Martinez
Refining Company

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Martinez, CA 94553

VIA e-mail to shorepower@arb.ca.gov

March 19, 2026

Chief, Transportation and Toxics Division
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Subject: MRC Revised Terminal Plan for At-Berth Rule

To Whom It May Concern:

The purpose of this submittal is to provide the revised Terminal Plan required under California Air Resources Board's (CARB) Control Measure for Ocean-Going Vessels at Berth (California Code of Regulations, Title 17, Section 93130.14) for the Martinez Refining Company LLC (MRC). The required plan is attached to this letter in the form of a technical feasibility study conducted by a third-party engineering firm. MRC was under the impression that CARB had received a submittal of this updated terminal plan in 2023, shortly after the feasibility study was completed. However, based on recent communication with CARB, it appears that CARB does not have record of having received the attached plan.

Please contact Devon Maheshwari at (925) 313-5386 or devon.maheshwari@pbfenergy.com for any questions regarding this plan.

Sincerely,

Rina Mansingh

Rina Mansingh
Manager, Environmental Department
Martinez Refining Company

Attachment

ATTACHMENT A

MRC Terminal Plan

CARB AT-BERTH FEASIBILITY STUDY
MRC MARTINEZ TERMINAL

Martinez, CA
14 April 2023

SGH Project 227402

Date Signed: 14 April 2023

PREPARED FOR
Martinez Refining Company, LLC
3485 Pacheco Blvd
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PREPARED BY
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ATTACHMENTS

1. INTRODUCTION

The Martinez Refining Company, LLC (MRC) requested Simpson Gumpertz & Heger Inc. (SGH) to prepare a technical feasibility study to support their Terminal Plan submitted to the California Air Resources Board (CARB) in response to Section 93130.14 of CARB's At-Berth regulation. The feasibility study evaluates whether a CARB Approved Emissions Control Strategy (CAECS) can be implemented in a feasible, safe, and reliable manner to tankers berthing at the MRC Marine Oil Terminal within the compliance deadline of 1 January 2027.

2. BACKGROUND

MRC submitted a Terminal Plan to the California Air Resources Board (CARB) on 1 December 2021, in response to CARB's At-Berth requirements. Section 93130.14 of CARB's At-Berth regulation requires an evaluation of whether a CARB Approved Emissions Control Strategy (CAECS) can be implemented in a feasible, safe, and reliable manner at the MRC Marine Oil Terminal.

In the Terminal Plan submittal, MRC included an evaluation of each of the three CAECS approaches (shore power, barge-based capture and control, and wharf-based capture and control), and documented why each of the three cannot be implemented within the regulatory time frame.

In CARB's 2 March 2022 response letter, CARB requested a technical feasibility study evaluating if there are any other emission control options that could be implemented more quickly at the terminal.

MRC responded on 24 May 2022 and attached the DNV Report done for WSPA, dated 30 November 2021, as the technical feasibility study.

We understand that CARB has recently rejected the DNV report submitted and has requested a site-specific feasibility study to support the MRC Terminal Plan.

2.1 CARB At Berth Regulation Background

The Control Measure for Ocean-Going Vessels At Berth (Control Measure) is set forth in Title 17, Division 3, Chapter 1, Subchapter 7.5, Sections 93130 to 93130.22 of the California Code of Regulations (CCR). The Control Measure, enacted by CARB, extends an existing regulation for container, cruise, and refrigerated cargo vessels at berth to tanker and roll-on/roll-off (ro-ro) vessels. The purpose of the Control Measure is to reduce diesel

particulate matter (PM) and oxides of nitrogen (NOx) from ocean-going vessels auxiliary engines while they are docked at California ports.

The Control Measure requires that tanker vessels comply with the regulation by 1 January 2025, for tankers calling on terminals located in the Port of Los Angeles or Port of Long Beach. A compliance start date of 1 January 2027 applies to all other tankers, including those that call at the MRC terminal.

A terminal that receives less than twenty visits a year from a regulated vessel category is exempt from the regulation. The Control Measure defines an ocean-going vessel as a commercial, government, or military vessel, excluding articulated tug barges (ATBs), meeting any of these criteria:

- A vessel greater than or equal to 400 ft in length overall;
- A vessel greater than or equal to 10,000 gross tons; or
- A vessel propelled by a marine compression ignition engine with a per-cylinder displacement of greater than or equal to 30 liters.

An ATB is defined in the Control Measure as a tanker barge that is mechanically linked with a paired tug that functions as one vessel. For the purposes of the Control Measure, ATBs are not considered to be ocean-going vessels. Other barges are excluded from the regulation due to not being “ocean-going.”

The Control Measure defines CARB Approved Emission Control Strategy (CAECS) as a method of reducing emissions from an ocean-going vessel at berth to a satisfactory level for compliance with the Control Measure and is verified and approved by CARB.

2.2 CAECS Technologies

CARB has approved three primary CAECS technologies to achieve compliance with the Control Measure that we have considered in this feasibility study.

- Shore Power – where either the local utility or a grid-neutral distributed generation system provides electrical power to a vessel at berth.
- Barge-based Capture and Control – where an exhaust hood over the vessel stack captures emissions and directs them through ducting to a control device located on a barge.
- Shore-based or Wharf-based Capture and Control – where an exhaust hood over the vessel stack captures emissions and directs them through ducting to a control device located on the shore or on a fixed terminal structure. We understand that because of the long distance to shore from the wharf, there is almost no chance that the system would operate efficiently enough to meet CARB requirements. As such, we have primarily considered only a wharf-based system.

3. TERMINAL DESCRIPTION

3.1 Site Location

The MRC Marine Terminal, formerly known as the Shell Martinez Marine Terminal, is located in the Carquinez Strait in Martinez, CA, approximately 1/2 mile from the Benicia Bridge. Figure 1 shows the location of the site.

3.2 Terminal Layout

As shown in Figure 2, the terminal comprises a 1900 ft long timber approach trestle that connects to two reinforced concrete loading platforms with a center mooring island. Two mooring dolphins are located at each end of the terminal. The approach trestle was originally constructed in the 1920s. The loading platforms and mooring dolphins were constructed in the 1960s. Seismic dolphins were added on the landside and ends of the loading platforms as part of a seismic retrofit constructed in 2017.

The upstream loading platform houses Berth 1 on the water side and Berth 3 on the land side. The downstream loading platform houses Berth 2 on the water side and Berth 4 on the land side. Only Berths 1 and 2 receive the tankers that are within the scope of the CARB At-Berth regulations.

Attachment 1 shows the terminal plans of the wharf structures from the 1964 design drawings. Attachment 2 shows the current terminal plans of the loading platforms and seismic dolphins from the 2017 as-built drawings for the seismic retrofit project.

3.3 Water Depths

Attachment 3 shows the most recent bathymetry for the terminal, from November 2019. All soundings shown are relative to Mean Lower Low Water (MLLW).

Figure 3 shows an excerpt from Attachment 3 showing the water depths near the upstream loading platform. The deepest water adjacent to the berth is approximately 74 ft.

The minimum water depth, as shown in the Terminal Operating Limits (Attachment 4) at both Berths 1 and 2, is 42 ft at MLLW.

3.4 Vessels

Attachment 4 presents the Terminal Operating Limits (TOLs) for vessels approved to call at the terminal. The TOLs provide a concise statement of the purpose of each berthing system at the wharf in terms of operating limits and mooring configurations for representative vessel size ranges.

Approved vessels at both Berths 1 and 2 include barges ranging from 6,000 Dead Weight Tonnes (DWT) to 27,500 DWT, and tankers ranging from 30,000 DWT to 188,000 DWT. Vessels can berth either port-to or starboard-to. The barges noted are not within the scope of the Control Measure. However, any physical modifications to the terminal or changes in operations must consider the constraints due to potential mooring and berthing of these barges that call at the terminal.

Figure 4 - Figure 11 show the range of tankers approved to call at the terminal, with their approximate positioning and mooring line configurations.

3.5 Description of Terminal Structures

Tankers berth alongside the upstream and downstream loading platforms, which house Berths 1 and 2. Each loading platform comprises plumb and battered 20 in. prestressed, precast piles supporting concrete beams and deck. The four mooring dolphins and six finger pier bents supporting trestle walkways are of similar construction.

From 2015 to 2017, both loading platforms were seismically strengthened with the addition of twenty-one seismic dolphins constructed along the west, south, and east sides of the loading platforms. Seismic dolphins consist of 24 in. octagonal prestressed, precast concrete piles with 4 ft deep concrete decks abutting the original concrete wharf structures. Fiber-reinforced

polymer (FRP) wrapping of the piles was also performed for seismic strengthening of pile-to-deck connections.

