X - SPECIAL INFORMATION

These products contain the following substances that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Chemical Name	CAS Number	Max. lbs/1000 units
Lead	7439-92-1	39.4
	(Use Toxic Chemical Category Code)	
Lead Compounds	N420	2.0
Barium Compounds	N040	1.8
Chromium Compounds	N090	1.9

Range* of Section 313 Chemicals in each product

Product	lb Pb per 1000 detonators	lb Pb compounds per 1000 detonators	lb Ba compounds per 1000 detonators	lb Cr compounds per 1000 detonators
NONEL® MS	**0 - 27**	**0.3 – 1.5**	**0 – 0.9**	**0 – 0.9**
NONEL® LP	**0 - 30**	**0.3 – 2.0**	**0 - 1.8**	**0 - 1.9**
NONEL® SL	**7 - 27**	**0.3 – 1.5**	**0**	**0**
NONEL® TD	**0 - 18**	**0.3 – 0.7**	**0**	**0**
NONEL® MS Connector	**5 - 16**	**0.3 – 0.4**	**0**	**0**
NONEL® TWINPLEX™	**5 - 15**	**0.3 – 0.7**	**0**	**0**
NONEL® STARTER	**0**	**0.3**	**0**	**0**
NONEL® EZ DET®	**22 - 36**	**2.0**	**0**	**0**
NONEL® EZTL™	**5 - 15**	**0.5 – 0.7**	**0**	**0**
NONEL® EZ DRIFTER	**39.4**	**1.3**	**1.2**	**1.3**
NONEL® SUPER	**019**	**0.35**	**1.1**	**1.4**

*** The exact quantity and weight percent of Section 313 Chemicals in each delay period and tubing length for each product is available upon request.**

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NONEL® Lead Line

Technical Information

Nonelectric Shock Tube



Product Description

NONEL LEAD LINE is NONEL shock tube spooled at the factory in 763 meter (2,500 foot) lengths for easy application and deployment. NONEL LEAD LINE shock tube is a small diameter, three-layer plastic tube coated on the innermost wall with a reactive explosive compound. When initiated, NONEL shock tube propagates a low energy signal, similar to a dust explosion, at approximately 2000 m/sec (6,500 ft/sec) along the tube's length with minimal disturbance to the outside of the tube. The signal is transmitted from one NONEL shock tube to another through field-assembled splices.

NONEL LEAD LINE provides maximum flexibility to the blaster in choosing a position of safety from which to initiate nonelectric blast rounds in either underground or surface applications. NONEL LEAD LINE is the only NONEL product that can be cut and spliced into a NONEL detonator product to construct a custom length nonelectric starter assembly.

Application Recommendations

- **ALWAYS** splice NONEL LEAD LINE to NONEL EZTL™ nonelectric trunkline delay detonators, NONEL EZ DET® nonelectric blast initiation system, NONEL TD or NONEL Starter detonators to make-up the nonelectric starter assembly when using

Properties

MSDS #1124

Net Explosive Content per 100 units 0.0795 kg
0.1752 lbs

Length		Spools / Case
m	ft	
762	2500	2

- Length rounded to nearest one-half meter.
- See case label for exact case weight.

Hazardous Shipping Description

Articles, Explosives, N.O.S. (HMX, Aluminum), 1.4S, UN 0349, PG II



NONEL® Lead Line

Technical Information

Application Recommendations (continued)

NONEL LEAD LINE as the primary initiator for NONEL blast rounds.

- **ALWAYS** trim at least 3 m [10 ft] of tubing before inserting into a nonelectric shock tube starting device or whenever dirt and/or moisture may have compromised the open tube ends before making a splice connection.
- **ALWAYS** replace the plastic tube closure over the open end of any NONEL LEAD LINE that remains on the spool and is intended to be used to make up another nonelectric starter assembly.
- **ALWAYS** make the final hook-up of the nonelectric starter assembly to the blast round only after all equipment and non-essential personnel are clear of the blast area.
- **ALWAYS** unspool NONEL LEAD LINE by hand if the starter assembly has been spliced to it and is attached to the blast round.
- **ALWAYS** keep any NONEL LEAD LINE tube ends sealed and free from dirt and moisture since dirt or moisture in the shock tube may cause a misfire.
- **NEVER** use NONEL LEAD LINE for in-hole use. NONEL LEAD LINE is for use outside the borehole only.
- **NEVER** attempt to knot different lengths of shock tube together. Shock tube will not initiate itself through knot connections. It must be spliced.
- **NEVER** remove the plastic tube closure from the NONEL LEAD LINE shock tube until just before splicing.
- **NEVER** attach the starter assembly to the blast round until after the LEAD LINE deployment is complete whenever NONEL LEAD LINE is to be unspooled by any method other than by hand,
- **NEVER** run over NONEL LEAD LINE with equipment. This may damage the shock tube and may cause a misfire. **ALWAYS** replace the NONEL LEAD LINE if it is damaged.
- When making a nonelectric starter assembly using NONEL LEAD LINE, **ALWAYS** remove the plastic tube closure and save for later use. Splice two freshly-cut ends of NONEL shock tube together (one from the NONEL LEAD LINE and the other from the NONEL detonator) by inserting them into opposite ends of the plastic connector sleeve and pushing them toward one another until they are both at least ½ cm (¼ in) in the splice.

Application Recommendations (continued)

Transportation, Storage and Handling

- NONEL LEAD LINE must be transported, stored, handled and used in conformity with all federal, state, provincial and local laws and regulations.
- For maximum shelf life (3 years), NONEL LEAD LINE must be stored in a cool, dry, well ventilated magazine. Explosive inventory should be rotated. Avoid using new materials before the old. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives.

Case Dimensions

51 x 25 x 28 cm 20 x 9 ⅞ x 10 ⅞ in

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CANUTEC (CANADA) 613-996-6666

MSDS # 1124
Date 09/16/10

Supercedes
MSDS # 1124 08/13/08

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): NONEL® LEAD LINE

Product Class: Shock Tube

Product Appearance & Odor: Hollow plastic tubing (normally yellow) with dusty inner coating of HMX and aluminum. No detectable odor.

DOT Hazard Shipping Description: **UN0349** Articles, explosive, n.o.s. (HMX) 1.4S II.
For 10,000 ft spools with Wire Lock Terminations only: Not regulated as an explosive, 0000

NFPA Hazard Classification: Not Applicable (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

			Occupational Exposure Limits	
Ingredients:	**CAS#**	**% (Range)**	**OSHA PEL-TWA**	**ACGIH TLV-TWA**
Cyclotetramethylene Tetranitramine (HMX)	2691-41-0	0.35	None[1]	None[2]
Aluminum (dust)	7429-90-5	0.04	15 mg/m^3 (total) 5 mg/m^3 (respirable)	10 mg/m^3

[1] Use limit for particulates not otherwise regulated (PNOR): Total dust, 15 mg/m^3 ; respirable fraction, 5 mg/m^3.
[2] Use limit for particulates not otherwise classified (PNOC): Inhalable particulate, 10 mg/m^3 ; respirable part., 3 mg/m^3.
Note: The above hazardous dust mixture is present at approximately 15 mg per meter of tubing.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable
Vapor Density: Not Applicable
Melting Point: HMX decomposes violently at melting pt., about 278°C
Evaporation Rate (Butyl Acetate = 1): Not Applicable
Vapor Pressure: Not Applicable
Density: Not Applicable
Solubility in Water: Not Soluble
Percent Volatile by Volume: Not Applicable

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SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable
Flammable Limits: Not Applicable
Extinguishing Media: Water, inert powder, CO_2
Special Fire Fighting Procedures: For shock tube only, consider initial isolation of at least 15 meters (50 feet) in all directions. Fight fire with normal precautions and methods used for plastic fires from a reasonable distance. IF DETONATORS OR OTHER EXPLOSIVES ARE PRESENT, DO NOT FIGHT FIRE.
Unusual Fire and Explosion Hazards: May burn vigorously with localized detonations and projection of fragments, with effects usually confined to the immediate vicinity of packages. Toxic smoke from combustion of the plastic material may be emitted. If product functions, high heat and pressure are released from the end of the tube if not covered or enclosed, typically by a metal device.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

This is a packaged product that will not result in exposure to hazardous ingredients (inner coating materials) under normal conditions of use.
Eyes: Not a likely route of exposure. Dust particles may be irritating.
Skin: Not a likely route of exposure. Dust particles may cause skin irritation.
Ingestion: Not a likely route of exposure. Ingestion of large amounts of the reactive powder (HMX) is poisonous and may cause cardiovascular collapse.
Inhalation: Not a likely route of exposure. Breathing dust can cause respiratory irritation. During manufacture and at processing temperatures, irritating fumes may evolve.
Systemic or Other Effects: None known.
Carcinogenicity: No constituents are listed by NTP, IARC or OSHA.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.
Skin: Wash with soap and water.
Ingestion: Not Applicable
Inhalation: Not Applicable
Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable
Conditions to Avoid: Keep away from heat, flame, impact, friction, ignition sources and strong shocks. Also avoid stretching to failure.
Materials to Avoid (Incompatibility): Incompatible with strong oxidizers and acids.
Hazardous Decomposition or Combustion Products: Hazardous carbon monoxide (CO), nitrogen oxide (NO_X) gases and products of plastic decomposition produced.
Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate area not less than 50 feet in all directions. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, repackage undamaged devices in original packaging, accounting for every device. If the ends or tube wall have been opened such that powder may have

been released from the tube, isolate the spill area. Contamination of the HMX/Aluminum powder with sand, grit or dirt will render the material more sensitive to detonation. Carefully wet down and clean "loose" powder spills using a damp sponge or rag, avoid applying friction or pressure to the explosive, and place in a (Velostat) electrically conductive bag. Follow applicable Federal, State, and local spill reporting requirements.
Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: None normally required. Provide enhanced ventilation if used in underground mines, indoors or other enclosed areas.
Respiratory Protection: None normally required. Extended testing of the product indoors or in enclosed areas may necessitate respiratory protection.
Protective Clothing: None normally required. Wear chemical-resistant gloves during post-detonation cleanup or spill cleanup operations.
Eye Protection: Safety glasses or goggles are recommended for handling, testing or cleanup.
Other Precautions Required: None

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State, and local regulations. Keep away from heat, flame, ignition sources and strong shock. Only properly qualified and authorized personnel should handle and use Shock Tube.
Precautions to be taken during use: Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death. Avoid breathing the fumes or gases from detonation of explosives. Detonation in confined or unventilated areas may result in exposure to hazardous fumes or oxygen deficiency.
Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

SECTION X - SPECIAL INFORMATION

This product contains the following substances that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Chemical Name	CAS Number	% By Weight
None		

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Operational Forms

ACQUISITION RECORD

DATE	NAME OF MANUFACTURER OR BRAND	DATE CODE MARKS OR I.D.	QUANTITY	DESCRIPTION	DEALER ADDRESS LICENSE NO.

DISPOSITION RECORD

DATE	NAME OF MANUFACTURER OR BRAND	DATE CODE MARKS OR I.D.	QUANTITY	DESCRIPTION	DEALER ADDRESS LICENSE NO.

CDB MAGAZINE INVENTORY		Magazine #:				
Project:						
PRODUCT	DATE CODE	IN	OUT	BALANCE	DATE	NAME

BLAST REPORT

Project : _____

Blast No. _____ **Date** _____
Type _____ **Day of Wk** _____
Location _____ **Weather** _____
Time of Blast _____ **Temp.** _____
No. of Holes _____
Hole Diameter _____
Depth _____
Spacing _____
Burden _____
Max Lbs/Hole _____
Max Lbs/Delay _____
Max Holes/Delay _____
Total Delays _____
Total Pounds _____
Powder Factor _____

Explosives Used

Product	Size	# of sticks	total pounds

Detonators Used

Type	Length	# used

yes **no**
Diagram Attached

Blast Monitoring Results

	Station 1	Station 2
Location		
Instrument S.N.		
Calibration Date		
Distance from Shot (ft)		
Peak Overpressure (psi)		
Peak Air Blast (dB)		
PVS (ips)		
PPV - Transverse (ips)		
PPV - Vertical (ips)		
PPV - Longitudinal (ips)		
Max. PPV		

NOTES: _____

_____
Blaster Date

BLAST LOCATION SKETCH

DAILY MONITORING REPORT

Contractor: _____ Contract #: _____

Project: _____ File #: _____

Location: _____ Location #: _____

_____ Sheet _____ of _____

Address:

Date	Time	Eqpt. S/N	Blast Number	dB	PPV	PSI	Remarks

Technician _____ Date: _____

Engineer _____ Date: _____

MONITORING EQUIPMENT LOCATION

Contractor: _____ Contract No: _____

Project: _____ Pier #: _____

Location: _____ Sheet _____ of _____

Date Placed		RASS Box #		File No.	
Date Removed		Equipment S/N		Roll No.	
Address		Station No.		Negative No.	

Equipment Location Sketch

Technician: _____ Date: _____



DRILLING & BLASTING

SAFETY PLAN

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1. INTRODUCTION

Contract Drilling & Blasting LLC (CDB) is committed to providing a safe workplace for its employees and all others at or near our work sites. Our goal is to conduct blasting operations in the safest manner possible while minimizing the risk of injuries and damage to property. This blasting safety plan defines our company policy regarding all work in which explosives are stored, transported, and used. This safety policy will be communicated to our employees, contractors, and suppliers through on-site training and regular safety meetings. These policies do not supersede any federal, state, or local regulations regarding explosives and blasting work. Compliance with these policies and all applicable federal, state, and local regulations will be strictly enforced.

All employees are responsible to perform their work in a safe manner and will immediately report all accidents and/or near misses to their supervisor / safety representative.

Many policy guidelines refer to the "blast site." For the purposes of this safety plan, and federal regulations, the blast site is defined as:

"The area where explosive material is handled during loading including an area extending 50 feet in all directions from loaded blast holes or explosive materials."

2. DRUGS & ALCOHOL

All potential employees will be subject to a drug screening prior to employment. Those failing the drug screening (1 or more positive results) will be refused employment. During the course of employment with CDB all employees are subject to random drug / alcohol screening. Any employee found to be under the influence of drugs or alcohol on the job or while operating a company vehicle will be terminated. All persons involved in a job related accident will be screened for drugs and alcohol, positive results will result in termination. Any employee suspecting another employee of being under the influence of drugs or alcohol while on the job or operating a company vehicle shall report the individual to a supervisor / safety representative.

3. BLASTER IN CHARGE

The designated Blaster-in-charge shall have complete authority over all personnel within the blast site and is responsible for all blasting activities that occur at the project. The blaster-in-charge shall hold all required blasting licenses, have appropriate experience and training, and generally be responsible for:

3.1. Maintaining an explosives storage and transportation system that is safe and in compliance with all applicable regulations.

3.2. Implementing the specific blast plans that have been approved for the project.

3.3. Overseeing that all drilling and blasting work is done in a safe and efficient manner.

3.4. Inspecting field equipment to ensure its safety readiness.

3.5. Blast clearing and guarding operations.

3.6. Continuously monitoring the work habits of the blasting crew, and providing corrective actions when necessary.

3.7. Ensuring that all appropriate blasting plans, reports, and explosive storage records are kept and submitted as required by the project documents and regulatory agencies.

3.8. Ensure that all site first-aid kits are at full supply and all employees know the location of the first-aid kits.

4. HAZARD AND RISK ASSESSMENT

The general and site specific blasting hazards and environmental impacts will be defined for each blasting site. Blasting plans and procedures will incorporate all reasonable measures necessary to eliminate negative impacts on persons and minimize negative impacts on property and the environment. The following general hazard areas shall be reviewed to help identify potential site-specific hazards and controls for each blast site.

4.1. Define public and commercial access, and traffic volumes.

4.2. Determine the relative location and condition of nearby structures.

4.3. Determine vibration and air overpressure limits (or peak water pressure limits—if blast is under water).

4.4. Determine public and regulatory notification requirements.

4.5. Know the location and condition of all nearby utilities that are above and below the ground or water surface.

4.6. Define who is responsible for any damage, or claims of damage, to any nearby property.

4.7. Study the local area blasting history with respect to incidents, damage claims, or litigation.

4.8. Determine specific environmental impacts that might require special blasting control measures.

4.9. Define hazardous material notification requirements for employees, and develop a program to implement it.

4.10. Stray current tests will be performed at blast sites before any electric detonators are used.

If extraneous electricity causes current flow exceeding 0.05 amperes at a blast site, Electric detonators must not be used!

5. EXPLOSIVE STORAGE

If temporary explosive storage magazines are used on or near the site, the blaster-in-charge will ensure that full compliance with federal, state, and local regulations governing explosive storage is maintained.

5.1. The blaster-in-charge will thoroughly review and understand all regulations enforced by Federal Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) regulations, as described in the Organized Control Act of 1970, Title XI – Regulation of Explosives – Public Law 91-492 as amended by the SAFE EXPLOSIVES ACT on November 25, 2003 with regard to:

5.1.1. Magazine construction requirements

5.1.2. Locking requirements

5.1.3. Inventory record keeping requirements

5.1.4. Explosive loss reporting requirements. Immediately report by calling**:** **1-888-ATF-BOMB** and the local authorities.

5.1.5. Table of distance requirements

5.2. Required magazine permits will be obtained as required by local or state authorities.

5.3. Emergency action plans will be submitted to local emergency response agencies.

6. ON-SITE EXPLOSIVE TRANSPORTATION

The blaster-in-charge will ensure that:

All vehicles hauling explosives will be properly loaded and display adequate explosives warning signs as specified by either OSHA, MSHA, DOT—whichever is applicable.

6.1. All vehicles will have appropriate safety equipment, as required by state and federal regulations.

6.2. Passengers shall not accompany explosives.

6.3. Equipment or other materials must never share the same cargo space with explosives.

6.4. Explosive vehicles, safety equipment, and day boxes shall be regularly inspected, maintained and cleaned.

6.5. All explosives, and any traces of explosives, must be removed from transportation equipment before it is serviced.

6.6. Explosives day boxes shall be properly built and marked as required by OSHA regulations.

6.7. When detonators and explosives are transported in a day box, they shall be separated by a four-inch hardwood, or equivalent, partition.

6.8. Only vehicles authorized by the Blaster-in-Charge shall be allowed on the blast site.

6.9. Proper shipping papers shall accompany explosives when they are delivered to and from the job site.

6.10. Explosive transportation must be undertaken under the supervision of a person who is familiar with the hazards involved, and the actions required in the event of fire or other abnormal occurrence.

7. BLAST DESIGN

In many blast applications, it is often impossible to fully satisfy all of the design objectives. Therefore, some sort of trade-off analysis is needed to balance design sacrifices based on priority. In blast design work, there are usually two general types of goals: 1) safety goals and 2) operational goals. Whenever safety goals conflict with operational goals, the safety concerns

shall have the highest priority. For instance, producing minus 12-inch rock might be an operational objective while controlling flyrock is a safety goal. Since the safety goals must have the highest priority, the blast plan might specify the use of conservative amount of stemming to control rock movement, thus sacrificing rock fragmentation in the collar area. The following guidelines shall be used to evaluate all blast design choices:

7.1 General Blast Design Considerations:

7.1.1 Blast designs shall never compromise safety, and safety goals shall have the highest design priority.

7.1.2 While satisfying all primary design objectives, blast designs shall be as simple as possible.

7.1.3 The blast designer(s) must have thorough knowledge and understanding of the blast requirements and constraints for each individual application. If the lead blaster is unfamiliar with a particular application, design, or product, outside help shall be obtained from a consultant or explosive-supplier representative who is familiar with the application or product.

7.1.4 Blast design geometry shall be appropriate for the application. The geology of the blast site and area control requirements must be considered when selecting hole size, explosive diameter, stemming height, and all other design dimensions.

7.2 Initiation System Guidelines:

7.2.1 Initiation systems must provide adequate protection against stray current hazards.

7.2.2 Delay timing schemes shall be as simple as possible, while providing adequate burden relief and sufficiently advanced in-hole energization to prevent surface cut-off failures.

8. BLAST PLANNING

Good advance planning and preparation work will improve blasting productivity and safety. Blast planners shall:

8.1. Determine the number, skill and experience requirements of drillers, blasters, and helpers required to perform the work.

8.2. Prepare a blasting work schedule that allows for unforeseen problems or delays.

8.3. Develop plans for dealing with special environmental conditions might occur during this work. Examples are lightning, floods, cold or hot weather, etc.

8.4. Define and obtain any special equipment that may be needed for the blasting work.

8.5. Plan to have back-up units to replace critical instruments like blasting machines and non-electric initiating devices.

8.6. The functionality of all critical instruments like blasting machines, testers, and seismographs shall be tested the day before each scheduled blast.

8.7. Spare batteries and other essential parts for blasting instruments shall be kept at the job site.

8.8. Evaluate local services and carefully screen potential product and service providers.

8.9. Investigate explosive storage and delivery options. If it is necessary to establish a temporary magazine site, allow several months of time to negotiate leases and for permitting.

9. DRILLING and BLASTING SAFETY

Use of the following personal protective equipment is mandatory:

Protective Head gear – hard hat

Protective Footwear – steel/molded toed boots

Protective eye wear -- safety glasses

The following protective equipment may be used, and under certain conditions, supervisors may require their use.

Gloves

Ear Protection – plugs or muffs

Protective clothing

Respirators

Personal Floatation Devices

Fall Protection

9.1 Drilling

9.1.1 All drillers must have adequate experience and operating knowledge about each drill before operating it.

9.1.2 Drillers shall perform safety inspections and on all drills before they are operated. Any conditions that might cause unsafe operation shall be corrected before drill is put into service.

9.1.3 Drills must be routinely serviced and lubricated as specified by the manufacturer.

9.1.4 All safety equipment, like hose release guards, must be properly installed.

9.1.5 Drillers shall monitor bit wear and penetration rates, and they shall vary feed pressure, hammer rates, and other operating variables to achieve maximum bit life.

9.1.6 The blaster-in-charge shall establish a system for marking hole collar locations. Drillers shall collar holes as close as possible to the designed collar location and they shall carefully align the drill boom to guide the drill stem along the intended hole path.

9.1.7 The driller's primary goal is to drill properly aligned and clean holes. Driller should vary hole-flushing rates and determine which drill settings are producing the cleanest and most accurately placed holes.

9.1.8 Holes shall never be drilled in any positions where there is any chance they might intersect another live hole. Unless a specific variance is granted, the minimum collar distance from a loaded hole must 50 feet or 2 x the hole depth, whichever is greatest.

9.1.9 For surface blasting, drillers shall note any unusual conditions or adjustments to the original plan. Drill log information shall be submitted to the blaster-in-charge at the end of each drilling shift.

9.2 Loading Shots

9.2.1 Safety Review Meetings:

The blaster-in-charge shall assemble all blast crew personnel to conduct a safety review meeting before explosive loading work begins. The following issues shall be addressed at each safety review meeting.

- Identify the blaster-in-charge
- Review personal safety responsibilities
- Review site specific hazards
- Review loading plans and procedures
- Assign work responsibilities
- Review equipment requirements and safe operation procedures
- Review emergency and site security procedures
- Review requirement that open flames or sparks must not occur on the blast site, and that smoking is absolutely prohibited.
- Confirm that the crew has the proper tools to safely perform loading and site security tasks. Equipment not specifically approved for blasting work shall not be used. Check the following (tool requirements will vary):
    - Non-sparking loading poles, powder punches, knives, etc.
    - Blasting machines or non-electric starters
    - Testing equipment; blasters galvanometers/multimeters
    - Measuring tapes with non-sparking weights

- Warning sirens
- Radios, blasting area warning signs, traffic vests, first aid kit, and drinking water

9.2.2 Blast Site Inspection:

The blaster-in-charge and loading crew shall inspect the blast site before loading begins. Hazards or conditions that might expose explosives to excessive pressure, heat, or friction shall be corrected prior to loading. If the inspection reveals that blast hole re-drilling is required, the re-drilling shall be done before loading commences.

9.2.3 All needed explosives, stemming material and other supplies shall be brought to the blast site before commencing hole-charging operations. All mobile equipment, not expressly used and approved for hole-charging charging operations shall always be kept a safe distance away from blast holes once loading begins.

9.2.4 All equipment and all non-essential equipment and people shall be removed from blast sites once loading operations begin.

9.2.5 Blast holes will be inspected before holes are loaded.

9.2.6 Primers shall be prepared just before they are loaded.

9.2.7 When column separation is suspected, a second primer using the same delay detonator as the first primer shall be loaded into the separated portion of the column.

9.2.8 If damage to an initiator lead is suspected, the hole shall be re-primed with a similar primer.

9.2.9 When it is necessary to operate mobile equipment on the blast site, the blaster-in-charge shall closely monitor every movement and setup. Extreme care must be taken to ensure that detonators, initiator leads, and explosives are not run over, snagged, or otherwise damaged by mobile equipment. No non-essential vehicles shall be allowed on the blast site.

9.2.10 No sparking materials or loose rocks shall be allowed to enter blast holes after they contain explosives.

9.2.11 Crewmembers shall immediately report any dangerous conditions, such as overloaded holes, to the blaster-in-charge who shall develop measures to safely control the condition.

9.2.12 Records detailing the quantities of explosives brought to the site and used each day shall be accurately kept.

10 INITIATION SYSTEM HOOK-UP PROCEDURES

10.1 Blasting machines and non-electric starters must be stored away from the blast area while blasts are loaded and tied in.

10.2 Only persons designated by the blaster-in-charge shall participate in blast hookups. All other persons shall vacate the blast site.

10.3 Blast crews shall only use connections and hookups that are approved by the product manufacturer.

10.4 Blast hookup shall not begin until all holes have been loaded and stemmed, the blast site is clear of all vehicles and unnecessary people, and no hazards that might delay the blast exist in the blasting security zone.

10.5 The blaster-in-charge, and one other crewmember, shall independently inspect and double-check all hookups.

10.6 To prevent hook-up mistakes caused by rushing to meet a blasting time limit; blasting work schedules shall allow adequate time for careful blast hook-up work.

10.7 When blast hookups are completed more than one half hour before blast time, the hookup shall be inspected again just prior to detonation.

11 BLAST AREA CLEARING AND SECURITY PROCEDURES

11.1 Pre-blast Review Meeting:

Before blasting, the blaster-in-charge shall assemble all blast crew personnel to review the blast area security plan and blast emergency plan. The blaster-in-charge shall cover the following issues and responsibilities at each pre-blast meeting.

11.1.2 Acknowledge the shot is properly loaded, hooked up, secured, and ready for detonation.

11.1.3 Review the blasting firing time schedule.

11.1.4 Review tagout procedures that will ensure no persons are underground when the blast occurs.

11.1.5 The blaster-in-charge shall specify who shall fire the shot and define the safe shot initiation location.

11.1.6 Review the communication system that shall be used between the blaster-in-charge and all blast area security personnel.

11.1.7 Specify what signals shall be used to announce:

- Preblast Warnings
- Blast Time
- All Clear
- Blast Countdown Suspension

11.1.8 Outline general emergency plans that shall be used in the event of an accident or other unplanned event.

11.1.9 Review procedures for handling misfires.

11.2 Clearing And Guarding Procedures: Blaster-in-Charge's responsibility.

11.2.1 The Blaster-In-Charge shall coordinate blasts, with all concerned parties, on an approved blasting schedule.

11.2.2 A tagout procedure will be used to ensure no persons are underground when blasts occur. A safe area around the shaft collar or tunnel portal will be established, cleared and secured.

11.2.3 When the area is secure, a primary initiating device shall be connected to the shot approximately five minutes before the scheduled blasting time.

11.2.4 The blaster-in-charge shall then have the five-minute blast warning signal given to warn all in the area that a blast is impending.

11.2.5 Four minutes later, the one minute blast warning signal shall be given if all persons, including the shot-initiator, are in a safe location and all guards confirm that the blast area is still secure.

11.2.6 At blast time, if the blast area is secure, the blaster-in-charge shall fire or instruct the designated shot firer to fire the blast.

11.2.7 After post blast fumes have dissipated to safe levels – as verified by testing -- the blaster-in-charge shall inspect the shot area. This examination shall look for:

- Dangerous rock conditions
- The presence of undetonated explosives and/or initiators
- Abnormal blast conditions and any other hazards

11.2.8 If misfires or other hazards are present, the blaster-in-charge shall supervise the removal of the hazard by the most appropriate means available.

11.2.9 When the area is clear of hazards the blaster-in-charge shall give the all clear signal allowing work to resume in the area.

12 MISFIRE PROCEDURES

When blasting misfires occur, or are suspected, their existence and extent must be carefully established under the direction of the blaster-in-charge. Under these circumstances, the blaster-in-charge shall:

12.1 Ensure that no one enters the blast area, and it remains secured, for at least 30 minutes.

12.2 Develop a plan involving minimum people to safely re-fire, wash out, or recover un-shot explosives, before any other normal work resumes near the blast site.

12.3 Record the location of any potentially un-detonated explosives on the blast report.

12.4 Expand the blast security area if flyrock potential is increased when misfires are re-blasted.

13 BLAST EMERGENCY PLAN

The elements of specific blast emergency plans shall vary based on the unique conditions that exist at each job site. Emergency plans shall:

13.1 Include a posted list of all emergency response telephone numbers including; ambulance, hospital, OSHA or MSHA district office, police, state regulatory authorities, and home phone numbers of all site employees.

13.2 Be clearly communicated to and understood by all site workers and supervisors.

13.3 Define notification procedures for contacting supervisors, family, and regulatory agencies based on the nature of an incident or accident.

13.4 For each work site, the location of first aid kits and the identity of trained first aid providers shall be known by all workers at the site.

14 BLAST REPORTS

Individual blast reports shall be prepared for each blast. Blast reports shall include the following:

14.1 Blast date, time, and location.

14.2 Blast geometry, including, but not limited to, hole size(s), hole depths, drill pattern, number of holes, bench height, and sub-drilling.

14.3 Blast hole loading summaries, including typical hole loads, explosive types, primers, detonator delays, stemming type and quantity, and total explosive consumption by product.

14.4 Shot volume and powder factor calculations.

14.5 Initiation timing scheme, including in-hole delays, surface delays, and planned hole firing times.

14.6 Blast effect monitoring data (if applicable), such as ground vibration levels, air overpressure, and peak water pressures [IF APPLICABLE].

14.7 Notes about blast results, unusual conditions, occurrences, or special precautions.

14.8 Name and signature of the blaster-in-charge.

EMPLOYEE ACKNOWLEDGEMENT

I, _____, (employee) have read and understand the Blasting Operations Safety Plan for Contract Drilling & Blasting LLC. I also acknowledge that failure to comply with the policies outlined in the Plan or to endanger the safety and well being of other employees, workers or public through my actions will result in the following disciplinary actions;

Minor Offenses (non-injury causing, non life threatening)

	Action
First Offense	Written Warning
Second Offense	3 day suspension from work with no pay
Third Offense	Immediate Termination

Major Offenses (injury causing, life threatening, drug/alcohol use)

	Action
First Offense	Immediate Termination

EMPLOYEE SIGNATURE _____.

DATE _____.

APPENDIX B2

SR 679 Bayway Structure E Imperiled Species and Marine Mammal Watch Plan

Imperiled Species and Marine Mammal Watch Plan

This Imperiled Species and Marine Mammal Watch Plan (IS/MMWP), a part of the overall Blast and Watch Plan (BWP), has been developed by Land & Sea Group, Inc. (LSG) for American Bridge Company. Its intent is to meet the permit requirements for the blasting demolition of the old bridge piers of SR 679 (Pinellas Bayway Structure E) over Boca Ciega Bay South (Run 24) a part of Tampa Bay in Pinellas County, Florida.

Watch Team Information

LSG has assembled a Watch Team that is highly experienced in providing IS/MMWP for bridge demolitions in the State of Florida. The following are the qualifications of the team, resumes may be found in Attachment A.

Team Leaders

Janice Sands Ash, P.E.
Primary Coordinator
Experienced Marine Mammal Observer (MMO), President, The Land & Sea Group, Inc, BS Civil Engineering, MS Civil Engineering

Tom Ash
Primary Observer (Aerial – in helicopter)
Experienced aerial observer, General Manager, Environmental Protection Commission of Hillsborough County (EPC), BS Marine Biology

Observers

Jorden Mericle
Experienced Marine Mammal Observer (MMO)

Kristina Haselier
Experienced MMO

Tony Corbett
Experienced MMO/ Photographer

Kevin Shelton
On-call stand-by Experienced Aerial Observer

Britt'ne K. Mericle
MMO Trainee

Qualifications and Contact Information

The following is a summary of the pertinent Blast experience (shown in purple) for each team member and other recent Imperiled Species and Marine Mammal Observation experience. Detailed resumes that show additional MMO experience are included in Attachment A.

Observer Name	Role	Blast Project Name	Date	Client
Tom Ash	Primary Aerial Observer	Bayway Bridge Structure C Demolition	6/13/2013	Orion Contractors
813-927-3812	Primary Aerial Observer	US-19 Bridge Demolition over Cross FL Barge Canal	7/20/2010	Cone & Graham, Inc.
	Primary Aerial Observer	Belleair Bridge Demolition	7/15/2009	Misener Marine Construction
	Primary Aerial Observer	John's Pass Bridge Demolition	12/16/2008	Flatiron Constructors
	Primary Aerial Observer	Treasure Island Causeway Bridge Demolition	3/1/2006	Johnson Bros. Corp
Janice Sands Ash, PE	Experienced MMO/ coordinator	Captiva Island 5.7 mi Subaqueous Cable Project	6/1/2018	Lee Co Electric Coop
813-927-0617	Experienced MMO-Coordinator	Bayway Bridge Structure C Demolition	6/13/2013	Orion Contractors
	Experienced MMO	US-19 Bridge over Cross FL Barge Canal	7/20/2010	Cone & Graham, Inc.
	Experienced MMO	Belleair Bridge Demolition	7/15/2009	Misener Marine Construction
	Experienced MMO-Coordinator	John's Pass Bridge Demolition	12/16/2008	Flatiron Constructors
	Experienced MMO-Coordinator	Treasure Island Causeway Bridge Demolition	3/1/2006	Johnson Bros. Corp
Judy Mericle	Experienced MMO	Jacksonville Harbor Deepening Project	10/1/2019	Great Lakes Dredge Company
813-394-1688	Experienced MMO	Canaveral Harbor Deepening Project	6/1/2019	Norfolk Dredge Company
	Experienced MMO	Captiva Island 5.7 mi Subaqueous Cable Project	6/1/2018	Lee Co Electric Coop
	Experienced MMO	Bayway Bridge Structure C Demolition	6/13/2013	Orion Contractors
	Experienced MMO	US-19 Bridge over Cross FL Barge Canal Demolition	7/20/2010	Cone & Graham, Inc.
Kristina Hasselier	Experienced MMO	Jacksonville Harbor Deepening Project	10/1/2019	Great Lakes Dredge Company
863-899-3979	Experienced MMO	Canaveral Harbor Deepening Project	6/1/2019	Norfolk Dredge Company
	Experienced MMO	Captiva Island 5.7 mi Subaqueous Cable Project	6/1/2018	Lee Co Electric Coop
	Experienced MMO	Chevron Pascagoula Oil Project	7/22/2011	Weeks Marine
Anthony Corbett	Experienced MMO- Photographer	Bayway Bridge Structure C Demolition	6/13/2013	Orion Contractors
813-291-1592	Experienced MMO-	US-19 Bridge over Cross FL Barge Canal	7/20/2010	Cone & Graham, Inc.
	MMO Trainee	John's Pass Bridge Demolition	12/16/2008	Flatiron Constructors
	MMO Trainee	Treasure Island Causeway Bridge Demolition	3/1/2006	Johnson Bros. Corp
Kevin Shelton	Experienced aerial observer	Bayway Bridge Structure C Demolition	6/13/2013	Orion Contractors
863-272-4879	Experienced MMO - Coordinator	US-19 Bridge over Cross FL Barge Canal	7/20/2010	Cone & Graham, Inc.
	Experienced MMO - Coordinator	Belleair Bridge Demolition	7/15/2009	Misener Marine Construction
	Experienced MMO	John's Pass Bridge Demolition	12/16/2008	Flatiron Constructors
	Bridge Blast Demolition projects			
MMO	Marine Mammal Observer			

Watch Program

Prior to Event

American Bridge will place red and yellow buoys east and west of the bridge demarcating the exclusion zone as shown on Figure 1. The safety radius based on calculations defined in the Blast Design is a 1863-foot exclusion zone and a 300 foot buffer zone.

Land & Sea Group, Inc. (LSG) will coordinate with American Bridge to organize one (1) formal watch coordination meeting to be held at least two days prior to the blast event. Attendees will receive written notification from LSG as to when and where the meeting will take place. Teleconferencing or Zoom Conference will be utilized for this meeting where applicable. Attendees will include the observers, construction contractors, demolition subcontractors, and other interested parties (i.e. USCG, NOAA, FWC and USFWS).

The Primary Coordinator will host the meeting and inform all attendees about the possible presence of manatees, dolphins, marine turtles, sturgeon, small-tooth sawfish, or whales in the blasting area. It will be made clear that civil and/or criminal penalties can result from harassment, injury, and/or death of an endangered species.

Day of Event

LSG will provide a team of at least four (4) observers, including one aerial observer, for the watch program. One observer (Tom Ash) will be designated as "Primary Observer" and will be stationed in a helicopter above the area. The Primary Coordinator (Janice Ash) will be stationed on the top of the new bridge. Additional observers will be positioned on the bridge at the best vantage points, one facing east and one facing west on the new bridge. One observer will be positioned on a boat who will be in contact with the aerial observer by 2-way radio. Please see Figure 1 for Exclusion Zone diagram and observer positions.

The watch program shall begin at least one hour prior to the scheduled start of the blasting to identify the possible presence of manatees, dolphins, marine turtles, sturgeons, small-tooth sawfish, or whales located in the near shore area. All observers will be on-location at the watch start time and annotate time they are on station in their Observation Log.

The aerial observer will do a pre-event surveillance sweep at the one hour prior to the blast. This sweep will cover a 1 mile beyond the safety perimeter to identify any animals approaching the exclusion zone. This sweep will be repeated 30 minutes prior to the blast if animals are found to be moving toward the safety perimeter. If no animals are present, the aerial observer will restrict his observation to the safety perimeter.

The watch program shall continue until at least one-half hour after detonation(s) is complete. The observers will be in close communication via two-way radio or cellular phone with each other, American Bridge and the blasting sub-contractor (the blaster). All observers will be equipped with the following items at all times.

- Working two-way radio
- Cell phone,
- Polarized sunglasses,
- Safety Work Vest
- Binoculars,
- Red flag for backup communication, and
- Sighting log with a map to record sightings (See Attachment B)

All protected species will be tracked and no blasting will occur until all observed animals are clear of the blast zone and safety buffer. The size of this zone will be determined in accordance with the State accepted calculations based on charge size. Should an animal be last observed within the safety zone, no blasting will occur until the animal is observed outside of the area or not observed for at least 30 minutes prior to the blast.

If for any reason the helicopter is delayed (mechanically, logistically or weather- related) or must leave the site for refueling, a boat observer will be deployed to perform observation in the areas covered by the helicopter. Coordination with the Primary coordinator and blaster will occur 15 minutes prior to departure so boat observer will be deployed to provide the coverage. If available, a drone may be deployed until the helicopter arrives on-site.

During the watch program all blasting events will be weather dependent. The team of observers will determine if climatic conditions are suitable for optimal viewing conditions. An "all clear" signal must be obtained from the aerial observer before detonation can occur.

Primary Coordinator and Aerial Observer will be in contact via 2-way radio with the Blaster. Radio Checks will be taken at the top of each hour.

All observers will remain at station until 30 minutes after the final detonation. During at such time the observers will continue to survey their designated area and document any animals potentially impacted or show behavioral changes as a result of the blast.

Thirty minutes post blast, the Primary Coordinator will declare “stand-down”. A post-mortem meeting onsite will be performed to gather all log sheets, equipment and debrief on the event.

Post-Event Report

The primary coordinator shall submit a report to the FWC and the USFWS providing a description of the event, number and location of the animals observed, and what actions were taken when animals were seen. Any problems with the event and suggestions for improvements will be documented in the report.

LAND & SEA GROUP, INC.
ENGINEERS & SCIENTISTS
2828 66th Terrace South
St. Petersburg, FL 33712
813-927-0617 janlandsea@gmail.com



FIG. 1.0 - AERIAL MAP

Pinellas County, Florida
December 2020

LAND & SEA GROUP, INC.
ENGINEERS & SCIENTISTS
2828 66th Terrace South
St. Petersburg, FL 33712
813-927-0617 janlandsea@gmail.com

Attachment A
Observer Resumes

Janice Sands Ash, PE
President – Land & Sea Group, Inc.



Total Experience

40 Years

Registrations

Registered Professional Engineer, FL, #42730, 1990

Florida General Contractor, CGC1519893

Education

MS, Civil/Environmental Engineering, University of South Florida, 1990

BS, Engineering Science, University of South Florida, 1987

Memberships

American Society of Civil Engineers, Utilities Subcommittee, Chairman

Florida Utilities Coordinating Committee

Transportation Research Board

University of South Florida Engineering Alumni Association

Jan brings an impressive array of engineer and scientific experience any project. Her expertise is built upon more than four decades of work in civil and environmental engineering for public and private sector infrastructure; subsurface utility engineering; utility infrastructure design, construction management, and inspection; and water resources, marine, ecological, and environmental engineering. Her ecological experience starts as a trainee at the US Corp of Engineers Regulatory Division in the early 1980's and spans to current day.

As the founder of Land & Sea Group, Inc. (LSG) and the Ash Group before it became part of Ayres Associates, Jan has been practicing a hands-on management approach in which her more than 40 years of engineering design, project management, and quality control experience benefits every project under her supervision. She made sure LSG resources are efficiently and effectively applied to projects to make project execution cost-effective, timely, and of consistent quality. Jan's demonstrated leadership abilities have benefited the Tampa metropolitan area and the professional organizations in which she has been active.

Related Projects – Imperiled Species and Marine Mammal Observation

Protected Species and Marine Mammal Observation Projects

North Captiva Island 5.7 Mile Subaqueous Power Cable Installation, Lee County Electric Cooperative, Collier County, Florida

Position: Observer, Environmental Compliance Officer and Project Manager

Provided Observation services and managed a team of 3 observers during the installation of 5.7 miles of electrical lines installed in Pine Island Sound by Directional Drill and Hydro Plow. Performed turbidity monitoring, provided observation for Manatees, Sea Turtles, Cetaceans, and Small Tooth Sawfish. Prepared Daily, Weekly and monthly reports, along with final reporting and as-built.

Event Watch Programs

Ye Mystic Krewe of Gasparilla, Gasparilla Boat Parade Manatee Watch Programs Annually 1994 – 2017) , Hillsborough County, FL.

Position: Observer coordinator and Primary Marine Mammal Observer(MMO).

Responsible for coordination and training of staff, volunteers, and the USCG Auxiliary for the Gasparilla Manatee Watch Program. Coordinated one aerial observer and twenty water-based observers to monitor manatee

activity in and around the parade route. Scope of work included managing volunteers and staff, coordinating permit requirements, documenting event, coordinating observation locations, attending coordination meetings with USCG and other law enforcement, coordinating public notices and press releases, and preparing Post Manatee Watch Report for submittal to permitting agencies. Observation area covered approximately 36 square miles to ensure manatee safety.

"The Punisher" Film Production, Pinellas County, Florida,
Position: Marine Mammal Observer(MMO).
Coordinated and conducted monitoring of Gulf of Mexico waters surrounding Fort DeSoto Pier for presence of manatees and other listed marine species during explosion scenes for the film "The Punisher." Assisted film coordinator in FDEP permit compliance procedures regarding listed species.

Bridge Blast Demolition Watch Programs
Responsible for coordinating the Manatee Watch Program for the underwater blasting demolition of each bridge listed below. Coordinated one aerial observer and four water and land-based observers to monitor manatee activity in and around the demolition area. Scope of work included managing observers, coordinating permit requirements, documenting event, coordinating observation locations, attending coordination meetings with USCG and other law enforcement, and preparing Post Manatee Watch Report for submittal to permitting agencies. Observation area covered approximately one square mile to ensure manatee safety.

- **Johnson Bros., Inc, Manatee Watch Program, Treasure Island Bridge, Pinellas County, FL.**
  Position: *Primary MMO and Coordinator.*
- **Orion Contracting, Manatee Watch Program, Bayway Bridge Structure "C", St. Petersburg, FL.**
  Position: *Primary MMO and Coordinator*
- **Cone & Graham, Manatee Watch Program, US-19 over Cross-Florida Barge Canal, Crystal River, Florida**
  Position: *Experienced MMO*
- **Flatiron Constructors, Inc, Manatee Watch Program, Johns Pass Bridge, Madiera Beach, Pinellas County, FL.**
  Position: *Primary MMO and Coordinator.*
- **Misener Marine, Inc, Manatee Watch Program, Bellair Bridge, Bellaire, Pinellas County, FL.**
  Position: *Primary MMO.*

Beach Nesting Bird & Shorebird Monitoring
Ash provided environmental monitoring services for the dredging of various areas and beach renourishment projects. Ash monitored the confined disposal facility for bird activity. This included daily monitoring of species present as well as any breeding and nesting observations. Ms. Ash oversaw the preparation of daily reports and weekly summaries which were submitted to the USACE to satisfy permitting requirements. Once each month a comprehensive point-count survey was conducted and reported. A final report of all observations and nesting success was developed and submitted. During these projects, several birds began nesting within close proximity to the construction site. Ash negotiated with permitting agencies to develop and implement a plan to protect those nests while allowing dredge operations to continue.

- **Orion Dredging Services, LLC, Port Manatee Dredge Project, Manatee County, FL**
  Position: Observer and Project Manager.
- **Great Lakes Dredge & Dock Co, Gasparilla Island Beach Renourishment Project, Lee County, FL**
  Position: Observer and Project Manager.
- **Great Lakes Dredge & Dock Co./Coastal Systems International, Inc, Hillsboro & Deerfield Beach Renourishment,**
  Position: Project Manager

Thomas Ash

Tom Ash brings a wide range of experience both from his work with the Environmental Protection Commission of Hillsborough County and his work throughout the State and region. He is a degreed Marine Biologist with extensive field training in most aspects of environmental sampling and data collection. Tom is known for special projects and time-critical assignments. He has worked in marine resource management for the past 35 years. Mr. Ash has over 30 years of Marine Science experience in the Tampa Bay area, performing Protected Species/ Marine Mammal Observations (MMO) and Watches, endangered and threatened species surveys, submerged aquatic species surveys, benthic analysis and other scientific services.

Years of Experience: 35

CREDENTIALS:

Areas of Expertise:

- Marine Sciences
- Laboratory Management
- Artificial Reef Design and Construction
- Manatee Protection Plans and Watch Programs (MMO/PSO)
- Fish and Benthic Taxonomy
- Submerged Aquatic Vegetation Surveys

Education:

- Marine Biology, Richard Stockton State College, New Jersey, 1986

Certificates/Training:

- United States Coast Guard Licensed Captain / 6-pack (Expired)
- Advanced SCUBA Diver
- Private pilot, single engine / land

Associations:

- Tampa Bay Regional Planning Council Agency on Bay Management
- Tampa Bay Estuary Program
- FLERA (Florida Local Environmental Resource Agencies)
- AOPA (Aircraft Owners & Pilots Association)

PROFESSIONAL EXPERIENCE:

EPC of Hillsborough County Roger P. Stewart Center Offices & Laboratories, Tampa, FL
Role: General Manager / Assistant Director Water Management Division
Design and operation of water chemistry and biology laboratories and associated staff offices for the Environmental Protection Commission of Hillsborough County. Construction supervision and coordination with architects and contractors as owner representative and end user. Specified layout, cabinetry, counter tops, sinks, flooring, and instrumentation. Supervises 12-20 scientists and specialists performing water and sediment quality analyses, benthic infauna and plankton taxonomy, and maintenance and calibration of water monitoring instrumentation.

Pinellas Bayway Bridge – Structure C Marine Mammal/Blast Watch, Pinellas County, FL
Role: Primary MMO / Certified Aerial Observer
Blast Related Endangered Species Surveys
Performed endangered species survey, manatee watch services and formal watch coordination for the blasting monitoring of the Demolition of the Pinellas Bayway Bridge, Pinellas County. Stationed as the Primary Aerial Observer in helicopter during the blasting event. Sighted 5 manatees and 4 dolphins.

Treasure Island Bridge Demolition Marine Mammal/Blast Watch, Pinellas County, FL
Role: Primary MMO / Certified Aerial Observer
Blast Related Endangered Species Surveys
Performed endangered species survey, manatee watch services and formal watch coordination for the blasting monitoring of the demolition of the Pinellas Bayway Bridge, Pinellas County. Stationed as the Primary Aerial Observer in helicopter during the blasting event. Sited 2 manatees, 10 dolphins and 2 turtles.

Belleair Bridge Demolition Marine Mammal/ Blast Watch, Pinellas County, Florida,
Role: Primary MMO / Certified Aerial Observe
Blast Related Endangered Species Surveys
Provided Primary Aerial Observer Services for this bridge demolition Project and underwater blasting demolition of the Belleair Causeway Bridge. Stationed as the Primary Aerial Observer in helicopter during the blasting event. Sited 5 dolphins and 1 manatee.

Johns Pass Bridge Demolition Marine Mammal/ Blast Watch, Pinellas County, Florida,
Role: Primary MMO / Certified Aerial Observer

Blast Related Endangered Species Surveys

Provided Primary Aerial Observer Services for underwater blasting demolition of the Johns Pass Bridge between Madeira Beach and Treasure Island. Stationed as the Primary Aerial Observer in helicopter during the blasting event. Sited 4 dolphins and 2 manatees

U.S. 19/Cross Florida Barge Canal Bridge Demolition Marine Mammal/ Blast Watch, Citrus County, Florida
Role: Primary MMO / Certified Aerial Observer
Blast Related Endangered Species Surveys
Provided Primary Aerial Observer Services for underwater blasting demolition of the Johns Pass Bridge between Madeira Beach and Treasure Island. Stationed as the Primary Aerial Observer in helicopter during the blasting event. No observations

Ye Mystic Krewe of Gasparilla, Gasparilla Boat Parade Manatee Watch Programs Annually 1990 – 2017), Hillsborough County, FL.
Position: Observer coordinator, Primary Aerial Observer and Primary Marine Mammal Observer (MMO).
Event Related Endangered Species Surveys
Responsible for coordination and training of staff, volunteers, and the USCG Auxiliary for the Gasparilla Manatee Watch Program. Coordinated one aerial observer and twenty water-based observers to monitor manatee activity in and around the parade route. Scope of work included managing volunteers and staff, coordinating permit requirements, documenting event, coordinating observation locations, attending coordination meetings with USCG and other law enforcement, coordinating public notices and press releases, and preparing Post Manatee Watch Report for submittal to permitting agencies. Observation area covered approximately 36 square miles to ensure manatee safety. Thousands of manatees and dolphins observed over the 26 year period.

Florida Offshore Boat Race/Poker Run, Sarasota County, Florida,
Role: Primary MMO / Certified Aerial Observer
Event Related Endangered Species Surveys
Served as aerial observer for offshore boat race. Observed multiple manatees and dolphins during the event outside the exclusion zone.

U.S. Navy Air & Sea Spectacular, Jacksonville, Duval County, Florida,
Role: Primary MMO / Certified Aerial Observer
Event Related Endangered Species Surveys
Served as aerial observer for Navy Demonstration & Recruiting event in the St. Johns River. Observed multiple manatees and dolphins during the event outside the exclusion zone.

Manatee River Boat Race, Bradenton, Florida,
Role: Primary MMO / Certified Aerial Observer
Event Related Endangered Species Surveys
Served as Primary observer coordinator for in river boat race, stationed on bridge. Observed dolphins during the event outside the exclusion zone.

"The Punisher" Film Production, Pinellas County, Florida,
Role: Primary MMO/ On-boat Observer
Event Related Endangered Species Surveys
Coordinated and conducted monitoring of Gulf of Mexico waters surrounding Fort DeSoto Pier for presence of manatees and other listed marine species during explosion scenes for the film "The Punisher." Assisted film coordinator in FDEP permit compliance procedures regarding listed species.

Judy "Jordan" Mericle

PO Box 358184
Gainesville, FL 32635

(813) 394-1688
jordanmericle@yahoo.com

- PSO Certification #100807-051709-13701511 by PartnerPlast, Inc., July 9, 2015
- TWIC #17390034
- ODESS Certification by USACE, May 17, 2019
- FL Shorebird Database Entry Certification by Florida Shorebird Alliance, Feb. 2013
- BOSIET (w/ HUET and EBS) Certification #00735700080715903626 by Falck Safety Services, July 8, 2015

Marine Mammal/Protected Species Observer and Turbidity Monitor Projects, Feb. 2010 – present:

- **Marine Mammal/Protected Species Observer (MMO/PSO): Fernandina Harbor Maintenance Dredging, Great Lakes Dredge & Dock Co./Tide Environmental, LLC.: Oct. – Nov. 2020**
  - 348 hours of day-shift, nearshore observation on clamshell Dredges #58 off of Fernandina Beach, FL
  - 2 sea turtles and 1 manatee observed within project perimeter; 2 shutdowns required

- **Marine Mammal/Protected Species Observer (MMO/PSO): Jacksonville Harbor Construction Dredging, Great Lakes Dredge & Dock Co./ REMSA, Inc. and Tide Environmental, LLC.: April 2019 – present**
  - FDEP Permit #0129277-017-BI and USACE Permit #W912EP-18-C-0021
  - 2,750 hours of day- and night-shift, nearshore observation on clamshell Dredges #55 and #53, and excavator Dredge New York in Jacksonville Harbor and St. John's River, FL
  - 280+ dolphin sighted

- **Marine Mammal/Protected Species Observer (MMO/PSO): Norfolk Harbor Navigational Improvements in Thimble Shoal Channel, VA, Weeks Marine/ Tide Environmental, LLC.: June 17 – July 7, 2020**
  - USACE Norfolk District
  - 336 hours of day- and night-shift observation on hopper Dredge BE Lindholm
  - 2 Incidental takes of sea turtle species; 44+ dolphin sighted

- **Marine Mammal/Protected Species Observer (MMO/PSO): Charlotte/Sarasota Regional Beach Renourishment Project, Great Lakes Dredge & Dock Co./ Tide Environmental, LLC.: March 1 – 14, 2020**
  - Nearshore off of Manasota Key, FL
  - 168 hours of day-shift observation on hopper Dredge Padre Island
  - 20+ dolphin sighted

- **Turbidity Monitor: Tampa Harbor Comprehensive Maintenance Dredging, Dredge, Great Lakes Dredge & Dock Co./ REMSA, Inc.: May 19 – June 1, 2019**
  - FDEP Permit #0157891-021-BN and USACE Contract #W912EP-18-C-0023
  - 156 hours of turbidity monitoring in and upstream of plumes from trailing suction hopper dredge Terrapin Island in Egmont Channel and Mullet Channel and outflow pipes on Egmont Key, FL
  - No water quality violations recorded for– samples collected twice daily at surface, mid-column, and bottom at ambient upstream location and within plume
  - YSI DSS Pro Turbidimeter calibrated to 10 NTUs: ID# 15C100314

- **<u>Marine Mammal/Protected Species Observer (MMO/PSO)</u>: Tampa Harbor Big Bend Channel Dredge, Great Lakes Dredge & Dock Co./ REMSA, Inc.: Feb. – April 2019**
  - Permit #0157891-017-BI and Modification #0157891-020-BM
  - 350 hours of night-shift, nearshore observation on hydraulic cutter suction dredge Carolina in Tampa Harbor, FL
  - 1 manatee sighted outside project permit perimeter; 40+ dolphin sighted

- **<u>Marine Mammal/Protected Species Observer (MMO/PSO)</u>: Town of Jupiter Island Beach Nourishment, Weeks Marine/ Marine Ventures International, Inc.: Jan. – Feb. 2019**
  - Permit #s: FDEP 0186991-0087; USACE #SAJ-1992-07140 (MOD-LCK) Modification-3
  - 180 hours of night-shift, offshore vessel-based observation on live-aboard hopper dredge BE Lindholm in Atlantic Ocean off of Jupiter Island, Martin County FL
  - 1 manatee sighted outside project permit perimeter; 10+ dolphin sighted

- **<u>Marine Mammal/Protected Species Observer (MMO/PSO)</u>: Tampa Harbor Big Bend Channel Dredge, Great Lakes Dredge & Dock Co./ Marine Ventures International, Inc.: Dec. 2018 – Jan. 2019**
  - Permit #0157891-017-BI and Modification #0157891-020-BM
  - 300 hours of night-shift, nearshore observation on hydraulic cutter suction dredge Alaska in Tampa Harbor, FL
  - 30+ dolphin sighted

- **<u>Marine Mammal/Protected Species Observer (MMO/PSO) and Turbidity Monitor</u>: Captiva Island Subaqueous Power Cable Installation, Lee County Electric Cooperative/ Ayers Associates, Inc.: June – Sept. 2018**
  - Permit #0340508-001-EI
  - 900 hours of daytime, nearshore observation and turbidity monitoring on hydraulic jet plow sled dredge Catherine in Pine Island Sound, FL
  - Severe Red Tide event during project – 1 live manatee and ~20 live dolphin sighted outside the project perimeter
  - Shorebird surveys conducted daily
  - No permit violations recorded for water quality – samples collected twice daily at surface, mid-column, and bottom at ambient upstream location and within 5 feet of dredging plow
  - Turbidimeter calibrated to 10 NTUs

- **<u>USCG (United States Coast Guard) Communications Coordinator and Marine Mammal & Sea Turtle Observer (MMO/PSO)</u>: Ye Mystic Krewe Gasparilla Boat Parade (flotilla), The Ash Group, Inc.: Jan. 2016**
  - 12 hours of daytime, land and boat-based observation in Hillsborough Bay, FL
  - Group of 5 manatee sighted near Apollo Beach aggregation area and upper Hillsborough Bay

- **<u>USCG (United States Coast Guard) Marine Mammal & Sea Turtle Observer (MMO/PSO):</u> Ye Mystic Krewe Gasparilla Boat Parade (flotilla), The Ash Group, Inc.: Jan. 2015**
  - 10 hours of daytime, boat-based observation in Hillsborough Bay, FL
  - Observed herd of about 35+ manatee near Apollo Beach aggregation area and in Hillsborough Bay

- **<u>Beach Nesting Bird & Shorebird Monitor</u>: Gasparilla Island Beach Renourishment Project, Great Lakes Dredge & Dock Co./ The Ash Group, Inc.: Nov. 2013**

- Permit #0174403-001-JC
- 45 hours of onshore beach-nesting bird monitoring and FL Shorebird Database entries

- **<u>Sea Turtle & Marine Mammal Observer (MMO/PSO)</u>: Captiva Island Beach Renourishment, Great Lakes Dredge & Dock Co./ Coastwise Consulting, Inc.: Sept. – Nov. 2013**
  - 320 hours of daytime, nearshore observation on a hopper dredge in Gulf of Mexico, Captiva Island, FL
  - 5 manatees, 4 Loggerhead, and 2 Green sea turtles sighted outside project perimeter; 80+ dolphin sighted

- **<u>Marine Mammal/Protected Species Observer (MMO/PSO)</u>: Bayway Bridge Blast, The Ash Group, Inc.: June 2013**
  - Permit #SAJ-2002-02432
  - 12 hours of daytime, bridge-based observation in lower Tampa Bay Main Channel, Pinellas, FL
  - ~15 dolphin sighted

- **<u>USCG (United States Coast Guard) Marine Mammal & Sea Turtle Observer (MMO/PSO)</u>: Ye Mystic Krewe Gasparilla Boat Parade (flotilla), The Ash Group, Inc.: Jan. 2013**
  - 12 hours of land-based observation in lower Hillsborough River, FL
  - Group of 3 manatee and ~8 dolphin sighted

- **<u>USCG (United States Coast Guard) Marine Mammal & Sea Turtle Observer (MMO/PSO)</u>: Ye Mystic Krewe Gasparilla Boat Parade (flotilla), The Ash Group, Inc.: Jan. 2012**
  - 12 hours of land-based observation in lower Hillsborough River, FL
  - 2 manatee and ~10 dolphin sighted

- **<u>Marine Mammal/Protected Species Observer (MMO/PSO)</u>: Chevron Pascagoula Base Oil Project (PBOP), Chevron Corporation/Weeks Marine, Inc./ ECOES, Inc.: Jul. 22, 2011 – Sept. 16, 2011**
  - Permit # SAM-2008-00603-JBM
  - 252 hours of daytime, nearshore observation on clamshell dredge in Gulf of Mexico, Pascagoula, MS
  - 100+ dolphin sighted inside and outside project perimeter; no shutdown required

- **<u>FWC Beach-Nesting Bird/Shorebird Monitor</u>: Hillsboro & Deerfield Beach Renourishment, Great Lakes Dredge & Dock Co./Coastal Systems International, Inc./Ash Engineering, Inc.: Apr. 1, 2011 – May. 15, 2011**
  - USACE Permit #0289706-001-JC
  - 55 hours of onshore beach-nesting bird monitoring and FL Shorebird Database entries

- **<u>Marine Mammal & Sea Turtle Observer (MMO)</u>: Hillsboro & Deerfield Beach Renourishment, Great Lakes Dredge & Dock Co./Coastal Systems International, Inc./Ash Engineering, Inc.: Feb. 26, 2011 – May 15, 2011**
  - USACE Permit #0289706-001-JC
  - 720 hours of daytime, nearshore observation on a cutter suction dredge Illinois in Atlantic, Hillsboro & Deerfield Beaches, FL
  - 1 Loggerhead sea turtle sighted – shutdown required; 30+ dolphin sighted outside project perimeter

- **<u>FWC Marine Mammal & Sea Turtle Observer (MMO)</u>: Ye Mystic Krewe Gasparilla Boat Parade (flotilla), Ash Engineering, Inc.: Jan. 2011**
  - USCG Permit #SP-002-11
  - 10 hours of boat-based observation in Hillsborough Bay, FL
  - 3 manatee sighted near Apollo Beach aggregation area and in upper McKay Bay

- **<u>FWC Marine Mammal & Sea Turtle Observer (MMO)</u>: Ye Mystic Krewe Gasparilla Boat Parade (flotilla), Ash Engineering, Inc.: Feb. 2010**
  - 10 hours of boat-based observation in Hillsborough Bay, FL
  - Observed groups of manatee averaging 20+ manatees near Apollo Beach aggregation area and in lower McKay Bay

Kristina Haselier

4047 NW 13th Ave.
Gainesville, FL 32605
khaselier@yahoo.com

Tel: 863-899-3979

EXPERIENCE & TRAINING

- MMO/PSO: Marine Mammal Observer/Protected Species Observer, FWC Approved in 2018
- TWIC (Transportation Worker Identification Credential) Card
- PSO Certification training, PartnerPlast, Inc.
- Migratory & Shorebird Monitoring, FWC Approved Monitor
- Project Management, Logistics Coordination, & Work Flow Development
- Community Planning, Public Relations, Marketing Development, & Design
- Budgeting, Resource Allocation, Scoping, Risk Management, & Deliverables
- Data Entry & Analyses; Quality Assurance/Quality Control (QA/QC) Management

EDUCATION

- M.S. Community Planning for Nature-Based Recreation, August 2015
  University of Florida, Gainesville, FL
- B.A. Biology and B.A. Philosophy; April 2006
  Florida Southern College, Lakeland, FL
- Desktop Publishing/Graphic Design Certification: University of South Florida,
  Tampa, FL – November 2010
- Web Design & Development Certification: University of South Florida,
  Tampa, FL – July 2011

WORK HISTORY

- University of Florida, School of Forest Resources & Conservation, **Academic Advisor and Lecturer**: Nov. 2011 – present
  - Fall 2020 professor of FNR3020 *Professional Practice in Natural Resources*
  - Academic Advisor for 4 majors: Forest Resources & Conservation, Natural Resource Conservation, Marine Sciences, and Geomatics

- D&G Forestry Services, Inc., **Environmental Scientist & Project/Logistics Coordinator**: Jul. 2010 – Oct. 2020
  - QA/QC Manager & Data Entry Team Coordinator of Statewide Tree Survey Data for Citrus Canker Assessment Project

- Independent Contractor, **Protected Species/Marine Mammal Observer and Environmental Compliance Officer**, Jan. 2009 – Aug. 2018:

  - **Marine Mammal/Protected Species Observer (MMO/PSO), Jacksonville Harbor Deepening Project, Great Lakes Dredge & Dock Co./REMSA, Inc.: Oct. 2019**
    - 12 hours of nearshore observation on excavator dredge New York in St. Johns River, Jacksonville, FL
    - No protected species sighted inside the project perimeter

- **Marine Mammal/Protected Species Observer (MMO/PSO), Canaveral Harbor Deepening Project, Norfolk Dredging Company/Marine Ventures International: June 2019**
    - 36 hours of nearshore observation on clamshell dredge Atlantic off Atlantic Coast, Cape Canaveral, FL
    - 5 sea turtles sighted inside and outside the project perimeter – 2 shutdowns required
- **Marine Mammal/Protected Species Observer (MMO/PSO), Turbidity Monitor, and Environmental Compliance Officer (ECO): Captiva Island Subaqueous Power Cable Installation, Lee County Electric Cooperative/ Ayers Associates, Inc.: June – Sept. 2018**
    - Permit #0340508-001-EI
    - 96 hours as ECO observing landward bore activities encroaching upon tidal mangrove wetland
    - 12 hours of nearshore observation and turbidity monitoring on hydraulic jet plow sled dredge Catherine in Pine Island Sound, FL
    - Over 20 live dolphin sighted outside the project perimeter during red tide
    - No permit violations recorded for water quality – samples collected twice daily at surface, mid-column, and bottom at ambient upstream location and within 5 feet of dredging plow; Turbidity meter calibrated to 10 NTUs
- **USCG (United States Coast Guard) MMO/PSO: Ye Mystic Krewe Gasparilla Boat Parade (flotilla), The Ash Group, Inc.: Jan. 2016**
    - 12 hours of land and boat-based observation in Hillsborough Bay, FL
    - Group of 5 manatee sighted near Apollo Beach aggregation area and upper Hillsborough Bay
- **USCG MMO/PSO: Ye Mystic Krewe Gasparilla Boat Parade (flotilla), The Ash Group, Inc.: Jan. 2015**
    - 10 hours of boat-based observation in Hillsborough Bay, FL
    - Observed herd of 35 manatee near Apollo Beach aggregation area and in Hillsborough Bay
- **USCG MMO/PSO: Ye Mystic Krewe Gasparilla Boat Parade (flotilla), The Ash Group, Inc.: Jan. 2013**
    - 12 hours of land-based observation in lower Hillsborough River, FL
    - Group of 3 manatee and 8 dolphin sighted
- **USCG MMO/PSO: Ye Mystic Krewe Gasparilla Boat Parade (flotilla), The Ash Group, Inc.: Jan. 2012**
    - 12 hours of land-based observation in lower Hillsborough River, FL
    - 2 manatee and 10 dolphin sighted
- **MMO/PSO: Chevron Pascagoula Base Oil Project (PBOP), Chevron Corporation/Weeks Marine, Inc./ ECOES, Inc.: Jul. 22, 2011 – Sept. 16, 2011**
    - Permit # SAM-2008-00603-JBM
    - 252 hours of night-shift nearshore observation on clamshell dredge in Gulf of Mexico, MS
    - Over 100 dolphin sighted inside and outside project perimeter; no shutdown required
- **FWC Beach-Nesting Bird/Shorebird Monitor: Hillsboro & Deerfield Beach Renourishment, Great Lakes Dredge & Dock Co./Coastal Systems International, Inc./Ash Engineering, Inc.: Apr. 1, 2011 – May. 15, 2011**
    - USACE Permit #0289706-001-JC
    - 55 hours of onshore beach-nesting bird monitoring and FL Shorebird Database entries

- **MMO/PSO: Hillsboro & Deerfield Beach Renourishment, Great Lakes Dredge & Dock Co./Coastal Systems International, Inc./Ash Engineering, Inc.: Feb. 26, 2011 – May 15, 2011**

    - USACE Permit #0289706-001-JC
    - 720 hours of night-shift, nearshore observation on a cutter suction dredge Illinois in Atlantic, Hillsboro & Deerfield Beaches, FL
    - Over 40 dolphin sighted outside project perimeter; 1 Loggerhead sea turtle sighted – shutdown required
- **FWC MMO/PSO: Ye Mystic Krewe Gasparilla Boat Parade (flotilla), Ash Engineering, Inc.: Jan. 2011**
    - USCG Permit #SP-002-11
    - 10 hours of boat-based observation in Hillsborough Bay, FL
    - 3 manatee sighted near Apollo Beach aggregation area and in upper McKay Bay
- **FWC MMO/PSO: Ye Mystic Krewe Gasparilla Boat Parade (flotilla), Ash Engineering, Inc.: Feb. 2010**
    - 10 hours of boat-based observation in Hillsborough Bay, FL
    - Observed groups of manatee averaging 20+ manatees near Apollo Beach aggregation area and in lower McKay Bay
- **FWC MMO/PSO Communications Coordinator: Ye Mystic Krewe Gasparilla Boat Parade (flotilla), Ash Engineering, Inc.: Jan. 2009**
    - 10 hours of boat-based observation in Hillsborough Bay, FL
    - Observed group of 3 manatee and 1 single manatee near Apollo Beach aggregation area and in lower McKay Bay

- Birkitt Environmental Services, Inc., **Environmental Scientist & Project Manager**: June 25, 2007 – Feb. 26, 2009
    - Project management, coordination, & QA/QC management for pipeline, development, & restoration monitoring projects
    - MMO/PSO: Marine Mammal & Sea Turtle Watch Program Trainer & Coordinator
    - College Intern Program Coordinator – Intern Supervisor & Trainer
    - Species specific surveys such as wading/migratory birds, Audubon's crested caracara, & gopher tortoise surveys
    - Wetland delineation, qualitative and quantitative monitoring, & UMAM/WRAP analyses
    - Marketing development & company branding design

- Ash Engineering, Inc., **Project Manager & Field Scientist**: Aug. 16, 2006 – June 6, 2007
    - Project manager for bridge & dock environmental resource permitting & utility cable crossing exemptions projects
    - MMO/PSO: FWC Marine Mammal & Sea Turtle Watch Official & USCG Communications Coordinator
    - Species specific surveys, relocation, and protection/management plans for species such as sea whip, manatee, & gopher tortoise
    - Marine benthic surveys, including seagrasses, oyster beds, & sea whips GPS mapping

- FL Southern College, **Construction Design Reviewer for Ecological Resource Impacts**, The Lake Hollingsworth Project: Southern Landing, 2003-2006

PUBLICATIONS

- "Exploring Environmental Ethics Regarding Lake Hollingsworth." Ed. Haldeman, John and Bernard Quetchenbach. *Lake Hollingsworth: Reflections and Studies on a Florida Landmark*. Charleston: History Press, 2005.
- Photo Documentation, *Lake Hollingsworth* (as cited above).
- "Environmental Ethics and Lake Hollingsworth Restoration." *LakeWatch*. Vol. XIX: 3. Lakeland: Lakes Education/ Action Drive, 2004.
- Featured in *Eagle's View*, Lake Region Audubon Society, 2003.
- United States Green Building Council (USGBC), FL Gulf Coast Ch., Member since Apr. 2009

Anthony Corbett

WORK HISTORY

Mystic Krewe Gasparilla Boat Parade (flotilla), The Ash Group, Inc.: Jan. 2016
Position: Marine Mammal Observer, Photographer.
12 hours of land and boat-based observation in Hillsborough Bay, FL
Group of 5 manatee sighted near Apollo Beach aggregation area and upper Hillsborough Bay

Ye Mystic Krewe Gasparilla Boat Parade (flotilla), The Ash Group, Inc.: Jan. 2015
Position: Marine Mammal Observer, Photographer.
10 hours of boat-based observation in Hillsborough Bay, FL
Observed herd of 35 manatee near Apollo Beach aggregation area and in Hillsborough Bay

Ye Mystic Krewe Gasparilla Boat Parade (flotilla), The Ash Group, Inc.: Jan. 2013
Position: Marine Mammal Observer, Photographer.
12 hours of land-based observation in lower Hillsborough River, FL
Group of 3 manatee and 8 dolphin sighted

Ye Mystic Krewe Gasparilla Boat Parade (flotilla), The Ash Group, Inc.: Jan. 2012
Position: Marine Mammal Observer, Photographer.
12 hours of land-based observation in lower Hillsborough River, FL
2 manatee and 10 dolphin sighted

Treasure Island Bridge Marine Mammal/ Blast Watch Program, , Pinellas County, FL.
Position: Marine Mammal Observer, Photographer.
Stationed on bridge as Observer for marine mammal protection.

Bayway Bridge Structure "C", Manatee Watch Program, St. Petersburg, FL.
Position: Marine Mammal Observer, Photographer.
Stationed on bridge as Observer for marine mammal protection.

US-19 over Cross-Florida Barge Canal Manatee Watch Program, Crystal River, Florida
Position: Experienced MMO
Stationed on bridge as Observer for marine mammal protection.

Johns Pass Bridge Manatee Watch Program, , Madiera Beach, Pinellas County, FL.
Position: Primary MMO and Coordinator.
Stationed on bridge as Observer for marine mammal protection.

Kevin Shelton, PWS, CERP

Senior Scientist/Project Manager

Professional Summary

Mr. Kevin Shelton has more than 30 years of ecological experience with a focus on state and federal regulatory permitting requirements. Mr. Shelton has experience in wetland delineations including use of methods defined by 62-340, F.A.C. and USACE 1987 Manual and its regional supplements. He has conducted benthic surveys including seagrasses, benthic infauna, and corals. He has a wide variety of experience with wildlife surveys and monitoring including listed species such as crested caracara, Florida sand skink, shorebirds, and manatees. He is an FWC-approved primary observer for marine endangered species observations including explosive underwater demolitions and aerial surveys.

Qualifications

Education

- Bachelor of Science, Environmental Science and Policy, 2015

Registrations / Certifications / Licenses

- Professional Wetland Scientist, No. 2814
- Certified Ecological Restoration Practitioner, No. 0261
- United States Coast Guard Licensed Captain 50 Gross Ton Master
- PADI Divemaster
- FDEP Lake Vegetation Index

Marine Endangered Species Observation Experience

Project Manager/Primary Scientist

Marine Endangered Species Observation – Treasure Island Causeway Bridge Demolition, Johnson Bros., Inc., Pinellas County, Florida, $5,700 (2006)

Coordinated Marine Endangered Species Watch Program for underwater blasting demolition of the Treasure Island Causeway Bridge bascules. Coordinated one aerial observer and four water- and land-based observers to monitor manatee and other protected species' activity in and around the demolition area. Managed observers, coordinated permit requirements, documented event, coordinated observation locations, attended coordination meetings with USCG and other law enforcement, and prepared Final Action Report for submittal to permitting agencies. Observation area covered approximately one square mile.

Experience

- Industry: 1989

Languages

- English

Professional Associations

- Society of Wetland Scientists
- Society for Ecological Restoration International
- Florida Association of Environmental Professionals
- Tampa Bay Association of Environmental
- American Association of Zoo Keepers
- Tampa Bay Estuary Program Manatee Awareness Coalition
- National Military Fish and Wildlife Association
- Tampa Bay Regional Planning Council Agency on Bay Management

Areas of Expertise

- Wetland delineation and evaluation
- Environmental resource permitting and compliance
- Ecosystem restoration
- Wildlife impact assessment

Project Manager/Primary Scientist

Marine Endangered Species Observation – Belleair Bridge Demolition, Johnson Bros./Misener Marine JV, Pinellas County, Florida, $5,700 (2009)

Managed the Marine Endangered Species Watch Program for the underwater blasting demolition of the Belleair Causeway Bridge. Coordinated one aerial observer and four water- and land-based observers to monitor manatee and other protected species' activity in and around the demolition area. Managed observers, coordinated permit requirements, documented event, coordinated observation locations, attended coordination meetings with USCG and other law enforcement, and prepared Final Action Report for submittal to permitting agencies. Observation area covered approximately one square mile.

Project Manager/Primary Scientist

Marine Endangered Species Observation – U.S. 19/Cross Florida Barge Canal Bridge Demolition, Cone and Graham, Inc., Citrus County, Florida, $10,000 (2010)

Coordinated the Marine Endangered Species Watch Program, permitting and blasting plan for underwater blasting demolition of the U.S. 19 Bridge over the Cross Florida Barge Canal. Developed the blasting plan, including hazard minimizations. Obtained expedited permit modifications to allow for blasting demolition of pier footers from SWFWMD, FWC, and USFWS to keep project on schedule. Coordinated aerial observer and water/land-based observers to monitor manatee and other protected species' activity in and around the demolition area. Managed observers, obtained permits, documented event, coordinated observation locations, attended coordination meetings with USCG and other law enforcement, and prepared Final Action Report for submittal to permitting agencies.

Project Manager/Primary Scientist

Marine Endangered Species Observation – John's Pass Bridge Demolition, Flatiron Construction Corp., Pinellas County, Florida, $5,700 (2008)

Coordinated Marine Endangered Species Watch Program for underwater blasting demolition of the John's Pass Bridge bascules. Coordinated one aerial observer and four water- and land-based observers to monitor manatee and other protected species' activity in and around demolition area. Managed observers, coordinated permit requirements, documented event, coordinated observation locations, attended coordination meetings with USCG and other law enforcement, and prepared Final Action Report for submittal to permitting agencies. Observation area covered approximately one square mile.

Project Manager/Primary Scientist

Marine Endangered Species Observation – Annual Gasparilla Pirate Invasion, Ye Mystic Krewe of Gasparilla, Hillsborough County, Florida, $2,500 (1995 to 2018)

Coordinated and trained staff, volunteers, and USCG Auxiliary for the Gasparilla Manatee Watch Program. Coordinated one aerial observer and 20 water- and land-based observers to monitor manatee activity in and around the parade route. Managed volunteers and staff, coordinated permit requirements, documented event, coordinated observation locations, attended coordination meetings with USCG and other law enforcement, produced and distributed public notices and press releases, and prepared Final Action Report for submittal to permitting agencies. Observation area covered approximately 36 square miles. Served as primary aerial observer, secondary water observer, and watch coordinator.

Project Scientist

Evaluation of Sonar Detection of Manatee and Dolphin during Dredge Operations, U.S. Army Corp of Engineers, Brevard County, Florida, $18,300 (2010)

Performed a highly detailed manatee and dolphin survey during testing of various sonar devices to evaluate effectiveness of automated detection systems within Port Canaveral. Recorded all visually observed animals with high-time accuracy to compare to recorded sonar detections. Documented all observations using a video camera, including timestamps and voice description of animal presence, size, direction of travel, and speed. Transcribed all observations to spreadsheets and maps for delivery to client. Performed 15 days of observation during various climatic conditions and dredge simulations.

Project Manager/Primary Scientist

Marine Endangered Species Observation – "The Punisher" Film Production, Pinellas County, Florida, $2,800 (2003)

Coordinated and conducted monitoring of Gulf of Mexico waters surrounding Fort DeSoto Pier for presence of manatees and other listed marine species during explosion scenes for the film "The Punisher." Assisted film coordinator in FDEP permit compliance procedures regarding listed species.

Project Manager/Primary Scientist

Marine Endangered Species Observation – Communications Line Replacement at Alafia River, TECO Peoples Gas, Hillsborough County, Florida, $1,700 (2008)

Conducted a Marine Endangered Species Watch Program during installation of overhead communications cables across the Alafia River. Coordinated permit requirements, documented event, and prepared Final Action Report for submittal to permitting agencies.

Project Manager/Primary Scientist

Marine Endangered Species Observation – Ammonia Pipeline Installation at Bullfrog Creek, Tampa Pipeline Corporation, Hillsborough County, Florida, $1,700 (2009)

Conducted a Marine Endangered Species Watch Program during installation of subaqueous anhydrous ammonia pipeline across Bullfrog Creek. Coordinated permit requirements, documented event, and prepared Final Action Report for submittal to permitting agencies.

Project Manager/Primary Scientist

Marine Endangered Species Observation – Florida Offshore Boat Race/Poker Run, Sarasota County, Florida, $5,000 (2002 to 2003)

Coordinated and trained staff, volunteers, and USCG Auxiliary for Marine Endangered Species Watch. Coordinated one aerial observer and multiple water-based observers to monitor manatee and other protected species' activity in and around racecourse. Managed volunteers and staff, coordinated permit requirements, documented event, conducted coordination meetings with USCG and other law enforcement, and prepared a Final Action Watch Report for submittal to permitting agencies. Served as primary aerial observer.

Primary Scientist

Marine Endangered Species Observation – Port Sutton Maintenance Dredge, Misener Marine, Hillsborough County, Florida, $1,200 (2004)

Conducted a marine endangered species watch during clamshell dredging of the Port Sutton berths within Tampa Harbor. Responded quickly to a last-minute request from client to keep the project on schedule and avoid down-time delay costs. Served as sole observer.

Attachment B

Imperiled Species/ Marine Mammal Watch Observer Sighting Log and Map

Imperiled and Marine Mammal Species Watch
Observer Sighting Log

This document is to be utilized in conjunction with a sighting map to record all observations during the marine event.

- Event #: Mark the map with a consecutive series of numbers for each sighting and correspond that number with this sighting log. Also use the Event column for the following events: Please indicate:
  - RC for any radio checks initiated
  - FS for fish scare
  - DEL for blast delay
  - BL for time of blast
  - AC for all Clear

- Time: Record the time that the animal or event was observed.
- Species and #: Record the species of the animal observed and how many were observed. If you know the exact species record this in the notes section. For example if three manatees were observed record M3.
  - M = Manatee
  - T = Turtle (loggerhead, green, leatherback, hawksbill, Kemp's Ridley)
  - C = Cetacean (dolphin, whale)
  - O = Other Species _____
- Direction of Travel: Indicate the direction that the animal was heading when you observed it. This can be a compass heading in degrees or north, south, east, west.
- Notes: Note any observation that may be helpful in determining the danger potential to the animal from the marine event.

Date of Event: _____

Observer Name: _____

Observer Location: _____

Observer Radio Call: _____

Time on-station: _____

Time of Off-station: _____

Event #	Time	Species and # Observed	Direction of Travel	Notes

Event #	Time	Species and #	Direction of Travel	Notes



FIG. 1.0 - AERIAL MAP

Pinellas County, Florida
December 2020

LAND & SEA GROUP, INC.
ENGINEERS & SCIENTISTS
2828 66th Terrace South
St. Petersburg, FL 33712
813-927-0617 janlandsea@gmail.com

APPENDIX B3

Pinellas County Bayway (SR 679) Bridge Structure E Demolition Imperiled Species and Marine Mammal Watch Plan Report

Imperiled Species and Marine Mammal Watch Plan (IS/MMWP) Report

Pinellas County Bayway (SR 679) Bridge Structure E Demolition

May 18, 2021



Prepared For:

American Bridge Company
5411 West Tyson Avenue
Tampa, FL 33611

Attention: Jonathan Yates
Phone: 813-538-8012

Prepared By:

Land & Sea Group, Inc.
2828 66th Terrace South
St. Petersburg, FL 33712
813-927-0617

Janice Sands Ash, P.E.

LAND & SEA GROUP, INC.
ENGINEERS AND SCIENTISTS

Overview

Janice Sands Ash, P.E., President of Land & Sea Group, Inc. (LSG), Project Manatee Watch Coordinator, coordinated the Imperiled Species and Marine Mammal Watch Plan (IS/MMWP) for the Pinellas Bayway (SR 679) Structure E Bridge demolition performed on May 18, 2021. The program was established at the request of American Bridge Company. Aerial, boat, and land-based manatee surveys/watches were conducted prior to, during and after the event to assess potential impacts on protected marine species including West Indian manatee (*Trichechus manatus*), cetaceans, Giant Manta Ray, marine turtles, small-toothed sawfish, or Gulf sturgeon. No adverse effect to listed species identified in the area was noted.

Environmental Considerations

Overall survey conditions were good. The May 18, 2021 event was preceded by several days of mild (82-89 °F) weather. The water temperature in the Intracoastal Waterway on May 18th was approximately 81°F and air temperatures were in the mid 80's °F. Clear skies and easterly winds at 12 MPH with gusts of 15 MPH were present. Due to the Bayway causeway obstruction to the winds, there was calm water conditions present throughout the day resulting in good observation conditions. The tide was outgoing with a moderate flow.

Event Summary

May 18 Event:

The blasting was scheduled to occur at 1:30pm. A meeting was held at 12:00 noon to review the schedule and safety/ watch procedures for all employees and watch officials. The Manatee Watch/Imperiled Species Watch (M/ISW) commenced at 12:39 pm. All Clear was called at 1:39 pm. The blast occurred at 1:42pm. The watch continued until 2:15 pm.

Observation Team and Positions

LSG assembled a Watch Team that is highly experienced in providing IS/MMWP for bridge demolitions in the State of Florida. All team members proposed in the plan were in attendance on the day of the event

Janice Sands Ash, P.E., Primary Coordinator, Experienced Marine Mammal/ Imperiled Species Observer (MM/ISO)
Observer Location: Mid-span on New Bridge facing west

Tom Ash, Primary Observer, Experienced Aerial MM/ISO
Observer Position: Aerial in R-22 Helicopter viewing the entire site and 1 mile radius continually throughout the watch event.

Jorden Mericle, Experienced Marine Mammal Observer (MMO)
Observer Position: Boat Observer -eastern bay area

Kristina Haselier, Experienced MMO

Observer Position: South and western sector of new bridge

Tony Corbett, Experienced MMO/ Photographer
Observer Position: Midspan on new bridge facing east

Kevin Shelton, Experienced MMO/Aerial Observer
Observer Position: Boat Observer – Northwestern bay area

Britt'ne K. Mericle, MMO Trainee
Observer Position: Midspan of New Bridge shadowing Primary Coordinator

Summary of Manatee Watch Program Activities

May 11, 2021: A formal MM/IS Plan coordination meeting was held at 10:00am at the Zoom meeting. In attendance were the MM/IS Primary coordinator and observers, explosives engineer, construction superintendent, law enforcement representatives, and various agency representatives. All participants were briefed on the possible presence of protected marine species in the area, the logistics of the detonation schedule, details of the aerial survey, potential civil fines for harassment, and the communications plan. The agenda for the meeting may be found in Attachment A.

May 18, 2021: Blast Day Event details are provided below.

10:30 - 11:30 am: Coordinators and observers arrived at the Bayway Structure E Bridge.

12:00 Noon- Safety and Watch Plan Briefing: A meeting was held to review the schedule and safety procedures for all employees and watch officials. Observers were provided with safety equipment, vests, hard hats, radios, a red flag for back up communications, and the attached map and sighting log. Observers maintained radio and/or cellular telephone contact with the primary observer throughout the watch.