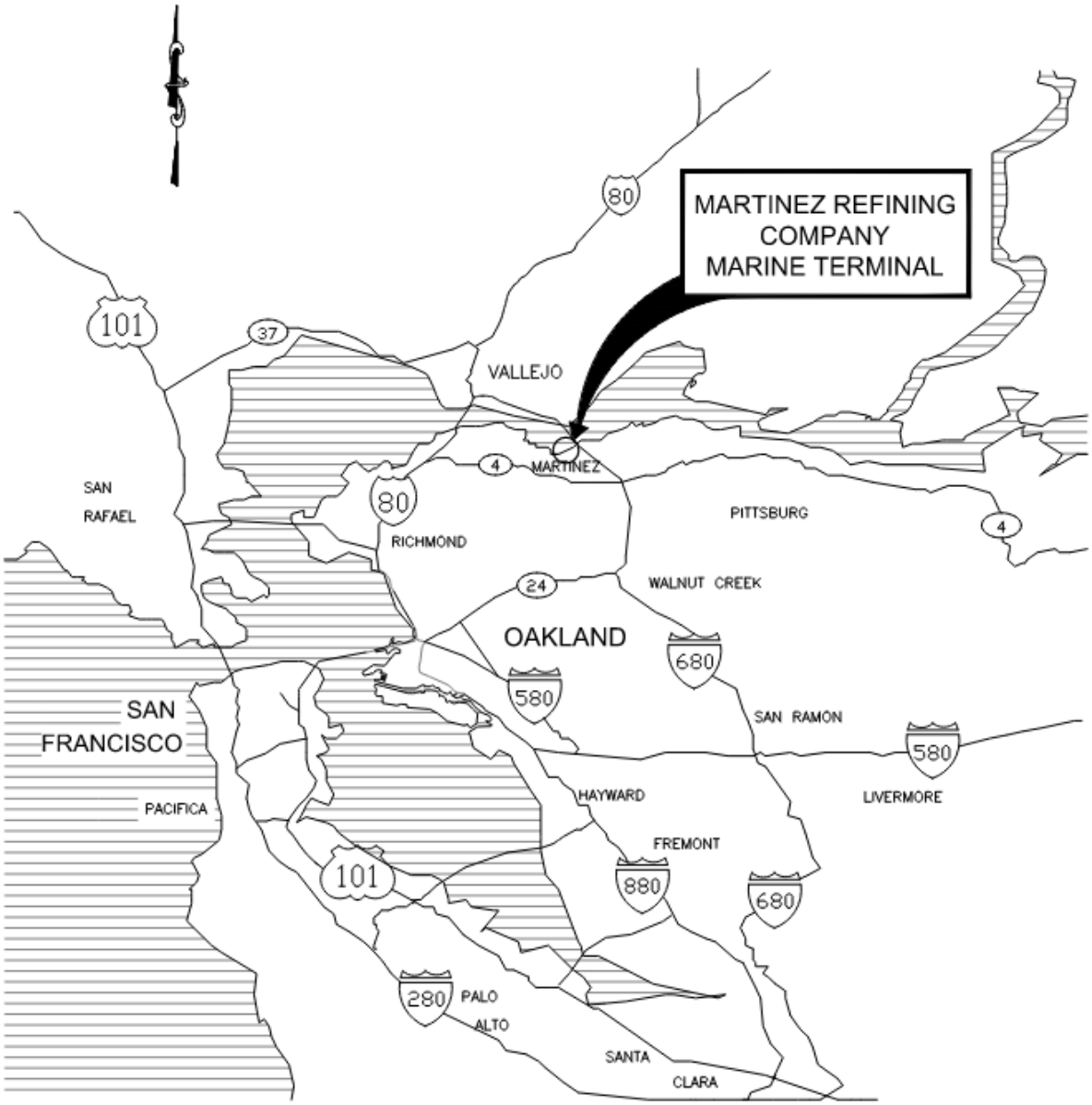


Figure 1 – Site Location

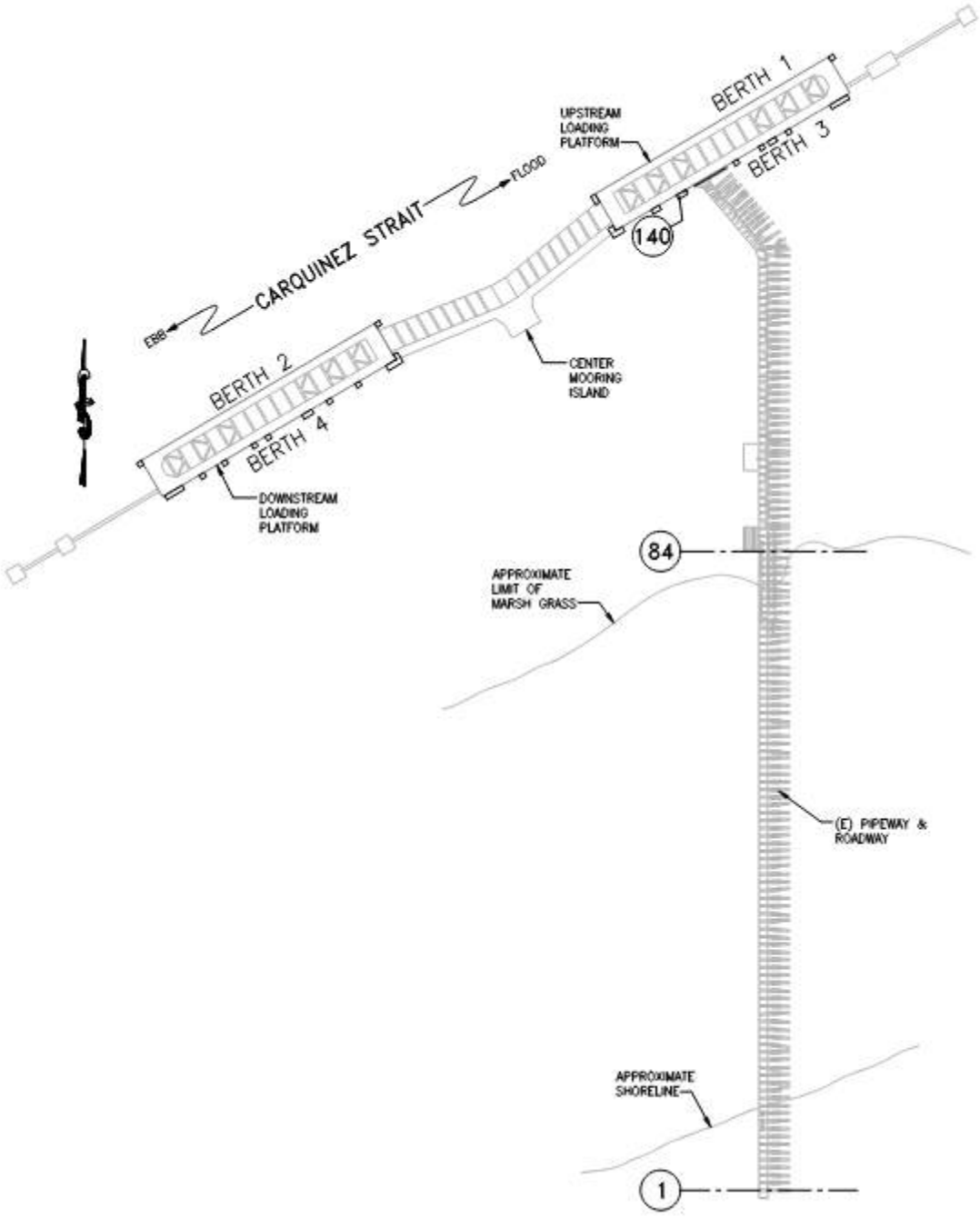


Figure 2 – Terminal Plan

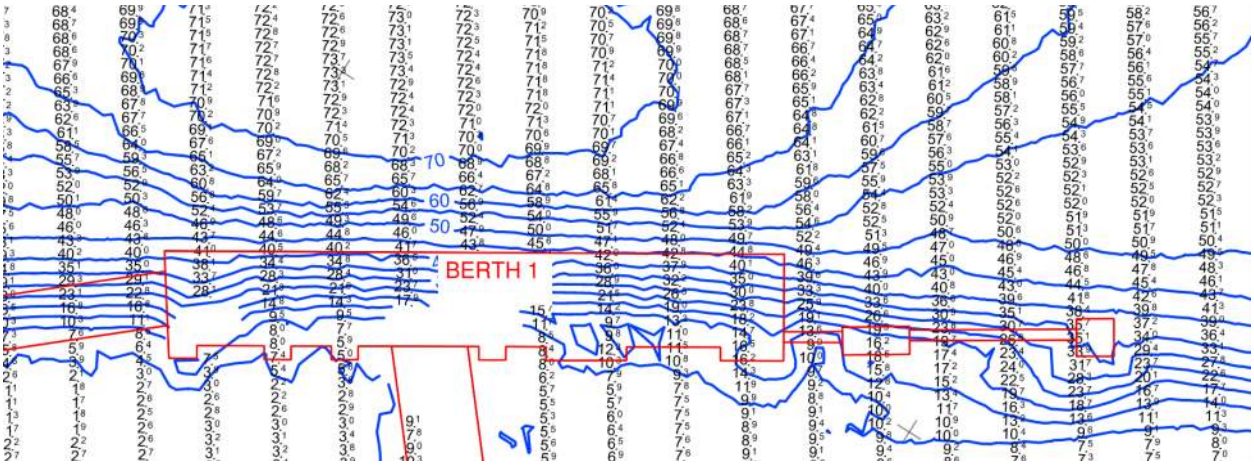


Figure 3 – Closeup of Water Depths Near Berth 1 (from Attachment 3)

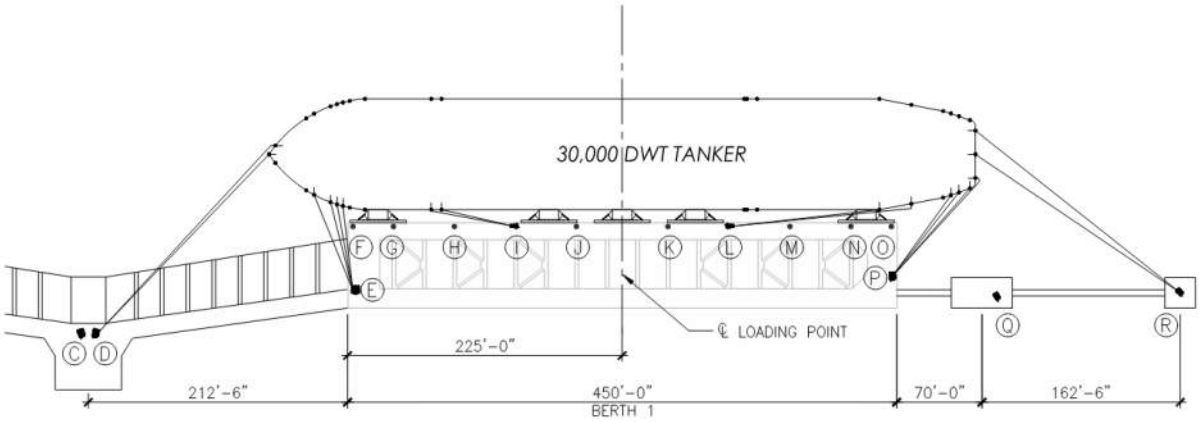


Figure 4 - Mooring Configuration 30,000 DWT Tanker – Berth 1 Port Side (From Attachment 4 - Sheet 10)

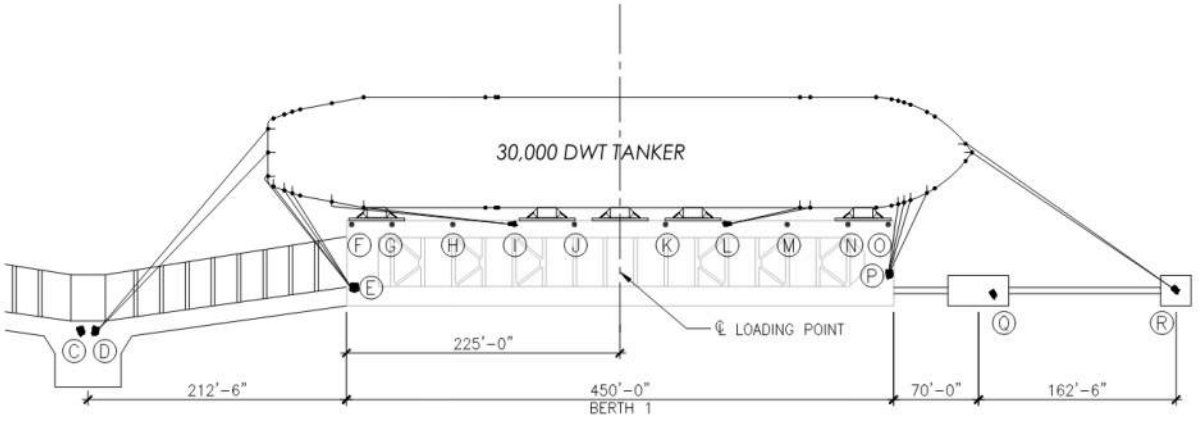


Figure 5 - Mooring Configuration 30,000 DWT Tanker - Berth 1 Starboard Side (From Attachment 4 - Sheet 11)

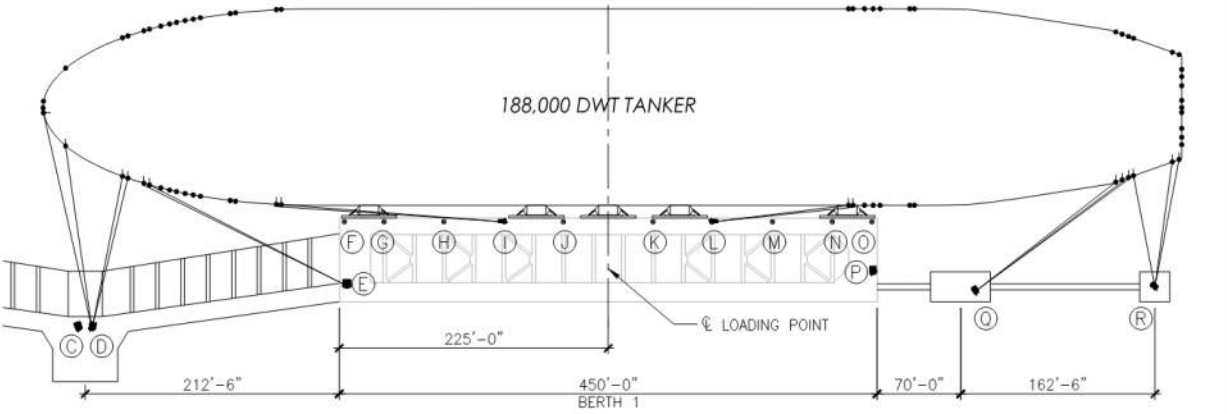


Figure 6 - Mooring Configuration 188,000 DWT Tanker - Berth 1 Port Side (From Attachment 4 - Sheet 20)

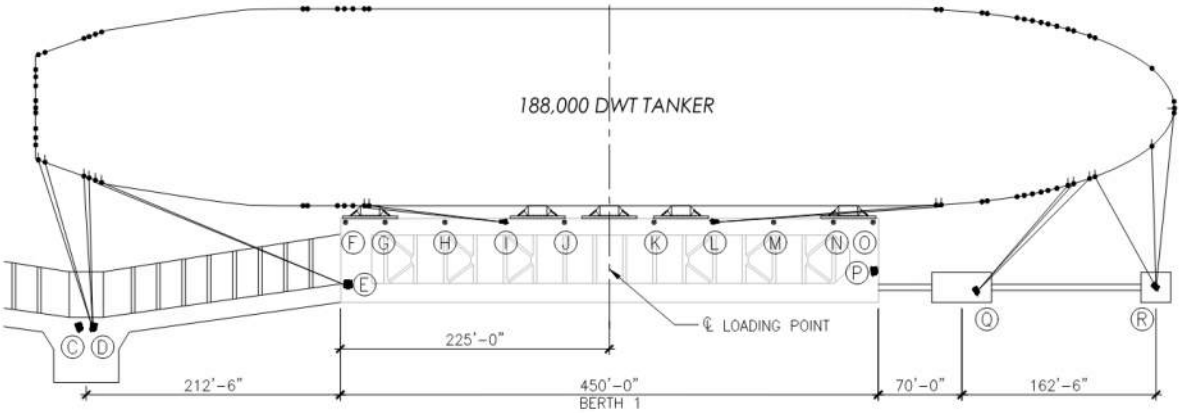


Figure 7 - Mooring Configuration 188,000 DWT Tanker - Berth 1 Starboard Side (From Attachment 4 - Sheet 21)

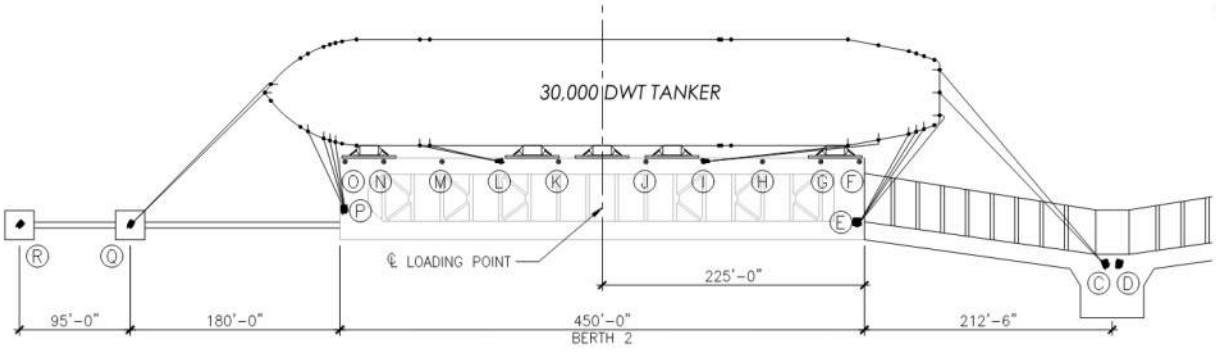


Figure 8 - Mooring Configuration 30,000 DWT Tanker - Berth 2 Port Side (From Attachment 4 - Sheet 30)

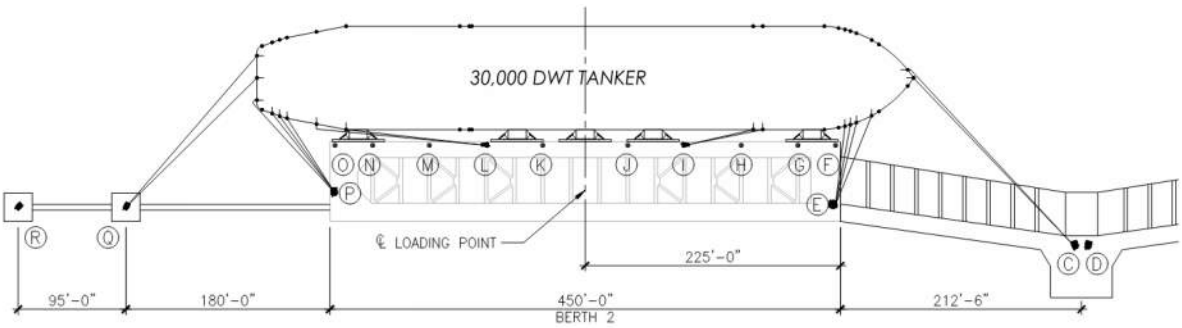


Figure 9 - Mooring Configuration 30,000 DWT Tanker - Berth 2 Starboard Side (From Attachment 4 - Sheet 31)

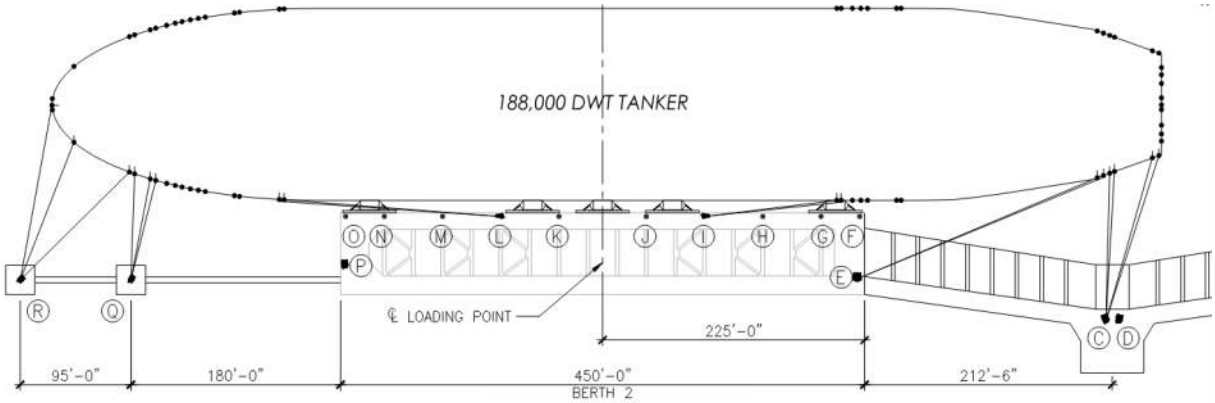


Figure 10 - Mooring Configuration 188,000 DWT Tanker - Berth 2 Port Side (From Attachment 4 - Sheet 40)

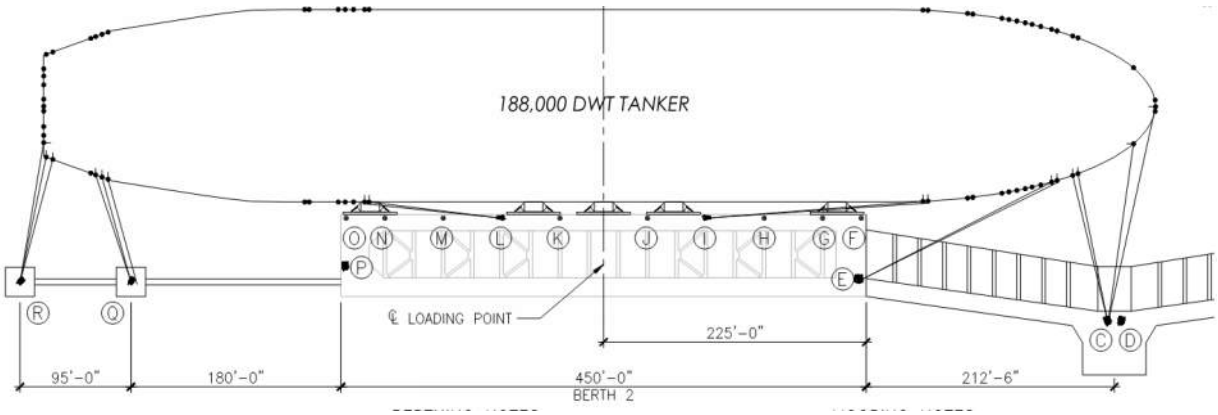


Figure 11 - Mooring Configuration 188,000 DWT Tanker - Berth 2 Starboard Side (From Attachment 4 - Sheet 41)

4. RISK ANALYSIS

The risk analysis was developed during a workshop with MRC staff and project consultants SGH (Facilitator), YEI Engineers (Electrical Engineering), and Gail Strzepa (Retired MRC Electrical Engineer). MRC staff included individuals with expertise in regulatory compliance, MRC project construction, and terminal operations.