12:20 pm- Aerial Observer on Station: Aerial observer begins 1 mile sweep. Notified Primary Coordinator of presence of 3 Manatees east of condominiums east of the exclusion zone in the grass flats. Four manatees were sited northwest of the exclusion zone. Please see Attachment B for Event Day Map with location of sightings/observers and a combined observer log sheets.

12:30 pm – all Observers on station: The primary coordinator was positioned midspan on the new bridge with the observer trainee. Two observers were positioned on each side of the bridge over the main channel: one facing west, and one facing east. One boat observer patrolled the area east of the bridge, the other patrolled the northwest quadrant of the bay. The aerial observer flew during the entire event at approximately 500-800 feet above ground level. Radio check was performed.

12:39 – 1:39 pm: MM/IS Watch of the project site was conducted. 30-minute count down was commenced at 1:09pm. No manatees or marine turtles were seen within or approaching the exclusion zone or safety buffer. Several manatees were present in the seagrass areas outside of the exclusion zone, they were stationary or moved off away from the exclusion zone. Throughout the event, aerial observer provided account of manatee numbers, locations, movement and final disposition. Please see Event Combined Log sheet in Attachment B for details.

1:30 pm: All traffic was closed from the bridge

1:36 pm: All on-bridge observers and construction crews vacated the bridge. Boat observers moved to safe distance.

1:39 pm: All clear called by Aerial Observer and Primary Coordination.

1:40 pm: Detonation occurred

1:42 pm: All MM/IS Observers were back on station checking the area for injured marine species. Aerial observer verified all manatees previously sited were present at their pre-blast locations, no harm evident. Observers remained in position until 2:15pm

2:15 pm Watch Conclusion: Primary Coordinator called Stand Down, all observers to return to rally area to return equipment and collect log sheets.

No protected animals were seen to be dead or injured. The watch concluded at 2:15 pm. A total of 14 manatees were seen on adjacent seagrass beds during the watch.

Documentation

Documentation and photographs are archived with the primary coordinator at Land & Sea Group, Inc. including all observer sighting logs and maps.

Comments and Recommendations

SUMMARY: Good weather resulted in optimal observation conditions. No manatees, small-tooth sawfish, giant manta rays, whales, dolphins, gulf sturgeon or turtles were observed within the safety radius or buffer zone. Several manatees were present at various times but remained clear of the safety zone prior to blasting. The event went well with no apparent injury to protected species.

1. The use of hand-held radios worked very well for primary communication. When radios were unavailable, cellular telephones were used. Aerial communications via aircraft transceiver and handheld unit were likewise very useful.

2. Safety protocols were adhered to and understood by all participants.

3. The use of a sighting log and map was useful to the coordinator in producing the final report.

4. A small pre-blast charge was not used for this event. This pre-blast charge may startle turtles or manatees into moving. This movement could make a previously detected animal not visible to observers.

Photos



Overall Project site



Pre-blast preparations, observers on station



1:40 pm Detonation



Log Event #4 – Nine (9) Manatees on grass flats NW of Exclusion/Safety Radius. See Attachment B for location map



Event #5 – Two Manatees of the 5 sited near the grass flat of Lttle Bird Key

ATTACHMENT A

Pre- Blast Meeting Agenda May 11, 2021

Pre-Blast Meeting

May 11, 2021 10:00 am

- Introduction.
- Blast schedule Overview (AB/CDB)
    - Day before Blast.
        - Notice to the Public (Message Board) “05/18/21 intermittent bridge closure”.
    - Blast day.
        - Timeline.
        - Bridge Closure. (Vehicular/Pedestrian)
        - Chanel Closure
        - Team Locations
        - After Blast
- Watch Coordination program (Land and Sea/AB)
    - Event day
    - Parking location
    - On-site safety meeting and briefing
    - Observer Locations
    - Equipment Requirements
    - Communication Plan
    - Species Protected and Observed
    - Civil Penalties for harassment of species (i.e., No Herding)
    - Recording Data on Log Sheets
    - Recommendations to other Participants.

- Closing Statements
    - Questions
    - Comments

Blasting Agenda

May 17, 2021 – day 1 of loading explosives into the piers

- 6:00 am.
    - Explosives arrive on site escorted to the trestle where it will be driven onto the winch barge (explosives barge). (AB/CDB)
      USCG will established safety perimeter with additional AB Carpenter barge Support.
    - The explosives barge will be pushed by tug boat to the west side of the north pier. (AB)
- 7:00 am to 4:00
    - Explosives will be carried by hand from the barge to the pier on an as-needed basis and loaded in holes per approved sequence.
      (CDB/AB)
    - Once the loading of the North Pier is complete the explosives barge will be moved to the South Pier for loading of explosives in the pier.
- 4pm to 5:00 pm
    - Remaining explosives will be carried back to truck, Explosives barge will be moved back to trestle, truck driven off barge, onto trestle and back to Dyno's Magazine site.
      (AB/CDB)
    - USCG closes Safety Perimeter.
    - Overnight guarding of loaded Structure in the water.

Blast Day Thursday, May 18, 2021

- 6:00am
    - Explosives arrive on site escorted to the trestle where it will be driven on to winch barge (explosives barge).
    - Explosives barge will be tug boat to the west of south pier.
- 7:00 am to 10:00 am
    - Explosives will be carried by hand and loaded in holes per approved sequence.
    - Once all holes are loaded remaining explosives will be carry back to truck, explosives barge will be moved back to trestle, truck driven on to trestle and back to Magazine site.
- 10:00 am to 11:00 am
    - Now that all holes are loaded hole to hole connections will be made on both piers.
- 11:00 am to 12:00 pm
    - Blast mats will be placed and the connector line from north pier to south pier will be ran.
    - Lead line will be ran to the location chosen by the Blaster-in-Charge.
- 12:00 pm
    - Watch Program Meet and Safety briefing and stage in assigned locations.
- 12:30pm
    - Watch Program begins. (Aerial Sweep)
- 1:00pm
    - Connection from Pier to Pier will be made.
    - Watch Program Second Aerial Sweep 30Min countdown Starts

- 1:15pm
    - Pedestrian traffic stops
    - Bridge sweep for pedestrians.
- 1:30pm
    - Watch Program “All Clear”
    - Bridge Traffic stops
    - 5 Min Warning (3ea 3 seconds Air horn)
- 1:34pm
    - 1 Min Warning (2ea 3 seconds Air horn)
- 1:35 pm
    - BLAST.
    - Blaster inspection.
    - Blaster “All Clear” (1ea 10 seconds Air horn)
- 2:00pm
    - Watch Program “Stand Down” Post-mortem meeting and debrief.

ATTACHMENT B

Compiled Log Sheet and Siting/ Observer Map

Imperiled and Marine Mammal Species Watch
Observer Sighting Log

This document is to be utilized in conjunction with a sighting map to record all observations during the marine event.

- Event #: Mark the map with a consecutive series of numbers for each sighting and correspond that number with this sighting log. Also use the Event column for the following events: Please indicate:
  - RC for any radio checks initiated
  - FS for fish scare
  - DEL for blast delay
  - BL for time of blast
  - AC for all Clear

- Time: Record the time that the animal or event was observed.
- Species and #: Record the species of the animal observed and how many were observed. If you know the exact species record this in the notes section. For example if three manatees were observed record M3.
  - M = Manatee
  - T = Turtle (loggerhead, green, leatherback, hawksbill, Kemp's Ridley)
  - C = Cetacean (dolphin, whale)
  - G= Giant Manta Ray
  - O = Other Species _____
- Direction of Travel: Indicate the direction that the animal was heading when you observed it. This can be a compass heading in degrees or north, south, east, west.
- Notes: Note any observation that may be helpful in determining the danger potential to the animal from the marine event.

Date of Event: 5-18-2021

Observer Name: Compiled from All Observers

Observer Location: Aerial (A), Boat 1 and 2 (B1 & B2), Observer Bridge-east (BE), Observer Bridge-West (BW), Primary Coordinator Mid-span on Bridge (PC)

Time On-Station: 12:39 PM

Time of Off-station: 2:15 pm

Event #	Time	Species and # Observed	Direction of Travel	Notes
	12:00p			On-site Safety meeting
Wheels up	12:10p			Aerial Observer in helicopter mobilizing to project site. (A)
Aerial	12:17p			Aerial Observer On station (A) performing 1 mile sweep
Onsite	12:39p			All bridge observers on-station (PC)
1	12:20p	4M	none	4 manatees east of SE condos in grass flats (A) Outside of exclusion Zone

Event #	Time	Species and #	Direction of Travel	Notes
2	12:20p	2M	none	2m SE of 1st st E along road seawall.
3	12:20p	7M	none	NW of Bridge – outside of exclusion zone (A)
	1:09p			30-minute Countdown initiated (PC)
	1:09p			Aerial sweep of 1 mile perimeter (A)
4	1:12p	9M	none	2M joined 7M on grass flats NW of exclusion zone (A)(B1)
5	1:17p	5M	none	Southeast grass flats outside of exclusion zone (A)(B1)
6	1:19p	1M	SE	Moving away from SE seagrass bed outside exclusion zone (A)
7	1:30p	9M	none	Same group as event #3, no movement (A)
8	1:30p	5M	none	Same group as event #4, no movement (A)
AC	1:39p			All Clear Called (PC) verified by Aerial Observer
BL	1:40p			Time of Detonation
	1:42p			All Observers Back on-station, Commence 30-minute post- blast watch (PC)
9	1:43p	14M	none	All manatees previously located in events #4 and #5 were verified in location, no movement, no erratic behavior (A)
10	1:48p	O	circling	3 large tarpon swimming erratically and circling (PC)
	1:58p	14M		All manatees previously located in events #4 and #5 were verified in location, no movement, no erratic behavior (A)
	1:59p			Helicopter low on fuel – Demobilized from Site (A)
	2:15p			Manatee Watch Concluded – Stand down (PC)



FIG. 1.0 - AERIAL MAP

Pinellas County, Florida
December 2020

LAND & SEA GROUP, INC.
ENGINEERS & SCIENTISTS
2828 66th Terrace South
St. Petersburg, FL 33712
813-927-0617 janlandsea@gmail.com

APPENDIX B4

Veterans Memorial Bridge Blasting Plan

Volusia County
Veterans Memorial Bridge
FIN 242172-1-58-01
County Project P-5351-1
Bridge # 794198

Submittal: 2720-45

Blasting Plan

Contractor:

Johnson Bros. Corporation a Southland Company
2462 W Sand Lake Rd.
Orlando, FL 32809
O: (407) 248-9208 F: (407) 248-2540

October 3rd, 2016
Pages Included:
30

ENGINEERED EXPLOSIVE SERVICE, LLC

Allan Thompson, P.E.
P.O. Box 967
Helotes, TX 78023
210-867-5342/210-410-1785
210-695-3430
ExplosiveService@aol.com

September 27, 2016

Johnson Bros. Corporation
2462 Sand Lake Rd
Orlando, FL 32809

ATTN: Mike Brown

Email: mbrown@johnson-bros.com
Tele: 850-464-0069

BLAST PLAN (REVISION #1)

RE: Blast Plan for Explosive Bridge Demolition of 2 Existing Bridge Bascule Footings for Veterans' Memorial Bridge over Halifax River, Daytona Beach, FL

Dear Sir:

It is our intention to demolish both existing concrete bascule bridge piers at the above referenced bridge with explosives. All explosive work will be done in accordance with Title 29 Code of Federal Regulations Part 1928, Safety and Health Regulations for Construction OSHA. The following is our proposed blast plan and detonation procedure.

The explosive demolition work will require two (2) blasts detonated in succession and the interruption of bridge and river traffic for 15 minutes.

I. Bridge Explosive Demolition Plan

MAJOR WORK ITEMS

1. Drill Concrete Bridge Piers from +2.00 elevation down to bottom of seal concrete working from temporary platform.

2. Drill concrete Bridge Piers using PVC casing where blast hole collar is below water level.

3. Load Blast Holes

4. Control flyrock with steel drapes when blast hole collar is at or above water lever

5. Stop all bridge and river traffic a minimum of 1000 LF from Blast Site

6. Detonate Blast Holes

7. Check Blast Detonation and Signal All Clear when completed

BLAST DEMOLITION SCHEDULE

I. Blast Schedule

Work Item	Estimated Time Required	Start Date
1. Remove top of pier structure down to 2.0 elevation by conventional means	By Others	To be determined
2. Drill Pier Base from water level down to bottom of seal concrete working from temporary work platform	2 piers 4 days each	To be determined
3. Load Blast Holes and Detonate	2 blasts 1 day	To be determined
4. Proceed with Additional Mechanical Demolition and Remove Rubble	By Others	

II. Estimated Crane Requirements – Place Drilling Equipment and Personnel on work barge and temporary work platform

III. Special Requirements - COE Permit Modification

IV. Blast Detonation Procedure

The following procedure will be necessary for demolition blast.

WORK ITEM	TIME REQUIRED
1. Check Blast Holes and Receive Explosives	½ hour
2. Load Explosives in Blast Holes	4 hours
3. Clear Blast Safety Zone	15 minutes
4. Stop Traffic on roadway & river	15 minutes
5. Give Blast Horn Signal	1 minute
6. Install Detonation Blasting Cap and Make Final Visual Check of Blast Safety Zone	3 minutes
7. Detonate Fish & Bird Scare Shots	1 minute
8. Detonate Blast	---

9. Check Site for Complete Detonation	3 minutes
10. Check roadway for debris (Clear as Required)	10 minutes
11. Open Roadway and River to Traffic	15 minute
12. Removal of Rubble from River	As Required By Others

V. Blast Hole Design

A. +2.0 Elevation down to bottom of concrete seal

Blast Hole Diameter:	3 ½"
Average Depth:	18'
Spacing:	5' x 6' Box (See Sketch #1)

B. -7.25 Elevation down to bottom of concrete seal

Blast Hole Diameter:	3 ½ "
Maximum Depth:	8.75'
Spacing:	5' x 6' Box (See Sketch #2)

VI. Explosive Design and Loading

A. Collar above water

Detonator:	Nonel EZ Det - 2 per Blast Hole
Primer:	Emulex or Equal
Blasting Agent:	ANFO
Delays:	25 ms for each hole
Stemming:	5'

B. Collar below water

Detonator:	Nonel EZ Det – 2 per Blast Hole
Primer:	Emulex or Equal
Blasting Agent:	Hydromite or Equal
Delays:	25 ms for each adjacent blast hole
Stemming:	3' at Collar

VII. Maximum Pounds per Delay

The plan is to detonate both Piers separately with a 25ms delay between adjacent holes as required. Maximum depth of Blast Hole is estimated to be 18 VF = maximum pounds per delay of 32.5#.

VIII. Inspection of Adjacent Structures

Any existing structures within 500 LF will receive a pre blast survey.

IX. Explosive Transportation

Explosives will be delivered to the job by a licensed explosive supplier in a vehicle which meets ATF and DOT rules and regulations for transportation of explosives over public roads.

All explosives will be under constant visual observation of a licensed blaster while on the job.

Any remaining explosive materials will be picked up by the supplier and returned to his magazine. There will be no on-site storage of explosives.

X. Traffic Control

All Road and River Traffic will be stopped during each blast.

During detonation traffic within the safety zone will be stopped by contractor personnel at a location outside the safety zone and will be held at that location until the "All Clear" is given which is estimated to require 15 minutes.

The Road and River traffic stop will be controlled visually by blasting contractor personnel from the blast control point. Blast detonation will be done only when all traffic and personnel are clear.

XI. Safety

A. The explosive subcontractor personnel performing this work will have extensive of experience explosively demolishing reinforced concrete structures involving roadway and navigable waterways.

B. Pre-Blast Work

The explosive subcontractor will obtain necessary permits for shipping, handling and use of explosives. Prior to the date of each blast the following agencies will be notified:

FL Highway Patrol
Emergency Units (911, Ambulance, Fire Department, Sheriff Department)
Any Adjacent Residences within 1000 ft

The County Fire Marshal's Office and will be notified a minimum of 72 hours prior to the blast.

C. Explosive Demolition Procedures

1. No on-site storage will be used on this project.

2. Explosive Security prior to beginning blast loading a 250' safety zone will be established around the work area.

A licensed blaster will be on the job site at all times during the explosive loading procedure and explosives will be under constant observation from the delivery until the shot detonation.

3. Blast Day Surveillance

Prior to blasting, any pedestrians and onlookers will be cleared for a safety zone with a minimum 500' radius from the shot. Restrictions of vehicular and pedestrian traffic will be coordinated with local officials. Traffic will be shut down 15 minutes prior to blasting the structure. At all times, unauthorized persons shall be prohibited from the blast safety zone.

D. Blast Monitoring

Each blast will be monitored to verify that blast vibration and air over pressure remain within acceptable limits.

One monitor will be placed at approximately 300 feet from the blast or between the blast location and any existing building improvements and one monitor will be placed on any segments of the new bridge adjacent to each blast.

Maximum Project Blast Vibrations and Noise Criteria per ISEE Standards are as follows: Vibration – 2.0"/sec for Building Improvements
10.0"/sec for reinforced concrete structures
Noise - 136 DBL

Estimated vibration due to proposed blast at listed distance from blast:

Feet	Estimated Vibration
100'	1.63in/sec
300'	0.28in/sec
500'	0.12in/sec
1000'	0.04in/sec

E. Specific Marine Impact Mitigation Requirements

1. All blast holes will be stemmed with clean crushed stone of approximately 3/8" diameter and a minimum of 3' depth.

2. All explosives will be detonated within confined blast holes. No unconfined of open water blasts will be used.

3. All blast holes will be delayed as required to maintain charge weight at or below the approved maximum charge weight.

4. Blasting is to be done using maximum pounds of explosive per delay being 32.5#.

5. All blasts will be detonated during daylight hours.

6. Fish scare shots will be used on this project. Scare shot charges will be approximately .003# and will be located in the center of each structure.

F. Coordination with Project Manatee, Dolphin, Sea Turtle and Small Tooth Sawfish Watch Program

1. All Blast Holes will be detonated by "non electric det caps" which are gas tub detonators.
2. Each Blast will include 30 blast holes which will be delayed at 25 millisecond from each adjourning hole so that no two detonate simultaneously.
3. The structures being blasted are very massive reinforced concrete which are supported by concrete piling and standing in 8-12' of water.
4. Measures to drive fish from blast area will be "scare shots" as designed in scare charge test report Cooper River, South Carolina.
5. The blast watch zone perimeter will be marked with brightly colored buoys.
6. The contractor has developed a plan to monitor injuries to fish from each blasting event. This plan includes collection, enumeration, and identification of all fish information and collection of blast data provided after each shot and identify lessons learned from the blasting event and provided to NMFS, FWC and other resource agencies within 30 days of completion of the blasting. A separate monitoring/watch plan will be followed for protected marine species (Such as manatees, dolphins, sea turtles and small tooth sawfish), and is attached to this document. The FWC will be notified of the potential dates for blasting at least 30 days prior, by sending an email to ImperiledSpecies@myfwc.com.

G. Misfire Procedure

All explosive charges will be provided with multi or looped detonation paths to reduce the possibility of misfire. Following blast detonation the licensed blaster will visually inspect all concrete demolition charges to confirm complete detonation prior to resuming traffic flow. If any demolition charge did not detonate the charge will be recapped and the detonation procedure repeated.

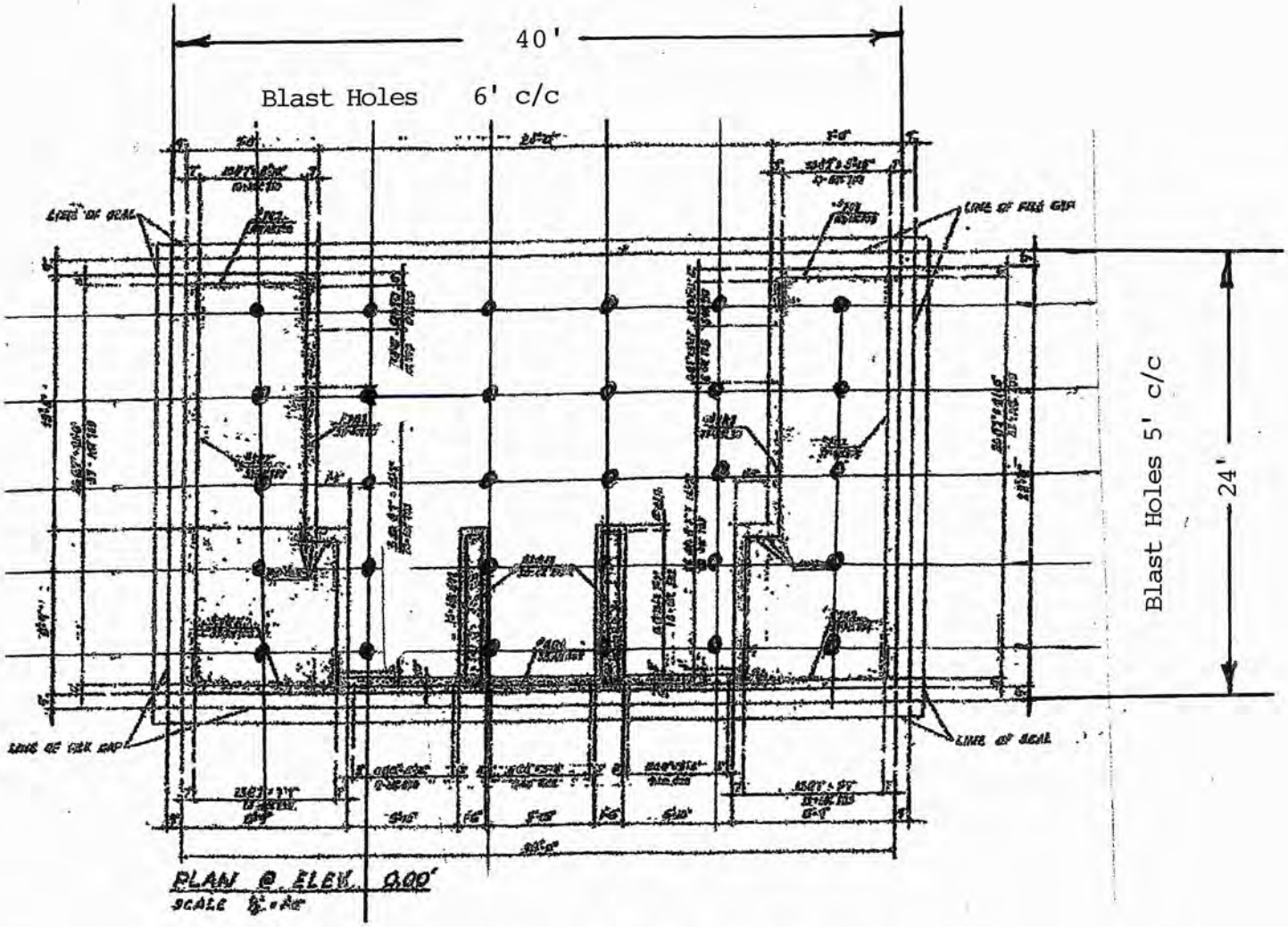
H. Post Blast

The licensed blaster shall give the "All Clear" signal before any other person or equipment is permitted inside the blast zone. At that time, vehicular traffic shall resume on existing roadway and water.

XII. Blast Plan Attachments

1. Blast Hole Design Sketch #1, #2, & #3
2. Existing Bridge Plan Elevation & Profile
3. Blast Safety Zone Plan
4. Fly Rock Drape Location Sketch
5. Existing Bridge Photo
6. Manufactures' Data Sheets
7. Marine Species Watch Plan

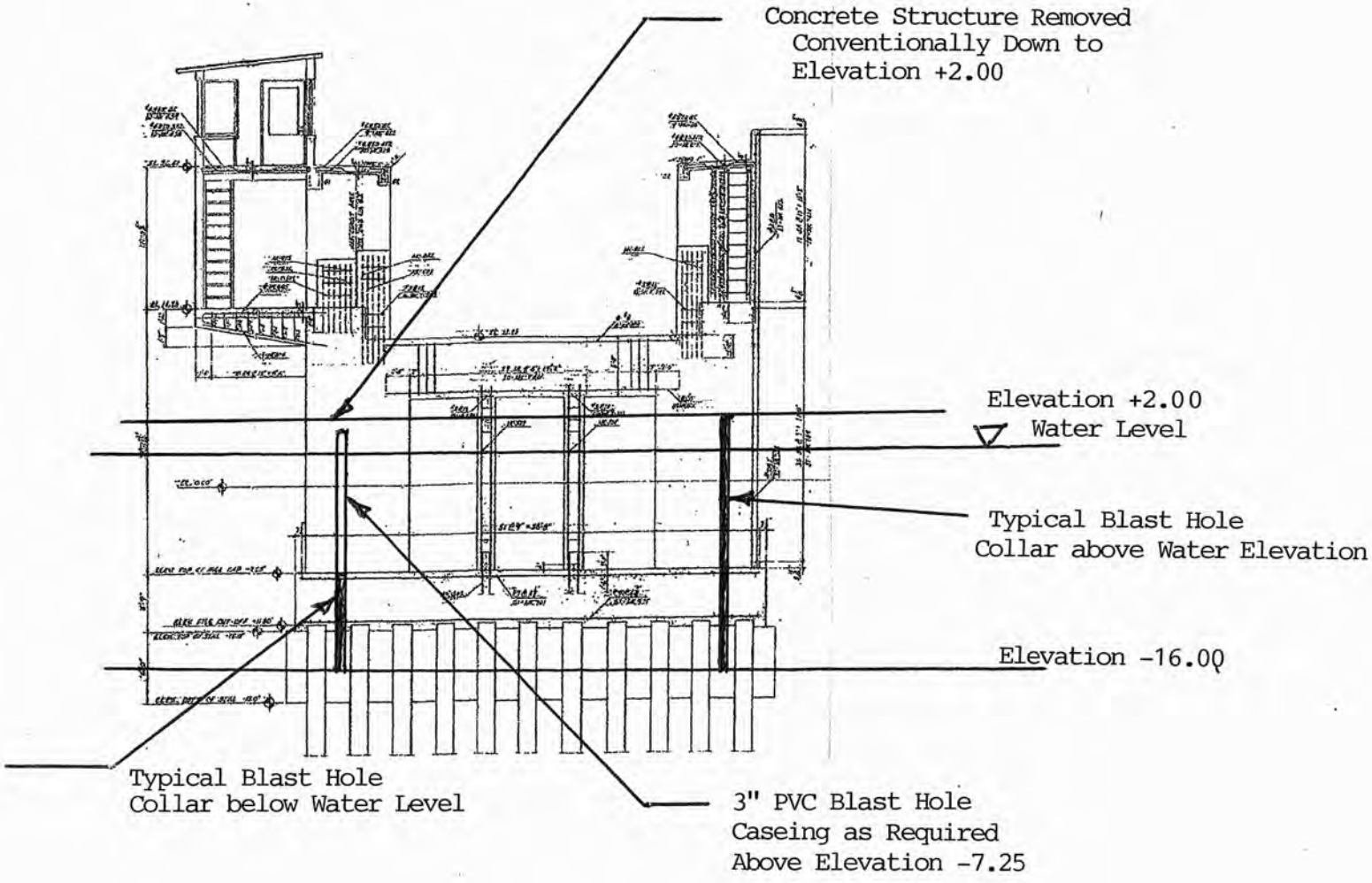
ALLAN THOMPSON, P.E

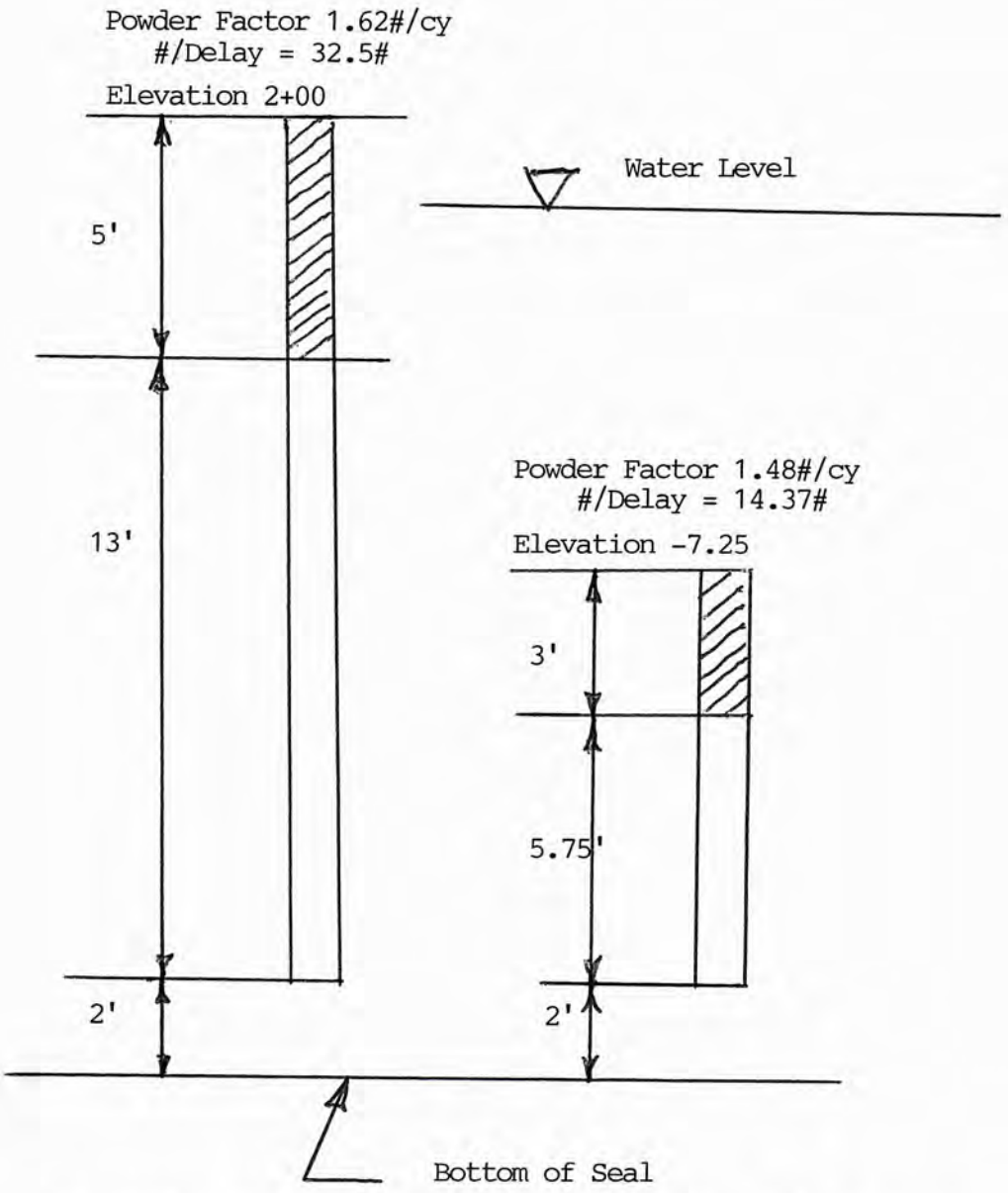


Bascule Pier Plan View at Elevation 0.00

BLAST HOLE DESIGN _ SKETCH #1

BLAST HOLE DESIGN CROSS SECTION _ SKETCH #2

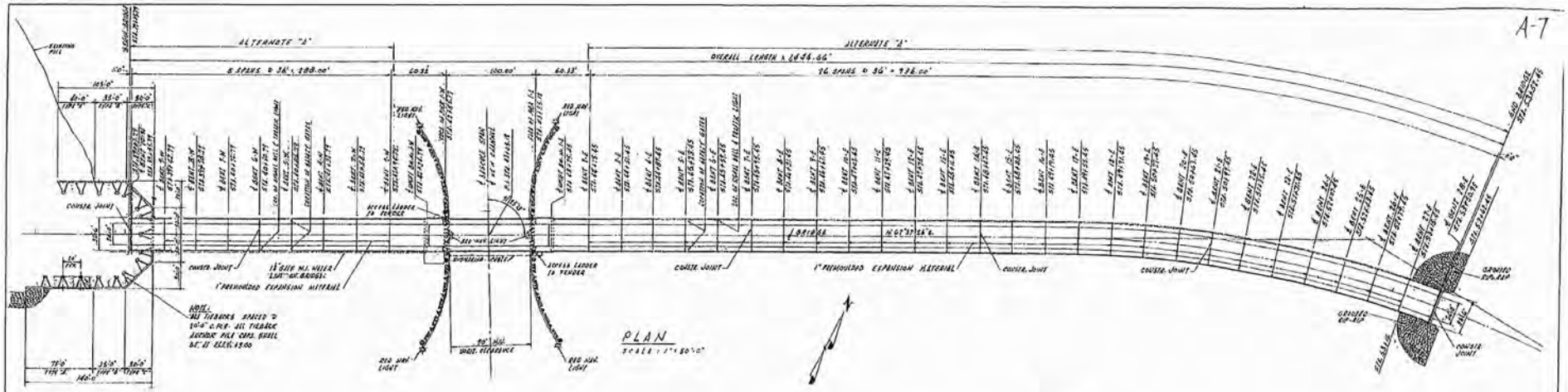


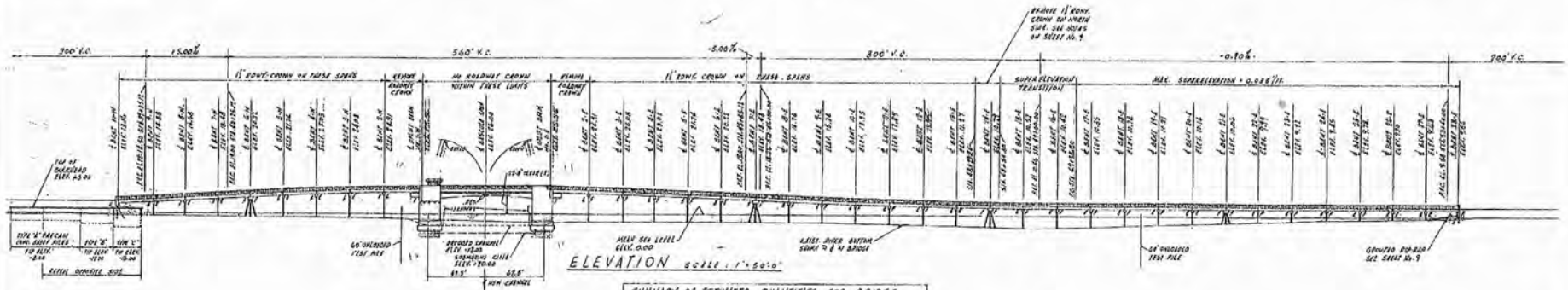


BLAST HOLE DRAWING _ SKETCH #3

EXISTING BRIDGE PLAN ELEVATION AND PROFILE

A-7





PILE CUT-OFF ELEVATION SCHEDULE

PIER OR BENT NO.	ELEV.	PIER OR BENT NO.	ELEV.
1E & 1W	-11.00	13E	6.51
2E & 2W	20.15	14E	6.08
3E & 3W	11.32	15E	5.85
4E & 4W	18.22	16E	5.46
5E & 5W	16.98	17E	5.30
6E & 6W	15.46	18E	5.13
7E & 7W	13.72	19E	5.16
8W	11.92	20E	5.09
9W	10.12	21E	5.01
10W	8.50	22E	4.86
		23E	4.87
8E	12.00	24E	4.80
9E	10.48	25E	4.73
10E	9.19	26E	4.65
11E	8.09	27E	4.58
12E	7.19	28E	4.51

SUMMARY OF ESTIMATED QUANTITIES FOR BRIDGE

ITEM NO.	ITEM	UNIT	QUANTITY
6B	TREATED STRUCTURAL TIMBER (FPS)	M.F.B.M.	65.
10-1	CONCRETE CLASS A (BRIDGE)	CU.YD.	1175.
10-2	CONCRETE CLASS A (36" SPANS)	CU.YD.	6303.
10-3	CONCRETE CLASS A (COUNTERWEIGHT)	CU.YD.	120.
11	CONCRETE, SEAL	CU.YD.	404.
13	CONCRETE HANDRAIL	LIN.FT.	2604
17-1	REINFORCING STEEL (BRIDGE)	LB.	105,000.
17-2	REINFORCING STEEL (36" SPANS)	LB.	947,810.
20	STRUCTURAL STEEL	LUMP SUM	1
22	MACHINERY AND CASTINGS	LUMP SUM	1.
24	TREATED TIMBER PILING (12")	LIN.FT.	10,000.
27-A	PRECAST CONCRETE PILING (BRIDGE) 18"	LIN.FT.	3,570
27-B	PRECAST CONCRETE PILING (36" SPANS) 18"	LIN.FT.	9,960
29	UNLOADED TEST PILING (18")	LIN.FT.	120
134	CONTROL HOUSE	LUMP SUM	1.
136	ELECTRICAL EQUIPMENT	LUMP SUM	1.
139-A	CONCRETE BULKHEAD (TYPE A PILING)	LIN.FT.	115.
139-B	CONCRETE BULKHEAD (TYPE B PILING)	LIN.FT.	70.
139-C	CONCRETE BULKHEAD (TYPE C PILING)	LIN.FT.	146.
133-A	STEEL BRIDGE FLOOR (5" DECK)	SQ.FT.	2,300.
133-B	STEEL BRIDGE FLOOR (3" DECK-ARMORED)	SQ.FT.	790.

GENERAL NOTES

1. DESIGN SPECIFICATIONS - A.A.S.H.O. 1949.
2. LOADING - H-20-44.
3. ELEVATIONS - ALL ELEVATIONS REFER TO MEAN SEA LEVEL DATUM.
4. REINFORCEMENT - DETAIL STEEL SHALL BE INTERMEDIATE GRADE.
5. CHANNELS - ALL REINFORCING STEEL SHALL HAVE 3 INCHES CLEAR COVER FROM FACE OF CONCRETE UNLESS NOTED OTHERWISE.
6. CONCRETE FINISH - NO ADDITION TO FORM SURFACES SPECIFIED. ALL SURFACES OF HANDRAILS AND HANDRAIL POSTS, THE OUTSIDE 8" OF SIDEWALKS, THE ENTIRE EXTERIOR OF MONTROSS JOINTS AND ALL SURFACES ON THE BALL ON THE BASCULE PIERS SHALL BE GIVEN CLASS "A" SURFACE FINISH.
7. DESIGN LOAD FOR 18"ø PRECAST CONCRETE PILES 60 TONS.

* ITEM NO. 18 INCLUDES APPROXIMATELY 102,400 LBS. OF BASCULE LEAVES, 70,700 LBS. OF SPANS FLANKING BASCULE PIERS AND 9,200 LBS. MISCELLANEOUS.

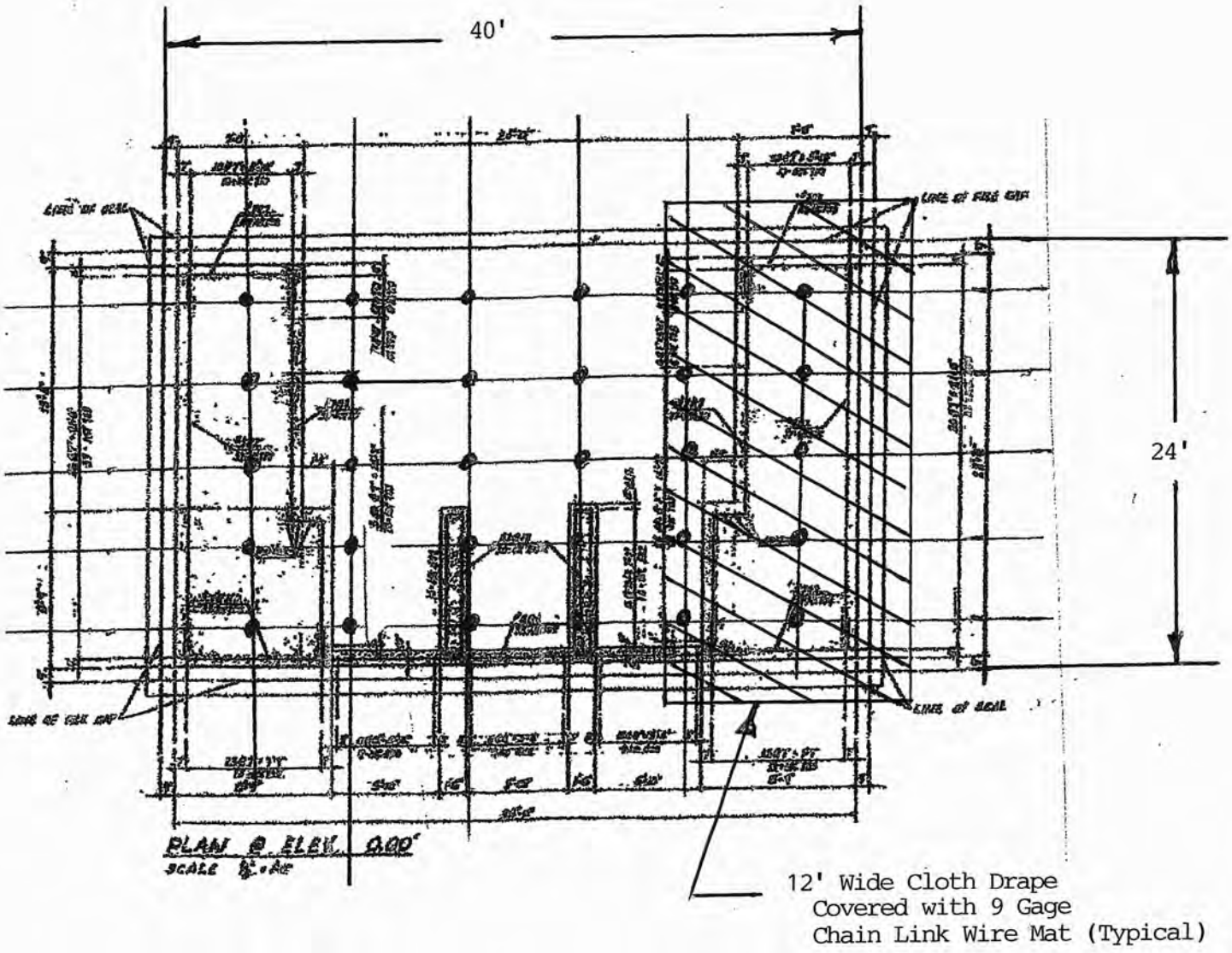
PLAN & ELEVATION OF BRIDGE

SOUTH BRIDGE AND APPROACHES
DAYTONA BEACH
VOLUSIA COUNTY, FLORIDA

REYNOLDS, SMITH & HILLS
ARCHITECTS & ENGINEERS
JACKSONVILLE, FLORIDA

DRAWN BY: E.C.L.
CHECKED BY: F.H.H.
DATE: 8-11-58

SHEET 30
PROJ. NO. 5431



FLY ROCK DRAPE LOCATION

ENGINEERED EXPLOSIVE SERVICE, LLC

8301 Windway
Windcrest, TX 78239
210-867-5342
ExplosiveService@aol.com

August 23, 2016

Veterans Memorial Bridge Replacement
Contract no. 1575
ITB no.15-B-183JD
Project no. 5351-1
USCG Permit no.1-15-7

ANTICIPATED DEBRIS FROM PROPOSED BLAST

The enclosed figures and comments are intended to identify the anticipated debris field and size of debris resulting from the explosive demolition of Bascule Pier Footings of the existing Veterans Memorial Bridge over the Halifax River, Volusia County, FL.

DEBRIS FIELD

1. All explosive material used in the proposed blast will be placed in blast hole a minimum of 3' below water level.

2. Fly Rock will be eliminated from the structure at 2' above water level by a cloth and wire mesh drape placed over top of structure (See Sketch 1 & 2)

3. The spread of concrete debris from this blast under water will be significantly reduced by the water and should not extend more than 10' beyond the perimeter of the existing structure.

SIZE OF DEBRIS

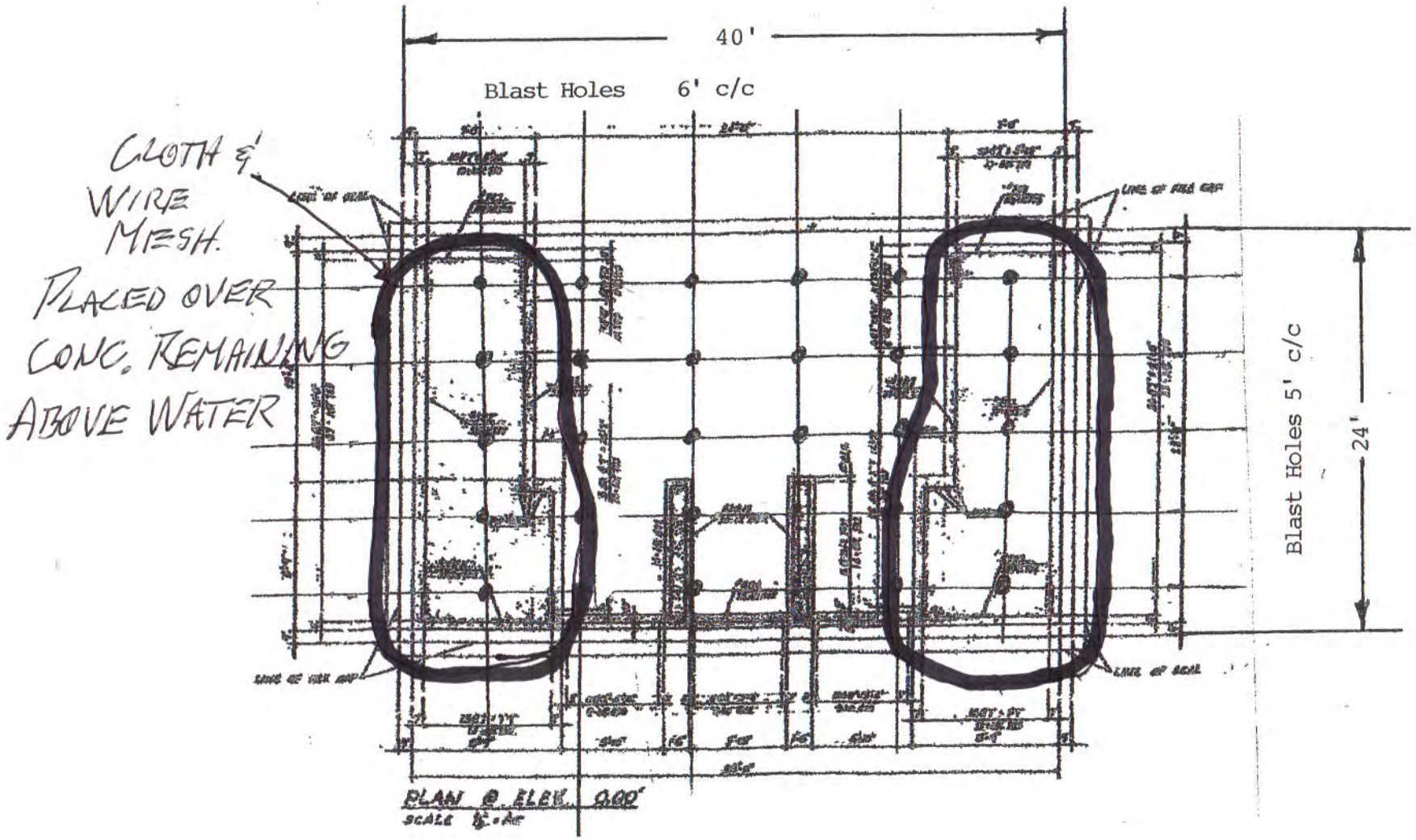
1. The size of the largest expected concrete debris can be estimated base on ½ of the blast hole spacing which in this project is a 6' box.

2. Working under water allows significant blast hole loads and I estimate the majority of debris to be 12" – 24" pieces with the largest being 36".

3. Working under water the large pieces of debris will encounter the most resistance to movement with most remaining within the existing structure boundary.

I have enclosed with this response Sketch #1 and #2 of the Blast Plan where I have shown the location of drapes which will confine any fly rock from the concrete walls that protrude up to 2' above the water level at the time of the blast.

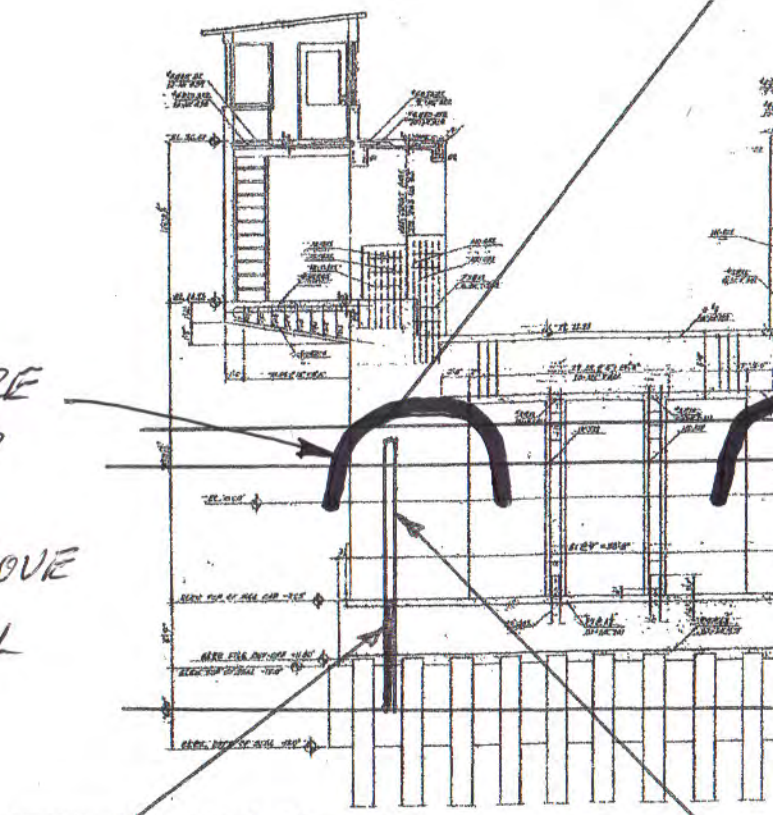
ALLAN THOMPSON, P.E.
P.E. #28337



Bascule Pier Plan View at Elevation 0.00

BLAST HOLE DESIGN _ SKETCH #1

BLAST HOLE DESIGN CROSS SECTION _ SKETCH #2



Concrete Structure Removed
Conventionally Down to
Elevation +2.00

CLOTH & WIRE MESH PLACED OVER CONC. REMAINING ABOVE WATER LEVEL

Elevation +2.00
Water Level

Typical Blast Hole
Collar above Water Elevation

Elevation -16.00

Typical Blast Hole
Collar below Water Level

3" PVC Blast Hole
Caseing as Required
Above Elevation -7.25

Google Maps South Bridge



500' Blast Safety Zone

South Bridge

Daytona Beach, FL 32114

Safety Zone is for vehicles and pedestrians not directly involved with the blasting operations

Google Maps



MATERIAL SAFETY DATA SHEET

SHOCK *STAR
NON-ELECTRIC DETONATORS

SECTION I

Issued by the Safety and Compliance Dept.

AUSTIN STAR DETONATOR COMPANY
901 CANTU ROAD
BROWNSVILLE, TX 78520

CHEMTREC (24HR EMERGENCY TELEPHONE), CALL 1-800-424-9300- United States, Canada, Puerto Rico (U.S. Commonwealth) and the Virgin Islands (U.S. Territory).
International callers, dial the U.S. access number followed by 1-703-527-3887 (Mexico access number 00).
U.S. Maritime callers dial- 1-703-527-3887.

For non-emergency assistance, call
956-831-7751

TRADE NAME AND SYNONYMS

Shock*Star: Twin* Star Detonators, In-Hole Delays, Detonators, Surface Delay Connectors, Quick-Relay Connectors, Dual-Delays, Shorty, Long Period, STD (Shock Tube with Detonators), Quick*Start and MS Connector.

Non-Electric Blasting Caps

SECTION II HAZARDOUS INGREDIENTS

Explosive components are PETN or RDX and lead compounds sealed in a metal shell.

PETN, Pentaerythritol tetranitrate, $C_5H_8N_4O_{12}$	CAS No. 78-11-5
RDX, Cyclotrimethylene Trinitramine, $C_3H_6N_6O_6$	CAS No. 121-82-4
Lead Azide, Pb $(N_3)_2$	CAS No. 13424-46-9
Lead Styphnate, Lead Trinitroresorcinate, $C_6H_3N_3O_9Pb$	CAS No. 15245-44-0

SECTION III PHYSICAL DATA

BOILING POINT	N/A	VAPOR PRESSURE (mm Hg)	N/A
SPECIFIC GRAVITY (H_2O = 1)	N/A	VAPOR DENSITY (Air = 1)	N/A
PERCENT VOLATILE BY VOL. (%)	N/A	EVAPORATION RATE:	N/A
SOLUBILITY IN WATER:	Insoluble		

APPEARANCE AND ODOR: Aluminum or copper shells with Shock Tube attached. See the Shock Tube MSDS. No odor.

SECTION IV FIRE AND EXPLOSION DATA

FLASH POINT:	N/A
FLAMMABLE LIMITS:	N/A
EXTINGUISHING MEDIA:	See below
SPECIAL FIREFIGHTING PROCEDURES:	Do not fight fire. Withdraw personnel immediately. Allow fire to burn itself out.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	May explode when subjected to flame, heat, impact or friction. Safe from extraneous electric currents except for high energy discharges such as lightening. Do not exceed 150°F (66°C). Avoid toxic fumes from fire.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: ACGIH: 0.05 mg/M³ TWA, lead, elemental, and inorganic compounds, as Pb.
RDX-Skin 1.5 mg/M³
OSHA : 50 µg/M³ PEL as Pb. For additional information, see 29 CFR 1910.1025

EFFECTS OF OVEREXPOSURE: None likely when safe blasting practices are employed.

EMERGENCY AND FIRST AID PROCEDURES: Improper handling or misuse may cause detonation resulting in injuries from shrapnel. Lead and lead compounds are listed in the 1987 IARC Monographs as possible human carcinogens (Group 2B). Lead is not listed in the NTP annual report on carcinogens.

MATERIAL SAFETY DATA SHEET

SHOCK*STAR NON ELECTRIC DETONATORS

Austin Star Detonator Company
901 Cantu Road
Brownsville, TX 78520

SECTION VI REACTIVITY DATA — **Issued by the Safety and Compliance Dept.**

STABILITY: May explode when subjected to flame, heat, impact or friction. Shock*Star and non-electric detonators are safe from extraneous electric currents except for high energy discharges such lightening.

INCOMPATIBILITY (MATERIALS TO AVOID): Avoid contact with acids or alkalies.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide and lead fumes.

HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Pick up containers or units by hand. Avoid conditions affecting stability. DO NOT use damaged detonators.

WASTE DISPOSAL METHOD: Dispose of under direct supervision of a qualified person according to local, state and federal regulations. Call Austin Powder for recommendations and assistance. This material may become a hazardous waste under certain conditions and must be collected, labeled and disposed of per state and federal hazardous waste regulations.

TRANSPORTATION EMERGENCIES involving spills, leaks, fires or exposures in the United States, Canada, Puerto Rico (U.S. Commonwealth) and the Virgin Islands (U.S. Territory): **CALL CHEMTREC** for emergencies only: 1-800-424-9300. **International callers,** dial the U.S. access number followed by 1-703-527-3887 (Mexico access number 00). **U.S. Maritime callers dial-** 1-703-527-3887. All calls are recorded.

SECTION VIII SPECIAL PROTECTION	**INFORMATION:**
RESPIRATORY PROTECTION:	Avoid breathing fumes from detonation.
VENTILATION:	Not required.
PROTECTIVE GLOVES:	Not required.
EYE PROTECTION:	Not required.

SECTION IX SPECIAL PRECAUTIONS

COMPLY WITH THE SAFETY LIBRARY PUBLICATION NO. 4 "WARNINGS AND INSTRUCTIONS" AS ADOPTED BY THE INSTITUTE OF MAKERS OF EXPLOSIVES.

TRANSPORTATION, STORAGE AND USE MUST COMPLY WITH OSHA SAFETY AND HEALTH STANDARDS 29CFR1910.109, APPLICABLE MSHA REGULATIONS, THE DOT AND HAZARDOUS MATERIALS REGULATIONS, BATF REQUIREMENTS AND STATE AND LOCAL TRANSPORTATION, STORAGE AND USE REGULATIONS AND ORDINANCES.

THESE DETONATORS MAY BE SHIPPED UNDER ONE OF THE FOLLOWING DOT CLASSIFICATIONS:
DOT or IMDG proper shipping description:
Detonator Assemblies, Non-Electric, 1.1B, UN0360, PGII Detonator Assemblies, Non-Electric,1.4B, UN0361, PGII
Consult IME Safety Library Publication No. 22, RECOMMENDATIONS FOR THE SAFE TRANSPORTATION OF DETONATORS IN A VEHICLE WITH CERTAIN OTHER EXPLOSIVE MATERIALS AND THE GUIDE FOR THE USE OF THE IME 22 CONTAINER.

MATERIAL SAFETY DATA SHEET

EMULEX 500, 700, AND 900 SERIES

DATE SEPTEMBER 1998 **MSDS NO. E-3**

SECTION I **Issued by the Safety and Compliance Dept.**

AUSTIN POWDER COMPANY
25800 SCIENCE PARK DRIVE
CLEVELAND, OHIO 44122
EMERGENCY PHONE
DAY 216-464-2400
NIGHT 216-464-2407

TRADE NAME AND SYNONYMS
Seismex MH
Emulex Emulsions
Enviroseis Emulsions
Emuline and Pyroline Are Emulex Products That Incorporate A Continuous Length of Detonating Cord. See MSDS.

Primegel Contains a Cast Booster. See MSDS.

Emuseis products are packaged in threaded plastic tubes.

SECTION II HAZARDOUS INGREDIENTS

Ammonium Nitrate: NH_4NO_3, CAS No. 6484-52-2, (60 - 90%)
Sodium Nitrate, $NaNO_3$, CAS No. 7631-99-4, (0 - 17%)
Petroleum Hydrocarbons, (3 to 9%)
Aluminum, Al, CAS No. 7429-90-5, (0 to 10%)
An emulsified water in oil mixture of ammonium nitrate, mineral oil, and emulsifiers.

SECTION III PHYSICAL DATA

BOILING POINT N/A
SPECIFIC GRAVITY (H_2O = 1) 1.14 to 1.35
PERCENT VOLATILE BY VOL. (%) N/A
VAPOR PRESSURE (mm Hg) N/A
VAPOR DENSITY (Air=1) N/A
EVAPORATION RATE: N/A
SOLUBILITY IN WATER: Although in excess of 80% of the materials are readily soluble in water, the products have excellent water resistance.
APPEARANCE AND ODOR: Viscous emulsion. If aluminum is present, grey metal particles will be visible. Slight odor of oil.

SECTION IV FIRE AND EXPLOSION DATA

FLASH POINT: Oil 114°C (PMCC)
FLAMMABLE LIMITS: Not available
EXTINGUISHING MEDIA: See below.
SPECIAL FIRE FIGHTING PROCEDURES: Do not fight fires. Withdraw personnel immediately. Allow fire to burn itself out.
UNUSUAL FIRE AND EXPLOSION HAZARDS: May explode when subjected to fire or shock, especially when confined and in large quantities.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: ACGIH: Oil Mist, mineral, 5 MG/M³, Aluminum metal dust, 10 MG/M³
OSHA: Oil Mist, mineral, 5 MG/M³, Aluminum metal dust, 15 MG/M³
EFFECTS OF OVEREXPOSURE: Acute: Ingestion of large amounts may cause cyanosis, nausea, collapse, vomiting, abdominal pain, rapid heartbeat and breathing, coma, convulsions, and death may occur.
EMERGENCY AND FIRST AID PROCEDURES:
Eyes: Slight irritant. Flush with large amounts of water for at least 15 minutes and consult a physician.
Skin: Slight irritant. Wash with mild soap and water.

MATERIAL SAFETY DATA SHEET

EMULEX 500, 700, AND 900 SERIES

SECTION VI REACTIVITY DATA — Issued by the Safety and Compliance Dept.

STABILITY: Stable under normal conditions. May explode when subjected to fire or shock, especially when confined and in large quantities. Avoid temperatures above 212°F, (100°C).

INCOMPATIBILITY (MATERIALS TO AVOID): Avoid all contamination, especially peroxides and chlorates. Alkaline contamination may liberate ammonia fumes.

HAZARDOUS DECOMPOSITION PRODUCTS: Gaseous Nitrogen Oxides and Carbon Oxides.

HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Pick up and dispose of all spilled material immediately. Do not permit smoking or open flames near spill site.

WASTE DISPOSAL METHOD: Uncontaminated material may be placed in large diameter boreholes and detonated so that the explosive energy is utilized as originally intended. Dispose of under direct supervision of a qualified person according to local, state and federal regulations. Call Austin Powder for recommendations and assistance.

TRANSPORTATION EMERGENCIES involving spills, leaks, fires or exposures in the United States: **CALL CHEMTREC:** 1-800-424-9300. For emergency calls originating outside the U. S. dial the U. S. access number followed by: 1-703-527-3887. All calls are recorded.

SECTION VIII SPECIAL PROTECTION INFORMATION:

RESPIRATORY PROTECTION:	Not required under normal conditions.
VENTILATION:	Not required under normal conditions.
PROTECTIVE GLOVES:	Slight skin irritant.
EYE PROTECTION:	Slight eye irritant.

SECTION IX SPECIAL PRECAUTIONS

COMPLY WITH "ALWAYS AND NEVER" AS ADOPTED BY THE INSTITUTE OF MAKERS OF EXPLOSIVES. TRANSPORTATION, STORAGE AND USE MUST COMPLY WITH OSHA SAFETY AND HEALTH STANDARDS 29CFR1910.109, APPLICABLE MSHA REGULATIONS, THE DOT AND HAZARDOUS MATERIALS REGULATIONS BATF REQUIREMENTS AND STATE AND LOCAL TRANSPORTATION, STORAGE AND USE REGULATIONS AND ORDINANCES.

DOT or IMDG proper shipping description: Explosives, Blasting, Type E, 1.1D, UN0241, PG II

This product contains ammonium nitrate solution in an emulsified form which may be a toxic chemical subject to the reporting requirements of section 313 of SARA Title III and 40 CFR Part 372, Toxic Chemical Release Reporting: Community Right-To-Know.

This material may become a hazardous waste under certain conditions and must be collected, labeled and disposed of per state and federal hazardous waste regulations.

None of the components are listed in the 1987 IARC Monographs, Group 1, 2A or 2B as known, probable, or possible carcinogens, nor are they listed in the NTP annual report on carcinogens.

MATERIAL SAFETY DATA SHEET

HYDROMITE ADVANCE BULK EMULSION

DATE MAY 2011 **MSDS NO. E-22**

SECTION I **Issued by the Safety and Compliance Dept.**

Austin Powder Company
25800 Science Park Drive
Cleveland, Ohio 44122

CHEMTREC (24HR Emergency Telephone), call
1-800-424-9300- United States, Canada, Puerto Rico (U.S. Commonwealth) and the Virgin Islands (U.S. Territory).
International callers, dial the U.S. access number followed by 1-703-527-3887 (Mexico access number 00).
U.S. Maritime callers dial- 1-703-527-3887.

For non-emergency assistance, call
216-464-2400

TRADE NAME AND SYNONYMS
Hydromite Advance 120
Hydromite Advance 125
Hydromite Advance 220
Hydromite Advance 225

SECTION II HAZARDOUS INGREDIENTS

Ammonium Nitrate: NH_4NO_3:	CAS No. 6484-52-2	(75 - 85%)
Hydromite Advance 100 Series contains Petroleum Hydrocarbon Blend:	CAS No. C11-16-64742-96-7 CAS No. C11-25-64741-43-1	(6 - 9%)
Hydromite Advance 200 Series contains NF Grade White Mineral Oil:	CAS No. 8042-47-5	(6 - 9%)

NF Grade White Mineral Oil meets FDA specifications: 21 CFR 172.878 and 21 CFR 178.3620(a)

SECTION III PHYSICAL DATA

Boiling Point:	N/A	Vapor Pressure (Mm Hg):	N/A
Specific Gravity (H_2o = 1):	1.15 To 1.30	Vapor Density (Air=1):	N/A
Percent Volatile By Volume:	N/A	Evaporation Rate:	N/A

Solubility In Water: Although in excess of 90% of the ingredients are readily soluble in water; the product has excellent water resistance.
Appearance and Odor: White to tan colored thick cream.

SECTION IV FIRE AND EXPLOSION DATA

Flash Point:	165°F (74°C) (PMCC)
Flammable Limits:	Not available
Extinguishing Media:	See below.
Special Fire Fighting Procedures:	Do not fight fires. Withdraw personnel immediately. Allow fire to burn itself out.
Unusual Fire And Explosion Hazards:	May explode when subjected to fire or shock, especially when confined and in large quantities.

SECTION V HEALTH HAZARD DATA

Threshold Limit Value: ACGIH: Oil mist, mineral, 5 mg/m³
OSHA: Oil mist, mineral, 5 mg/m³

Effects Of Overexposure: Acute: Ingestion of large amounts may cause cyanosis, nausea, collapse, vomiting, abdominal pain, rapid heartbeat and breathing, coma, convulsions, and death may occur.

Emergency And First Aid Procedures:
Eyes: Slight irritant. Flush with large amounts of water for at least 15 minutes and consult a physician.
Skin: Slight irritant. Wash with mild soap and water.

MATERIAL SAFETY DATA SHEET

HYDROMITE ADVANCE BULK EMULSION

SECTION VI REACTIVITY DATA **Issued by the Safety and Compliance Dept.**

Stability: Stable under normal conditions. May explode when subjected to fire or shock, especially when confined and in large quantities. Avoid temperatures above 212°F, (100°C).

Incompatibility (Materials To Avoid): Avoid all contamination, especially peroxides and chlorates. Alkaline contamination may liberate ammonia fumes.

Hazardous Decomposition Products: Gaseous nitrogen oxides and carbon oxides: Toxic decomposition products including carbon monoxide (CO) may migrate to off blast-site areas.

Hazardous Polymerization Will Not Occur.

SECTION VII SPILL OR LEAK PROCEDURES

Steps To Be Taken In Case Material Is Released Or Spilled: Pick up and dispose of all spilled material immediately. Do not permit smoking or open flames near spill site.

Waste Disposal Method: Uncontaminated material may be placed in large diameter boreholes and detonated so that the explosive energy is utilized as originally intended. Dispose of under direct supervision of a qualified person according to local, state and federal regulations. Call Austin Powder for recommendations and assistance.

Transportation Emergencies involving spills, leaks, fires or exposures in the United States, Canada, Puerto Rico (U.S. Commonwealth) and the Virgin Islands (U.S. Territory): **CALL CHEMTREC** for emergencies only: 1-800-424-9300.
International callers, dial the U.S. access number followed by 1-703-527-3887 (Mexico access number 00).
U.S. Maritime callers dial- 1-703-527-3887. All calls are recorded.

SECTION VIII SPECIAL PROTECTION INFORMATION:

Respiratory Protection:	Not required under normal conditions.
Ventilation:	Not required under normal conditions.
Protective Gloves:	Slight skin irritant.
Eye Protection:	Slight eye irritant.

SECTION IX SPECIAL PRECAUTIONS

Comply With The Safety Library Publication No. 4 "Warnings And Instructions" As Adopted By The Institute Of Makers Of Explosives.

Transportation, storage and use must comply with OSHA safety and health standards 29CFR1910.109, applicable MSHA regulations, the DOT and hazardous materials regulations, BATF requirements and state and local transportation, storage and use regulations and ordinances.

Hydromite Advance - DOT or IMDG proper shipping description: Explosive, Blasting, Type E, 1.5D, UN0332, PG II

This material may become a hazardous waste under certain conditions and must be collected, labeled and disposed of per state and federal hazardous waste regulations.

None of the components are listed in the 1987 IARC Monographs, Group 1, 2A or 2B as known, probable, or possible carcinogens, nor are they listed in the NTP annual report on carcinogens.

Lenisa Tipton

4170 River Marsh Dr.
Fernandina Beach, FL 32034
(727)510-7939
lenisa_t@hotmail.com

Education

Humboldt State University, Arcata, California
B.S. in Zoology and Biology (marine emphasis), spring 1997

Highlights

-Vertebrate Physiology
-Animal Behavior
-Invertebrate zoology
-Marine Mammalogy
-Ecology
-Mammalogy
-Bacteriology
-Genetics

Bay Air Flying Service, St. Petersburg, FL
Private Pilot Certificate, December 2001
Instrument Rating, June 2003
Commercial Pilot Certificate, October 2004
Multi-Engine Commercial Certificate, November 2004

Work & Research Experience

Total Aerial Survey Time: 1000+hrs
Total Pilot Time: 350hrs

Wildlife Trust, Sarasota, Florida (field site St. Simon's Island, GA and Charleston, SC)
Aerial Surveyor, November- April (Seasonal) 2003- current
Cynthia Taylor (941) 388-4441

- Conducting right whale aerial surveys; Logging information on right whales and ship locations; Facilitating the transmittal of that information to the U.S. Navy, Georgia and South Carolina's Department of Natural Resources and Florida Marine Research Institute; entering it into computer data base.

Super Boat International/APBA Offshore, Rossville, Georgia
Marine Mammal Watch Program Coordinator/Aerial Observer, April 2001-Current
Jim Poplin (423) 718-1188

- Marine Mammal and Sea Turtle Watch Coordinator and aerial observer. Since 2001, have been involved with the majority of the South East races. Worked with race officials and USFWS to developed observation plan, scheduled pilot and plane, organized other Watch staff and produced final report for USCG and USFWS. Locations include Daytona, Ft. Lauderdale, Key West, Marathon, Miami, Sarasota, St. Petersburg, Florida and Savannah, Georgia.

Farthing Racing, Port St. Lucie, Florida
Marine Mammal and Sea Turtle Watch Coordinator/ Observer, June 2002-Current
Nichole and Dustin Farthing (772)879-7589

1 Manatee Watch Coordinator and Observer for Jet Ski races in St. Petersburg and Daytona Beach, Florida. Coordinated watch program with USGC, USFWS, and racing company in addition to observation during the race.

Duke University, Durham, North Carolina (field site Houma, Louisiana)
Aerial Survey Coordinator and Observer, August (seasonal) **2003- 2004**
Dr. J. Kevin Craig (252)504-7571

- Aerial survey and data collection to document the distribution of marine mammals, sea turtles, fishes and fishing vessels relative to the low oxygen ("dead") zone on the Louisiana continental shelf. Identification of dolphin, sea turtle, and fish at the species level.

National Oceanic and Atmospheric Administration (NOAA), Pascagoula, Mississippi
Aerial Surveyor, July- August 2002 Wayne Hoggard (228) 762-4591

- Aerial survey and data collection for Mid-Atlantic Tursiops Survey. Identification of dolphin, sea turtle, and fish at the species level. Aerial photography and extensive travel included.

Florida Fish and Wildlife Conservation Commission, St. Petersburg, Florida
Research Staff, December 1997-July 2001 Gil Mc Crae (727)896-8626

- Radio telemetry of manatees. Field tracking by air, land and boat. Construction of tracking devices. Download and management of recent satellite generated location data (ARGOS). Created monthly reports on individual animals.
- Photo identification. Investigation of manatee sightings. Assisted in establishing and coordinating an intern program. Maintenance of all equipment, including boats, trucks, and cameras.
- Accumulated, maintained and updated water temperate database for the West Coast of Florida.
- Aerial/Synoptic manatee surveys. Over 150 hours of flight time. Designed maps for sighting locations. Coordinated schedules with airport and pilots.
- Assisted in Boater Compliance Study. Scheduled field days, coordinate all logistics including budget, travel arrangements, equipment, vehicles, supplies, and staff/ volunteer assistance. Collected and verified data. Trained staff and volunteers as necessary. Purchased and maintained field equipment. Worked closely with law enforcement and field station staff. Assisted with report writing and public presentations. This project required extensive travel.

Alaska Department of Fish and Game, Anchorage, Alaska
Research Assistant, June - July 1997 Una Swain (907)267-2193

- Study was designed to assist in determining the reason for the decline of Stellar sea lions. Tasks included 7-14 hour observation sessions often in adverse weather conditions on a remote island in the Gulf of Alaska. Focal animal scans, group scans and composition counts were taken. Identifications of individual sea lions were made in an identification log with notes and sketches.

APPENDIX B5

Veterans Memorial Bridge Marine Species Watch Program

Marine Species Watch Program Plan
For the demolition of the
Veterans Memorial Bridge
Daytona Beach, FL
October 2016

The demolition of the bascule piers for the Veteran's Memorial Bridge of Orange Avenue and Silver Beach Avenue will be completed in one blast event scheduled for October 2016. The bascule piers include the pier walls below the waterline, the entire footer, and partial seal of each bascule.

The demolitions will occur within the range of the West Indian (Florida) manatee *(Trichechus manatus latirostris)*; bottlenose dolphins *(Tursiops truncatus)*; and sea turtles, which include the leatherback *(Dermochelys coriacea),* green *(Chelonia mydas*), Kemp's ridley *(Lepidochelys kempii),* hawksbill *(Eretmochelys imbricata),* and loggerhead *(Caretta caretta).* A Marine Species Watch Program (MSWP) therefore will be established and implemented to reduce the impact that this type of event would have on the above listed animals and other endangered species. The following includes information regarding pre-blast preparation and coordination, the watch program and the post-blast watch activities.

Pre-Blast Preparation and Coordination

The pre-blast objectives of the plan are to establish; a safety zone for minimum distance of marine animals from the blast area during the event, a network of marine species observers for the safety zone clearance during blast event, and plans for MSWP coordination/training meetings.

The Safety Zone

The safety zone for the blast is determined by use of the exclusion zone formula listed below. It is typically recommended by USFWS and FWC for protected species measures and was originally based on the U.S. Navy formula derived for divers based on an uncontrolled blast suspended in the water column, and has since been revised for protected species. See Appendix 1 for Safety Zone circle over bridge.

$$R= [520(W)^{1/3}] + 500$$

R= Radius of Safety Zone
W= Weight of Maximum Explosive per Delay (TNT equivalent in pounds)
(Maximum pound per delay required at this site was = 32.5 lbs.)

$$R= [520(32.5)^{1/3}] + 500$$
$$R = 2160 \text{ ft.}$$

The Marine Species Observer Network

The marine species observer network will consist of a minimum of five (5) observers, one (1) chief observer with aerial survey experience and four (4) primary observers. All of the observers shall have previous experience in observing/spotting marine mammals and sea turtles. Any apprentices shall be trained and informed in the method of surveying and locating manatees by the chief observer and be in the company of an experienced observer during all blast activities.

The Chief Observer will conduct a continuous aerial survey by aircraft. The additional observers can be located in various positions around the blast site either on the ground or in a boat. These positions will be situated to provide maximum visibility of the blast safety zone. Their positons are indicated by a yellow X in Appendix 1. The X in the water indicates an observer in a boat. Marcy Lee and Emily Walker will be two of the observers and two of the four other observers listed in Appendix 2 will be chosen with the other two as their alternates. FWC will need to approve all six observers. Lenisa Blair has been named to fill the position of the Chief Observer and has aided in the development of this document. Marcy Lee will be the Observer Team Leader. Contact information for all observers is listed in Appendix 2.

The MSWP Coordination Meeting

A formal MSWP coordination meeting, hosted by Johnson Brothers, will be held at least one (1) week prior to the blast event. Attendees will include the MSWP chief observer, general contractors, demolition subcontractors, Volusia County officials, US Fish and Wildlife Service (USFWS), and Florida Fish and Wildlife (FWC) officials. All present will be informed about the possible presence of protected species in the area, and that civil or criminal penalties can result for harassment, injury, and/or death of an endangered species. The Scope of Work, Protocol, and logistics of the blast day will also be addressed.

A MSWP blast day coordination meeting will be held the morning of the blast event. Watch logistics, including communication protocols between the observers and sub-contractors, and location of observers during the watch will be discussed at this meeting. See Appendix 3 for specific details. Attendees to this meeting will include all observers, the sub-contractor and any other interested and relevant parties.
At this meeting Johnson Brothers will insure that each observer is equipped with a two-way radios and/or cellular phones, binoculars, and polarized sunglasses. The radios will enable each individual observer the ability to communicate directly with the manatee watch coordinator and the sub-contractor.

<u>Watch Program</u>

The event will only be held under weather and water surface conditions suitable for

observing marine mammals and other sea life. Optimum viewing conditions are generally characterized as clear skies, little or no wind, and flat, calm water. The observers will be responsible for determining whether suitable conditions exist at the time of the watch. The limit that will be set for weather conditions leading to the observers terminating the blast will be determined by the Chief Observer. Additionally, the blast, and the marine animal watch shall, to the maximum extent possible, be scheduled such that there is sufficient light for observation and a minimal amount of glare on the water, as determined by the observers.

The exact locations of the observers will be determined after an inspection of the blast site by the Chief Observer. The observers will conduct a continuous watch beginning one hour (60 minutes) prior to the blast. The event will be halted if a protected species is sighted within the Safety Zone (2160' radius around the blast site). An "all-clear" signal must be obtained from the aerial observer and all other observers before detonation can occur. The blasting event will be immediately halted upon the request of any observer. If animals are sighted in the Safety Zone, the blast event shall not take place until the animal(s) moves out of the area under its own volition. Animals must not be herded away or harassed into leaving. Specifically, the animals must not be intentionally approached by project watercraft. If the animal(s) is not sighted a second time, the event may resume 30 minutes after the last sighting.
All sightings will be recorded in a sighting log provided by the Chief Observer. All of the observers will be in close communication with blasting subcontractor through the Observation Team Leader in order to halt the blast if needed.

Post-Blast Watch Activities

After the blast is completed the watch will resume for one-half hour (30 minutes) after, looking for any animals in distress. If an injured or dead manatee, other marine mammal, or protected species is sighted after the blast event, the observers shall maintain contact with the injured or dead animal until authorities arrive. In the event of an injury or death, the resource agencies will be notified:

1. Florida Wildlife Conservation Commission's FWC Hotline: 1-888-404 FWCC

2. USFWS Jacksonville field office: 1-904-731-3336

Within 30 days after completion of all blasting events, the chief observer will submit a report to the USFWS and FWC (sent to ImperiledSpecies@myfwc.com), providing the names of the observers and their position during the event, number and location of manatee, other marine mammals or sea turtles seen and what actions were taken when the animals were seen. Additionally, information regarding when and under what weather conditions the watch and blast occurred and if any problems were encountered during the watch and recommendations for solutions to those problems will also be included.

If any one of the conditions in this plan is not met prior to or during the blasting, the chief observer of the MSWP will have the authority to terminate the blast event. The construction contractors and the DOT will assume any liability for a violation of aforementioned protective measures.

Appendix 1

Protected Marine Species Blast Radius
Radius = 2160'



Appendix 2
Observers and Contact Information

Lenisa Blair	Chief/Aerial Observer	(727)510-7939	lenisa_t@hotmail.com
Marcy Lee	Observer Team Leader	(912)816-2083	marcylee@yahoo.com
Emily Walker	Observer	(321)695-4707	ewalker521@gmail.com
Pedro Santos	Observer		
Salvador Castro	Observer		
Juan Castaneda	Observer		
Regulo Estrada	Observer		

Appendix 3

Day of Coordination Meeting Outline and Observer Responsibilities

A. Pre-Blast

Approximately 3 hours before the blast event a meeting will be held at the construction site and the following items completed:

1. The construction and observation crew will go over the basic watch program plan and observer responsibilities.
2. The observation crew will receive data sheets and maps and assigned locations and will note their locations on their maps.
3. The following basic data sheet information will be completed:
    - Observer name and contact information (phone number, email)
    - Position/location
    - Date
    - Weather conditions/visibility/Tide(to be completed on site)
    - Radio channel/frequency
4. The entire crew will go through a mock verbal run of the watch and blast sequence.
5. The blast coordinator will set an exact time for the blast event and the construction crew and observer crew will synchronize their watches.
6. The observer that is in direct contact with the blast operator is the Observation Team Leader (OTL).

At the end of the meeting, the aerial observer will leave for the airport and the remaining observers will go to their posts. All observers will be in position at their posts at exactly 60 minutes before the blast event and will conduct a radio check at that time.

B. Blast Event

1. Begin radio check and watch at 60 minutes prior to scheduled blast time.
2. Conduct observation checks through the sequence of observers at the following intervals:
    b. 45 minutes prior to blast,
    c. 30 minutes prior to blast,
    d. 15 minutes prior to blast
    e. 10 minutes prior to blast,
    f. 5 minutes prior to blast.

3. Protected species sighted within or near the Safety Zone should be reported by the observer to all other observers and then tracked at reasonable intervals by observers.
4. The information on the data sheets and the locations on the map should be logged for all protected species sightings.
5. If one the protected species is within or approaching the Safety Zone with no sign of exit at 2 minutes prior to blast, the blast must be aborted.
6. For aborted blasts, reset blast time, continually coordinate with all observers, and conduct protected species watch for at least 10 minutes prior to new blast time.
7. The term "manatee" or "animal" shall include dolphins, sea turtle, manatees and other protected species.

C. Post-Blast

1. Resume watch for 30 minutes.
2. Turn in all marked data sheets and maps, double checking to make sure they care completely filled out.
3. Return all equipment.

OBSERVER RESPONSIBILITIES

Observation Method

Observers will be stationed on the ground near the blast site and/or in a boat, and in the air. Observers will use polarized sunglasses for easier observation of the water surface. Each observer will also have a pair of binoculars for purposes of identifying the animal species if possible. During the observation period, all observers will make continuous visual sweeps of the water surface for signs of protected species activity within and just outside the Safety Zone. Observers will look for dark objects on the bottom and for surfacing of animals taking breaths. When an animal is sighted, the observation will be recorded on a data sheet and map. The aerial observer will be able to distinguish the animals' forms against the bottom and alert ground observers to locations. When animals are sighted they will not be approached by any of the observers (i.e., boat crew), but will be tracked as long as necessary.

Observation Sequence

Blast Event Watch

The following procedure will be followed for the blast event:

1. All observers will be stationed and ready at their posts at exactly 60 minutes prior to blast event.

2. The OTL will be the primary contact between the observation team and the blast coordinator. If reasonable, they will be standing right next to him.
3. The OTL will conduct a radio check with all observers by name in the following Order: Aerial, Observer 1, Observer 2, and Observer 3.

a. Radio check is verbalized as follows for each sequence:

OTL: "Team Leader calling Aerial for radio check, over"

Aerial observer: "This is Aerial. Radio check okay, over"

b. Normal radio and observation checks will always be conducted in the same order starting between the OTL and Aerial observer.

4. Observation begins at exactly 60 minutes prior to blast. This will be noted as the "Start Time" on the data sheet.
5. All observers will check in with each other, to be initiated by the OTL, at the following intervals: 45 minutes before blast, 30 minutes before blast, 15 minutes before blast, 10 minutes before blast and 5 minutes before blast:

a. At each check in, the OTL will initiate as follows for each observer sequence: "Team Leader calling Aerial for 45 minute check:
b. Each observer will respond as appropriate to the OTL: "This is Aerial. Code Green" or other appropriate response as outlined below.

6. At each check-in time, when the Code Green signal is given by each observer, the crew will continue to observe until the next check-in time. Code signal meanings are as follows:

a. Code Green means there are no protected species observed within or anywhere near the Safety Zone.
b. Code Yellow means a protected species is sighted outside the Safety Zone. In this case, the observer will identify the animal species; if possible; give the approximate location and state whether the animal(s) is/are stationary or moving and in what direction.
c. Code Red means a protected species is inside the Safety Zone. The observer will relay the same information as for Code Yellow.
d. All observers will coordinate with each other to track the animal(s) at each subsequent check in time.

7. When a protected species is sighted, the observer notes the observation on his data sheet map with a sequential letter designation (A, B, C) along with the exact time of observation. A corresponding observation letter and time along with the animal species, descriptive location (e.g., 500 feet north of bridge on west side of ICW), direction of travel and behavior (i.e., steady travel, stationary, appears to be feeding, random movement, stop and start travel, etc.), and any other observation of note. Subsequent sequential observations of the same animal or group may be noted at the check in times or at reasonable intervals to track animal movement.
8. At 5 minutes before blast, if all observers have given the "Code Green" signal the blast will proceed with no further observer communication, unless protected species are sighted. The blast shall not be detonated until the OTL gives the blaster an "All Clear" for protected species. Once the blast is detonated, the OTL will immediately notify all other observers with an "All Clear" signal indicating that the blast sequence is complete. If within the 5 minute window, protected species are sighted within the Safety Zone or

moving towards the Safety Zone, the observer will relay the appropriate Code and information to the OTL and all observers will track the animal continuously.

9. If at 2 minutes (120 seconds) before blast, protected species are sighted within the Safety Zone and do not show signs of being clear of the Safety Zone in time, the blast will be aborted. The "Abort" signal can be initiated up to 120 seconds before the blast.

10. Immediately upon the "All Clear" signal from the OTL, the observation crew will note the time and initiate the post-blast watch phase. The post-blast watch will be conducted during the 30 minutes immediately following the "All Clear" signal.

11. During the post-blast watch, observers will note observations of protected species in the same manner as during the pre-blast watch and will communicate observations in general to other observers. No other coordination is necessary unless an observer notes problems with the behavior or condition of animals themselves.

12. At 30 minutes from notification of blast detonation, the OTL will contact all observers in general with the "Terminate Watch" signal. At that time all observers will record the time on the "Completion Time" section of their data sheet. The observation crew will then return to the construction site and submit all data sheets and maps to the consultant for preparation of the event report.

13. In the event that the blast is delayed or aborted due to other circumstances unrelated to the manatee watch, the OTL will notify the observation crew and coordinate continually until the blast schedule is back on track in which case the watch will resume at 10 minutes prior to blast.

APPENDIX B6

Veterans Memorial Bridge Demolition Marine Animal Watch Program Post Blast Summary Report

Marine Animal Watch Program Post Blast Summary Report
Veteran's Memorial Bridge Demolition
January 19, 2017
Daytona Beach, Florida

The demolition of the underwater support for the Veteran's Memorial Bridge was completed in a single demolition event of two simultaneous blasts. The demolition occurred within the range of the West Indian (Florida) manatee *(Trichechus manatus latirostris);* bottlenose dolphins *(Tursiops truncatus);* and sea turtles, which include the leatherback *(Dermochelys coriacea),* green (*Chelonia mydas*), Kemp's ridley *(Lepidochelys kempii),* hawksbill *(Eretmochelys imbricata),* and loggerhead *(Caretta caretta).* A Marine Animal Watch Program (MAWP) was therefore established and implemented to reduce the impact of this type of event on these animals. Following is a detailed account of the day's MAWP activities, to include information regarding pre-blast preparation, coordination, and the watch, and the post-blast watch.

Pre-Blast Preparation and Coordination

The MAWP Plan was submitted to and approved by Florida Fish and Wildlife Conservation Commission (FWC) by Johnson Brothers Corporation. The plan included a safety zone for minimum distance of marine animals from the blast area during the event, a network of marine animal observers for safety zone clearance during the blast event, plans for a MAWP coordination meeting and post blast activities.

The safety zone for the blast was a 2160 foot radius around the blast sight. This number was calculated using the following formula.

$$R= [520(\sqrt[3]{W})]+500$$

R= Radius of Safety Zone
W= Weight of Maximum Explosive per Delay
(Maximum pound per delay required for the Ocean Avenue Bridge = 32.5 lbs.)

$$R= [520(\sqrt[3]{32.5})]+500$$
$$R= 2160$$

There was a full project coordination meeting on January 12, 2017. Participants included Johnson Brothers employees, Explosive Services employees, FWC personnel, and the MAWP chief observer. The MAWP plan was discussed and featured the kinds of animals that might be sighted in the area. A "tailgate coordination meeting" was conducted for all observers the morning of the blast. Data sheets, radios, binoculars and position assignments were handed out at that time. Data sheets were discussed and reviewed. Radios were checked, watches and phones were synchronized, and phone numbers were exchanged. All watch personnel had the opportunity to go over any portion of the watch that may not have been clear to them and were reminded that they were to have no other responsibilities during the watch.

The MAWP was comprised of five observers; one aerial, two boat-based and two land-based individuals. The aerial observer was responsible for coverage of the entire safety zone and out one mile and a half, where applicable. The land-based personnel included the observation team leader (OTL), who was in the vicinity of the demolition team and was the communication coordinator; orchestrating cooperation by contractor officials, demolitions personnel, land- and water-based assigned marine mammal observers and the aerial observer. All communications went through this individual, due to their proximity to the blast site and they could be better heard over construction noise than the aerial observer. Following is a list of the observers by name and their positions during the pre-blast and post-blast watch. See figure #1 for diagram of locations.

Observer	*Position During Blast Event (from detonation site)*
Lenisa Blair	Chief/Aerial Observer
Lisa Varano	Obs. #1 Observation Team Leader (W)
Emily Walker	Obs. #2 Land-based Observer (NW)
Regulo Gutierrez	Obs. #3 Boat-based Observer (N)
Pedro Santos	Obs. #4 Boat-based Observer (S)

Pre-Blast Watch

All observers could contact the blasting subcontractor, if needed, via the OTL. The latter commenced scheduled radio checks at the beginning of a 60-minute watch period before the event could take place. At each contact, observers were to indicate if their area was clear of any marine animals listed above.

The blast, originally scheduled for 14:00, was delayed until 14:07 to accommodate the moving of a barge to a safe location from the detonation area. Observers began formal watch activities at 13:00, providing watch services for an additional seven minutes. Radio checks and "all clear" data began at that time and every fifteen minutes thereafter, then at ten and five minutes prior to the actual blast.

There were three animals sighted in the safety zone during the pre-blast watch; one manatee, one bottlenose dolphin, and one unidentified sea turtle. See figure #1 for times and location of each animal sighting. At 14:05, the OTL obtained a final "all clear" from all land and boat-based observers then notified the aerial observer that no animals remained in the safety zone. The aerial observer was able to relocated all three animals and confirm they were all out of the safety zone; she then gave final authorization to proceed. Detonation occurred at 14:07 and demolitions personnel were dispatched to ensure that all explosives had been expended and the area was again safe for normal activities.



Figure 1. Observer locations and marine species sightings. **GREEN** represents manatee sightings and path with times listed when the animal was located by an observer. **BLUE** represents an unidentified sea turtle and **ORANGE** represents bottlenose dolphin.

Post-Blast Watch

The OTL instructed all observers to resume their assigned watch positions for an additional half-hour and notified the aerial observer that the watch had been resumed. The aerial observer was only able to stay on site for an additional ten minutes, not the full 30, due to weather. Prior to the detonation the weather conditions were excellent for the watch; light winds, slight chop to flat water and no cloud cover. However, during the hour of the watch a fog bank rolled in from the east off the ocean. At the time of the blast it was coming over the island about to cover the Halifax river at an altitude that was between the river and the 750-1000ft altitude of the plane. By 14:17 the river was covered by fog and the aerial observer could no longer see the water. Additionally, the entire watch took place on Daytona International Airport's take off path and with the fog it became almost impossible to remain in visual contact with departing aircraft. Both the pilot and aerial observer agreed it was no longer safe to stay out there.

There were no marine animals sighted during the post-blast watch by the rest of the team.

APPENDIX C
CONCEPTUAL BLASTING PLAN

Conceptual Blasting Plan

TOWN OF BAY HARBOR ISLANDS

BROAD CAUSEWAY BRIDGE REPLACEMENT
PROJECT DEVELOPMENT & ENVIRONMENT STUDY



Prepared for:

Town of Bay Harbor Islands, Florida

July 24, 2024

Financial Project Identification Number:	452428-1-21-01
Federal Aid Project Number:	N/A
FDOT Efficient Transportation Decision Making (ETDM) Number:	14520
Town of Bay Harbor Islands Project Number:	BC-160

Conceptual Blasting Plan

July 24, 2024

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated May 26, 2022, and executed by Federal Highway Administration (FHWA) and FDOT.

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1.0 INTRODUCTION

The Town of Bay Harbor Islands (Town), in cooperation with the Florida Department of Transportation (FDOT) District 6, is conducting a Project Development and Environment (PD&E) Study to evaluate potential bridge replacement alternatives of the existing Broad Causeway in Miami Dade County, Florida. A Project Location Map showing the PD&E Study area and the existing Broad Causeway Bridge is provided in **Appendix A**.

This *Conceptual Blasting Plan* has been prepared during the PD&E phase to provide an estimate for the blasting effort that will be required to demolish the two bascule piers associated with the existing drawbridge. This *Conceptual Blasting Plan* has been developed based on the Engineer's best estimate at this phase of the Broad Causeway Bridge project and includes a tentative worst-case scenario for the impact of explosives on marine animals for the project, as requested by the National Marine Fisheries Service (NMFS). A *Final Blasting Plan* will be prepared during the design and permitting phase of the project which will contain the blasting details as determined by the Blasting Contractor. A Blasting Contractor will be selected during the design phase of the project. The *Final Blasting Plan* will be reviewed and approved by the US Fish and Wildlife Service (USFWS), NMFS, US Coast Guard (USCG), US Army Corps of Engineers (USACE), and Florida Fish and Wildlife Conservation Commission (FWC).

2.0 SCOPE OF WORK

For the purposes of this *Conceptual Blasting Plan*, the scope of work includes drilling and blasting for the demolition of the two existing bascule piers of the Broad Causeway Bridge structure. The General Contractor will mechanically remove the bascule piers to elevation +5. A Blasting Contractor will then utilize a drill rig placed on a work platform on top of each bascule pier to drill bore holes at the designed locations in the piers. Drill templates and casing pipes will be used where required for the drilling of holes in the foundations. Prior to the blast, temporary sheet piling will be installed on three sides of each bascule pier (i.e., north side, south side, and side nearest the federal navigation channel) to isolate the blast debris in a controlled perimeter and minimize the blast pressure wave. The piers will then be loaded with explosives, covered with blast mats, and blasted per scheduled loading days and shot day. The piers will be blasted simultaneously in one event. Explosives will be delivered on blast day and no onsite storage will be required. Once the blasting is complete, the General Contractor will complete the removal of the debris from Biscayne Bay with their equipment.

The goal is to conduct blasting operations in the safest manner possible while minimizing the risk of injuries and damage to property. Once finalized, the blasting plan will be communicated to employees, contractors, and suppliers through on-site training and regular safety meetings. These policies do not supersede any federal, state, or local regulations regarding explosives and blasting work. Compliance with these policies and all applicable federal, state, and local regulations will be strictly enforced by the Blasting Contractor.

All employees are responsible to perform their work in a safe manner and will immediately report all accidents and/or near misses to their supervisor / safety representative.

Many policy guidelines refer to the "blast site." For the purposes of this safety plan, and federal regulations, the blast site is defined as: "The area where explosive material is handled during loading including an area extending 50 feet (ft) in all directions from loaded blast holes or explosive materials.

3.0 BLASTING DESIGN

3.1 Blasting Design Goals and Considerations

In many blast applications, it is often impossible to fully satisfy all of the design objectives. Therefore, a trade-off analysis is needed to balance design sacrifices based on priority. In blast design work, the general goals are safety goals and operational goals. Whenever safety goals conflict with operational goals, the safety concerns shall have the highest priority. For instance, producing minus 12-inch (in) rock might be an operational objective while controlling flyrock is a safety goal. Since the safety goals must have the highest priority, the blasting plan might specify the use of conservative amounts of stemming to control rock movement, thus sacrificing rock fragmentation in the collar area. The following guidelines shall be used to evaluate all blast design choices:

General Blast Design Considerations:

- Blast designs shall never compromise safety, and safety goals shall have the highest design priority.
- Blast designs shall be as simple as possible while satisfying all primary design objectives.
- The blast designer(s) must have thorough knowledge and understanding of the blast requirements and constraints for each individual application. If the Blaster-in-Charge is unfamiliar with a particular application, design, or product, outside assistance shall be obtained from a consultant or explosive-supplier representative who is familiar with the application or product.
- Blast design geometry shall be appropriate for the application. The geology of the blast site and area control requirements must be considered when selecting hole size, explosive diameter, stemming height, and all other design dimensions.

Initiation System Considerations:

- Initiation systems must provide adequate protection against stray current hazards.
- Delay timing schemes shall be as simple as possible, while providing adequate burden relief and sufficiently advanced in-hole energization to prevent surface cut-off failures.

Site Condition Considerations:

- The condition of the existing piers to be blasted
- The proximity of any utilities
- The proximity of the new Broad Causeway Bridge

- Water depths
- Benthic elevations and limits of debris removal
- The proximity of other structure(s) in the area
- Marine life in the immediate area
- Environmental concerns

The blast design presented in this *Conceptual Blasting Plan* has addressed these factors (to the extent possible at this point in the project) and blast hole patterns and weight of explosives detonated per delay have been designed to minimize any detrimental impact and while providing sufficient fragmenting of the concrete for removal.

The design plans for the existing Broad Causeway Bridge, including the bascule pier detail drawings for the Pier 1 and Pier 2 bascule piers, are provided in **Appendix B**.

3.2 Pier Removal

The existing bascule piers will be drilled vertically with a rock drill rig positioned on work platforms on top of each bascule pier structure. The following is an estimate for the anticipated drilling details:

- 98 holes will be drilled in Pier No. 1 (eastern bascule pier); hole spacing at 4x4 ft separation.
- 116 holes will be drilled in Pier No. 2 (western bascule pier); hole spacing at 4x4 ft separation.
- Hole size (diameter) is anticipated to be 2.75-3.5 in.

A figure showing the conceptual drill hole layout for the bascule piers is provided in **Appendix A**. It should be noted that the final hole layout, hole depths, and firing sequence will be determined by the Blaster-in-Charge and presented in the approved *Final Blasting Plan*. It is anticipated that the drilling of the foundation will require the use of casing pipes and a template to ensure the location of the holes is correct and to ensure no debris falls into the holes after they are drilled. Once drilled, hole plugs will be inserted in the top of each hole to prevent foreign material from entering.

Once the drilling of both piers is complete, a blast date and time will be scheduled by the Blaster-in-Charge. Explosives will be brought to the site by the explosives distributor at an adequate time ahead of the scheduled blast time to allow for the loading of explosives in the piers. All holes to be loaded will be checked for depth and obstructions the day prior to the explosives delivery. Transfer/transport of the explosives to the piers will be coordinated with the Fire Department, Police Department, and USCG, and conducted in accordance with regulations. Loading of the piers will be conducted by Florida licensed blasters and once completed, all unused explosives will be returned to the distributors truck and taken back to their magazine site. There will be no onsite storage of explosives. Once loading is complete, the hole-to-hole connections will be made in the proper sequence as per the approved plan. The pier will then be covered with blast mats (i.e., cloth and wire mesh or appropriate equivalent). On the scheduled blast day, the connection from pier to pier will be made in preparation for detonation of the blast.

To ensure the greatest visibility of imperiled species and marine animals by the marine observers, the blast will be detonated during the daylight hours on incoming tide or slack high tide (marine animal

observation details are provided in the *Draft Imperiled Species and Marine Mammal Watch Plan* in **Appendix C**). The blast will be detonated under the direction of the Blaster-in-Charge once all safety measures have been confirmed; the Blast Safety Zone is cleared of people and vehicles and is secured with guards; the Marine Safety Zone is clear of marine traffic, and the Marine Animal Watch Zone (see Section 8.1) has been deemed clear by the marine observers. A post-detonation inspection will be conducted by the Blaster-in-Charge and the final "All Clear" will be issued at his direction.

To minimize impacts to the new bridge, surrounding structures, and the marine environment, the blast will be conducted with the minimum amount of explosive pounds per delay while maintaining sufficient powder factors to adequately fragment the piers while confining the debris to a small footprint. The anticipated explosive to be used is a 60% nitroglycerine (NG) product (e.g., Unimax 60%) which has proven to be very effective at fragmenting concrete at low powder factors and separating the concrete from reinforcing steel with very good water resistance. Each column of explosives will be primed with two non-electric detonators for redundancy. Proper stemming material (anticipated to be 3/8-inch angular, uniform, crushed clear stone), will be used for all decking and stemming of the collar of each loaded hole to ensure the explosive energy is contained in the structure to achieve maximum work of the energy in breaking the concrete. Stemming shall be placed a minimum of three drill hole diameters above the placed charge. Proper collar stemming lengths will be used to prevent blow outs at the top of hole and reduce air overpressure levels. Explosive delays will be utilized to effectively complete the necessary demolition while lowering the maximum charge weight per delay to as low as reasonably achievable. The anticipated delay for the Broad Causeway Bridge project will be a minimum of 9 milliseconds (ms).

4.0 PROTECTION OF THE PUBLIC

The conceptual blast design has taken into consideration the proximity of buildings in the area, the new bridge, waterways, and adjacent work areas. All explosives will be handled, transported, used and stored in accordance with all State and Federal Regulations. All on site workers will be notified of the activities and instructed to stay clear of the blast area. Signs will be posted to identify the blast area to other workers on the site. Only those workers authorized by the Blaster-in-Charge will be permitted in this area. All unused product will be returned to the explosives distributor's delivery vehicle prior to detonating the blast. The bascule piers will be covered with blasting mats to reduce air blast and prevent any flying debris. Prior to detonation, the Blaster-in-Charge will ensure that the 250-foot minimum radius Blast Safety Zone is clear of all people and vehicles and secured by guards, and the 1500-foot Marine Safety Zone has also been secured. This will be accomplished by designated persons stationed at designated locations on the site and safety boats at designated locations on the adjacent waterway. The waterway will be secured 10 minutes prior to the scheduled shot time and will remain secured until the Blaster-in-Charge issues the "All Clear" signal. All persons involved with securing the Blast Safety Zone will be equipped with radios. When it is confirmed that the Blast Safety Zone is clear and the Blaster-in-Charge is comfortable with the conditions, the Blaster-in-Charge will sound the five-minute warning, check with stationed personnel to ensure the area is still clear, fire the shot, check the post shot conditions, and give the "All Clear" signal.

State police, local police, local fire departments, and the US Coast Guard will be made aware of the blasting schedules, along with any changes in the schedule, in advance of the blast. Should a circumstance arise that prevents the firing of any loaded explosives at the scheduled time, a security person will "guard" the shot until the blast is fired at a new shot time. No structures loaded with explosives will be left unattended. Local police, fire departments, and the US Coast Guard will be notified of the situation.

4.1 Warnings and Signals

The Blaster-in-Charge will warn all employees on the job site of an impending blast through communication with the General Contractor's Superintendent and the use of warning signals. The warning signals will be posted and all employees onsite will be advised of the schedule of warning signals. The warning signals to be used are as follows:

- 5-minute warning – three 3-second blasts of the air horn.
- 1-minute warning – two 3-second blasts of the air horn.
- All Clear – one 10-second blast of the air horn.

After the blast is over, there will be an "All Clear" signal sounded so all persons in the area understand that all blasting operations are finished. The signal is a prolonged horn or siren following the inspection of the blast area to indicate that all blasting has ceased.

4.2 Pre-Blast Notifications

All required agencies will be notified 48 hours prior to any blast to coordinate with the Blaster-in-Charge to determine the proper time for the blasting. A 2-hour notification will be given to the General Contractor's Superintendent. A blast will not be fired until communication with the guards at the perimeter of the secured Blast Safety Zone and visual inspection of the Blast Safety Zone confirms it is clear and the Chief Observer confirms the Marine Animal Watch Zone (see Section 8.1) is clear.

4.3 Guarding Before a Blast

The Blaster-in-Charge will identify the perimeter of the Blast Safety Zone prior to commencing loading any explosives in the planned blast. The Blasting Contractor will place guards around the Blast Area, when instructed to do so by the Blaster-in-Charge, to ensure that no unauthorized people enter while a blast is being detonated. Sufficient guards must be in place to see all approaches to the area. The guards must be in radio communication with the Blaster-in-Charge and able to stop the blast, if necessary.

4.4 Control of Blast Debris

The structure to be blasted will be covered with cloth and wire mesh blast mats (or appropriate equivalent). If deemed necessary by the Blaster-in-Charge, the adjacent new bridge piers will also be covered. Temporary sheet piling will be installed on three sides of each bascule pier (i.e., north side, south side, and side nearest the federal navigation channel) to isolate the blast debris in a controlled

perimeter. The Existing Bascule Bridge Footing Blast Plan figure in **Appendix A** shows the approximate location of the sheet piling walls.

5.0 PROTECTION OF EXISTING STRUCTURES

The conceptual blast design has taken into consideration the proximity of the new bridge piers, commercial/residential structures and utilities. Pounds of explosives per delay have been designed to produce minimal negative impacts on these structures.

Each bascule pier will be covered with cloth and wire mesh blast mats (or appropriate equivalent) prior to detonation to prevent any flying debris. Sandbags will be placed on top of the structure to be matted to protect the shock tubes of the detonators from damage by the mats.

5.1 Pre-Construction Surveys

When required, the Blasting Contractor shall arrange for a pre-blast survey of any nearby buildings, structures, or utilities which may potentially be at risk from blasting damage. The pre-blast surveys must contain drawings of each wall of the structure and photographs of existing damage. The survey method used shall be acceptable to the Blasting Contractor's insurance company. The pre-blast survey records shall be made available to the Engineer for review. Occupants of local buildings shall be notified prior to the commencement of blasting.

5.2 Vibration Control and Monitoring

When blasting near buildings, structures, or utilities which may be subject to damage from blast induced ground vibrations, the ground vibrations shall be controlled by the use of properly designed delay sequences and allowable charge weights per delay. Allowable charge weights per delay shall be based on vibration levels which will not cause damage. The allowable charge weights per delay shall be established through industry standard prediction equations and constantly checked through seismograph monitoring of the blast generated ground vibration levels for each blast.

Because the proposed blast is located within 1,000 ft of a land-based location, particle velocities will be monitored by the Blasting Contractor. The blasting event will be monitored using approved seismographs to record the resulting ground vibrations and air overpressures. The seismographs will be located, as approved, between the blast and the closest structure subject to blast damage. The seismographs will be capable of recording particle velocity for three mutually perpendicular components of vibration in the range generally found with controlled blasting.

Data recorded for each shot shall be furnished to the Blaster-in-Charge and the Engineer and shall include the following:

- Identification of instrument used
- Name of equipment operator
- Distance and direction of recording station from blast area
- Type of ground at recording station and material on which the instrument is sitting

- Maximum particle velocity in each component
- Peak particle velocity (ppv)
- Frequency, in hertz, of the maximum particle velocity in each component
- A dated and signed copy of records of seismograph readings

The accepted conservative safe limits for blast vibration are given in **Table 5-1** below. Reports of particle velocity monitoring will be made available to the USFWS, NMFS, and the FWC within three business days following the blast, if requested. The details of the monitoring will be provided by the Blasting Contractor in the *Final Blasting Plan.*

Table 5-1 Safe Vibration Levels

Structure Type	Maximum ppv (inches per second)
Standard construction (timber, frame, brick, and concrete buildings)	2.0 (frequency >40)
Reinforced concrete structures	4.0
Steel structures	4.0
Buried utilities	4.0
New bridge	20.0

5.2.1 Vibration Level for New Bridge

The majority of new bridges are designed to withstand an earthquake impact in the range of 7.3 on the Richter scale. This is approximately equivalent to a peak particle velocity of 28 inches per second (ips) at a one hertz earthquake frequency or 56 inches per second for a 0.5 hertz earthquake frequency. The allowable ground vibration level of 20 ips for blast design purposes is considered conservative. An earthquake would impact the entire bridge for seconds at these Richter levels where a blast is a localized, transient, high frequency event lasting only milliseconds. **Table 5-2** shows the levels required to cause damage to massive concrete.

Table 5-2 Vibration Levels Required to Damage Massive Concrete*

Damage	Strain (µin/in)	ppv (inches per second)
Static	140	20
Grout spall	700	100
Skin spall	1300	200
Cracking	2400	375

*Data are based on *Construction Vibrations and Geotechnology* (Oriard 2002) and *Vibrations from Blasting* (Siskind 2000)

As shown in **Table 5-3**, with the temporary sheet piling installed between the old bridge bascule pier and the new bridge bascule pier, the predicted ppv (for a maximum weight of explosives per delay of 18 pounds) is well below this conservative threshold value to damage the new bridge piers or the

existing seawall. These data will be confirmed with the Blaster-in-Charge and also addressed in the *Final Blasting Plan*.

Table 5-3 Predicted Ground Vibrations Generated by Pier Blasts

Structure	Distance	Maximum Pounds/Delay	PPV (inches per second)
New bridge piers	12 ft	18 (below water)	2.0
Seawall	449 ft	18 (below water)	< 0.5

5.2.2 Air Blast and Noise Control

Appropriate blast hole patterns, detonation systems, stemming material, and cloth and wire mesh blast mats (or appropriate equivalent) will be used to prevent venting of blasts and to minimize air blast and noise levels produced by the blasting operations. The peak overpressure recorded for each blast will be included on the blast reports/logs (see Section 5.3).

5.3 Blast Reports/Logs

Individual blast reports/logs will be prepared by the Blasting Contractor for every shot fired. Records for each shot of the blasting program shall be retained by the project proponent for the duration of project and made available to the USFWS, NMFS, and FWC immediately onsite or within two business days to the specified mailing address, as requested. Per the USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida*, blasting reports shall contain the following information:

1. The upper and lower bounds of cemented or consolidated material to be removed or blasted
2. The weight of blasting agents and explosives, and their upper and lower bounds
3. Stemming material appropriate for the size of the borehole
4. Upper and lower bounds of the stemming placement within the cemented or consolidated material (usually rock or concrete)
5. The sequence of delays from the shortest to longest individual delay time with the total weight of blasting agent at that delay time

The record keeping shall provide enough detail to allow interpretation of the quality of shooting and level of compliance with the *Final Blasting Plan*. Blast reports typically contain the following information:

- Blast date, time, and location
- Blast geometry, including, but not limited to, hole size(s), hole depths, drill pattern, number of holes, bench height, and sub-drilling
- Blast hole loading summaries, including typical hole loads, explosive types, primers, detonator delays, stemming type and quantity, and total explosive consumption by product
- Shot volume and powder factor calculations

- Initiation timing scheme, including in-hole delays, surface delays, and planned hole firing times
- Blast effect monitoring data (if applicable), such as ground vibration levels, air overpressure, and peak water pressures [if applicable]
- Notes about blast results, unusual conditions, occurrences, or special precautions
- Name and signature of the Blaster-in-Charge

6.0 IMPACT ASSESSMENT

6.1 Likelihood of Occurrence of Imperiled Species and Marine Mammals within Blasting Area

The likelihood of occurrence of sea turtles and marine mammals within the blasting area is described in the April 15, 2024 *Natural Resources Evaluation (NRE)* for the Broad Causeway Bridge PD&E Study and summarized below. The following sea turtle species have the potential to occur within the blasting area: green sea turtle (*Chelonia mydas*), loggerhead sea turtle (*Caretta caretta*), Kemp's ridley sea turtle (*Lepidochelys kempii*), hawksbill sea turtle (*Eretmochelys imbricata*), and leatherback sea turtle (*Dermochelys coriacea*). Marine mammals with the potential to occur within the blasting area include the West Indian manatee (*Trichechus manatus*) and the bottlenose dolphin (*Tursiops truncatus*). Federally listed fish species with the potential to occur within the blasting area include the giant manta ray (*Manta birostris*), Nassau grouper (*Epinephelus striatus*), and smalltooth sawfish (*Pristis pectinata*). The project study area occurs within the USFWS's designated Consultation Area and designated critical habitat (CH) for the West Indian manatee. The project area is also located within proposed CH for the green sea turtle. The common bottlenose dolphin is not listed under the Endangered Species Act of 1973; however, they are protected under the Marine Mammal Protection Act. **Table 6-1** presents the imperiled species and marine mammals with the potential to occur within the blasting area (based on potential availability of suitable habitat and known species ranges), along with their listing status and occurrence potential. This information was compiled as a result of a thorough review of existing literature, field surveys, and considerations of suitable habitat availability, along with confirmed sightings or documented home ranges. The given likelihood of occurrence of each species' presence within the project area has been determined based on data and field assessments and rated as low, moderate, or high based on the following criteria:

- **Low** - species that have minimal or marginal suitable habitat within or adjacent to the project study area, but there are no documented occurrences of the species in the vicinity of the project study area and the species was not observed within the project study area during field reviews.
- **Moderate** - species that have suitable habitat within the project study area, but there are no documented occurrences of the species in the vicinity of the project study area and the species was not observed within the project study area during field reviews.

- **High** - species that have suitable habitat within the project study area, have at least one documented occurrence of the species within the project study area, and/or the species was observed during field investigations.

Table 6-1 Imperiled Species and Marine Mammals Potentially Occurring within the Project Study Area and Their Associated Effect Determinations

Common Name	Scientific Name	Listing Status[1]	Occurrence Potential	Effect Determination[2]
SEA TURTLES				
Green sea turtle	*Chelonia mydas*	FT	Moderate (PCH)[3]	*May affect, not likely to adversely affect*
Hawksbill sea turtle	*Eretmochelys imbricata*	FE	Moderate	*May affect, not likely to adversely affect*
Kemp's ridley sea turtle	*Lepidochelys kempii*	FE	Low	*May affect, not likely to adversely affect*
Leatherback sea turtle	*Dermochelys coriacea*	FE	Low	*No effect*
Loggerhead sea turtle	*Caretta caretta*	FT	Low	*May affect, not likely to adversely affect*
MAMMALS				
Bottlenose dolphin	*Tursiops truncatus*	Not Listed	Moderate	*N/A*
West Indian manatee	*Trichechus manatus*	FT	High (CH)[4]	*May affect, not likely to adversely affect*
FISH				
Giant manta ray	*Manta birostris*	FT	Low	*May affect, not likely to adversely affect*
Nassau grouper	*Epinephelus striatus*	FT	Low	*No effect*
Smalltooth sawfish	*Pristis pectinata*	FE	Low	*May affect, not likely to adversely affect*

[1]FE = Federally Endangered, FT = Federally Threatened
[2]N/A = Not Applicable
[3](PCH) - the project study area is located within the proposed CH for the green sea turtle
[4](CH) – the project study area is located within designated CH for the manatee

Manatees have a high likelihood of occurrence as they are known to travel through the project study area, the project area is located within the designated CH for the manatee, and suitable seagrass foraging habitat is located north and south of the existing bridge. The green sea turtle, hawksbill sea turtle, and bottlenose dolphin have a moderate likelihood of occurrence based on the presence of suitable foraging habitat for these species within the project area. The project study area is located within the proposed CH for the green sea turtle and foraging habitat (seagrass) is located within the project study area. The remaining imperiled species have a low likelihood of occurrence based on lack preferred habitats within the project area and/or life history strategies not supported by the project area. Additional information on each of these species, along with the reasoning for the associated effect determinations are provided in the April 15, 2024 *NRE* document, as well as the July 25, 2024 *NRE Addendum*.

Blasting pressure waves can injure or kill marine animals, including sea turtles and marine mammals. The risk of injury/mortality to sea turtles and marine mammals (as well as other imperiled species) will be minimized by the implementation of an Imperiled Species and Marine Mammal Watch Plan. Under the Imperiled Species and Marine Mammal Watch Plan, marine observers will be deployed to monitor

for the presence/absence of imperiled species and marine mammals within the potential impact area of the blast (Marine Animal Watch Zone). See Section 8.0 and **Appendix C** for details on the Imperiled Species and Marine Mammal Watch Plan.

The pressure wave caused by a blast event also has the potential to rupture fish swim bladders. Giant manta rays and smalltooth sawfish lack swim bladders and thus are less prone to mortality or injury from underwater blasting compared to those fish species with swim bladders. The Nassau grouper does have a swim bladder; however, as indicated in the *NRE*, this species is not expected to occur within the project area. Thus, no impacts to the Nassau grouper are anticipated from the proposed project blasting. Furthermore, as described in Section 7.3, small fish scare charges (0.01 pounds of explosives) will be detonated just prior to initiating the blast to minimize injury/mortality to fish by driving fish away from the structure being blasted. The fish scare charges have a non-lethal impact upon detonation.

6.2 Imperiled Species and Marine Mammal Habitat Impacts

The proposed blast event is a localized, transient event lasting only milliseconds. There is no anticipated permanent impact to the water column from the proposed blasting event. With implementation of the *Final Imperiled Species and Marine Animal Watch Plan* during the blasting event, no permanent impacts to marine mammals, giant manta rays, Nassau groupers, or smalltooth sawfish, or their breeding or foraging habitats, are anticipated in association with the proposed blasting event.

Seagrass provides foraging habitat to manatees and green sea turtles and juvenile nursery habitat for Nassau groupers. There is no documented seagrass habitat within 100 feet of the existing bascule piers. Based on the findings of the 2023 quantitative benthic survey (see the *NRE* for details), the closest seagrass bed is Wetland SO, located approximately 110 ft southeast of Pier No. 1. No permanent impacts to seagrasses are anticipated from the proposed blasting event. As detailed in the *NRE Addendum*, NMFS has indicated that the Section 7 consultation letter will address any additional/enhanced seagrass impact avoidance required for this project based on proposed green sea turtle CH status.

The existing bascule piers are located immediately adjacent to live bottom habitat and macroalgal beds (see the *NRE* for details). A minimal amount of impact to the invertebrates (i.e., sponges hydroids, and tunicates) within the live bottom habitat may be anticipated from the proposed blast event. A similar, nominal amount of impact may occur within the adjacent macroalgal beds. These communities are likely to recover naturally after the blasting event. The installation of the temporary sheet piles walls will contain the blast debris and minimize the blast pressure wave. As described in the *NRE*, the Town has committed to the relocation of corals and barrel sponges from the project impact area prior to construction. Coral and sponge relocation will be conducted in accordance with the *Plan for Relocation and Monitoring of Corals, Octocorals, and Sponges* which will be developed and coordinated with the regulatory agencies during the permitting process.

7.0 BLASTING MITIGATION

In-water blasts have been designed to minimize the impact on marine life in the area through confinement of explosives in the concrete of the structures, use of adequate stemming lengths, controlling the weight of explosives detonating at a given time (pounds of explosives per delay), and utilizing a fish scare charge.

7.1 Environmental Conditions for Blasting

To ensure the greatest visibility of imperiled species and marine mammals by the marine observers, the blast will be detonated only during daylight hours when weather conditions do not hinder visibility (i.e., no blasting during fog, rain, or other weather hindering visibility). In addition, the blast will be detonated on incoming tide or slack high tide to maximize visibility of marine animals within the water column. These requirements are also referenced in Section 7.2, in the *NRE Addendum*, and in the *Draft Imperiled Species and Marine Mammal Watch Plan* (**Appendix C**). The blast will not proceed until the Marine Animal Watch Zone has been deemed clear by the marine observers and the Aerial Observer/Chief Observer notifies the Blaster-in-Charge the "All Clear" for detonation.

7.2 Explosive Minimization and Post-Blast Cleanup

The following measures will be implemented to minimize impacts to marine and aquatic species from the proposed blasting:

- The proposed blasting event will use the minimum blast necessary to conduct the work in a manner that is efficient, safe for workers, and protection of aquatic and marine organisms.
- The blasting event will only occur during daylight hours when weather conditions do not hinder visibility (details in Section 7.1).
- The blast will be detonated on incoming tide or slack high tide to maximize visibility of marine animals by the marine observers (details in Section 7.1).
- All explosives will be detonated within confined blast holes. No unconfined or open water blasts will be used.
- All blast holes will be delayed, as required, to maintain charge weight at or below the approved maximum charge weight. The minimum delay will be 9 ms.
- Blasting will be conducted with a maximum of 18 pounds of explosive per delay.
- All blast holes will be stemmed with angular, uniform, crushed clear stone of approximately 3/8-inch. Stemming lengths will be a minimum of three feet.
- To minimize impacts from potential flyrock, a cloth and wire mesh blast mat (or appropriate equivalent) will be positioned over the structure to be detonated.
- Temporary sheet piling will be installed on three sides of each bascule pier (i.e., north side, south side, and side nearest the federal navigation channel) to isolate the blast debris in a controlled perimeter and minimize the blast pressure wave. The Existing Bascule Bridge Footing Blast Plan figure in **Appendix A** shows the approximate location of the sheet piling

walls to be installed. The sheet piling installation will be similar to what was utilized for the State Road (SR) 679/Pinellas Bayway Structure E bascule pier blasting which occurred in 2021 (see image below).

- Small Fish Scare Charges will be used for this project (details in Section 7.3)



Photograph of the SR 679/Pinellas Bayway Structure E blasting event. Note the sheet piling installed on three sides of each bascule pier that was being blasted.

The *Final Blasting Plan* will ensure that the volume and length of all blasting agents, detonation cord, and explosives are limited to the minimum necessary to conduct the work in a manner that is efficient, safe for workers, and protection of aquatic and marine organisms. Initiation of explosive charges will be conducted with the minimum length of detonation cord possible (or will utilize alternative initiation systems). After the conclusion of each blast, all shock-tubes and detonation cord or electric wires will be recovered and removed from the project area.

7.3 Fish Scare Charges

Prior to initiating an in-water blast, fish scare charges will be detonated. Scare charges are a widely used technique, cost effective, and easily deployed prior to a blast. The weight of explosives is minimal and produces low level, non-lethal impact upon detonation. There is minimal data available demonstrating the effectiveness of fish scare charges. Keevan et al. (1997) monitored the movements of three species of freshwater fish (i.e., largemouth bass, channel catfish, and flathead catfish) and found mixed results with regard to fish movement away from the charge location. Nonetheless, this technique presents a good faith effort to reduce potential impacts to marine animals.

These fish scare charges will consist of a series of non-electric blasting caps, each estimated to contain 0.75 grains (0.01 pounds) of explosives, suspended in the water column surrounding the structure to be blasted. The fish scare charges will be detonated 15 to 30 seconds prior to the main blast.

The location of the fish scare charges is based the recommendations in previous bridge blasting projects in Florida (i.e., the Blasting Plan for the Pinellas Bayway Structure E project) and the intent is to drive fish away from the structure being blasted. Placing the charges at further distances from the structure, even if delayed, could potentially drive fish towards the structure.

8.0 IMPERILED SPECIES AND MARINE MAMMAL WATCH PLAN

The Broad Causeway Bridge project will adhere to an Imperiled Species and Marine Animal Watch Plan to minimize impacts to imperiled species and marine mammals from the proposed blasting. To support this *Conceptual Blasting Plan*, a *Draft Imperiled Species and Marine Mammal Watch Plan* (**Appendix C**) has been developed for the project in accordance with in the USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida.* Marine observers will be deployed to monitor for the presence/absence of imperiled species and marine mammals within the potential impact area of the blast (i.e., the Marine Animal Watch Zone – see Section 8.1). It should be noted that the *Draft Imperiled Species and Marine Mammal Watch Plan* represents the Town's best approximation of the blasting needs at this phase of the project.

A *Final Imperiled Species and Marine Mammal Watch Plan* will be developed during the design phase and adhered to during the blasting activity to ensure the required Marine Animal Watch Zone is clear of imperiled species and marine mammals immediately prior to the detonation of the blast. Once the *Final Blasting Plan* has been prepared by the Blasting Contractor, the *Final Imperiled Species and Marine Mammal Watch Plan* will be completed and will be reviewed and approved by the USFWS, NMFS, USCG, USACE, and FWC.

8.1 Marine Animal Watch Zone

The Marine Animal Watch Zone radius for the blast is determined based on the Exclusion Zone plus an additional 300-foot buffer. The radius of the Exclusion Zone is based by the Exclusion Zone formula cited in the USFWS May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida*. This formula is typically recommended by USFWS and FWC for protected species measures and was originally based on the US Navy formula derived for divers based on an uncontrolled blast suspended in the water column and has since been revised for protected species. For the purposes of this project, a 500-ft buffer is added to the radius of the Exclusion Zone.

The radius of the Exclusion Zone is represented by the following formula:

$$R_{EZ}\ (ft) = (520\ w^{1/3}) + 500\ ft$$

where "R_{EZ}" is the radius (in ft) and "w" is the maximum charge weight (in pounds per delay). For a maximum pounds per delay of 18, **R_{EZ} = 1,863 ft** (R_{EZ} = 520 x $18^{1/3}$ + 500).

The radius of the Marine Animal Watch Zone is represented by the following formula:

$$R_{MAWZ}\ (ft) = R_{EZ} + 300\ ft$$

The radius of the Marine Animal Watch Zone is 2,163 ft (R_{MAWZ} = 1,863 + 300) for the proposed project. A figures showing the limits of the Exclusion Zone and Marine Animal Watch Zone is provided in Attachment C of the *Draft Imperiled Species and Marine Mammal Watch Plan* (**Appendix C**).

9.0 REFERENCES

Keevin, T.M., 1998, A Review of Natural Resource Agency Recommendations for Mitigating the Impacts of Underwater Blasting. Reviews in Fisheries Science, 6(4), 281–313. https://doi.org/10.1080/10641269891314302

Oriard, L.L., 2002, Construction Vibrations and Geotechnology, Explosives Engineering Chapter 11, pg. 415-416, 420-422, 474-454.

Siskind, D.E., 2000, Vibrations from Blasting, International Society of Explosives Engineers, Cleveland OH, pg. 63-64.

APPENDIX A - FIGURES

Project Location Map

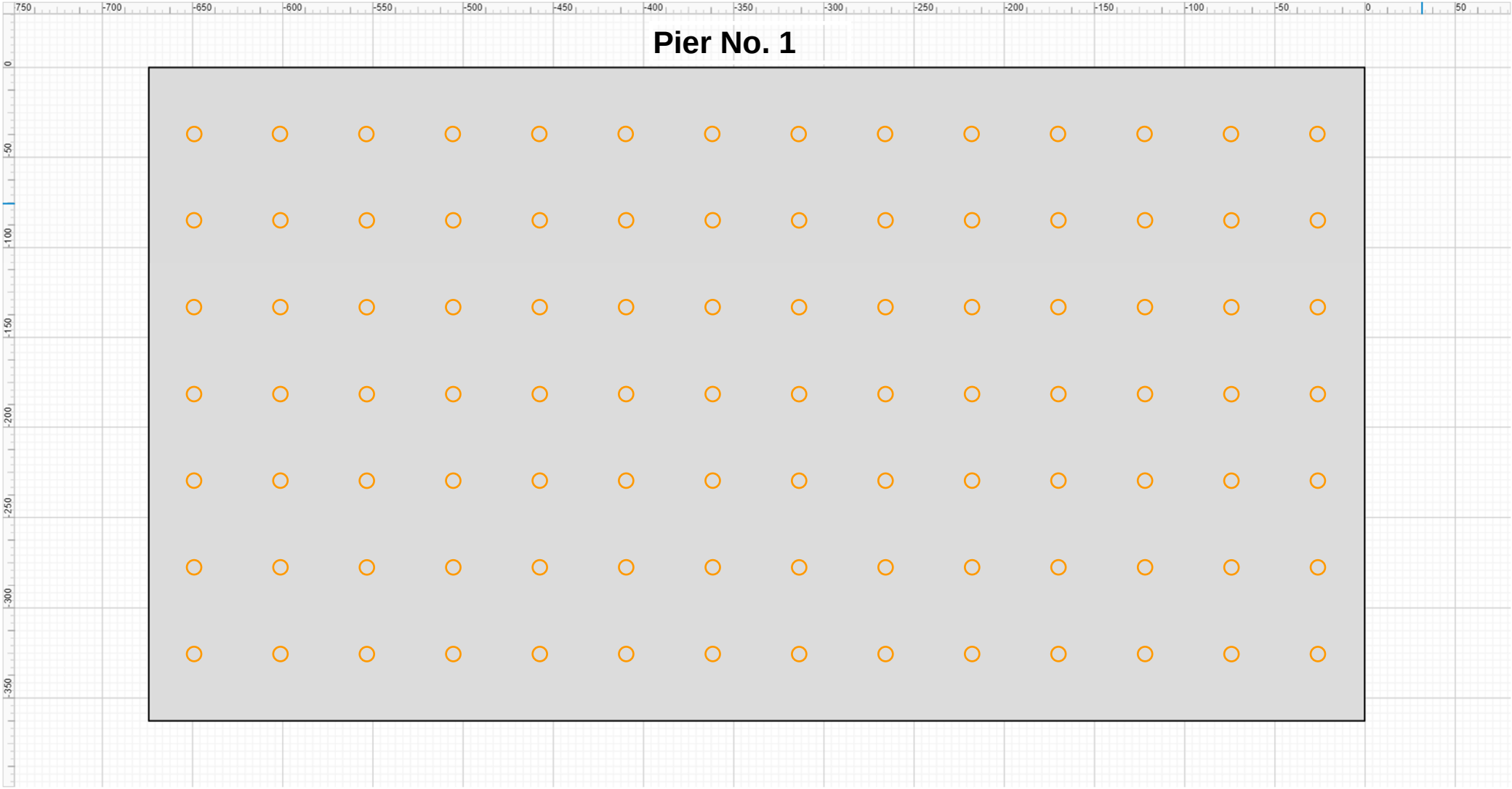
Conceptual Drill Hole Layout for the Bascule Piers

Existing Bascule Bridge Footing Blast Plan

Project Location Map



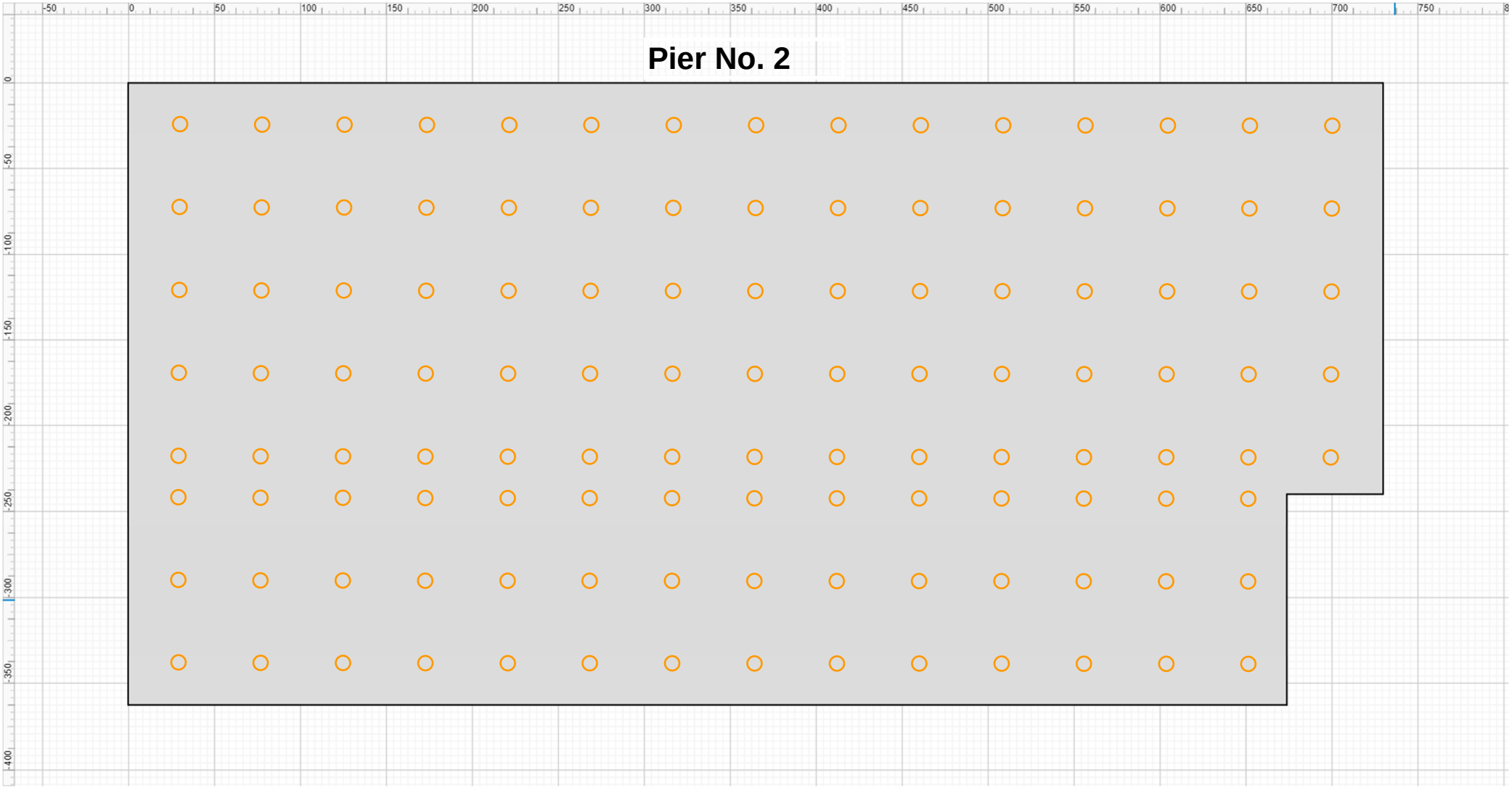
Conceptual Drill Hole Layout for Bascule Piers



Hole Diameter = 2.75"-3.5"
Spacing = 2' to 4'
Number of Holes = 98

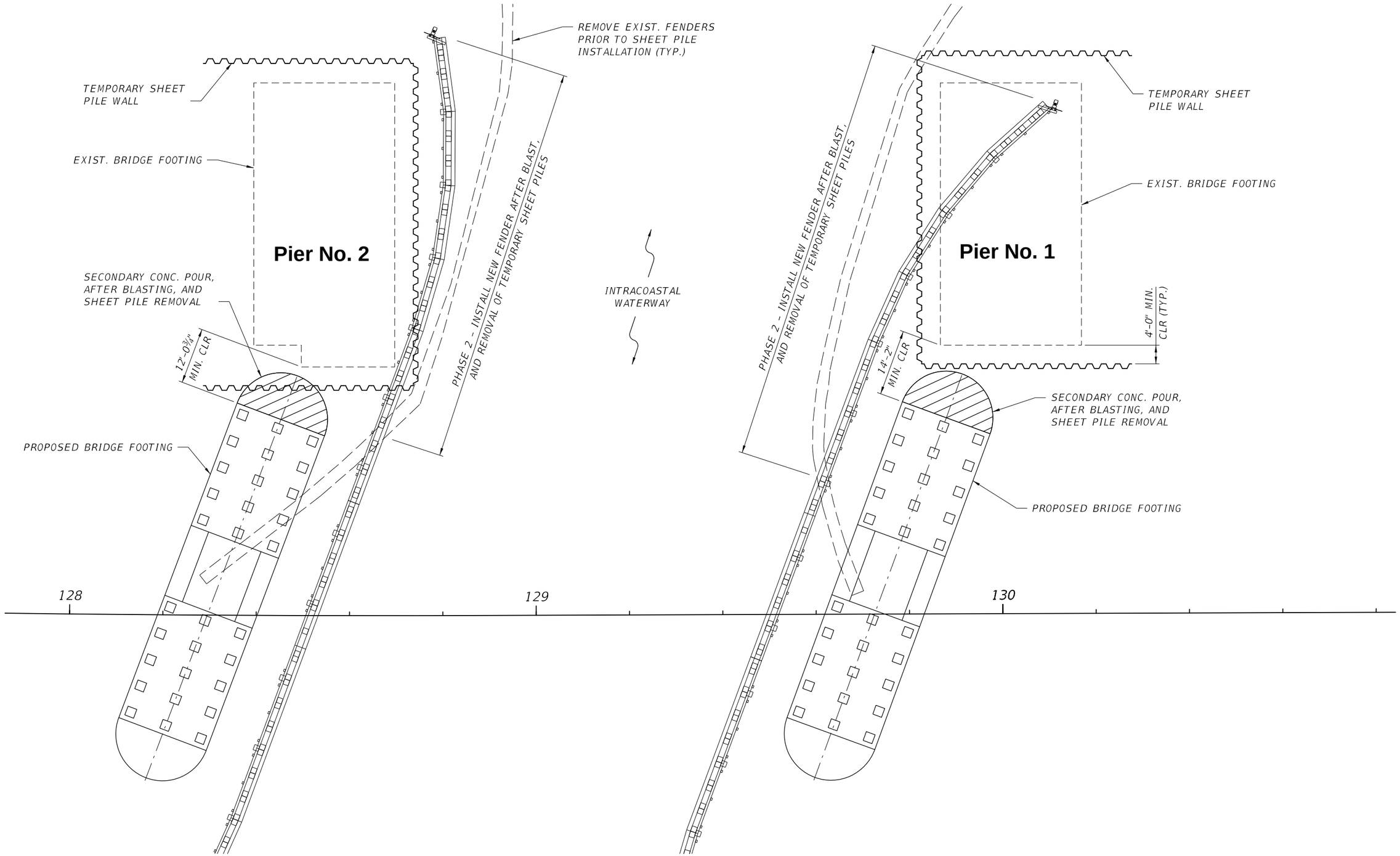
New Bridge

Pier No. 2



Hole Diameter = 2.75"-3.5"
Spacing = 2' to 4'
Number of Holes = 116

New Bridge



BRIDGE NO. XXXXXX

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

NOT FOR CONSTRUCTION
PRELIMINARY AND SUBJECT TO CHANGE

DAVID KONZ, P.E.
P.E. LICENSE NUMBER 69635
AtkinsRéalis
4030 W Boy Scout Blvd, Suite 700
Tampa, Florida 33607

DRAWN BY:	TJL
CHECKED BY:	TCH
DESIGNED BY:	AGV
CHECKED BY:	DK

TOWN OF BAY HARBOR ISLANDS

ROAD NO.	COUNTY	PROJECT ID
922	MIAMI-DADE	452428-1-21-01

SHEET TITLE: EXISTING BASCULE BRIDGE FOOTINGS BLAST PLAN

REF. DWG. NO.:

PROJECT NAME: BROAD CAUSEWAY / KANE CONCOURSE

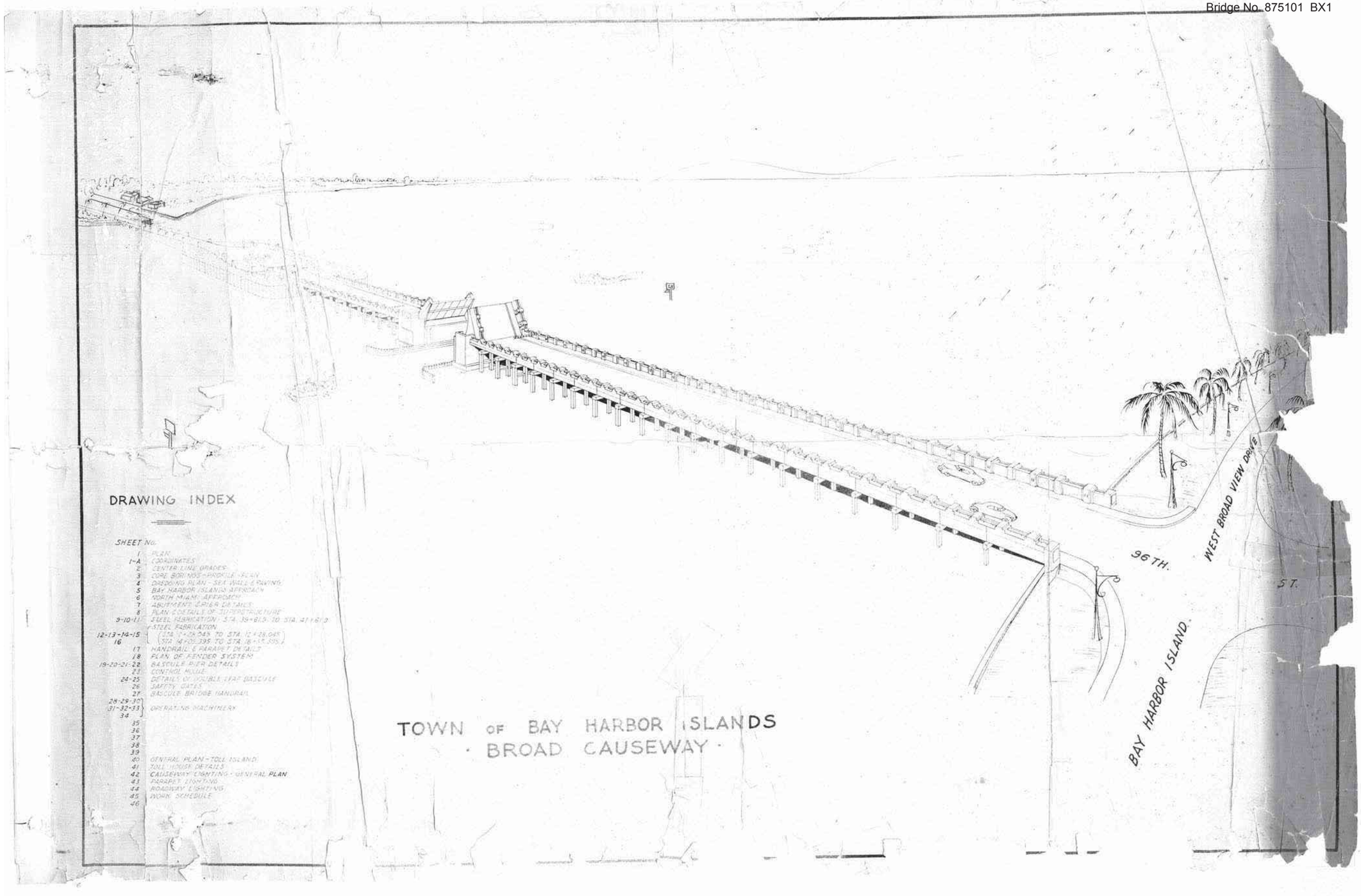
SHEET NO.: 000

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

6/21/2024 4:30:55 PM USER: MA504591
pw://sncl-us-pw.bentley.com:sncl-us-pw-04/Documents/Roads and Bridges/Projects/100080949 Broad Cswy Bridge/3_Execution/FPID/Structures/B/SKETCH_BLAST_PLAN_SHT_01.dgn

APPENDIX B

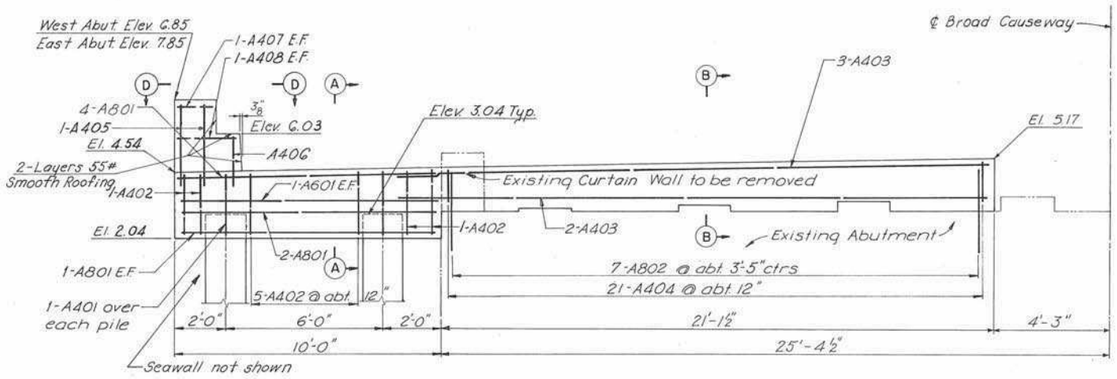
EXISTING BROAD CAUSEWAY BRIDGE DESIGN PLANS



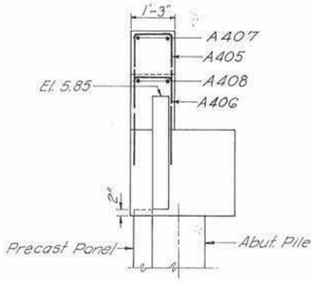
DRAWING INDEX

SHEET No.	
1	PLAN
1-A	COORDINATES
2	CENTER LINE GRADES
3	CURB BORINGS - PROFILE - PLAN
4	DREDGING PLAN - SEA WALL & PAVING
5	BAY HARBOR ISLANDS APPROACH
6	NORTH MIAMI APPROACH
7	ABUTMENT & PIER DETAILS
8	PLAN & DETAILS OF SUPERSTRUCTURE
9-10-11	STEEL FABRICATION - STA. 39+61.5 TO STA. 41+61.5
12-13-14-15	STEEL FABRICATION (STA. 14+26.345 TO STA. 12+28.045)
16	(STA. 14+05.395 TO STA. 16+15.205)
17	HANDRAIL & PARAPET DETAILS
18	PLAN OF FENDER SYSTEM
19-20-21-22	BASCULE PIER DETAILS
23	CONTROL HOUSE
24-25	DETAILS OF DOUBLE LEAF BASCULE
26	SAFETY GATES
27	BASCULE BRIDGE HANDRAIL
28-29-30	OPERATING MACHINERY
31-32-33	
34	
35	
36	
37	
38	
39	
40	GENERAL PLAN - TOLL ISLAND
41	TOLL HOUSE DETAILS
42	CAUSEWAY LIGHTING - GENERAL PLAN
43	PARAPET LIGHTING
44	ROADWAY LIGHTING
45	WORK SCHEDULE
46	

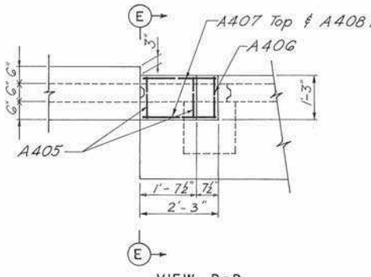
TOWN OF BAY HARBOR ISLANDS
· BROAD CAUSEWAY ·



HALF ELEVATION ABUTMENT



SECTION E-E

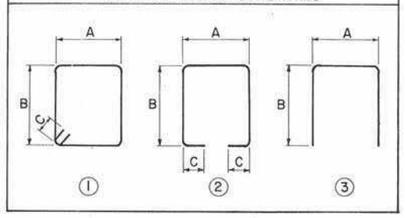


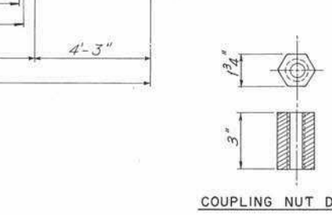
VIEW D-D

(Dimensions shown @ Elevation 4.54)

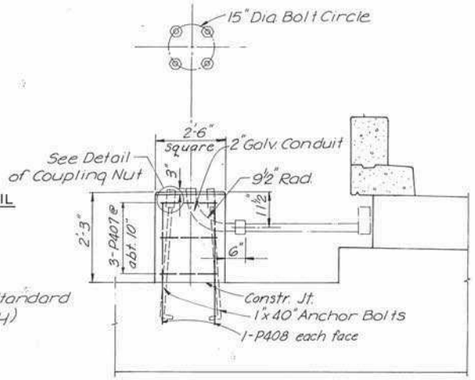
REINFORCING SCHEDULE							
MARK	NUMBER		LENGTH	TYPE	DIMENSIONS		
	ABUT.	PIERS			A	B	C
A401	8		7'-6"	2	2'-6"	2'-0"	6"
A402	36		9'-8"	1	2'-6"	2'-0"	4"
A403	20		22'-5"	Str.			
A404	84		5'-8"	1	1'-6"	1'-0"	4"
A405	8		9'-5"	3	9"	4'-4"	
A406	4		5'-9"	3	9"	2'-6"	
A407	8		1'-2"	Str.			
A408	20		1'-9"	Str.			
A409	4		2'-10"	Str.			
A801	32		9'-6"	Str.			
A802	28		2'-6"	Str.			
A601	8		9'-6	Str.			
P401		16	8'-4"	2	2'-6"	2'-5"	6"
P402		8	8'-0"	2	2'-6"	2'-3"	6"
P403		20	7'-6"	2	2'-6"	2'-0"	6"
P404		88	9'-8"	1	2'-6"	2'-0"	4"
P405		96	10'-0"	1	2'-6"	2'-2"	4"
P406		64	10'-6"	1	2'-6"	2'-5"	4"
P407		6	8'-8"	1	2'-0"	2'-0"	4"
P408		8	3'-3"	Str.			
P601		16	29'3"	Str.			
P602		8	11'-0"	Str.			
P603		180	1'-6"	Str.			
P801		64	29'3	Str.			
P802		24	12'-0"	Str.			

BAR BENDING DIAGRAMS



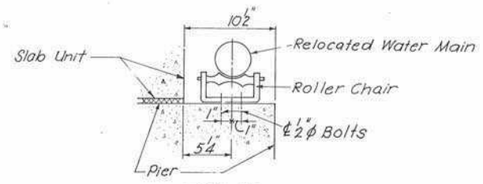


COUPLING NUT DETAIL



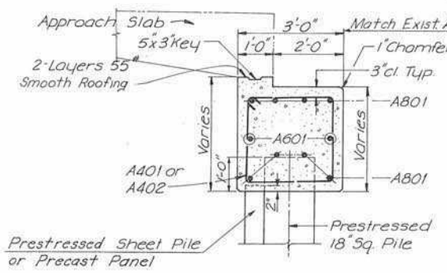
LIGHT STANDARD BASE MOUNTING DETAIL

HALF ELEVATION PIER

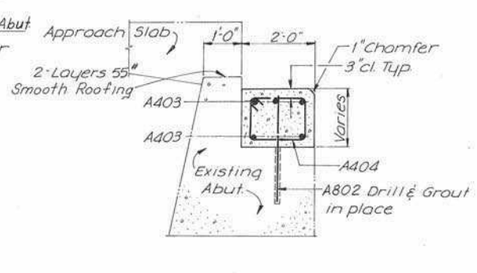


DETAIL "A"

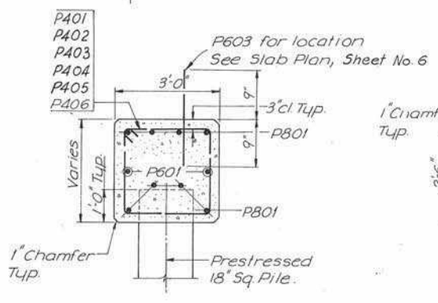
NOTES:
For Prestressed Pile Details see sheet No. 5.
For Approach Slab Details see sheet No. 5.
E.F. Denotes Each Face.
For Additional Abutment Details see sheet No. 10



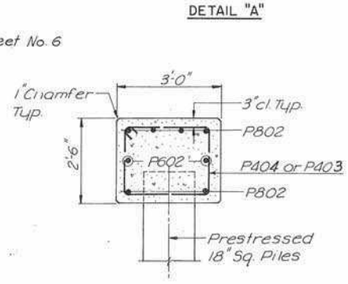
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

ISSUED
JUL 16 1971
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
Consulting Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY ORLANDO NEW YORK

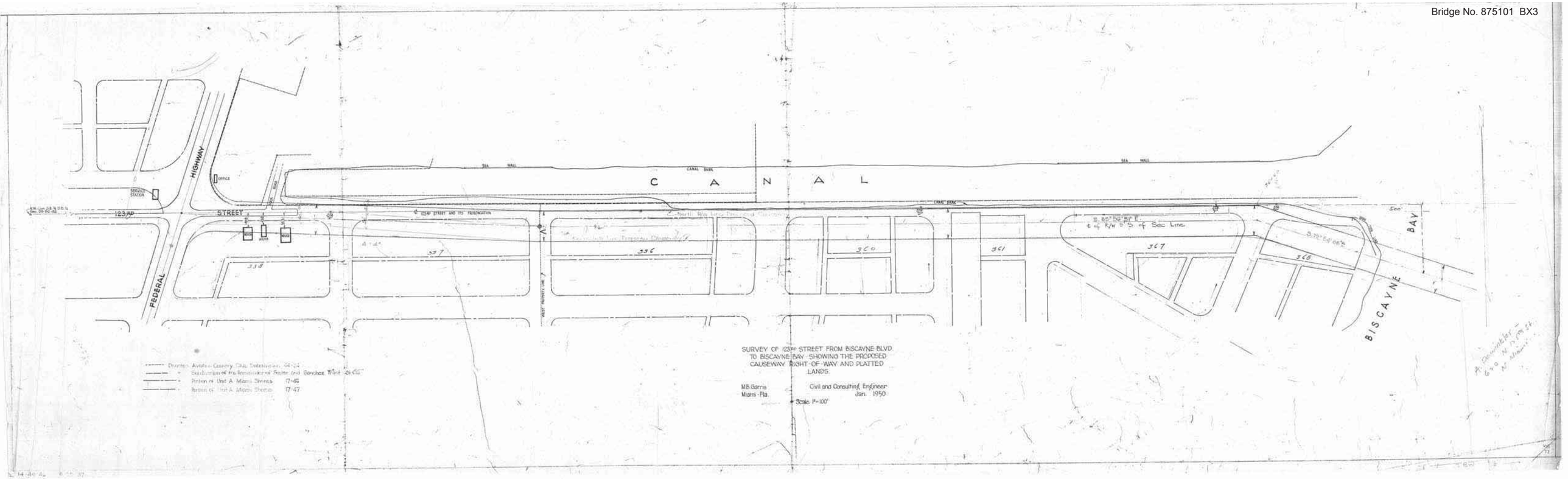
TOWN OF BAY HARBOR ISLANDS

BROAD CAUSEWAY-WEST BRIDGE
ABUTMENT & PIER DETAILS

REVISIONS		COUNTY	STATE	
Dates	Descriptions	DADE	FLORIDA	

	Names	Dates	
Detailed by	D.L.S.	3-69	Date: Recommended for Approval H.N.T. & B.
Checked by	J.R.C.	5-69	
Quantities by			Date: Approved Town of Bay Harbor Islands
Checked by			
Traced by			Drawing No. 4 Index No.

Bridge No. 875101 BX3

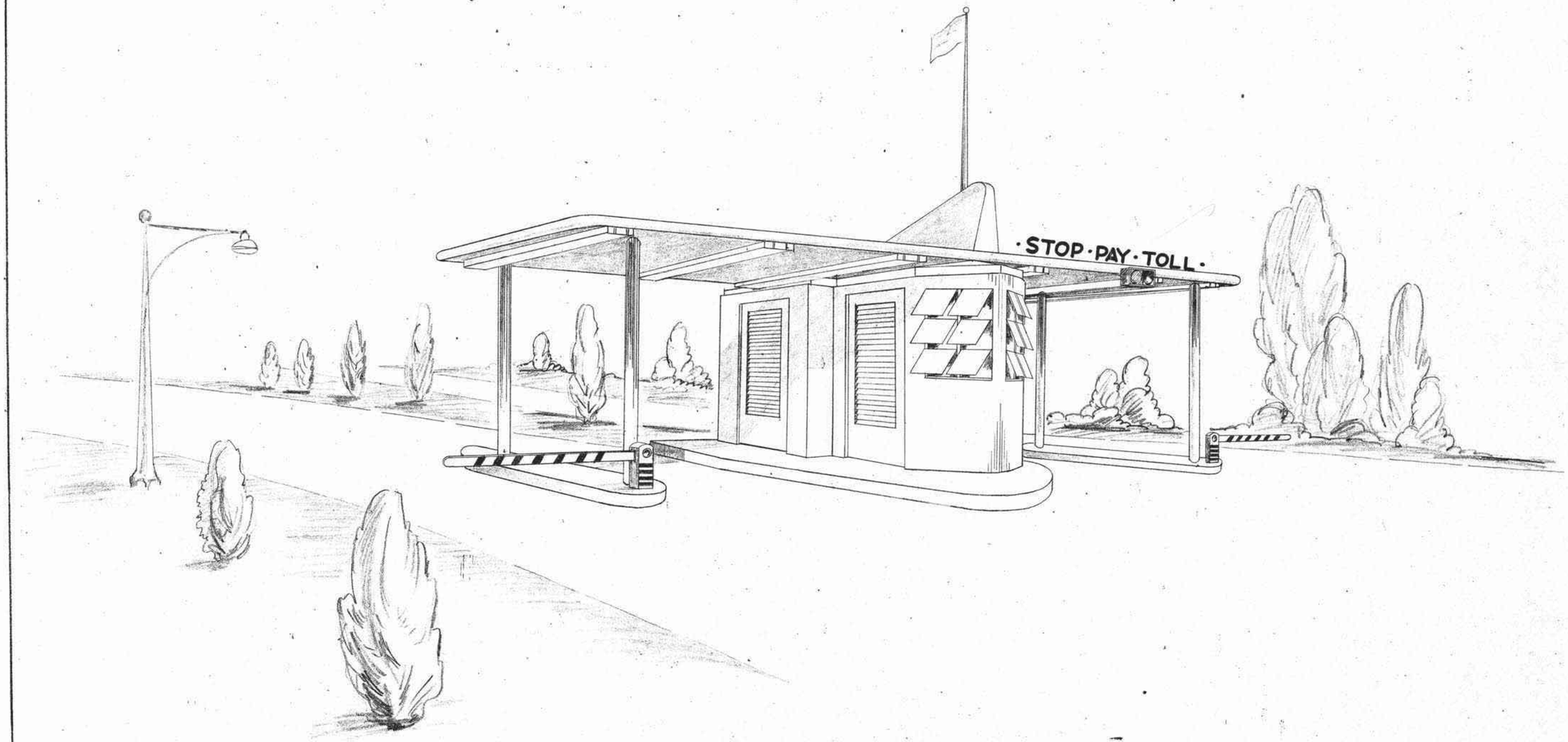


SURVEY OF 123rd STREET FROM BISCAYNE BLVD. TO BISCAYNE BAY SHOWING THE PROPOSED CAUSEWAY RIGHT-OF-WAY AND PLATTED LANDS.

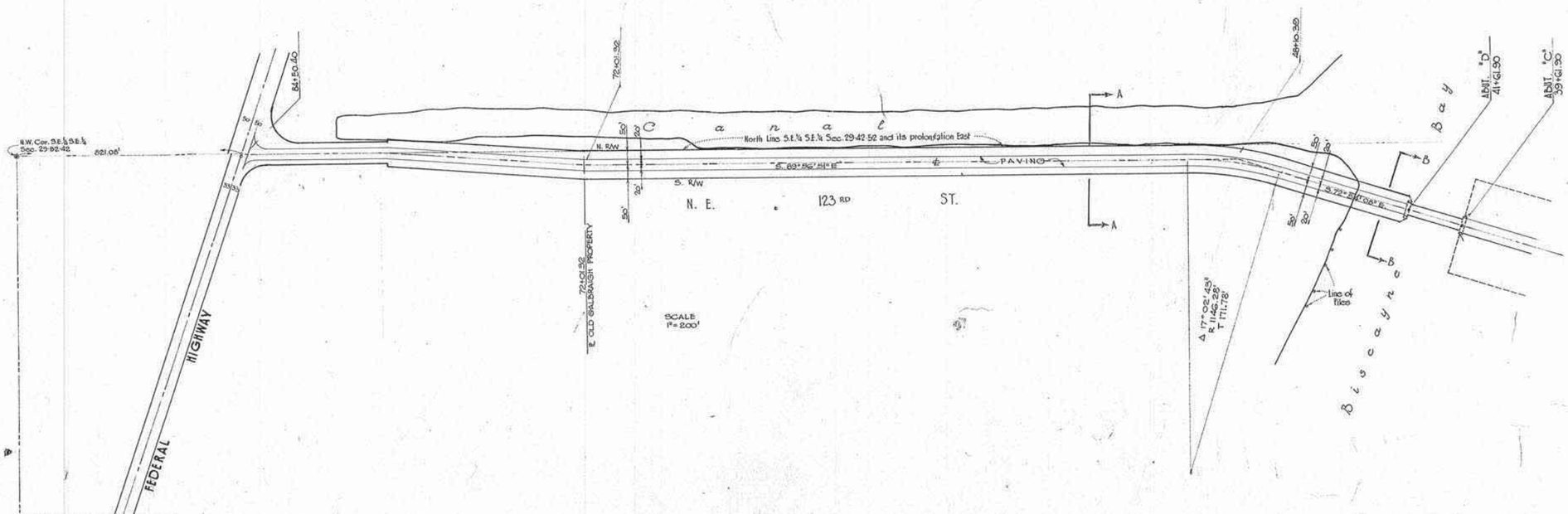
M.B. Garris
Miami - Fla.

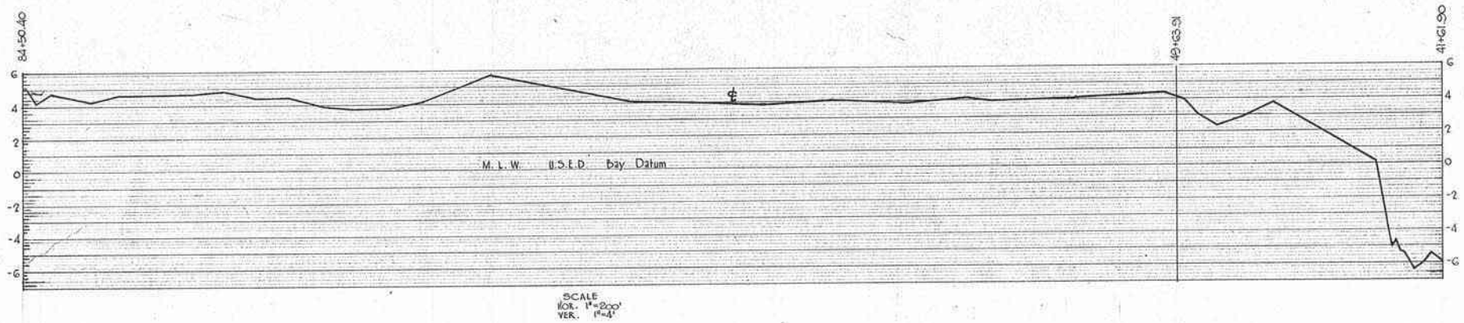
Civil and Consulting Engineer
Jan. 1950

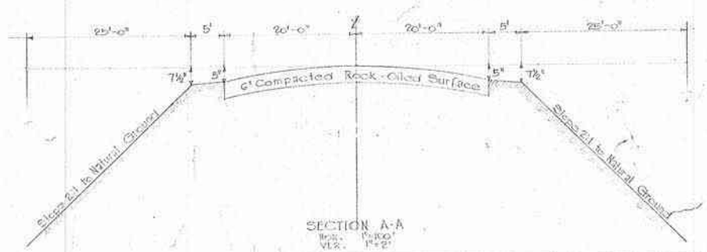
Scale 1" = 100'



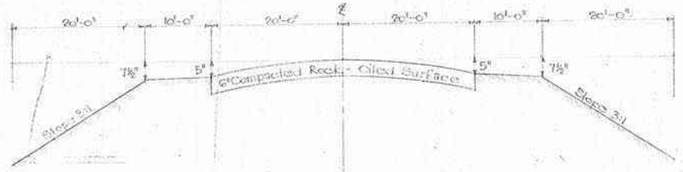
BROAD CAUSEWAY TOLL HOUSE







SECTION A-A
HOR. 1"=100'
VER. 1"=2'



SECTION B-B
HOR. 1"=100'
VER. 1"=2'

APPROACH TO BROAD CAUSEWAY - VIADUCT
NORTH MIAMI

6

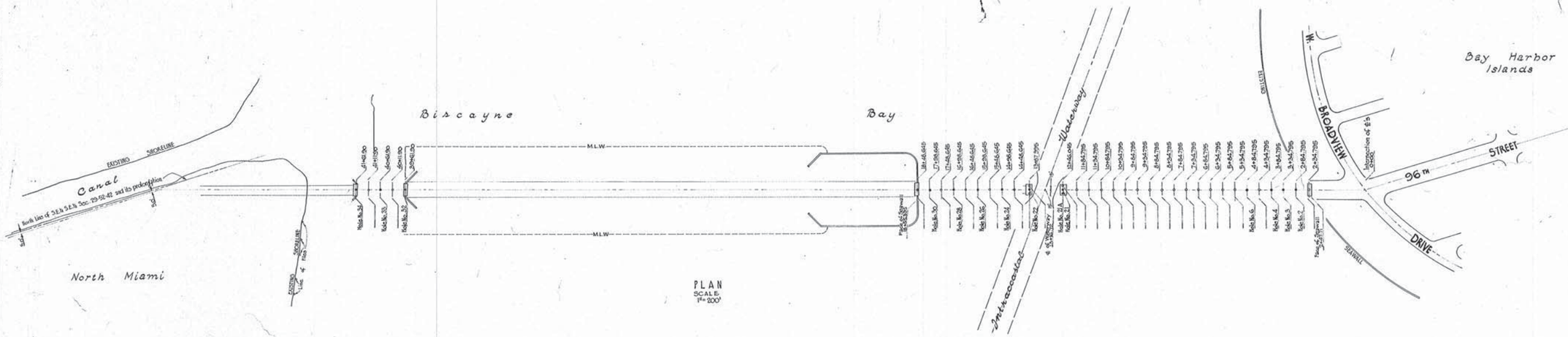
BROAD CAUSEWAY - VIADUCT

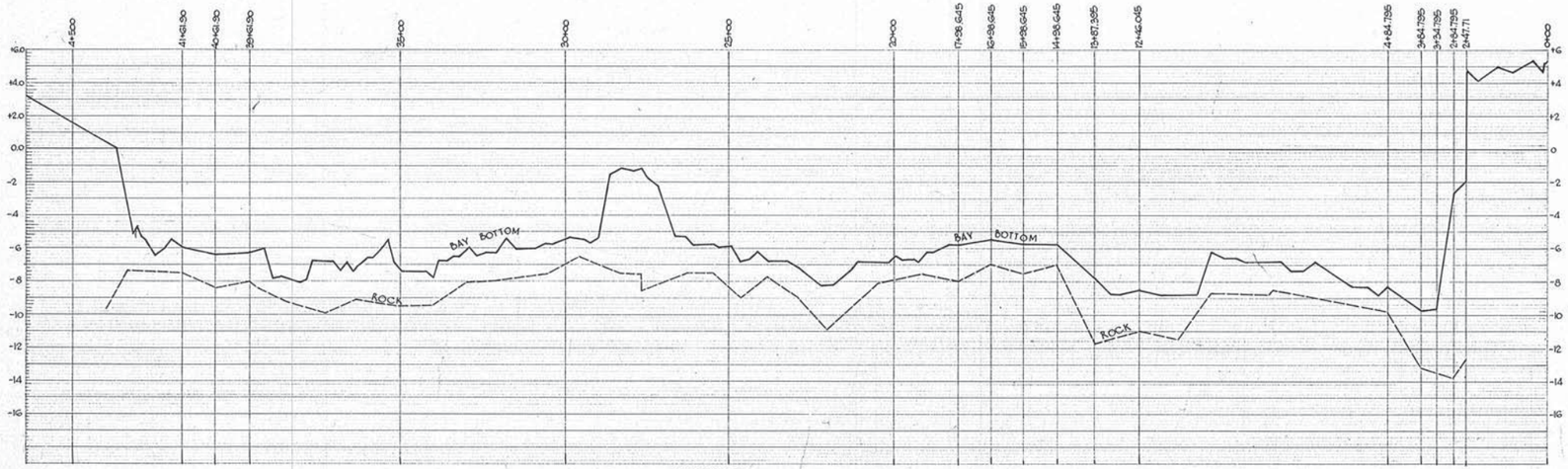
M.D. GARRIS
MIAMI - FLORIDA

CIVIL & CONSULTING ENGINEER
JULY 1950

SCALE AS SHOWN

SHEET 6 OF SHEETS





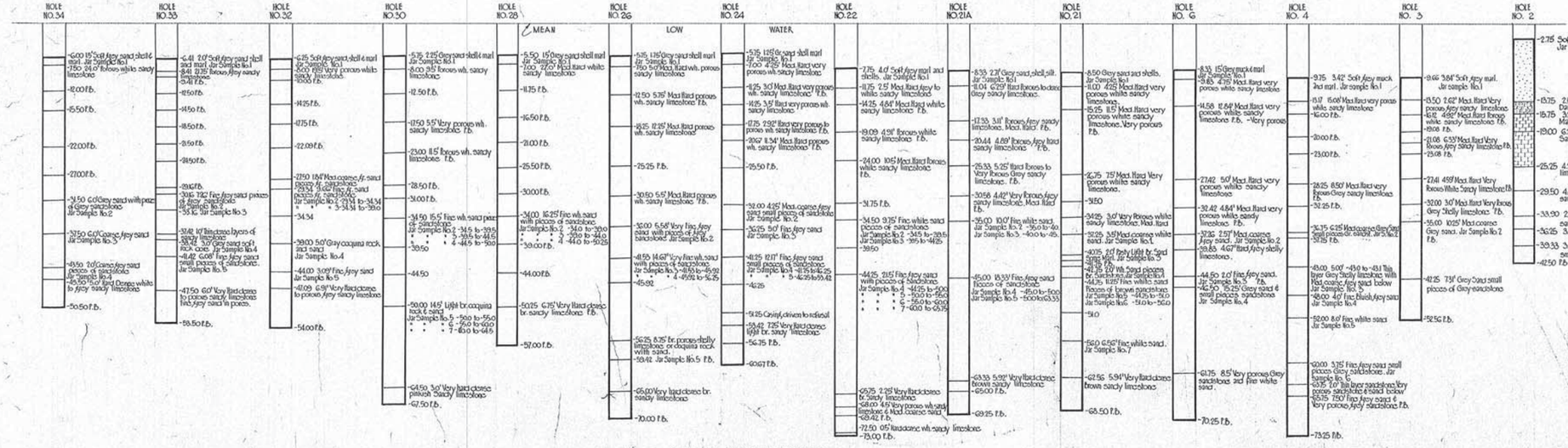


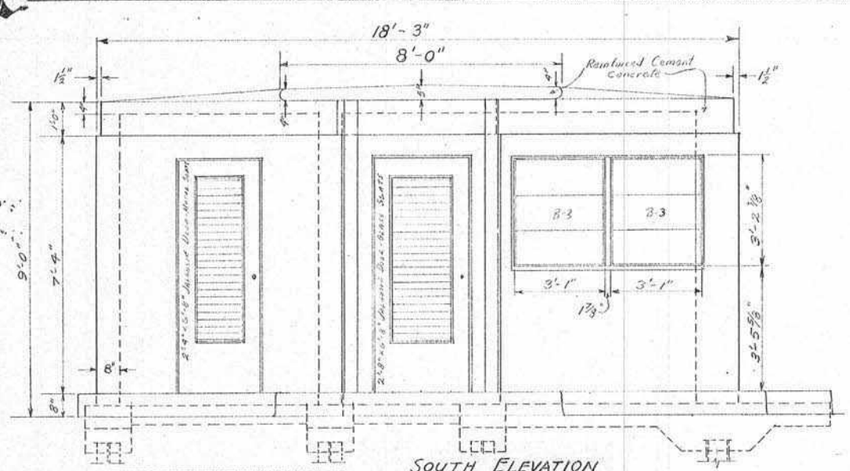
DIAGRAM OF CORE BORINGS
VERT. SCALE 1"= 10'