A standard industry risk analysis approach was followed. The goals of the risk analysis were to identify risks that might prevent implementation of a technically feasible and safe CAECS by the MRC wharf by the regulatory deadline. Identifying risk mitigations was not part of the risk assessment.

For each of the three CAECS approaches evaluated, the team identified potential risks and roadblocks, qualitatively ranked the likelihood of each roadblock preventing implementation, and the potential consequences of that roadblock.

In evaluating potential consequences, the team considered health and safety, environmental, regulatory, and operational consequences. The team did not consider cost in the evaluation.

The following sections provide additional discussion on the risk assessment results for each of the CAECS approaches in the study. Attachment 5 presents the complete risk assessment report.

Section 5 provides additional discussion regarding the risks for each CAECS.

4.1 Shore Power

The team identified the following eight potential roadblocks as a high risk of preventing implementation of shore power prior to the compliance deadline:

1. Tankers not available that are capable of accepting shore power.

2. Voltage and frequency incompatibility between shipboard power and shore power.

   Tankers don't have standardized voltage to accept shore power.

3. Range of ship sizes and berthing configurations may limit access to shore side power supply due to space and strength limitations of existing wharf structures.

4. Connection points need to be outside of tanker hazardous zones.

5. There is no national or international standard for shore power connections to oil tankers.

6. The existing electrical infrastructure at the wharf does not have spare capacity to provide shore power to vessels.

   The energy grid may need upgrades in capacity and reliability for shore power to be a reliable compliance method.

7. The shore power system must not inhibit the vessel's ability to get underway within 30 min. in an emergency scenario.

8. The accidental or unexpected power loss of shore power may impact the safety and cargo operations.

The team identified the following two potential roadblocks as a medium risk of preventing implementation of shore power prior to the compliance deadline:

9. Long-term impacts of Public Safety Power Shutoffs (PSPS) and other actions (including by the Governor) may require curtailment of shore power electricity consumption during peak statewide demand.

10. Ships cranes may not have capacity or reach for handling cables.

The team identified the following three potential roadblocks as a low risk of preventing implementation of shore power prior to the compliance deadline:

11. Personnel injuries during handling of heavy shore power connections.

12. Personnel injuries from exposure to electrical equipment and operation.

13. Language barriers between terminal personnel and ship operators may lead to miscommunication and misalignment of work.

4.2 Barge-based Capture and Control

The team identified the following five potential roadblocks as a high risk of preventing implementation of barge-based capture and control prior to the compliance deadline:

1. The site has unique and challenging Metocean conditions including strong currents that may preclude the use of self-propelled barges, as being designed for Southern California sites.

2. If self-propelled barges are used, they may be subject to loss of power or an underpowered propulsion system in extreme weather or currents.

3. Movement of tanker relative to barge with spuds due to motions from wind, current, or passing vessels

4. The capture and control system must not inhibit the vessel's ability to get underway within 30 min. in an emergency scenario.

5. Potential operation of 'hazardous zone' non- compliant placement boom within hazardous zones.

The team identified the following seven potential roadblocks as a medium risk of preventing implementation of barge-based capture and control prior to the compliance deadline:

6. Potential damage to underground pipelines or cables if spud-based technology is used.

7. Geotechnical conditions at the site may not be adequate for spud-barge operations.

8. Possible interference with shipping channels.

9. Possible encroachment into or interference with operations of Amorco terminal when deploying barge-based C&C.

10. There may be some vessels that cannot be accepted during the vessel vetting process due to geometry or location of vessel stacks that are not compatible with the capture hood system.

11. The schedule to procure and commission a barge is delayed due to high demand.

12. Unless a barge is purchased or a long-term service agreement is in place, there is a risk that the service is not available when required.

The team identified the following two potential roadblocks as a low risk of preventing implementation of barge-based capture and control prior to the compliance deadline:

13. Relies on third party operators at the terminal for compliance.

14. There is a risk that the barge based mechanical equipment experiences downtime.

The team identified the following four potential roadblocks for preventing implementation of barge-based capture and control prior to the compliance deadline, but were not able to provide a risk level at this time, as the likelihood of these concerns could not be evaluated by the team at this time:

15. There is a risk that a barge vendor goes out of business.

16. There is a risk that barge vendors do not develop a barge solution that is acceptable for safe operation on oil tankers at this location.

17. There is a risk the barge vendor does not develop a barge solution that achieves CARB approval.

18. The CARB regulation may change in the future requiring upgrades or modifications to the barge treatment system.

4.3 Shore/Terminal-based Capture and Control

The team identified the following three potential roadblocks as a high risk of preventing implementation of shore/terminal-based capture and control prior to the compliance deadline:

1. Shore-based location not feasible due to distance from vessels and loss of efficiency.

2. Due to the site geometry and required location of C&C equipment, the system may be within the vessel hazardous area for some vessels.

3. Range of ship sizes and berthing configurations may limit access to terminal-based C&C due to space and strength limitations of existing wharf structures.

The team identified the following three potential roadblocks as a medium risk of preventing implementation of shore/terminal-based capture and control prior to the compliance deadline:

4. The capture and control system must not inhibit the vessel's ability to get underway within 30 min. in an emergency scenario.

5. Some vessels at the terminal may have a missed connection due to incompatibility between the vessel stacks and the capture hood and/or the operator or terminal may elect not to attempt a connection for safety reasons.

6. The accidental or unexpected power loss of shore-based C&C may impact safety and cargo operations.

The team identified the following potential roadblock as a low risk of preventing implementation of shore/terminal-based capture and control prior to the compliance deadline:

7. Long-term impacts of Public Safety Power Shutoffs (PSPS) and other actions (including by the Governor) may require curtailment of shore power electricity consumption during peak statewide demand.

The team identified the following potential roadblock for preventing implementation of shore/terminal-based capture and control prior to the compliance deadline, but were not able to provide a risk level at this time, as the likelihood of this concern could not be evaluated by the team at this time:

8. The CARB regulation may change in the future, requiring upgrades or modifications to the shore/terminal-based treatment system.

5. DISCUSSION

The following sections provide additional discussion related to several of the key roadblocks identified by the team that may prevent implementation of each CAECS by the implementation deadline.

5.1 Shore Power

The high-ranking risks identified by the team and listed in Section 4.1 are related to tanker limitations, safety issues that are specific to petrochemical tankers, and infrastructure issues. Several of the key issues are discussed further in the following paragraphs.

5.1.1 Tanker Limitations

MRC does not own or charter their own fleet. Rather, they must rely on tanker owners to make costly improvements to their vessels. MRC has little leverage over the tanker fleet to force vessel improvements by the compliance date, possibly significantly limiting the pool of available tankers. To the team's knowledge, new build tankers are not being outfitted for shore power.

There are several technical risks related to petrochemical tankers and shore power. There are incompatibilities between where the ship can put a transformer and where the terminal can place the shore power system. For tankers, the nominal voltage level is normally 440 V AC, while some tankers may use 6.6 kV / 11.0 kV AC. A voltage step-down transformer may be needed onboard the tankers for transforming the voltage to be compatible with the ships' needs. Smaller tankers may have space constraints for including a transformer.

One roadblock for implementation of shore power as an effective CAECS is that there is no national or international standard for shore power connections to oil tankers. Such a standard will need to develop prescriptive requirements for the connection point on a tanker before shore power can be safely implemented at the terminal. An international standard exists through the International Electrotechnical Commission (IEC) IEC/IEEE 80005-1 for shore power systems at container and cruise terminals. However, the committee progressing this standard has not

started the chapter pertaining to shore power connections for oil tankers. Lacking unified standards for shore power, especially the plugs and sockets, a tanker might not use the shore power connection due to its worldwide operation profile.

5.1.2 Safety Issues

In order to implement shore power as an effective CAECS, safety issues must be resolved that are specific to oil tankers that do not impact other vessels, such as container vessels and cruise ships. The most significant concern is that connection points need to be outside of tanker hazardous zones. Shore power equipment is not currently commercially available for use in classified areas.

Attachment 6 shows the hazardous classification areas at the terminal. The entire unloading platforms are within classified zones. Any equipment installed in these areas must be approved by a national recognized testing laboratory, such as UL, FM, etc. per OSHA 1910.307. Such equipment for shore power is not currently commercially available for installation in hazardous areas.

The team identified a concern that loss of power during loading or unloading could cause the tanker to lose all control and monitoring capabilities, including safety shutdown systems. This would create a serious risk of explosion or release to the environment.

5.1.3 Infrastructure Issues

In addition to the concerns related to hazardous zones, the unloading platforms do not have space to house a cable management system (CMS) on the unloading platform. The existing structures may also not have the strength to house the equipment, which may include a crane.

One possible mitigation discussed by the team to address this concern would be the construction of a separate platform to house the CMS as a minimum, and possibly a crane for lifting and tending cables.

Figure 12 highlights the minimum requirements for such a platform for starboard-to berthing. The platform to the left of the access trestle would need to be sufficiently long to span the connection locations from the largest to smallest tanker approved to call at the terminal. The width of the structure illustrated would accommodate a CMS of a similar size to that used at Berth 121 at the Port of Long Beach, which is the only shore power system for oil tankers currently in operation in the United States. The single platform illustrated assumes a movable CMS that would be relocated depending on the size of the tanker.

The highlighted dimensions show the horizontal offset of this platform to the edge of the tanker near the connection point. We understand from discussions with CMS vendors that current designs can only range to about 150 ft. Standard IEC/IEEC 80005 doesn't permit the use of extension cables, due to possible safety risks associated with the additional connecting plugs, cable design, and maintenance. The distances shown may reach the limits of current designs when including the vertical offset. Figure 13 shows the similar requirements for port-to-berthing at Berth 1.

Even if such a solution could be shown to be technically feasible, it is highly unlikely that structures such as these could be designed, permitted, and constructed within the compliance period, especially given the difficulty of getting regulatory approval for new structures in waters regulated by the Bay Conservation Development Commission (BCDC). Construction windows for in-water work are also limited by regulation in this area.

In addition to concerns about space and structure limitations of the existing marine structures, the existing electrical infrastructure at the wharf does not have spare capacity to provide shore power to vessels. MRC has estimated that shore power would require an additional 7 to 10 MW of service, requiring a new substation near the wharf. PG&E does not have a substation within a 1.5 mi. radius from the MRC wharf and the MRC main substation is located approximately 2 mi. away.

We understand that PG&E may not have the capacity to accommodate this demand on their existing grid. PG&E would require an electrical feasibility study to assure that shore power demand can be provided safely and reliably from their grid, and they have estimated that it would take one to one-and-a-half years to perform such a study.

5.1.4 Other Concerns

The team identified several other concerns that were rated as medium or low risks. The team identified a similar loss of power concern as discussed previously, but caused by a Public Safety Power Shutoff or other actions that might require curtailment of shore power electricity consumption during periods of peak statewide demand, such as those that occurred in 2022. The team identified a possibility that there may be exemptions granted for terminals, or that other mitigations could be implemented for this loss of power that could likely be predicted in advance and assigned this a medium risk.

Several roadblocks were identified and rated as low risk of preventing implementation by the compliance deadline. The team believed that the risks identified were not unique to tankers and that the risks are likely to be mitigated over the next few years as the rules are implemented for other types of vessels and locations.

5.2 Barge-based Capture and Control

The team identified several potential roadblocks for this CAECS related to technology that is not currently developed for application at this location. The highest risk concerns are related to barge technology and the ability to maintain station in challenging metocean conditions, and safety and regulatory issues specific to tankers.

5.2.1 Barge Technology Issues

The MRC wharf is subject to severe metocean conditions, including strong currents and winds, and the ability for a barge to maintain station. The team understands that self-propelled barges, as being designed for use in southern California terminals, may not be feasible at MRC. The

ability to keep station may be subject to loss of power or an underpowered propulsion system in extreme weather or currents.

If a barge with spuds is used, there is a risk related to movement of the tanker relative to the spudded barge due to motion of the vessel while at berth when subject to wind, current, or passing vessels. The TOLs for MRC allow tankers a surge movement of +/- 10 ft and sway of +/- 2 ft. Movement of that magnitude could cause impact between the tanker and barge, and a short circuit due to contact of the stack adaptor to the stack.

5.2.2 Safety and Regulatory Issues

A specific regulatory and safety concern was noted that a tanker must be able to get underway on its own power within 30 min. during an emergency, such as a fire, earthquake, or tsunami, per California Code of Regulations 2 CCR 2340 (c) (28). This regulation is unique to tankers and does not apply to container or cruise ships.

Marine contractors familiar with the MRC site report that it takes 30 to 60 min. to safely lift and stow spuds for evacuation. Because there are currently no self-propelled spud barges, additional time may be needed for tug assist. Additional time is also required to lift and stow the placement boom.

Another issue specific to tankers is the potential operation of the placement boom in a hazardous zone that is not compliant for use in hazardous zones. We understand that the current plan of system operators is to approach the stack at the stern of the tankers, outside of the hazardous zone, this is not possible for all tankers due to the mooring configurations that use lines at the stern of the vessel, as shown in Figure 14 and several other TOLs in Attachment 4.

5.2.3 Other Concerns

The team identified several other medium and low risks that they believe could be mitigated prior to the compliance deadline.

Due to the location of the MRC terminal, there is concern over interference with the shipping channel in the Carquinez Strait, which is on the MRC side of the strait, as well as operations at the neighboring Amorco Terminal. Figure 15 shows that with the largest approved tanker at Berth 1, the barge would likely be approximately 300 ft from the mapped boundaries of the shipping channel.

Issues related to the use of a spud barge that are considered possible to mitigate include the location of pipelines and geotechnical conditions at the site.

The team also identified risks related to potential contractual and operational constraints where the likelihood could not be evaluated, or where the team believed they are likely or possible to be mitigated prior to the compliance deadline.

5.3 Shore/Terminal-based Capture and Control

The team identified several potential roadblocks for this CAECS related to technology that is not currently developed for application at this location. The highest risk concerns are related to barge technology and the ability to maintain station in challenging metocean conditions and safety and regulatory issues specific to tankers.

The team first identified that, based on our understanding of the capture and control technology, a shore-based system is not feasible due to the distance from vessels to shore and the resulting loss of efficiency. All further discussion was related to a terminal-based system, with the equipment stationed on a marine structure.

The team recognized that very similar safety and terminal infrastructure issues exist as discussed for shore power in Sections 5.1.2 and 5.1.3.