PLAN - PROFILE
DIAGRAM OF CORE BORINGS

BROAD CAUSEWAY VIADUCT

M. B. GARRIS CIVIL & CONSULTING ENGINEER
MIAMI · FLORIDA JUNE 1950

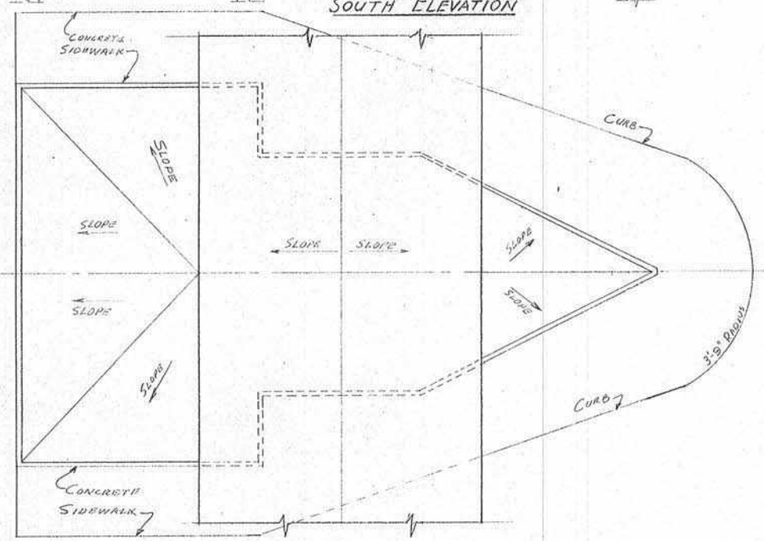
SCALE AS SHOWN SHEET 5 OF SHE



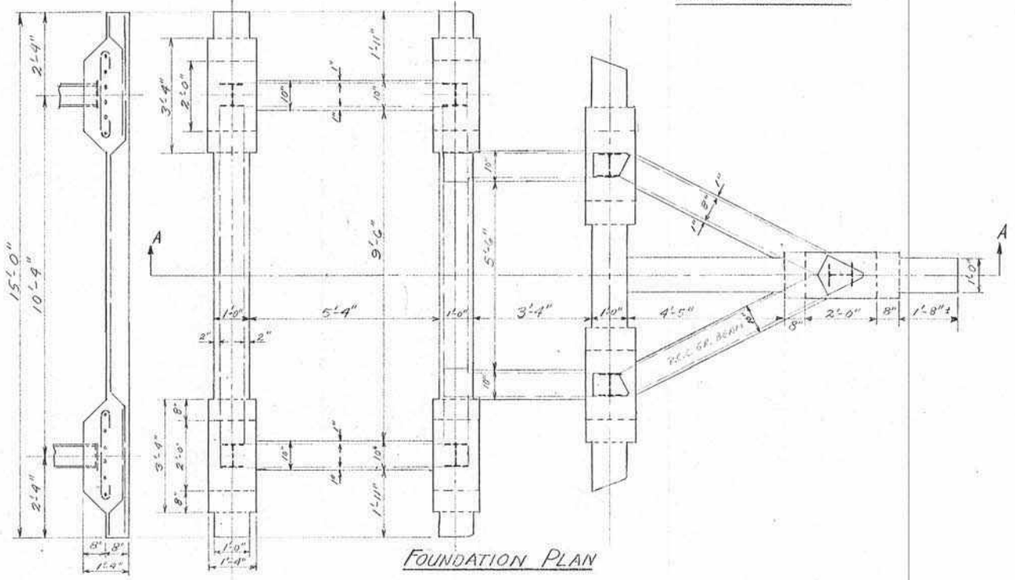
SOUTH ELEVATION



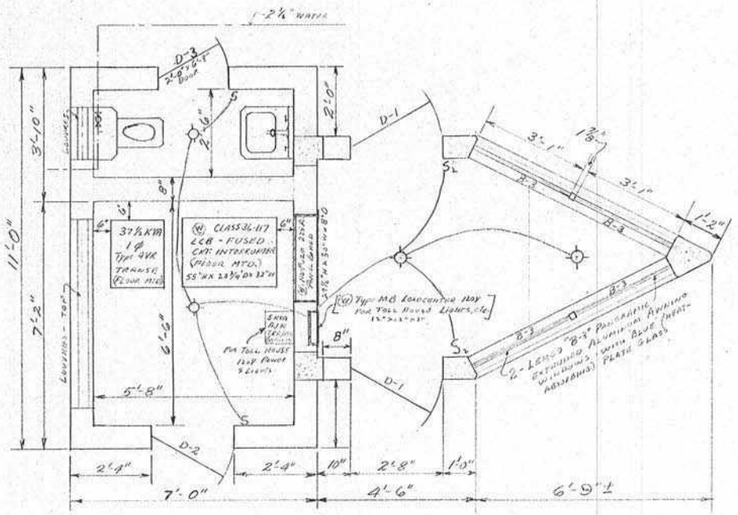
EAST ELEVATION



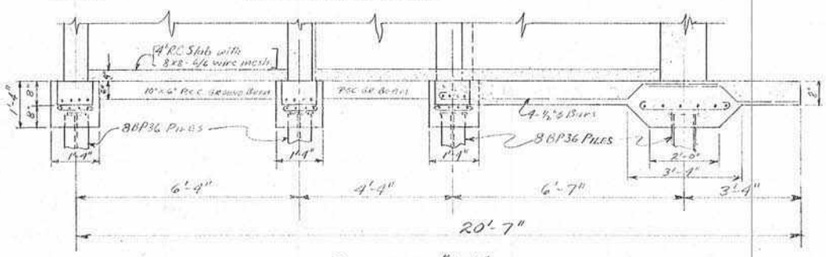
ROOF PLAN



FOUNDATION PLAN



FLOOR PLAN



SECTION "A-A"

36

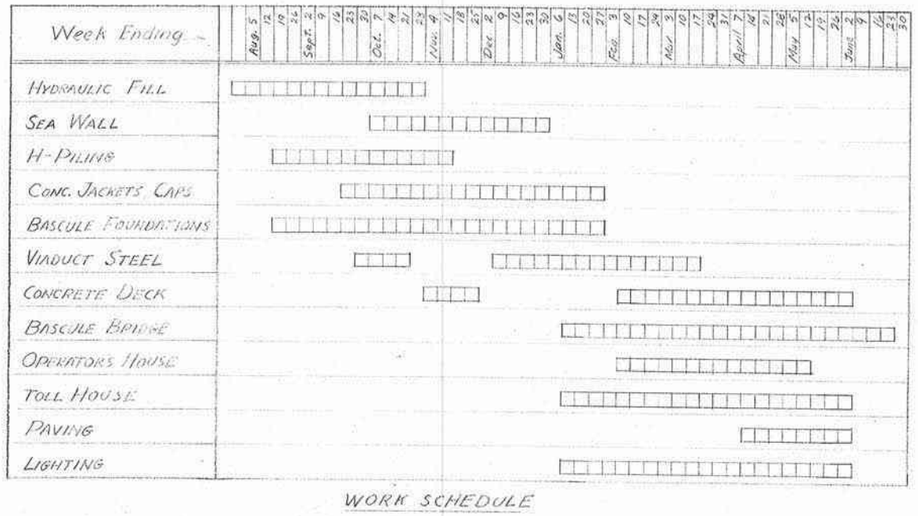
TOLL HOUSE DETAILS

BROAD CAUSEWAY

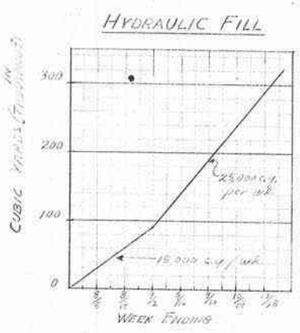
DRAWN: LLS

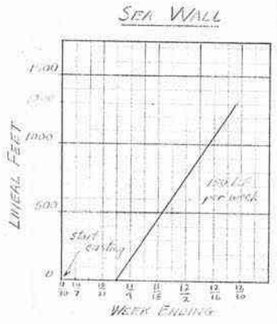
JULY 27, 1950

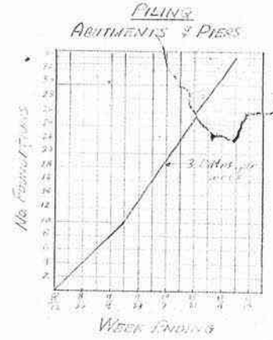
SCALE: 1/2" = 1'-0"

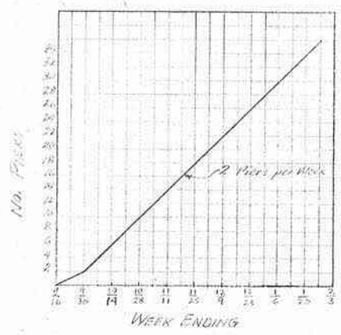


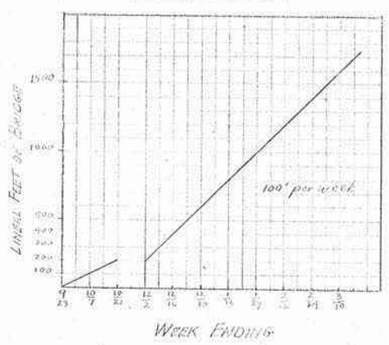
WORK SCHEDULE

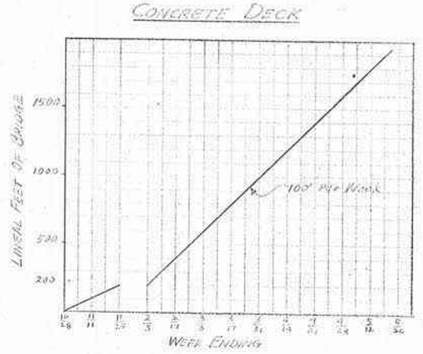






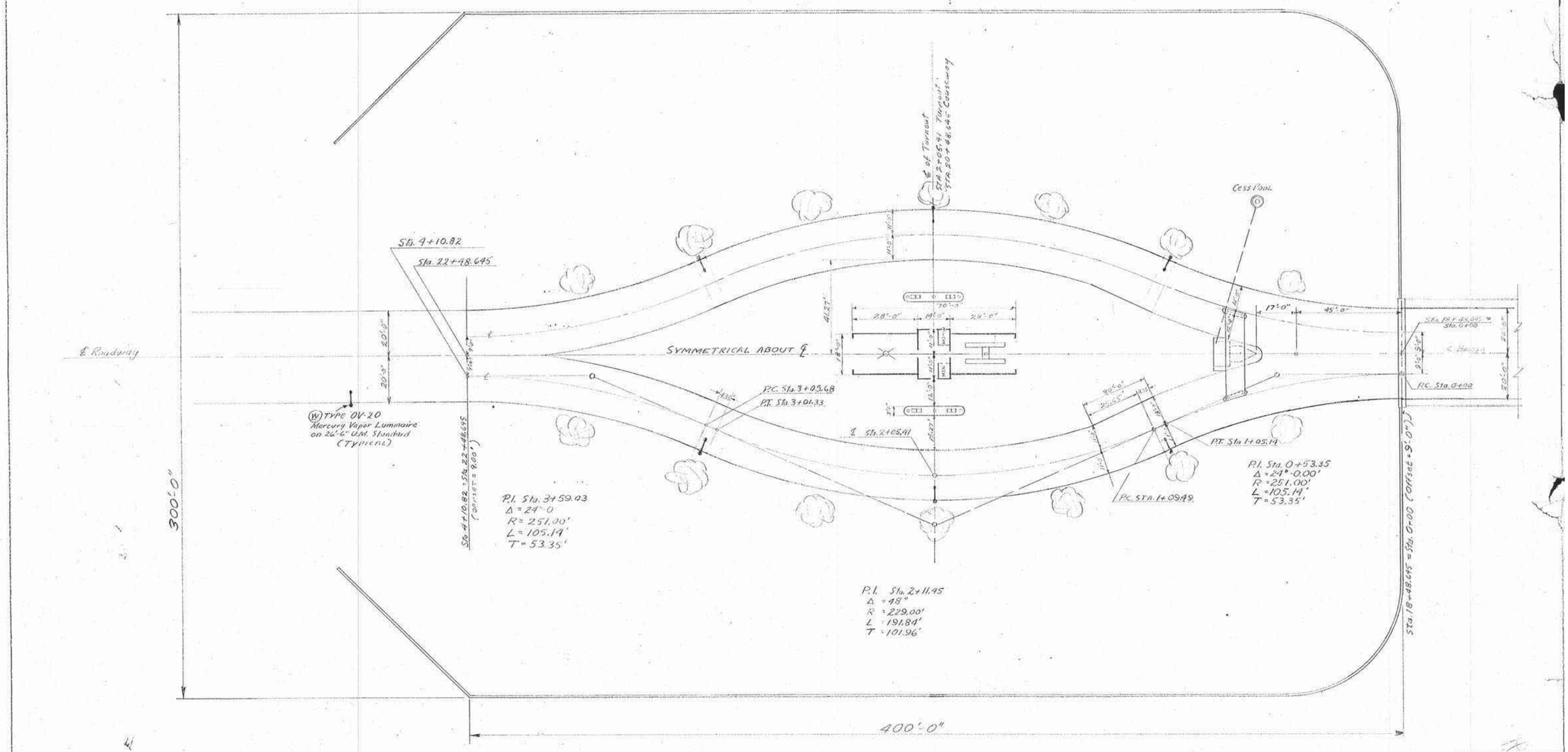






BROAD CAUSEWAY

WORK SCHEDULE



BROAD CAUSEWAY

CONNECTING 96TH. ST. (BAY HARBOR ISLAND) AND 123RD. ST (NORTH MIAMI)

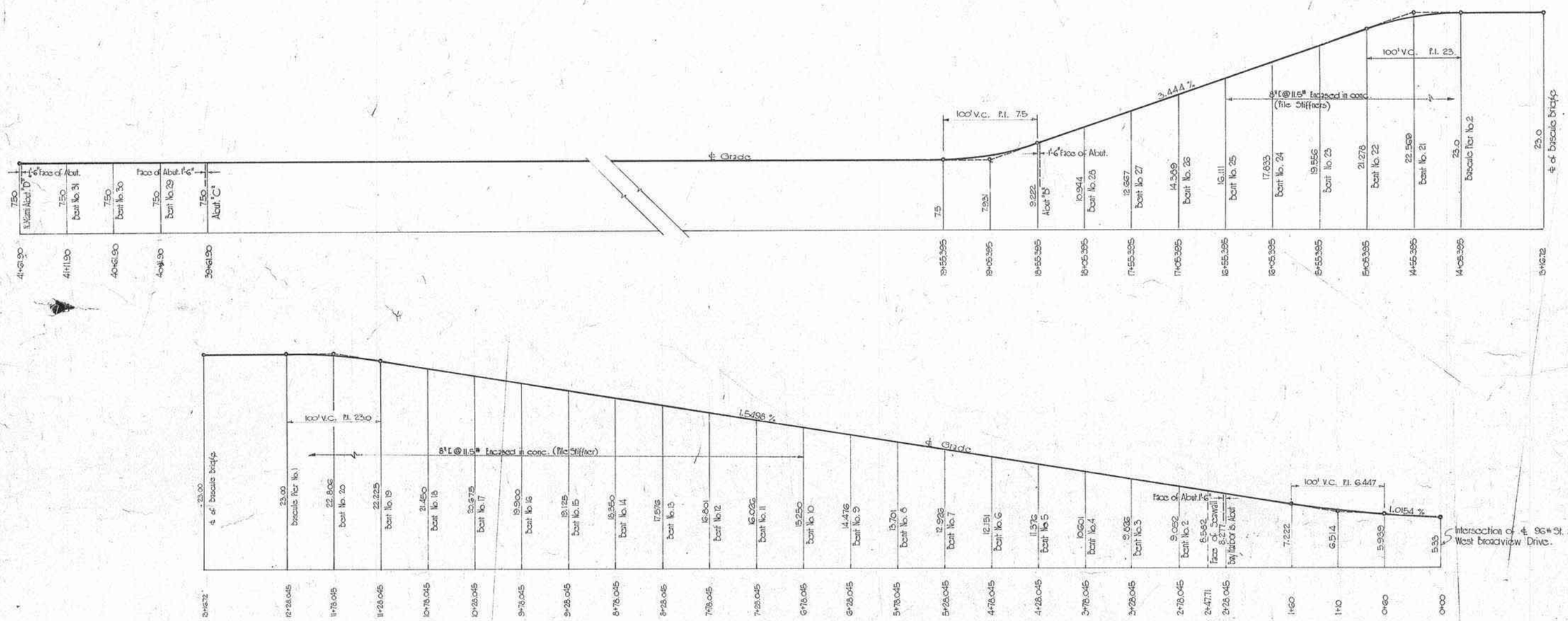
GENERAL PLAN-TOLL ISLAND

M·B·GARRIS CIVIL & CONSULTING ENGINEER

MIAMI · FLORIDA AUGUST · 1950

SCALE: 1" = 20'-0"

REV.	APPROVED	



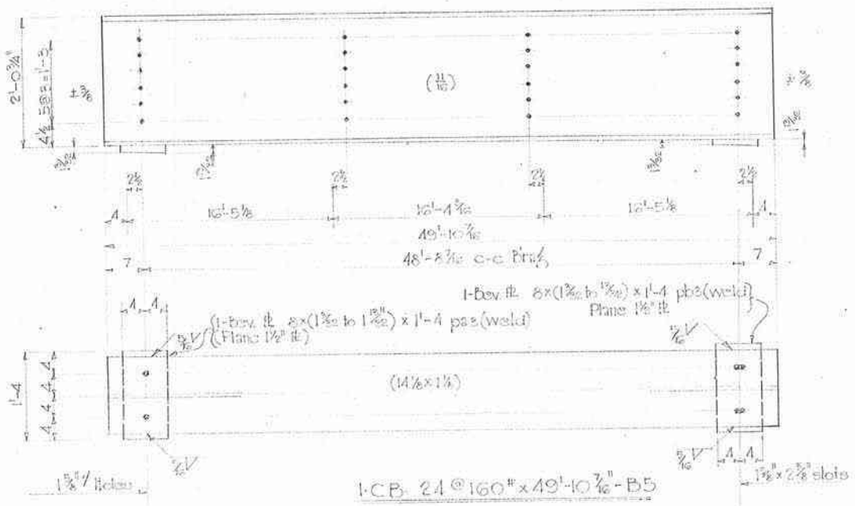
CENTER SECTION SHOWING FINISHED CENTER LINE GRADES

BROAD CAUSEWAY · VIADUCT

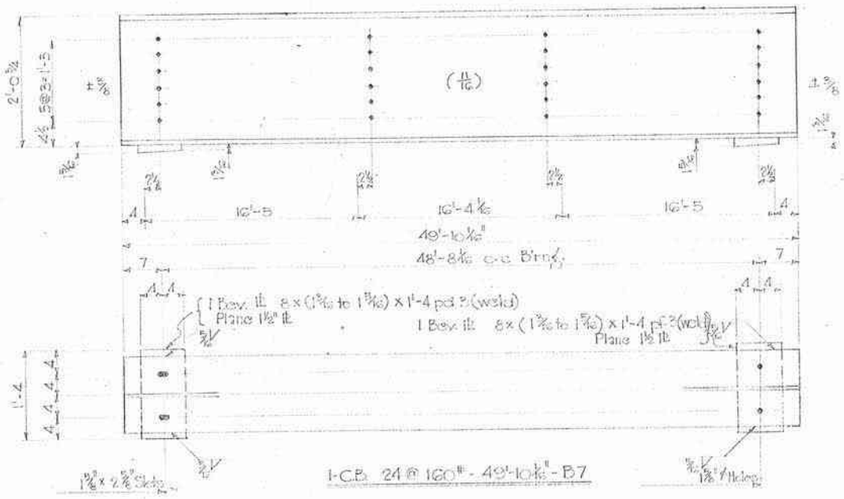
M.B. GARRIS CIVIL & CONSULTING ENGINEER
MIAMI · FLORIDA JUNE 1950

SCALE: HOR. 1"=50' VER. 1"=5'

SHEET 2 OF SHEE



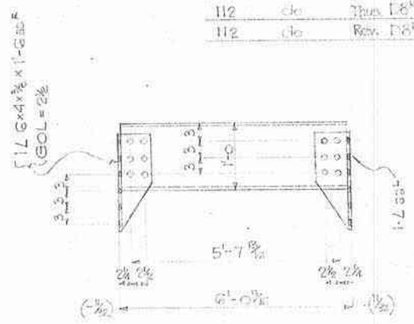
1-C.B. 24 @ 160#x 49'-10 7/16"-B5



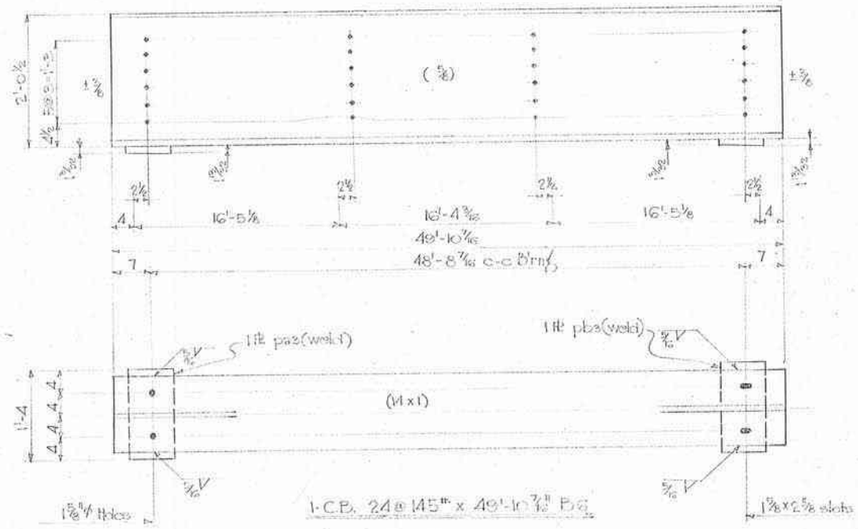
1-C.B. 24 @ 160#- 49'-10 7/16"- B7

Reqd List

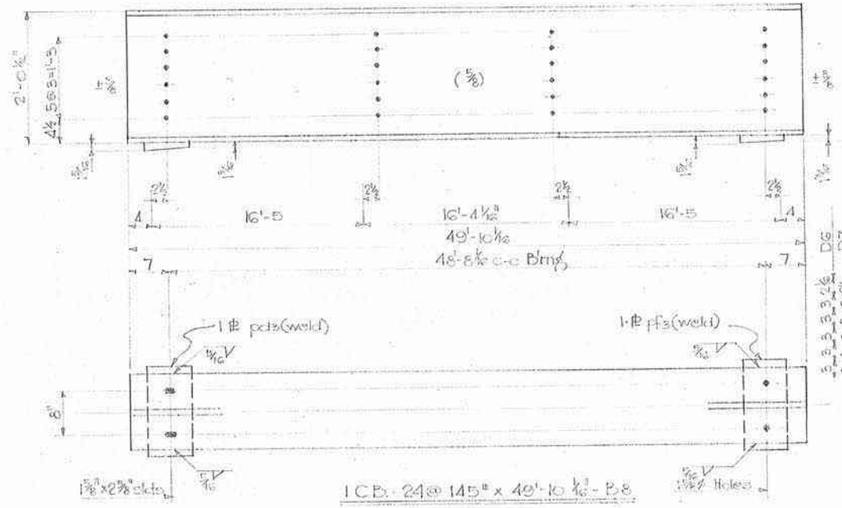
Make	Description	Mark
12	Beams	B5
36	do	B6
36	do	B7
108	do	B8
140	Diaphragms	L8
112	do	Thru D6[A]
112	do	Rev. D6[A]
112	do	Thru D7[A]
112	do	Rev. D7[A]
112	do	Thru L8[A]
112	do	Rev. L8[A]



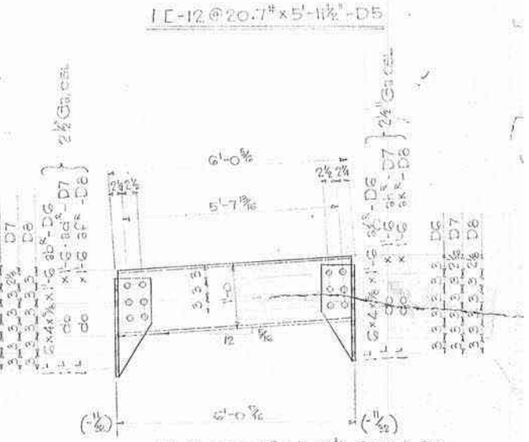
1 E-12 @ 20.7# x 5'-11 3/8"-D5



1-C.B. 24 @ 145# x 49'-10 7/16" B6



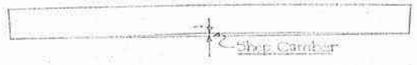
1 C.B.- 24 @ 145# x 49'-10 1/2"- B8



1 E-12 @ 20.7# x 5-11 3/8 D6-D7-D8



Camber Diagram for B5-B7



Camber Diagram for B6-B8

Shop Notes:
Paint erection marks on the left-hand end of all members as shown on details.

STEEL FABRICATION
STA. 0+28.45 TO STA. 5+98.45 & STA. 14+40.28 TO STA. 18+08.28

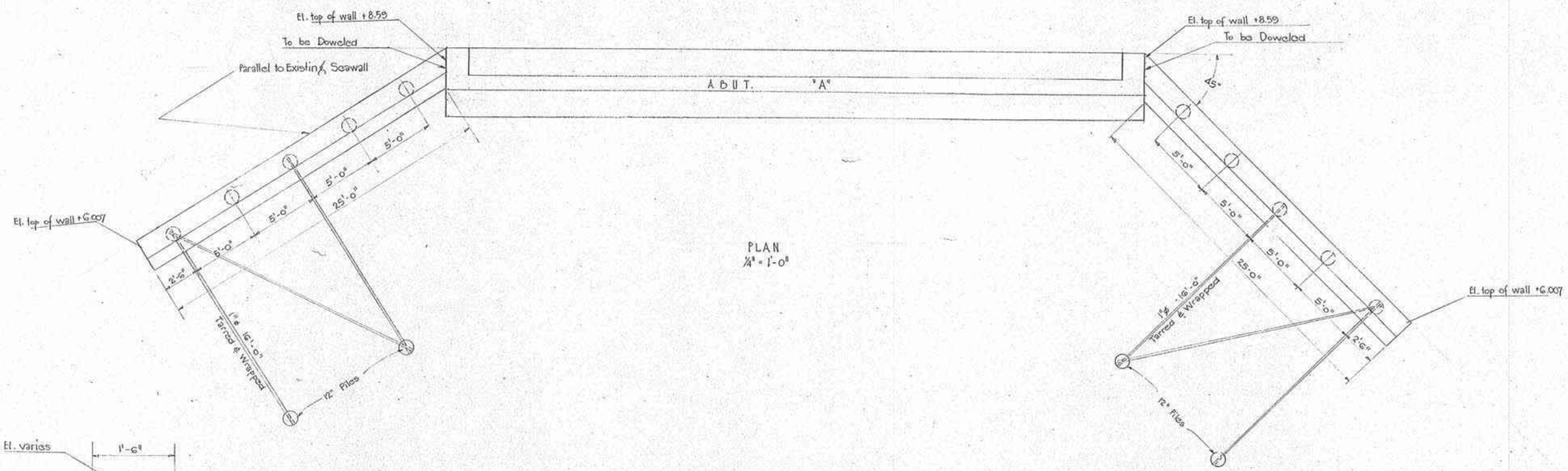
BROAD CAUSEWAY - VIADUCT

MAP-SAKKIS
MIAMI - FLORIDA

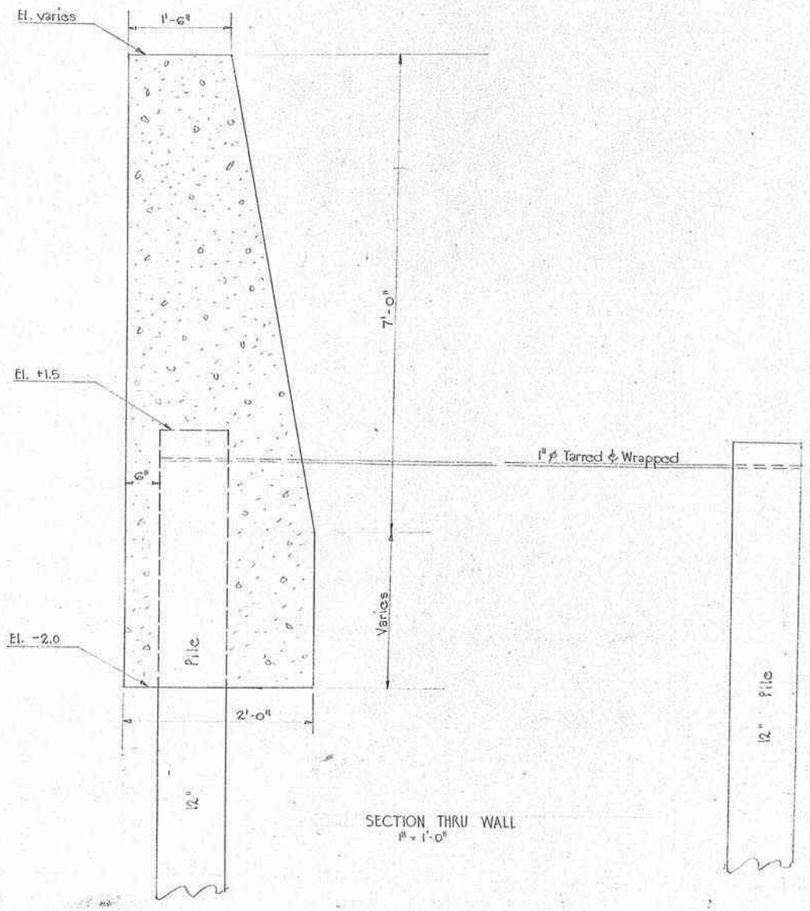
CONSTRUCTION ENGINEERS
STEEL DIV.

SCALE: AS SHOWN

SHEET NO. 4 OF 5 SHEETS



PLAN
1/4" = 1'-0"



SECTION THRU WALL
1" = 1'-0"

DETAIL
WINGWALL

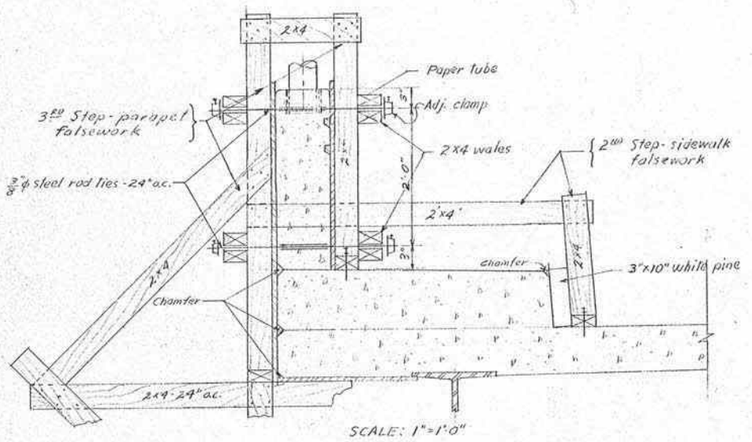
BROAD CAUSEWAY VIADUCT

M.B.GARRIS
MIAMI · FLA.

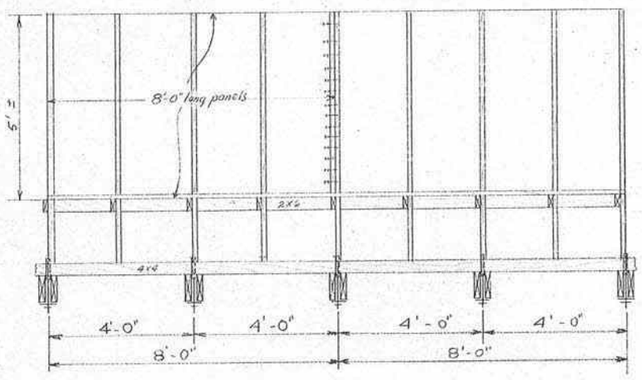
CIVIL & CONSULTING ENGR.
MAR. 1951

SCALE AS SHOWN

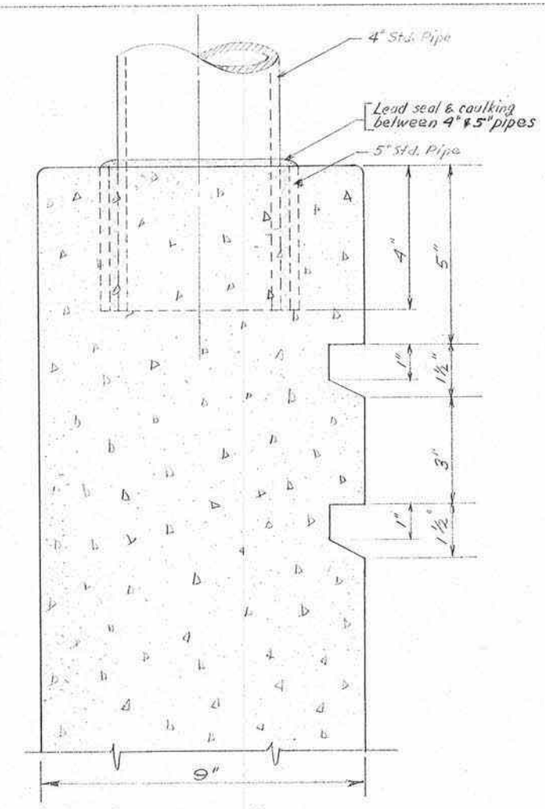
SHEET NO. 47



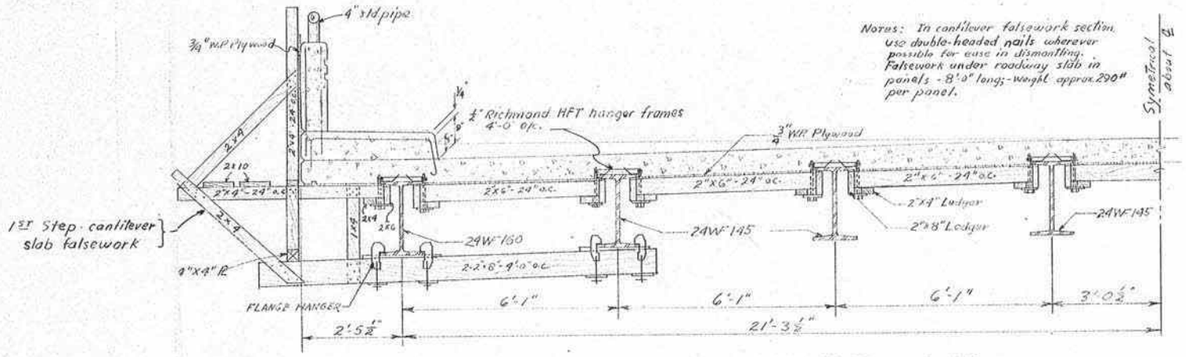
SCALE: 1"=1'-0"



END VIEW SHOWING SUGGESTED FALSEWORK FOR SIDEWALK AND PARAPET



CROSS SECTION OF PARAPET
HALF SIZE

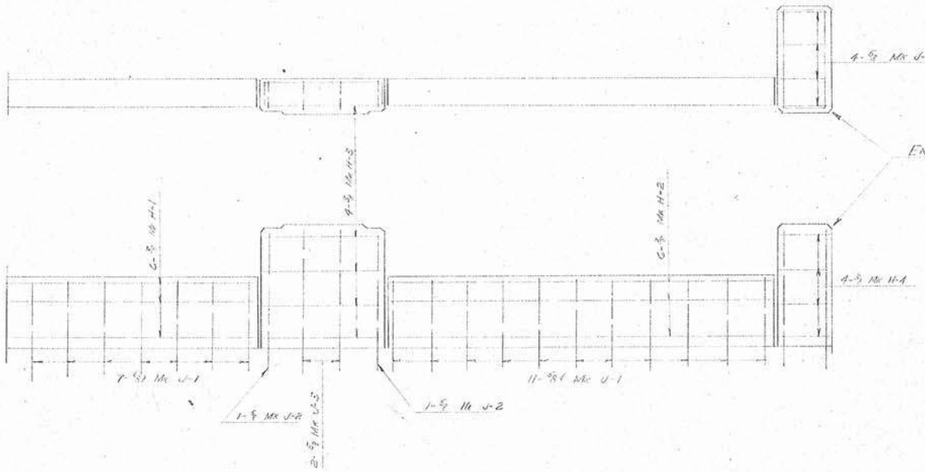


HALF CROSS SECTION OF DECK SLAB SHOWING SUGGESTED FALSEWORK
SCALE: ½"=1'-0"

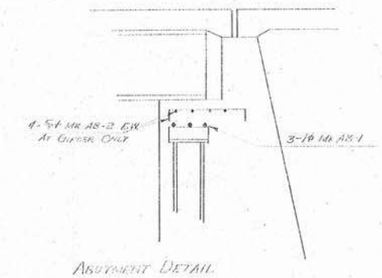
FALSEWORK - FORM DETAIL
BROAD CAUSEWAY

DRAWN BY L.L.S.

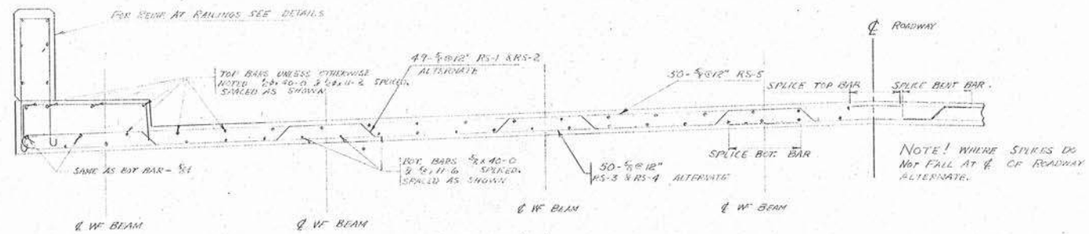
SCALE AS SHOWN



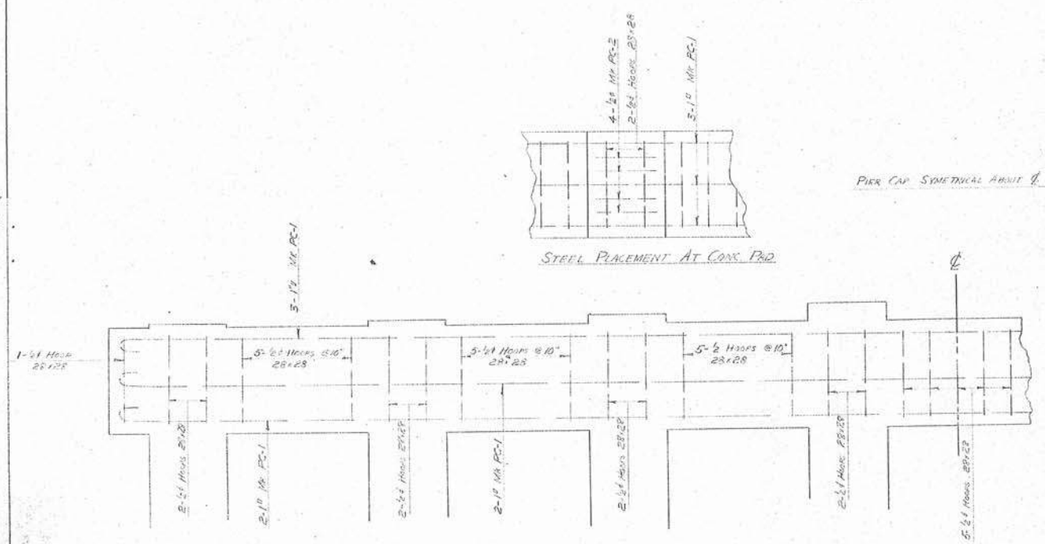
TYPICAL DETAILS FOR PLACING REINF. IN HANDRAILS



ABUTMENT DETAIL



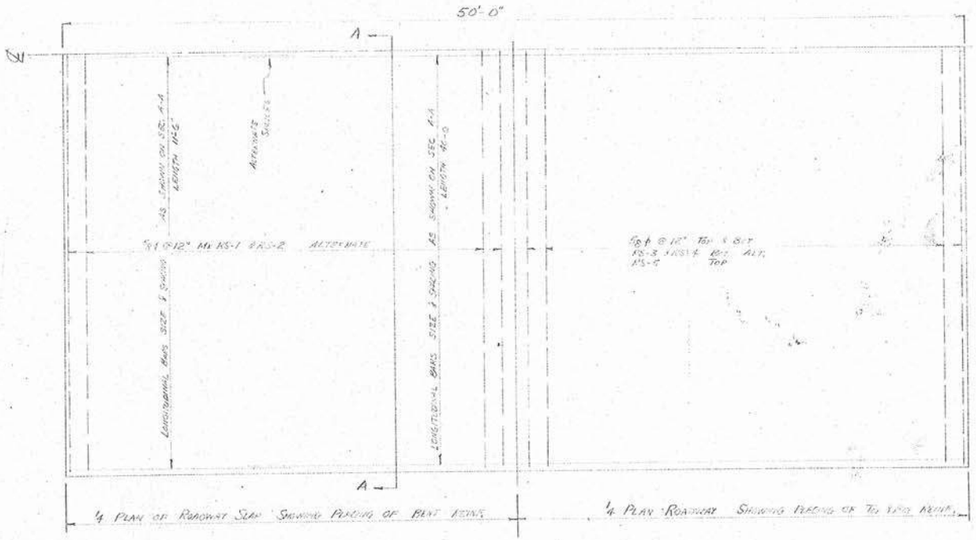
SECTION A-A



STEEL PLACEMENT AT CONC. PIER

HALF ELEVATION - PIER CAP

SHOWING ARRANGEMENT OF REINF. STEEL

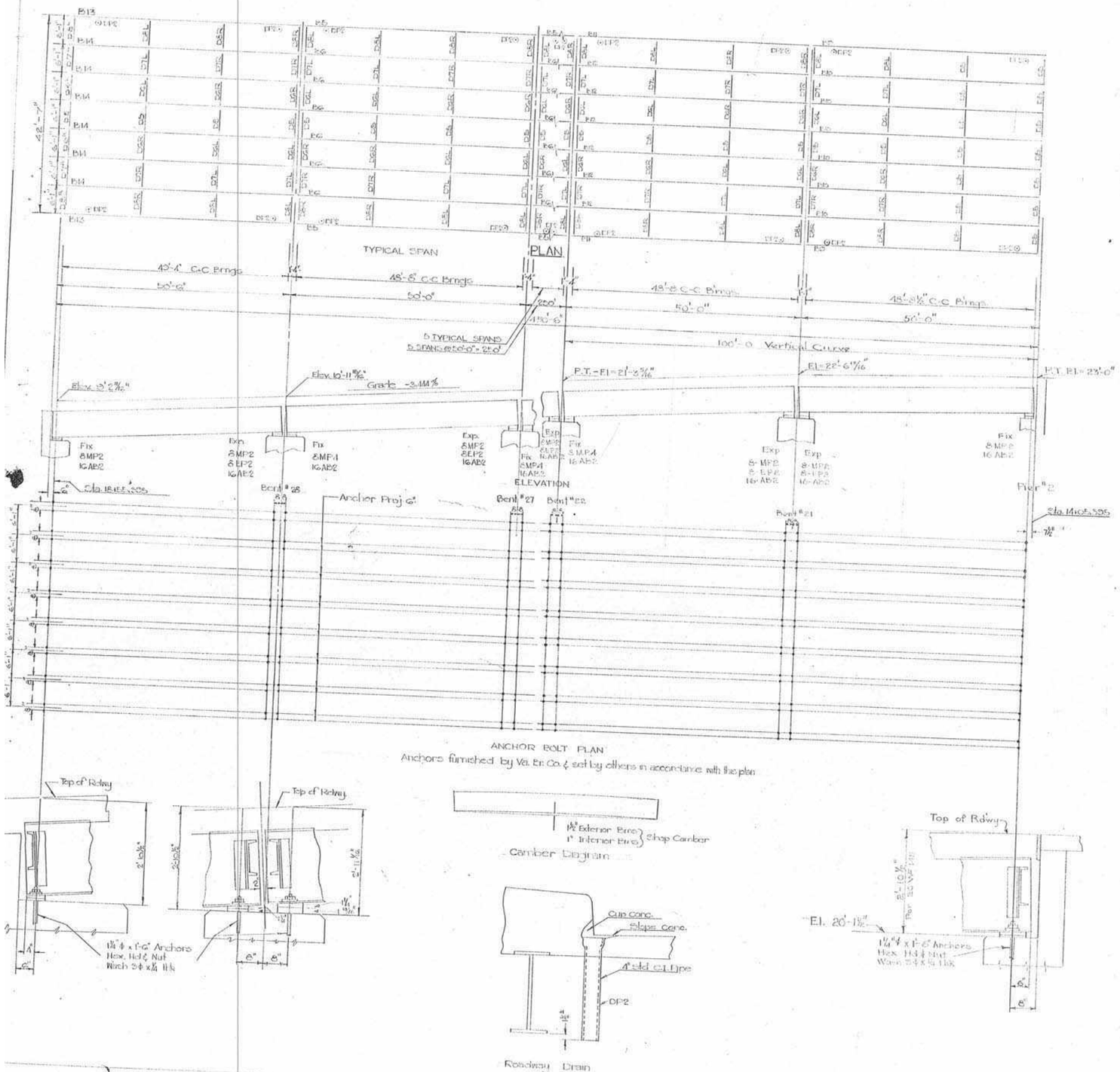


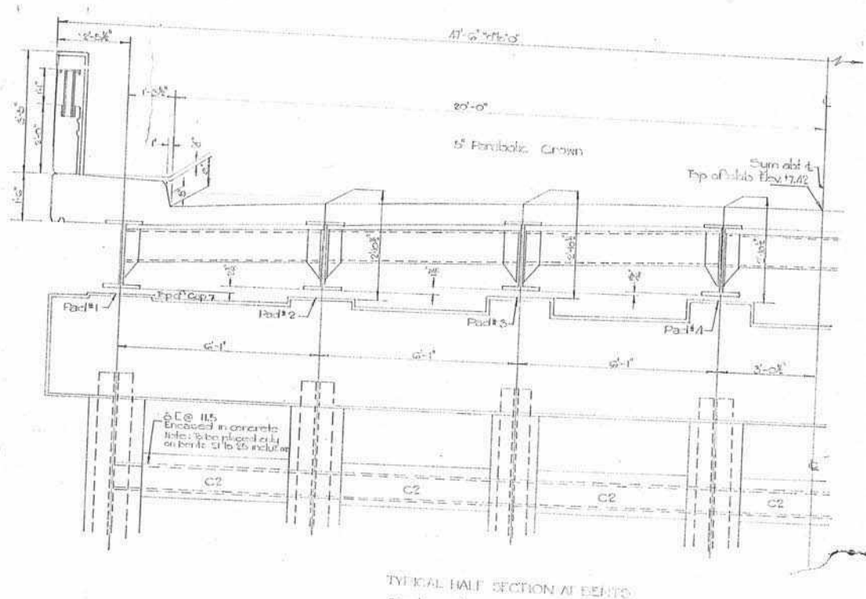
¼ PLAN OF ROADWAY SLAB SHOWING PLACING OF BENT REINF.

¼ PLAN OF ROADWAY SHOWING PLACING OF TOP REINF.

REVISED CHANGE OF FLOOR PANEL SLAB
REVISED 10/4/50

PLACING DETAILS FOR REINF. PIER CAPS-ABUTMENTS-ROADWAY BROAD CAUSEWAY VIA





TYPICAL HALF SECTION AT BENTS

Erection Notes:
Shim as to be installed in field as directed by Engr. Holes slotted as plan to match end distances, then field riveted

ELEVATIONS							
STATION	BENT Nº	ETOP of ROAD	TOP of CAP	PAD Nº 1	PAD Nº 2	PAD Nº 3	PAD Nº 4
18+55.305	ABUT "B"	23.250	5.750	5.458	6.105	6.292	6.335
15+05.305	28	19.944	7.480	7.188	7.835	7.021	6.964
11+55.305	27	16.661	9.203	8.911	9.558	9.744	9.787
10+05.305	26	14.980	10.055	9.763	10.410	10.596	10.639
8+55.305	25	13.311	10.908	10.616	11.263	11.449	11.492
6+05.305	24	11.647	11.760	11.468	12.115	12.301	12.344
4+55.305	23	9.986	14.462	14.170	14.817	15.003	15.046
3+05.305	22	8.316	16.982	16.690	17.337	17.523	17.566
1+55.305	21	6.650	17.814	17.521	18.168	18.354	18.397
1+05.305	PASCUE ABT "A"	5.90	20.127	20.116	20.121	20.121	20.127

STEEL FABRICATION
STA. 18+55.305 TO STA. 14+05.305

13

BROAD CAUSEWAY - VIADUCT

M.E. GARRIS CIVIL & CONSULTING ENGINEER
MIAMI, FLORIDA

Top of End Post (Level)
Abut. A 12.000
B 12.935
C 11.230
D 11.230

Back of Walk 50' Sta. & Elev. of Cap
Abut. A 8.590
B 9.535
C 7.813
D 7.813

Top of Sand Wall (Level)
Abut. A 7.074
B 7.990
C 6.320
D 6.920

Abutment Seat (Level)
Abut. A 4.840
B 5.785
C 4.065
D 4.065

DIAGRAM SHOWING ELEVATIONS
½" = 1'-0"

NOTE
Angle of wing wall on north side of Abutment "A" is 45°. On south side wing wall is parallel to existing seawall.

ELEVATION WING WALL - ABUTMENT "A"
SCALE ⅜" = 1'-0"

PLAN
Slope ½":1'-0"

ELEVATION WING WALL - ABUTMENT "C"
SCALE ⅜" = 1'-0"

No. SPANS	ABUTMENTS A	B	C	PILES	LENGTH
2	4'-6½"	4'-1¼"	5'-1"	8	141'-0"
2	5'-2⅜"	4'-7⅛"	7'-7"		
2	5'-11⅛"	5'-3⅝"	7'-7"		
ABUTMENT "B"					
2	12'-5¾"	11'-9⅜"	7'-7"	2	17'-5¾"
2	11'-8⅞"	11'-1⅛"	7'-7"	2	16'-8⅜"
2	11'-0"	10'-4⅜"	7'-7"	2	16'-0"
2	10'-4"	9'-8½"	7'-7"	2	15'-4"
2	9'-7⅝"	9'-0"	7'-7"	2	14'-7⅜"
2	8'-11⅛"	8'-5⅝"	7'-7"	2	13'-11⅛"
2	8'-2¾"	7'-9¾"	5'-1"	128	13'-0"
122	8'-0"	8'-0"	7'-7"		
2	8'-0"	8'-0"	5'-1"		

No. SPANS	ABUTMENTS A	B	C	PILES	LENGTH
2	8'-3⅜"	7'-11⅝"	7'-7"	2	12'-[illegible]
2	8'-7⅝"	8'-3⅜"	7'-7"	2	13'-[illegible]
2	8'-11⅜"	8'-8"	7'-7"	2	13'-[illegible]
2	9'-4"	9'-¼"	7'-7"	2	13'-[illegible]
2	9'-8⅛"	9'-4⅜"	7'-7"	2	14'-[illegible]
2	10'-0"	9'-8⅜"	7'-7"	2	14'-[illegible]
2	10'-4⅝"	10'-⅛"	7'-7"	2	15'-[illegible]
2	10'-8⅞"	10'-5"	7'-7"	2	15'-[illegible]
				2	15'-[illegible]
ABUTMENT "D"					
2	9'-3"	8'-9⅞"	5'-1"	2	13'-8
2	9'-11⅜"	9'-3⅞"	7'-7"	2	14'-[illegible]
2	10'-5⅝"	10'-0"	7'-7"	2	14'-[illegible]
				2	15'-[illegible]

PLAN
Slope ½":1'-0"

ELEVATION OF SEAWALL - ABUTMENT "B"
SCALE ⅜" = 1'-0"

ELEVATION WING WALL - ABUTMENT "D"
SCALE ⅜" = 1'-0"

DETAIL
SEAWALL

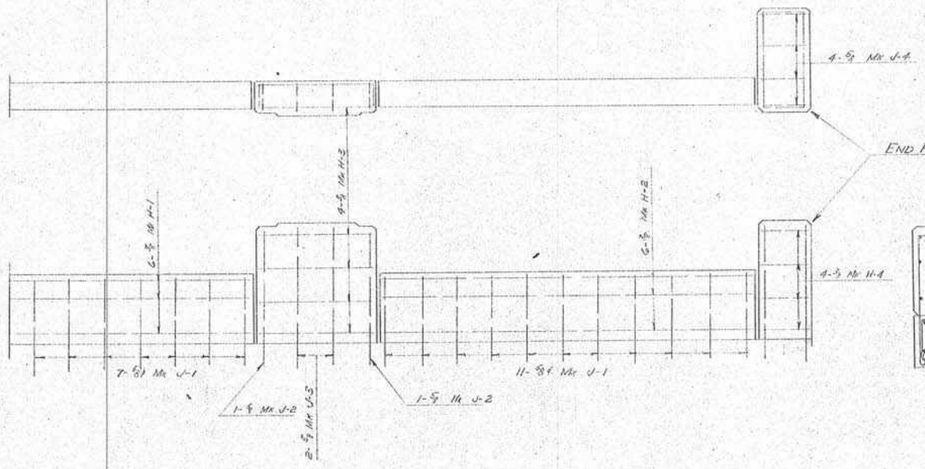
BROAD CAUSEWAY VIADUCT

M.E. GARRIS
MIAMI - FLA

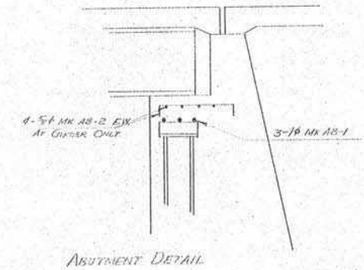
CIVIL & CONSULTING ENGR.
OCT. 1950

SCALE AS SHOWN

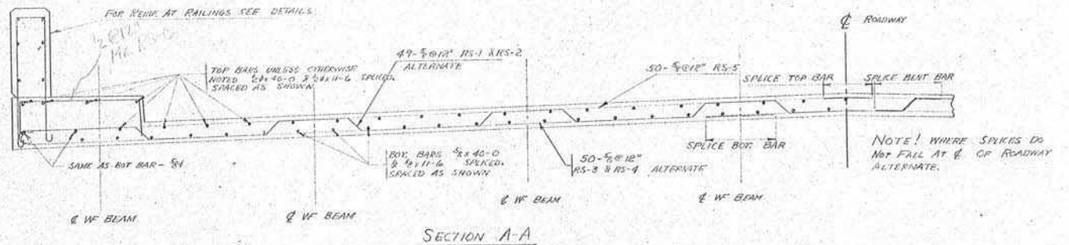
SHEET NO. 46



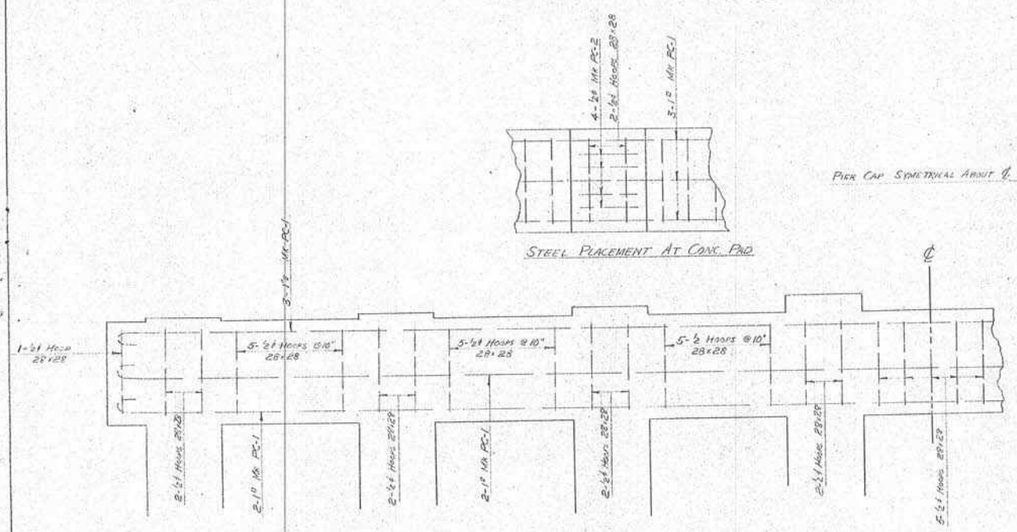
TYPICAL DETAILS FOR PLACING REINF. IN HANDRAILS



ABUTMENT DETAIL

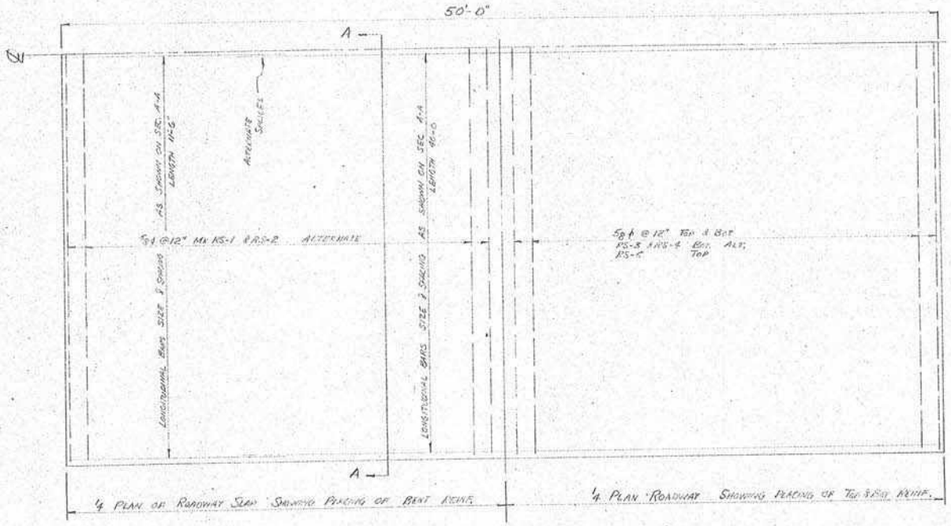


SECTION A-A



STEEL PLACEMENT AT CONC. PAD.

HALF ELEVATION - PIER CAP
SHOWING ARRANGEMENT OF REINF. STEEL



¼ PLAN OF ROADWAY SLAB SHOWING PLACING OF BENT REINF.

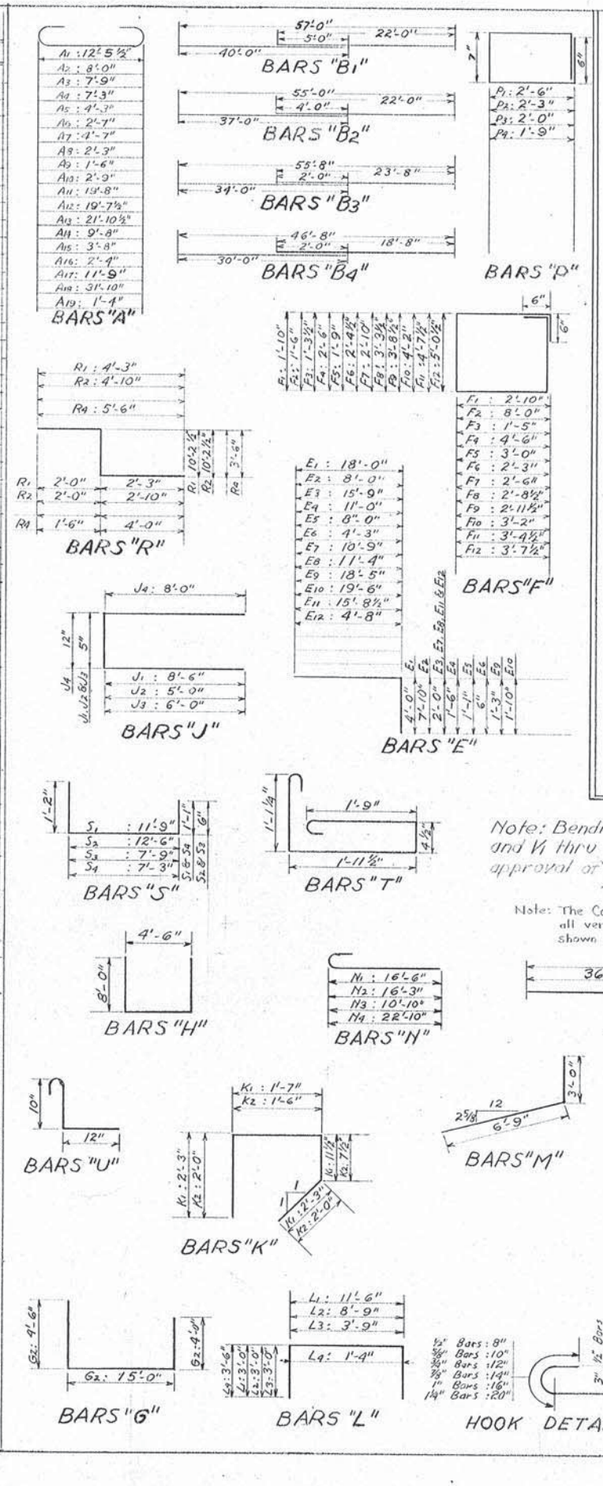
¼ PLAN ROADWAY SHOWING PLACING OF TOP STEEL REINF.

PLACING DETAILS FOR REINF. STEEL
PIER CAPS - ABUTMENTS - ROADWAY SLAB
BROAD CAUSEWAY VIADUCT

Drawn by JW (WL) 9/5/50
Traced NTS.
Checked
S.O. 1-51 M6 R-1

BILL OF REINFORCING STEEL. (FOR 2 PIERS)

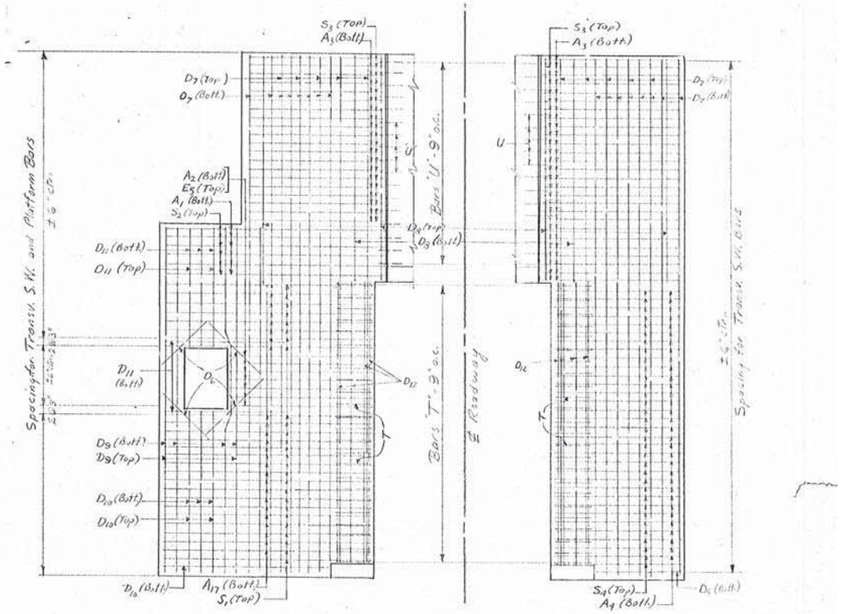
MARK	SIZE	No REQD	LENGTH	LOCATION	BENDING
A1	5/8"ϕ	6	13'-9½"	S.W. & Control House Fl.	Bent
A2	"	7	9'-4"	" " " " "	"
A3	"	96	9'-1"	" " " " "	"
A4	"	96	8'-7"	" " " " "	"
A5	"	7	5'-7"	" " " " "	"
A6	"	32	3'-11"	Trunnion Pedestal	"
A7	"	16	5'-11"	" "	"
A8	½"ϕ	24	3'-4"	Floor Beam Pedestal	"
A9	"	16	2'-7"	Pilaster at Uplift	"
A10	"	12	3'-10"	" " "	"
A11	"	12	20'-9"	Slab	
A12					
A13					
A14					
A15	5/8"ϕ	28	5'-0"	Live Load Support	Bent
A16	"	40	3'-8"	" " "	"
A17	"	33	13'-1"	S.W. & Control House Fl.	"
A18	1¼"□	180	34'-6"	Footing	"
A19	½"ϕ	16	2'-5"	Buffer Seat	"
B1	1¼"□	120	62'-0"	Footing	See Diagram
B2	1"□	68	59'-0"	Machinery Platform	" "
B3	½"ϕ	22	57'-8"	Front Walls	" "
B4	5/8"ϕ	20	48'-8"	Rear Wall	" "
B5	"	50	57'-6"	" "	" "
C1	5/8"ϕ	62	17'-1"	Vertical Walls	Straight
C2	7/8"ϕ	56	16'-3"	Under L.L.S.	"
C3	5/8"ϕ	92	25'-4"	Vertical Walls	"
C4	"	16	11'-6"	" "	"
C5	"	148	10'-9"	" "	"
C6	"	90	22'-0"	Vertical Rear Wall	"
C7	"	28	13'-6"	Vertical Front Wall	"
C8	"	112	11'-0"	Trunnion Pedestal	"
C9	"	48	8'-0"	Floor Beam Pedestal	"
C10	"	16	7'-9"	Pedestal for "Uplift"	"
C11	½"ϕ	111	11'-0"	Vertical Walls	"
C12	"	56	9'-4"	Walls Under Control House	"
C13					"
C14	½"ϕ	8	6'-6"	Rear Wall	"
C15	½ ϕ	24	8'-1"	Vertical Walls	"
C16	"	8	10'-9"	Front Wall	Field Bend
D1	½"ϕ	36	7'-0"	Horizontal Side Walls	Straight
D2	"	10	35'-0"	Horizontal Front Walls	"
D3	"	8	6'-9"	Rear Wall	"
D4	"	10	40'-0"	Rear Front Walls	"
D5	"	4	4'-9"	Sidewalk	"
D6	"	52	3'-8"	"	"
D7	"	46	30'-3"	"	"
D8	"	8	13'-0"	"	"
D9	"	6	20'-0"	Under Control House	"
D10	"	6	9'-3"	" " "	
D11	"	7	7'-0"	" " "	
D12	"	16	16'-6"	Sidewalk	
D13	"	5	24'-3"	"	
D14	"	8	38'-0"	Front Wall	
D15	"	72	6'-9"	" "	
D16	"	5	2'-11"	Sidewalk	
D17	"	1	13'-6"	"	
E1	½"ϕ	29	21'-11"	Horizontal Side Walls	Bent
E2	"	40	15'-9"	" Front "	"
E3	"	80	17'-8"	" Side "	"
E4	"	20	12'-5"	" " "	"
E5	5/8"ϕ	7	9'-0"	Sidewalk	"
E6	"	7	4'-8"	"	"
E7	½"ϕ	9	12'-8"	Wall Under Control House	"
E8	"	9	13'-3"	" " " "	"
E9	"	9	19'-7"	" " " "	"
E10	"	11	21'-3"	" " " "	"
E11	"	108	17'-7½"	Horizontal 12" Walls	"
E12	"	18	6'-7½"	Wall Under Control House	"
E13					
E14					
E15					
F1	5/8"ϕ	48	9'-11"	L.L.S. Pilaster	Bent
F2	"	52	19'-7"	Machinery Platform	"
F3	½"ϕ	48	6'-0"	Curb Beam Pilaster	"
F4	5/8"ϕ	28	14'-7"	Trunnion Pedestal	Bent
F5	½"ϕ	28	10'-1"	Pilaster at "Uplift"	"
F6	"	4	9'-10"	Floor Beam Pedestal	"
F7	"	4	11'-3"	" " "	"
F8	"	4	12'-7"	" " "	"
F9	"	4	13'-11"	" " "	"
F10	"	4	15'-3"	" " "	"
F11	"	4	16'-7"	" " "	"
F12	"	4	17'-11"	" " "	"
G2	½"ϕ	20	23'-4"	Horizontal Side Walls	Bent
H	½"ϕ	8	20'-4"	Below Machine Platform	Bent
J1	½"ϕ	74	17'-3"	Front Wall	Bent
J2	"	88	10'-3"	Rear "	"
J3	"	24	12'-3"	" "	"
J4	5/8"ϕ	20	16'-10"	Buffer Seat	"
K1	"	160	6'-10"	Approach Span Seat	Bent
K2	½"ϕ	30	5'-11"	Curb Beam Seat	"
L1	¾"ϕ	132	17'-4"	Footing	Bent
L2	"	76	14'-7"	"	"
L3	"	76	9'-7"	"	"
L4	1¼"ϕ	16	8'-2"	Buffer Seat	"
M	5/8"ϕ	14	9'-8"	Brackets	Bent
N1	7/8"ϕ	14	7'-3"	Brackets	Bent
N2	"	14	7'-2"	"	"
N3	1"ϕ	68	11'-11"	Vertical Rear Wall	"
N4	"	70	20'-11"	" " "	"
P1	½"ϕ	7	6'-3"	Brackets	Bent
P2	"	7	5'-9"	"	"
P3	"	7	5'-3"	"	"
P4	"	7	4'-9"	"	"
R1	½"ϕ	9	14'-4"	Horizontal Side Walls	Bent
R2	"	9	14'-11"	" " "	"
R4	"	48	8'-10"	" " "	"
S1	5/8"ϕ	26	14'-0"	Under Control House	Bent
S2	"	6	14'-2"	Sidewalk	"
S3	"	96	9'-5"	"	"
S4	"	98	9'-6"	"	"
T	5/8"ϕ	92	6'-3"	Curb & Roadway	Bent
U	5/8"ϕ	68	2'-5"	Curb	Bent
V1	½"ϕ	4		Adjacent Trunnion Pedestal	Bent
V2	"	18		Machinery Platform	"
V3	"	16		" "	"
V4	"	10		" "	"
V5	"	16		" "	"



Note: Bending Diagrams for Bars E14, E15 and V1 thru V5 will be furnished after approval of the Machinery Shop Plans.

Note: The Contractor may at his discretion, splice all vertical bars in walls, within the limits shown on sheet No. 3

All Bar dimensions are out to out



SIDEWALK AND PLATFORM DETAILS

ESTIMATED QUANTITIES (2 PIERS)

ITEM	UNIT	QUANTITY
Concrete, Class "AA"	Cu. Yd.	1528.
Concrete, Seal	Cu. Yd.	800.
Reinforcing Steel	Lb.	133,630
Concrete Handrail	Lin. Ft.	102
Untreated Timber Piling	Lin. Ft.	10,080

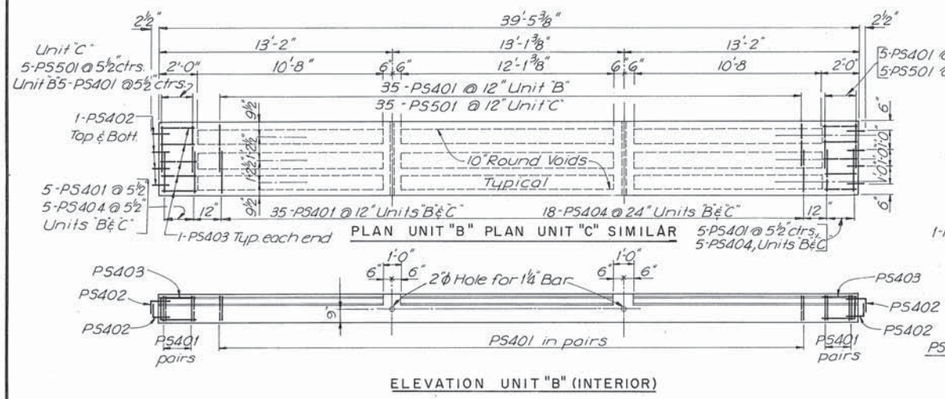
19

BASCULE PIER DETAILS
BILL OF REINFORCING STEEL
AND ESTIMATED QUANTITIES

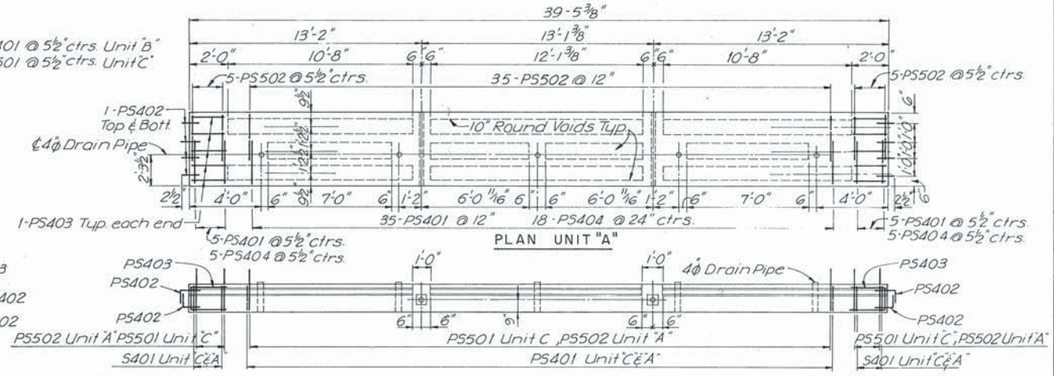
BROAD CAUSEWAY

M.B. GARRIS CIVIL AND CONSULTING ENGINEER
MIAMI · FLORIDA JUNE · 1950

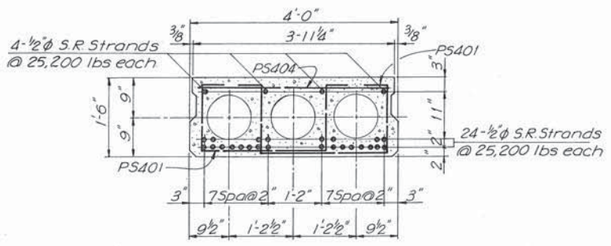
SHEET 5 OF 5



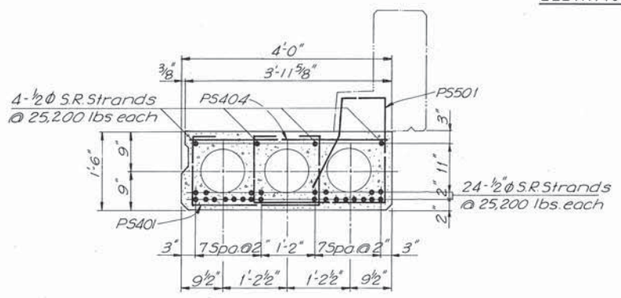
ELEVATION UNIT "B" (INTERIOR)



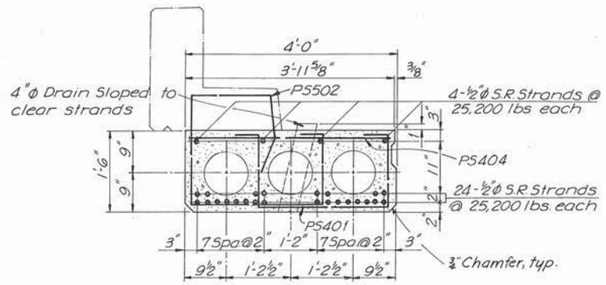
ELEVATION UNIT "A" (CURB) ELEVATION UNIT "C" SIMILAR



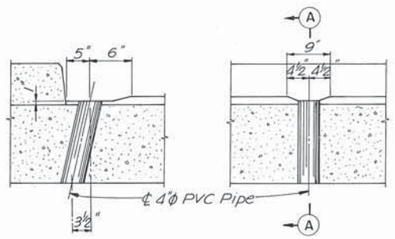
SECTION THRU UNIT "B" (INTERIOR)



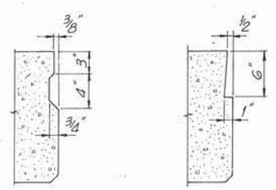
SECTION THRU UNIT "C" (CURB)



SECTION THRU UNIT "A" (CURB)



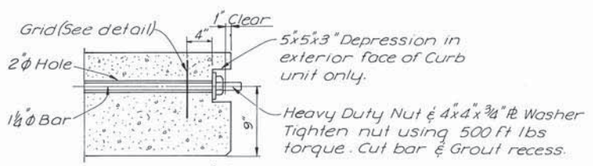
SECTION A-A SECTION THRU DRAIN



SHEAR KEY ALTERNATE SHEAR KEY



GRID DETAIL



END DETAIL OF 1¼" ¢ BAR

NOTES:

Pallets: All Prestressed Units shall be cast on concrete floored pallets.

Finish: Tops of Prestressed Units to be rough floated, At approximately time of initial set, entire top of Prestressed Units shall be scrubbed transversely with coarse wire brush to remove laitance and to produce a rough surface.

Concrete: Concrete for Prestressed Units shall be Florida Class P.

Cylinder Strength: at transfer of tensioning load the cylinder strength of Concrete shall be 4000 p.s.i.

Side forms: Wood forms may be used for sides of Prestressed Units

Strand Extension: All Strands shall extend 2½" beyond ends of Prestressed Units.

Handling: In the handling of Prestressed Units they must be maintained in an upright position at all times and must be picked up at ends to prevent damage.

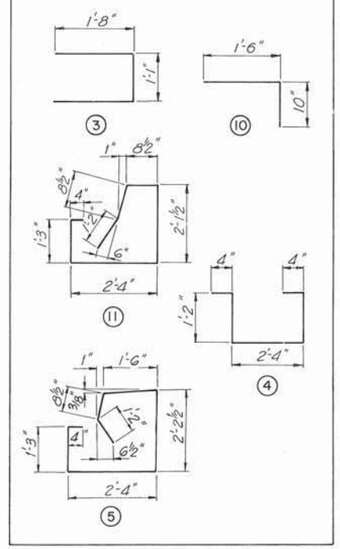
Live Load: HS 20-44

Shop Drawings: The Contractor shall submit shop drawings showing complete details of Slab Units including reinforcing steel to the Engineer for approval.

REINFORCING SCHEDULE

MARK	NUMBER UNIT A	NUMBER UNIT B	NUMBER UNIT C	LENGTH	TYPE
PS401	45	90	45	5'-4"	4
PS402	16	16	16	2'-4"	10
PS403	10	10	10	4'-5"	3
PS404	18	18	18	3'-8"	Str.
PS501			45	8'-8"	11
PS502	45			9'-6"	5

BAR BENDING DIAGRAMS



ISSUED
JUL 1 6 1971
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
Consulting Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY ORLANDO NEW YORK

TOWN OF BAY HARBOR ISLANDS

BROAD CAUSEWAY-WEST BRIDGE
PRESTRESSED SLAB DETAILS

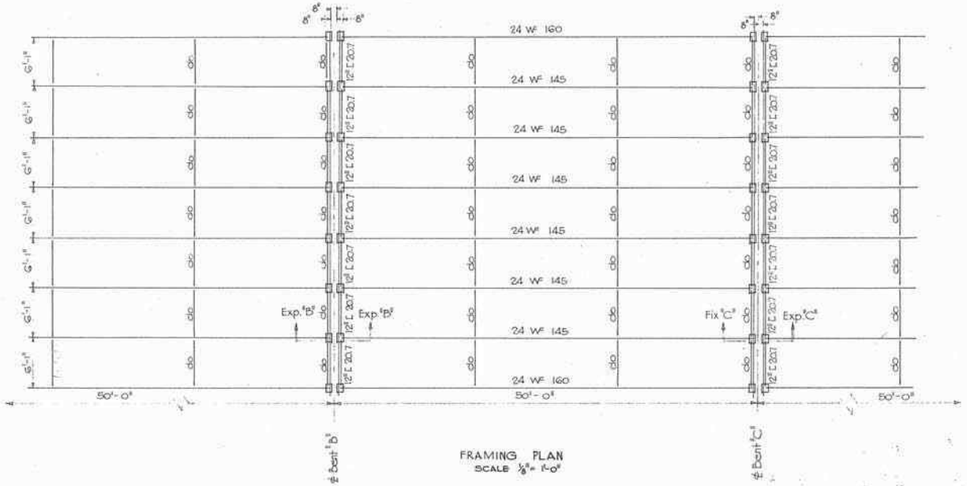
REVISIONS Dates	Descriptions	COUNTY	STATE
		DADE	FLORIDA

	Names	Dates
Detailed by	D.L.S.	3-69
Checked by	J.R.C.	5-69
Quantities by		
Checked by		
Traced by		

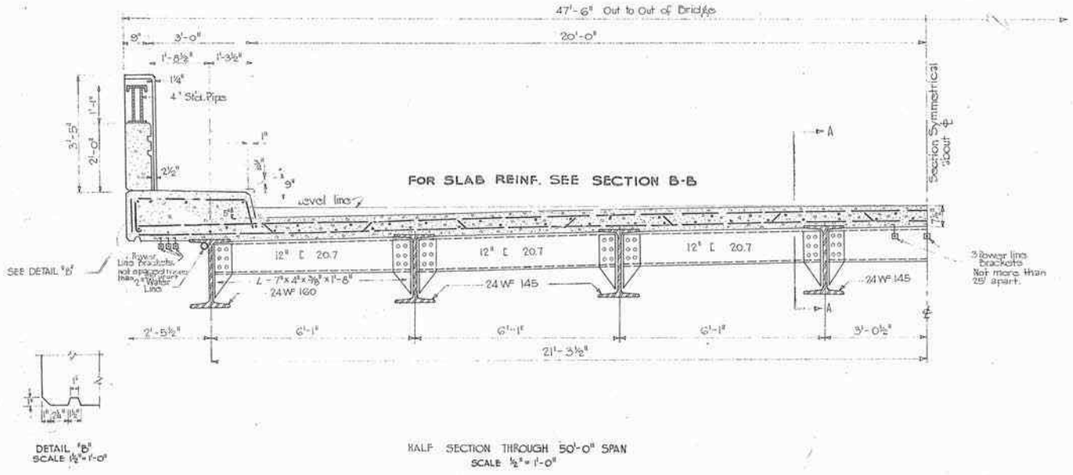
Date
Recommended for Approval H.N.T. & B.

Date
Approved Town of Bay Harbor Islands

Drawing No. 7 Index No.



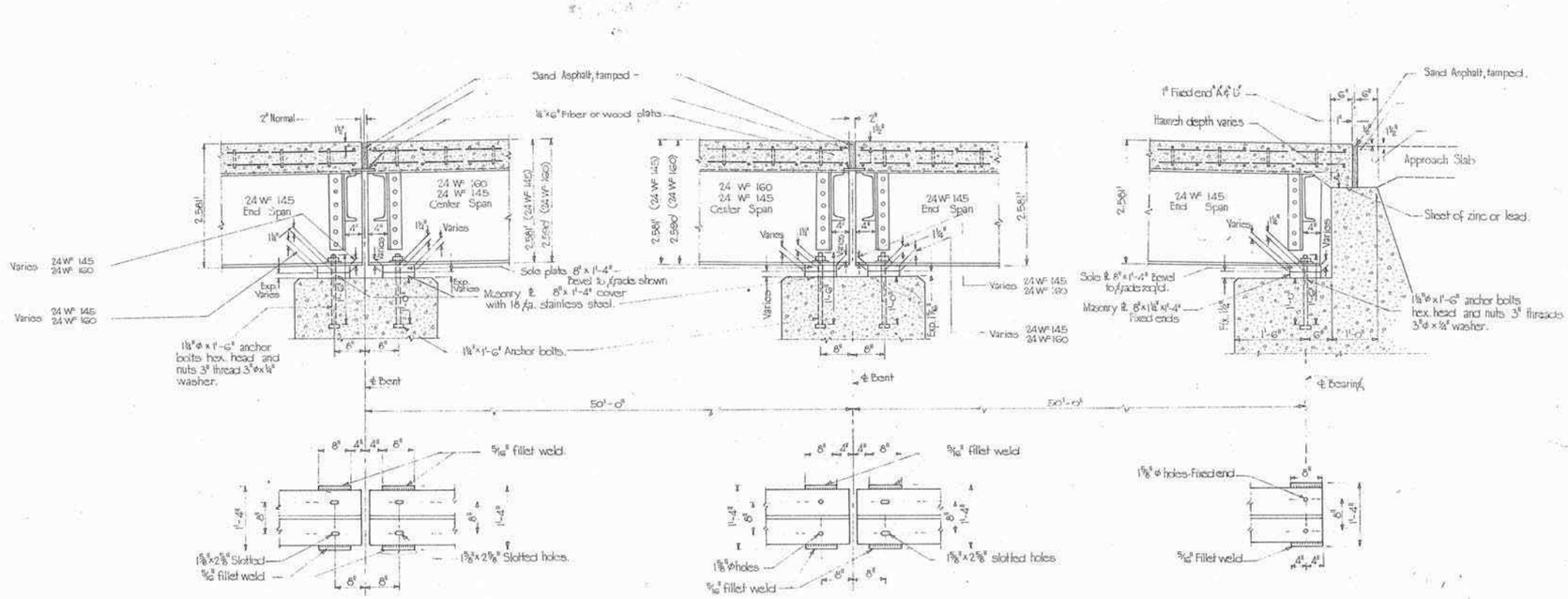
FRAMING PLAN
SCALE 1/8" = 1'-0"



HALF SECTION THROUGH 50'-0" SPAN
SCALE 1/2" = 1'-0"

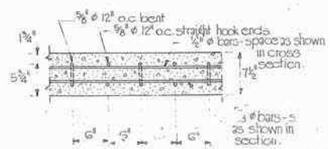


DETAIL "B"
SCALE 1/2" = 1'-0"

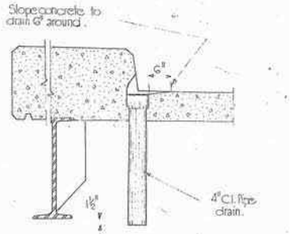


DETAIL "C" AT FIX. & EXP. BENT "C"
SCALE 3/4" = 1'-0"

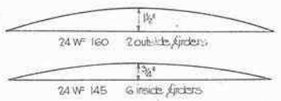
DETAIL AT ABUTMENTS
SCALE 3/4" = 1'-0"



SECTION A-A
SCALE 1" = 1'-0"

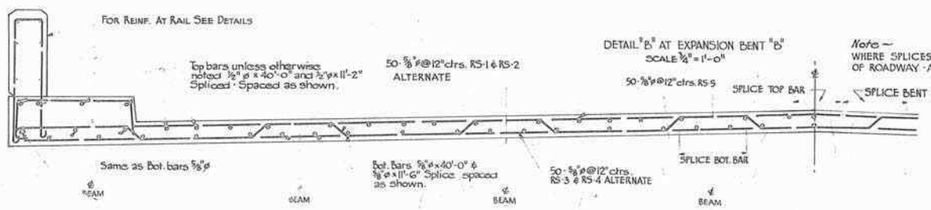


DETAIL OF DRAIN



CAMBER DIAGRAMS

Camber includes DL deflection and allowance for vertical curve, so that flanges will be parallel to vertical curve of roadway.



SECTION B-B

DETAIL "B" AT EXPANSION BENT "B"
SCALE 3/4" = 1'-0"
50 - 5/8"ø@12" ctrs. RS-5
SPLICE TOP BAR
SPLICE BENT BAR
SPLICE BOT. BAR

Note — WHERE SPLICES DO NOT FALL AT ℄ OF ROADWAY - ALTERNATE

NOTES

All structural steel in accordance with Florida State Road Dept. specifications April 1, 1947.
All concrete Class A in accordance with specifications.
All rivets 3/4"ø, holes 15/16" ø unless otherwise noted.
Billet steel bars for concrete reinforcement - intermed. grade deformed bars, in accordance - Fla. State Road Dept. Spec., April 1, 1947.