5.3.1 Safety Issues

With regards to safety, Attachment 6 shows the hazardous classification areas at the terminal. The entire unloading platforms are within classified zones. Any equipment installed in these areas must be approved by a national recognized testing laboratory, such as UL, FM, etc. per OSHA 1910.307. We understand that equipment for capture and control systems is not currently commercially available for installation in hazardous areas.

5.3.2 Terminal Infrastructure Issues

In addition to the concerns related to hazardous zones, the unloading platforms do not have space to house the capture and control system. The existing structures may also not have the strength to house the equipment.

Similar to shore power, one possible mitigation discussed by the team to address this concern would be the construction of a separate platform to house a portable capture and control system.

Figure 16 highlights the minimum footprint requirements for such a platform for starboard-to berthing. The platform to the left of the access trestle would need to be sufficiently long to span the stack locations from the largest to smallest tanker approved to call at the terminal. The width of the structure illustrated would accommodate a system of a similar size to the one developed by Clean Air Engineering Maritime (CAEM).

The highlighted dimensions show the horizontal offset of this platform to the edge of the tanker stack. The distances shown may reach the limits of current designs when including the vertical offset.

Similar to the discussion related to shore power, even if such a solution could be shown to be technically feasible, it is highly unlikely that structures such as these could be designed, permitted, and constructed within the compliance period, especially given the difficulty of getting regulatory approval for new structures in waters regulated by the Bay Conservation

Development Commission (BCDC). Construction windows for in-water work are also limited by regulation in this area.

5.3.3 Other Concerns

The team identified other medium and low risk concerns related to operations of this terminal that were considered to be likely or possible to mitigate prior to the mitigation deadline. These are similar to those previously discussed for shore power and barge-based capture and control.

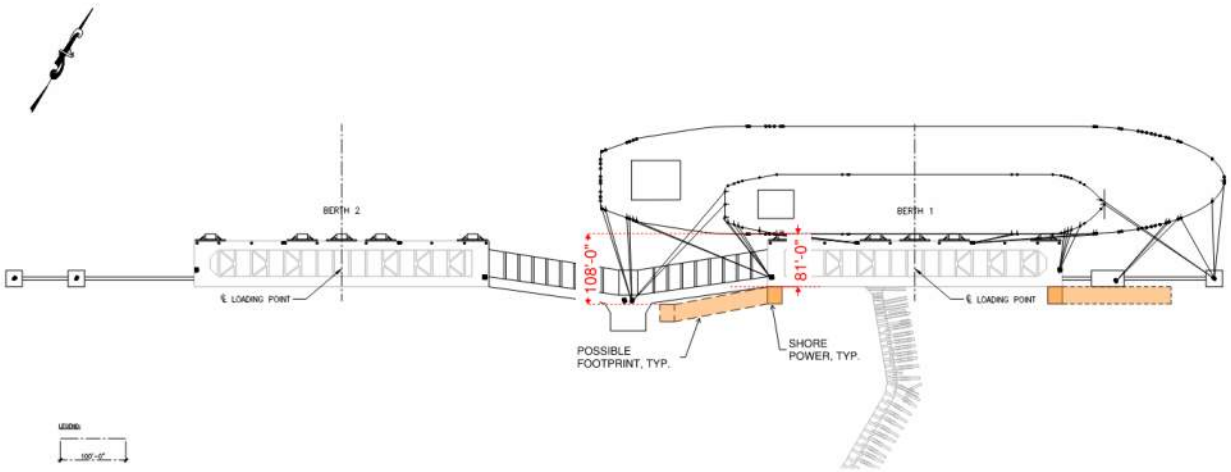


Figure 12 - Shore Power Platforms for Berth 1 - Starboard-to Berthing

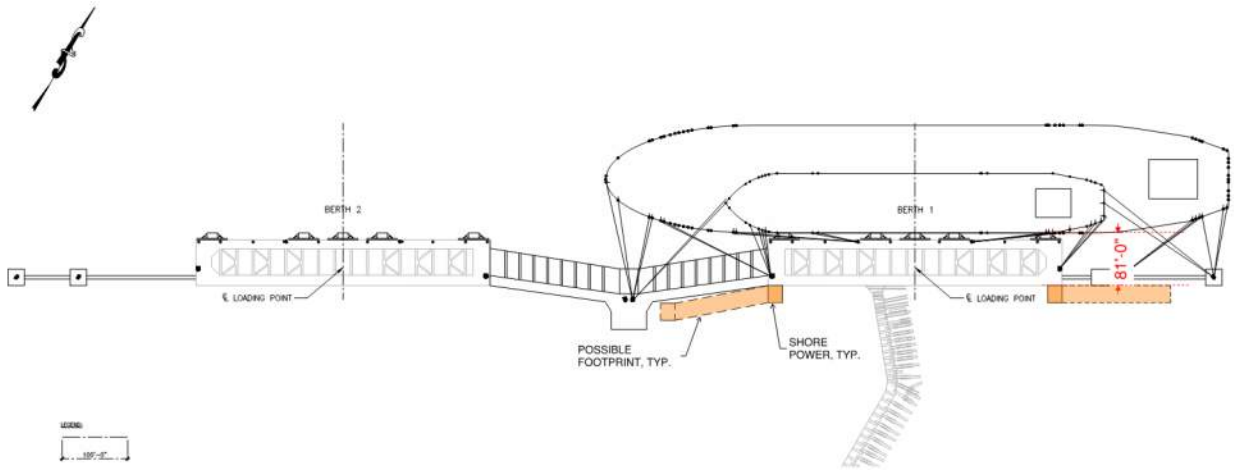


Figure 13 - Shore Power Platforms for Berth 1 - Port-to Berthing

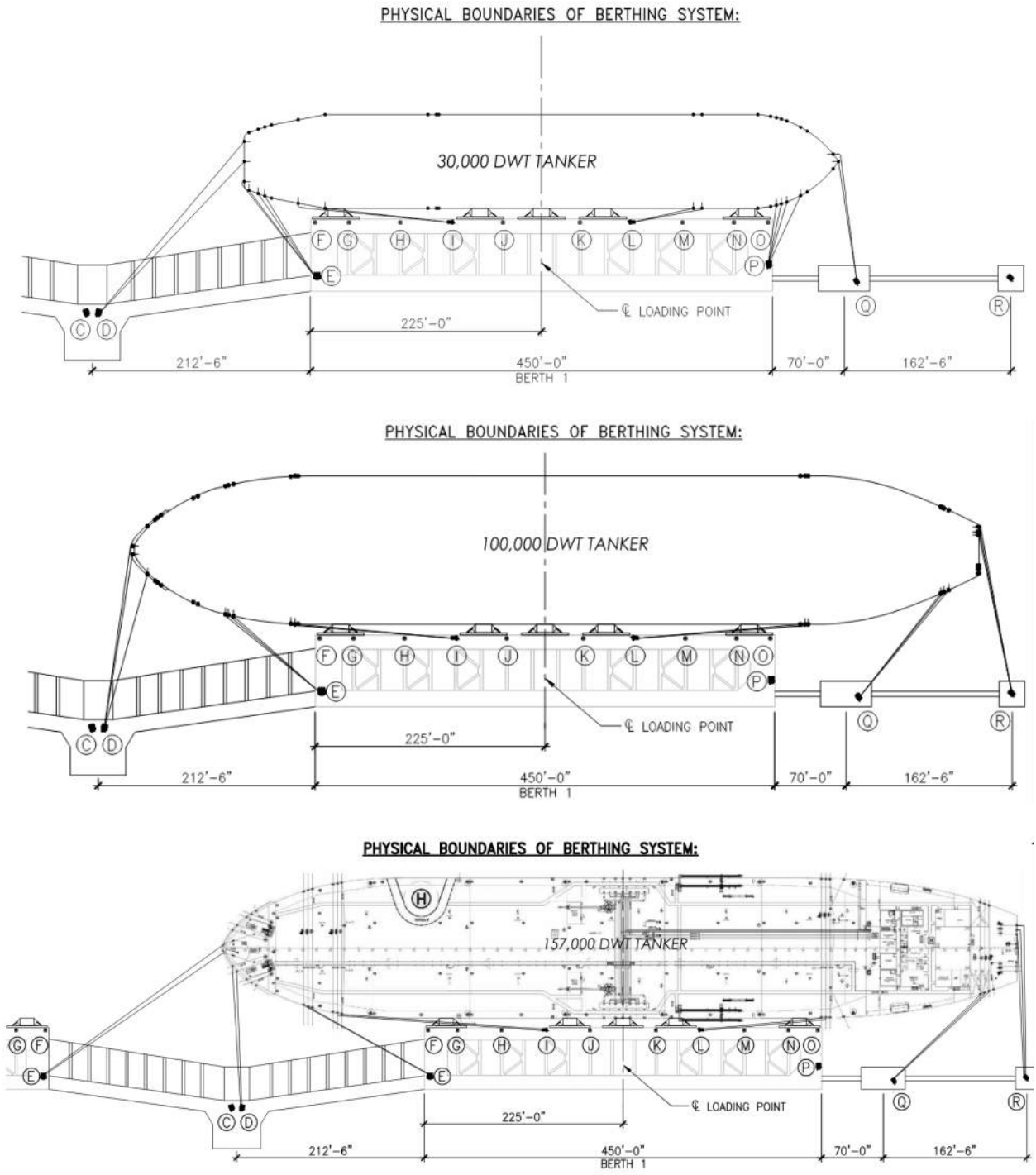


Figure 14 - Example Mooring Configurations with Lines at Stern for Various Size Vessels. (From Attachment 4, Sheets 13, 18, and 20A)

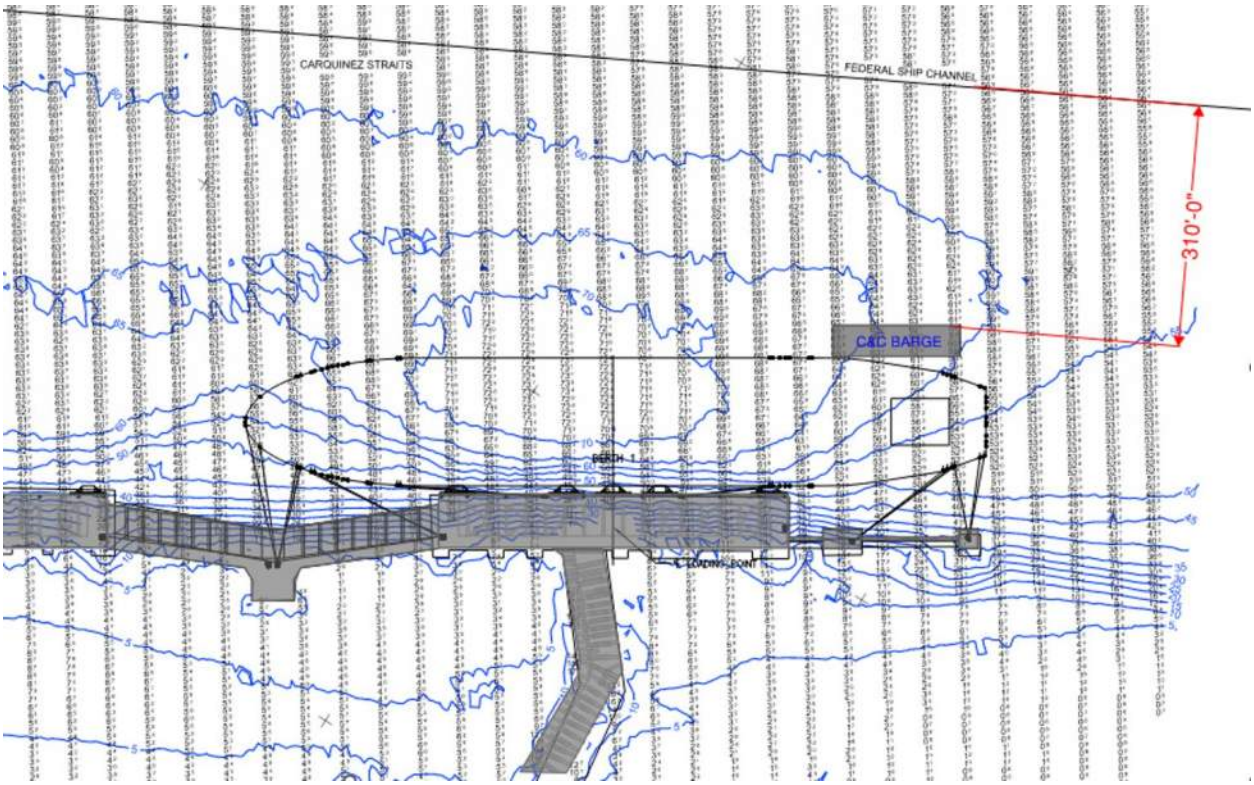


Figure 15 - Capture and Control Barge at Berth 1

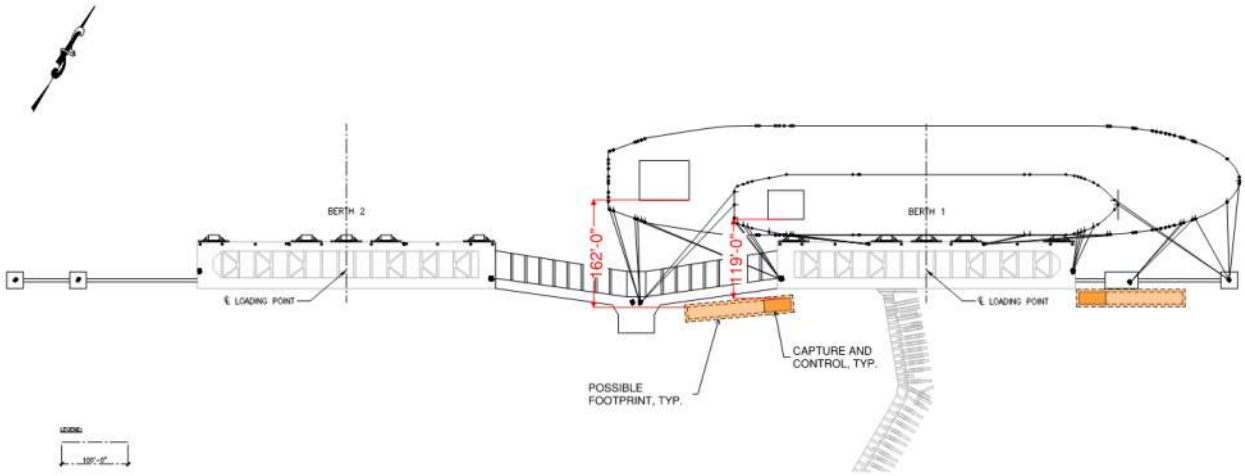


Figure 16 - Terminal-based Capture and Control Platforms for Berth 1 - Port-to Berthing

6. CONCLUSIONS

We have identified a number of roadblocks that could potentially prevent a CAECS from being implemented at the MRC marine terminal prior to the 1 January 2027 compliance deadline and evaluated the risks associated with each of these issues. The following sections summarize our findings for each of the CAECS approaches evaluated.

6.1 Shore Power

Shore power has several significant roadblocks related to tanker fleet limitations, safety and regulatory constraints, and terminal and electrical grid infrastructure limitations. In order to implement shore power as a CAECS for the MRC terminal, these would all need to be mitigated. Based on limitations of current available technology, our understanding that there are no ongoing efforts to resolve the issues noted, and such efforts being beyond the control or influence of MRC, we believe that there is a very low probability that these issues will be resolved in a time that will allow shore power to be implemented as a CAECS for the MRC terminal.

6.2 Barge-based Capture and Control

Barge-based capture and control has significant roadblocks related to barge technology and the ability to maintain station in challenging metocean conditions, and safety and regulatory issues specific to tankers. In order to implement barge-based capture and control as a CAECS for the MRC terminal, these would all need to be mitigated. We understand that developers of CAECS technology are aware of these issues, but we understand also that their priority is addressing those that affect oil terminals in the Ports of Los Angeles and Long Beach, and not those issues specific to northern California locations at this time. As the technology is not currently available, and significant effort is required to mitigate the noted risks, beyond the control of MRC, we believe there is a high risk that these issues will not be resolved in a time frame that will allow barge-based capture and control to be implemented as a CAECS for the MRC terminal.

6.3 Shore/Terminal-based Capture and Control

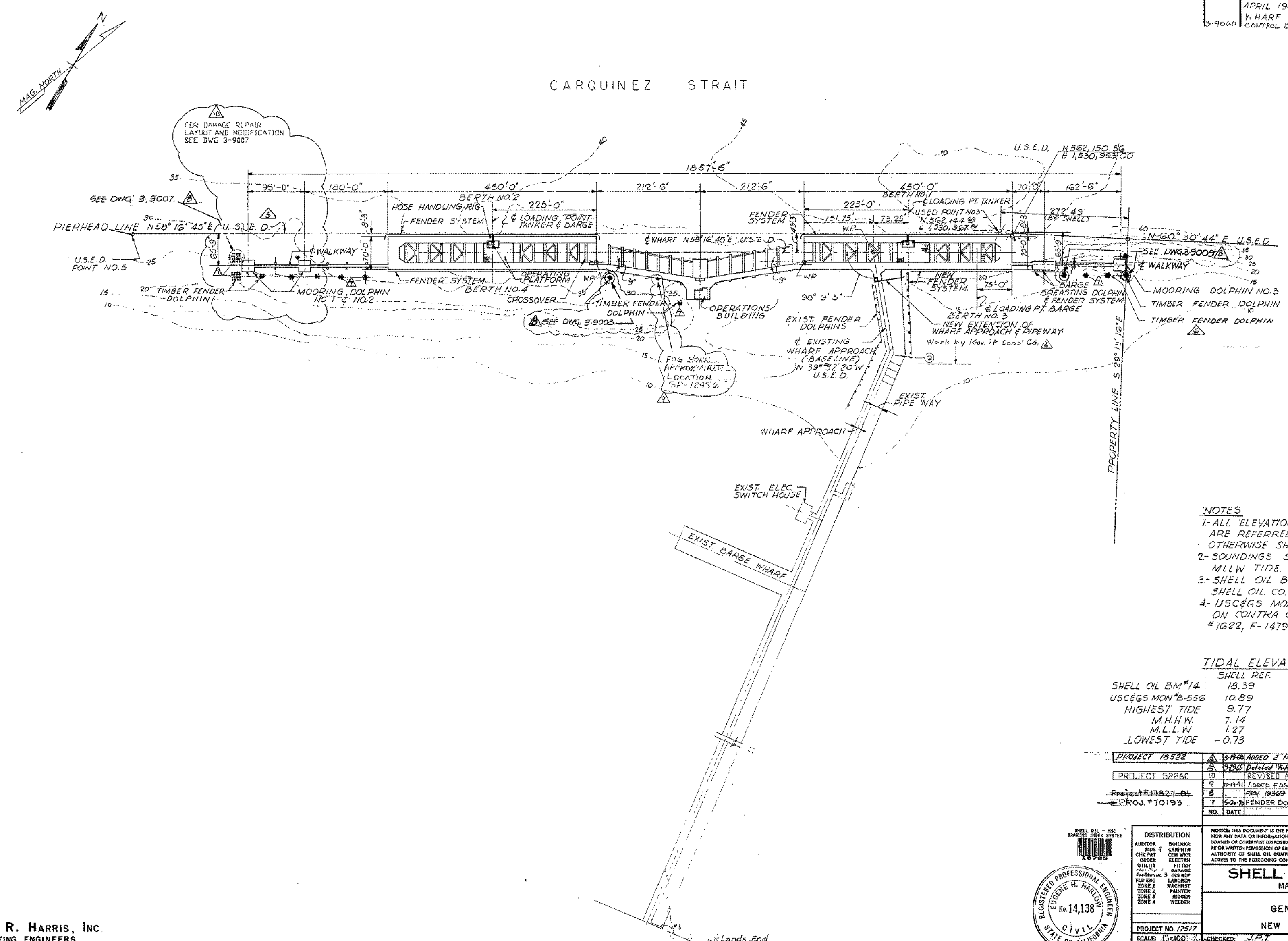
Shore/Terminal-based capture and control has several significant roadblocks related to safety and regulatory constraints and terminal infrastructure limitations. In order to implement shore/terminal-based capture and control as a CAECS for the MRC terminal, these would all need to be mitigated. Based on limitations of current available technology, our understanding that there are no ongoing efforts to resolve the issues noted, and such efforts being beyond the control or influence of MRC, we believe that there is a very low probability that these issues will be resolved in a time that will allow shore/terminal-based capture and control to be implemented as a CAECS for the MRC terminal.

ATTACHMENT 1

TERMINAL PLANS FROM ORIGINAL WHARF CONSTRUCTION DRAWINGS

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION
3-9233-0	CONTOUR MAP SOUNDINGS TAKEN APRIL 1963 AND NOVEMBER 1963
3-9060	WHARF CONTROL DIAGRAM



NOTES

1. ALL ELEVATIONS SHOWN ON ALL DRWGS ARE REFERRED TO SHELL DATUM UNLESS OTHERWISE SHOWN.
2. SOUNDINGS SHOW DISTANCE BELOW MLLW TIDE ELEVATION
3. SHELL OIL BM #14 IS LOCATED ON SHELL OIL CO. PROPERTY NEAR WHARF
4. USC&GS MON #B-556 IS IDENTIFIED ON CONTRA COSTA COUNTY DWG #1622, F-14790.

TIDAL ELEVATIONS FT

	SHELL REF.	U.S.C&G.S.	TIDE
SHELL OIL BM #14	18.39	14.60	17.12
USC&GS MON #B-556	10.89	7.10	9.62
HIGHEST TIDE	9.77	5.98	8.50
M.H.H.W.	7.14	3.35	5.87
M.L.L.W.	1.27	-2.52	0.00
LOWEST TIDE	-0.73	-4.52	-2.00

PROJECT 18522

PROJECT 52260

~~Project #17827-01~~

~~PROJ. #70193~~

NO.	DATE	DESCRIPTION	BY	APP.
△	3-1968	ADDED 2 NEW FENDER DOLPHINS	DKC	
△	9-1965	Deleted "Future" At Downstream Dolphin	RDS	
10		REVISED AS INDICATED	AJF	
9	11-19-91	ADDED FOG HORN SP-12456	RWB	
8		PROJ. 19369 ADDED NOTES AS SHOWN	FMB	
7	5-20-76	FENDER DOLPHIN ADDED	TAG	

REVISIONS △ 190 020

SHELL OIL - MNC DRAWING INDEX SYSTEM
10765

DISTRIBUTION

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REGISTERED PROFESSIONAL ENGINEER EUGENE H. HARLOW No. 14,138 CIVIL STATE OF CALIFORNIA

SHELL OIL COMPANY
MARTINEZ REFINERY

GENERAL PLAN
NEW WHARF FACILITY

PROJECT NO. 17517
SCALE: 1" = 100'
DATE: 1-24-64
DRAWN: S.S.
CHECKED: J.P.T.
APPROVED: R.T.
APPROVED: E.H.H.
DWG. NO. 3-9001-10

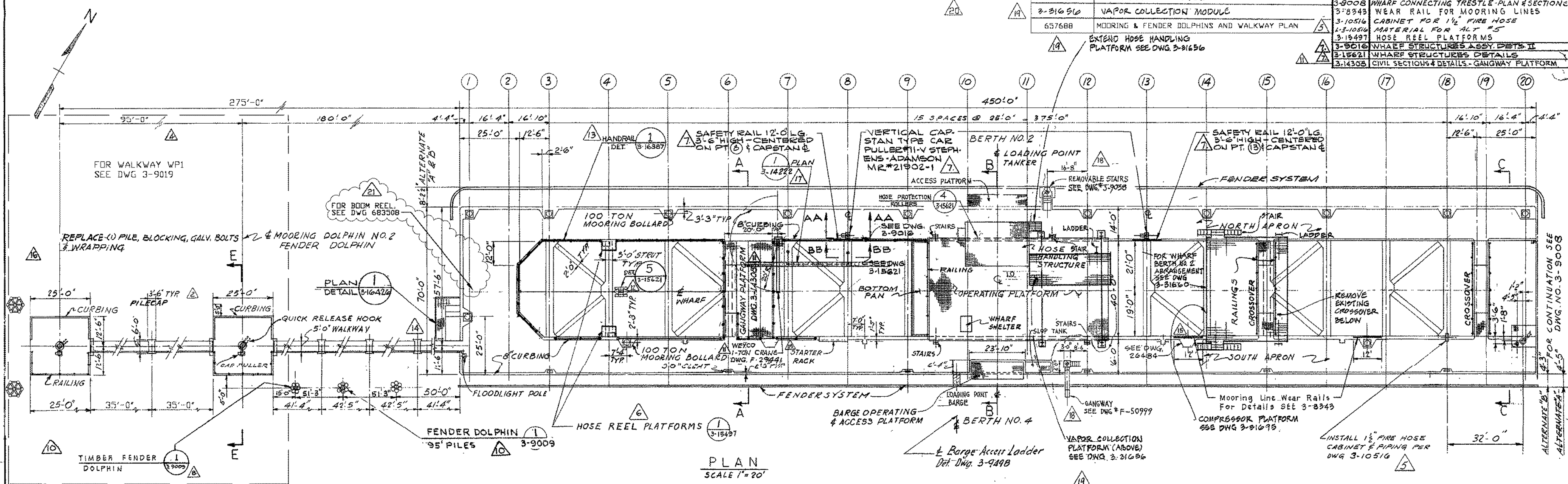
FREDERIC R. HARRIS, INC.
CONSULTING ENGINEERS
NEW YORK

DWG. NO.	DESCRIPTION
3-31695	COMPRESSOR MODULE
3-31656	VAPOR COLLECTION MODULE
657688	MOORING & FENDER DOLPHINS AND WALKWAY PLAN

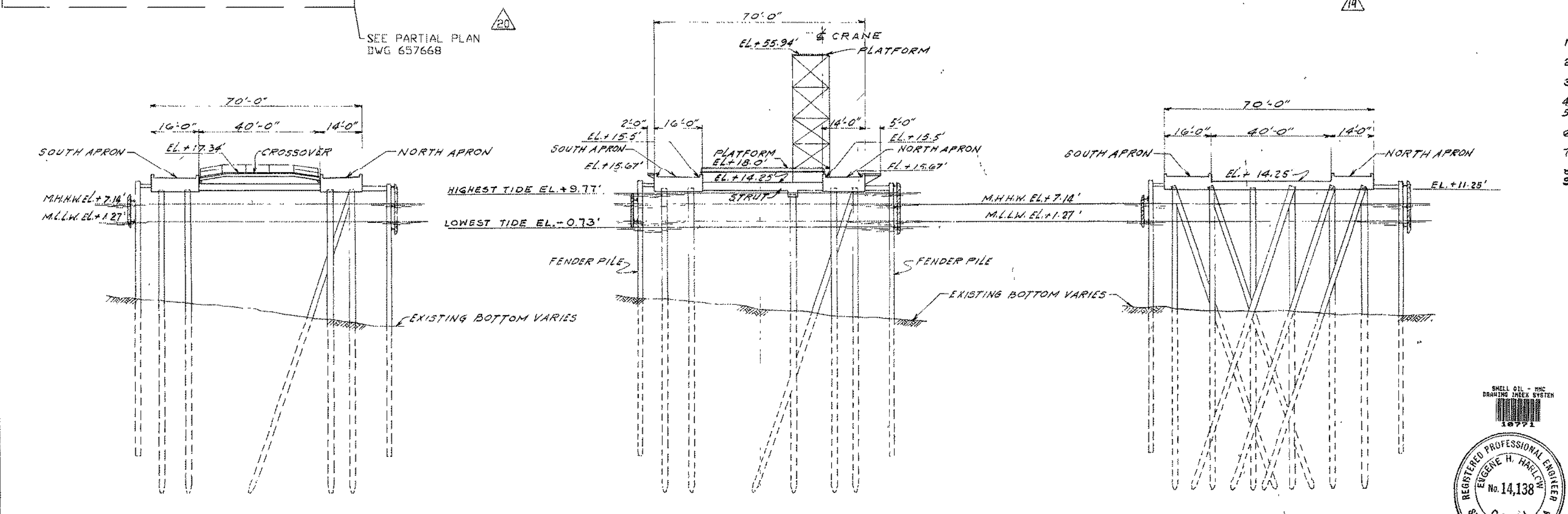
EXTEND HOSE HANDLING PLATFORM SEE DWG. 3-31656

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION
3-9008	WHARF CONNECTING TRESTLE-PLAN & SECTIONS
3-8343	WEAR RAIL FOR MOORING LINES
3-10516	CABINET FOR 1½" FIRE HOSE
L-3-10516	MATERIAL FOR ALT #5
3-15497	HOSE REEL PLATFORMS
3-9016	WHARF STRUCTURES ASSY. DETS. II
3-15621	WHARF STRUCTURES DETAILS
3-14308	CIVIL SECTIONS & DETAILS - GANGWAY PLATFORM



PLAN
SCALE 1" = 20'



SECTION A-A
SCALE 1" = 20'

SECTION B-B
SCALE 1" = 20'

SECTION C-C
SCALE 1" = 20'

GENERAL NOTES:

1. PIER DESIGNED IN ACCORDANCE WITH LATEST ACI & AISC SPECIFICATIONS.
2. ROADWAY DESIGNED IN ACCORDANCE WITH AASHO H15-44 TRUCK LOAD & WITH 30% IMPACT.
3. MINIMUM CONCRETE COVER UNLESS OTHERWISE NOTED; CAST IN PLACE = 3"; PRECAST & PRESTRESSED = 2½"
4. ALL CAST IN PLACE CONCRETE TO BE f'c=3000 PSI
5. ALL PRESTRESSED & PRECAST CONCRETE TO BE f'c = 5000 PSI
6. REINFORCING (NON PRESTRESSED) STEEL TO BE INTERMEDIATE GRADE fs = 20000 PSI
7. PRESTRESSING STEEL MINIMUM ULTIMATE STRENGTH 7/16"φ STRANDS 27000 LBS
8. INITIAL PRESTRESSING FORCE - 18,900 LBS
9. IN HANDLING, THE PRECAST OR PRESTRESSED BOXES AND BEAMS MUST BE MAINTAINED IN AN UPRIGHT POSITION AT ALL TIMES WITH LOCATION OF PICK UP POINTS AND PICK UP DEVICES APPROVED BY SHELL.
10. FOR SECTION E-E SEE DWG. NO. 3-9009

PROJ. NO.	NO.	DATE	DESCRIPTION	BY	APP.
MA01-C91025-0101C	21	1/23/06	ADDED BOOM REEL (10650047)	BB	BC/DW
52260	20	5/3/01	REVISED AS INDICATED		
70792-002	19	4/11/91	REMOVE CROSSOVER (ADD PLATFORMS)	[illegible]	[illegible]
7208	13		ADDED HANDRAIL	[illegible]	[illegible]
70176-13	12	[illegible]	ADDED OIL DETECTOR	EAE	[illegible]
70689-13	11	7-7-79	ADDED GANGWAY PLATFORM & CRANE	LM	[illegible]
20644-01	9	12/1/84	ADDED HOSE PROTECTION ROLLERS	EAE	[illegible]
18622-01	8	5/19/69	ADDED NEW TIMBER DOLPHINS	OEG	[illegible]
71443	18		ADDED GANGWAY & REMOVABLE STAIRS	E.D.Z.	
7490	17	8-21-78	60' GANGWAY SUPPORT ADDED BETWEEN COLS. 7 & 8	JBC	[illegible]
19369	16		REVISED PILE AS SHOWN IN PLAN.	FMB	[illegible]
7545	15	2/74	REMOVED BOLLARDS @ BENT 7 & BENT 14 SOUTH APRON	MEN	[illegible]
7251	14	9-5-72	PROJ. 7251 ADDED OILBOOM PLATFORM	KNT	[illegible]
	2	2-16-65	UPDATED - Barge Access Ladder added	EAB	
70913	10	5-?-70	FENDER & PILE DOLPHINS ADDED	TAG	[illegible]

REVISIONS

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REGISTERED PROFESSIONAL ENGINEER EUGENE H. HARLOW No. 14,138 CIVIL STATE OF CALIFORNIA

SHELL OIL COMPANY

MARTINEZ REFINERY

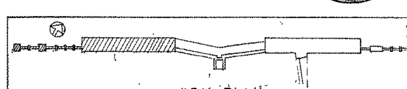
DOWNSTREAM WHARF FACILITY

PLAN AND SECTIONS

NEW WHARF FACILITY

PROJECT NO. 17517
SCALE AS SHOWN
DATE 1-24-64
DRAWN M.R.
CHECKED: S.S.
APPROVED: J.P.T.
APPROVED: E.H.H.