REV. FEB. 1951

SUPERSTRUCTURE
PLAN & DETAILS

BROAD CAUSEWAY VIADUCT

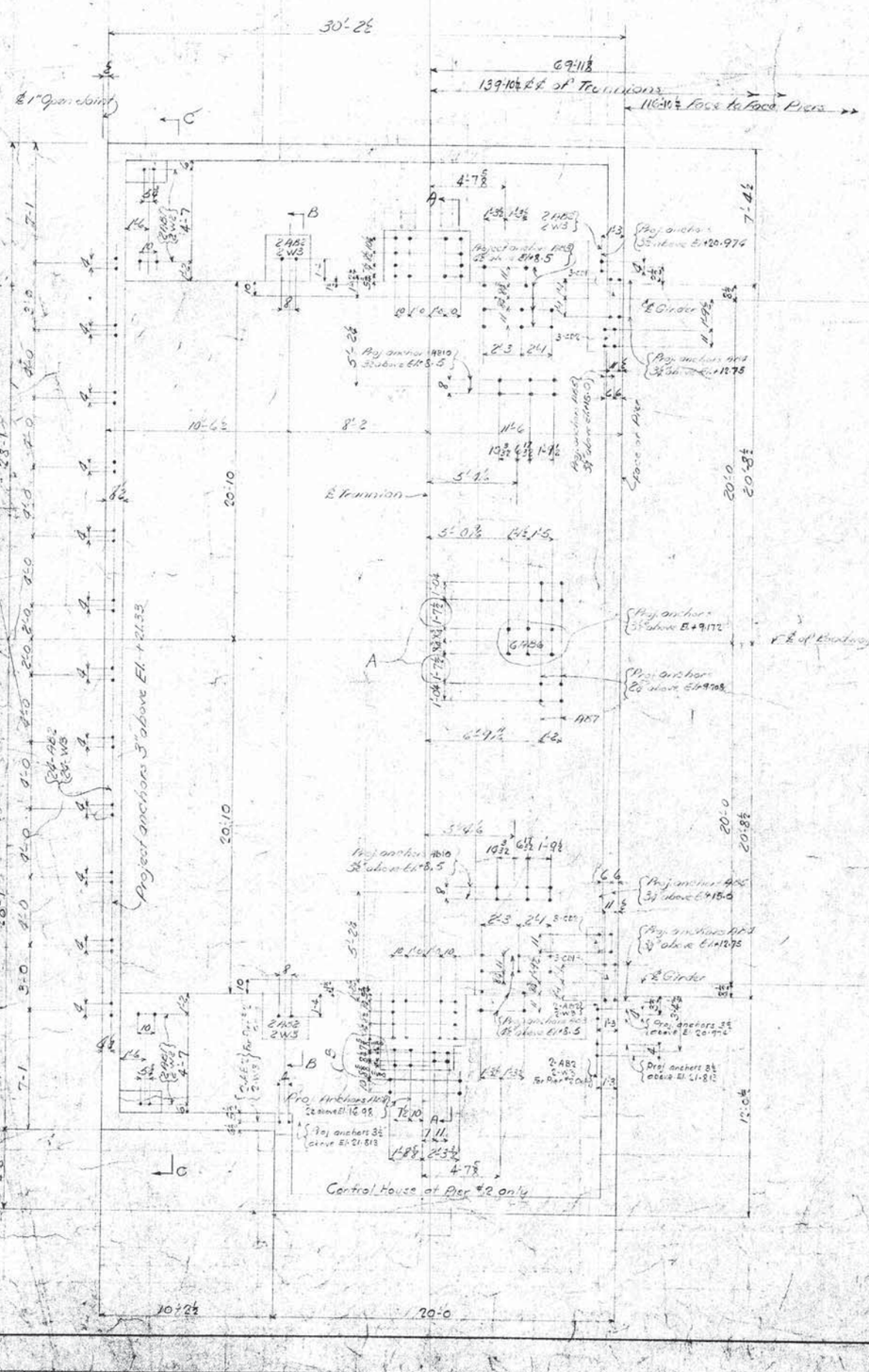
M.B. GARRIS CIVIL & CONSULTING ENGINEER
MIAMI - FLORIDA SEPT. 1950

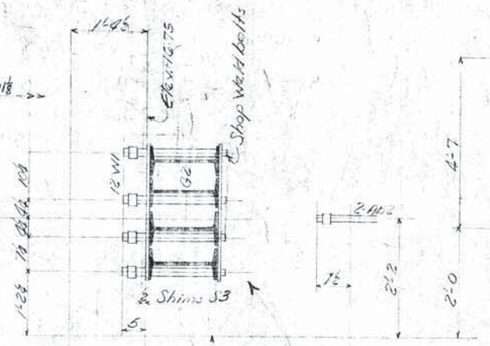
SCALE AS SHOWN SHEET 8 OF SHEETS

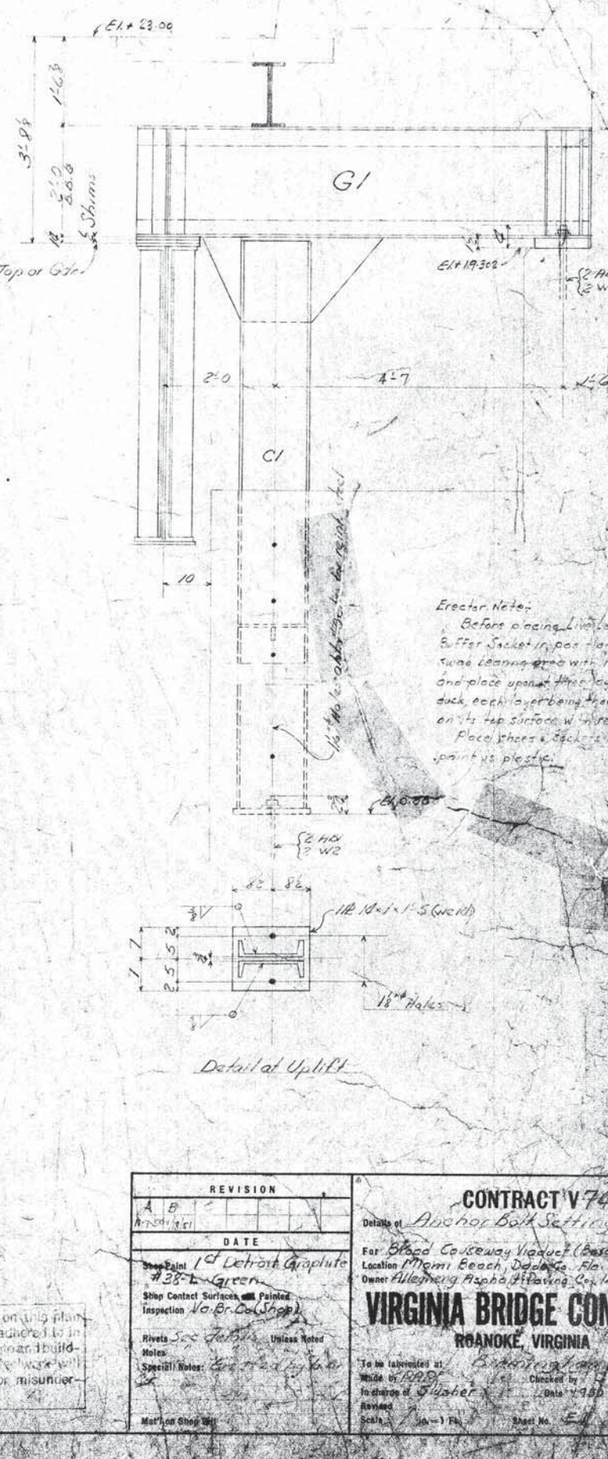
Bridge No. 875101

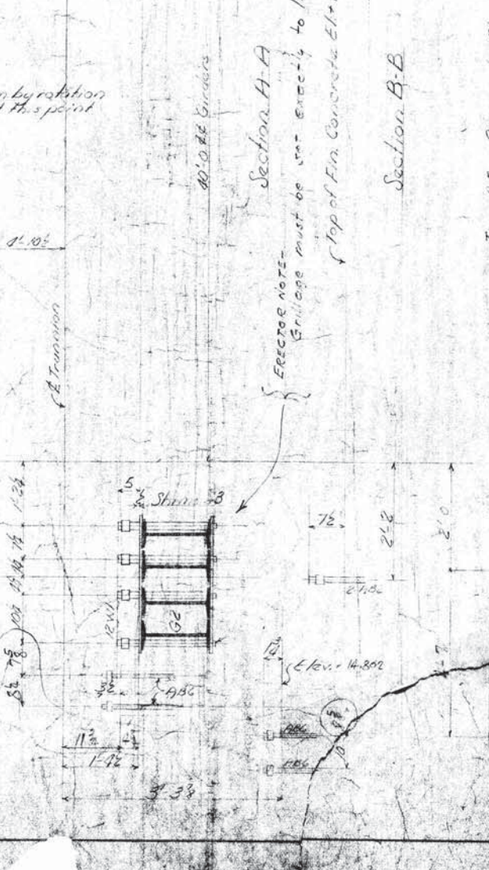
Anchor Bolt Setting Plan

Anchor Bolts furnished by V.B.Co. Set by others in accordance with this plan.









REVISION						
	A	B				
DATE	4-7-54	7-21				

Shop Paint 1st Detroit Graphite #38-L-1 Green.
Shop Contact Surfaces not Painted
Inspection Va. Br. Co. (Shop)
Rivets See Notes Unless Noted
Holes
Special Notes: See Notes
Material Shop Bill

CONTRACT V 7407
Details of Anchor Bolt Setting Plan
For Broad Causeway Viaduct (Bascule Span)
Location Miami Beach, Dade Co. Fla.
Owner Allegheny Asphalt Paving Co. Inc.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Engineering Dept.
Made in RADY Checked by B.P.P.
In charge of Shafer Date 7-1954
Revised
Scale 1/8"=1 Ft. Sheet No. E-4 of 87

DIVISION 1B

DIVISION 1A

Matchmark #3

Matchmark #4

℄ Trunnion

Face of Pier #1

℄ Bridge

"A"

PLAN OF EAST SPAN

For Machinery Supports see Dwg. # E4

Erector Note
- Erection marks painted on left-hand end of members as shown on detail drawing shall be erected in relative position indicated on the erection plans.

Typical Handrail Corner Post (For Piers)

Typical Handrail Base (For Piers)

Lead Sheets to be Rolled & Placed in Pier Holes Before Placing Leg Bolts.

Section "B-B"

℄ of Roadway

DIVISION 1B

Erector Note - For Handrail Bases See Typical Section this Dwg.

Face of Pier #1

℄ Open Joint

PLAN OF EAST SPAN AT PIER Nº 1

REVISION						
DATE						

Shop Paint / # 38-L Green / 1st Detroit Graphite

Shop Contact Surfaces ~~will~~ Painted.

Inspection Va. Bridge Co. (Shop)

Rivets Noted on details Unless Noted

Holes " " " "

Special Notes:
Field Conn.- Riveted
Erected- Va. Br. Co.

Mat'l on Shop Bill

CONTRACT V 7407

Details of Erection Plan (EAST SPAN)

For Broad Causeway Viaduct (Bascule Span)

Location Atlantic Beach, Duval Co., Fla.

Owner Atlantic Beach, Mayport Ferry, Wells & Paving Co. Inc.

VIRGINIA BRIDGE COMPANY

ROANOKE, VIRGINIA

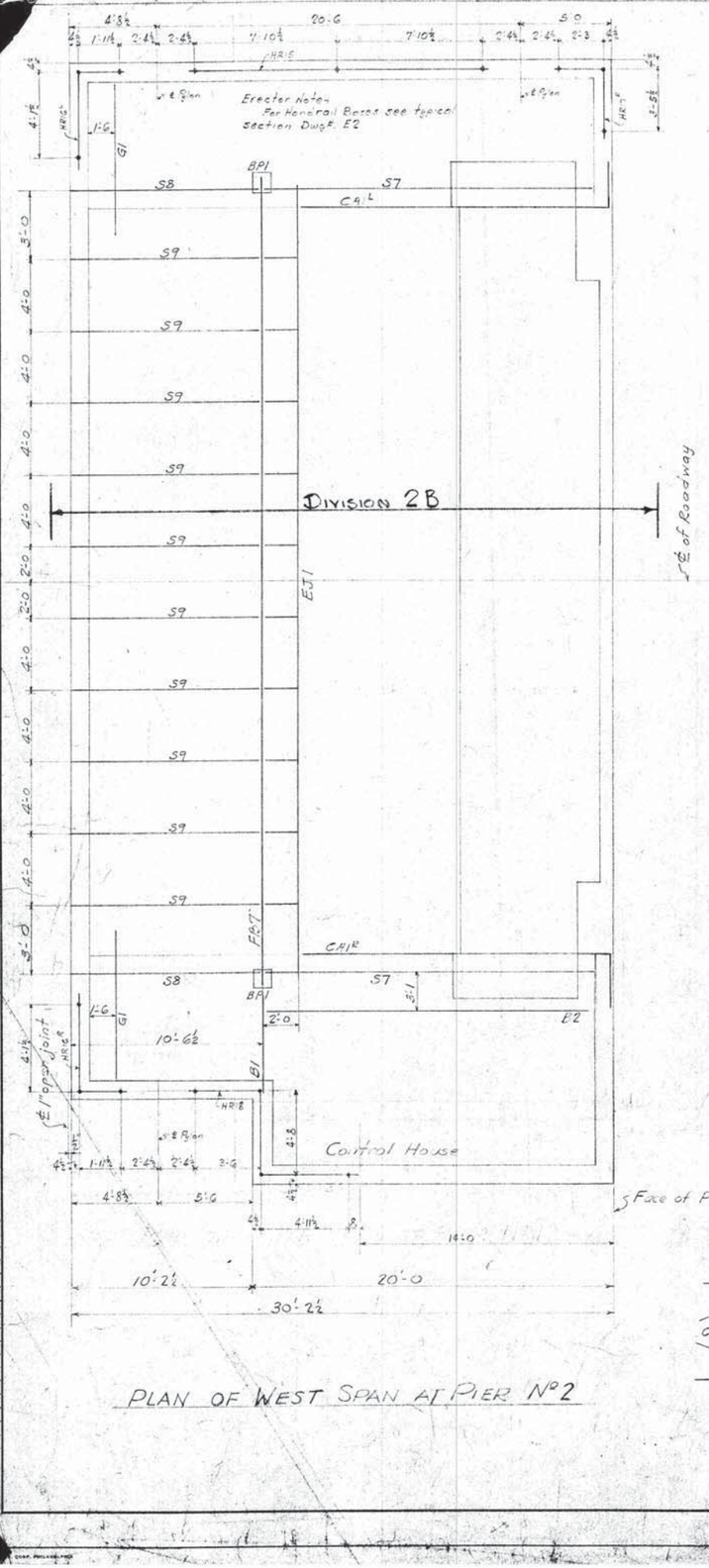
To be fabricated at Birmingham plant

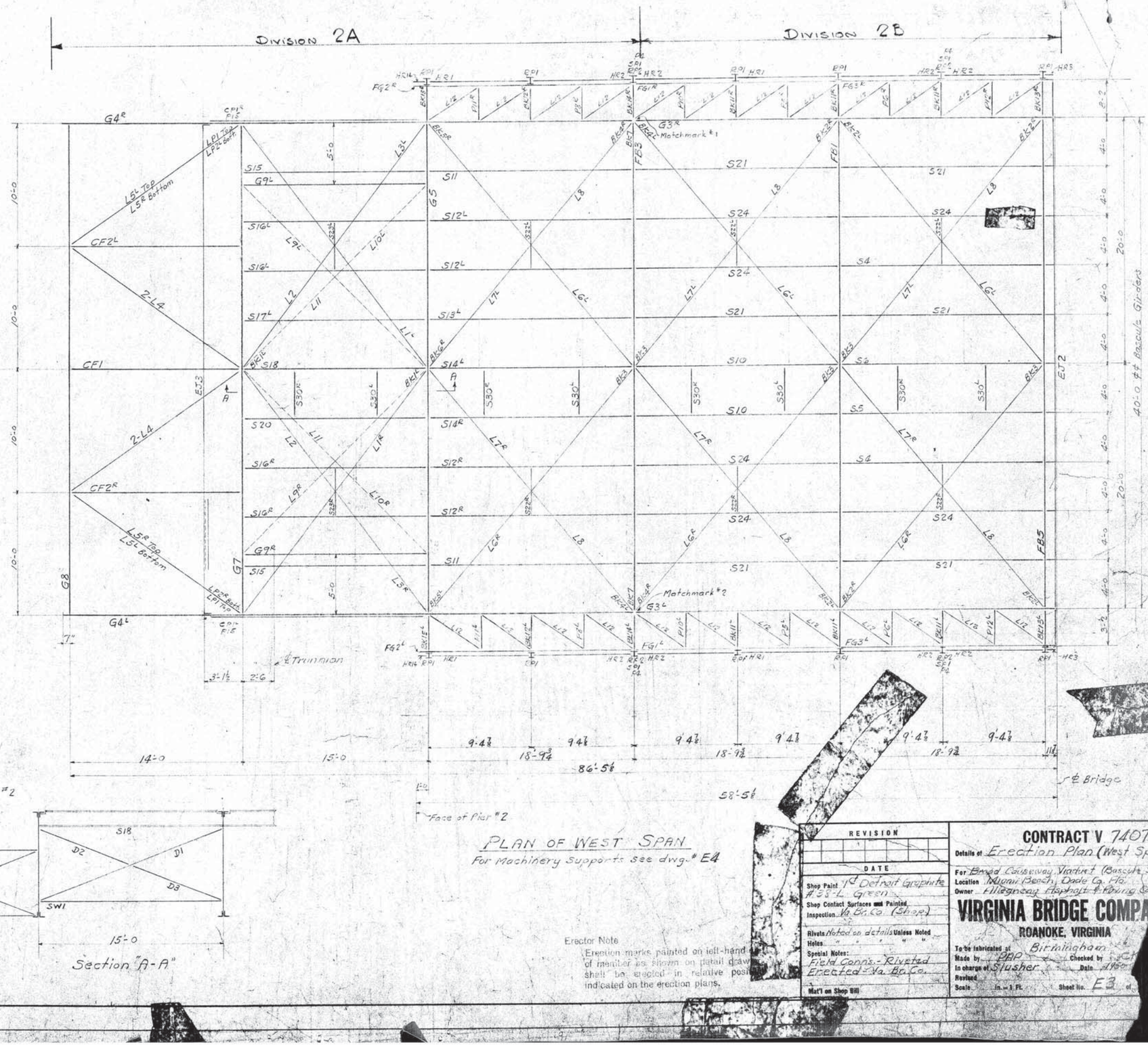
Made by [illegible] Checked by [illegible]

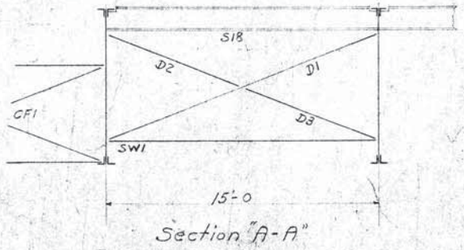
In charge of [illegible] Date 1950

Revised

Scale 1" = 1'-0" Sheet No. E2





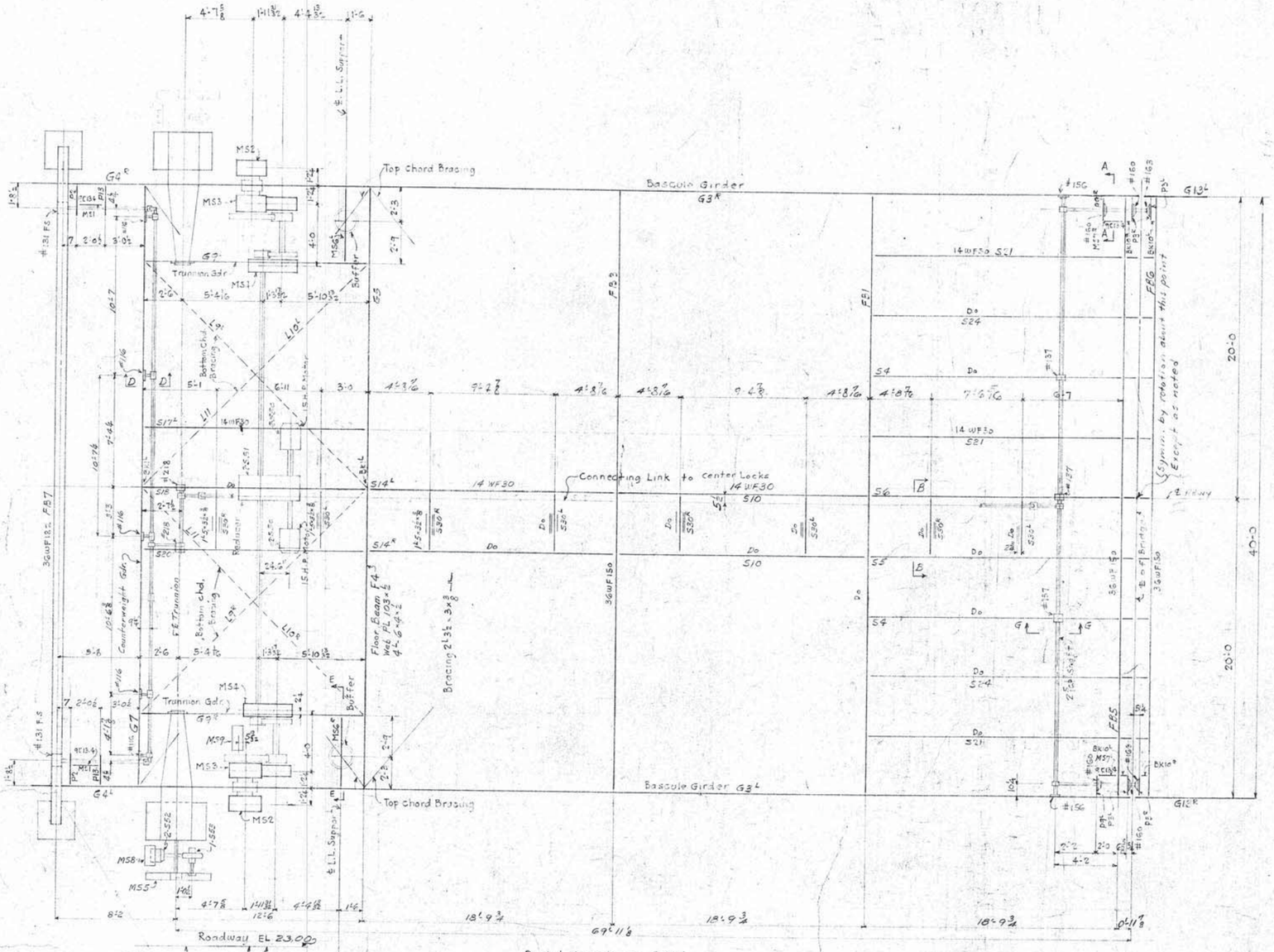


Erector Note
Erection marks painted on left-hand end of member as shown on detail drawings shall be erected in relative position indicated on the erection plans.

REVISION	DATE

Shop Paint 1st Detroit Graphite #33-L Green
Shop Contact Surfaces and Painted
Inspection Va. Bridge Co. (Shop)
Rivets Noted on details Unless Noted
Holes " " " "
Special Notes:
Field Conns.- Riveted
Erected - Va. Br. Co.
Mat'l on Shop Bill

CONTRACT V 7407
Details of Erection Plan (West Span)
For Broad Causeway Viaduct (Bascule Span)
Location Miami Beach, Dade Co. Fla.
Owner Hillsboro Asphalt & Paving Co.
VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA
To be fabricated at Birmingham
Made by PAP Checked by
In charge of Slusher Date 1950
Revised
Scale in. = 1 Ft. Sheet No. E3 of



PLAN OF WEST SPAN

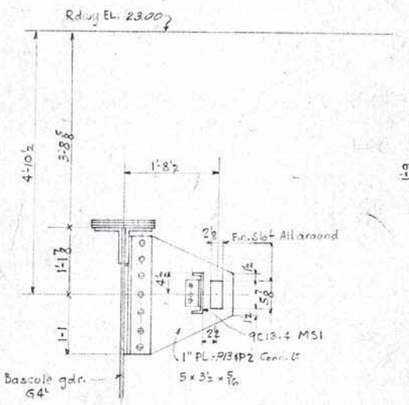
East Span same as West Span except omit Linkage to center Locks

SECT DD

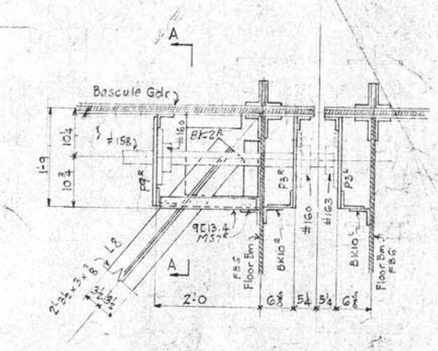
SIDE VIEW OF L.L. SUPPORT

SECT CC

SECT GG



TAIL LOCK SUPPORT MS1

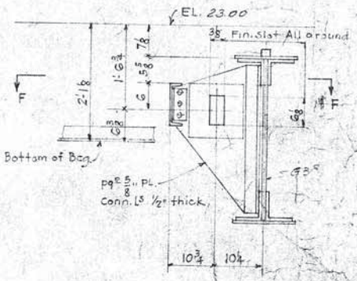


PLAN AT FF



SECT BB

(Typical for all 5 x 3 1/2 x 5/16 L)



SECT AA SHOWING SUPPORT MS7

GENERAL NOTES

Material O.H. Structural Carbon Steel
Spec. Fla. State Road Dept. 1941 and A.A.S.H.O. Std. Spec.
Rivets 3/4 Unless noted
Shop Paint as per spec.
Reaming as per Fla. State Road Dept's special provision
All Shims furnished by VBCo as shown on Earle Gear & Mch. Co. dwgs # 5519 E30 to 5525 E30 except as shown on this Design
For Sect EE, Mch. Supports MS2 to MS6 see sheet #2
Trunnion Gdr, Sway frame SW1 and anchorage for Reducer and 15 H.P. Motors see sheet #3

DESIGN A1347 Sheet #1 of 3

REVISION	DATE

Shop Paint 1st Detroit Graphite #38-L Green
Shop Contact Surfaces not Painted
Inspection Va. Bt. Co (Shop)
Rivets Ketchum Driven Unless Noted
Holes
Special Notes:

Mail on Shop Bill

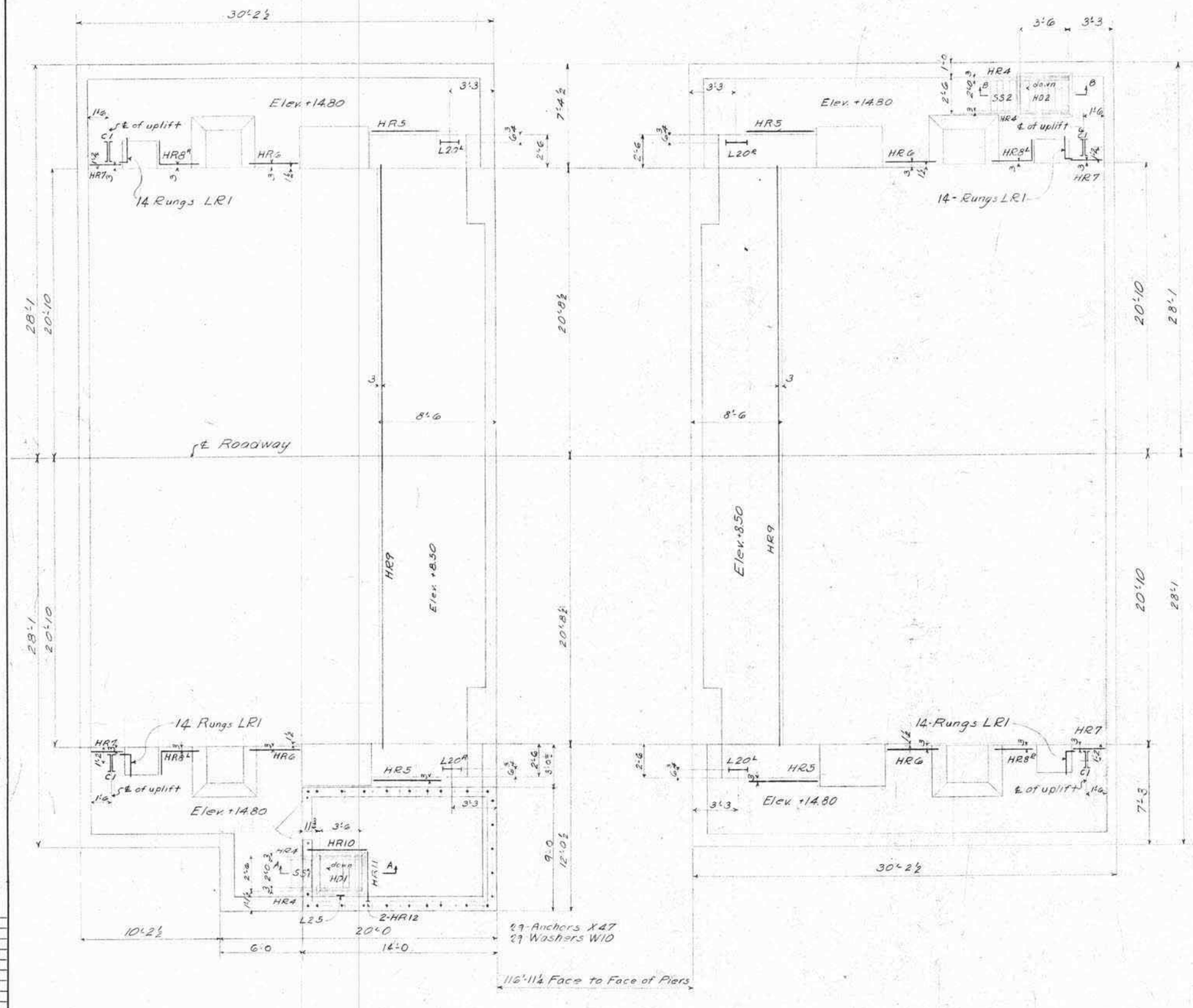
CONTRACT V 7407

Details of Machinery Supports

For Broad Causeway Viaduct Bascule Span
Location Miami Beach, Dade Co. Fla.
Owner Allegany Asphalt Paving Co. Inc.

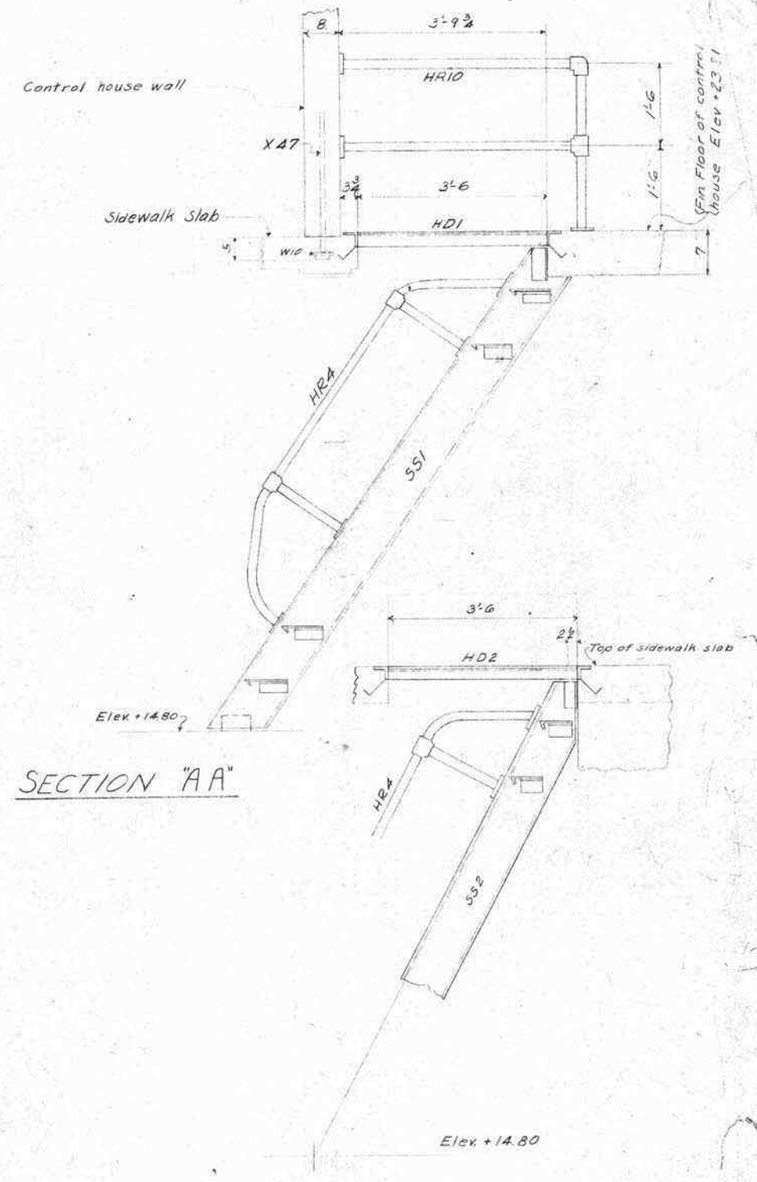
VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham Plant
Made by RST Checked by CKB
In charge of Stuart Date 1950
Revised
Scale 1 in. = 1 Ft. Sheet No. E4



PLAN OF PIER No. 2 BELOW ROADWAY

PLAN OF PIER No. 1 BELOW ROADWAY



SECTION "A A"

SECTION "B-B"

REVISION	DATE

Shop Paint 1 Ct Detroit Graphite #38-L Green
Shop Contact Surfaces ■ Painted
Inspection Va. Br. Co. (Shop)
Rivets See Details Unless Noted
Holes " " "
Special Notes: Field Conn's.-Riveted. Erected by V.B.CO.
Mat'l on Shop Bill

CONTRACT V 7407

Details of Erection Plan

For Brood Causeway Viaduct (Bascule Span)
Location Miami Beach, Dade Co., Fla.
Owner Allegheny Asphalt & Paving Co.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham plant
Made by F.W.W. Checked by C.K.L.
In charge of Slusher Date 1950
Revised
Scale ___ in. = 1 Ft. Sheet No. E5 of ___

PLATES	D	pc	b
BARS			
ANGLES			
TEES			
BENT PLATES			

2-MAIN GIRDERS

Pieces	Weight W	X	Y	+WX	-WX	+WY	-WY
2-Web ft 107-3/4-48-4⅜	16530	+7.54	0	125013			
4-ps	4079	+0.43	+0.08	1775		320	
4-pk	1452	-4.93	+2.75		5930	3960	
4-U4×6×5⅛ & 4-pd	1058	-4.59	+1.39		4776	1466	
2-Cover Pl 16×1⅛ & 2-16×⅝	1075	-7.96	+1.19		8557	1280	
8-L 5×3½×⅜	4588	-9.31	-1.58		42749		7526
6-bf, 4-fg, 2-fy, 2-fp	255	-6.28	+2.88		1601	736	
2-bk, 2-ak, 2-al	146	-9.59	-1.43		1400		226
4-fm, 4-dm, 4-dp	1096	-16.51	-1.55		18095		1760
6-dh, 2-dk, 2-ar, 2-bl, 2-fk	516	-9.11	-1.33		4701		715
2-fc, 2-ff, 2-dal, 4-dk	813	-2.48	-1.55		2016		1260
2-dn, 4-dm	234	-2.47	+2.78		573	650	
8-dd, 8-fd	710	0	+0.07	1770		50	
4-dk	892	+6.04	+0.01			8	
5-dl, 6-dc, 4-dm, 2-fl, 2-fj	2010	+11.00	+0.08	22110		160	
4-fa, 4-fb	1456	+11.00	+0.03	16396		46	
2-an, 2-al, 2-dm, 2-dp	1535	+12.63	0	19376			
2-fn, 2-fx, 4-ff	490	+12.00	+0.05	6018		35	
4-fn, 2-fn, 6-fn, 4-fp	875	+21.58	+0.74	18883		645	
2-del, 2-dl, 2-dkh	833	+31.28	+1.47	10873		490	
2-ao, 2-ap	1017	+31.59	+1.61	31832		1515	
4-ast, 4-dt, 2-dv, 2-ft	415	+37.84	+1.81	17980		830	
4-dt, 4-dx	271	+44.49	+2.25	12373		620	
bar, and as 3rd fal	338	+50.11	+2.51	16926		845	
dt, dbv, dba, dbb, fu	379	+56.76	+2.65	21506		1000	
dba, dbb, dbs, dbw	971	+56.45	+3.83	54655		1050	
faa, fab, fat, ffv	331	+62.12	+1.85	12678		355	
Top Cord 6 Cover Pls	7320	+31.08	+6.17	234826		30520	
2-Web Pls 107-3/4×48-⅜	5586	+46.13	+2.31	257744		12210	
Bottom Cord 6-6×6×⅝×10'-0	3747	+50.55	+0.61	189411		2285	
" " Splice 17⅛	2677	+7.00	-4.08	18729			10790
4-an, 8 Splice	370	+15.73	-3.76	6138			1460
2-fah, fam, faq, fak	103	+16.73	-3.16	1672			325
2-2an, 6 2-ba, 2-bd	1368	+13.21	+4.41	18071		6070	
2-ay, 6 2-ba, 2-bb, 2-bf	1457	+50.59	+4.44	73710		6465	
2-Top Cen Pl 14×⅜×35-5⅜	2755	+32.12	+4.30	88491		11845	
2- " " ×46-7	1791	+17.60	+4.33	31540		7745	
2- " " ×49-6½	1083	-9.16	+4.36	9893		4705	
2- " " ×5-5⅝×59	197	+31.31	+4.50	6231		865	
2-Fills ffa	82	+26.25	+4.35	2153		355	
2- " ffs	103	+37.27	+4.36	3841		535	
2- " fff	1081	+55.42	+4.38	59938		4775	
2-Bolsters 14×⅜×37⅞	3178	+26.10	-1.82	83468			5830
2- " " ×56-13	1830	+16.36	-2.96	29939			5420
2- " " ×31-0	1130	+8.74	-3.73	9876			4215
2-fs ak	202	+31.31	-1.38	6325			280
4-fs ad	617	+31.31	+4.38	19318		2515	
4-fs 5×⅝	642	+31.31	-1.99	20101			700
2-Shims 14×⅜×10-8	195	-0.41	-4.37		80		850
2- " " ×1-0	37	+11.99	-4.31	407			160
Rivet heads	1540	+22.11	+1.02	34047		1870	
Total - 2 Girders	89511			1594420	92372	108040	45040
2 Rack Castgs #41	6100	- 0.33	- 5.34		2018		32880
2 Trunnion Collars #19	400	0	0				
Total - 2 Girders	89911			1594420	94390	108040	77920

OTHER STEEL

Pieces	Weight W	X	Y	+WX	-WX	+WY	-WY
1-FB1	6182	+50.15	+2.99	309842		17925	
1-FB3	6167	+31.31	+2.80	193059		17380	
2-BK1	343	+31.31	+0.49	10896		200	
54-5-6-10-21-24	16349	+50.31	+3.88	520205		40420	
1-F85	5900	+48.94	+3.88	406746		16990	
1-G5	12650	+12.50	+0.07	158125		885	
511-12-13-14	6830	+21.91	+3.83	127735		22420	
5-5-16-7-18-20	19100	+5.00	+3.83	20500		15705	
G7	17000	-2.50	0		42500		
2-G9	18630	+3.75	-0.10	32288			870
Bracket on 518	4300	+3.00	+2.79	2100		1170	
511	530	+5.00	-3.71	2650			1435
D1, D2 + D3	500	+5.00	-0.04	2500			20
G8	12120	+16.50	-1.55		199980		18785
L1, 2, 3	1700	+5.00	+3.88	8550		4925	
P13	400	5.54	0		2216		
P2	260	-7.58	0		1971		
CF1	1700	-9.50	-1.55		16150		2635
CF2	3000	-9.50	-1.55		28500		4650
L4, 5	4350	-9.50	-1.55		41325		6745
M26	460	11.00	+2.17	9900		1950	
L6, 7, 8	5000	+40.72	+2.38	203600		14400	
L9, 10, 11 & BK1	1570	+5.00	-2.81	7850			4410
LP1-3	290	-3.75	-1.55		1088		450
BK2-5-4-3-6	1140	+40.72	+2.33	46421		2689	
S22	305	+40.72	+3.75	12400		1145	
S23	105	+5.00	+3.75	525		395	
L12	600	+40.72	+4.29	24433		2575	
M21	74	- 6.54	0		492		
P3	260	+67.53	+3.06	18078		795	
BK1-12-13-14-15	4030	+40.65	+3.90	163820		15715	
FG1-2-3	4350	+40.58	+4.94	176523		21490	
PS-6-8-10-11-12	8600	+40.31	+5.44	346838		46785	
HR1-2-3-14	3163	+40.58	+7.59	128333		23985	
RP1-2	1465	+40.21	+5.52	59069		8100	
4-SP1 & FG	130	+45.43	+7.33	33157		5350	
4-Flood Light & HDG	536	+45.62	+7.68	24434		4113	
EU2	1040	+61.67	+3.96	72457		4118	
EU3	710	- 5.20	+4.77		3905	3385	
CP1R & P15	1500	+3.37	+5.12	5058		7680	
Total	138564				338037	303120	40000
Reinforcing Rods in Conc	3565	- 9.78	- 1.00		34960	3357	8150
Total	142128			3138750	377377	306477	48150

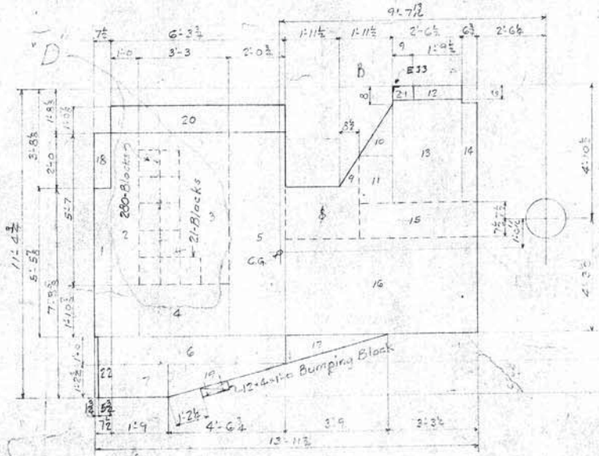
FLOOR & MACHINERY

Pieces	Weight W	X	Y	+WX	-WX	+WY	-WY
Flooring - Unit A	44660	+4.71	+4.65	210000		207390	
" B	41840	+60.72	+4.65	1742775		194555	
" C	690	+69.40	+4.65	47885		3210	
Buffers	2800	+11.90	- 0.37	33350			2635
Live Load Plates	180	+11.90	- 4.44	1785			800
Trunnions	12600	0	0				
End Lock Mach.	1080	- 1.83	- 2.96		1978		1035
" Bars	290	- 6.80	0		1885		
Center Lock Castgs	120	+61.67	+3.31	8165		3495	
Total	104260			2007735	3863	405545	4270
Center Lock Machy for One Leaf only:							
Lock Bar & Castg	640	+67.92	+3.31	43465		2120	
End Shaft	870	+64.77	+2.35	56350		2065	
Line "	450	+32.39	+3.31	14575		1470	
Links to Shaft	220	+ 1.00	+ 1.00		220	220	
(2-500 (Struts)	400	+31.82	+5.75	12728		1500	
Total (one Leaf Only)	2580			126798	220	7375	
Total with Center Lock	106780			2129530	4080	412926	4270

NET CONCRETE IN COUNTERWEIGHT

Item	Volume	- X	Y	-YX	+YY	-YY
Displaced Concrete By Main Girders	8.96	9.72	-1.55	87		14
" "	3.15	4.00	+2.78	13	9	
G7	7.73	2.53	0	20		
G8	6.05	16.42	-1.55	99		9
CF1	3.20	9.50	-1.55	30		4
CF2	5.71	9.50	-1.55	54		9
L4	3.01	9.59	-1.55	29		5
L5	5.01	9.08	-1.55	45		8
Ed3	1.80	5.43	+3.91	10	9	
Reinforcing Rods	1.28	62.50	-1.00	80	7	17
Total Displaced	52.80			478	25	66
Gross Concrete	4427			42060	2189	7001
Less Total above	52			470	25	66
Net Concrete	4375			41590	2164	6935

	Weight W	- WX	+WY	- WY
Net Concrete at 146# per cu ft =	638750	6072230	316000	1012500
Total Counterweight				

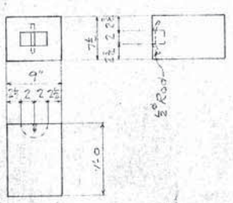


GENERAL OUTLINE OF COUNTERWEIGHT
For Size and Location of Reinforcing Bars See dwg. E7
Unit weight of Concrete 146 lbs. per cu. ft.
8750 cu. ft. of Concrete Reqd for Two Counterweights.

BALANCE BLOCKS

Blocks	Weight W	- X	Y	-WX	+WY	-WY
280 Blocks @ 70#	19500	14.13	+0.11	274360	2156	
21 "	1470	12.98	-1.87	19089		2778
301 Blocks - Total	21070			295440	2156	2778

366 Concrete Balance Blocks Reqd (Net)



Detail of Concrete Balance Block
Weight 70#

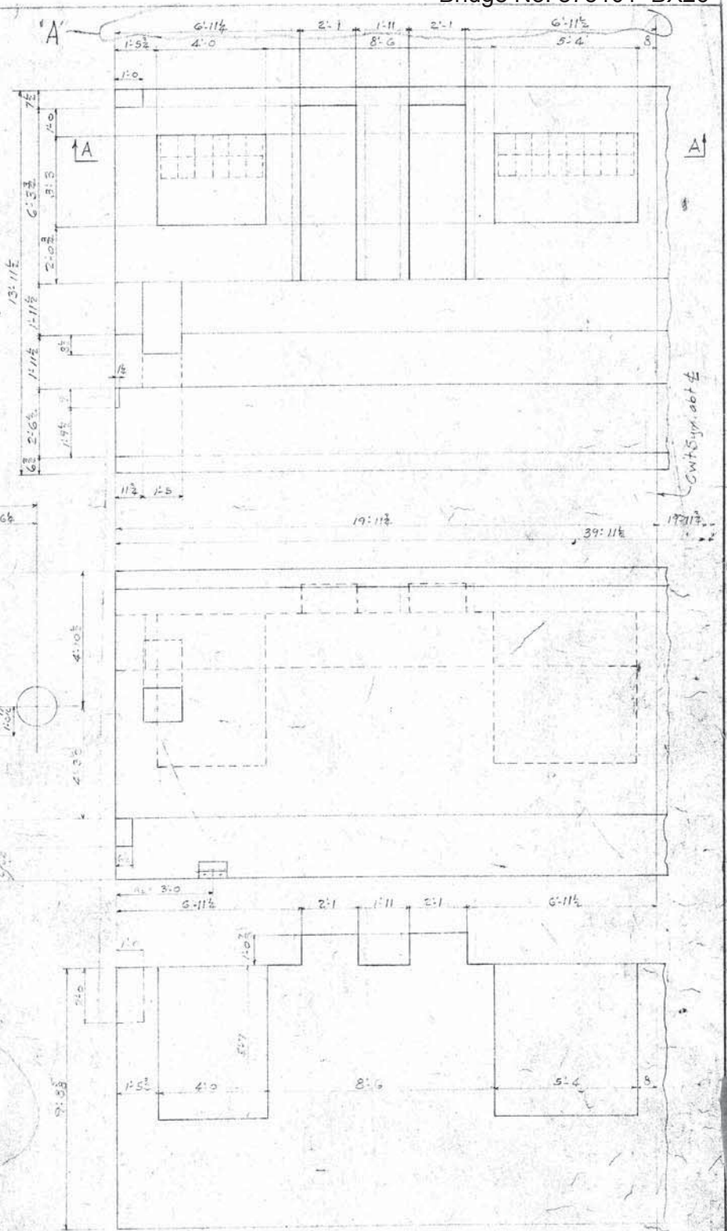
GROSS CONCRETE IN COUNTERWEIGHT

Sect	Dimensions	Area	Length	Volume	-X	Y	-YX	+YY	-YY
1	0.63×5.69	3.45	39.96	137.86	16.17	-1.55	2229		244
2	1.0×7.21	7.09	39.96	283.3	5.55	-2.85	1572		85
3	3.25×5.55	18.11	21.29	386.20	13.03	+0.41	5034	185	
4	3.25×1.91	6.21	21.29	132.18	13.22	-2.34	3283		309
5	2.06×7.49	15.43	39.96	616.58	10.51	-0.55	6481		339
6	6.3×1.0	6.31	39.96	252.15	13.70	+4.79	3454		1208
7	1.75×12.3	2.15	39.96	85.94	-4.77	-5.41	-1786		1157
8	2.27×1.88	4.26	39.96	170.25	8.21	+0.02	1398	85	
9	0.92×1.08	0.73	39.96	29.17	5.55	-2.58	162	101	
10	0.63×1.12	1.23	39.96	49.16	6.09	+2.92	299	180	
11	1.25×1.62	2.08	39.96	83.17	6.25	+1.46	520	121	
12	1.79×0.50	0.89	39.96	35.56	8.27	+4.46	294	160	
13	2.50×3.75	9.63	39.96	384.77	4.58	+2.50	1762	962	
14	0.38×3.63	2.00	39.96	79.92	2.56	+2.50	205	200	
15	4.25×1.25	5.46	39.96	218.19	4.70	-2.44	1026		2682
16	7.05×3.67	15.24	39.96	608.93	6.37	-2.44	3878		3654
17	1.85×1.00	1.83	38.85	71.08	13.27	-2.58	943		
18	0.63×2.60	1.20	37.74	47.82	16.17	+2.79	773	185	
19	4.25×1.25	2.56	21.66	111.10	17.23	-2.79	1907		639
20	6.31×1.67	6.75	8.32	56.46	19.20	+3.73	718	209	
21	4.75×.8	3.8	39.75	151.05	19.20	-2.82	2900	720	
22	4.63×2.63	6.07	39.96	242.5	6.69	-5.21	-1626		231
Total				4492.95			42060	2189	7001

Above Moments are for Leaf with Center Lock.
For Other Leaf, moment along X is reduced by 1265 sq ft lbs
which requires 130 less Balance Blocks in pockets of Counterweight.

SUMMARY OF MOMENTS ABOUT TRUNNION

Table	Weight W	+WX	-WX	+WY	-WY
Main Girders	89511	1586420	94990	108040	77920
Other Steel	142128	3138250	387400	306677	48150
Floor & Machy	106780	2129530	4080	412925	4270
Counterweight	638750		6072230	316000	1012500
Balance Blocks	21070		295440	2156	2778
Total	997739	6854200	6864200	1145778	1145618



REVISION							
	A	B	D				
DATE	6/15/51	9/42	7/30				

Shop Paint
Shop Contact Surfaces not Painted
Inspection
Rivets ... Unless Noted
Holes " "
Special Notes:

Mail no Shop Bill

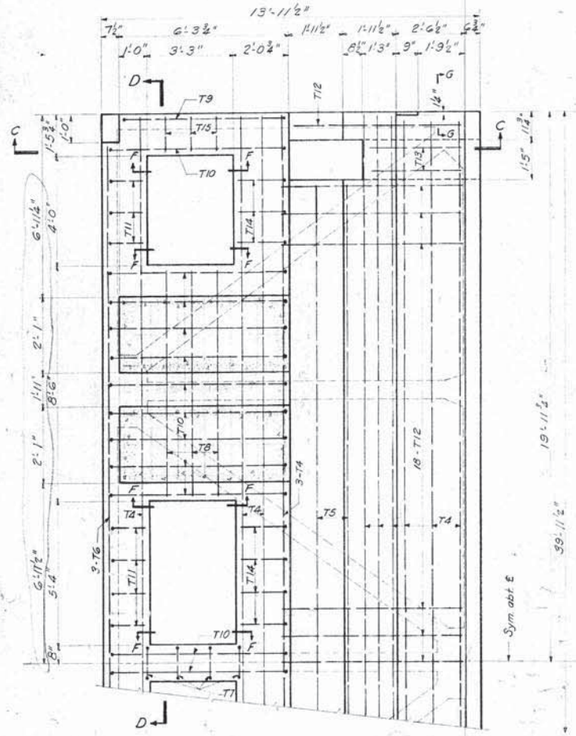
CONTRACT V 7407

Details of Counterweight

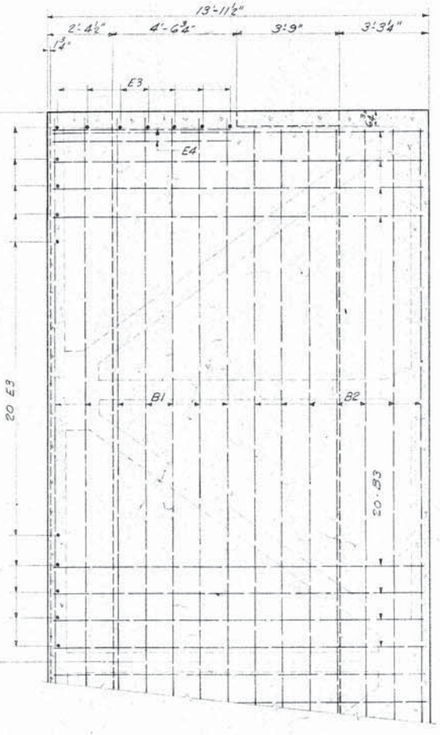
For Broad Causeway Viaduct (Bascule Span)
Location Miami Beach, Dade Co. Fla.
Owner Allegheny Asphalt & Paving Co. Inc.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

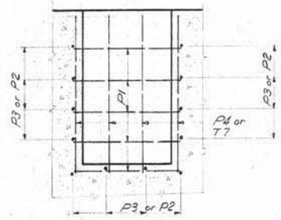
To be fabricated at Site plans
Made by W.C.B. 9/13/51 Checked by K.
In charge of Slusher Date 11/51
Revised
Scale In. = 1 Ft. Sheet No. E6 of



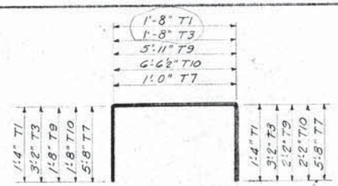
PLAN A-A



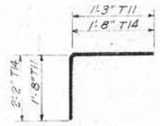
SECTION B-B



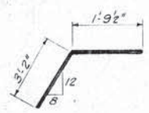
SECTION F-F



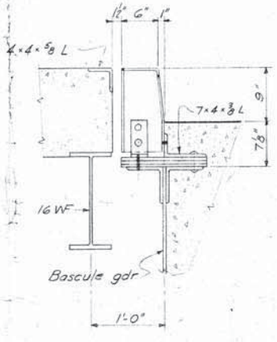
BARS T1, T3, T7, T9, & T10



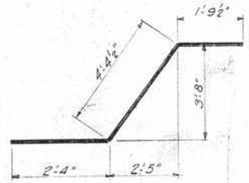
BARS T11 & T14



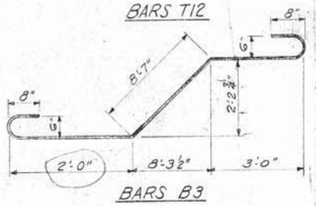
BARS T13



SECTION G-G



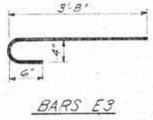
BARS T12



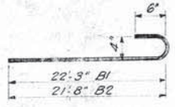
BARS B3

REINFORCING STEEL FOR TWO COUNTERWEIGHTS						
LOCATION	MARK	NO. REQ'D	SIZE	LENGTH	WEIGHT	REMARKS
Top	T1	48	½"ϕ	1'-4"	145	See detail
"	T2	24	"	5'-11"	95	Straight
"	T3	8	"	8'-0"	45	See detail
"	T4	48	"	21'-6"	690	Straight
"	T5	8	"	19'-6"	105	"
"	T6	12	"	21'-0"	170	"
"	T7	8	"	12'-4"	70	See detail
"	T8	12	"	8'-0"	65	Straight
"	T9	4	"	9'-9"	25	See detail
"	T10	44	"	10'-4½"	300	"
"	T11	28	"	2'-11"	55	"
"	T12	74	"	8'-6"	420	"
"	T13	8	"	4'-11½"	30	"
"	T14	28	"	3'-10"	70	"
"	T15	12	"	1'-2"	10	Straight
End-Sines	E1	80	½"ϕ	5'-2"	280	Straight
"	E2	32	"	21'-6"	460	"
"	E3	104	"	4'-4½"	300	See detail
"	E4	8	"	6'-4"	35	Straight
"	E5	8	"	5'-11"	30	"
"	E6	20	"	1'-8"	20	"
Bottom	B1	28	½"ϕ	22'-11"	430	See detail
"	B2	28	"	22'-4"	420	" "
"	B3	80	½"ϕ	15'-5½"	1860	" "
Pockets	P1	104	½"ϕ	4'-0"	280	Straight
"	P2	48	"	4'-9"	155	"
"	P3	48	"	6'-1"	195	"
"	P4	104	"	5'-8"	395	"
Total		1058			7155	

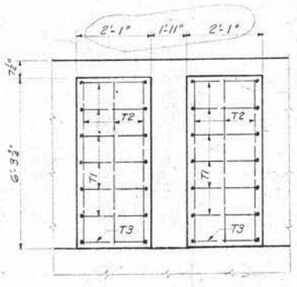
GENERAL NOTES:
See dwg. E6 for unit weight of concrete, center of gravity computations, balance blocks, etc;
Bars to be at least 2" cover from face of conc.
All reinforcing bars to be spaced approx. 12" ctrs.



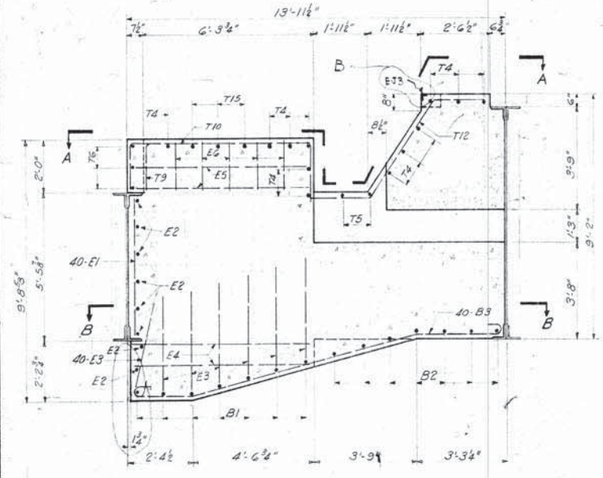
BARS E3



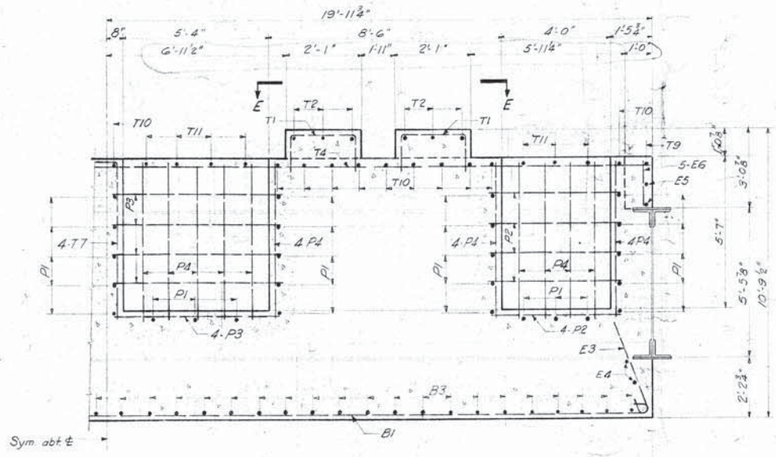
BARS B1 & B2



PLAN E-E



SECTION C-C



SECTION D-D

Inq. No. 50783 DESIGN A1466 Sheet 3 of 3

REVISION							
A	B						
4/18/56	4/23						

DATE

Shop Paint

Shop Contact Surfaces not Painted

Inspection

Rivets ... Unless Noted
Holes ... " "
Special Notes:

Mat'l on Shop Bill

Rev A as Rung up ○

CONTRACT V 7407

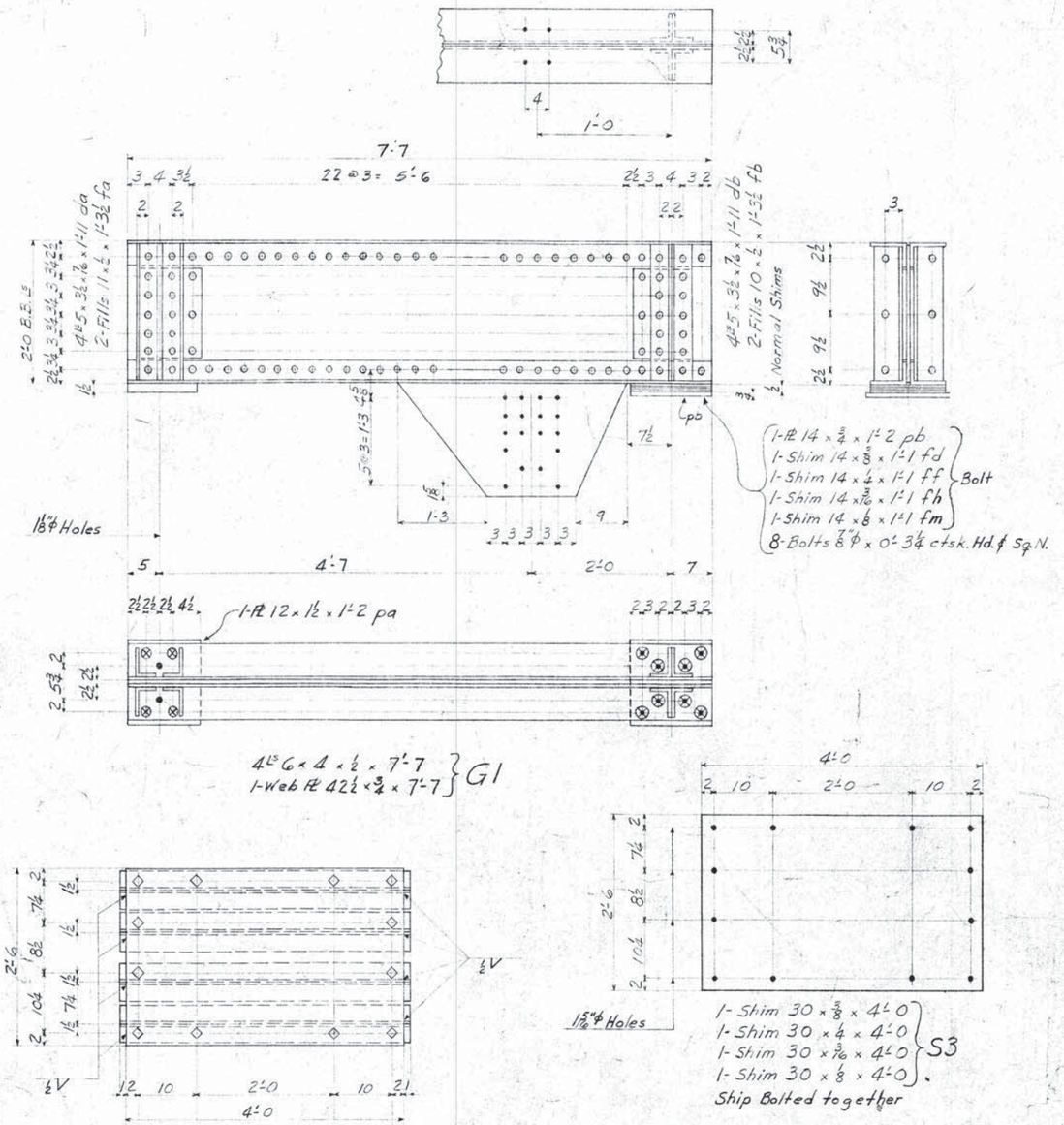
Details of Counterweight

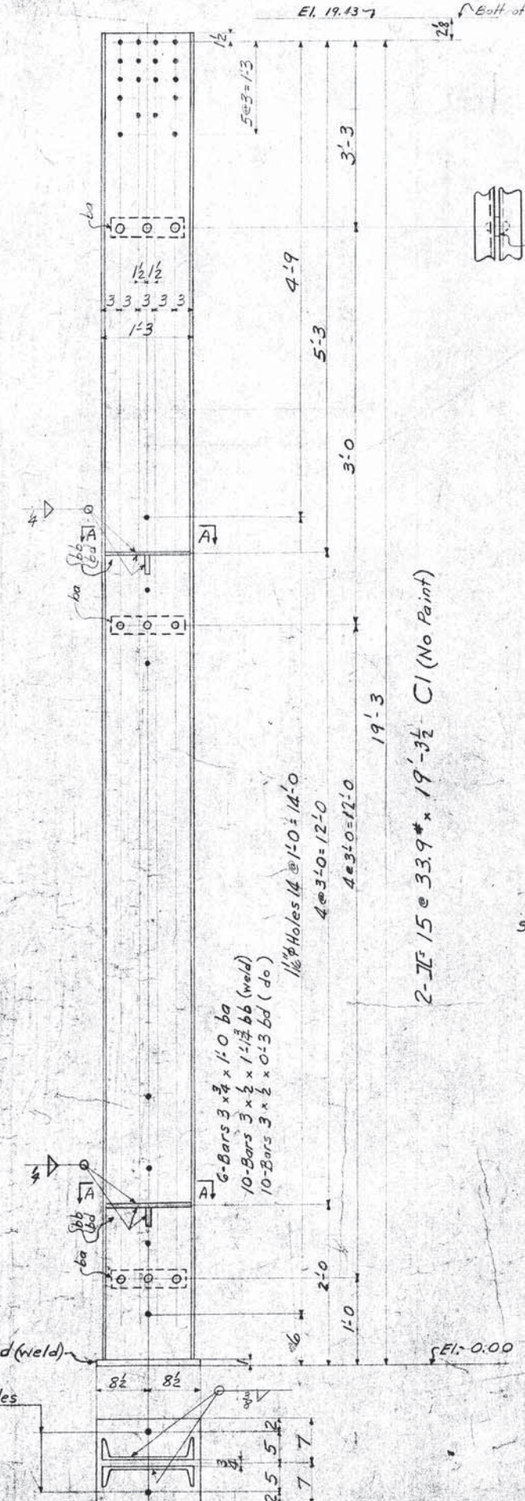
For Broad Causeway Viaduct over Biscayne Bay
Location Miami Beach, Dade Co., Fla.
Owner Allegheny Asphalt and Paving Co.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Site plant
Made by G.E.D. Checked by RO
In charge of Flusher Date 8-30-51
Revised
Scale 1" = 1 Ft. Sheet No. E7 of E7

G.E.D.





Req'd. List

	Make	Description	Mark
Advance Shipment	4	Girders	G1
	4	Columns	C1
	4	Grillages	G2
	4	Sets Shims	S3
	48	Washers 3" x ¼" Thk. x 1 9/16" hole	W1
	16	Washers 2½" x ¼" Thk. x 1 9/16" hole	W2
	68	Washers 2" x ¼" Thk. x 1 3/16" hole	W3

Reaming Note
General reaming is required. All holes for field connections to be subpunched 4" small and reamed to size in field.

REVISION	DATE

Shop Paint 1st Detroit Graphite #38-L Green.
Shop Contact Surfaces ~~Not~~ Painted
Inspection Va. Br. Co. (Shop)
Rivets ⅞ Unless Noted
Holes 1 "
Special Notes:
Mat'l on Shop Bill 142

CONTRACT V-7407
Details of Uplift Material & Grillages
For Broad Causeway Viaduct (Bascule Span)
Location Miami Beach, Dade Co. Fla.
Owner Allegheny Asphalt Paving Co. Inc.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham
Made by PAP Checked by C&B
In charge of Slusher Date 1/15/57
Revised
Scale 1" = 1'-0" Sheet No. 1 of 2

1-Sil. Cov. PL 14×½×15-6½ | 1-Sil. Cov. PL 14×½×6-11½ | Slot cov. pls. for web 6-0½ | 1-Sil. PL ½×½×5-11½ pd | ⅞" Φ rivets - 15/16" Φ holes

Sect. @ A

1-Bar 2½×⅝×20-0 ba. weld

1-L 7×4×⅝×36-2⅛ ay R

Chip to clear fillet of L

Typical Enlarged Section M-M

38-11⅞

24-5½

48-2½

14-0 | 11-0 | 9-4⅞

2-Sil. L 8×6×⅞×15-6½

2-PL 6×⅞×5-11½

2-L 5×5×½×3-8½ dob bolt

2-Fills 4×⅞×5-7⅞ pb

Ga. F.S.

Ga. N.S.

1-Fill 4½×½×1-0½ fan W.S.

1-Fill 3×½×0-8 fap F.S.

2-Fills 4½×½×0-7 fg bolt

2-Fill 3½×½×4-4½ fd

2-Fills 4½×½×1-4 fb

2-Fills 4×½×7½ ff

G4

Web R 102-7½ 48-4⅝

1-Sil. Web R 102-7½ 48-4⅝

Drill 1⅛" Φ hole to match trunnion collar #19 collar to be pressed on F.S.

Trunnion collar F.S. to be securely bolted in place after being pressed into web of girders

Drill 15/16" Φ holes for turned bolts to match rack casting #41

Sub-drill 2⅞" Φ ream in field to match #322

Shop Note: Work dwgs. #2-#3 & 4 together

Shop Note: Paint erection marks on the left-hand end of all members as shown on details.

Mill stiffner L ends bear

5'-3¾ Curve

53'-0⅝ curve to end of girder

Horizontal spacing

Rivet spacing same as Sect. A

Sect. B B

Sect. C C

Rack casting #41 to be securely bolted to girders in shop after shimming to figures shown.

REVISION	DATE

Shop Paint: 1 coat Detroit Graphite #38-Y-4 Green

Shop Contact Surfaces ☐ Painted ☐

Inspection: U.S. Co. (Shop)

Rivets ⅞" Φ Unless Noted

Holes 15/16" Φ

Special Notes:

Roanoke

Mail on Shop Bill to 4

CONTRACT V 7407

Details of Bascule Girders

For Broad Causeway Viaduct (Bascule Span)

Location Miami Beach, Dade Co. Fla.

Owner Miami Beach Asphalt & Paving Corp.

VIRGINIA BRIDGE COMPANY

ROANOKE, VIRGINIA

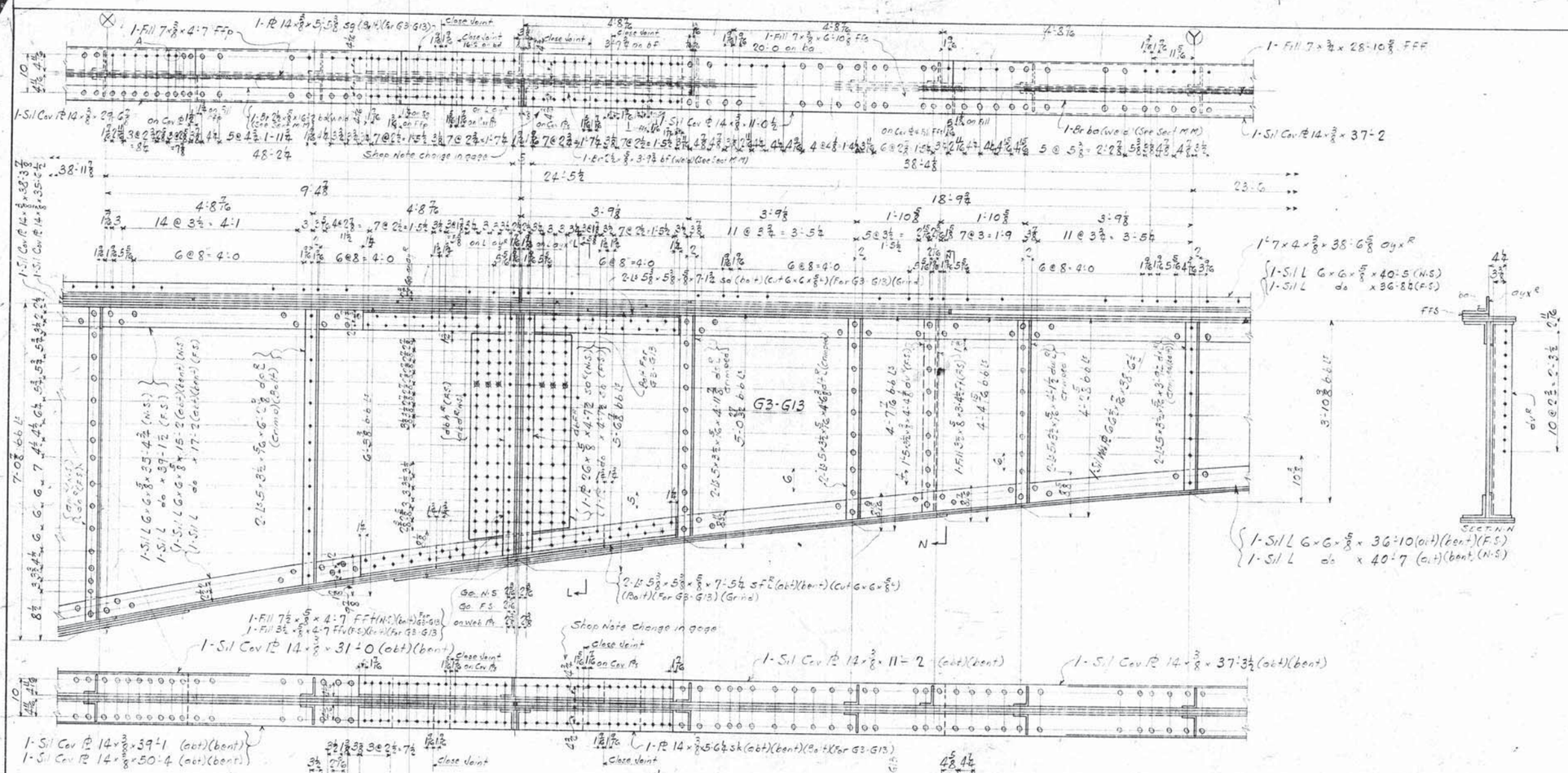
To be fabricated at Birmingham, Ala. Plant

Made by TMF Checked by CKB

In charge of Slocker Date 1-15-54

Revised

Scale: Full Size Sheet No. 21



REVISION							
A 2-5-57							

DATE

Shop Paint 1st Coat Inert Graphite #33-L Green

Shop Contact Surfaces ~~not~~ Painted

Inspection Va. Br. Co. (Shop)

Rivets 3/4 d Unless Noted

Holes 13/16 " "

Special Notes: Foaming: See Note

Mat'l on Shop Bill 3,445

CONTRACT V 7407

Details of Bascule Girders

For Broad Causeway Viaduct (Bascule Span)

Location Miami Beach, Dade Co., Fla.

Owner Allegheny Asphalt Paving Co. Inc.

VIRGINIA BRIDGE COMPANY

ROANOKE, VIRGINIA

To be fabricated at Birmingham plant

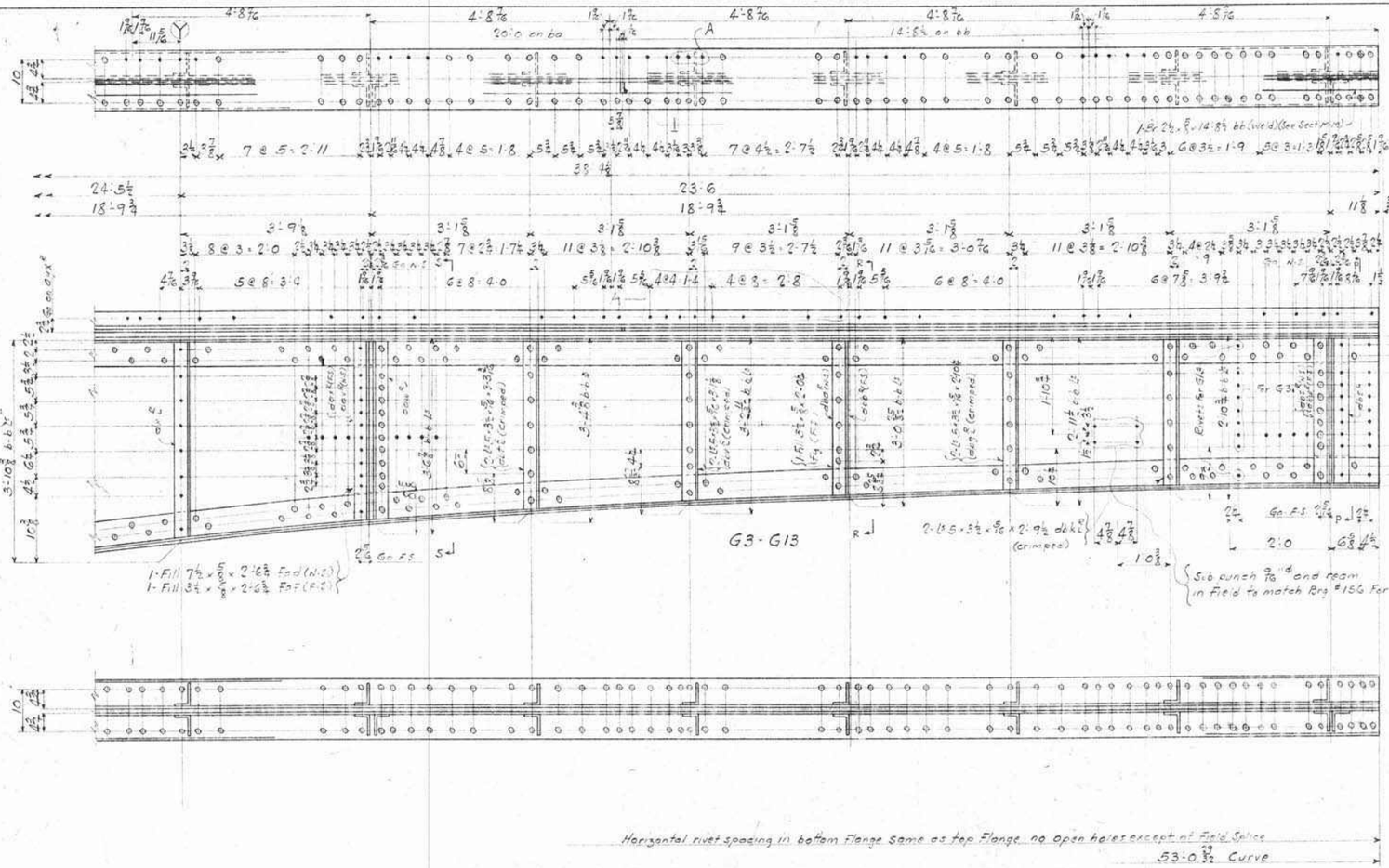
Made by P.A.S. Checked by C.K.B.

In charge of Slusher Date 1-8-57

Revised

Scale ..... In. = 1 Ft. Sheet No. 3 of

Blue Prints



Read List

Make	Description		Mark
1	Girder	Thus	G3R
1	do	Rev	G3L
2	do	Thus	G4R
2	do	Rev	G4L
1	do	Thus	G13R
1	do	Rev	G13L

Horizontal rivet spacing in bottom flange same as top flange, no open holes except at Field Splice

53-0 3/32 Curve

Reaming Note -

General reaming is required.

All holes in material ¾" thick or less except in lateral & sway bracing and railing to be sub-punched ¼" small and reamed to size while parts are securely bolted together.

Holes in material over ¾ thick to be drilled.

All Field connections except laterals, sway bracing and railing to be reamed to a steel templet 1" thick.

Girders G3-G4-G13 to be assembled in the Shop, splices reamed and matchmarked.

For matchmarking see dwgs E2+E3.

SHOP NOTE -

Work drawings #2-3-4 together

REVISION							
A 2-5-51							

DATE

Shop Paint 1st Dehut Graphite #33-L Green

Shop Contact Surfaces ~~not~~ Painted

Inspection Va. Br. Co. (Shop)

Rivets 7/8 Unless Noted

Holes 7/8 " "

Special Notes: Reaming - See Note.

Mat'l on Shop Bill 4 5

CONTRACT V.7407

Details of Bascule Girders

For Broad Causeway Viaduct (Bascule Span)

Location Miami Beach; Dade Co., Fla.

Owner Allegheny Asphalt & Paving Co. Inc.

VIRGINIA BRIDGE COMPANY

ROANOKE, VIRGINIA

To be fabricated at Birmingham plant

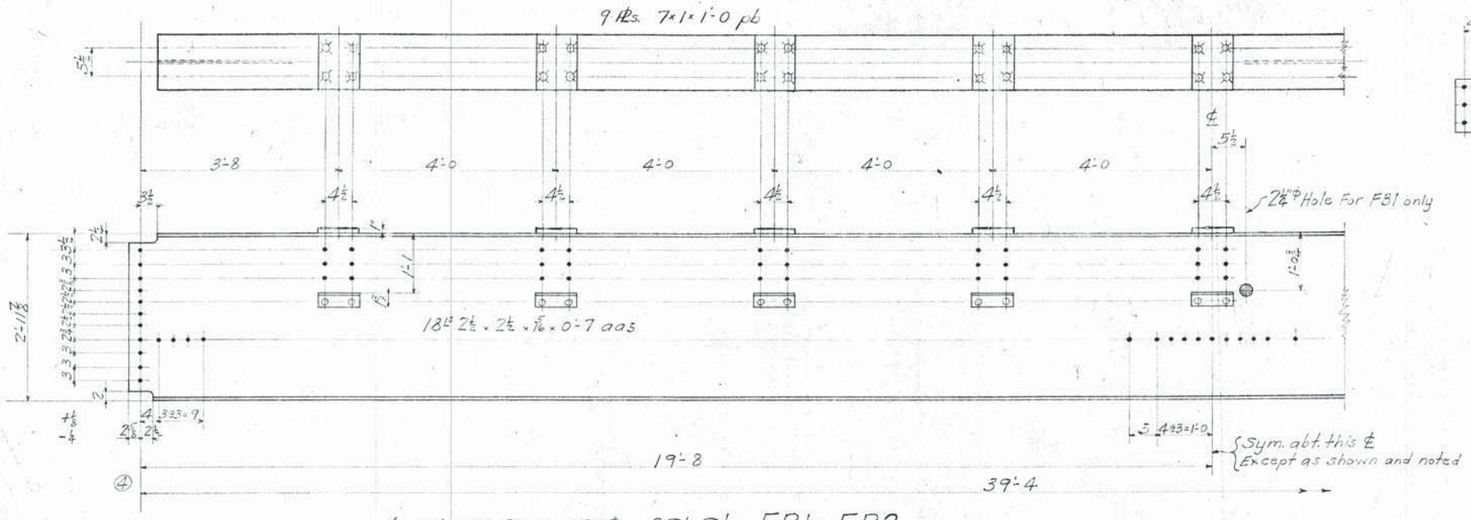
Made by PAP Checked by CKB

In charge of Slusher Date 1950

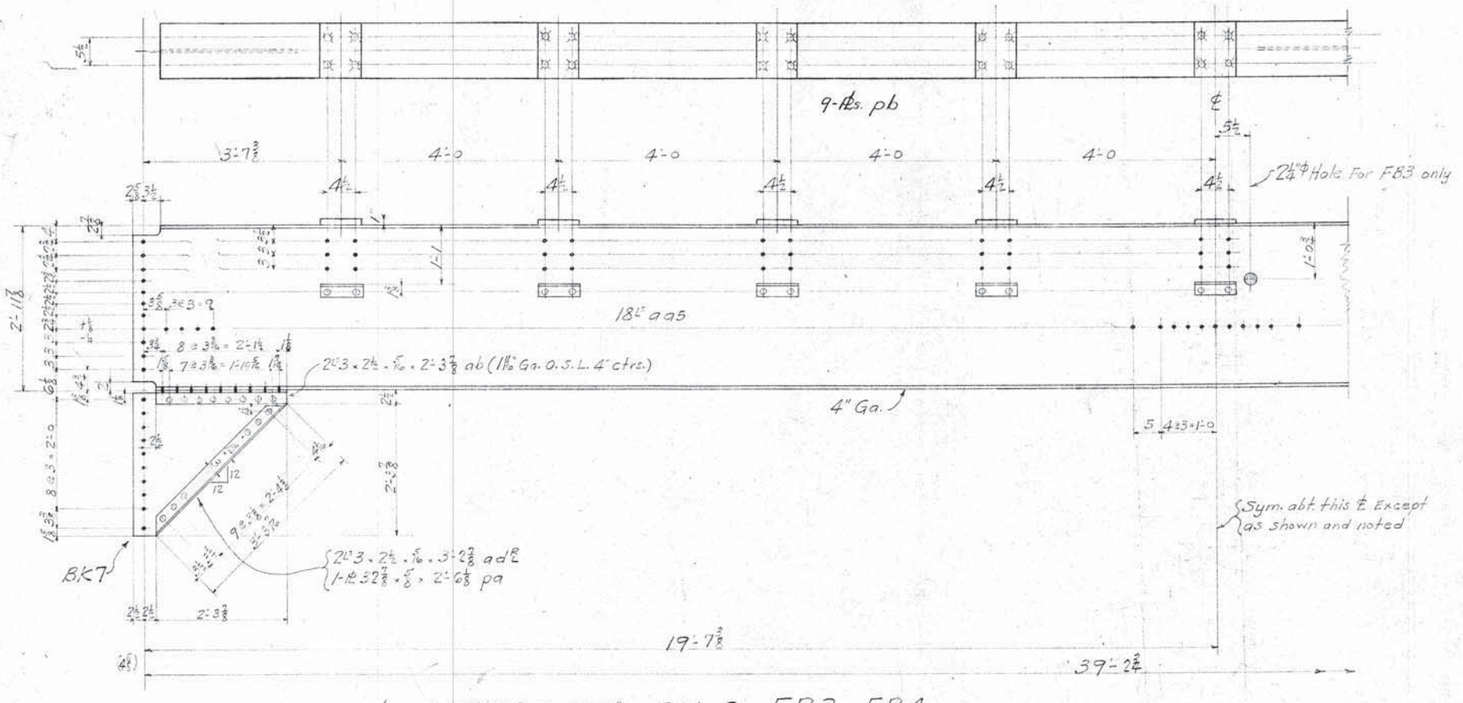
Revised

Scale in. = 1 Ft. Sheet No. 4 of

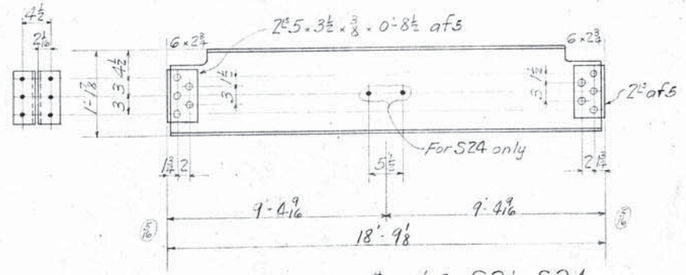
Bars a
Fitted Stiff. d
Bent Plates h



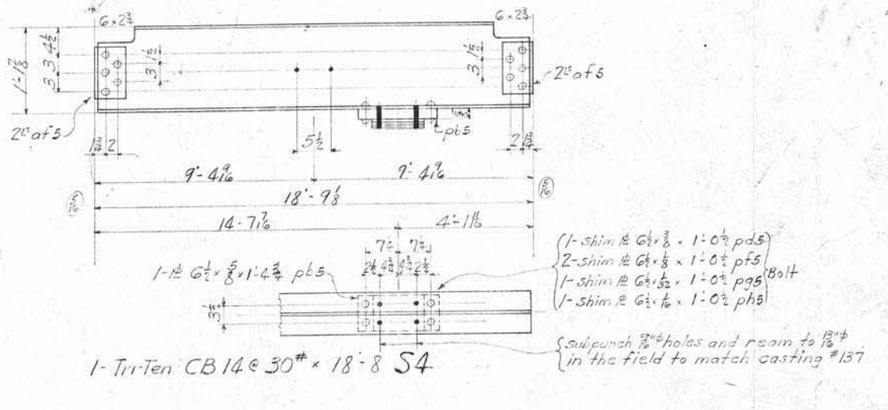
1- Sil. CB 36 @ 150# × 39'-9¼ FB1-FB2



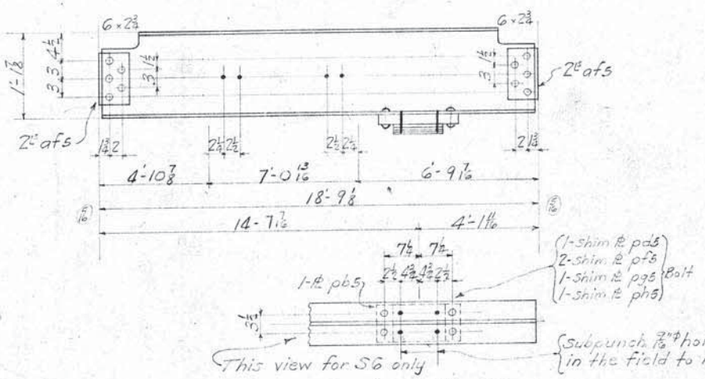
1- Sil. CB 36 @ 150# × 39'-8 FB3-FB4



1- Tri-Ten CB14 @ 30# × 18'-8 S21-S24



1- Tri-Ten CB14 @ 30# × 18'-8 S4



1- Tri-Ten CB14 @ 30# × 18'-8 S5-S6

Req'd. List

Make	Description	Mark
1	Floorbeam	FB1
1	do	FB2
1	do	FB3
1	do	FB4
16	Stringers	S21
14	do	S24
2	Stringers	S4
1	do	S5
1	do	S6
4	Brackets	BK7

Shop Note
Paint erection marks on the left-hand end of all members as shown on details.