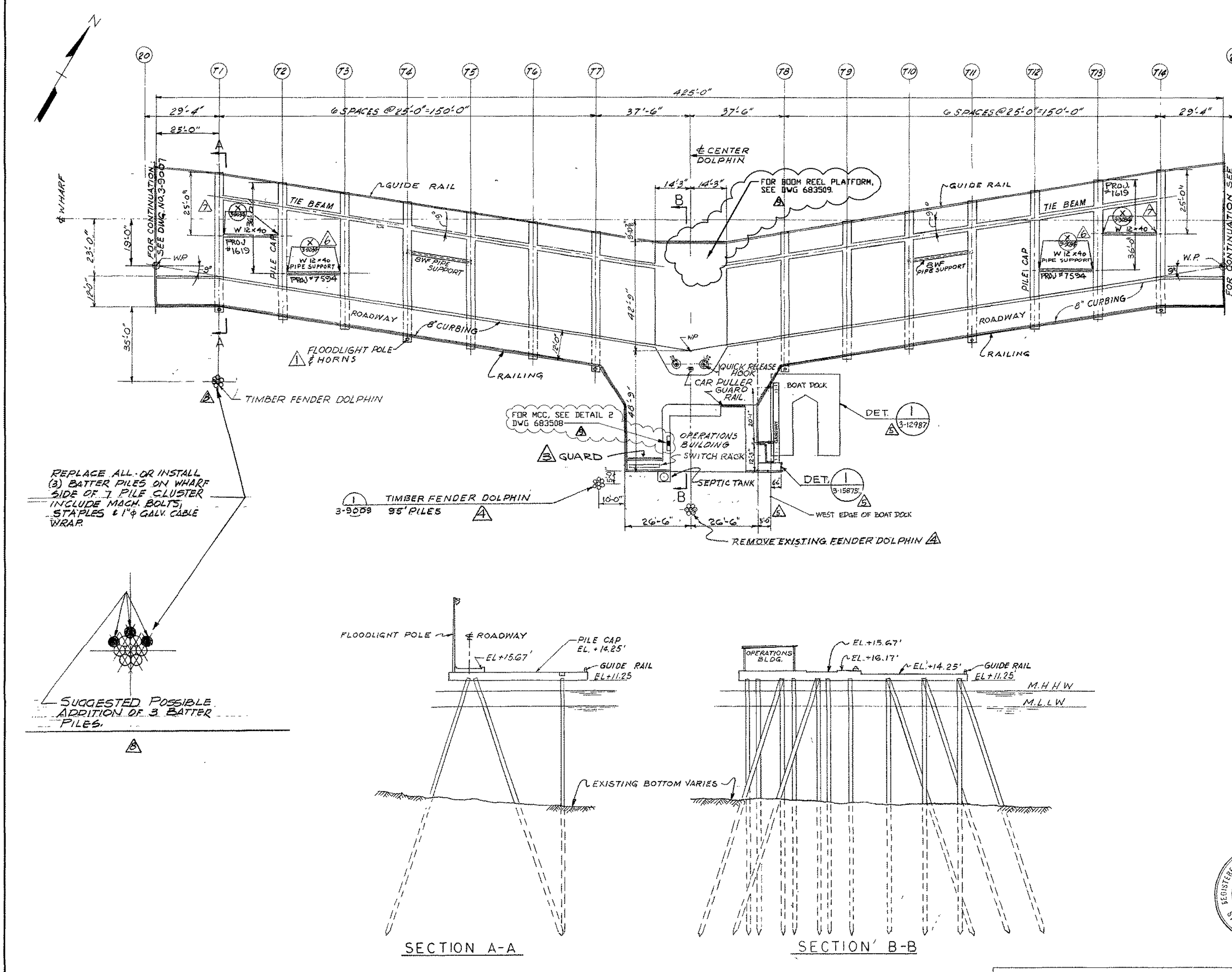
DWG. NO. 3-9007-21



KEY PLAN
SCALE 1" = 300'

FREDERIC R. HARRIS, INC.
CONSULTING ENGINEERS
NEW YORK

REFERENCE DRAWINGS	
DWG. NO.	DESCRIPTION
3-9007	DOWNSTREAM WHARF FACILITY PLAN & SECT'S.
3-9009	UPSTREAM WHARF FACILITY PLAN & SECT'S.



STAFF ENG. 3'

NOTE:
ISSUED FOR BOTH PROJECT 7594 & 1619 6 & 7

PROJ. #10193

SHELL OIL - MHC DRAWING INDEX SYSTEM 10772

NO.	DATE	DESCRIPTION	BY	APP.
9	1/23/06	ADDED BOOM REEL PLATFORM (10650047)	BB	BC/DV
8		PROJ. 13369 ADDED DETAIL & NOTES	FMB	
7	12-3-74	PROJ. #1619 ADD PIPE SUPPORTS	RRS	
6	11-27-73	PROJ #7594 ADDED PIPE SUPPORTS	RRS	
1	4-17-64	Added Horns	R.L.S.	

REVISIONS 8 190 022

REGISTERED PROFESSIONAL ENGINEER EUGENE H. HARLOW No. 14,138 CIVIL STATE OF CALIFORNIA

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AUDITOR BOILMKR
BIDS 9 CARPNTR
CHK PRT CEM WKR
ORDER ELECTRN
UTILITY FITTER
GARAGE
INS REP
FLD ENG LABORER
ZONE 1 MACHNST
ZONE 2 PAINTER
ZONE 3 RIGGER
ZONE 4 WELDER

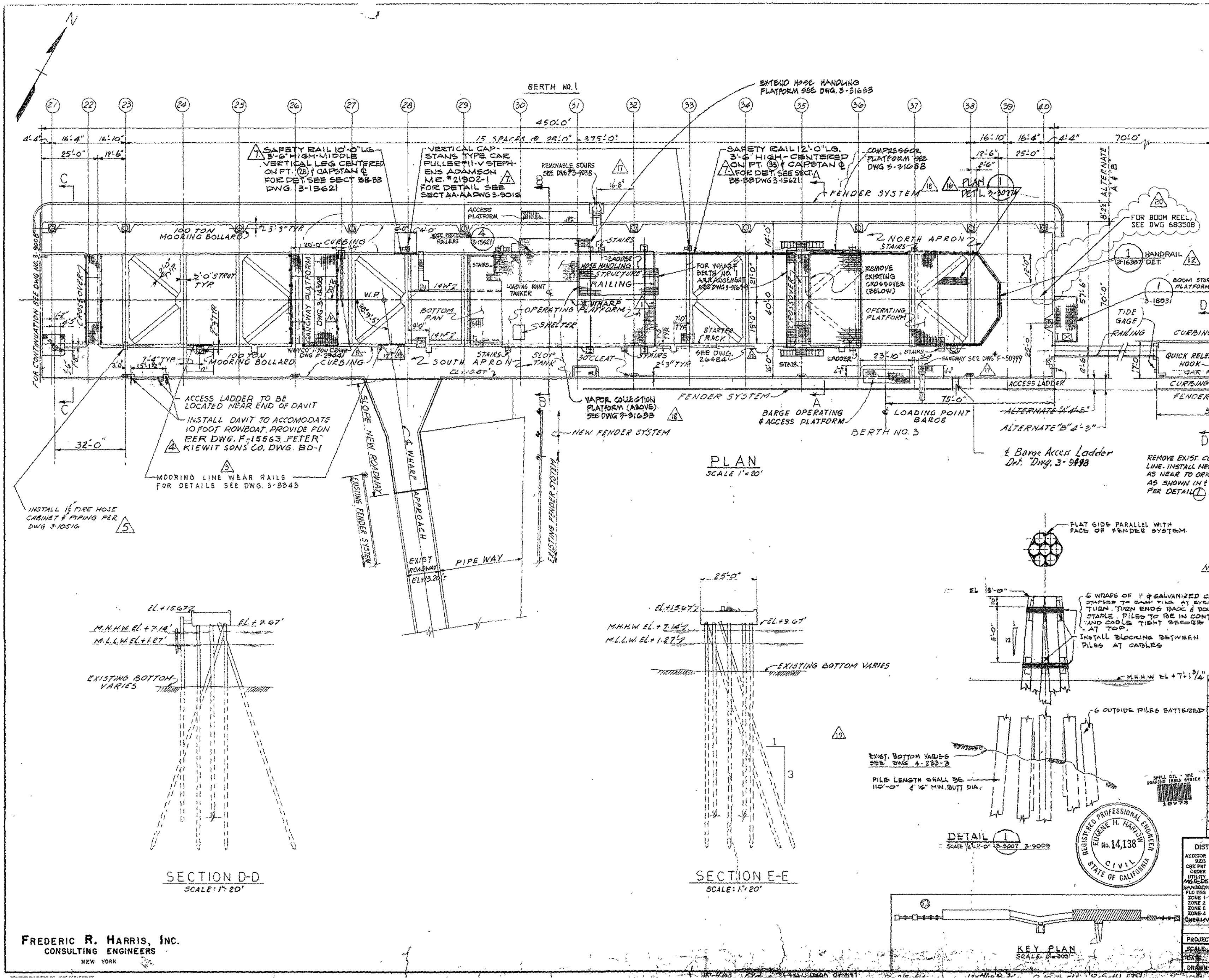
SHELL OIL COMPANY
MARTINEZ REFINERY

WHARF CONNECTING TRESTLE
PLAN AND SECTIONS
NEW WHARF FACILITY

PROJECT NO. 17512
SCALE: 1" = 20'
DATE: 1-24-64
DRAWN: M.R.
CHECKED: E.H.
APPROVED: J.P.T.
APPROVED: E.H.H.
DWG. NO. 3-9008-9

FREDERIC R. HARRIS, INC.
CONSULTING ENGINEERS
NEW YORK

PRINTED ON DIEPO NO. 1020 CLEARPRINT



REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION
3-9008	WHARF CONNECTING TRESTLE-PLAN & SECTIONS
3-8343	WEAR RAILS FOR MOORING LINES
F-15563	Boat Davit Base
3-10516	CABINET FOR 1½" FIRE HOSE
L-3-10516	MATERIAL FOR ALT #5
3-9016	WHARF STRUCT. ASSY. DETS. II
3-15621	WHARF STRUCT. DETAILS
3-14308	CIVIL SECTIONS & DETAILS - GANGWAY PLATFORM
3-30774	CIVIL SECT. & DET'L. @ WHARF FACILITY
3-31653	VAPOR COLLECTION MODULE
3-31688	COMPRESSOR MODULE

REVISIONS

PROJ. NO.	NO.	DATE	DESCRIPTION	BY	APP.
MA01-C50026-0101C	20	1/23/06	ADDED BOOM REEL (10650047)	BB	BC/DV
52260	19		REVISED AS INDICATED		
20792-002	18	4/11/91	ADDED PLATFORMS/REMOVED CROSSOVER	J.V.S.	[illegible]
71443	17	3/26/87	ADDED GANGWAY & REMOVABLE STAIRS	E.D.Z.	JAC
7208	12		ADDED HANDRAIL	[illegible]	[illegible]
70689-13	11	7-7-70	ADDED GANGWAY PLATFORM & CRANE	LM	[illegible]
20644-01	9	11/4/69	ADDED HOSE PROTECTION ROLLERS	EAE	[illegible]
18522-01	8	5/9/68	ADDED NEW TIMBER DOLPHINS	DEG	[illegible]
	7	4-2-69	ADDED CAPSTANS & RAILS @ POINTS 28 & 33 PROJ. #21902-01	CAA	[illegible]
~~[illegible]~~	~~6~~	~~[illegible]~~	~~ADDED 2 NEW TIMBER DOLPHINS~~		
7542	16	3/1/83	ADDED TIDE METER PLATFORM	SLG	[illegible]
79369	15		REVISED PILES AS SHOWN	AMB	[illegible]
7025	14	9-28-76	OIL SPIL BOOM PLATFORM ADDED	JBC	[illegible]
7545	13	3/1/74	REMOVED BOLLARDS @ BENT 28 & BENT 33 - SOUTH APRON	M.E.L.	[illegible]
70193	10	5-20-70	FENDER DOLPHIN ADDED	TAG	[illegible]

DISTRIBUTION: AUDITOR, BIDS, CHK PRT, ORDER, UTILITY, MGR DIST, SAN DESIGN, FLD ENG, ZONE 1, ZONE 2, ZONE 3, ZONE 4, BOILMKR, CARPNTR, CEM WKR, ELECTRN, FITTER, GARAGE, PINS REP, LABORER, MACHNST, PAINTER, RIGGER, WELDER