Reaming Note:-
Holes in material over ¾" thick to be drilled. All field connections except laterals, sway bracing and railing to be subpunched ¾" small and reamed to size to a steel template 1" thick.

REVISION	DATE

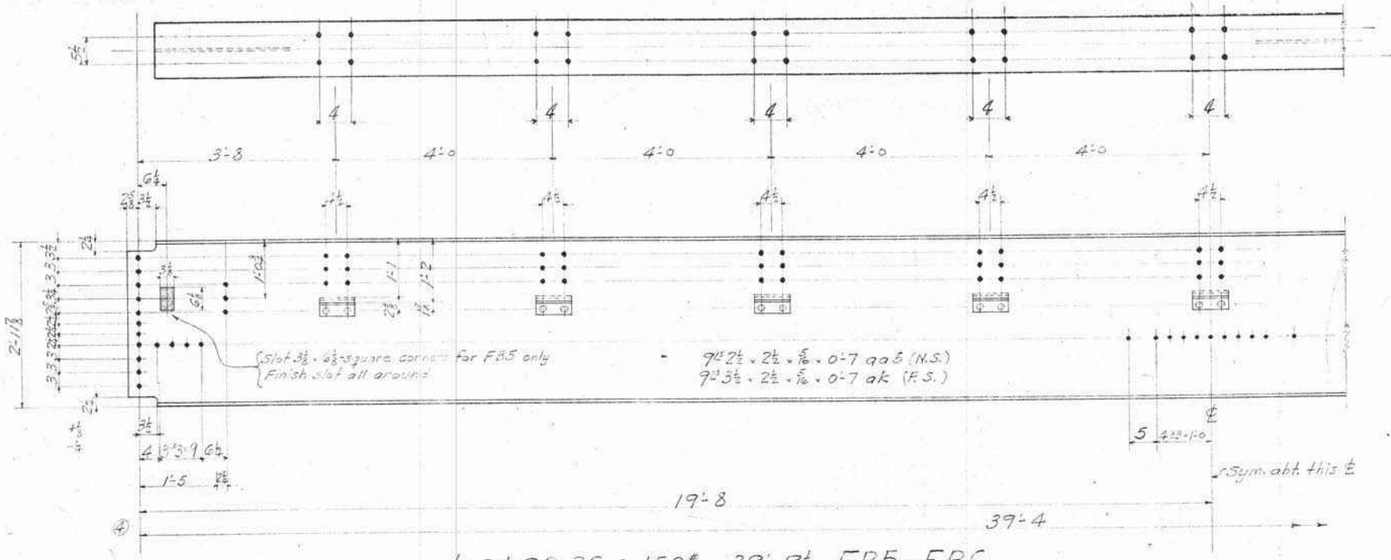
Shop Paint 1st Detroit Graphite #38-L Green
Shop Contact Surfaces not Painted
Inspection Va. Sp. 26 (Shop)
Rivets ⅞"ϕ Unless Noted
Holes 15/16"ϕ " "
Special Notes:
Reaming as Note
Mat'l on Shop Bill 7 # 8

CONTRACT V 7407
Details of Floorbeams and Stringers
For Broad Causeway Viaduct (Bascule Span)
Location Miami Beach, Dade Co., Fla.
Owner Allegheny Asphalt & Paving Co., Inc.

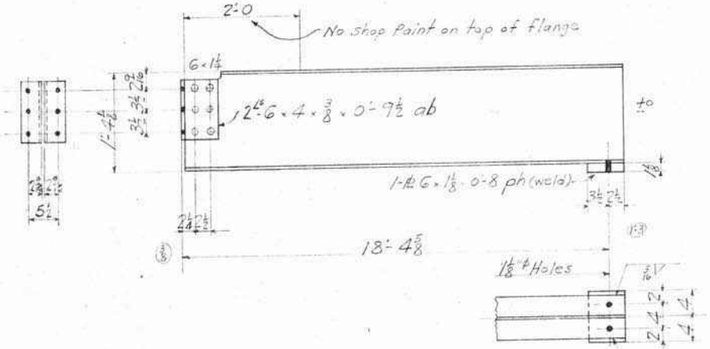
VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham, Ala. plant
Made by RAP Checked by KB
In charge of Slusher Date 1-20
Revised
Scale ... in. = 1 Ft. Sheet No. 5 of

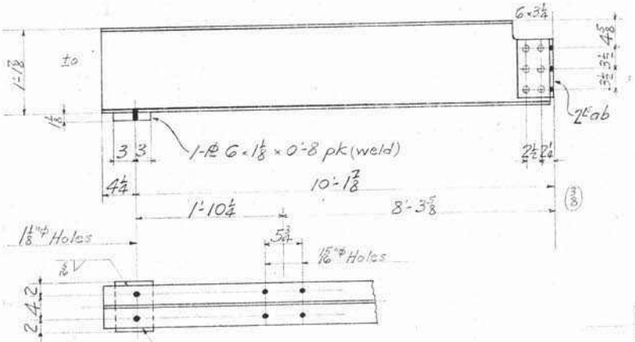
PLATES | BARS | SHAPES | BUILT PLATES



1-Sil. CB 36 @ 150# × 39'-9¼ FB5-FB6



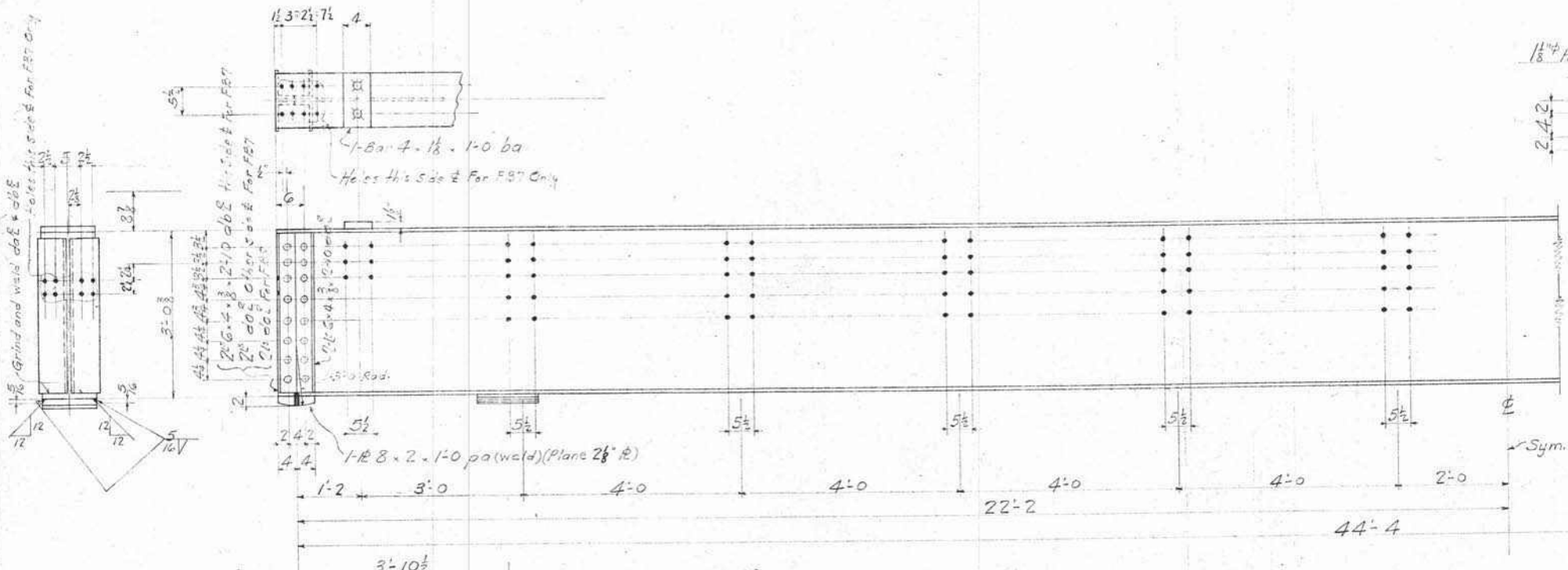
1-CB 16 @ 45# × 18'-6¾ - S7



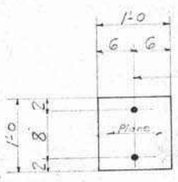
1-CB 14 @ 30# × 10'-5¾ - S8

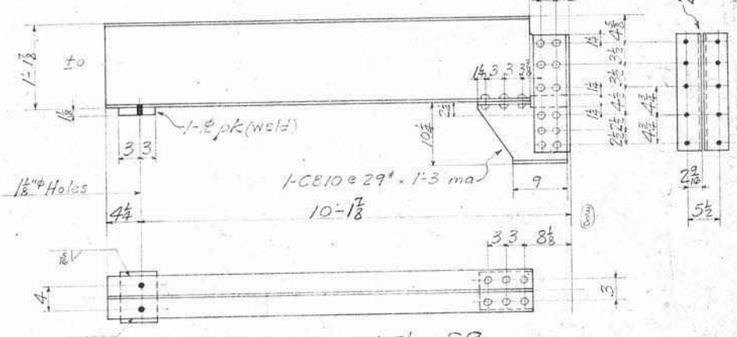
Reg'd. List

Make	Description	Mark
1	Floorbeam	FB5
1	do	FB6
1	do	FB7
4	Stringers	S7
4	do	S8
20	do	S9
4	Bearing Plates	BP1
1	Floorbeam	FB8



1-Sil. CB 36 @ 182# × 45'-0 FB7-FB8





1-CB 14 @ 30# × 10'-5½ - S9

Shop Note
Paint erection marks on the left-hand end of all members as shown on details.

Reaming Note:-
Holes in material over ¾" thick to be drilled.
All field connections except laterals, sway bracing and railing to be subpunched ¼" small and reamed to size to a steel template 1" thick.

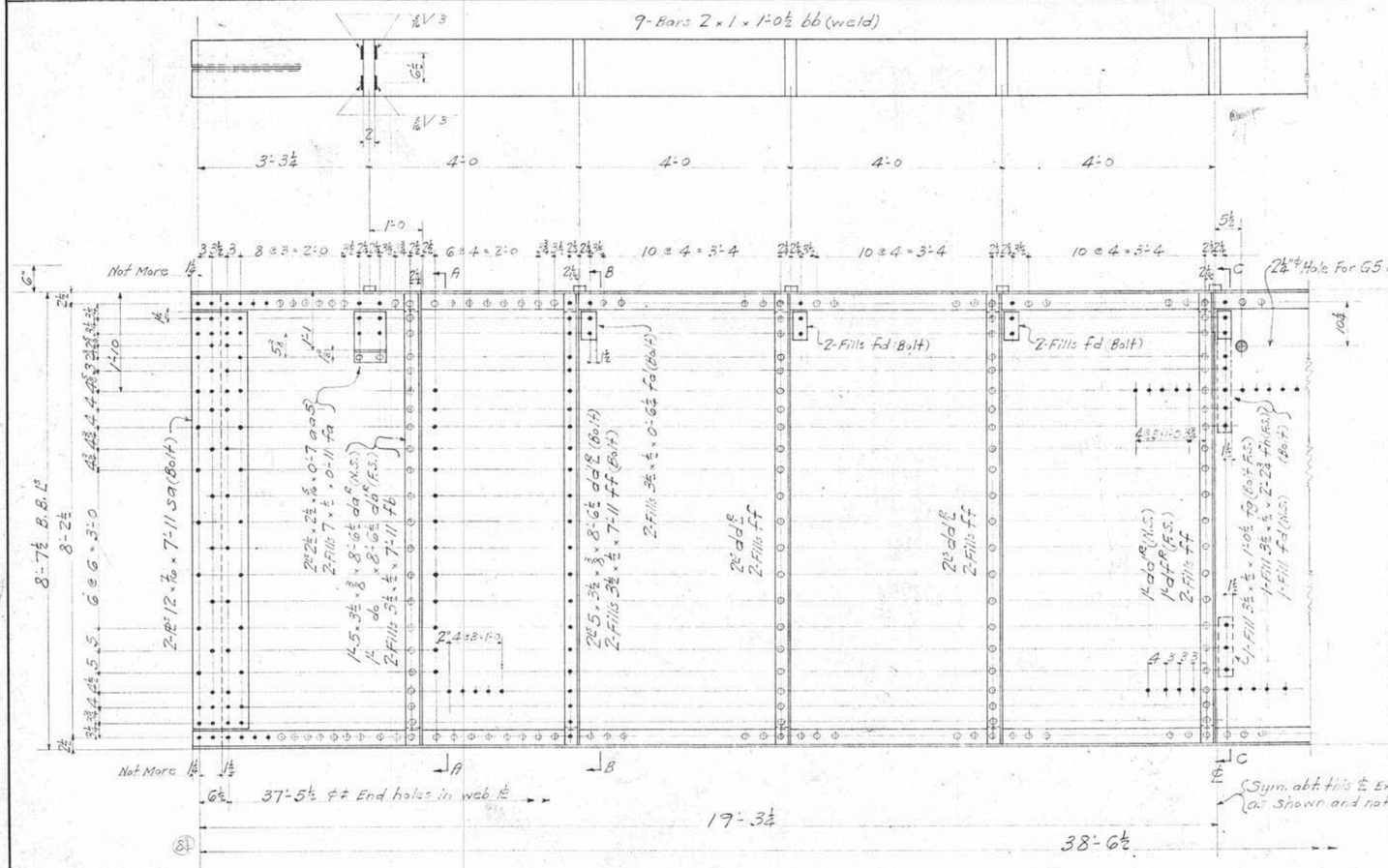
REVISION	DATE

Shop Paint 1st Detroit Graphite #38 L Green.
Shop Contact Surfaces not Painted.
Inspection Va. Bridge Co. (Shop)
Rivets ⅞" ϕ Unless Noted
Holes 13/16" ϕ " "
Special Notes:
Reaming See Note
Mat'l on Shop Bill 9

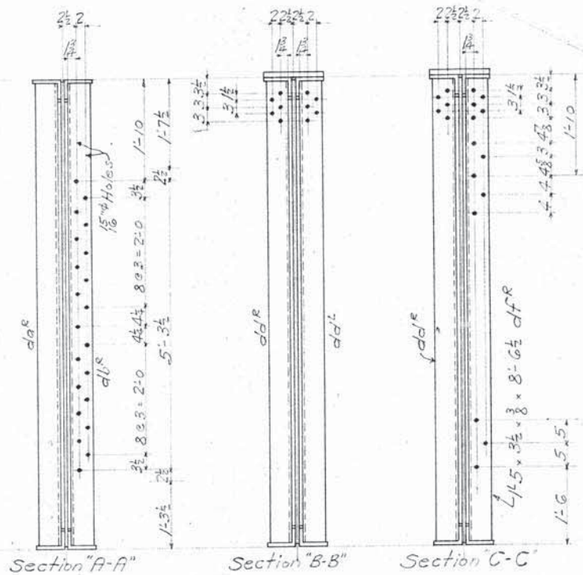
CONTRACT V 7407
Details of Floorbeams and Stringers
For Broad Causeway Viaduct (Bascule Span)
Location Miami Beach, Dade Co., Fla.
Owner Allegheny Asphalt & Paving Co., Inc.

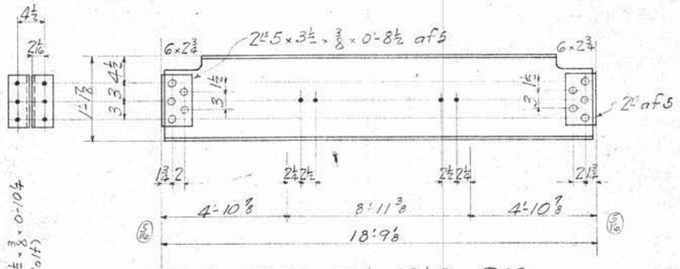
VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham plant
Made by PAP Checked by CKB
In charge of Susner Date 1963
Revised
Scale In. = 1 Ft. Sheet No. 6 of

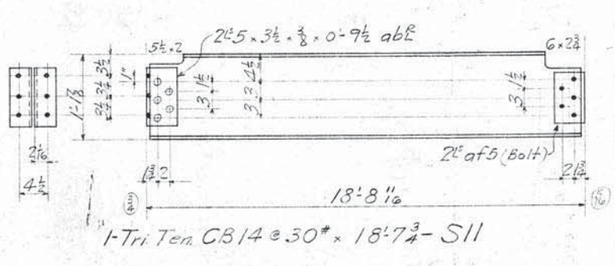


4 L 6 × 4 × ½ × 38'-9
1 - Web PL 103 × ½ × 37'-8½ } G5 - G6

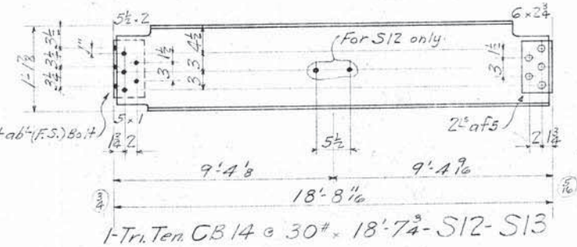




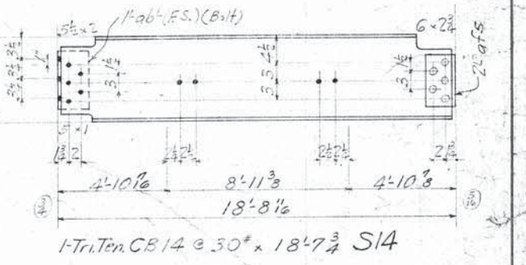
1-Tri. Ten. CB 14 @ 30# × 18'-8 - S10



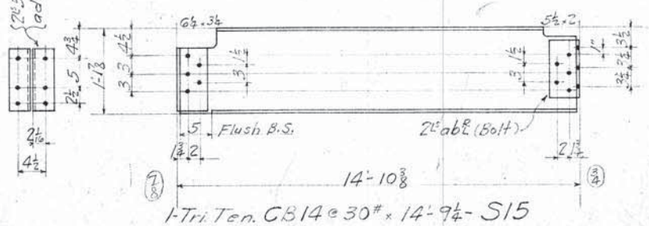
1-Tri. Ten. CB 14 @ 30# × 18'-7¾ - S11



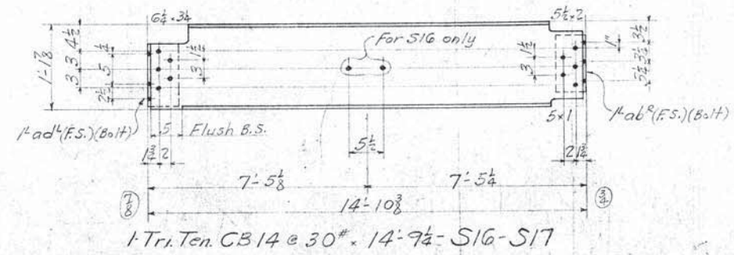
1-Tri. Ten. CB 14 @ 30# × 18'-7¾ - S12 - S13



1-Tri. Ten. CB 14 @ 30# × 18'-7¾ S14



1-Tri. Ten. CB 14 @ 30# × 14'-9¼ - S15



1-Tri. Ten. CB 14 @ 30# × 14'-9½ - S16 - S17

Reg'd. List

Make	Description		Mark
1	Girder	Rev.	G5
1	do	Thus	G6
2	Stringers		S10
4	do		S11
4	do	Thus	S12R
4	do	Rev.	S12L
2	do	Thus	S13R
2	do	Rev.	S13L
1	do	Thus	S14R
1	do	Rev.	S14L
4	do		S15
4	do	Thus	S16R
4	do	Rev.	S16L
1	do	Thus	S17R
2	do	Rev.	S17L

Shop Note
Paint erection marks on the left-hand end of all members as shown on details.

Reaming Note:-
General reaming is required for G5 & G6
All holes in material ¾" thick or less except in lateral and sway bracing and railing to be subpunched ¼" small and reamed to size while parts are securely bolted together.
Holes in material over ¾" thick to be drilled.
All field connections except laterals, sway bracing and railing to be subpunched ¼" small and reamed to size to a steel template 1" thick.

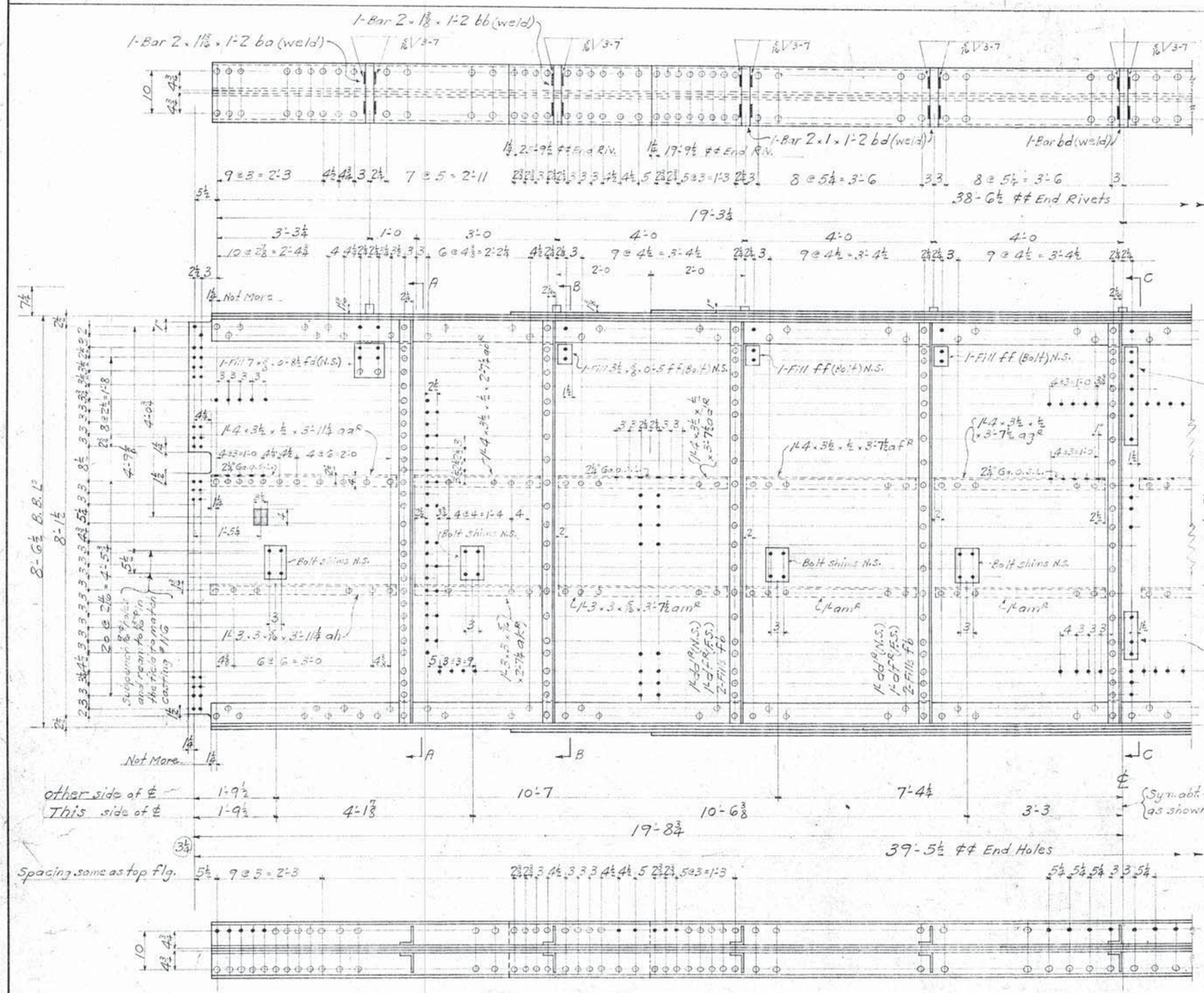
REVISION	DATE

Shop Paint 1st Detroit Graphite #38-L Green
Shop Contact Surfaces ■■ Painted
Inspection Va. Br. Co. (Shop)
Rivets ⅞" ø Unless Noted
Holes 13/16" " "
Special Notes:
Reaming Note No. 10
Mat'l on Shop Bill 10 & 11

CONTRACT V 7407
Details of Girders and Stringers
For Broad Causeway Viaduct (Bascule Span)
Location Miami Beach, Dade Co., Fla.
Owner Allegheny Asphalt & Paving Co. Inc.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham plant
Made by PAP Checked by CKB
In charge of Slusher Date 1950
Revised
Scale In. = 1 Ft. Sheet No. 7 of


1-Bar 2 - 1⅛ × 1'-2 ba (weld)
1-Bar 2 - 1⅛ × 1'-2 bb (weld)
1-Bar 2 × 1 × 1'-2 bd (weld)
1-Bar bd (weld)
1½ 2'-1 9½ ff End R.N.
1½ 19'-9½ ff End R.N.
9 @ 8 = 2'-3
7 @ 5 = 2'-11
8 @ 5¼ = 3'-6
38-6½ ff End Rivets
19'-3¼
10 @ 2⅝ = 2'-4⅜
6 @ 4⅓ = 2'-2⅓
7 @ 4½ = 3'-4½
1-Fill 7 × ⅝ × 0'-8½ fa (N.S.)
1-Fill 3½ × ⅝ × 0'-5 ff (Bolt) N.S.
1-Fill ff (Bolt) N.S.
1-Fill 3½ × ⅝ × 0'-11½ fh (Bolt) N.S.
L4 × 3½ × ½ × 3'-11½ aa^R
L4 × 3½ × ½ × 3'-7½ af^R
L4 × 3½ × ½ × 3'-7½ ag^R
Bolt shims N.S.
L3 × 3 × ⅝ × 3'-7½ am^R
L4 × 3½ × ½ × 3'-11¼ ah
L4 × 3½ × ½ × 3'-7½ ak^R
L4 × 3½ × ½ × 3'-11¼ al^R
L4 × 3½ × ½ × 3'-7½ an^R
L4 × 3½ × ½ × 3'-7½ ao^R
L4 × 3½ × ½ × 3'-7½ aq^R
L4 × 3½ × ½ × 3'-7½ ar^R
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L4 × 3½ × ½ × 3'-7½ qm^R
L4 × 3½ × ½ × 3'-7½ qn^R
L4 × 3½ × ½ × 3'-7½ qo^R
L4 × 3½ × ½ × 3'-7½ qp^R
L4 × 3½ × ½ × 3'-7½ qq^R
L4 × 3½ × ½ × 3'-7½ qr^R
L4 × 3½ × ½ × 3'-7½ qs^R
L4 × 3½ × ½ × 3'-7½ qt^R
L4 × 3½ × ½ × 3'-7½ qu^R
L4 × 3½ × ½ × 3'-7½ qv^R
L4 × 3½ × ½ × 3'-7½ qw^R
L4 × 3½ × ½ × 3'-7½ qx^R
L4 × 3½ × ½ × 3'-7½ qy^R
L4 × 3½ × ½ × 3'-7½ qz^R
L4 × 3½ × ½ × 3'-7½ ra^R
L4 × 3½ × ½ × 3'-7½ rb^R
L4 × 3½ × ½ × 3'-7½ rc^R
L4 × 3½ × ½ × 3'-7½ rd^R
L4 × 3½ × ½ × 3'-7½ re^R
L4 × 3½ × ½ × 3'-7½ rf^R
L4 × 3½ × ½ × 3'-7½ rg^R
L4 × 3½ × ½ × 3'-7½ rh^R
L4 × 3½ × ½ × 3'-7½ ri^R
L4 × 3½ × ½ × 3'-7½ rj^R
L4 × 3½ × ½ × 3'-7½ rk^R
L4 × 3½ × ½ × 3'-7½ rl^R
L4 × 3½ × ½ × 3'-7½ rm^R
L4 × 3½ × ½ × 3'-7½ rn^R
L4 × 3½ × ½ × 3'-7½ ro^R
L4 × 3½ × ½ × 3'-7½ rp^R
L4 × 3½ × ½ × 3'-7½ rq^R
L4 × 3½ × ½ × 3'-7½ rr^R
L4 × 3½ × ½ × 3'-7½ rs^R
L4 × 3½ × ½ × 3'-7½ rt^R
L4 × 3½ × ½ × 3'-7½ ru^R
L4 × 3½ × ½ × 3'-7½ rv^R
L4 × 3½ × ½ × 3'-7½ rw^R
L4 × 3½ × ½ × 3'-7½ rx^R
L4 × 3½ × ½ × 3'-7½ ry^R
L4 × 3½ × ½ × 3'-7½ rz^R
L4 × 3½ × ½ × 3'-7½ sa^R
L4 × 3½ × ½ × 3'-7½ sb^R
L4 × 3½ × ½ × 3'-7½ sc^R
L4 × 3½ × ½ × 3'-7½ sd^R
L4 × 3½ × ½ × 3'-7½ se^R
L4 × 3½ × ½ × 3'-7½ sf^R
L4 × 3½ × ½ × 3'-7½ sg^R
L4 × 3½ × ½ × 3'-7½ sh^R
L4 × 3½ × ½ × 3'-7½ si^R
L4 × 3½ × ½ × 3'-7½ sj^R
L4 × 3½ × ½ × 3'-7½ sk^R
L4 × 3½ × ½ × 3'-7½ sl^R
L4 × 3½ × ½ × 3'-7½ sm^R
L4 × 3½ × ½ × 3'-7½ sn^R
L4 × 3½ × ½ × 3'-7½ so^R
L4 × 3½ × ½ × 3'-7½ sp^R
L4 × 3½ × ½ × 3'-7½ sq^R
L4 × 3½ × ½ × 3'-7½ sr^R
L4 × 3½ × ½ × 3'-7½ ss^R
L4 × 3½ × ½ × 3'-7½ st^R
L4 × 3½ × ½ × 3'-7½ su^R
L4 × 3½ × ½ × 3'-7½ sv^R
L4 × 3½ × ½ × 3'-7½ sw^R
L4 × 3½ × ½ × 3'-7½ sx^R
L4 × 3½ × ½ × 3'-7½ sy^R
L4 × 3½ × ½ × 3'-7½ sz^R
L4 × 3½ × ½ × 3'-7½ ta^R
L4 × 3½ × ½ × 3'-7½ tb^R
L4 × 3½ × ½ × 3'-7½ tc^R
L4 × 3½ × ½ × 3'-7½ td^R
L4 × 3½ × ½ × 3'-7½ te^R
L4 × 3½ × ½ × 3'-7½ tf^R
L4 × 3½ × ½ × 3'-7½ tg^R
L4 × 3½ × ½ × 3'-7½ th^R
L4 × 3½ × ½ × 3'-7½ ti^R
L4 × 3½ × ½ × 3'-7½ tj^R
L4 × 3½ × ½ × 3'-7½ tk^R
L4 × 3½ × ½ × 3'-7½ tl^R
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L4 × 3½ × ½ × 3'-7½ tn^R
L4 × 3½ × ½ × 3'-7½ to^R
L4 × 3½ × ½ × 3'-7½ tp^R
L4 × 3½ × ½ × 3'-7½ tq^R
L4 × 3½ × ½ × 3'-7½ tr^R
L4 × 3½ × ½ × 3'-7½ ts^R
L4 × 3½ × ½ × 3'-7½ tt^R
L4 × 3½ × ½ × 3'-7½ tu^R
L4 × 3½ × ½ × 3'-7½ tv^R
L4 × 3½ × ½ × 3'-7½ tw^R
L4 × 3½ × ½ × 3'-7½ tx^R
L4 × 3½ × ½ × 3'-7½ ty^R
L4 × 3½ × ½ × 3'-7½ tz^R
L4 × 3½ × ½ × 3'-7½ ua^R
L4 × 3½ × ½ × 3'-7½ ub^R
L4 × 3½ × ½ × 3'-7½ uc^R
L4 × 3½ × ½ × 3'-7½ ud^R
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L4 × 3½ × ½ × 3'-7½ us^R
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L4 × 3½ × ½ × 3'-7½ ve^R
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L4 × 3½ × ½ × 3'-7½ vn^R
L4 × 3½ × ½ × 3'-7½ vo^R
L4 × 3½ × ½ × 3'-7½ vp^R
L4 × 3½ × ½ × 3'-7½ vq^R
L4 × 3½ × ½ × 3'-7½ vr^R
L4 × 3½ × ½ × 3'-7½ vs^R
L4 × 3½ × ½ × 3'-7½ vt^R
L4 × 3½ × ½ × 3'-7½ vu^R
L4 × 3½ × ½ × 3'-7½ vv^R
L4 × 3½ × ½ × 3'-7½ vw^R
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L4 × 3½ × ½ × 3'-7½ wb^R
L4 × 3½ × ½ × 3'-7½ wc^R
L4 × 3½ × ½ × 3'-7½ wd^R
L4 × 3½ × ½ × 3'-7½ we^R
L4 × 3½ × ½ × 3'-7½ wf^R
L4 × 3½ × ½ × 3'-7½ wg^R
L4 × 3½ × ½ × 3'-7½ wh^R
L4 × 3½ × ½ × 3'-7½ wi^R
L4 × 3½ × ½ × 3'-7½ wj^R
L4 × 3½ × ½ × 3'-7½ wk^R
L4 × 3½ × ½ × 3'-7½ wl^R
L4 × 3½ × ½ × 3'-7½ wm^R
L4 × 3½ × ½ × 3'-7½ wn^R
L4 × 3½ × ½ × 3'-7½ wo^R
L4 × 3½ × ½ × 3'-7½ wp^R
L4 × 3½ × ½ × 3'-7½ wq^R
L4 × 3½ × ½ × 3'-7½ wr^R
L4 × 3½ × ½ × 3'-7½ ws^R
L4 × 3½ × ½ × 3'-7½ wt^R
L4 × 3½ × ½ × 3'-7½ wu^R
L4 × 3½ × ½ × 3'-7½ wv^R
L4 × 3½ × ½ × 3'-7½ ww^R
L4 × 3½ × ½ × 3'-7½ wx^R
L4 × 3½ × ½ × 3'-7½ wy^R
L4 × 3½ × ½ × 3'-7½ wz^R
L4 × 3½ × ½ × 3'-7½ xa^R
L4 × 3½ × ½ × 3'-7½ xb^R
L4 × 3½ × ½ × 3'-7½ xc^R
L4 × 3½ × ½ × 3'-7½ xd^R
L4 × 3½ × ½ × 3'-7½ xe^R
L4 × 3½ × ½ × 3'-7½ xf^R
L4 × 3½ × ½ × 3'-7½ xg^R
L4 × 3½ × ½ × 3'-7½ xh^R
L4 × 3½ × ½ × 3'-7½ xi^R
L4 × 3½ × ½ × 3'-7½ xj^R
L4 × 3½ × ½ × 3'-7½ xk^R
L4 × 3½ × ½ × 3'-7½ xl^R
L4 × 3½ × ½ × 3'-7½ xm^R
L4 × 3½ × ½ × 3'-7½ xn^R
L4 × 3½ × ½ × 3'-7½ xo^R
L4 × 3½ × ½ × 3'-7½ xp^R
L4 × 3½ × ½ × 3'-7½ xq^R
L4 × 3½ × ½ × 3'-7½ xr^R
L4 × 3½ × ½ × 3'-7½ xs^R
L4 × 3½ × ½ × 3'-7½ xt^R
L4 × 3½ × ½ × 3'-7½ xu^R
L4 × 3½ × ½ × 3'-7½ xv^R
L4 × 3½ × ½ × 3'-7½ xw^R
L4 × 3½ × ½ × 3'-7½ xx^R
L4 × 3½ × ½ × 3'-7½ xy^R
L4 × 3½ × ½ × 3'-7½ xz^R
L4 × 3½ × ½ × 3'-7½ ya^R
L4 × 3½ × ½ × 3'-7½ yb^R
L4 × 3½ × ½ × 3'-7½ yc^R
L4 × 3½ × ½ × 3'-7½ yd^R
L4 × 3½ × ½ × 3'-7½ ye^R
L4 × 3½ × ½ × 3'-7½ yf^R
L4 × 3½ × ½ ×

Bare for running fit for piece #1. Piece #1 to be bolted on securely in shop as shown

Sect. BB

Sect. CC

Sect. AA

Reqd. List		
Make	Description	Mark
2	Trunnion Gdrs. Thus	G9
2	" " Rev.	G9
1	Stringer Thus	S18
1	" Thus	S19
1	Strut Thus	SW1
1	do Thus	SW2
2	Diagonals Thus	D1
2	" "	D2
2	" "	D3

Rivets $\frac{7}{8}$ ℙ
Holes $\frac{15}{16}$ ℙ unless noted

Reaming Note:
General reaming is required for G9
All holes in material $\frac{3}{8}$" thick or less except in lateral, sway bracing and railing to be sub-punched & small and reamed to size while parts are securely bolted together
Holes in material over $\frac{3}{8}$" thick to be drilled.
All field connections except lateral sway bracing and railing to be subpunched $\frac{3}{16}$" small and reamed to size to a steel templet 1" thick.

Shop Note
Paint erection marks on the left-hand end of all members as shown on details.

REVISION						
A	B					
11/8	3/31/61					

DATE

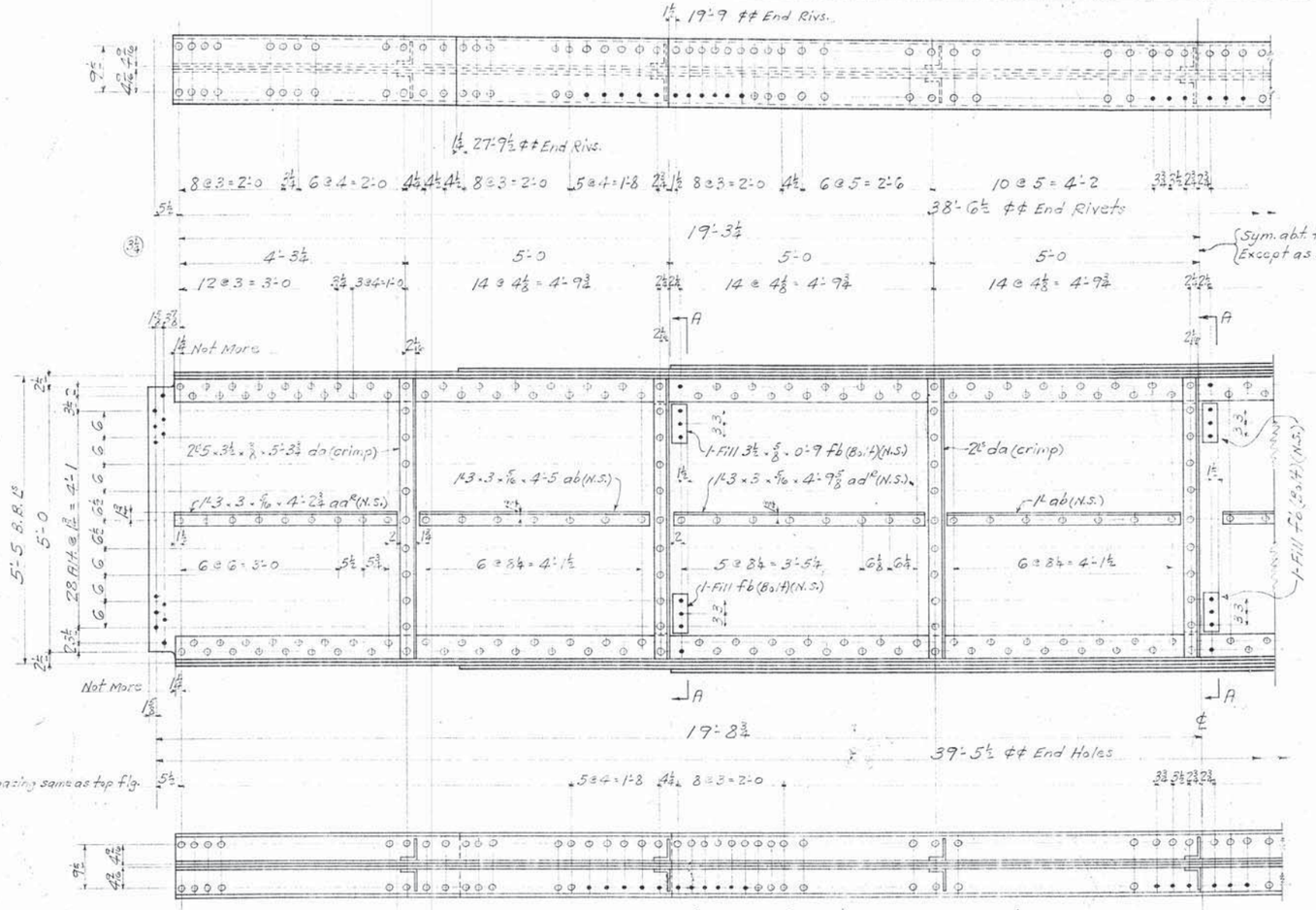
Shop Paint 1st Detroit Graphite #38-L Green
Shop Contact Surfaces ☒ Painted
Inspection Va. Br. Co. (Shop)
Rivets $\frac{7}{8}$ ℙ Unless Noted
Holes $\frac{15}{16}$ ℙ " "
Special Notes:
Mat'l on Shop Bill 13, 14, & 15

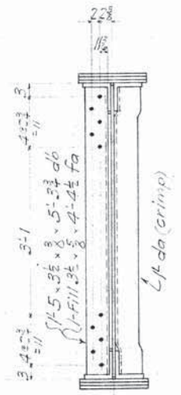
CONTRACT V 7407
Details of Trunnion Girder & Sway Frame
For Broad Causeway Viaduct (Bascule Span)
Location Miami Beach, Dade Co. Fla.
Owner Allegheny Asphalt & Paving Co. Inc.

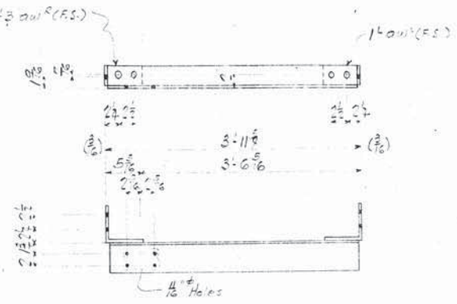
VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham plant
Made by PAP Checked by CKB
In charge of Slusher Date 1950
Revised
Scale 1 in. = 1 Ft. Sheet No. 9 of

Plates: Beam Stiff. Bent Plates



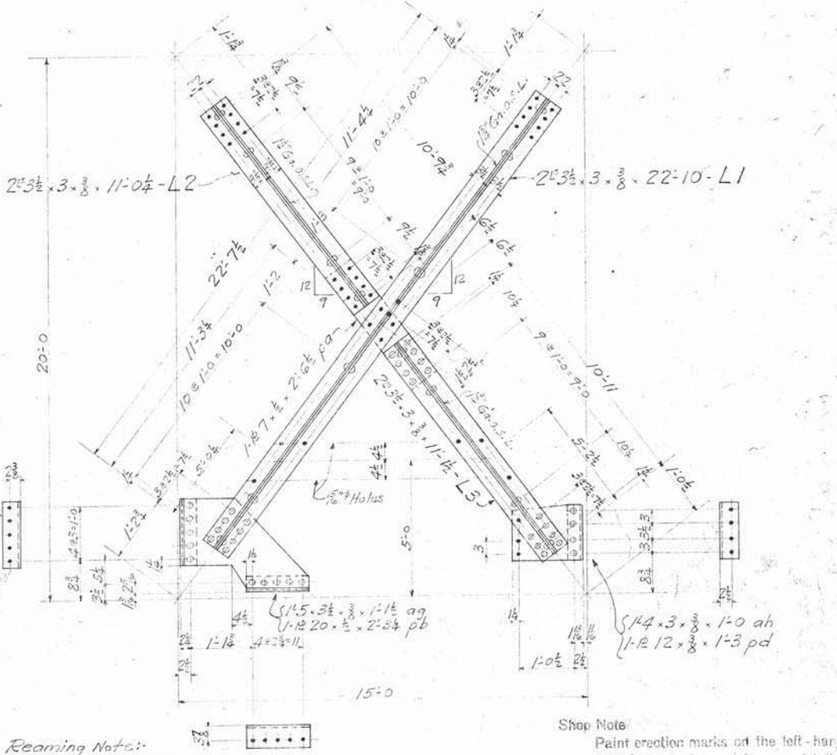




L 2.5 × 3½ × ⅜ × 3'-10½ S30

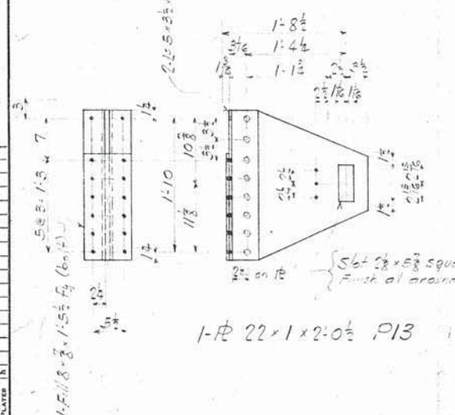
Req'd. List

Make	Description		Mark
2	Girders		G8
2	Laterals	Thus	L1^R
2	do	Rev.	L1^L
4	do	Thus	L2
2	do	Thus	L3^R
2	do	Rev.	L3^L
2	Machinery Supports		MS5
4	Struts	Thus	S30^R
4	do	Rev	S30^L
4	Brackets		P13
4	do		P2

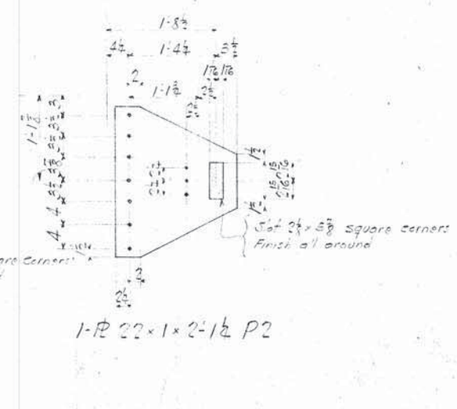


Shop Note
Paint erection marks on the left-hand end of all members as shown on details.

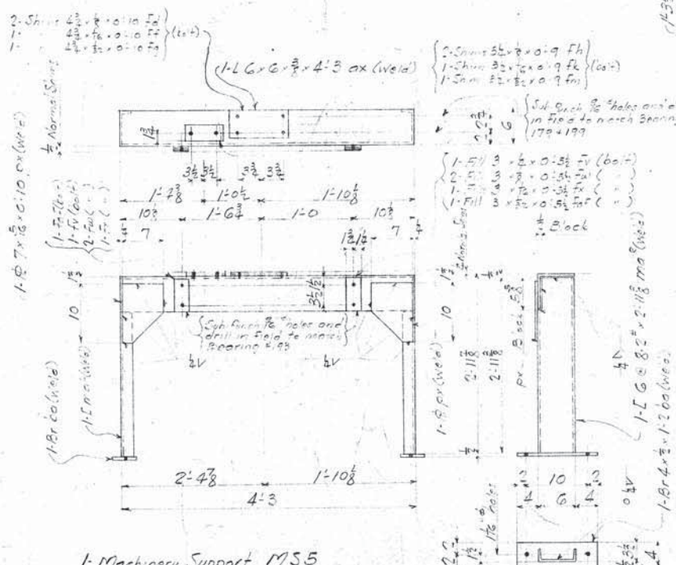
4L 6 × 6 × ⅝ × 38'-7
1-Web PL 67½ × ⅜ × 39'-8¾
2-Cov. PL 14 × 9/16 × 38'-9
2-Cov. PL do × 28'-0
2-Cov. PL do × 20'-0
} G8



1-PL 22 × 1 × 2'-0½ P13



1-PL 22 × 1 × 2'-1½ P2



1 Machinery Support MS5
Must be Square and out of wind

Reaming Note:-
General reaming is required for G8 All holes in material ¾" thick or less except in lateral and sway bracing and railing to be subpunched ¼" small and reamed to size while parts are securely bolted together.
Holes in material over ¾" thick to be drilled.
All field connections except laterals, sway bracing and railing to be subpunched ¼" small and reamed to size to a steel template 1" thick.

REVISION	
DATE	
Shop Paint	1st Untreat Graphite F58-L Green
Shop Contact Surfaces and Painted	
Inspection	V.A. Eng. Co. (Shop)
Rivets	Unless Noted
Holes	" "
Special Notes:	
Reaming Shop Note	
Mat'l on Shop Bill	16417.

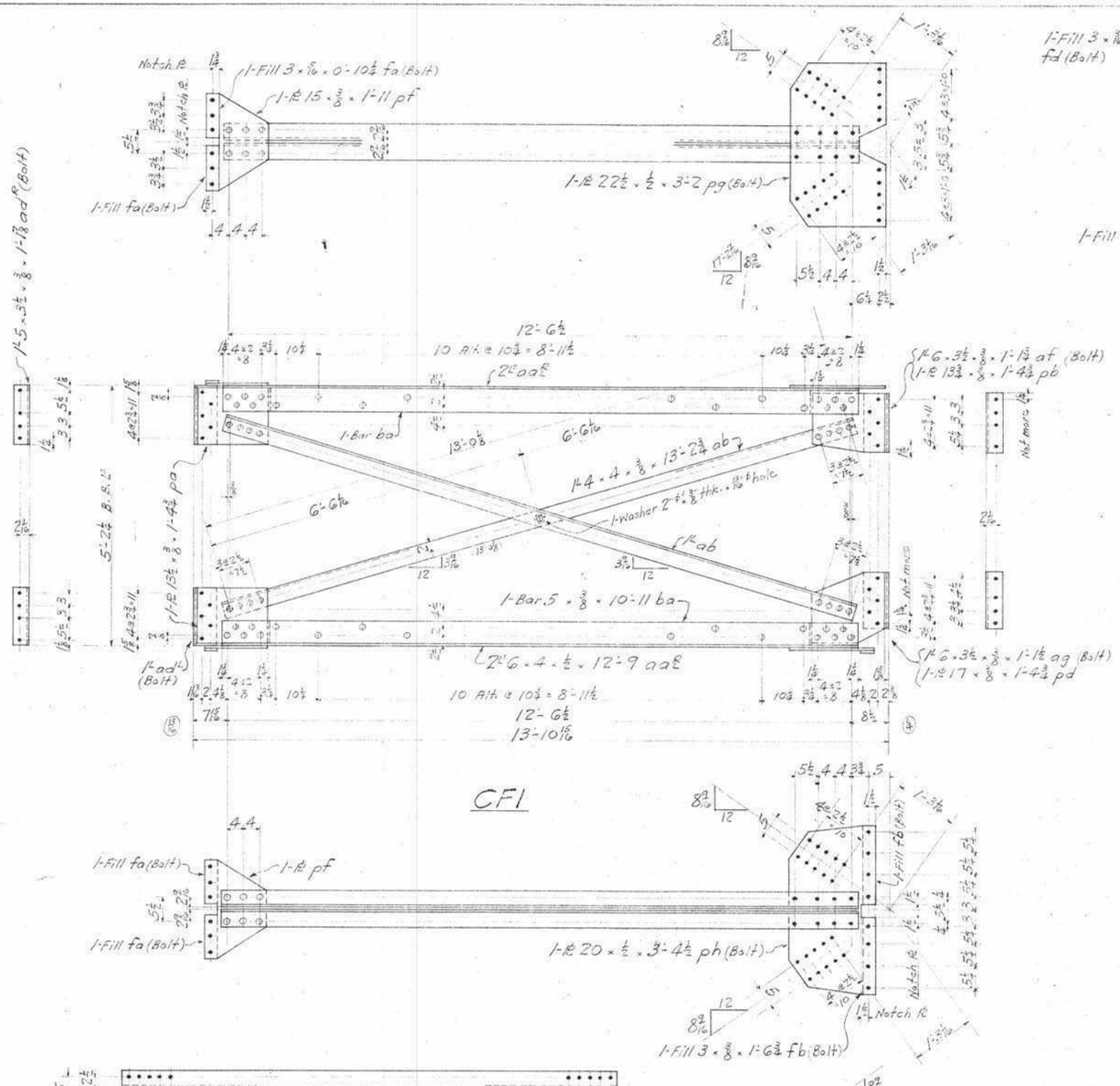
CONTRACT V 7407

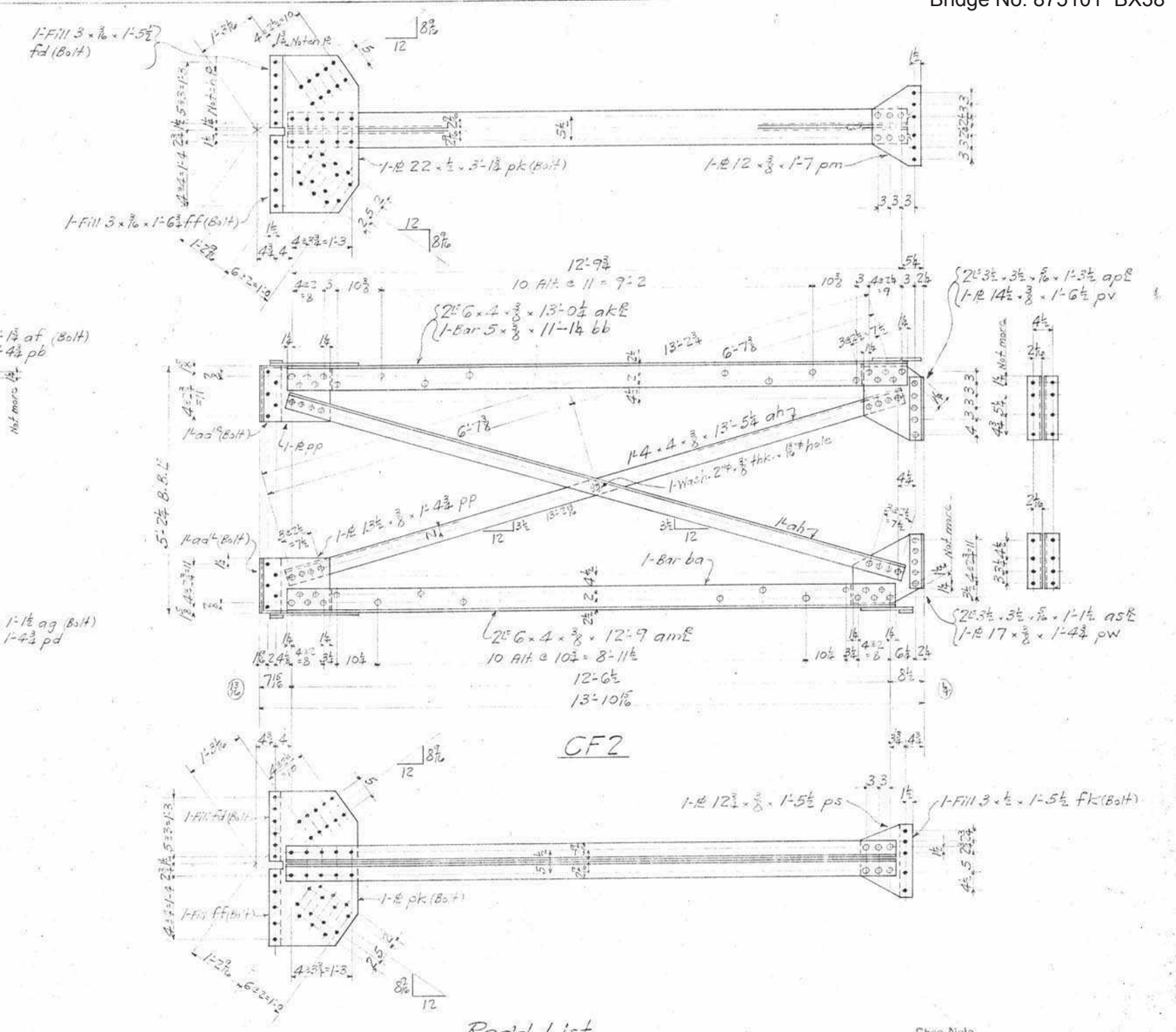
Details of Counterweight Girders
For Broad Causeway Viaduct (Fascia Span)
Location Miami Beach, Dade Co., Fla.
Owner Allegheny Ohio Trust Co. Trustee

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham plant
Made by EAH Checked by CKB
In charge of Blusher Date 1-20-59
Revised
Scale in. = 1 Ft. Sheet No. 10 of

PLATES
BARS
FITTED STUFF
SHOP PLATER





Reg'd. List

Make	Description		Mark
2	Cross Frames		CF1
2	Cross Frames	Thus	$CF2^R$
2	do	Rev.	$CF2^L$
8	Laterals	Thus	L4
4	do	Thus	$L5^R$
4	do	Rev.	$L5^L$

Shop Note
Paint erection marks on the left-hand end of all members as shown on details.

REVISION	DATE

Shop Paint 1st Coat Detroit Graphite A.S.L. Green
Shop Contact Surfaces not Painted
Inspection Va. Dept. of Highways

Rivets 3/4" ø — Unless Noted
Holes 13/16" ø — " "
Special Notes:
Roanoke - Name

Mat'l on Shop Bill 18 & 19

CONTRACT V. 7407

Details of Cross Frames & Laterals

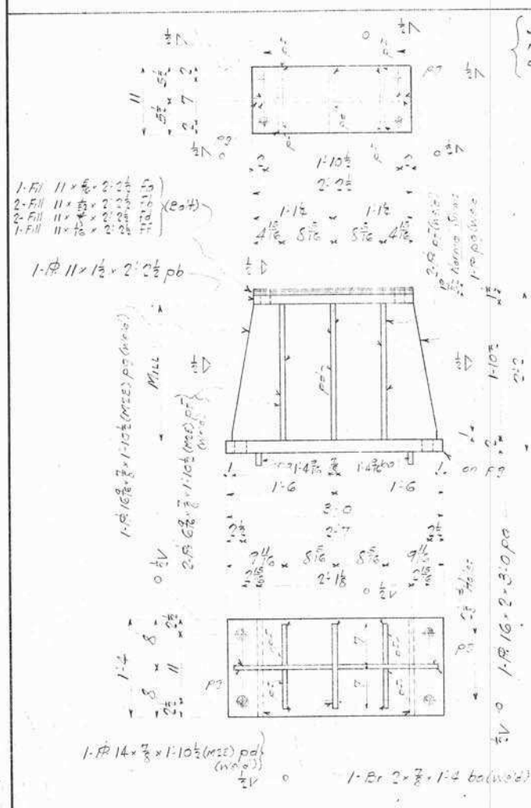
For Virginia Commonwealth Transportation Board (Roanoke Street)
Location Albemarle & Ecstn. Loop Co. Va.
Owner Virginia Department of Highways & Transportation

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

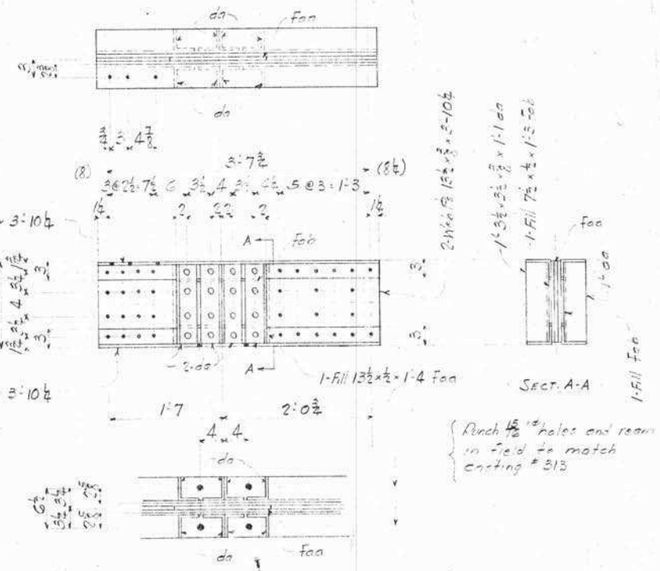
To be fabricated at Birmingham plant
Made by RAP Checked by CKB
In charge of Slusher Date
Revised
Scale in. = 1 Ft. Sheet No. 11 of

Reqd List

Make	Description	Mark
4	Bearing Supports	MS2
4	do	MS3
4	do	MS4
2	Buffer Support-Left	MS6 R
2	" " (Rt)	MS6 L
2	Limit Switch Supports	MS8

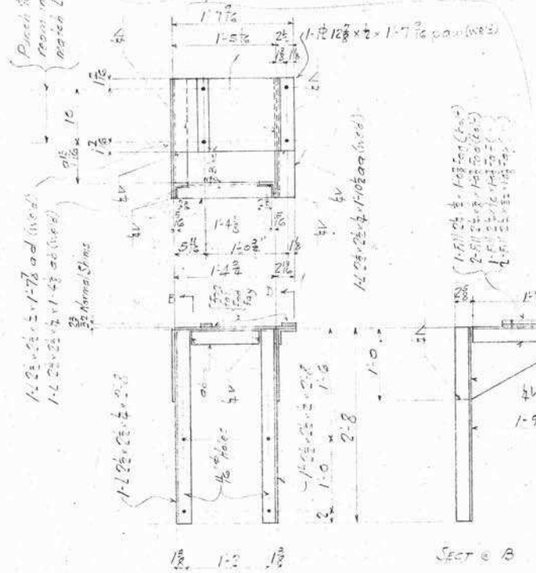


1-Bearing Support MS2
Must be square and out of wind



Material for Bearing Support MS3

1-Bearing Support MS3
Must be square and out of wind



1-Limit Switch Support MS8

1-Bearing Support MS4
Must be square and out of wind

Bearing Notes:
Holes in material over 3/4" ø to be drilled.
All field connections except lateral & sway bracing and railing to be subpunched 3/4" small and reamed to size to a steel template 1" thick.

REVISION								
A								
3-27								

DATE

Shop Paint 1 Cr Detroit Graphite #3-L Green
Shop Contact Surfaces not Painted
Inspection K. Gill (S. Group)
Rivets 3/4 ø Unless Noted
Holes 15/16 " "
Special Notes:
Bearing - See Note
Mat'l on Shop Bill 420 #21

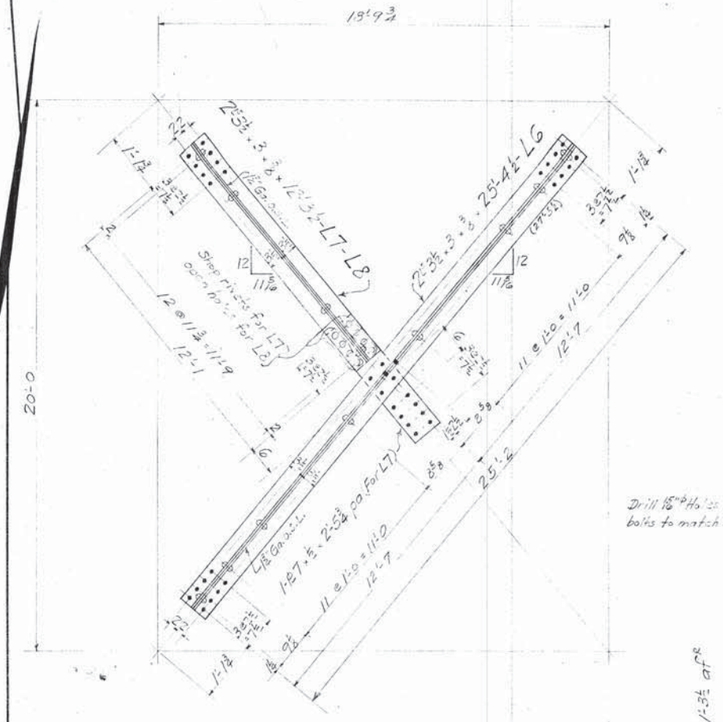
CONTRACT V 7407

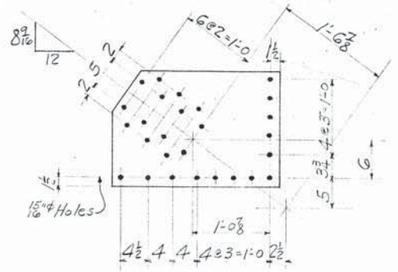
Details of Bearing Supports

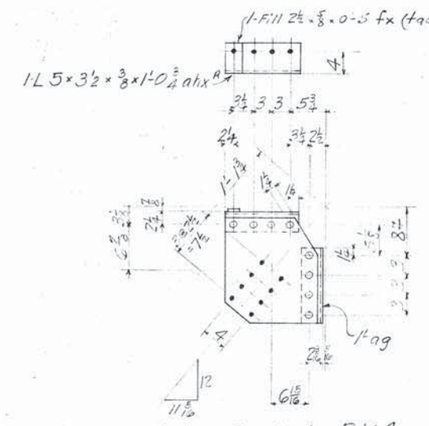
For Rapid Crossing Viaduct, Concrete Span.
Location Norfolk Branch, Dist. No. 1 Va.
Owner Elliott-Long Asphalt & Paving Co. Inc.

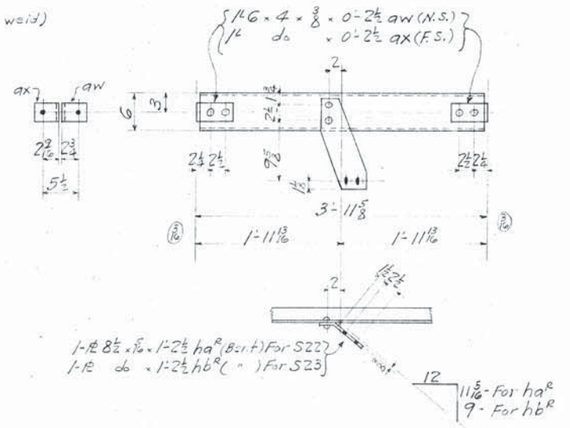
VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham plant
Made by FAP Checked by CKB
In charge of Susher Date
Revised
Scale in. = 1 Ft. Sheet No. 12 of



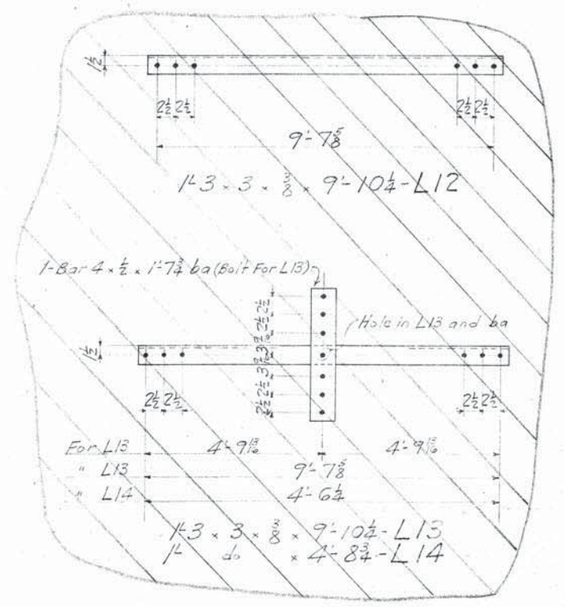


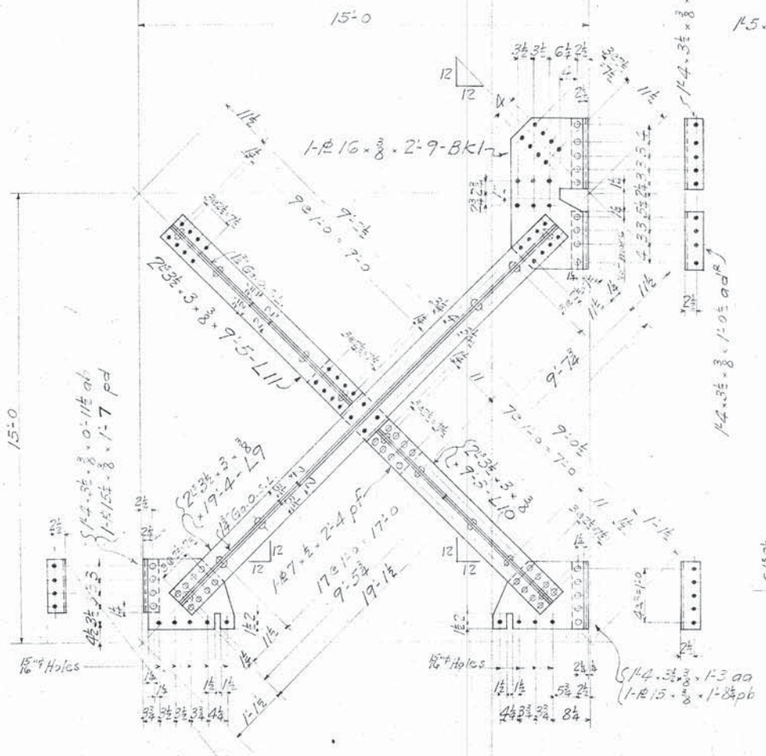


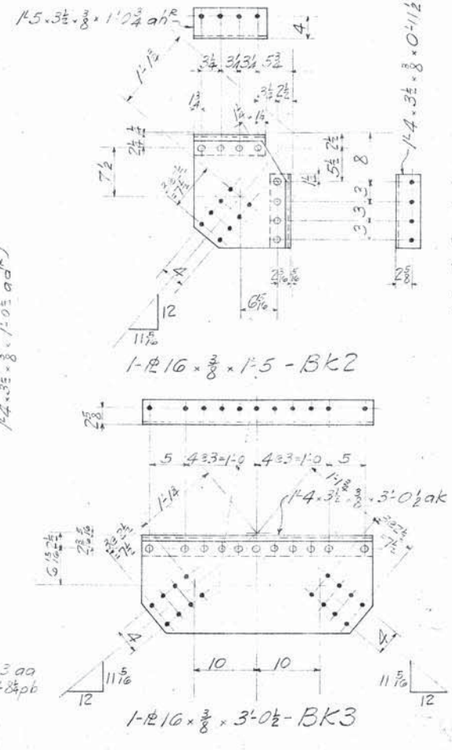


Reg'd. List

Make	Description	Thus	Mark
6	Laterals	Thus	L6R
6	do	Rev.	L6L
6	do	Thus	L7R
12	do	Thus	L8
2	do	Thus	L9R
2	do	Rev.	L9L
2	do	Thus	L10R
2	do	Rev.	L10L
4	do	Thus	L11
1	Bracket	Thus	BK1R
3	do	Rev.	BK1L
4	Lat. Plates	Thus	LP1
2	do	Thus	LP2R
2	do	Rev.	LP2L
6	Brackets	Thus	BK2R
6	do	Rev.	BK2L
10	do	Thus	BK3
4	do	Thus	BK4R
4	do	Rev.	BK4L
2	do	Thus	BK5R
2	do	Rev.	BK5L
1	do	Thus	BK6R
6	Laterals	Rev.	L7L
6	Struts	Thus	S22R
6	do	Rev.	S22L
2	do	Thus	S23R
2	do	Rev.	S23L
1	Bracket	Rev.	BK6L







REVISION	
DATE	
Shop Paint 1st Detroit Graphite #38 L Green	
Shop Contact Surfaces not Painted	
Inspection Va. Bi. Co. (Shop)	
Rivets ¾" ϕ Holes 15/16" ϕ	Unless Noted " "
Special Notes: None	
Mat'l on Shop Bill 66.23644	

CONTRACT V 7407

Details of Laterals, Lat. Plates & Hangers

For Broad Causeway Viaduct (Bascule Span)

Location Miami Beach, Dade Co. Fla.

Owner Allegheny Asphalt & Paving Co. Inc.

VIRGINIA BRIDGE COMPANY

ROANOKE, VIRGINIA

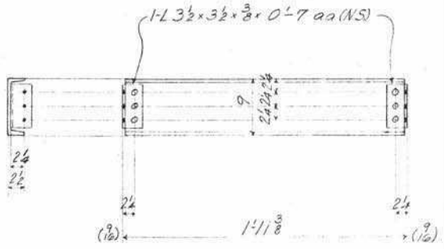
To be fabricated at Birmingham plant

Made by PAP Checked by CKB

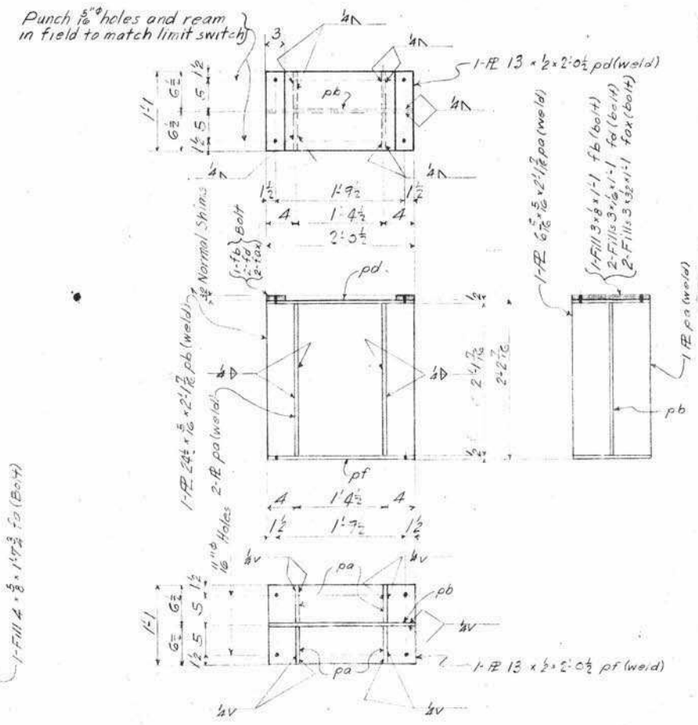
In charge of Slusher Date 1950

Revised

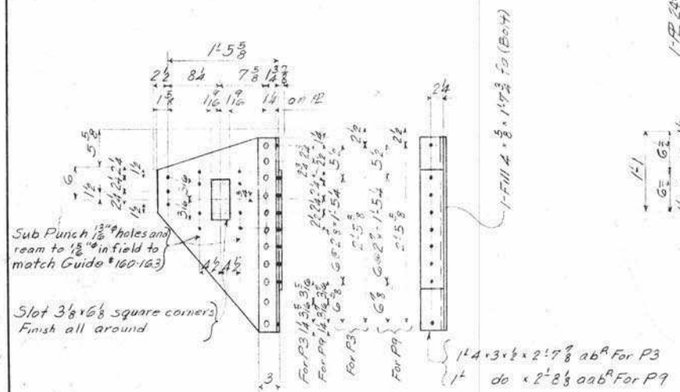
Scale in. = 1 Ft. Sheet No. 13 of



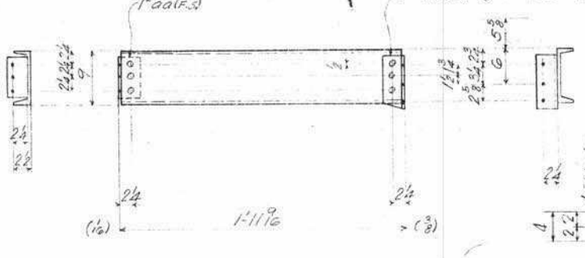
1-[9 @ 13.4# × 1'-10½ MS1



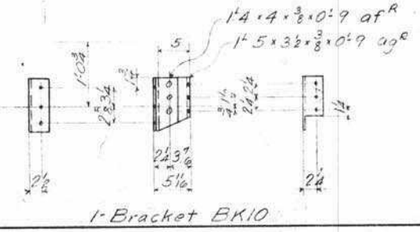
1-Limit Switch Support MS9



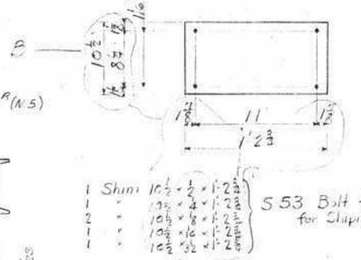
1-PL 18¾ × ⅝ × 2'-7⅞ P3
1-PL do × 2'-8⅛ P9



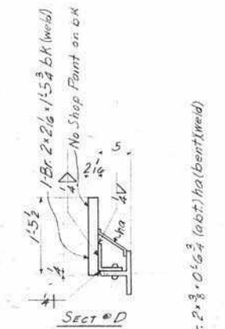
1-[9 @ 13.4# × 1'-10½ MS7

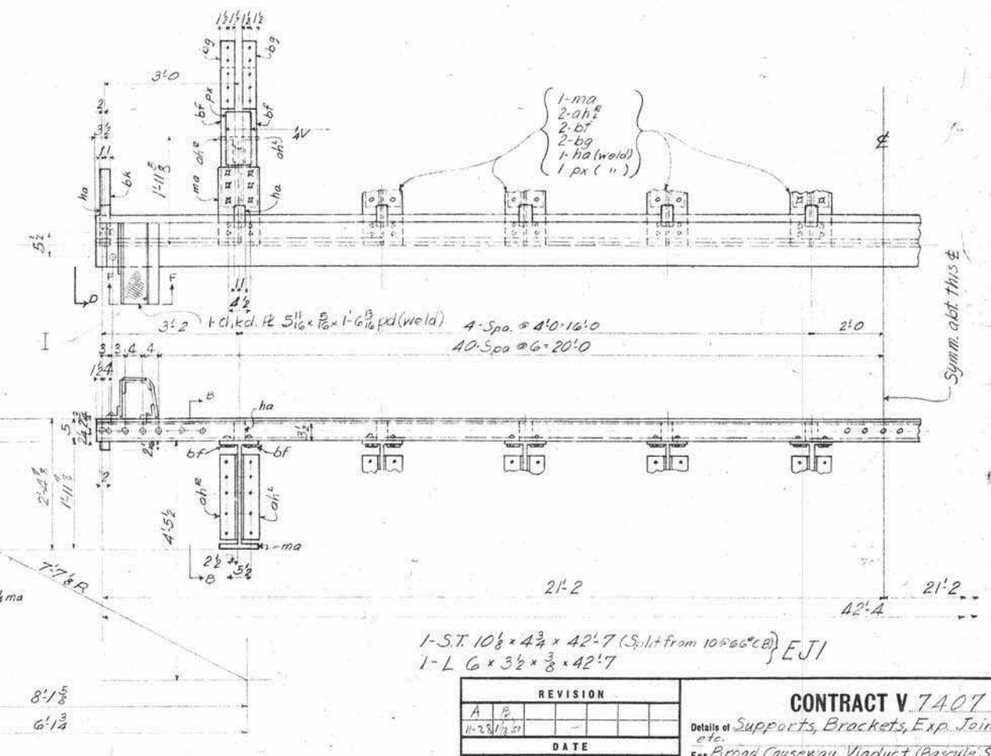


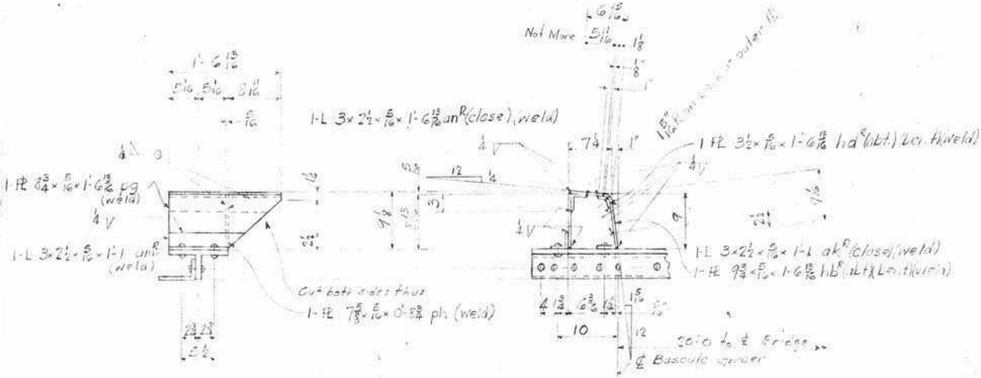
1-Bracket BK10



1-Shim 4 × 5/16 × 2'-10½
2- " 4 × ⅛ × 2'-10½
1- " 4 × 1/16 × 2'-10½
1- " 4 × 1/32 × 2'-10½
S.51 Bolt together for Shipment







Req'd List

Make	Description	Mark
4	Tail Lock Supports	MS1
2	Brackets Thus	P3^R
2	do Rev	P3^L
1	Support Thus	MS7^R
1	do Rev	MS7^L
2	Brackets Thus	BK10^R
2	do Rev	BK10^L
2	Limit Switch Supports	MS9
1	Bracket Thus	P9^R
1	do Rev	P9^L
2	Expansion Joints	EJ1
4	Sets Shims	S51
2	do	S53

Shop Note
Paint erection marks on the left-hand end of all members as shown on details.

Reaming Note—
Holes in material over ¾" thick to be drilled. All field connections except laterals, sway bracing and railing to be subpunched ¼" small and reamed to size to a steel templet 1" thick.

REVISION						
A	B					
11-28	12-20					

DATE

Shop Paint 1st Detroit Graphite #38-L Green
Shop Contact Surfaces ☐ Painted
Inspection Va. Br. Co. (Shop)
Rivets ¾" ϕ Unless Noted
Holes 13/16 " "
Special Notes:
Reaming: See note
Mat'l on Shop Bill EB&G

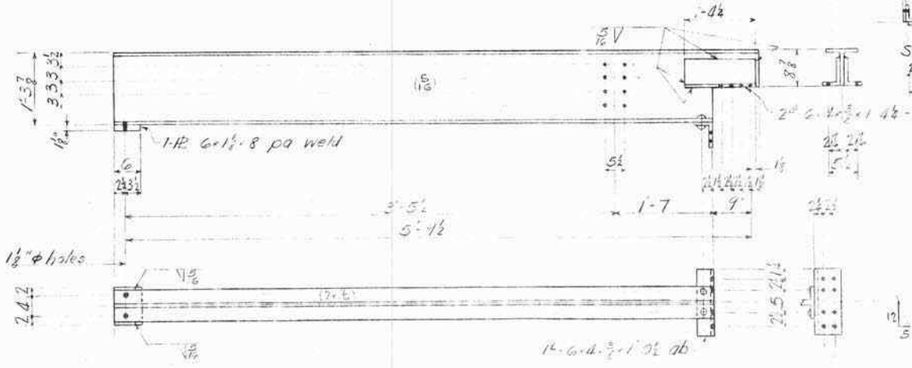
CONTRACT V. 7407

Details of Supports, Brackets, Exp. Joints, etc.
For Broad Causeway Viaduct (Bascule Span)
Location Miami Beach, Dade Co., Fla.
Owner Allegheny Asphalt Paving Co. Inc.

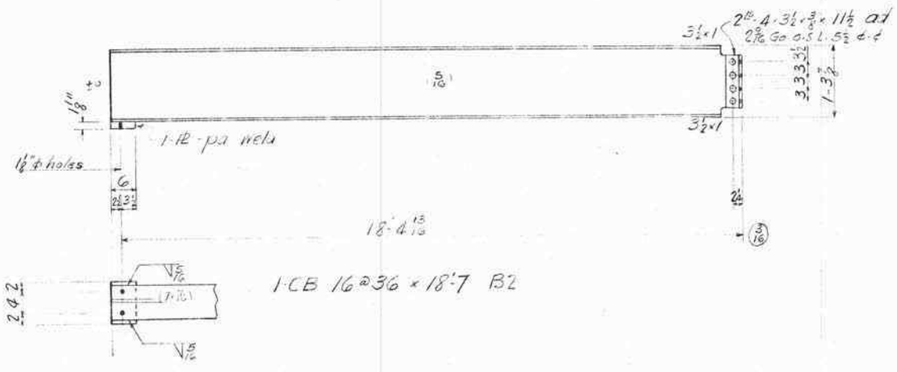
VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham plant
Made by R.W.W. Checked by C.K.B.
In charge of Slusher Date 1950
Revised
Scale ..... in. = 1 Ft. Sheet No. 14 of .....

PLATES
BARS
FITTED BOLTS
SHOP RIVETS









Rope List

Make	Description	Mark
1	Beam	B1
1	do	B2
2	Fasig Gdrs. Thru	FG1R
2	do Rev	FG1L
7	do Thru	FG2R
2	do Rev	FG2L
2	do Thru	FG3R
2	do Rev	FG3L
48	Laterals	L12

Shop Note
Paint erection marks on top flange and end of all members as shown on details.

REVISION	

DATE

Shop Paint 1st Detroit graphite #38 L Green
Shop Contact Surfaces ▬ Painted
Inspection
Rivets 7/8" ϕ Unless Noted " "
Holes 13/16" " "
Special Notes:
Mat'l on Shop Bill 37

CONTRACT V 7407

Details of FASIG GIRDERS

For Broad Crossing Viaduct (Cascade Span)

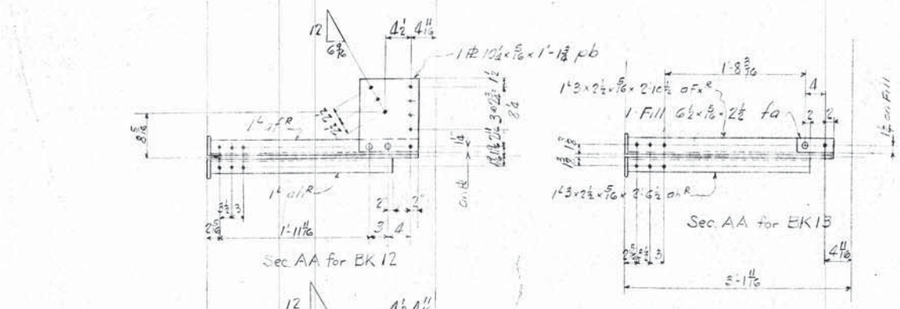
Location Miami Beach, Dade Co. Fla.