REGISTERED PROFESSIONAL ENGINEER EUGENE H. HARRIS No. 14,138 CIVIL STATE OF CALIFORNIA

SHELL OIL COMPANY
MARTINEZ REFINERY

UPSTREAM WHARF FACILITY
PLAN AND SECTIONS
NEW WHARF FACILITY

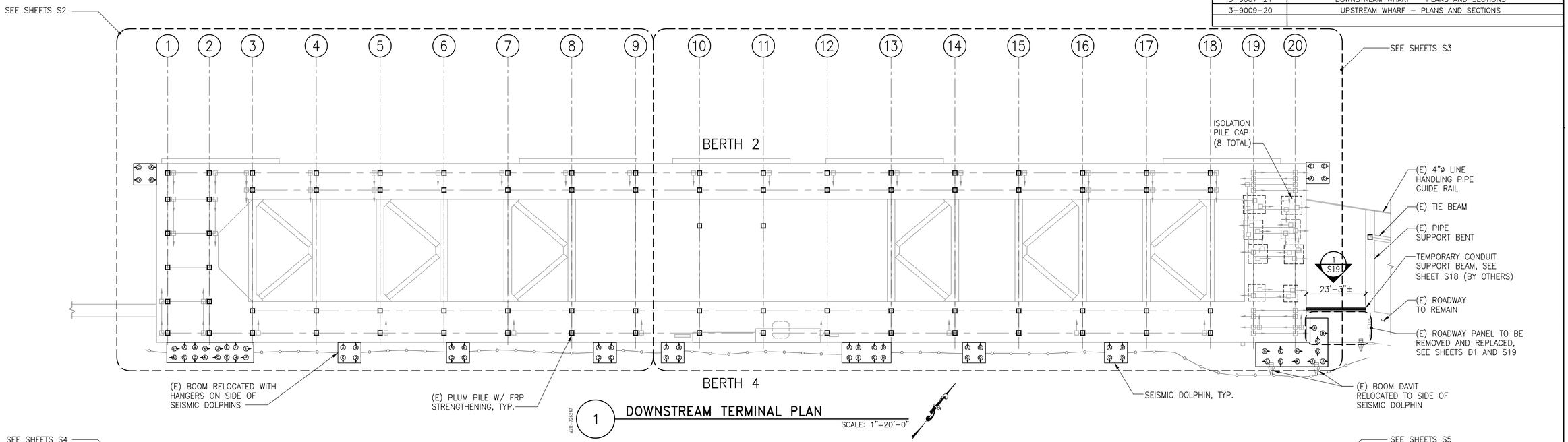
PROJECT NO. 12517
SCALE AS SHOWN — CHECKED S.S.
DATE 1-24-64 — APPROVED J.F.T.
DRAWN M.R. — APPROVED E.H.H.
DWG NO. 3-9009-20

FREDERIC R. HARRIS, INC.
CONSULTING ENGINEERS
NEW YORK

ATTACHMENT 2

TERMINAL PLANS FROM AS-BUILT DRAWINGS FOR SEISMIC RETROFIT

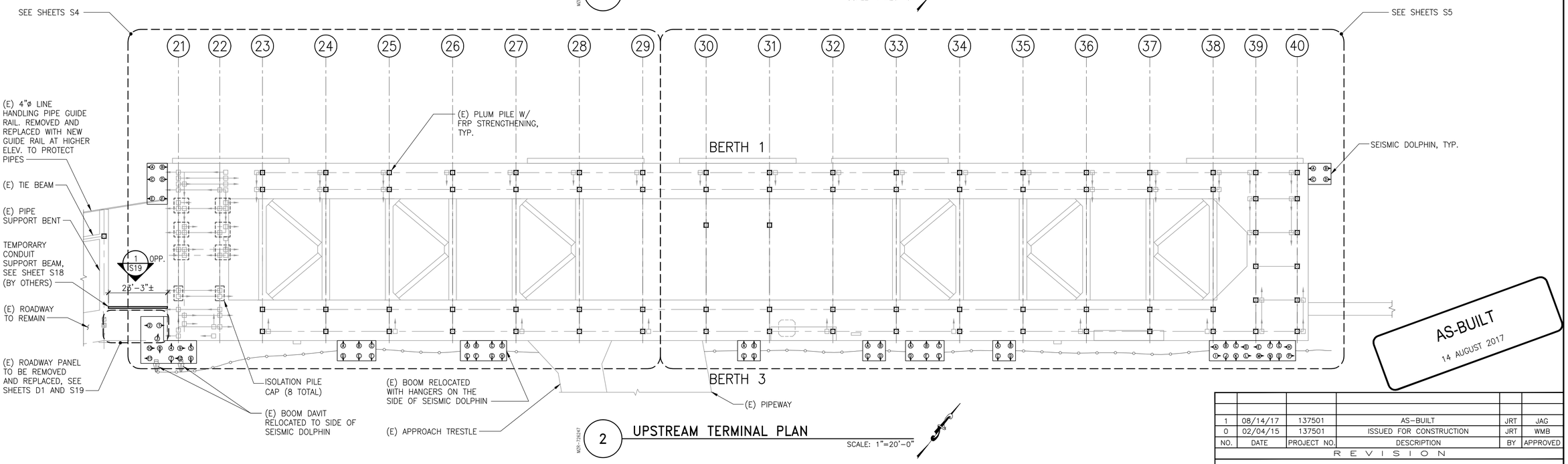
REFERENCE DRAWINGS	
DRAWING NO.	DESCRIPTION
3-9007-21	DOWNSTREAM WHARF – PLANS AND SECTIONS
3-9009-20	UPSTREAM WHARF – PLANS AND SECTIONS



1 DOWNSTREAM TERMINAL PLAN

SCALE: 1"=20'-0"

MZR-726247



2 UPSTREAM TERMINAL PLAN

SCALE: 1"=20'-0"

MZR-726247

AS-BUILT
14 AUGUST 2017

NO.	DATE	PROJECT NO.	DESCRIPTION	BY	APPROVED
1	08/14/17	137501	AS-BUILT	JRT	JAG
0	02/04/15	137501	ISSUED FOR CONSTRUCTION	JRT	WMB

REVISION

REGISTERED PROFESSIONAL ENGINEER
JULIE A. GALBRAITH
No. 76178
CIVIL
STATE OF CALIFORNIA
8/14/17

SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures
Simpson Gumpertz & Heger Inc.
500 12th Street, Suite 270
Oakland, California 94607
main: 510.457.4600 fax: 510.457.4599
www.sgh.com
Boston
Chicago
Los Angeles
New York
San Francisco
Washington, DC

PROJECT NO.:	137501
DATE:	08/14/17
SCALE:	AS NOTED
DRAWN BY:	JRT
PROJ. ENG.:	JAG
CHECKED:	WMB
APPROVED:	
OUTPUT SIZE:	D

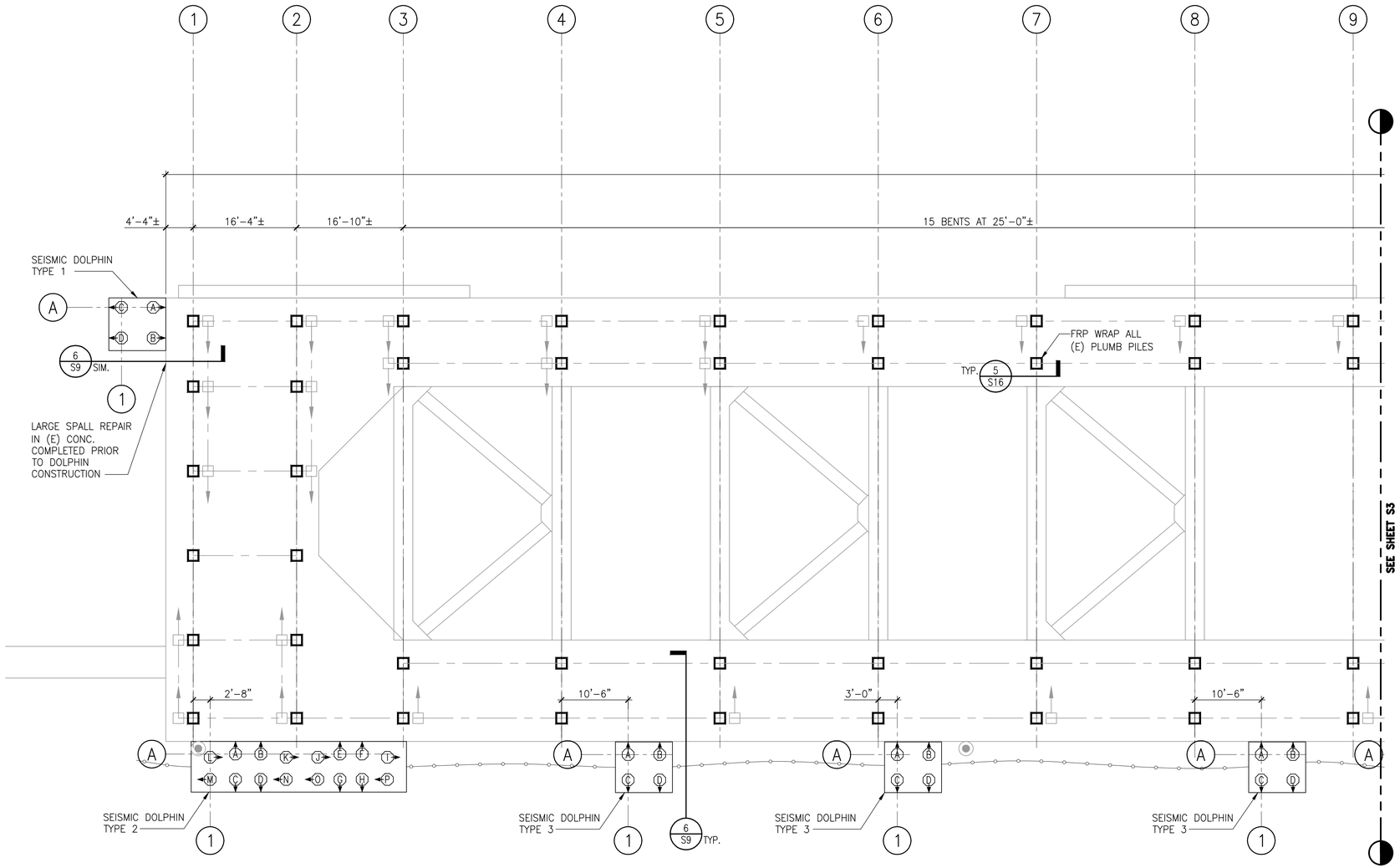
SHELL OIL PRODUCTS U.S.
MARTINEZ, CALIFORNIA

WHARF SEISMIC MITIGATON
TERMINAL PLANS

PLANT: AREA: WHARF

DRAWING NUMBER	SHEET	CLASS	DOC. CTRL. NO.	REV.
S1	11 OF 35		MZR-726247	1

REFERENCE DRAWINGS	
DRAWING NO.	DESCRIPTION
3-9007-21	DOWNSTREAM WHARF – PLANS AND SECTIONS
3-9007-20	UPSTREAM WHARF – PLANS AND SECTIONS



1 PARTIAL DOWNSTREAM LOADING PLATFORM PILE PLAN
SCALE: 1"=10'-0"

MZR-726248

LEGEND:

- (E) 20" OR 24" SQ. PRESTRESSED CONCRETE PILE (PLUMB) WITH NEW FRP SEE 5/S16
- (E) 20" OR 24" SQ. PRESTRESSED CONCRETE PILE (ARROW INDICATES DIRECTION OF BATTER)
- 24" OCTAGONAL PRESTRESSED CONCRETE PILE (ARROW INDICATES DIRECTION OF BATTER)
- 24" (E) CIP SPLICE AT DEPTH BELOW (E) DECK B.O.C. WITH NEW FRP SEE 6/S16
- FRP WRAPPED DECK BEAM
- (E) OIL SPILL CONTAINMENT BOOM SUPPORT TO BE RELOCATED AS DIRECTED BY SHELL

NOTE:

BEFORE ANY PILE DRIVING, VERIFY EXISTING PILE LOCATIONS AND BATTERS. VERIFY ANY INTERFERENCES WITH NEW PILES. NOTIFY SHELL OF ANY INTERFERENCES PRIOR TO PROCEEDING.

AS-BUILT
14 AUGUST 2017

NO.	DATE	PROJECT NO.	DESCRIPTION	BY	APPROVED
1	08/14/17	137501	AS-BUILT	JRT	JAG
0	02/04/15	137501	ISSUED FOR CONSTRUCTION	JRT	WMB

REVISION

REGISTERED PROFESSIONAL ENGINEER
JULIE A. GALBRAITH
No. 76178
CIVIL
STATE OF CALIFORNIA
8/14/17

SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures
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500 12th Street, Suite 270
Oakland, California 94607
main: 510.457.4600 fax: 510.457.4599
www.sgh.com
Boston
Chicago
Los Angeles
New York
San Francisco
Washington, DC

PROJECT NO.:	137501
DATE:	08/14/17
SCALE:	AS NOTED
DRAWN BY:	JRT
PROJ. ENG.:	JAG
CHECKED:	WMB
APPROVED:	
OUTPUT SIZE:	D

SHELL OIL PRODUCTS U.S.
MARTINEZ, CALIFORNIA

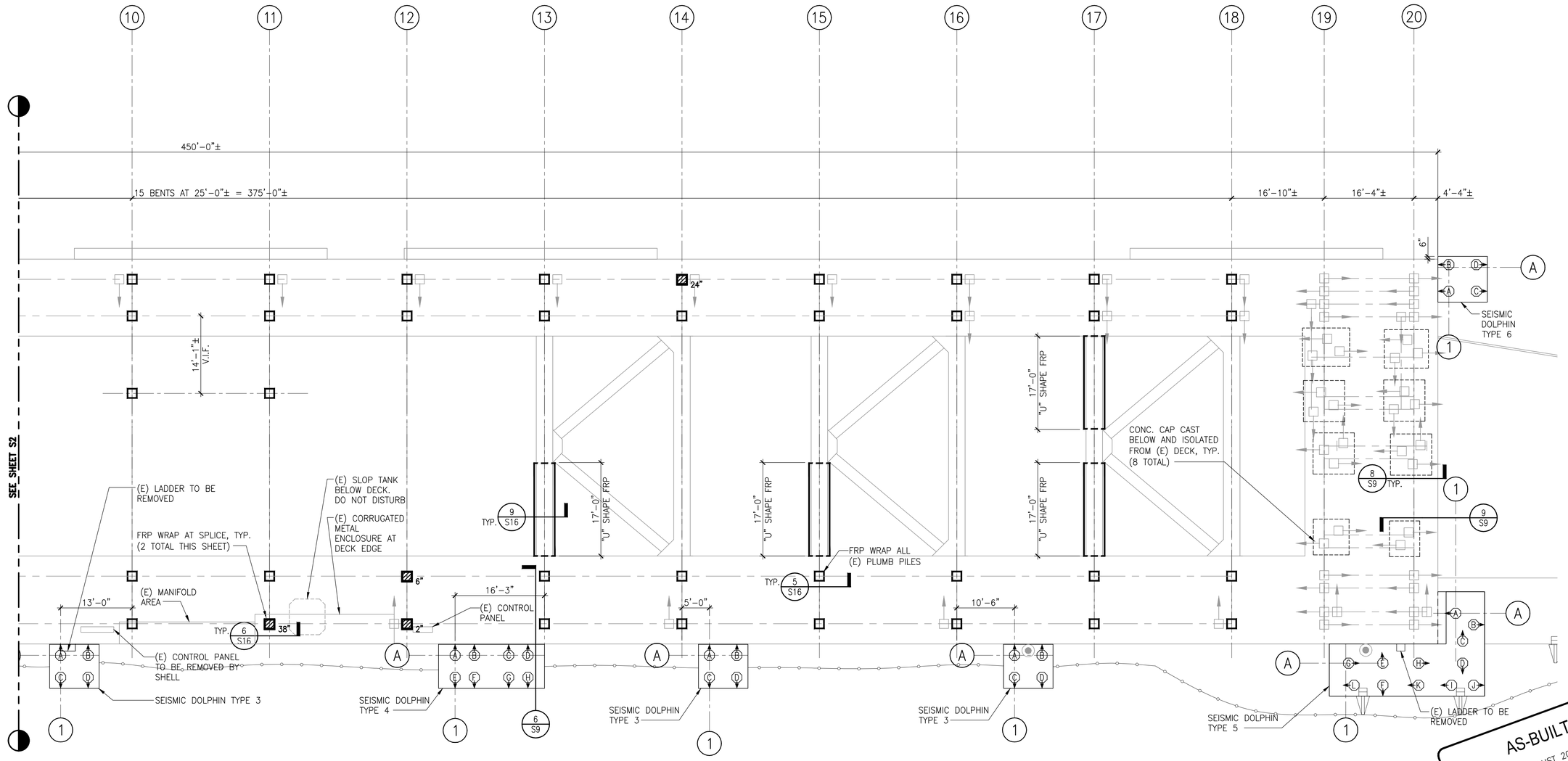
WHARF SEISMIC MITIGATON
PARTIAL DOWNSTREAM LOADING PLATFORM PLAN

PLANT: AREA: WHARF

DRAWING NUMBER	SHEET	CLASS	DOC. CTRL. NO.	REV.
S2	12 OF 35		MZR-726248	1

I:\OAK\Projects\2013\137501.00-SEQ1\Drawings\Working_Set - AS-BUILT\MZR-726248.dwg