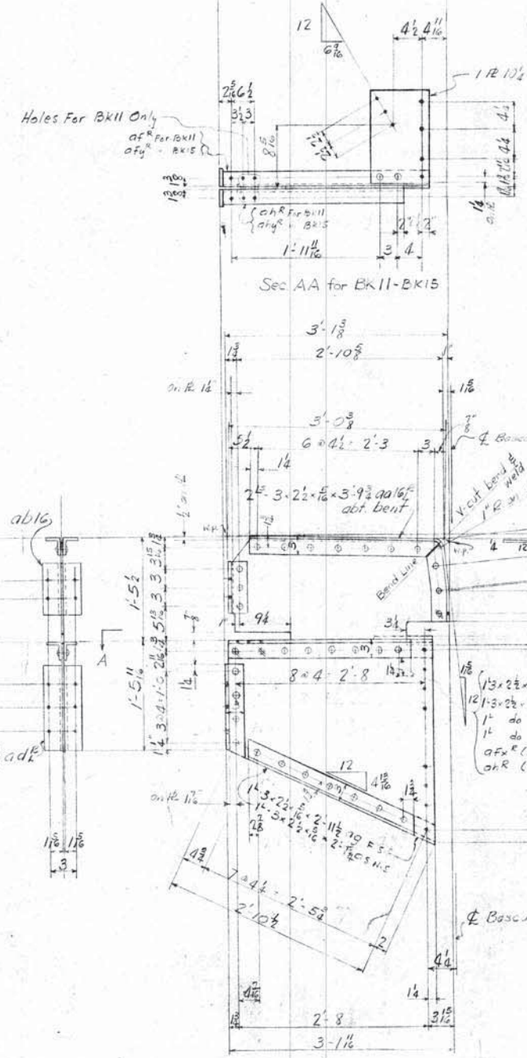
Owner Atlantic Coast Line R.R. Co.

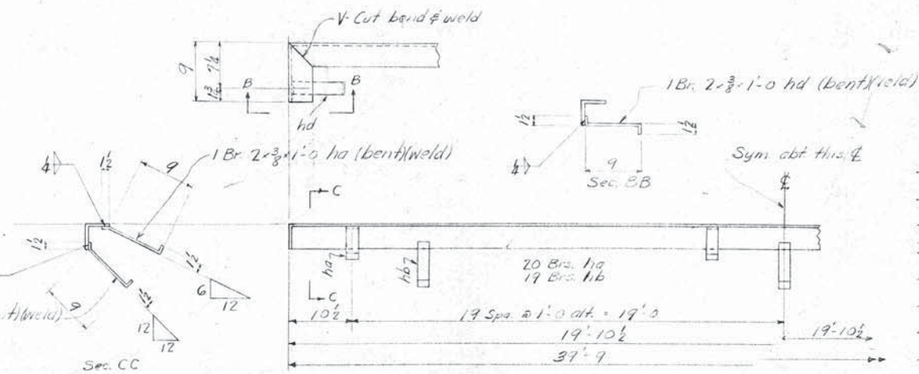
VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham plant
Made by [illegible] Checked by CRG
In charge of Bledsoe Date 12-70
Revised
Scale ½ in. = 1 Ft. Sheet No. 15 of

PLATES
BARS
ANGLES
FITTED STIFF.
BENT PLATES

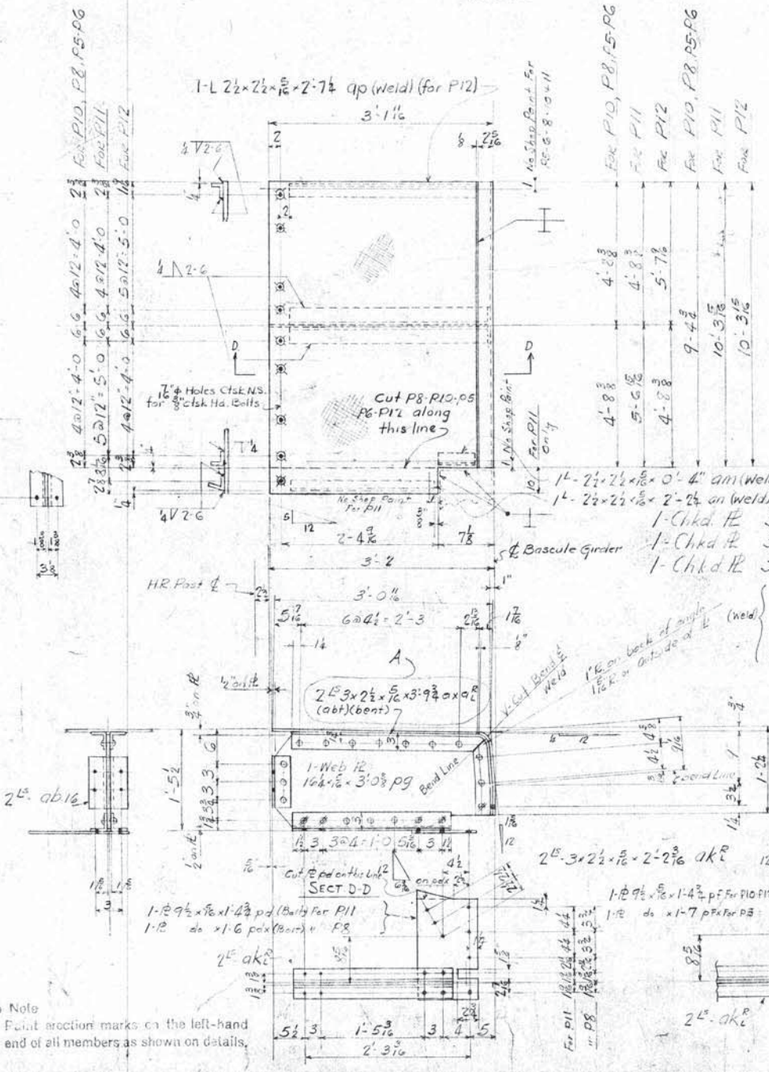


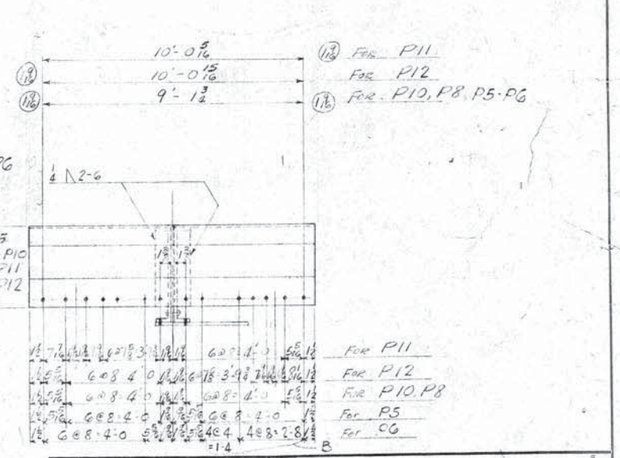




Reqd List

Make	Description	Mark
6	Brackets Thus	BK11R
6	do Rev.	BK11L
2	do Thus	BK12R
2	do Rev.	BK12L
2	do Thus	BK13R
2	do Rev.	BK13L
2	Chkd Pls Thus	P11R
2	do Rev.	P11L
2	do Thus	P8R
2	do Rev.	P8L
2	do Thus	P12R
2	do Rev.	P12L
2	do Thus	P10R
2	do Rev.	P10L
2	Expansion Joint	EJ3
2	Bracket Thus	BK15R
2	do Rev.	BK15L
2	Chkd Pls Thus	P5R
2	do Rev.	P5L
2	do Thus	P6R
2	do Rev.	P6L





REVISION						
A	B					
1/18	5/15/19					

DATE

Shop Paint 1st Detroit Graphite #38-L Green

Shop Contact Surfaces not Painted

Inspection Vis. Bolt & Shop

Rivets ⅞ Unless Noted

Holes ⅞ "

Special Notes:

Mat'l on Shop Bill 28, 29 & 30.

CONTRACT V 7407

Details of Sidewalk Brackets & Plates

For Expansion Joint - Bascule Span

Location Main Ch. Bascule Span Pier

Owner Norfolk Southern Railway Co.

VIRGINIA BRIDGE COMPANY

ROANOKE, VIRGINIA

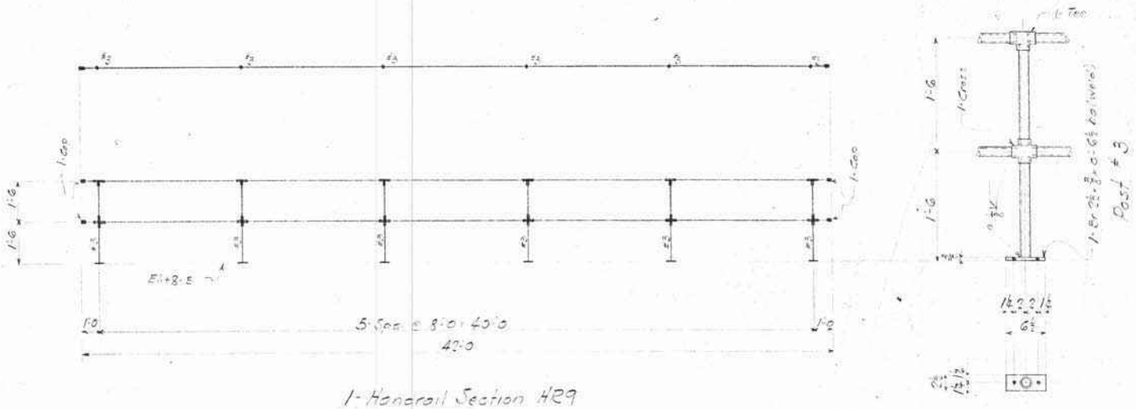
To be fabricated at Roanoke plant

Made by [illegible] Checked by CKD

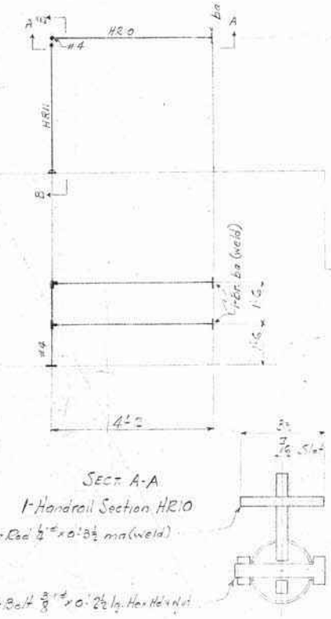
In charge of [illegible] Date 1/7/20

Revised

Scale in. = 1 Ft. Sheet No. 16 of

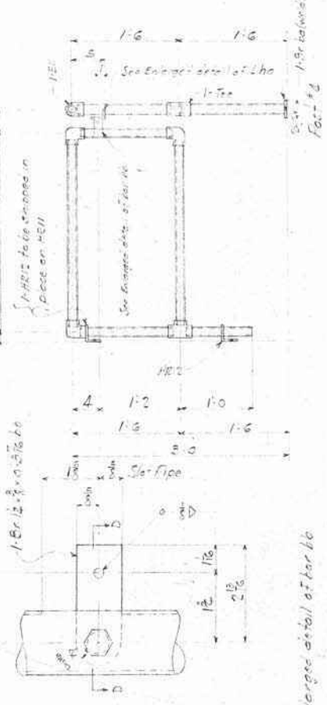


1-Handrail Section HR9



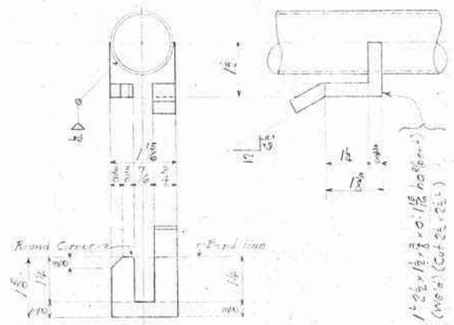
SECT. A-A
1-Handrail Section HR10

SECT. D-D

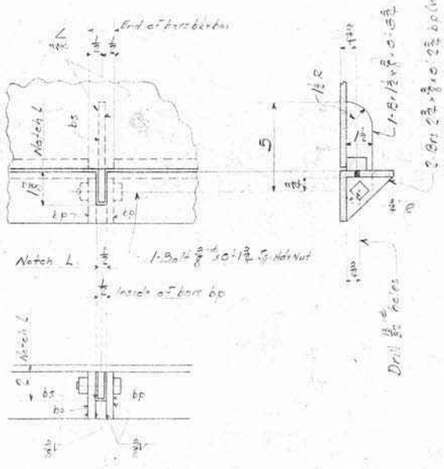


Enlarged Section B-B
1-Handrail Section HR11

Enlarged detail of Post #6

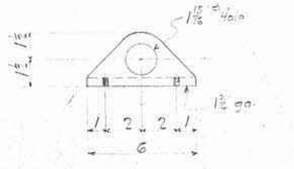


Enlarged detail of Post #3

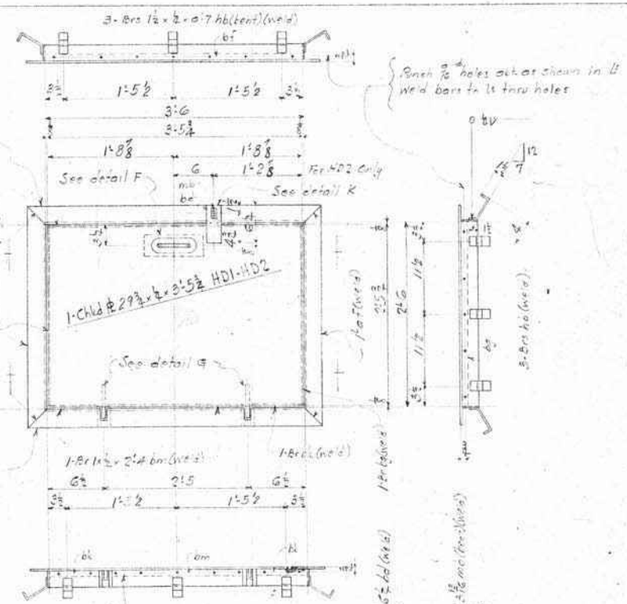


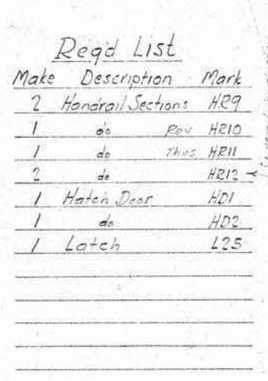
Enlarged detail G

Shop Notes—
All pipe railing to be 1½" Std. galv. pipe.
All pipe posts to be 1½" extra strong galv. pipe.
All Fittings to be Std. malleable type M.I.
All Posts, railing & Fittings Std. O.D.



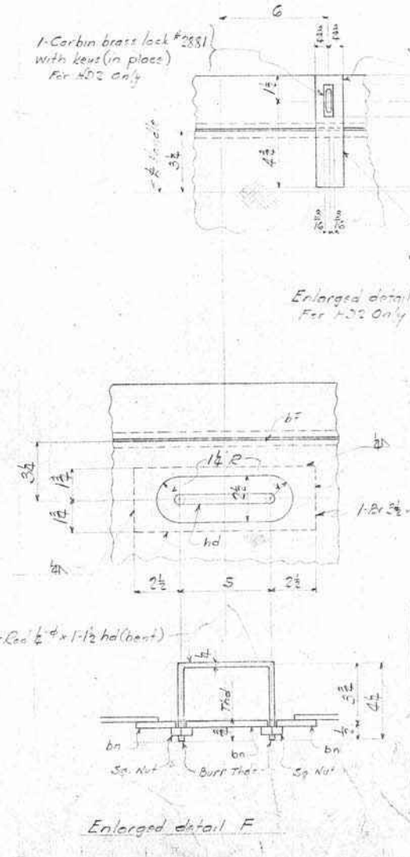
1-L 3½ x 3 x ⅜ x 0'-6 HR12

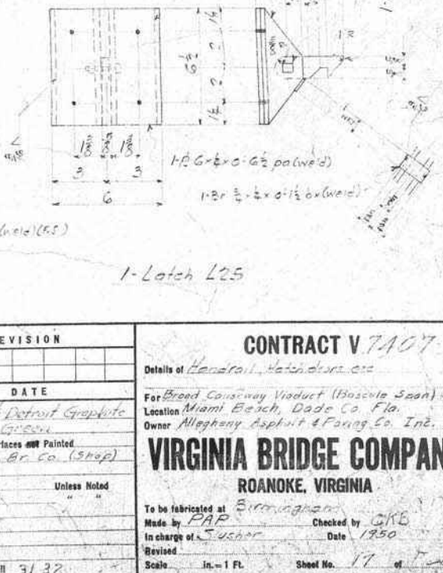




Reqd List

Make	Description	Mark
2	Handrail Sections	HR9
1	do Rev.	HR10
1	do Thos.	HR11
2	do	HR12
1	Hatch Door	HD1
1	do	HD2
1	Latch	L25





REVISION						

DATE	
Shop Paint	1 Ct. Detroit Graphite #38-L Green
Shop Contact Surfaces not Painted	
Inspection	Va. Br. Co. (Shop)
Rivets	None — Unless Noted
Holes	⅞ " "
Special Notes:	
Mat'l on Shop Bill	31,32

CONTRACT V 7107

Details of Handrail, Hatch door etc

For Broad Causeway Viaduct (Bascule Span)
Location Miami Beach, Dade Co. Fla.
Owner Allegheny Asphalt & Paving Co. Inc.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham plant
Made by PAP Checked by CKG
In charge of Tusher Date 1950
Revised
Scale in. = 1 Ft. Sheet No. 17 of 75

Angles								
Plates								
Bars								
Fitted Stiff.								
Bent Plates								

Reqd List

Make	Description	Mark
2	Curb Pl. Thru	CP1[K]
2	do Rev	CP1[M]
4	Pl	P15
2	Exp. Joints	EJ2
8	Sets Shims	S50
4	do	S52
29	Anchors	X47
29	Washers 3"ϕ × $\frac{3}{8}$" Thick × $1\frac{3}{16}$" Hole	W10

1 Pl 16(Avg) × $\frac{5}{16}$ × 16'-5$\frac{7}{8}$ (Bent) CP1

1 Pl. 13$\frac{7}{8}$ × $\frac{5}{16}$ × 16'-5$\frac{7}{8}$ P15

1 - Shim 2$\frac{1}{2}$ × 4 × 0'-11
2 - " 2$\frac{1}{2}$ × 8 × 0'-11
1 - " 2$\frac{1}{2}$ × 12 × 0'-11
1 - " 2$\frac{1}{2}$ × 32 × 3'-11
} S52 Bolt together for shipment

1 - Shim 4 × $\frac{3}{8}$ × 1'-6
2 - " 4 × $\frac{1}{2}$ × 1'-6
1 - " 4 × $\frac{5}{8}$ × 1'-6
1 - " 4 × $\frac{3}{4}$ × 1'-6
} S50 Bolt together for shipment

1 - Rod $\frac{3}{4}$"ϕ × 3'-11 X47

Reaming Note :-
Holes in material over $\frac{3}{4}$" thick to be drilled.
All field connections except laterals, sway bracing, and railing to be sub punched and reamed to size to a steel template 1" thick.

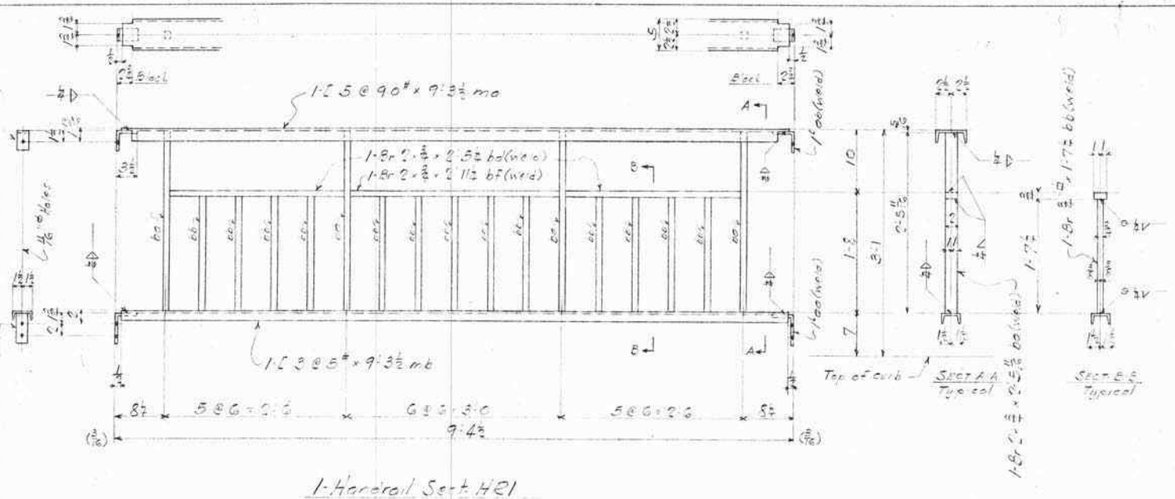
REVISION	DATE

Shop Paint 1st Detroit Graphite #32-L green
Shop Contact Surfaces not Painted
Inspection Va. Bridge (Shop)
Rivets $\frac{7}{8}$" ϕ Unless Noted
Holes $\frac{7}{8}$" ϕ " "
Special Notes: Reaming see note
Mat'l on Shop Bill 33 & 34

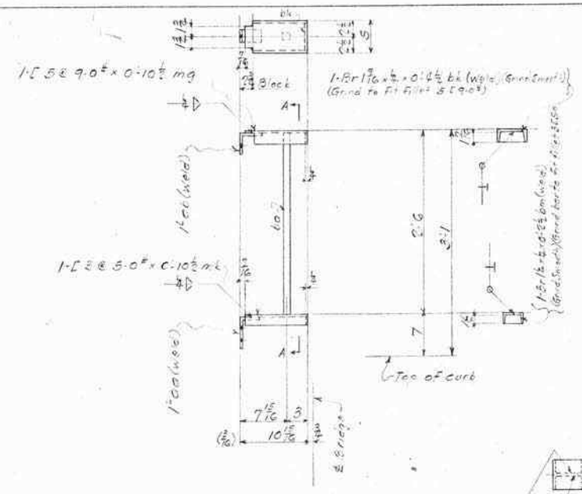
CONTRACT V 7407
Details of Curb Plates, Shims, Expansion
For Brook Causeway Viaduct - Eastside Span
Location Miami Beach, Dade Co., Fla.
Owner Atlantic Ave. Improvement & Realty Co.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

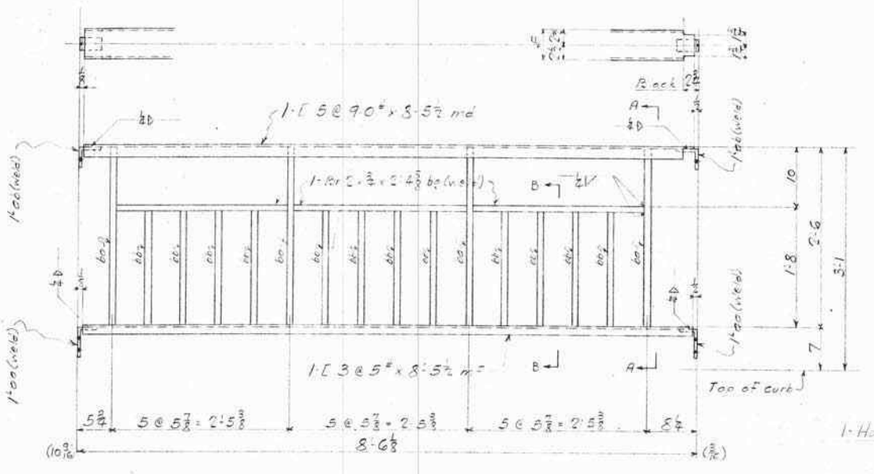
To be fabricated at Birmingham plant
Made by V.T.P. Checked by C.R.S.
In charge of Shuler Date 1959
Revised
Scale in. = 1 Ft. Sheet No. 18 of



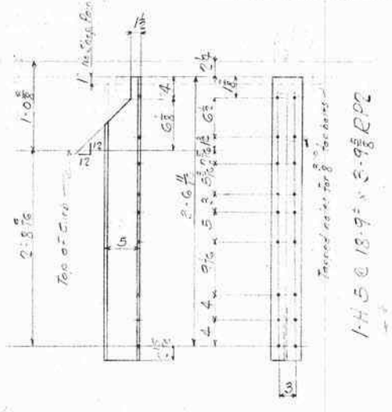
1-Handrail Sect HR1

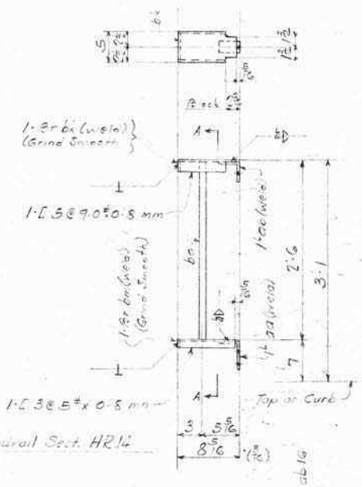


1-Handrail Sect HR3

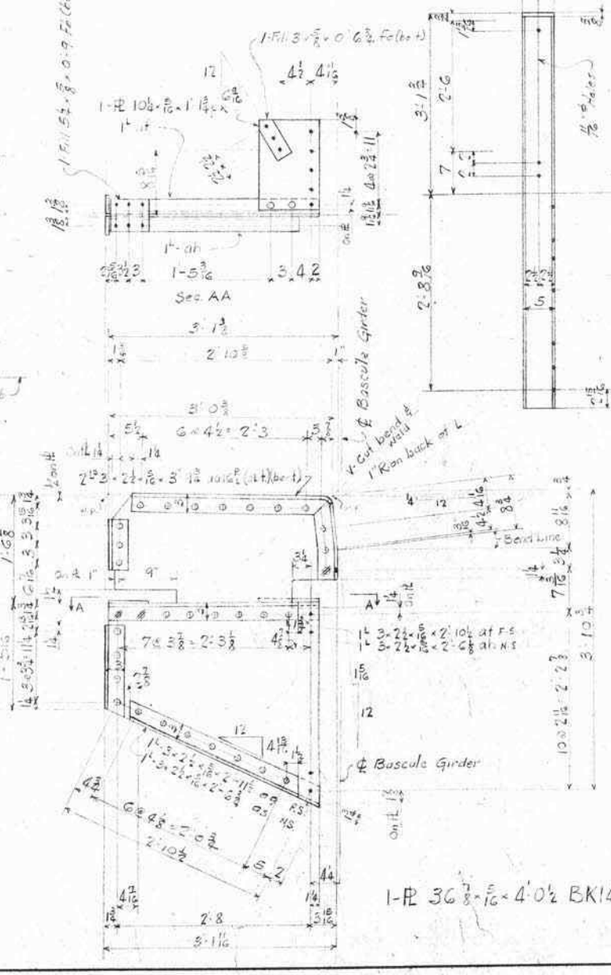


1-Handrail Sect HR2





1-Handrail Sect HR14


1-Fil ⅜ × ½ × 0'-6½ fc (Weld)
1-Pl 10½ × ⅜ × 1'-1½
1-Pl 5'-5⅛ × 0'-6 bh (weld)
1-Pl 5'-⅜ × 0'-6 bh (weld)
1-H 5 @ 18.9# × 6'-0⅞ RD1
1-Fil ⅜ × ½ × 0'-8 fc (Weld)
1-Pl ½ × 0'-8 bk (weld)
(Grind Smooth)
1-Pl ½ × 0'-8 bm (weld)
(Grind Smooth)
1-Co (weld)
1-Pl ½ × 0'-8 bf (weld)
1-Pl ½ × 0'-8 bn (weld)
1-Pl ½ × 0'-8 bp (weld)
1-Pl ½ × 0'-8 bq (weld)
1-Pl ½ × 0'-8 br (weld)
1-Pl ½ × 0'-8 bs (weld)
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1-Pl ½ × 0'-8 bu (weld)
1-Pl ½ × 0'-8 bv (weld)
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1-Pl ½ × 0'-8 bx (weld)
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1-Pl ½ × 0'-8 bz (weld)
1-Pl ½ × 0'-8 ca (weld)
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1-Pl ½ × 0'-8 cj (weld)
1-Pl ½ × 0'-8 ck (weld)
1-Pl ½ × 0'-8 cl (weld)
1-Pl ½ × 0'-8 cm (weld)
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1-Pl ½ × 0'-8 vm (weld)
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1-Pl ½ × 0'-8 vo (weld)
1-Pl ½ × 0'-8 vp (weld)
1-Pl ½ × 0'-8 vq (weld)
1-Pl ½ × 0'-8 vr (weld)
1-Pl ½ × 0'-8 vs (weld)
1-Pl ½ × 0'-8 vt (weld)
1-Pl ½ × 0'-8 vu (weld)
1-Pl ½ × 0'-8 vv (weld)
1-Pl ½ × 0'-8 vw (weld)
1-Pl ½ × 0'-8 vx (weld)
1-Pl ½ × 0'-8 vy (weld)
1-Pl ½ × 0'-8 vz (weld)
1-Pl ½ × 0'-8 wa (weld)
1-Pl ½ × 0'-8 wb (weld)
1-Pl ½ × 0'-8 wc (weld)
1-Pl ½ × 0'-8 wd (weld)
1-Pl ½ × 0'-8 we (weld)
1-Pl ½ × 0'-8 wf (weld)
1-Pl ½ × 0'-8 wg (weld)
1-Pl ½ × 0'-8 wh (weld)
1-Pl ½ × 0'-8 wi (weld)
1-Pl ½ × 0'-8 wj (weld)
1-Pl ½ × 0'-8 wk (weld)
1-Pl ½ × 0'-8 wl (weld)
1-Pl ½ × 0'-8 wm (weld)
1-Pl ½ × 0'-8 wn (weld)
1-Pl ½ × 0'-8 wo (weld)
1-Pl ½ × 0'-8 wp (weld)
1-Pl ½ × 0'-8 wq (weld)
1-Pl ½ × 0'-8 wr (weld)
1-Pl ½ × 0'-8 ws (weld)
1-Pl ½ × 0'-8 wt (weld)
1-Pl ½ × 0'-8 wu (weld)
1-Pl ½ × 0'-8 wv (weld)
1-Pl ½ × 0'-8 ww (weld)
1-Pl ½ × 0'-8 wx (weld)
1-Pl ½ × 0'-8 wy (weld)
1-Pl ½ × 0'-8 wz (weld)
1-Pl ½ × 0'-8 xa (weld)
1-Pl ½ × 0'-8 xb (weld)
1-Pl ½ × 0'-8 xc (weld)
1-Pl ½ × 0'-8 xd (weld)
1-Pl ½ × 0'-8 xe (weld)
1-Pl ½ × 0'-8 xf (weld)
1-Pl ½ × 0'-8 xg (weld)
1-Pl ½ × 0'-8 xh (weld)
1-Pl ½ × 0'-8 xi (weld)
1-Pl ½ × 0'-8 xj (weld)
1-Pl ½ × 0'-8 xk (weld)
1-Pl ½ × 0'-8 xl (weld)
1-Pl ½ × 0'-8 xm (weld)
1-Pl ½ × 0'-8 xn (weld)
1-Pl ½ × 0'-8 xo (weld)
1-Pl ½ × 0'-8 xp (weld)
1-Pl ½ × 0'-8 xq (weld)
1-Pl ½ × 0'-8 xr (weld)
1-Pl ½ × 0'-8 xs (weld)
1-Pl ½ × 0'-8 xt (weld)
1-Pl ½ × 0'-8 xu (weld)
1-Pl ½ × 0'-8 xv (weld)
1-Pl ½ × 0'-8 xw (weld)
1-Pl ½ × 0'-8 xx (weld)
1-Pl ½ × 0'-8 xy (weld)
1-Pl ½ × 0'-8 xz (weld)
1-Pl ½ × 0'-8 ya (weld)
1-Pl ½ × 0'-8 yb (weld)
1-Pl ½ × 0'-8 yc (weld)
1-Pl ½ × 0'-8 yd (weld)
1-Pl ½ × 0'-8 ye (weld)
1-Pl ½ × 0'-8 yf (weld)
1-Pl ½ × 0'-8 yg (weld)
1-Pl ½ × 0'-8 yh (weld)
1-Pl ½ × 0'-8 yi (weld)
1-Pl ½ × 0'-8 yj (weld)
1-Pl ½ × 0'-8 yk (weld)
1-Pl ½ × 0'-8 yl (weld)
1-Pl ½ × 0'-8 ym (weld)
1-Pl ½ × 0'-8 yn (weld)
1-Pl ½ × 0'-8 yo (weld)
1-Pl ½ × 0'-8 yp (weld)
1-Pl ½ × 0'-8 yq (weld)
1-Pl ½ × 0'-8 yr (weld)
1-Pl ½ × 0'-8 ys (weld)
1-Pl ½ × 0'-8 yt (weld)
1-Pl ½ × 0'-8 yu (weld)
1-Pl ½ × 0'-8 yv (weld)
1-Pl ½ × 0'-8 yw (weld)
1-Pl ½ × 0'-8 yx (weld)
1-Pl ½ × 0'-8 yy (weld)
1-Pl ½ × 0'-8 yz (weld)
1-Pl ½ × 0'-8 za (weld)
1-Pl ½ × 0'-8 zb (weld)
1-Pl ½ × 0'-8 zc (weld)
1-Pl ½ × 0'-8 zd (weld)
1-Pl ½ × 0'-8 ze (weld)
1-Pl ½ × 0'-8 zf (weld)
1-Pl ½ × 0'-8 zg (weld)
1-Pl ½ × 0'-8 zh (weld)
1-Pl ½ × 0'-8 zi (weld)
1-Pl ½ × 0'-8 zj (weld)
1-Pl ½ × 0'-8 zk (weld)
1-Pl ½ × 0'-8 zl (weld)
1-Pl ½ × 0'-8 zm (weld)
1-Pl ½ × 0'-8 zn (weld)
1-Pl ½ × 0'-8 zo (weld)
1-Pl ½ × 0'-8 zp (weld)
1-Pl ½ × 0'-8 zq (weld)
1-Pl ½ × 0'-8 zr (weld)
1-Pl ½ × 0'-8 zs (weld)
1-Pl ½ × 0'-8 zt (weld)
1-Pl ½ × 0'-8 zu (weld)
1-Pl ½ × 0'-8 zv (weld)
1-Pl ½ × 0'-8 zw (weld)
1-Pl ½ × 0'-8 zx (weld)
1-Pl ½ × 0'-8 zy (weld)
1-Pl ½ × 0'-8 zz (weld)
1-Pl ½ × 0'-8 aaa (weld)
1-Pl ½ × 0'-8 aab (weld)
1-Pl ½ × 0'-8 aac (weld)
1-Pl ½ × 0'-8 aad (weld)
1-Pl ½ × 0'-8 aae (weld)
1-Pl ½ × 0'-8 aaf (weld)
1-Pl ½ × 0'-8 aag (weld)
1-Pl ½ × 0'-8 aah (weld)
1-Pl ½ × 0'-8 aai (weld)
1-Pl ½ × 0'-8 aaj (weld)
1-Pl ½ × 0'-8 aak (weld)
1-Pl ½ × 0'-8 aal (weld)
1-Pl ½ × 0'-8 aam (weld)
1-Pl ½ × 0'-8 aan (weld)
1-Pl ½ × 0'-8 aao (weld)
1-Pl ½ × 0'-8 aap (weld)
1-Pl ½ × 0'-8 aaq (weld)
1-Pl ½ × 0'-8 aar (weld)
1-Pl ½ × 0'-8 aas (weld)
1-Pl ½ × 0'-8 aat (weld)
1-Pl ½ × 0'-8 aau (weld)
1-Pl ½ × 0'-8 aav (weld)
1-Pl ½ × 0'-8 aaw (weld)
1-Pl ½ × 0'-8 aax (weld)
1-Pl ½ × 0'-8 aay (weld)
1-Pl ½ × 0'-8 aaz (weld)
1-Pl ½ × 0'-8 aba (weld)
1-Pl ½ × 0'-8 abb (weld)
1-Pl ½ × 0'-8 abc (weld)
1-Pl ½ × 0

Rega List

Make	Description		Mark
2	Ladder	Thus:	L20R
2	do	Rev.	L20L
1	Stairway		SS1
1	do		SS2
4	Handrail Sections		HR4
4	do		HR5
4	do		HR6
4	do		HR7
2	do	Thus	HR8R
2	do	Rev.	HR8L

Shop Note:-
All pipe railings to be 1½" Std. blk pipe
All pipe posts to be 1½" extra streng blk pipe
All fittings to be std. ball type, m.i.
All posts, railings & fittings Std. R.H. Thread

REVISION		
DATE		
Shop Paint		
Shop Contact Surfaces not Painted		
Inspection		
Rivets		Unless Noted
Holes		
Special Notes:		
Mat'l on Shop Bill		

CONTRACT V 7407

Details of Steel Stairs, Handrail etc.

For Approach Causeway, Viaduct - Bascule Span

Location Miami Beach, Dade Co., Fla.

Owner Allegheny Asphalt & Paving Co., Inc.

VIRGINIA BRIDGE COMPANY

ROANOKE, VIRGINIA

To be fabricated at Roanoke, Va. Shop

Made by PAP Checked by [illegible]

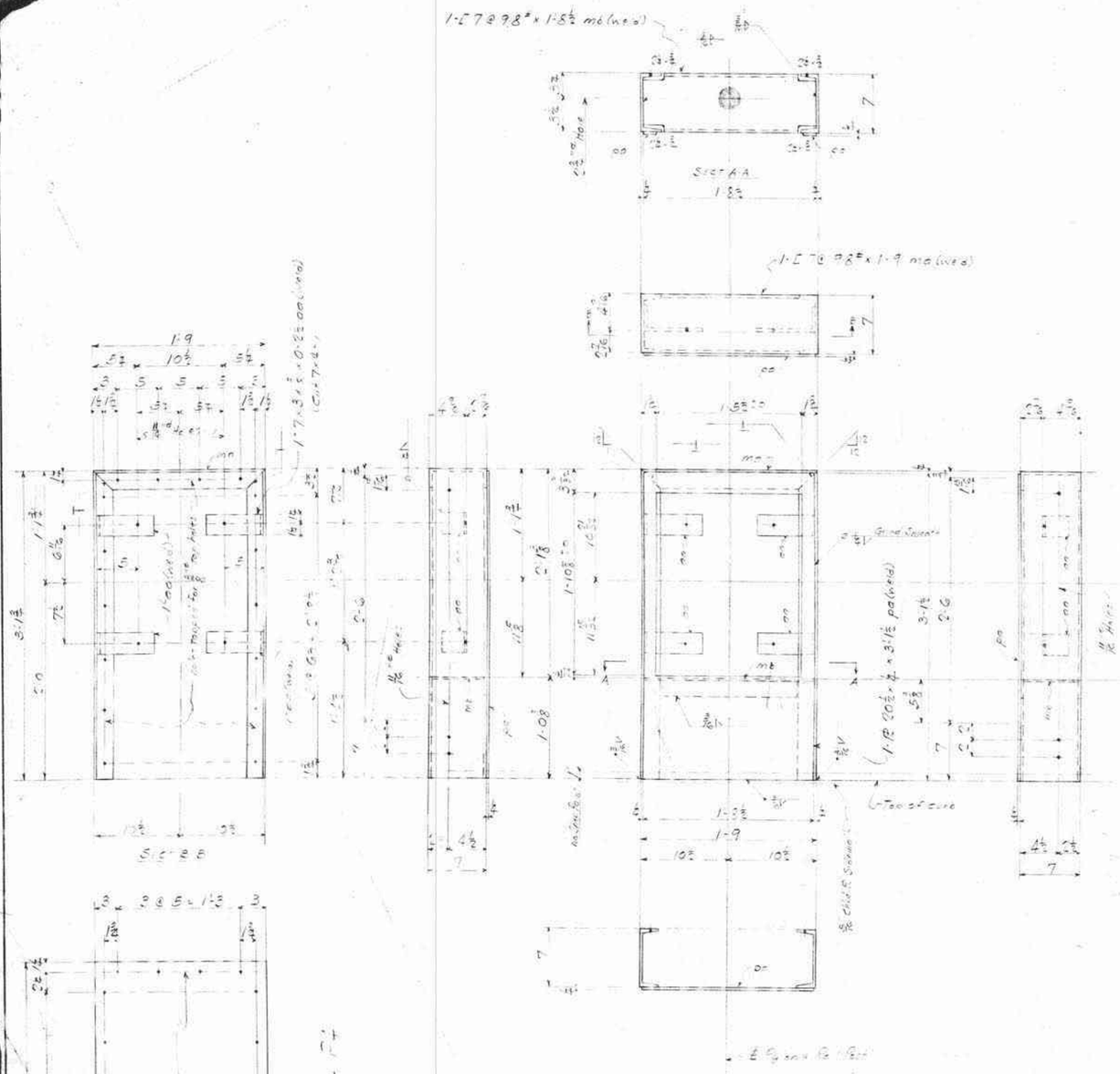
In charge of Slusher Date 1-10-51

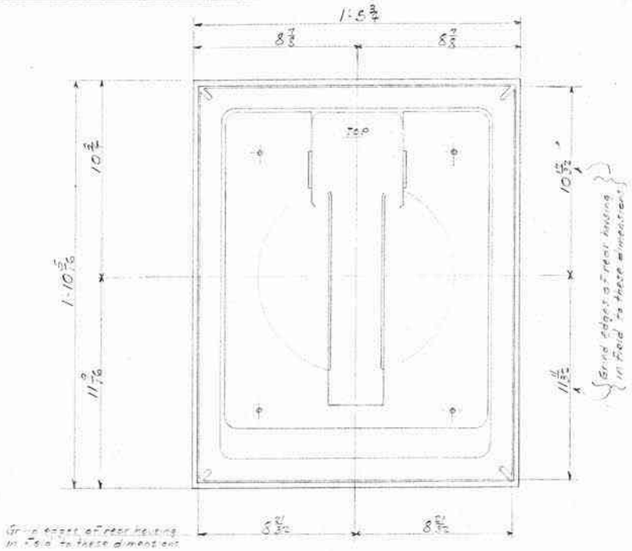
Revised Date

Scale In. = 1 Ft. Sheet 20 of [illegible] Sheets

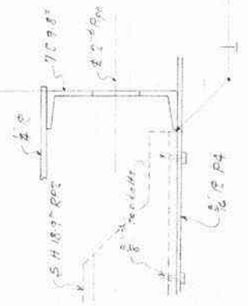
Reqd List

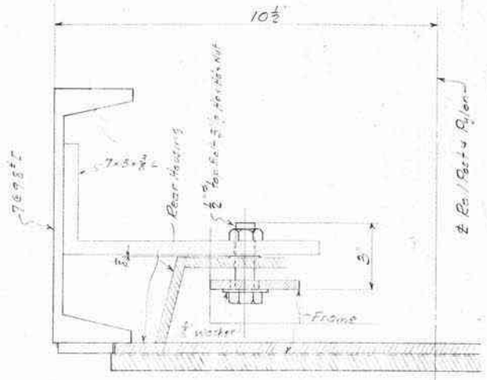
Make	Description	Mark
8	Steel Pylons	SP1
8	Plates	P4
32	Top Bolts 1" x 10'-3" Hex. Hd. Nut (T. to fit [illegible])	
160	Top Bolts 3/8" x 0'-6" Sq. Hd.	
32	Washers 1" O. x 3/8" Thk. for 1" Hex. Bolts	





Detail Showing Field assembly of rear housing to Frame, Type VCD-12 Lighting Units





Typical Detail Showing Field Connection of Frame and rear housing Steel Pylon.

REVISION						
DATE						

Shop Paint 1st Detroit Graphite #38-L Green

Shop Contact Surfaces and Painted

Inspection Va. Br. Co. (Shop)

Rivets None Unless Noted

Holes As Noted " "

Special Notes:

Reaming: None

Mat'l on Shop Bill 39

CONTRACT V 7407

Details of Steel Pylons

For Broad Causeway Viaduct (Access Span)

Location Miami Beach, Dade Co., Fla.

Owner Allegheny Asphalt & Paving Co. Inc.

VIRGINIA BRIDGE COMPANY

ROANOKE, VIRGINIA

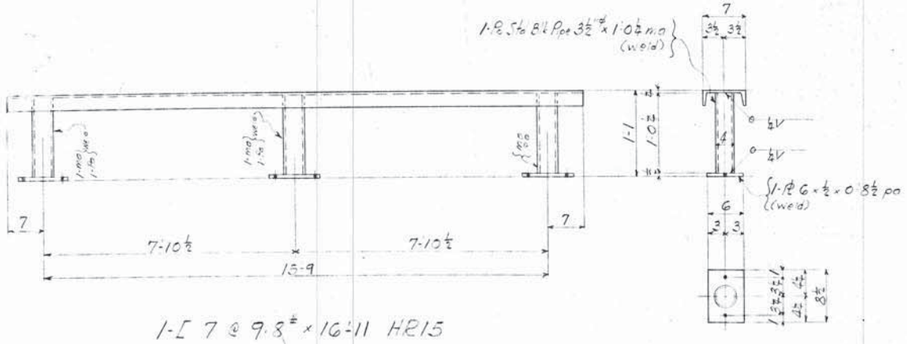
To be fabricated at Birmingham plant

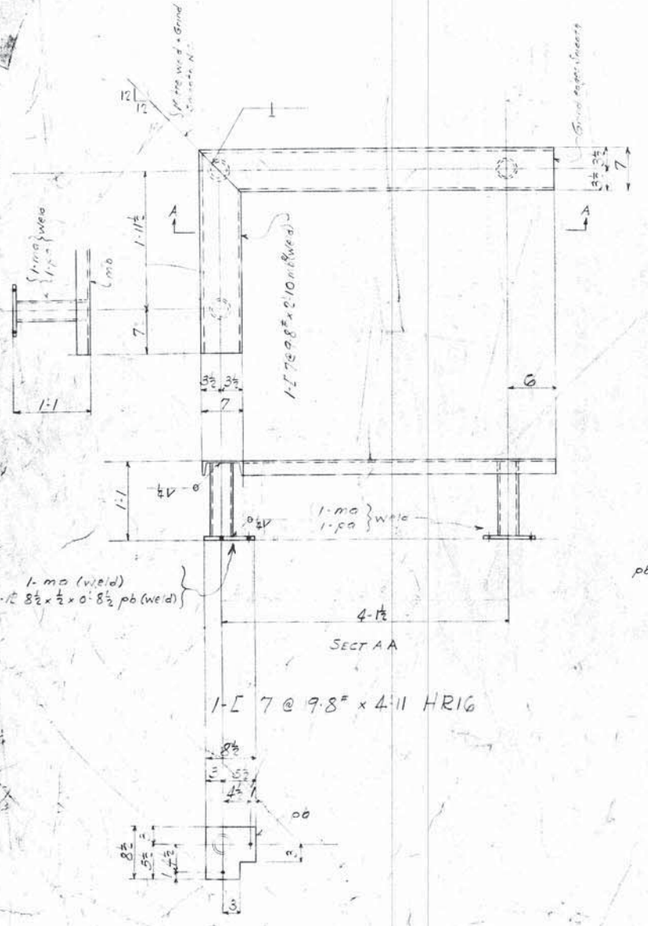
Made by DAP Checked by CKE

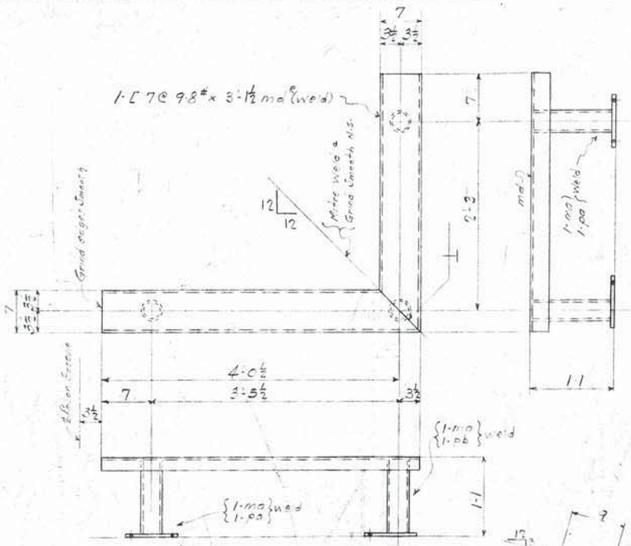
In charge of Stucker Date 1950

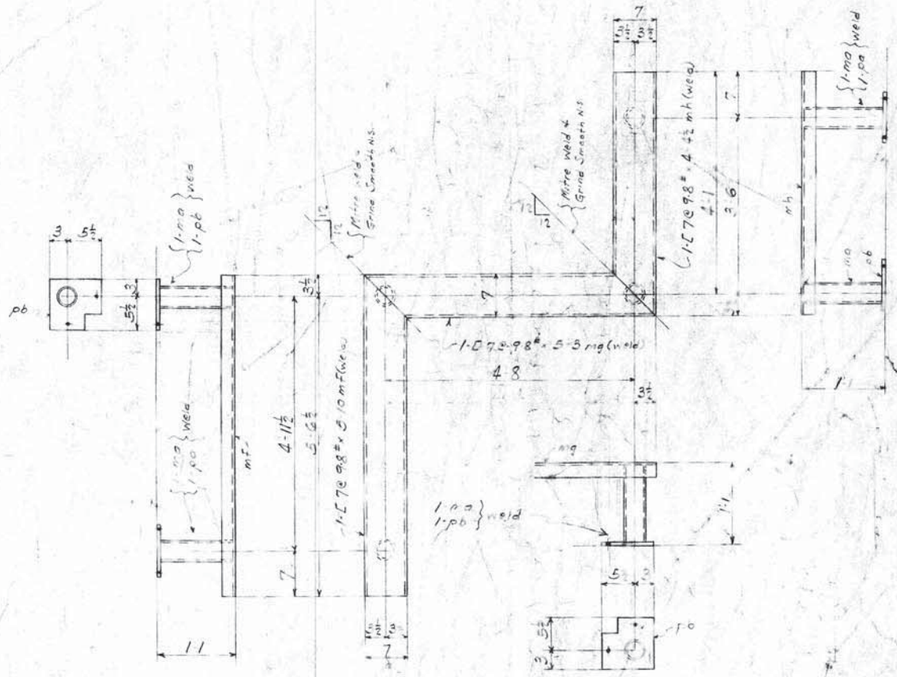
Revised

Scale in. = 1 Ft. Sheet No. 21 of





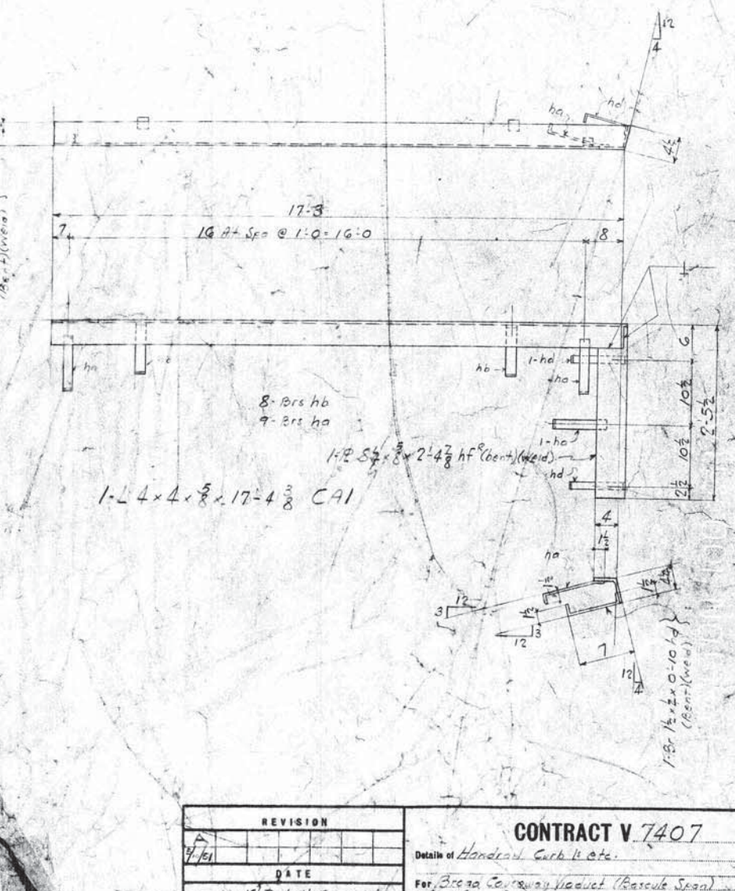




Reqd List

Make	Description	Mark
3	Handrail Sections	HR15
2	do	This HR16R
2	do	Rev HR16L
2	do	This HR17R
1	do	Rev HR17L
1	do	HR18
2	Curb Angles	This CA1R
2	do	Rev CA1L

GS Lag Bolts 3/8" d × 0'-4 Sq Hd
12 Pcs 12 to 14½ Duck 16' × 2'-7" CD1
12 Pcs " " " 11" × 1'-3" CD2
GS Pcs Sheet Lead 3½ × 8 × 0'-6 (Plain).



REVISION	
1	9/61
DATE	

CONTRACT V 7407

Details of Handrail Curb Plate.

For Broad Causeway Viaduct (Rascule Span)

Location Miami Beach, Dade Co. Fla.

Owner Allegheny Asphalt Paving Co. Inc.

VIRGINIA BRIDGE COMPANY

ROANOKE, VIRGINIA

Shop Paint 1 Coat Inert Graphite & Oil #38 Linseed

Shop Contact Surfaces not Painted

Inspection by Purchaser (Shop)

Rivets None Unless Noted

Holes —

Special Notes:

Coaming: None

Mark on Shop Bill

To be fabricated at Birmingham plant

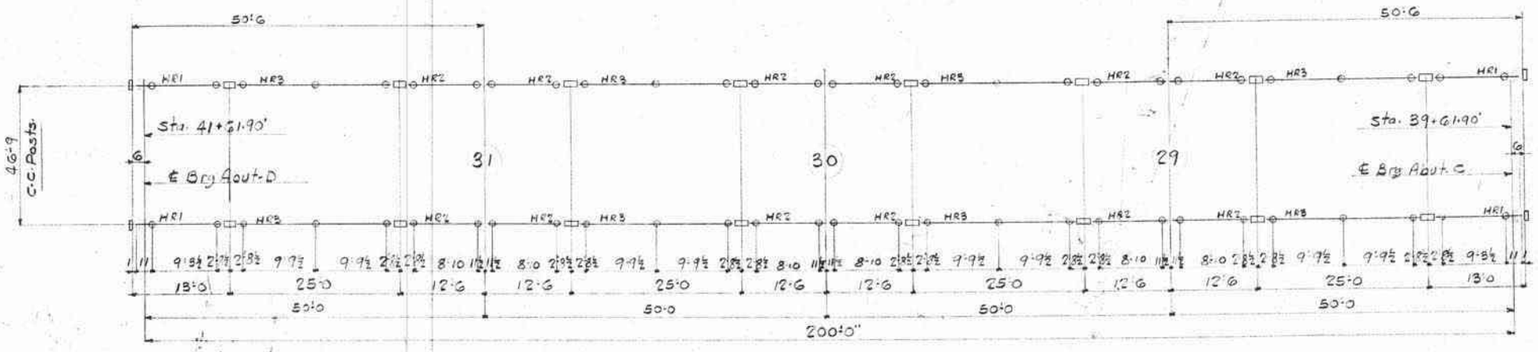
Made by P.A.J. Checked by C.K.J.

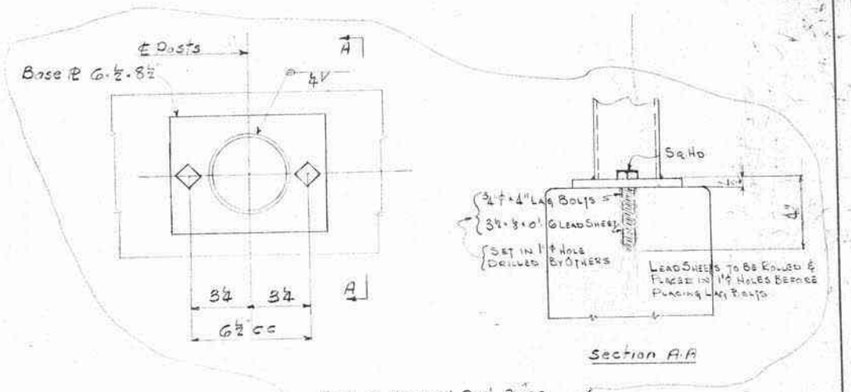
In charge of S. Fisher Date 1950

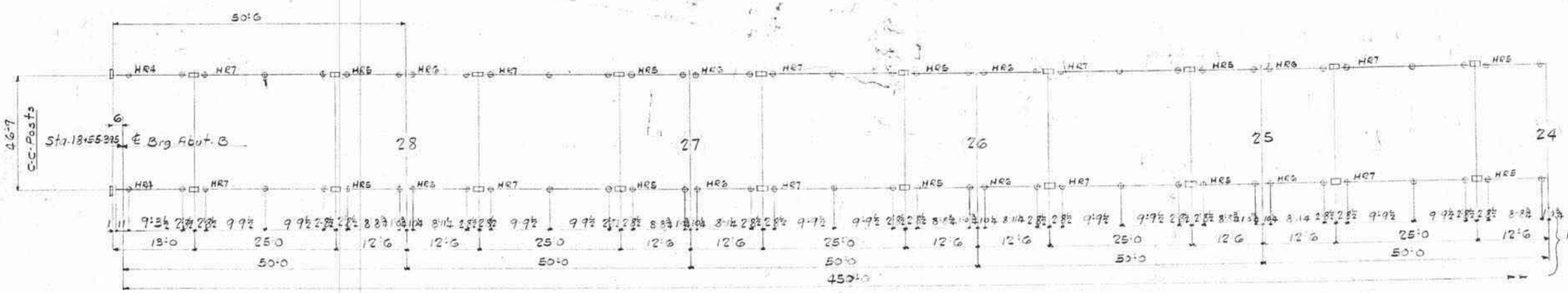
Revised

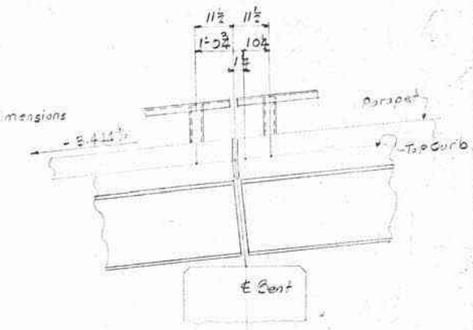
Scale in 1/1 Ft. Sheet No. 22 of Final

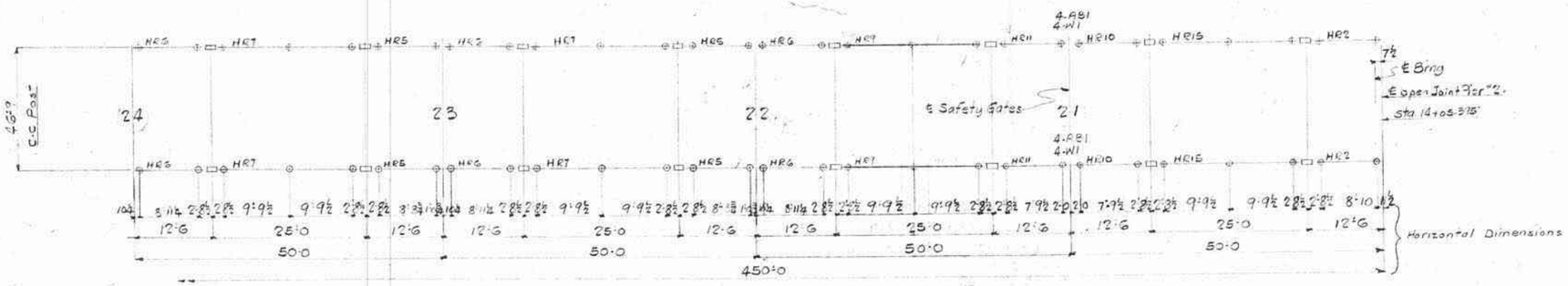
Angles
Plates
Bars
FITTED STIFF.
SHOP PLATES











Erector Note

Members shall be erected so that the erection marks painted on left-hand ends are in the positions shown on this drawing.

REVISION						
A						
9/7/61						
DATE						

Shop Paint Detroit Graphite #38-L Green

Shop Contact Surfaces not Painted

Inspection Va. Br. Co. (Shop)

Rivets None Unless Noted

Holes 13'-0 " "

Special Notes:

Mat'l on Shop Bill

CONTRACT V 7409

Details of Erection Plan of Handrail

For Broad Causeway Viaduct (West Approach)

Location Miami, Dade Co., Fla.

Owner Allegheny Ludlum Steel Corp.

VIRGINIA BRIDGE COMPANY

ROANOKE, VIRGINIA

To be fabricated at Birmingham plant

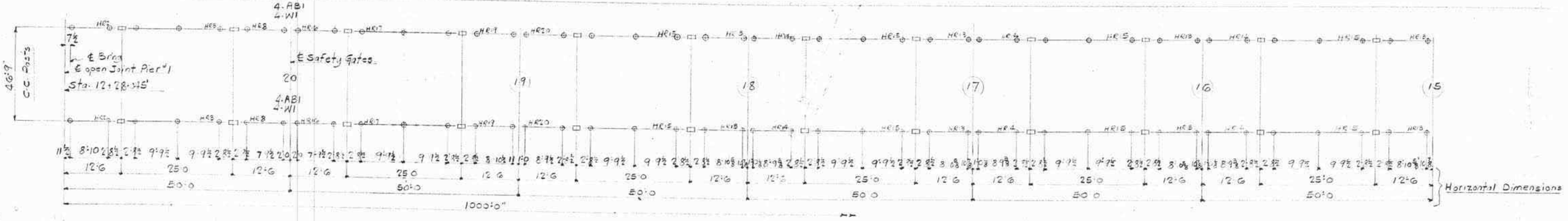
Made by JW Checked by PAO

In charge of Slusher Date 1960

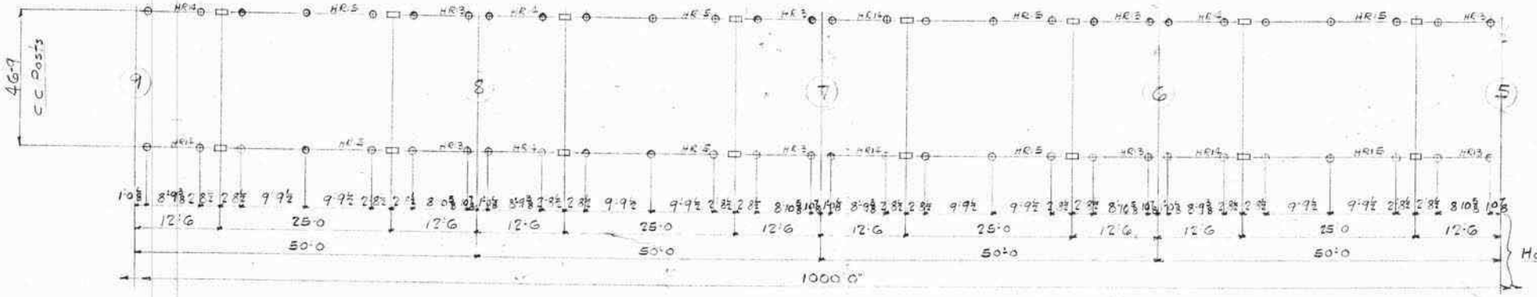
Revised

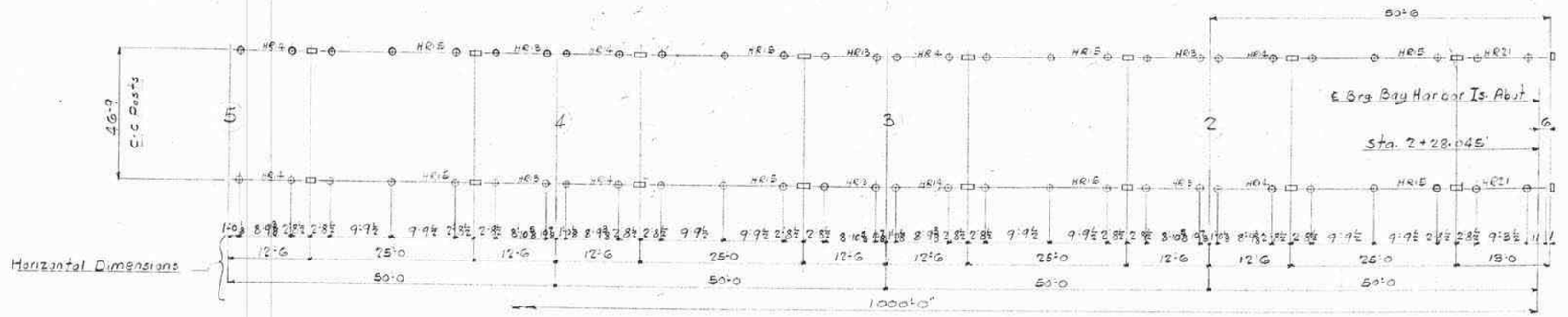
Scale in. = 1 Ft. Sheet No. E1 of E2

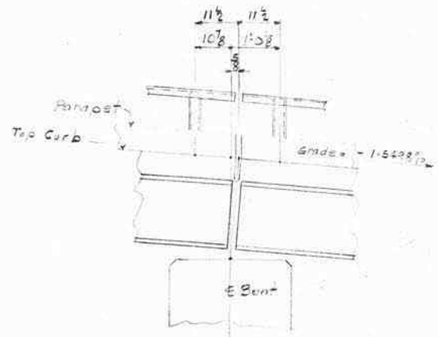
Plates — Bars — Fitted Stiff. — Shop Plates











Typical Section on Grade

Note
For typical handrail post base see drawing E1

Erector Note
Members shall be erected so that the erection marks painted on left-hand end are to the post and channel side of drawing.

REVISION	DATE

Shop Paint 1st Coat Detroit Graphite & 38 L Green
Shop Contact Surfaces and Painted
Inspection Va. Br. Co. (Shop)
Rivets None Unless Noted
Holes 13/16 " "
Special Notes:

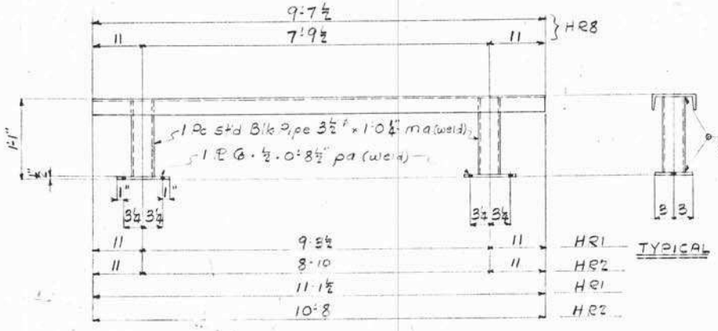
Mat'l on Shop Bill

CONTRACT V7409
Details of Erection Plan of Handrail
For Broad Causeway Viaduct East Approach
Location Miami Beach, Dade Co., Fla.
Owner Allegheny Asphalt & Paving Co.

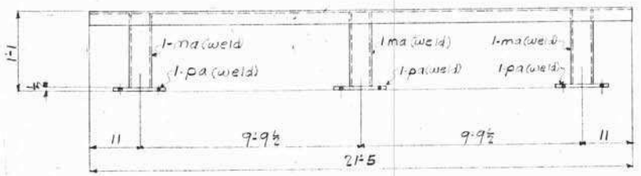
VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham plant
Made by JN. Checked by PAO
In charge of Slusher Date 1950
Revised
Scale in. = 1 Ft. Sheet No. E2 of E2

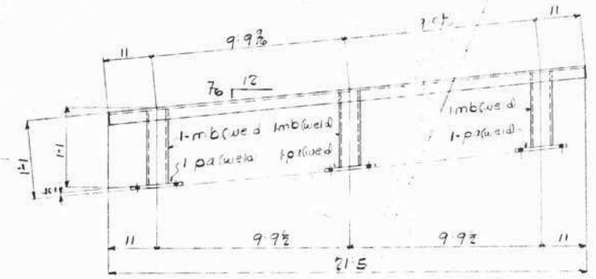
PLATES
BARS
STRUCTURAL SHAPES
BENT PLATES



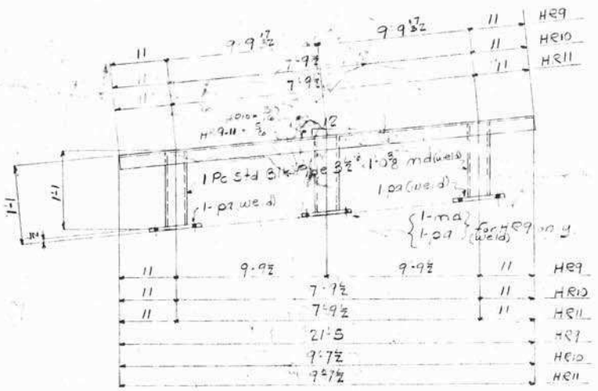
1-E 7 @ 9'-2" = 11'-4½" HR1
1-E do × 10'-8 - HR2
1-E do × 9'-7½ - HR8



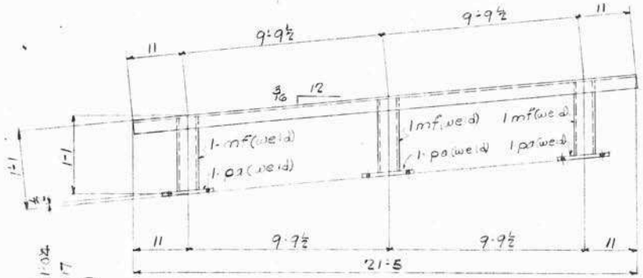
1-E 7 @ 9'-8" × 21'-5" - HR3



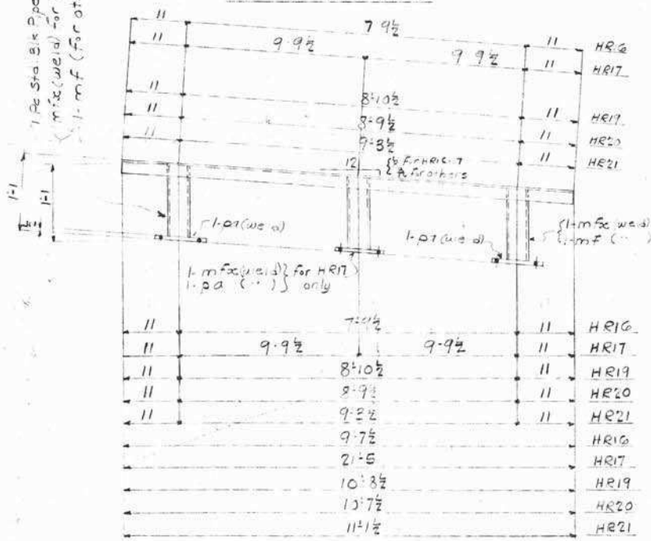
1-E 7 @ 9'-8" - 21'-5⅜ - HR7



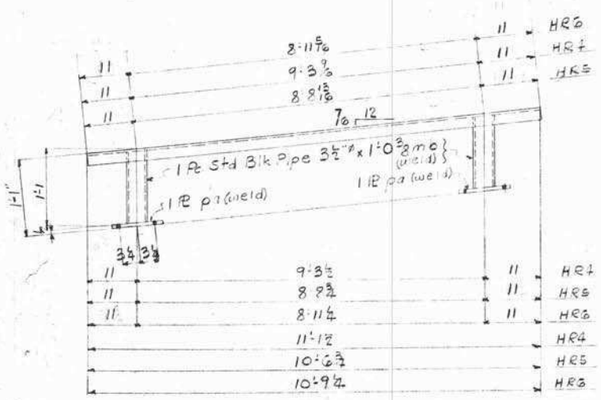
1-E 7 @ 9'-8" × 21'-5⅜ HR9
1-E do × 9'-7½ - HR10
1-E do × 9'-7½ - HR11



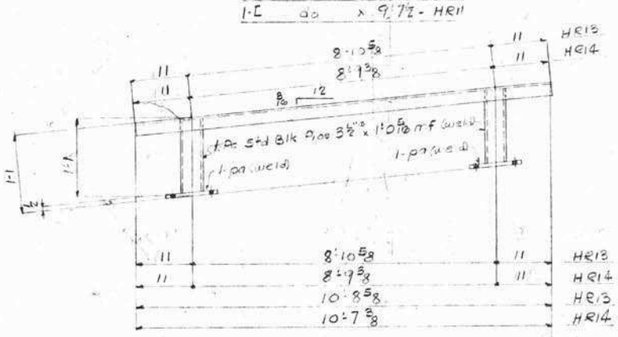
1-E 7 @ 9'-8" - 21'-5 - HR15



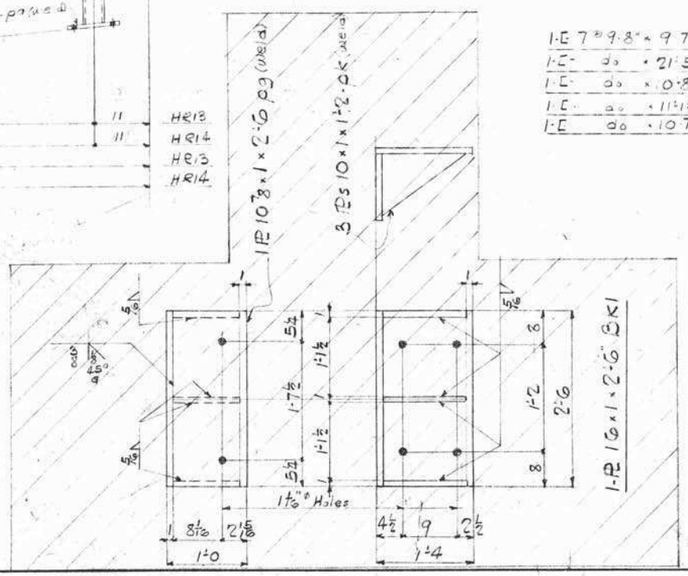
1-E 7 @ 9'-8" × 9 7/16 - HR16
1-E do × 21'-5 - HR17
1-E do × 10'-8½ - HR19
1-E do × 11'-1½ - HR21
1-E do × 10'-7½ - HR20

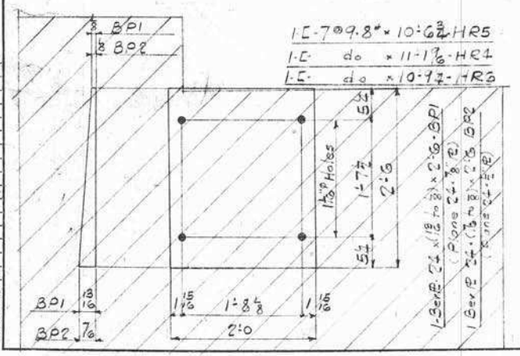


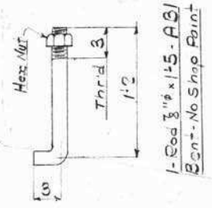
1-E 7 @ 9'-8" × 10'-6 7/16 HR5
1-E do × 11'-1 5/16 - HR4
1-E do × 10'-9¼ - HR3



1-E 7 @ 9'-8" × 10'-8 5/8 HR13
1-E do × 10'-7 5/8 HR14







1-Rod 7/8" x 1'-5 - A31
Galv - No Shop Paint

Reqd List

Make	Description	Mark
+	Handrail Sect	HR1
16	do	HR2
10	do	HR3
2	do	HR4
14	do	HR5
14	do	HR6
14	do	HR7
2	do	HR8
2	do	HR9
2	do	HR10
2	do	HR11
34	do	HR13
34	do	HR14
38	do	HR15
2	do	HR16
2	do	HR17
2	do	HR19
2	do	HR20
2	do	HR21
16	Washr 2" ϕ x ¼" thk x 1 5/8" ϕ Hole-W1	
924	Lag Bolts ⅞" ϕ x 10" L SQ HD	
16	Anchors Bent A31	
924	Lead Rs 3½ x ⅛ x 0'-6 (Plain)	

"A"

Shop Note
Paint erection marks on the left-hand end of all members as shown on details.

REVISION					
A 8/17/61					
DATE					

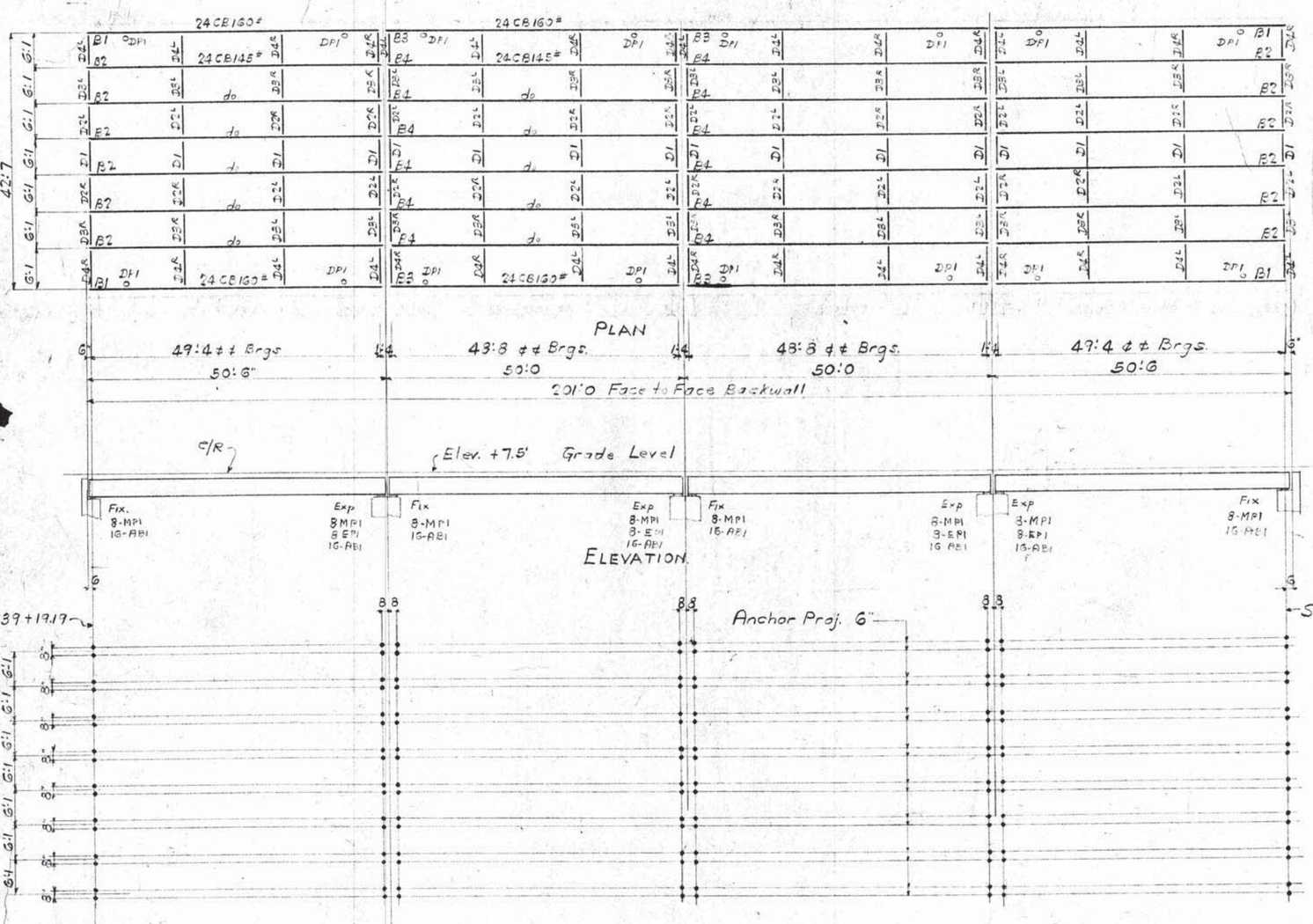
Shop Paint 1 Ct Detroit Grn pnt #33 - Green
Shop Contact Surfaces and Painted
Inspection by Bridge Co. Shop
Rivets ⅞" ϕ Unless Noted
Holes 13/16" ϕ " "
Special Notes:
Mat'l on Shop Bill 1,2

CONTRACT V 7409
Details of Handrail & Brackets.
For Broad Causeway Viaduct
Location Miami Beach, Dade Co., Fla.
Owner Allegheny Asphalt & Paving Co.

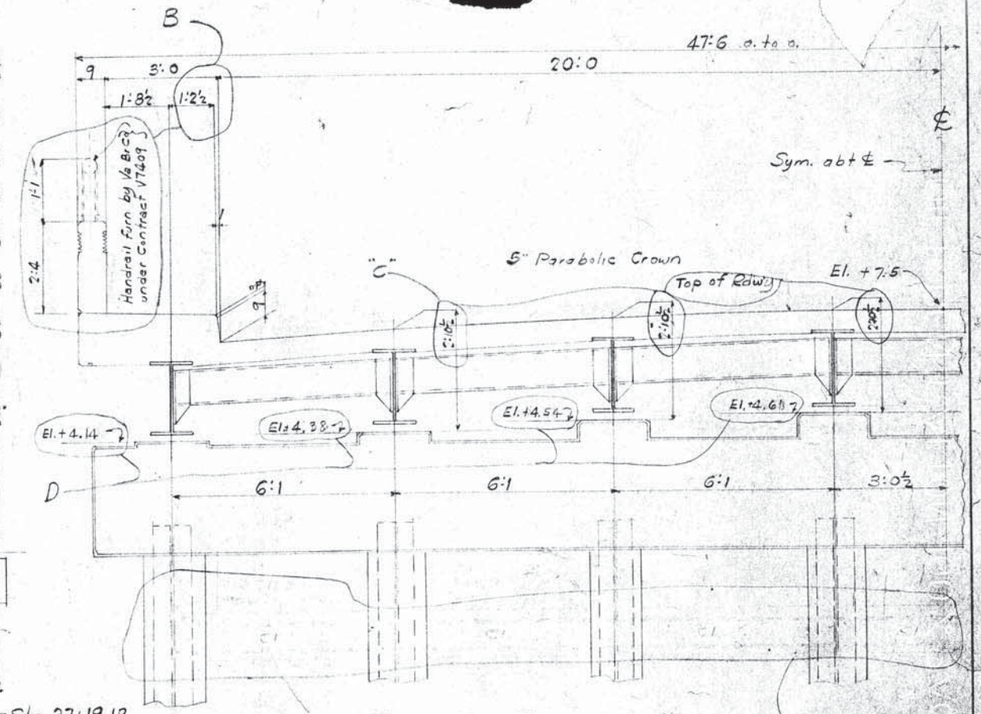
VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

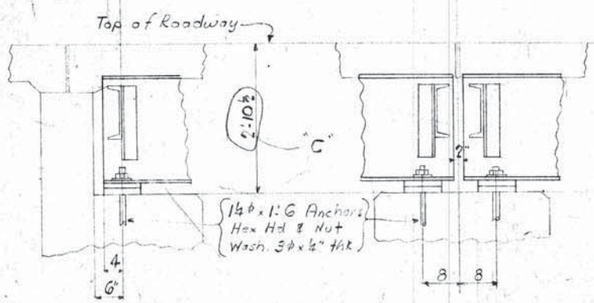
To be fabricated at Birmingham plant
Made by JW Checked by TPO
In charge of Slusher Date 1-1960
Revised
Scale in. = 1 Ft. Sheet No. 1 of 1 Final

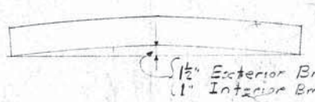
Diaph's 12E20.7#



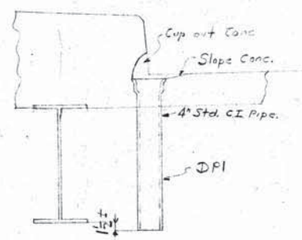
ANCHOR BOLT PLAN.
Anchors furnished by V. E. Co. and set by others in accordance with this plan.







Camber Diagram



Roadway Drain

Erector Note-
Before placing masonry this in position thoroughly swab the bridge seat bearing area with red lead paint and place upon it three layers of 12 to 14 oz. duck, each layer being thoroughly swabbed on its top surface with red Lead paint.
Place the stringers in position while paint is plastic.
Duck furnished by Va. Br. Co.

Erector Note
Members shall be erected so that the erection marks painted on left-hand ends are in the positions shown on this drawing.

The dimensions on this plan must be strictly adhered to in all masonry, concrete and building construction or the steelwork will not fit. Report any error or misunderstanding at once.

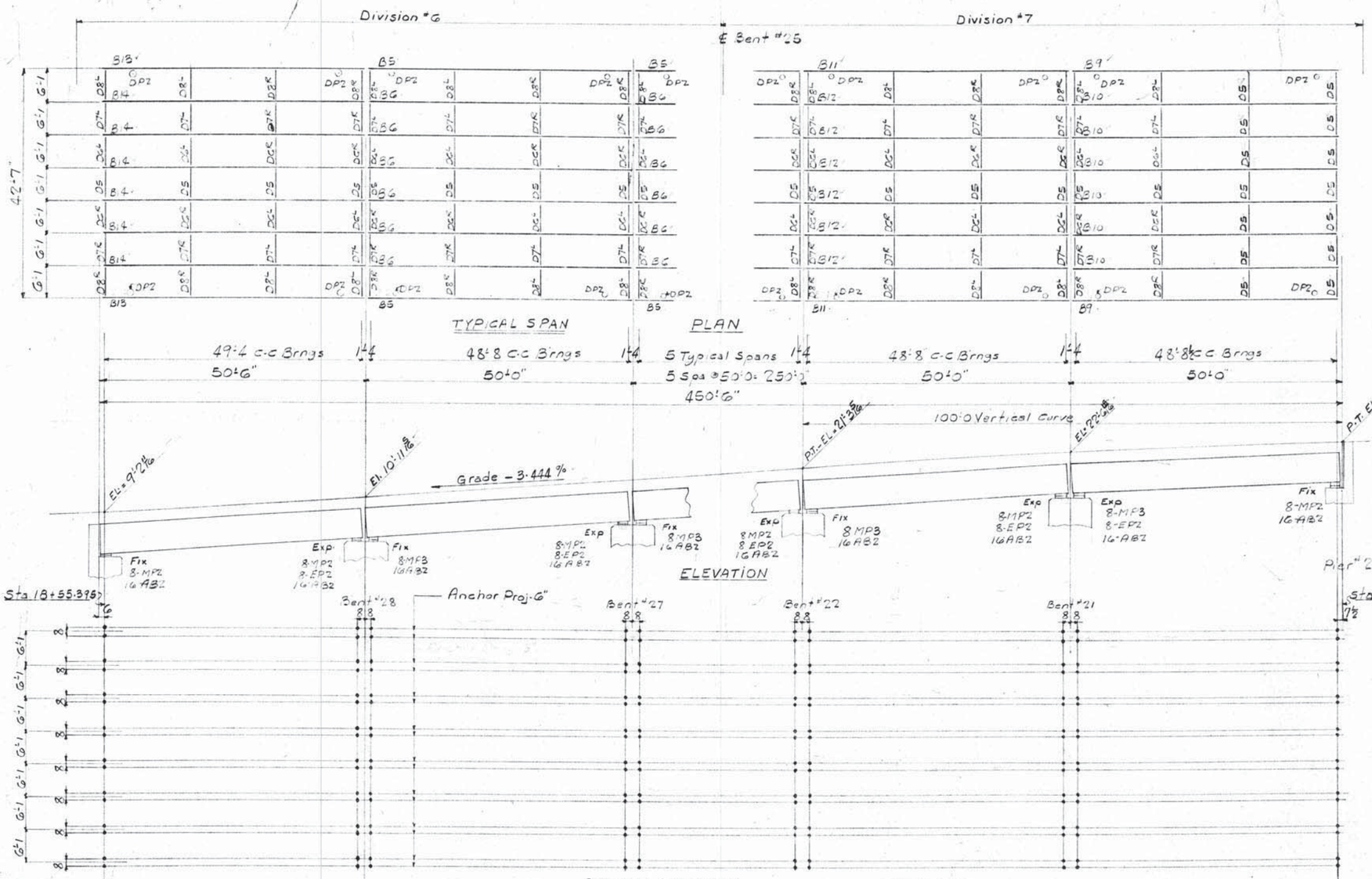
Handrail furnished under Contract V-7409

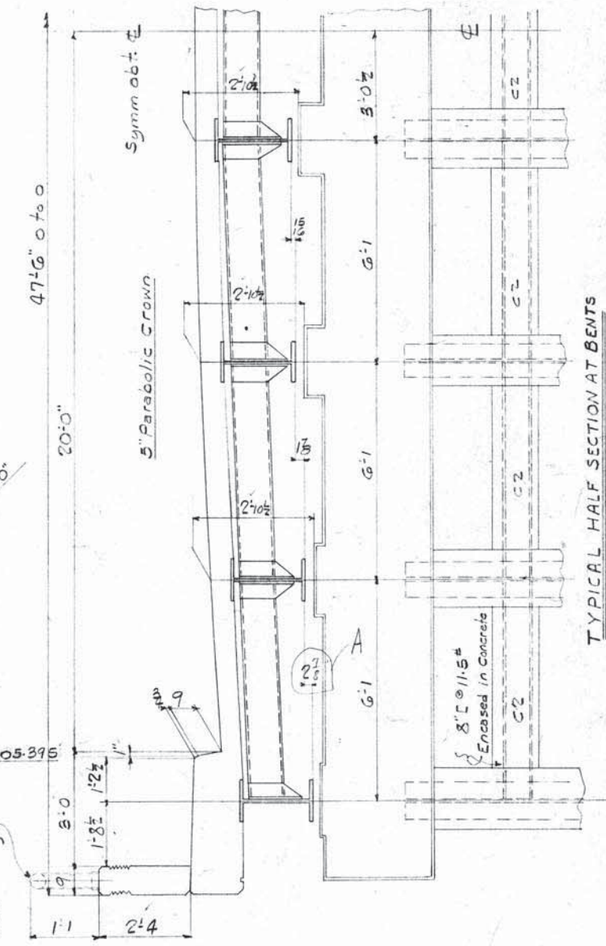
REVISION						
#	B	C	D			
7/16	8/28	9/12	10/2			
DATE						

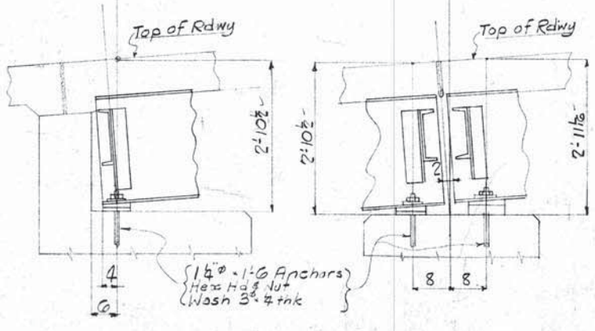
Shop Paint 1 ct R L & O.I. per Fla. St Hwy. Dept. Spec. for Code R-L
Shop Contact Surfaces and Painted
Inspection V. E. Co.
Rivets 7/8 ϕ Unless Noted
Holes 13/16 ϕ " "
Special Notes:
Erection and Field Paint by Va. Br. Co.
Field Conn. Riveted.
Mat'l on Shop Bill

CONTRACT V 7406
Details of Erection Plan
Viaduct over Biscayne Bay
For 4-85'-0 Beam Spans
Location Dade Co. Miami Fla.
Owner Allegheny Asphalt Paving Co.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA
To be fabricated at Birmingham Plant
Made by E.L.C. Checked by K.F.
In charge of Slusher, Date 8-29-28
Revised
Scale in. = 1 Ft. Sheet No. E1 of E3

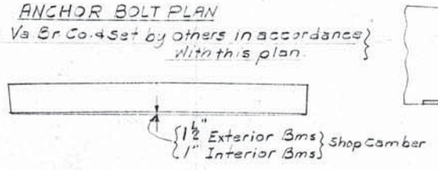




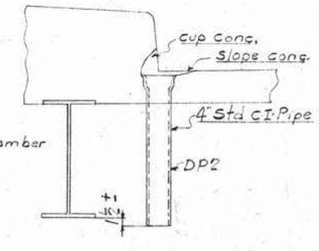


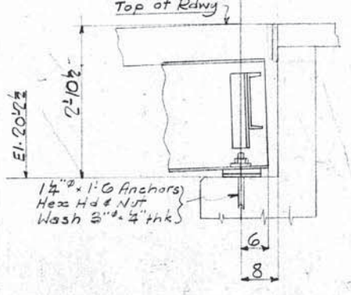
ANCHOR BOLT PLAN

Anchors Furnished by Va Br Co. & set by others in accordance with this plan.



Camber Diagram





Erector Note

Members shall be erected so that the erection marks painted on left-hand ends are in the positions shown on this drawing.

The dimensions on this plan must be strictly adhered to in all masonry, concrete and building construction or the steelwork will not fit. Report any error or misunderstanding at once.

REVISION						
A						
1/14						

DATE

Shop Paint: 1st Coat Detroit Graphite "88-L Green"

Shop Contact Surfaces not Painted

Inspection: Va Br Co. (Shop)

Rivets: 7/8" ø Unless Noted

Holes: 15/16" "

Special Notes: See Erectors notes on dwg E1

Mat'l on Shop Bill

CONTRACT V-7406

Details of: Erection Plan

Viaduct over Biscayne Bay

For: 9 - 50'-0 Beam Spans

Location: Dade Co., Miami, Fla.

Owner: Allegheny Asphalt and Paving Co.

VIRGINIA BRIDGE COMPANY

ROANOKE, VIRGINIA

To be fabricated at: Birmingham plant

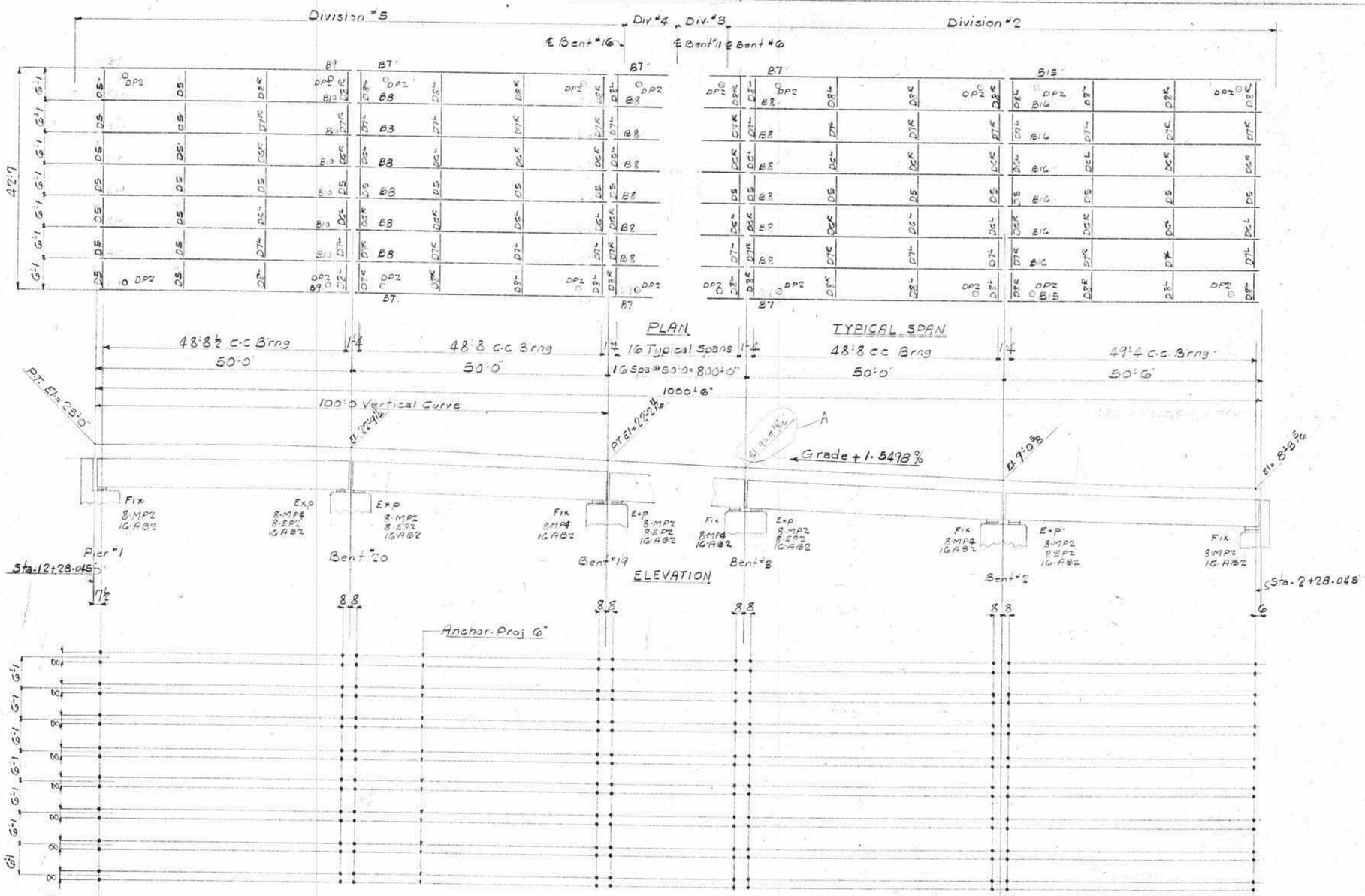
Made by: J.W. Checked by:

In charge of: Slusher Date: 8/24/56

Revised

Scale: ___ in. = 1 Ft. Sheet No: E2 of

ANGLES
PLATES
BARS
FILLER STRIPS
BENT PLATES



Erector Note

Members shall be erected so that the erection marks painted on left-hand ends are in the positions shown on this drawing.

The dimensions on this plan must be strictly adhered to in all masonry, concrete and building construction or the steelwork will not fit. Report any error or misunderstanding at once.

REVISION						
A						
DATE						

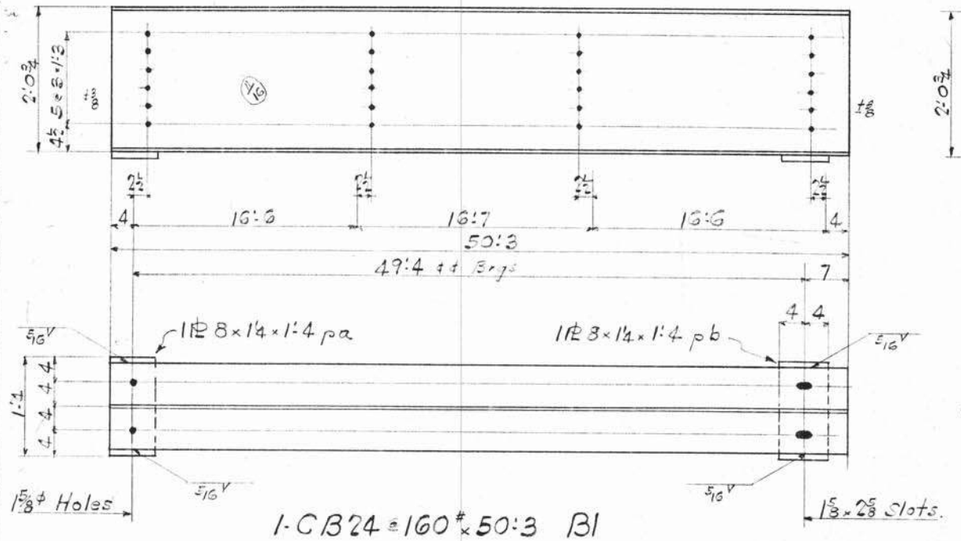
Shop Paint 1st Detroit Graphite #28-L Green
Shop Contact Surfaces not Painted
Inspection Va Br Co (Shop)
Rivets ⅞"ø, ¾"ø Unless Noted
Holes " "
Special Notes: See Erectors notes on Dwg "El. See Sections Dwg "E2
Mat'l on Shop Bill

CONTRACT V 7406

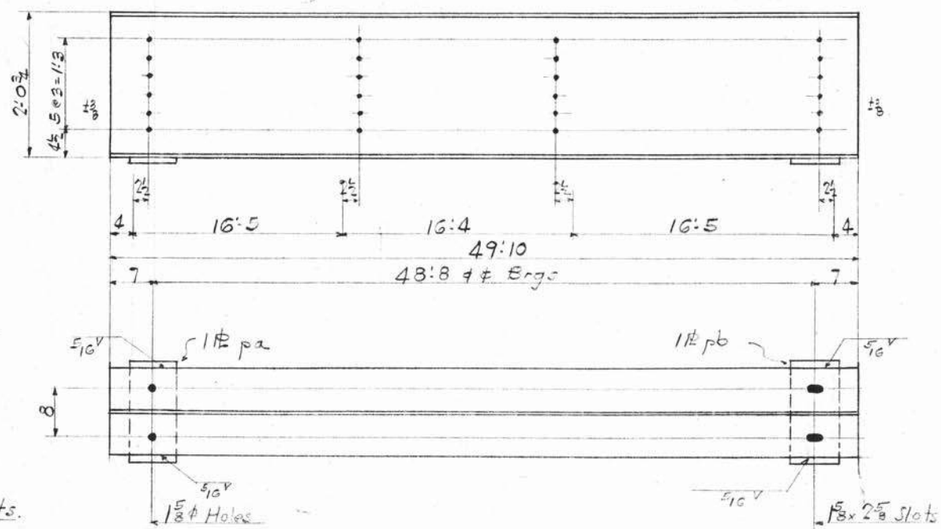
Details of Erection Plan
Viaduct over Biscayne Bay
For 20-800 Beam spans
Location Dade Co, Miami, Fla.
Owner Allegheny Asphalt and Paving Co.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

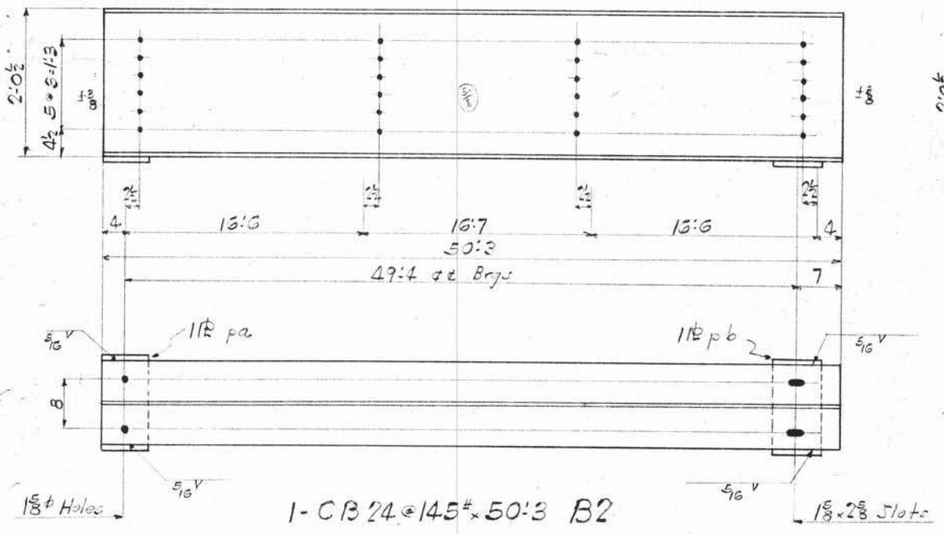
To be fabricated at Birmingham plant
Made by TW Checked by
In charge of Slusher Date 8-4-50
Revised
Scale in. = 1 Ft. Sheet No. E3 of E3 Final



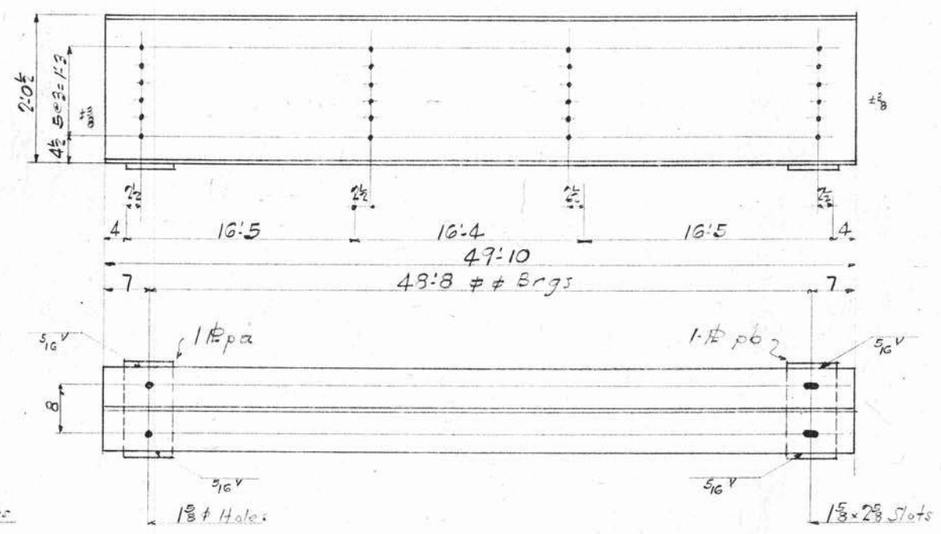
1-CB24 @ 160#× 50'-3 B1



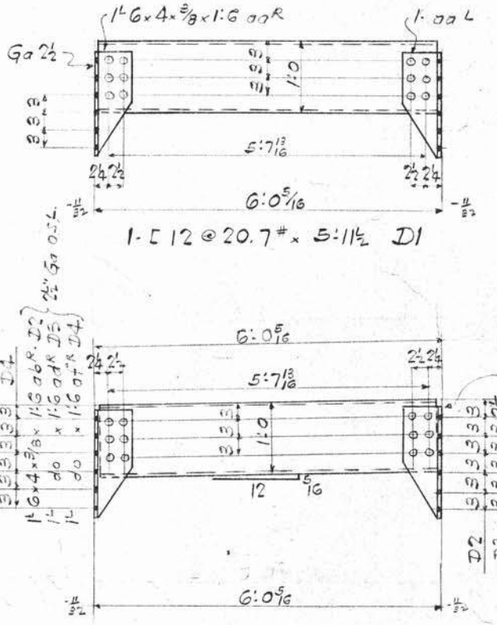
1-CB24 @ 160#× 47'-10 B3



1-CB24 @ 145#× 50'-3 B2

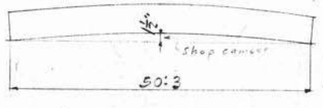


1-CB24 @ 145#× 49'-10 B4



REQ'D LIST

Make	Description		Mark
4	Beams		B1
12	do		B2
4	do		B3
12	do		B4
16	Diaphragms		D1
16	do	Thus	$D2^R$
16	do	Rev	$D2^L$
16	do	Thus	$D3^R$
16	do	Rev	$D3^L$
16	do	Thus	$D4^R$
16	do	Rev	$D4^L$



Camber Diagram for B1 & B3



Camber Diagram for B2 & B4

Shop Note
Paint erection marks on the left-hand end of all members as shown on details.

REVISION	DATE

Shop Paint 1st R.L.E. Oil per Fla. St. Hwy. Dept. Spec. Code R-L
Shop Contact Surfaces ~~not~~ Painted
Inspection V. B. Co
Rivets 7/8 ϕ Unless Noted
Holes 15/16 ϕ " "
Special Notes:
Mat'l on Shop Bill

Advance Mat'l

CONTRACT V 7406
Details of Beams & Diaphragms
Viaduct over Biscayne Bay
For 4-50'-0 Beam Spans
Location Dade Co., Miami, Fla.
Owner Allegheny Asphalt Paving Co.

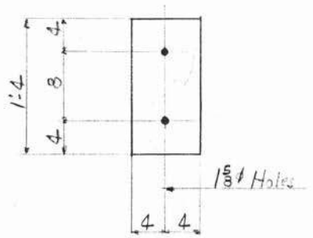
VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham plant
Made by E.L.C. Checked by
In charge of Slusher Date 5-17-57
Revised
Scale in. = 1 Ft. Sheet No. 1 of 5

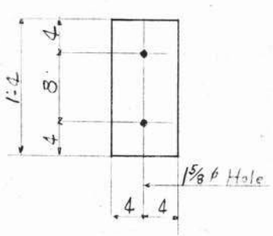
PLATES ½ | ⅝ | ¾ | ⅞ | 1
BARS Sq. Rnd. | ⅝ | ¾ | ⅞ | 1
FLAT PLATES | ⅝ | ¾ | ⅞ | 1

REQ'D LIST

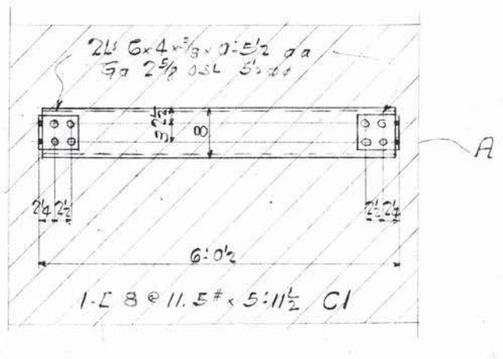
Make	Description	Mark
192	Pcs Canvas Duck 12 to 14 oz. 9"x1:5	
64	Masonry Pls	MPl
32	Exp. Pls	EPl
16	Drain Pipes	DPl
128	Anchors	ABl
128	Wash 2"x2"x¼" thk x 1⅝"ø Hole	



Mas Pl. 8"x14"x1:4 MPl
(Hot straighten)

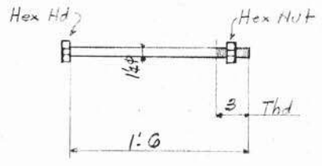


Stainless Steel Pl. 8"x18 Ga"x1:4 EPl
No Shop Paint
Type 321, #4 Finish.





4" ø Std. C.I. Pipe DPl
(one std length cuts 2)



Anchor 1¼ ø x 1:6 ABl

Advance Matl.

REVISION							
A	B						
7/16	5/24						
DATE							

Shop Paint 1 Ct RL & Oil per Fla St. Hwy. Dept. Specifications Code R-L

Shop Contact Surfaces not Painted

Inspection V. B. Co

Rivets 7/8 ø Unless Noted

Holes 15/16 ø " "

Special Notes:

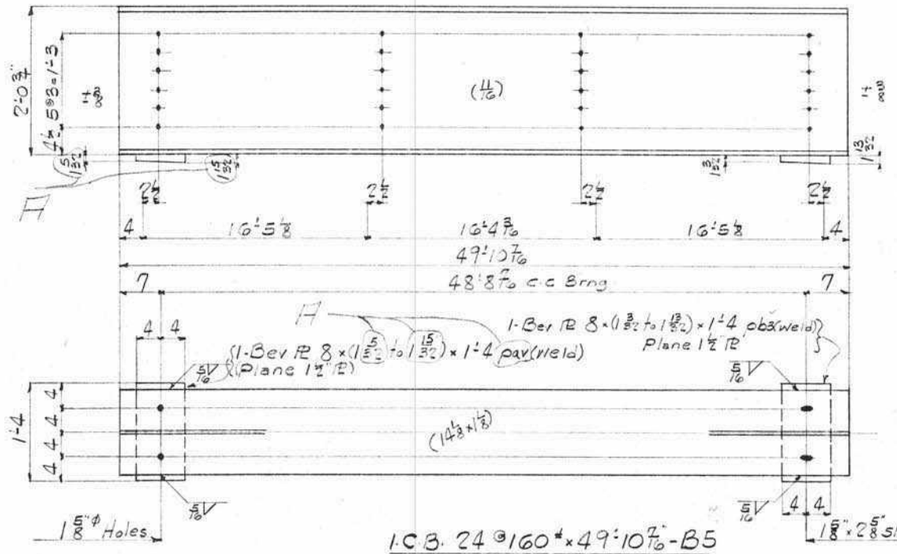
Mat'l on Shop Bill 2

CONTRACT V 7406

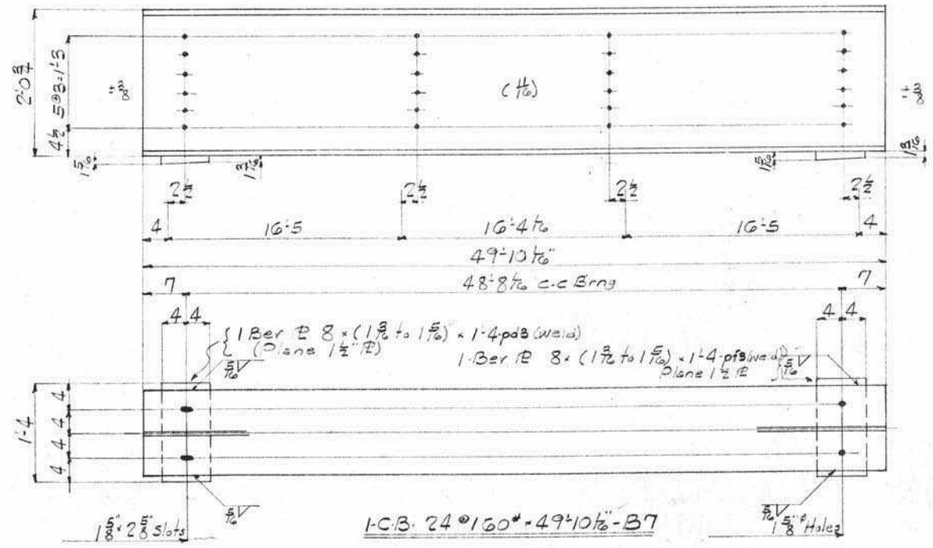
Details of Handrail: Pls-Anchors etc
Viaduct over Biscayne Bay
For 4-50'0 Beam Spans
Location Dade Co. Miami Fla.
Owner Allegheny Asphalt Paving Co.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham Plant
Made by ELE Checked by
In charge of Slusher Date 6-15-50
Revised
Scale in. = 1 Ft. Sheet No. 2 of



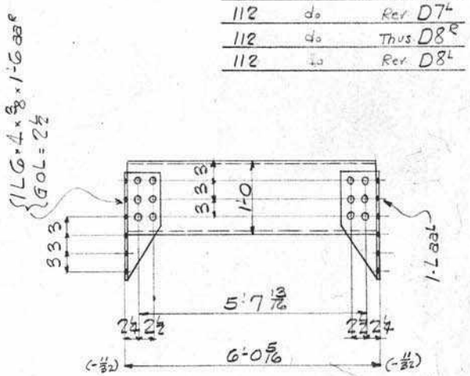
1-C.B. 24 @ 160# x 49'-10 7/16" - B5



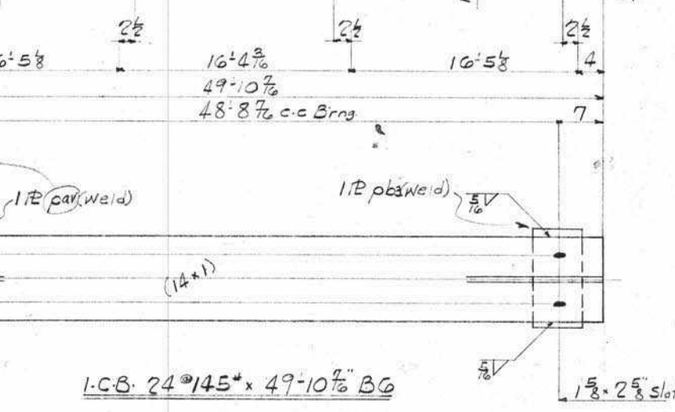
1-C.B. 24 @ 160# - 49'-10 7/16" - B7

Reqd List

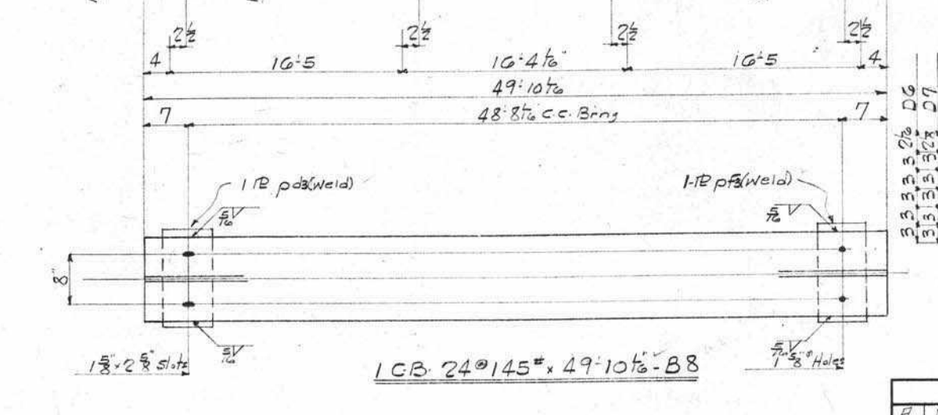
Make	Description	Mark
12	Beams	B5
36	do	B6
36	do	B7
108	do	B8
140	Diaphragms	D5
112	do Thus	D6 R
112	do Rev	D6 L
112	do Thus	D7 R
112	do Rev	D7 L
112	do Thus	D8 R
112	do Rev	D8 L



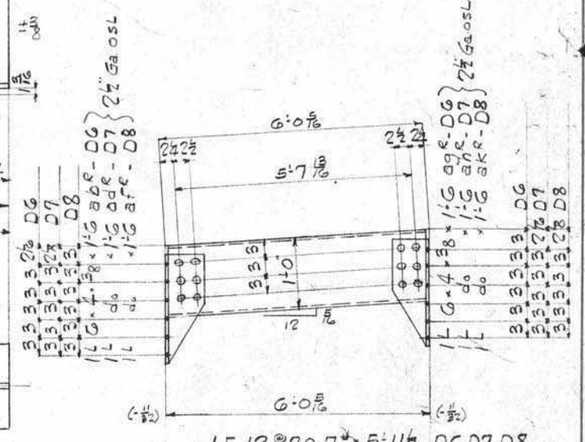
1 C 12 @ 20.7# x 5'-11 1/2" - D5



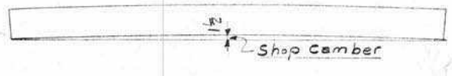
1-C.B. 24 @ 145# x 49'-10 7/16" B6



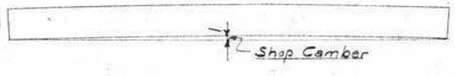
1-C.B. 24 @ 145# x 49'-10 7/16" - B8



1 C 12 @ 20.7# x 5'-11 1/2" D6-D7-D8



Camber Diagram for B5-B7



Camber Diagram for B6-B8

Shop Note
Paint erection marks on the left-hand end of all members as shown on details.

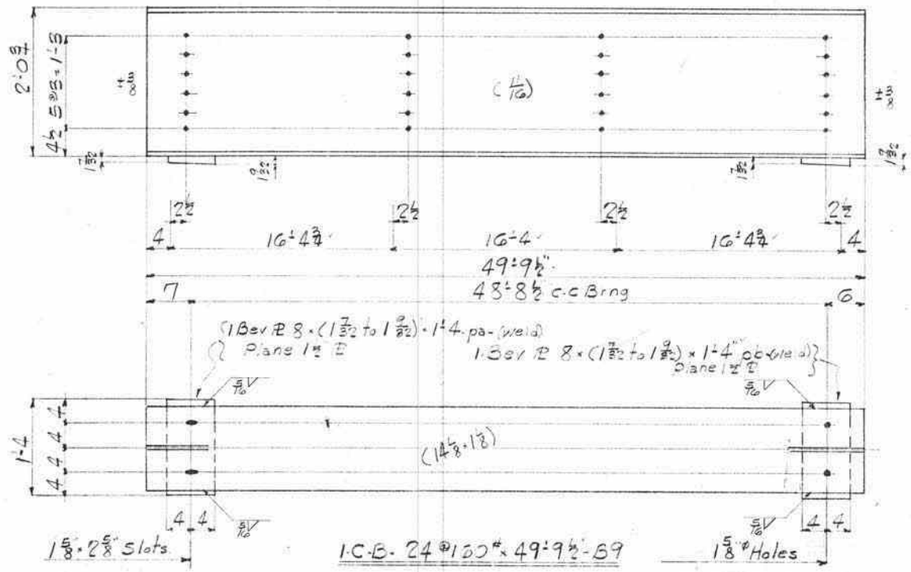
REVISION						
A 11-25-59	B 9/12					
DATE						

Shop Paint 1 Ct Detroit Graphite #38-L Green
Shop Contact Surfaces not Painted
Inspection Va Br Co. (Shop)
Rivets 7/8" ø Unless Noted
Holes 15/16" ø " "
Special Notes:
Mat'l on Shop Bill 34.

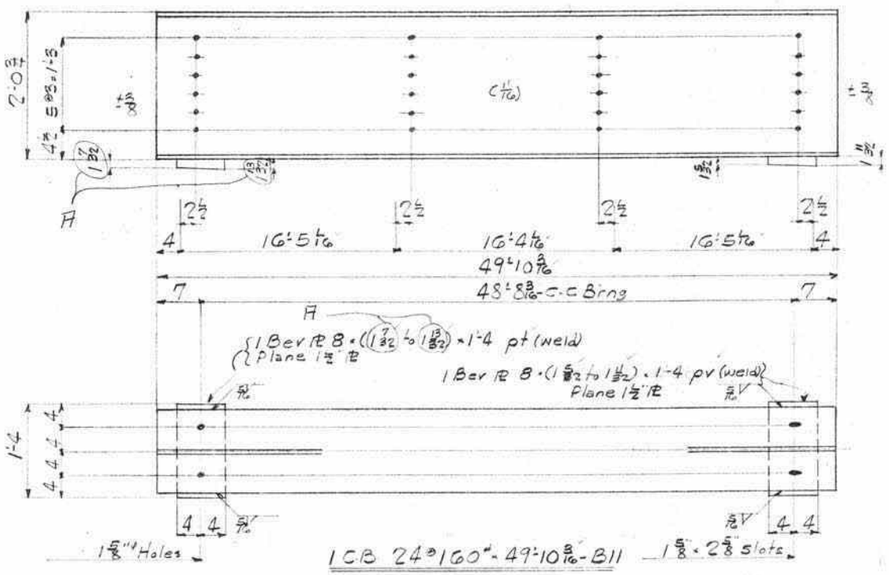
CONTRACT V 7406
Details of Beams - Diaphrams
Viaduct over Biscayne Bay
For 20-50.0 & 9-80-0 Beam Spans
Location Dade Co, Miami, Fla.
Owner Allegheny Asphalt & Paving Co.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham Ala plant
Made by J.W. Checked by
In charge of Slusher Date 8-8-59
Revised
Scale in. = 1 Ft. Sheet No. 3 of



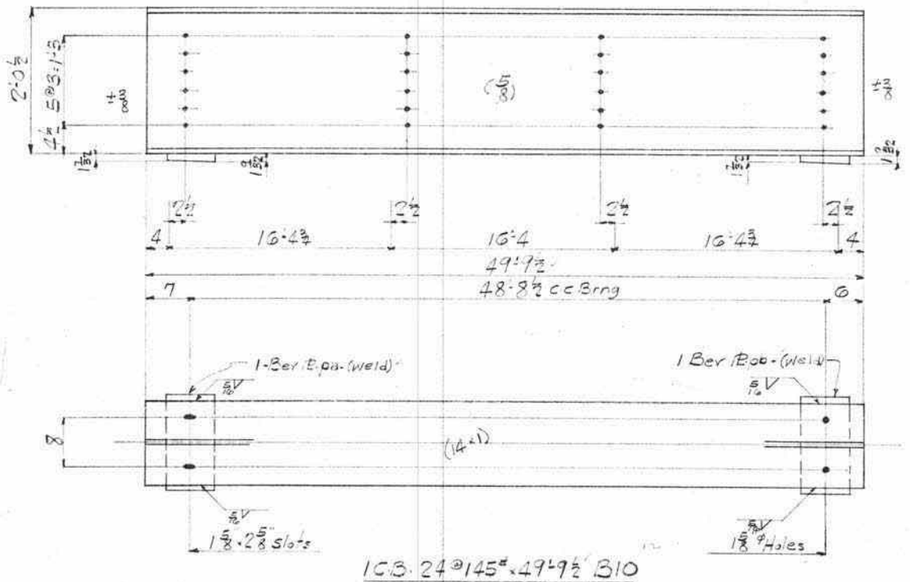
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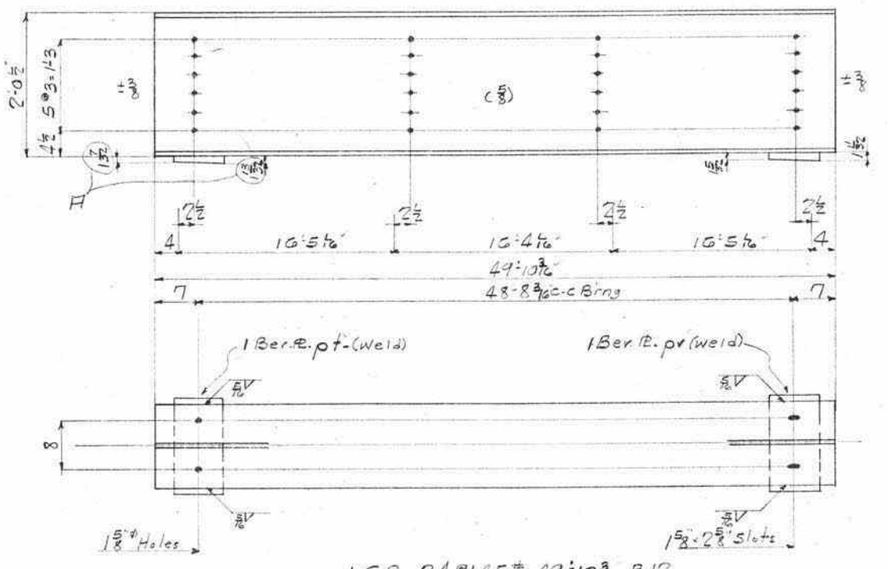
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Reqd List

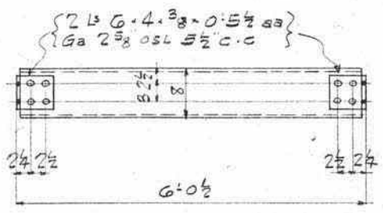
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2	do	B11
6	do	B12
112	Channels	C2



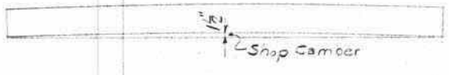
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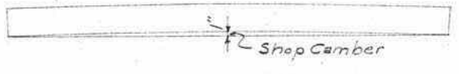
1 C.B. 24 @ 145# x 49'-10 3/16" - B12



1 C 8 @ 11.5# x 5'-11½" C2



Camber Diagram for B9-B11



Camber Diagram for B10-B12

Shop Note
Paint erection marks on the left-hand end of all members as shown on details.

REVISION						
A	B					
7-85	9/12					

DATE

B

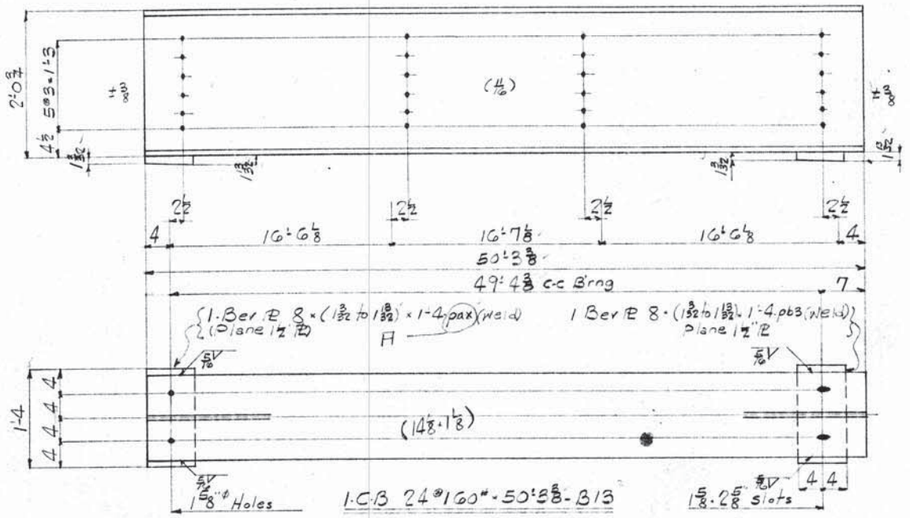
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Inspection Va Br. Co. (Shop)
Rivets 7/8" ø Unless Noted
Holes B.F. " "
Special Notes:

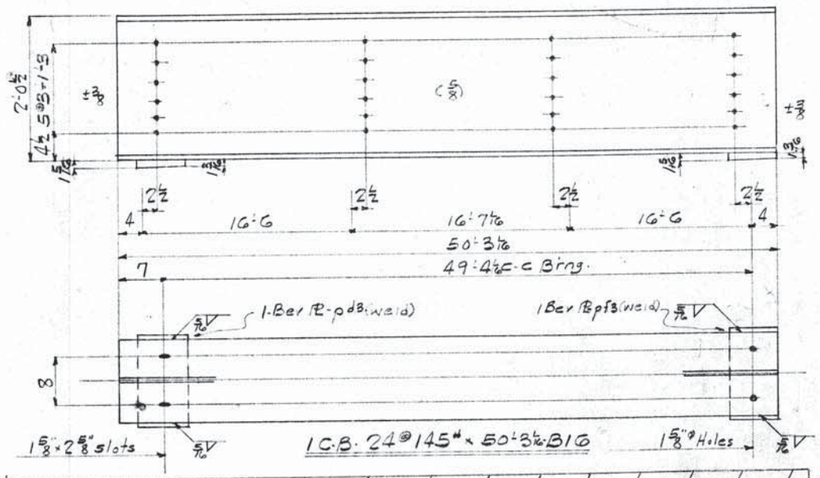
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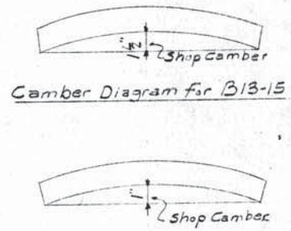
CONTRACT V 7406
Details of Beams & Channels
Viaduct over Biscayne Bay
For 9-50'-0 & 10-50'-0 Beam Spans
Location Dade Co. Miami Fla.
Owner Allegheny Asphalt & Paving Co.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA

To be fabricated at Birmingham
Made by J.W. Checked by
In charge of Slusher Date 5-8-85
Revised
Scale in.=1 Ft. Sheet No. 4 of

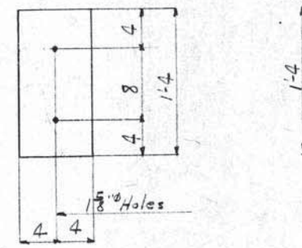


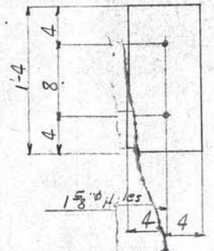


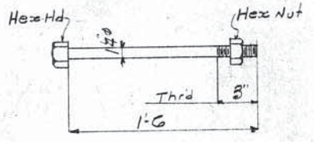


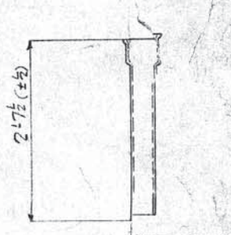
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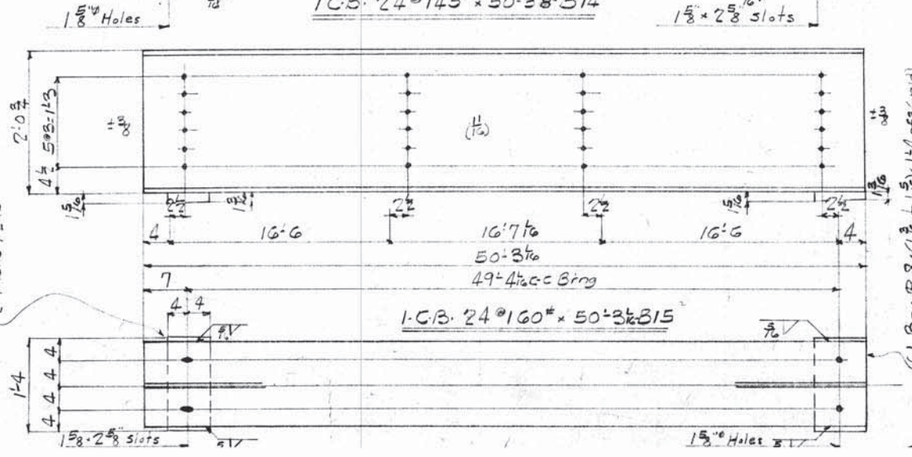
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6	do	B14
2	do	B15
6	do	B16
928	Wash. 3" ø × ¼ thk × 1 5/16" ø Holes	
1392	Pet. Canvas Duck 12" × 14 oz. 9"×16	
248	Mas. Pls	MP2
282	Exp Pls	EP2
928	Anchors	AB2
116	Drain Pipes	DP2
64	Mas. Pls	MP3
152	"	MP4

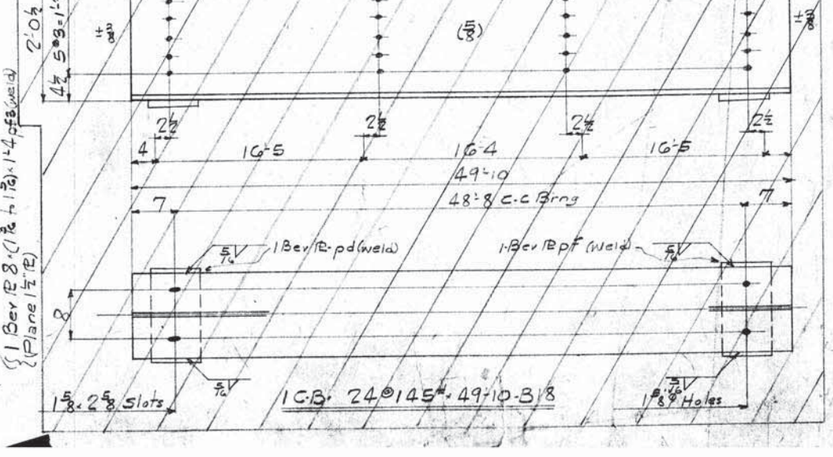












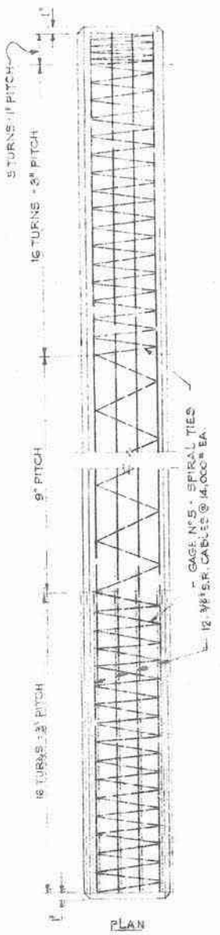
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end of all members as sh wn on details.

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DATE						

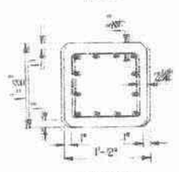
Shop Paint 1st Coat Detroit Graphite & 38-L Green
Shop Contact Surfaces not Painted
Inspection Va Bridge Co. (shop)
Rivets — Unless Noted
Holes
Special Notes:
Mat'l on Shop Bill

CONTRACT V 7406
Details of Beams, Pls etc:
Viaduct over Biscayne Bay
For 9-50'0 & 20-50'0 Beam Spans
Location Dade Co. Miami, Fla.
Owner Allegheny Asphalt & Paving Co.

VIRGINIA BRIDGE COMPANY
ROANOKE, VIRGINIA
To be fabricated at Birmingham
Made by JN Checked
In charge at Slusher
Revised
Scale in. = 1 Ft.

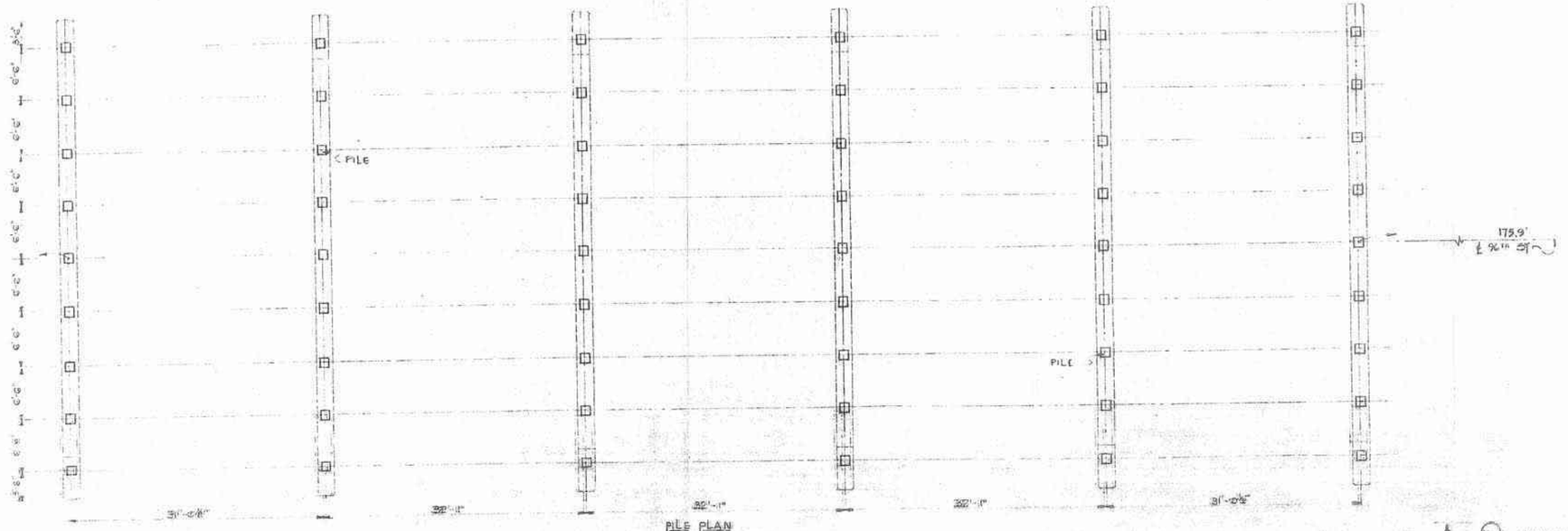


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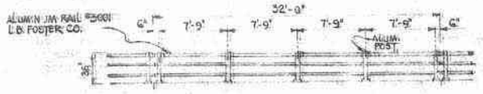


SECTION
DETAILS OF PRESTRESSED PILES
SCALE
1" = 1'-0"

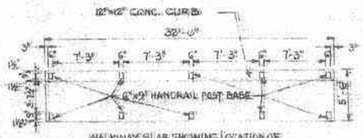
Note
ALL CONCRETE PILES SHALL BE DRIVEN TO A 45 TON LOADING.
54 REQ'D.



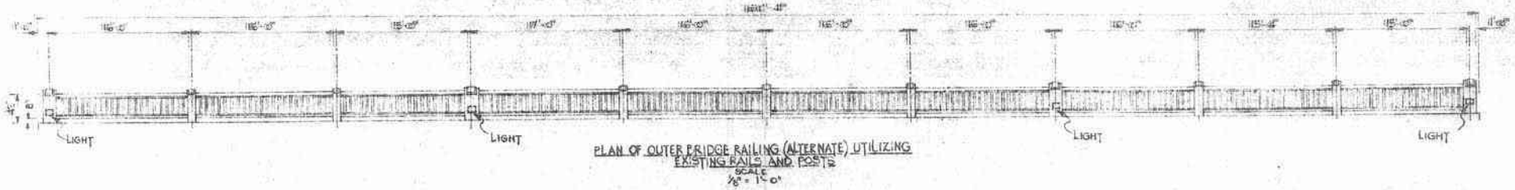
PILE PLAN
SCALE
1/8" = 1'-0"



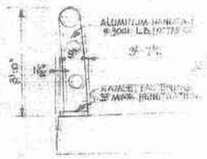
ELEVATION OF ALUM. HANDRAIL FOR ONE WALKWAY SECTION
SCALE
1/8" = 1'-0"



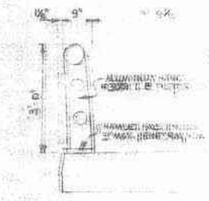
WALKWAY SLAB SHOWING LOCATION OF ALUM. HANDRAIL POSTS
SCALE
1/8" = 1'-0"



PLAN OF OUTER BRIDGE RAILING (ALTERNATE) UTILIZING EXISTING RAILS AND POSTS
SCALE
1/8" = 1'-0"



SECTION THRU ALUM. HANDRAIL
SCALE
1/2" = 1'-0"



SECTION THRU HANDRAIL
ALTERNATE POST
SCALE
1/2" = 1'-0"

875102

PRECAST PRE
BAY HARBOR
TOWN OF BAY HARBOR
M. B. GARRIS

SCALE
DRAWN BY

APPENDIX C

DRAFT IMPERILED SPECIES AND MARINE MAMMAL WATCH PLAN

Draft Imperiled Species and Marine Mammal Watch Plan

TOWN OF BAY HARBOR ISLANDS

BROAD CAUSEWAY BRIDGE REPLACEMENT
PROJECT DEVELOPMENT & ENVIRONMENT STUDY



Prepared for:

Town of Bay Harbor Islands, Florida

July 3, 2024



Financial Project Identification Number:	452428-1-21-01
Federal Aid Project Number:	N/A
FDOT Efficient Transportation Decision Making (ETDM) Number:	14520
Town of Bay Harbor Islands Project Number:	BC-160

Draft Imperiled Species and Marine Mammal Plan

July 3, 2024

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated May 26, 2022, and executed by Federal Highway Administration (FHWA) and FDOT.



Prepared for:
Town of Bay Harbor Islands

Prepared by:
AtkinsRéalis

TABLE OF CONTENTS

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2.0 WATCH TEAM 1

3.0 WATCH PLAN 2

3.1 PRE-BLAST COORDINATION MEETING 2

3.2 MARINE ANIMAL WATCH ZONE 2

3.3 ENVIRONMENTAL CONDITIONS FOR BLASTING 2

3.4 BLASTING EVENT 3

3.5 POST-BLAST REPORT 5

ATTACHMENT A – Marine Animal Watch Zone Figure

ATTACHMENT B – Draft Marine Observer Sighting Log

1.0 INTRODUCTION

This *Draft Imperiled Species and Marine Mammal Watch Plan* (*ISMMWP*) was prepared in accordance with the US Fish and Wildlife Service's (USFWS's) May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida*. This *Draft ISMMWP* supports the *Conceptual Blasting Plan* for the Town of Bay Harbor Islands (Town) Project Development and Environment (PD&E) Study to evaluate potential bridge replacement alternatives for the existing Broad Causeway Bridge in Miami Dade County, Florida. This *Draft ISMMWP* represents the Town's best approximation of the blasting needs at this phase of the project. During the design and permitting phase, the Engineer will develop the *Final ISMMWP* which will contain the final blasting and watch program details, including identification of qualified Watch Team personnel. The *Final ISMMWP* will be reviewed and approved by the regulatory agencies during the permitting process.

For the purposes of this document, the term "animal" shall include manatees, dolphins, sea turtles, Nassau grouper, smalltooth sawfish, giant manta rays, or whales.

2.0 WATCH TEAM

The Town will select qualified Watch Team members during the design phase of the Broad Causeway Bridge project. The *Final ISMMWP* will include detailed information on the Watch Team members, including relevant experience and resumes. The Watch Team will consist of at least five observers stationed at predetermined positions to maximize visibility of the Marine Animal Watch Zone. The marine observers will include:

1. One Aerial Observer/Chief Observer will be stationed in a helicopter above the Marine Animal Watch Zone. The Aerial Observer/Chief Observer and will be in contact with all Watch Team members and will issue the "All Clear" to the Blaster-in-Charge before detonation can occur.
2. At least two Watch Team members (including a Primary Coordinator and at least one other observer) will be positioned on the new bridge at the best vantage points, one facing north and one facing south.
3. At least two Watch Team members will be positioned on separate boats (one boat located north of the new bridge and the other located south of the new bridge).

Attachment A includes a Marine Animal Watch Zone diagram which also shows the proposed marine observer positions. Note that the number and locations of the proposed Watch Team members may be revised per USFWS, National Marine Fisheries Service (NMFS), and/or Florida Fish and Wildlife Conservation Commission (FWC) requirements which will be verified and included in the *Final ISMMWP*.

3.0 WATCH PLAN

3.1 Pre-Blast Coordination Meeting

At least one week prior to the initial blast event, a formal Pre-Blast Coordination Meeting will be held to discuss the responsibilities of all parties and to review and approve the proposed schedule of events. The Construction Contractor will host the Pre-Blast Coordination Meeting and invitees shall be contacted at least two weeks prior to the initial blasting event. Invitees shall include the Blaster-in-Charge, Watch Team, USFWS, NMFS, US Coast Guard (USCG), US Army Corps of Engineers (USACE), FWC, General Contractor, Blasting Contractor, and other interested parties. Conference technology (e.g., MS Teams, Zoom, etc.) will be utilized for this meeting where applicable. The agenda shall be coordinated with the USFWS, NMFS, and FWC prior to the meeting. The meeting shall inform all attendees about the possible presence of manatees, dolphins, sea turtles, Nassau grouper, smalltooth sawfish, giant manta rays, or whales in the blasting area. It will be made clear that civil and/or criminal penalties can result from harassment, injury, and/or death of an endangered species. The meeting will also cover the logistics of the detonation schedule; details of the aerial survey; the communications plan; and the responsibilities of involved parties.

3.2 Marine Animal Watch Zone

As detailed in the *Conceptual Blasting Plan* the Marine Animal Watch Zone radius for the blast includes the Exclusion Zone plus an additional 300-foot buffer. The Exclusion Zone is estimated to be 1,863 feet for the anticipated maximum pounds per delay of 18 for this project; thus, the Marine Animal Watch Zone radius is 2,163 feet (1,863 feet + 300-foot buffer). A figure showing the proposed Marine Animal Watch Zone is provided in **Attachment A**.

The Marine Animal Watch Zone will be clearly marked by the installation of temporarily buoys. Prior to the initial blasting event, highly visible colored buoys will be installed north and south of the bridge to mark the Exclusion Zone. In addition, white buoys will be installed to mark the edge of the Marine Animal Watch Zone 300 ft beyond the Exclusion Zone.

3.3 Environmental Conditions for Blasting

To ensure the greatest visibility of imperiled species and marine animals by the marine observers, the blast will be detonated only during daylight hours when weather conditions do not hinder visibility (i.e., no blasting should occur during fog, rain, or other weather obstructing visibility). The Aerial Observer/Chief Observer will determine whether the weather conditions are acceptable for observation.

The blast will be detonated on incoming tide or slack high tide to maximize the visibility of imperiled species and marine mammals within the water column. The blast will not proceed until the Marine Animal Watch Zone has been deemed clear by the Aerial Observer/Chief Observer.

3.4 Blasting Event

On-site Meeting

Approximately three hours prior to the scheduled blast time, a meeting will be held with the Watch Team, Blaster-in-Charge, and Engineer at the construction site to review the *Final ISMMWP* requirements. The following items will be discussed:

1. The construction crew and marine observers will review the watch program plan and observer responsibilities.
2. The marine observers will be provided with their Marine Observer Sighting Log and assigned observer positions. Their assigned positions will be noted on the Sighting Log maps.
3. The following basic data sheet information will be completed:
    - Observer name and contact information (phone number, email)
    - Assigned position
    - Date
    - Weather conditions/visibility/tide (to be completed on site)
    - Radio channel/frequency
4. The entire crew will run through a mock verbal run of the watch and blast sequence.
5. The Blaster-in-Charge will set an exact time for the blast event and the construction crew and marine observers will synchronize their watches.
6. The Aerial Observer/Chief Observer will be in direct contact with the Blaster-in-Charge to give the "All Clear."

After the on-site meeting has concluded, the Aerial Observer/Chief Observer will depart for the airport and the remaining marine observers will depart for their assigned positions. All marine observers will be in their positions exactly 60 minutes prior to the scheduled blast and will conduct a radio check at that time.

Blast Event Requirements/Schedule

The watch program shall begin at least 60 minutes prior to the scheduled start of the blasting so that the marine observers can identify the possible presence of manatees, dolphins, whales, sea turtles, giant manta rays, or smalltooth sawfish located in the project vicinity area. All marine observers will annotate the time they are in position in their Observation Log.

The Aerial Observer/Chief Observer will conduct a pre-event surveillance aerial sweep one hour prior to the initial blast. The aerial sweep will cover an area extending one mile beyond the Marine Animal Watch Zone perimeter to identify any animals approaching the Marine Animal Watch Zone. If animals are found to be moving toward the Marine Animal Watch Zone during the aerial sweep, a second aerial sweep will be repeated 30 minutes prior to the blast event. If no animals are present during the aerial sweep, the Aerial Observer will restrict their observations to the Marine Animal Watch Zone. If for any reason the helicopter is delayed (for mechanical issues, logistics, or weather) or must leave the site for refueling, a Boat Observer will be deployed to perform observation in the areas

covered by the helicopter. Coordination with the Primary Coordinator and Blaster-in-Charge will occur 15 minutes prior to departure so that the boat observer will be deployed to provide the necessary coverage. If available, a drone may be deployed until the helicopter arrives on-site.

The marine observers will be in close communication with each other during the watch program via two-way hand-held radio. If radios are malfunctioning, cellular telephones may be used as backup. The Primary Coordinator and Aerial Observer/Chief Observer will be in contact via two-way radio and aircraft transceiver with the construction contractor and the Blaster-in-Charge. Radio checks will be taken at the top of each hour.

All marine observers will be equipped with the following items at all times:

- Functioning two-way radio
- Cell phone
- Polarized sunglasses
- Safety Work Vest
- Binoculars
- Red flag for backup communication
- Marine Observer Sighting Log (a Draft Marine Observer Sighting Log is provided in the Draft ISMMWP in **Attachment B**)

The positions of all observed imperiled species and marine mammals will be tracked by the marine observers and no blasting will occur until all observed animals are clear of the Marine Animal Watch Zone. The size of the Marine Animal Watch Zone will be determined in accordance with the State accepted calculations based on charge size and will be confirmed by the Blaster-in-Charge in the *Final Blasting Plan* for the project. Should an animal be last observed within the Marine Animal Watch Zone, no blasting will occur until the animal is observed outside of the area or not observed for at least 30 minutes prior to the blast. If an animal is observed within the Marine Animal Watch Zone with no sign of exit at two minutes prior to the scheduled blast, the blast will be aborted. For aborted blasts, the blast time will be delayed for at least 10 minutes and there will be continued coordination between the marine observers and the Blaster-in-Charge. **An "All Clear" signal must be provided by the Aerial Observer to the Blaster-in-Charge before detonation can occur.**

Post-Blast Requirements/Schedule

The watch program will continue until at least 30 minutes after detonation is complete and all Marine Observers will remain at their stations, continuing to survey their designated area and document any animals potentially impacted by the blast or showing behavioral changes as a result of the blast. The Primary Coordinator will declare "Stand-down" once the watch program is complete. A post-blast debriefing with all marine observers will be conducted onsite to gather all Observer Sighting Logs and to review the events.

If an injured or dead imperiled species or marine mammal is sighted after the detonation, the Primary Coordinator shall contact the FWC through their Hotline at 1-888-404-FWCC and the USFWS at the Jacksonville Ecological Services Office at 904-232-2580.

3.5 Post-Blast Report

Within two weeks after completion of all blasting, the Primary Coordinator shall submit a summary report to the USFWS, NMFS, and FWC providing a description of the event, a summary of the Marine Observer Sighting Logs, names of the observers and their positions during the event, the number and location of imperiled species and marine mammals sighted, and the actions that were taken when the animals were observed. Any problems with the event and suggestions for improvements will be documented in the report.

ATTACHMENT A

Marine Animal Watch Zone Figure


Magnolia Dr
Biscayne Bay Dr
Keystone
Bayview Ln
N Bayshore Dr
922
Broad Causeway
W Broadview Dr
E Broadview Dr
103rd St
102nd St
101st St
100th St
99th St
97th St
96th St
Burt Ct
W Bay Harbor Dr
FLORIDA
PROJECT LOCATION
0
500
1,000
Feet
Service Layer Credits: World_Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Reference/World_Transportation: Esri, HERE, Garmin, (c) OpenStreetMap contributors
LEGEND
Marine Animal Watch Zone (2,163-ft Radius)
Exclusion Zone (1,863-ft Radius)
Blast Safety Zone (250-ft Radius)

ATTACHMENT B

Draft Marine Observer Sighting Log

Imperiled Species and Marine Mammal Watch Plan
Draft Marine Observer Sighting Log

Date of Event: _____

Observer Name: _____

Observer Position: _____

Observer Radio Call: _____

Time of On-station: _____

Time of Off-station: _____

Instructions

1. This Marine Observer Sighting Log consists of two components: 11) Observation Log Table and 2) Sighting Map. Both items should be used in conjunction to record all species observations during the watch program.
2. Observation Log Table:
    - **Event No. Column**: This column will include a consecutive series of numbers corresponding to each sighting. This event number will also be documented on the Sighting Map (as described in #3 below). In addition to numbered event entries, the following specific event codes will be documented in this column:
        - RC – radio check
        - FS – fish scare
        - DEL – blast delay
        - AC – "All Clear" signal
        - BL – time of blast event
    - **Time Column**: Record the time that the species observation/event was observed.
    - **Species & No. Observed Column**: Record the species observed and the number of individuals observed. The following abbreviations can be used:
        - M = Manatee
        - T = Sea turtle
        - C = Cetacean (dolphin, whale)
        - O = Other Species _____

      For example, an observation of three manatees would be entered as "M3". If the exact species can be discerned, record the species name in the "notes" column (e.g., (loggerhead sea turtle)
    - **Direction of Travel Column**: Record the direction that the species is traveling. This can be documented as a general direction (e.g., North, Southwest) or as a compass heading.
    - **Notes Column**: Record any observations that may be helpful in determining the danger potential to the animal from the marine event. Record any species names for individual animals observed.

Imperiled Species and Marine Mammal Watch Plan
Draft Marine Observer Sighting Log

Event No.	Time	Species & No. Observed	Direction of Travel	Notes

Locations of the Marine Animal Watch Zone, Exclusion Zone, and Anticipated Marine Observer Positions



APPENDIX D
USFWS CONCURRENCE

DocuSign Envelope ID: 15DDD96B-CE69-4CCC-BC06-745F235A9655

Florida Ecological Services Field Office

Service Project Code No. 2024-0071206

The U.S. Fish and Wildlife Service has reviewed the information provided and finds that the proposed action is not likely to adversely affect any federally listed species or designated critical habitat protected by the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 et. seq.). A record of this consultation is on file at the Florida Ecological Services Field Office.

This fulfills the requirements of section 7 of the Act and further action is not required. If modifications are made to the project, if additional information involving potential effects to listed species becomes available, or if a new species is listed, reinitiation of consultation may be necessary.

ROBERT CAREY

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Date: 2024.05.02 08:41:41 -04'00'

Environmental Review Supervisor

Flo

RON DESANTIS
GOVERNOR

, P.E.

April 30, 2024

Mr. John Wrublik
U.S. Fish and Wildlife Se
South Florida Ecological Services Office
1339 20th Street
Vero Beach, FL 32256-7517

Subject: **ESA Section 7 Coordination**
Project Name: Town of Bay Harbor Islands Broad Causeway Bridge Replacement
Limits: Broad Causeway Bridge from Broad Causeway Island to East of West Broadview Drive
Financial Management No.: 452428-1-21-01
Federal Aid No.: Not Assigned
County: Miami-Dade

Dear Mr. Wrublik,

The Town of Bay Harbor Islands (Town) conducted a Project Development and Environment (PD&E) Study in cooperation with the Florida Department of Transportation (FDOT), District Six, to evaluate potential bridge replacement alternatives of the existing Broad Causeway Bridge which connects the Town of Bay Harbor Islands with the City of North Miami, in Miami Dade County, Florida. As part of the study, a Natural Resources Evaluation (NRE), including a Protected Species and Habitat Evaluation was completed to determine potential impacts to federal and state listed species as a result of the proposed bridge replacement project. The Protected Species and Habitat Evaluation was conducted in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq), and the FDOT PD&E Manual. The following summarizes the project and federally listed species evaluation and effect determinations. This letter, and the attached NRE, are being transmitted to US Fish and Wildlife Service (USFWS) for review and concurrence in support of the PD&E Study.

The Preferred Alternative will address the structural and functional deficiencies of the existing Broad Causeway Bridge by replacing the existing bridge with a new 65-foot High-Level Fixed Bridge on a southern alignment. The new bridge includes a 4-lane divided roadway with two, 11-foot lanes in each direction separated by 4-foot inside shoulders and a 2-foot concrete barrier wall. The outside shoulders are 8 feet wide, adjacent to concrete barrier walls. A 14-foot shared use path along the north side of the new bridge accommodates pedestrians and bicycles with a 1.5-foot barrier wall to safely separate travel lanes and the path. In addition to the bridge replacement, the proposed project also includes new access ramps to the service station on the causeway island, a mid-block pedestrian crosswalk on Kane Concourse, signing, stormwater management facilities, and installation of new seawalls east and west of the existing bridge. In-water construction work is anticipated in association with the installation of the new bridge piers and demolition of the existing bridge. The new seawalls will be constructed landward of (behind) the existing

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seawalls on the east and west sides of the bridge, and the existing seawalls will be abandoned in place. All seawall construction activities will be conducted from land. The existing 27 bridge piers will have the piles cut off at the mudline with the portions below the mudline abandoned in place. Demolition of the two existing bascule piers is anticipated to require the use of explosives/blasting.

It is anticipated that the new bridge pilings/piers will be installed via impact hammer. The pile caps for the new bridge piers will be installed at the mean high water line without the need for dredging or changes to the mudline. The construction barge details (e.g., draw depths and weight/displacement) have not yet been determined. Thus, it is unclear whether the water depths within the project area will allow for barge movement during the new bridge pier/fender installation, and it is not yet known whether dredging will be required to allow for barge maneuvering during construction.

To identify and characterize the benthic habitats and biological resources to support the PD&E study, benthic surveys were conducted in August 2022 (Preliminary Benthic Survey) and July-August 2023 (Quantitative Benthic Survey). In addition, a June 2023 pedestrian field survey found occasional mangrove propagules and saplings (no mature trees) within the riprap along the causeway island. These mangroves are not considered essential fish habitat since they are very small and do not provide canopy or any substantial root structure that would provide any significant habitat for managed species. Five distinct benthic community types were identified within the survey area: Community 1 (Macroalgal Beds); Community 2 (Seagrass); Community 3 (Live Bottom); Community 4 (Coral Habitat Adjacent to the Seawalls); and Community 5 (Existing Seawalls and Bridge Piers). Each of these community types is described in the NRE and anticipated impacts to each community type are discussed below.

The following federal listed species were identified as having the potential to occur within the project study area – Florida bonneted bat (*Eumops floridanus*), West Indian manatee (*Trichechus manatus*), piping plover (*Charadrius melodus*), wood stork (*Mycteria americana*), American crocodile (*Crocodylus acutus*), and eastern indigo snake (*Drymarchon corais couperi*). Additionally, the tricolored bat (*Perimyotis subflavus*) and monarch butterfly (*Danaus plexippus*) were assessed as part of this project. The USFWS Information for Planning and Consultation (IPaC) and/or Florida Natural Areas Inventory (FNAI) Biodiversity Matrix Query reports identified 16 federally listed plant species with the potential to occur within the project study area: beach jacquemontia (*Jacquemontia reclinata*), Blodgett's silverbush (*Argythamnia blodgettii*), Cape Sable thoroughwort (*Chromolaena frustrata*), Carter's mustard (*Warea carteri*), Carter's small-flowered flax (*Linum carteri carteri*), crenulate lead-plant (*Amorpha crenulata*), deltoid spurge (*Chamaesyce deltoidea ssp. deltoidea*), Everglades bully (*Sideroxylon reclinatum ssp. austrofloridense*), Florida brickell-bush (*Brickellia mosieri*), Florida pineland crabgrass (*Digitaria pauciflora*), Florida prairie-clover (*Dalea carthagenensis floridana*), Florida semaphore cactus (*Consolea corallicola*), pineland sandmat (*Chamaesyce deltoidei pinetorum*), sand flax (*Linum arenicola*), Small's milkpea (*Galactia smallii*), tiny polygala (*Polygala smallii*), and Florida filmy fern (*Trichomanes punctatus ssp. floridanum*).

The project is within the USFWS designated Consultation Areas for the West Indian manatee, piping plover, American crocodile, and Florida bonneted bat. The project area also occurs within the Core Foraging Area of one previously documented wood stork colony. The project study area is located within the designated critical habitat (CH) for the West Indian manatee.

The effect determination for each of the federally listed species is discussed below and shown in **Table 1**.

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Mammals

Florida bonneted bat (FBB) - Because the project study area is located within the limits of the USFWS-designated 2019 FBB Consultation Area and within the South Florida Urban Bat Area, a FBB survey was conducted in 2023 which included a combination of acoustic and visual surveys (potential roost search). Based on the lack of FBB calls during the acoustic survey, the lack of potential roost trees, and the poor suitability of roosting habitat within the project study area, an effect determination of ***no effect*** has been made for the FBB.

West Indian manatee - The project study area is located within the designated critical habitat for the manatee and foraging habitat (seagrass) is located within the project study area. Manatees are known to travel through the project study area; however, no manatees were observed during any of the field surveys. The construction methodologies for demolition of the existing bridge structures have not yet been determined; however, demolition via the use of explosives/blasting will be required for the removal of the two bascule piers. Because the proposed project will: 1) implement the *Standard Manatee Conditions for In-water Work*, the National Marine Fisheries Service (NMFS) *Protected Species Construction Conditions* and the NMFS *Vessel Strike Avoidance Measures* during in-water construction activities (Appendix G of the NRE); 2) implement best management practices (BMPs) during construction to avoid or minimize unnecessary impacts to seagrasses; 3) mitigate for unavoidable impacts to seagrasses; 4) adhere to the agency-approved *Final Blasting Plan* and *Imperiled Species and Marine Mammal Watch Plan* to minimize impacts from the use of blasting/explosives (blasting plan will adhere to the USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida* - Appendix G of the NRE); and 5) install manatee exclusion devices on any drainage culverts (between eight inches and eight feet in diameter) associated with the proposed project, the project determination of effect for the manatee is ***may affect, not likely to adversely affect***. Furthermore, ***the proposed project will not result in the destruction or adverse modification of manatee critical habitat***.

Birds

Piping plover - No piping plovers were observed within the project study area during any of the field surveys. Because the project study area does not contain suitable nesting or foraging habitat for this species, the project determination of effect for the piping plover is ***no effect.***

Wood stork – The only potential wood stork suitable foraging habitat (SFH) within the project study area consists of two other surface waters (OSW 2 and OSW 7) that are stormwater features comprised almost entirely of mowed and maintained St. Augustine grass that may hold ponded water year-round. Permanent direct impacts to OSW 2 and OSW 7 are anticipated in association with construction of the proposed stormwater management ponds (a total impact of 0.236 ac). The project study area also lacks potential perching or roosting trees. No wood storks were observed during any of the field surveys. According to the Effect Determination Key for the Wood Stork in South Florida (May 2010), the project determination of effect for the wood stork is ***may affect, not likely to adversely affect*** based on the following pathway: A→B→*not likely to adversely affect (NLAA)*.

Reptiles

American crocodile - The project study area does not contain foraging habitat and includes limited basking/nesting habitat due to dense riprap and concrete rubble used to stabilize shorelines. Apart from the possibility of individual crocodiles traveling through the project study area, it is highly unlikely that this species would inhabit the project study area. No American crocodiles were observed during any of the field

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surveys. While there is a possibility that they could migrate through the proposed project area during construction, the urbanized areas in and around the project study area do not offer suitable foraging, basking, or nesting habitats for this species. Therefore, the project determination of effect for the American crocodile is ***no effect*.**

Eastern indigo snake – No eastern indigo snakes were observed during the field surveys. Additionally, no gopher tortoise burrows or other suitable eastern indigo snake refugia were observed during any of the field surveys. Using the USFWS *Eastern Indigo Snake Programmatic Effect Determination Key* (January 25, 2010 and revised July 2017), the project determination of effect for the Eastern indigo snake is ***may affect, not likely to adversely affect*** based on the following pathway: A→B→C→D→*may affect, not likely to adversely affect.* To increase protection of this species during construction, the Town will adhere to the most current version of the *Standard Protection Measures for The Eastern Indigo Snake* (Appendix G of the NRE).

Plants

The USFWS IPaC and/or FNAI Biodiversity Matrix Query reports identified 16 federally listed plant species with the potential to occur within the project study area (see above and Table 1). None of these federally listed plant species have the potential to occur within the project study area or vicinity based on lack of suitable habitat within the project study area and/or habitat ranges that are well outside of the project area. No federally listed plants were observed during the June 2023 pedestrian field survey. Therefore, the project determination of effect for the federally protected plant species listed in Table 1 is ***no effect***.

Other Species

Tricolored bat - A FBB survey was conducted in 2023 which included a combination of acoustic and visual surveys (potential roost search). No tricolored bat calls were documented during the acoustic survey. Furthermore, the project study area lacks potential roost trees, and contains poor suitability of roosting habitat. Based on the lack of FBB calls during the acoustic survey, the lack of potential roost trees, and the poor suitability of roosting habitat within the project study area, the probability of occurrence is low.

Monarch butterfly - The project study area does not contain suitable habitat for the monarch butterfly. No milkweed or suitable flowering vegetation was observed within the project study area during the pedestrian field survey. Apart from the possibility of individual monarchs traveling through the project study area, it is highly unlikely that this species would inhabit the project study area. No monarch butterflies were observed during any of the field surveys. While there is a possibility that they could migrate through the proposed project area during construction, the urbanized areas in and around the project study area do not offer habitat for this species, and the probability of occurrence is low.

Table 1: Federally Listed Species Potentially Occurring within the Project Study Area and their associated Effect Determinations

Species Name	Listing Status[1]	Occurrence Potential	Effect Determination[2]
MAMMALS			
Florida bonneted bat	FE	Low[3]	*No effect*
Tricolored bat	P(E)	Low[3]	*N/A*
West Indian manatee	FT	High (CH)[4]	*May affect, not likely to adversely affect*
BIRDS			

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Species Name	Listing Status[1]	Occurrence Potential	Effect Determination[2]
Piping plover	FT	Low	*No effect*
Wood stork	FT	Low	*May affect, not likely to adversely affect*
INSECTS			
Monarch butterfly	C	Low	*N/A*
REPTILES			
American crocodile	FT	Low	*No effect*
Eastern indigo snake	FT	Low	*May affect, not likely to adversely affect*
PLANTS			
Beach jacquemontia	FE	None	*No effect*
Blodgett's silverbush	FT	None	*No effect*
Cape Sable thoroughwort	FE	None	*No effect*
Carter's mustard	FE	None	*No effect*
Carter's small-flowered flax	FE	None	*No effect*
Crenulate lead-plant	FE	None	*No effect*
Deltoid spurge	FE	None	*No effect*
Everglades bully	FT	None	*No effect*
Florida Brickell-bush	FE	None	*No effect*
Florida pineland crabgrass	FT	None	*No effect*
Florida prairie-clover	FE	None	*No effect*
Florida semaphore cactus	FE	None	*No effect*
Pineland sandmat	FT	None	*No effect*
Sand flax	FE	None	*No effect*
Small's milkpea	FE	None	*No effect*
Tiny polygala	FE	None	*No effect*
Florida filmy fern	FE	None	*No effect*

[1]FE = Federally Endangered, FT = Federally Threatened, P(E) = Proposed for Listing as Federally Endangered, C = Candidate for Federal Listing
[2]N/A = Not Applicable
[3]Based on findings of the October 2023 Florida Bonneted Bat Survey (see Section 4.5 and Appendix F of the NRE for details).
[4](CH) – the project study area is located within designated CH for the manatee

The following commitments are proposed by the Town to avoid and minimize impacts to protected species:

1. If the listing status of the tricolored bat is elevated by USFWS to Threatened or Endangered and the Preferred Alternative is located within the consultation area during the design and permitting phase of the proposed project, the Town commits to reinitiating consultation with the USFWS to determine the appropriate survey methodology and to address USFWS regulations regarding the protection of the tricolored bat.

2. The USFWS and Florida Fish and Wildlife Conservation Commission (FWC) *Standard Manatee Construction Conditions for In-Water Work* will be utilized during construction.

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3. To reduce the risk of entrapment and drowning of manatees, manatee exclusion devices (such as grating) shall be installed and maintained over any existing or proposed pipes or culverts greater than eight inches that are submerged or partially submerged and reasonably accessible to manatees. If horizontal or vertical bars are used, no more than 8-inch gaps on center shall be allowed. Grates shall be in place at the accessible end(s) during all phases of the construction process and as a final design element to restrict manatee access.

4. If the listing status of the monarch butterfly is elevated by USFWS to Threatened or Endangered and if the project area is located within the consultation area, during the construction phase of the proposed project, the Town commits to reinitiating consultation with the USFWS to determine the appropriate survey methodology and to address USFWS regulations regarding the protection of the monarch butterfly.

5. The most recent version of the USFWS *Standard Protection Measures for the Eastern Indigo Snake* will be utilized during construction.

6. The NMFS *Protected Species Construction Conditions, NOAA Fisheries Southeast Regional Office* will be utilized during construction.

7. The NMFS *Vessel Strike Avoidance Measures, NOAA Fisheries Southeast Regional Office* will be utilized during construction.

8. A seagrass survey will be conducted during the peak seagrass growing season (i.e., June 1-September 30) in the design phase. The seagrass survey protocol will be coordinated with NMFS prior to completion. If it is determined that there will be unavoidable impacts to seagrasses from the project, coordination with NMFS and USFWS will take place to determine appropriate avoidance and minimization measures to apply during construction.

9. The Town will provide mitigation for unavoidable impacts to seagrasses. A *Seagrass Mitigation Plan* will be developed to offset unavoidable impacts to seagrass from the proposed project. The *Seagrass Mitigation Plan* will be reviewed and approved by the NMFS, USFWS, US Army Corps of Engineers (USACE), South Florida Water Management District (SFWMD), and Miami-Dade County Department of Regulatory and Economic Resources Division of Environmental Resource Management (DERM) during the permitting process.

10. To identify areas that should be avoided by barges and work boats for construction and staging, prior to construction commencement, the Town will delineate and mark with visible buoys seagrasses located adjacent to (outside of) the impact areas within the vicinity of the project corridor. The seagrass marking requirement will be coordinated with the NMFS and USFWS during the permitting process.

11. All in-water construction activities will be limited to daylight hours.

12. Measures to minimize potential underwater noise impacts from pile driving and in-water construction will be determined during design and implemented during construction. Noise abatement measures for the project will be coordinated with, and approved by, the NMFS and the USFWS during the design and permitting process.

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13. A *Conceptual Blasting Plan* to provide general blasting information for the project, including proposed measures to minimize and mitigate potential effects on species, will be developed during the design process and reviewed/approved by the USFWS, NMFS, US Coast Guard (USCG), USACE, and FWC. Prior to construction, the Town and their contractor will submit a *Final Blasting Plan* containing details of the blasting means and methods, including the blasting design, an impact assessment, a mitigation plan, and an *Imperiled Species and Marine Mammal Watch Plan* which will be reviewed and approved by the USFWS, NMFS, USCG, USACE, and FWC. The blasting plan will be required to adhere to the USFWS's May 2005 *Guidelines for the Protection of Marine Mammals and Sea Turtles During the Use of Explosives in the Waters of the State of Florida*.

14. The Town commits to reinitiating consultation during design and permitting with NMFS and USFWS for boulder star coral and manatee CH and will provide the information necessary to determine the type, degree, and extent of impacts to listed species [and/or CH] potentially adversely impacted by the proposed project. The Town will develop mitigation measures in consultation with the NMFS and USFWS to offset unavoidable impacts. Completion of consultation and documentation of the project's compliance with the avoidance, minimization and mitigation requirements for the impacted resources will be provided by the Town in a subsequent project reevaluation prior to advancing to construction.

We ask that USFWS review the attached NRE for this project and provide concurrence to support the PD&E Study. Thank you for your continued cooperation on various FDOT projects. If you have any questions or require additional information, please contact Steven James at Steven.James@dot.state.fl.us or by phone at (305) 470-5221.

Sincerely,

DocuSigned by:
Steven James
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Steven Craig James
District Environmental Manager, FDOT District 6

cc: Rob McMullen, Environmental Scientist III / District Noise Specialist, FDOT District 6
Megan Moore, Environmental Specialist III, FDOT District 6
Rodney Carrero-Santana, Town Engineer, Town of Bay Harbor Islands
David Konz, Senior Technical Manager, AtkinsRéalis

Attachments: Natural Resources Evaluation

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