REFERENCE DRAWINGS	
DRAWING NO.	DESCRIPTION



MZR-726249 1 PARTIAL DOWNSTREAM LOADING PLATFORM PILE PLAN

SCALE: 1"=10'-0"

AS-BUILT
14 AUGUST 2017

LEGEND:

- (E) 20" OR 24" SQ. PRESTRESSED CONCRETE PILE (PLUMB) WITH NEW FRP SEE 5/S16
- (E) 20" OR 24" SQ. PRESTRESSED CONCRETE PILE (ARROW INDICATES DIRECTION OF BATTER)
- 24" OCTAGONAL PRESTRESSED CONCRETE PILE (ARROW INDICATES DIRECTION OF BATTER)
- 24" (E) CIP SPLICE AT DEPTH BELOW (E) DECK B.O.C. WITH NEW FRP SEE 6/S16
- FRP WRAPPED DECK BEAM
- (E) OIL SPILL CONTAINMENT BOOM SUPPORT TO BE RELOCATED AS DIRECTED BY SHELL

NOTE:

BEFORE ANY PILE DRIVING, VERIFY EXISTING PILE LOCATIONS AND BATTERS. VERIFY ANY INTERFERENCES WITH NEW PILES. NOTIFY SHELL OF ANY INTERFERENCES PRIOR TO PROCEEDING.

NO.	DATE	PROJECT NO.	DESCRIPTION	BY	APPROVED
1	08/14/17	137501	AS-BUILT	JRT	JAG
0	02/04/15	137501	ISSUED FOR CONSTRUCTION	JRT	WMB

REVISION

PROJECT NO.:	137501
DATE:	08/14/17
SCALE:	AS NOTED
DRAWN BY:	JRT
PROJ. ENG.:	JAG
CHECKED:	WMB
APPROVED:	
OUTPUT SIZE:	D

REGISTERED PROFESSIONAL ENGINEER
JULIE K. GALBRAITH
No. 76178
CIVIL
STATE OF CALIFORNIA
8/14/17

SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures
Simpson Gumpertz & Heger Inc.
500 12th Street, Suite 270
Oakland, California 94607
main: 510.457.4600 fax: 510.457.4599
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Boston
Chicago
Los Angeles
New York
San Francisco
Washington, DC

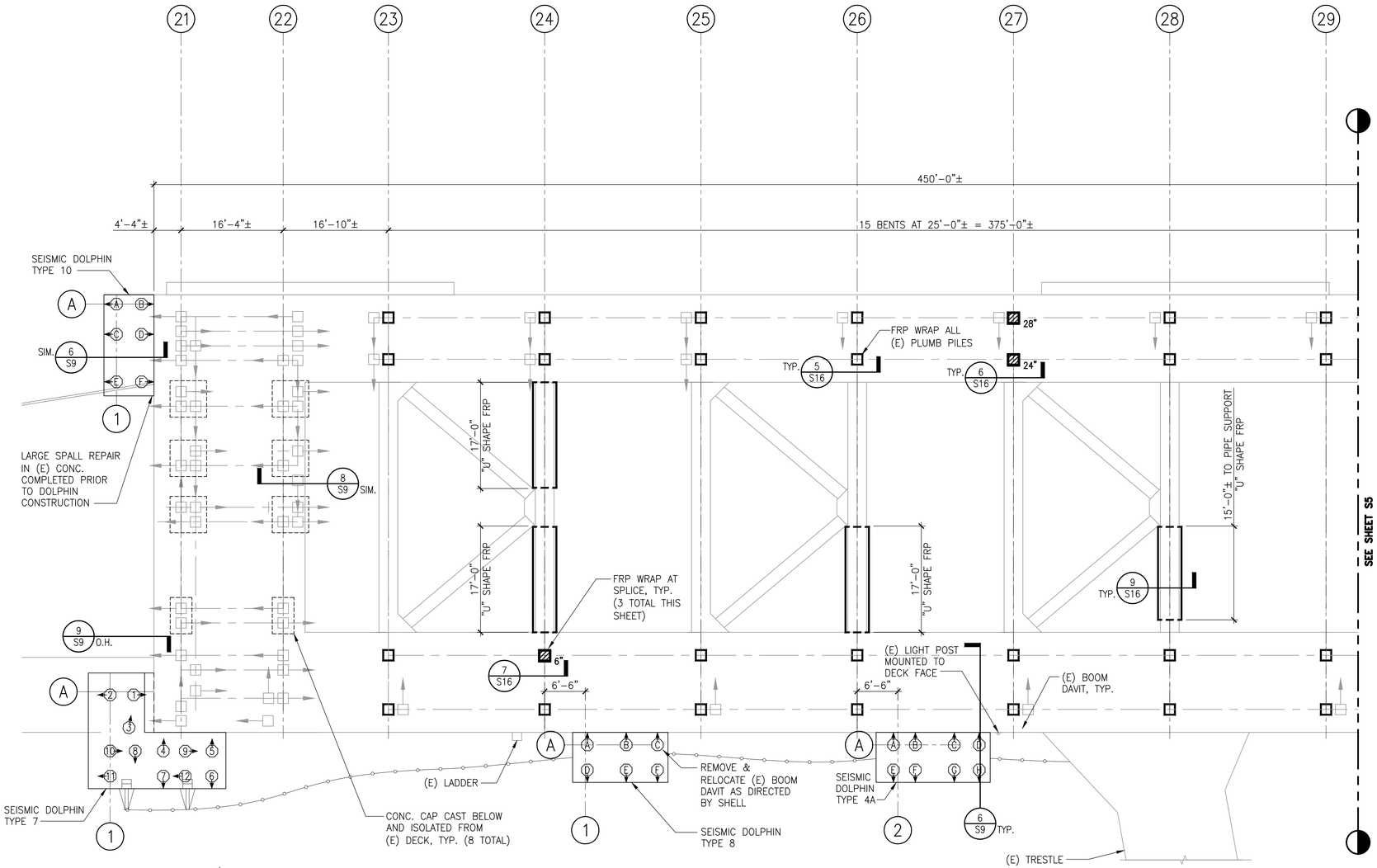
SHELL OIL PRODUCTS U.S.
MARTINEZ, CALIFORNIA

WHARF SEISMIC MITIGATON
PARTIAL DOWNSTREAM LOADING PLATFORM PLAN

PLANT: AREA: WHARF

DRAWING NUMBER	SHEET	CLASS	DOC. CTRL. NO.	REV.
S3	13 OF 35		MZR-726249	1

REFERENCE DRAWINGS	
DRAWING NO.	DESCRIPTION



1 PARTIAL UPSTREAM LOADING PLATFORM PILE PLAN
MZR-726250
SCALE: 1"=10'-0"

LEGEND:

- (E) 20" OR 24" SQ. PRESTRESSED CONCRETE PILE (PLUMB) WITH NEW FRP SEE 5 S16
- (E) 20" OR 24" SQ. PRESTRESSED CONCRETE PILE (ARROW INDICATES DIRECTION OF BATTER)
- 24" OCTAGONAL PRESTRESSED CONCRETE PILE (ARROW INDICATES DIRECTION OF BATTER)
- 24" (E) CIP SPLICE AT DEPTH BELOW (E) DECK B.O.C. WITH NEW FRP SEE 6 S16
- FRP WRAPPED DECK BEAM
- (E) OIL SPILL CONTAINMENT BOOM SUPPORT TO BE RELOCATED AS DIRECTED BY SHELL

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AS-BUILT
14 AUGUST 2017

NO.	DATE	PROJECT NO.	DESCRIPTION	BY	APPROVED
1	08/14/17	137501	AS-BUILT	JRT	JAG
0	02/04/15	137501	ISSUED FOR CONSTRUCTION	JRT	WMB

REVISION

REGISTERED PROFESSIONAL ENGINEER
JULIE A. GALBRAITH
No. 76178
CIVIL
STATE OF CALIFORNIA
8/14/17

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www.sgh.com
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Los Angeles
New York
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Washington, DC

PROJECT NO.:	137501
DATE:	08/14/17
SCALE:	AS NOTED
DRAWN BY:	JRT
PROJ. ENG.:	JAG
CHECKED:	WMB
APPROVED:	
OUTPUT SIZE:	D

SHELL OIL PRODUCTS U.S.
MARTINEZ, CALIFORNIA

WHARF SEISMIC MITIGATON
PARTIAL UPSTREAM LOADING PLATFORM PLAN

PLANT: AREA: WHARF

DRAWING NUMBER	SHEET	CLASS	DOC. CTRL. NO.	REV.
S4	14 OF 35		MZR-726250	1

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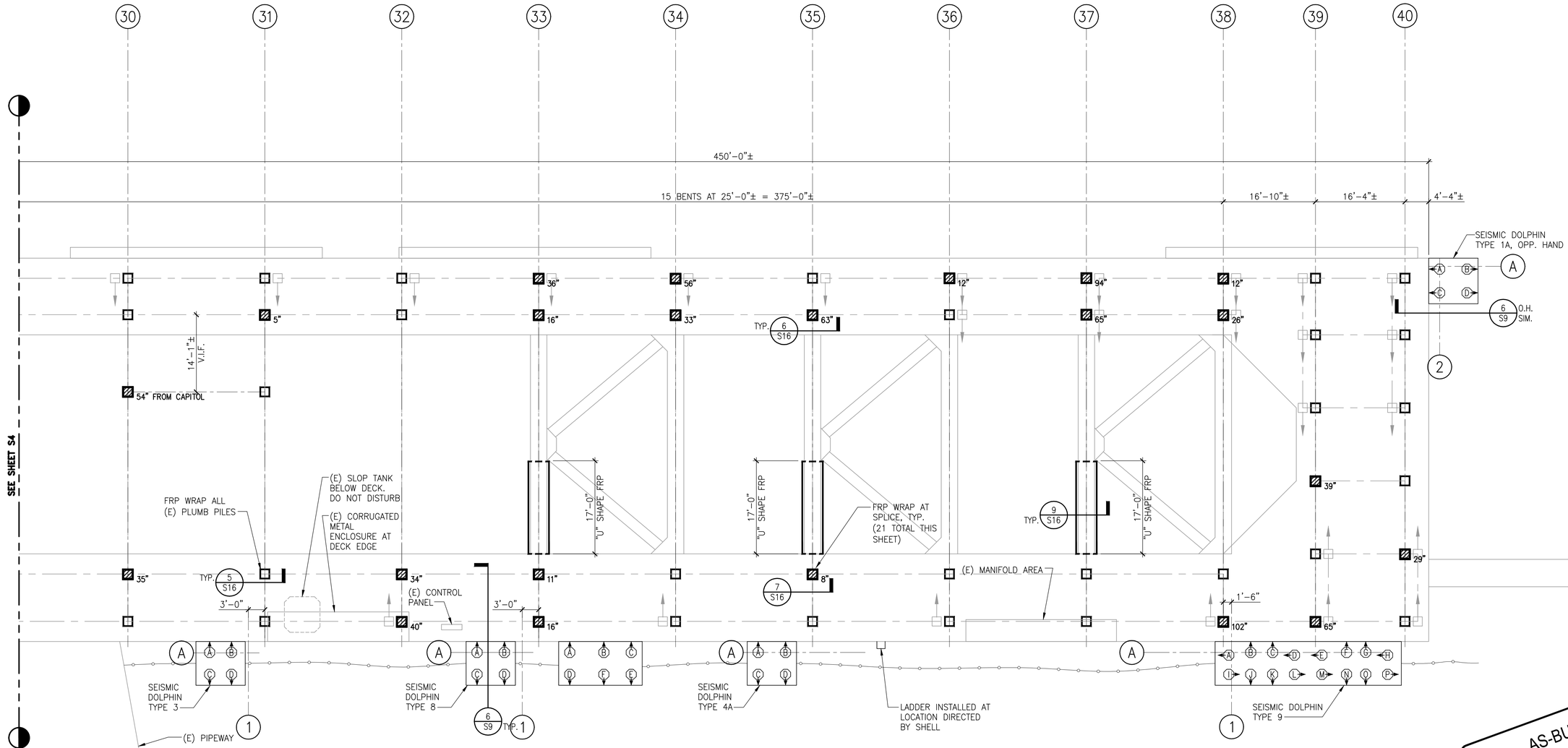
REFERENCE DRAWINGS	
DRAWING NO.	DESCRIPTION



LEGEND:

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- (E) 20" OR 24" SQ. PRESTRESSED CONCRETE PILE (ARROW INDICATES DIRECTION OF BATTER)
- 24" OCTAGONAL PRESTRESSED CONCRETE PILE (ARROW INDICATES DIRECTION OF BATTER)
- 24" (E) CIP SPLICE AT DEPTH BELOW (E) DECK B.O.C. WITH NEW FRP SEE 6/S16
- FRP WRAPPED DECK BEAM
- (E) OIL SPILL CONTAINMENT BOOM SUPPORT TO BE RELOCATED AS DIRECTED BY SHELL

NOTE:

BEFORE ANY PILE DRIVING, VERIFY EXISTING PILE LOCATIONS AND BATTERS. VERIFY ANY INTERFERENCES WITH NEW PILES. NOTIFY SHELL OF ANY INTERFERENCES PRIOR TO PROCEEDING.

MZR-726251 1 **PARTIAL UPSTREAM LOADING PLATFORM PILE PLAN**

SCALE: 1"=10'-0"

AS-BUILT
14 AUGUST 2017

NO.	DATE	PROJECT NO.	DESCRIPTION	BY	APPROVED
1	08/14/17	137501	AS-BUILT	JRT	JAG
0	02/04/15	137501	ISSUED FOR CONSTRUCTION	JRT	WMB

REVISION

REGISTERED PROFESSIONAL ENGINEER
JULIE A. GALBRAITH
No. 76178
CIVIL
STATE OF CALIFORNIA
8/14/17

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Los Angeles
New York
San Francisco
Washington, DC

PROJECT NO.:	137501
DATE:	08/14/17
SCALE:	AS NOTED
DRAWN BY:	JRT
PROJ. ENG.:	JAG
CHECKED:	WMB
APPROVED:	
OUTPUT SIZE:	D

SHELL OIL PRODUCTS U.S.
MARTINEZ, CALIFORNIA

WHARF SEISMIC MITIGATON
PARTIAL UPSTREAM LOADING PLATFORM PLAN

PLANT: AREA: WHARF

DRAWING NUMBER	SHEET	CLASS	DOC. CTRL. NO.	REV.
S5	15 OF 35		MZR-726251	1

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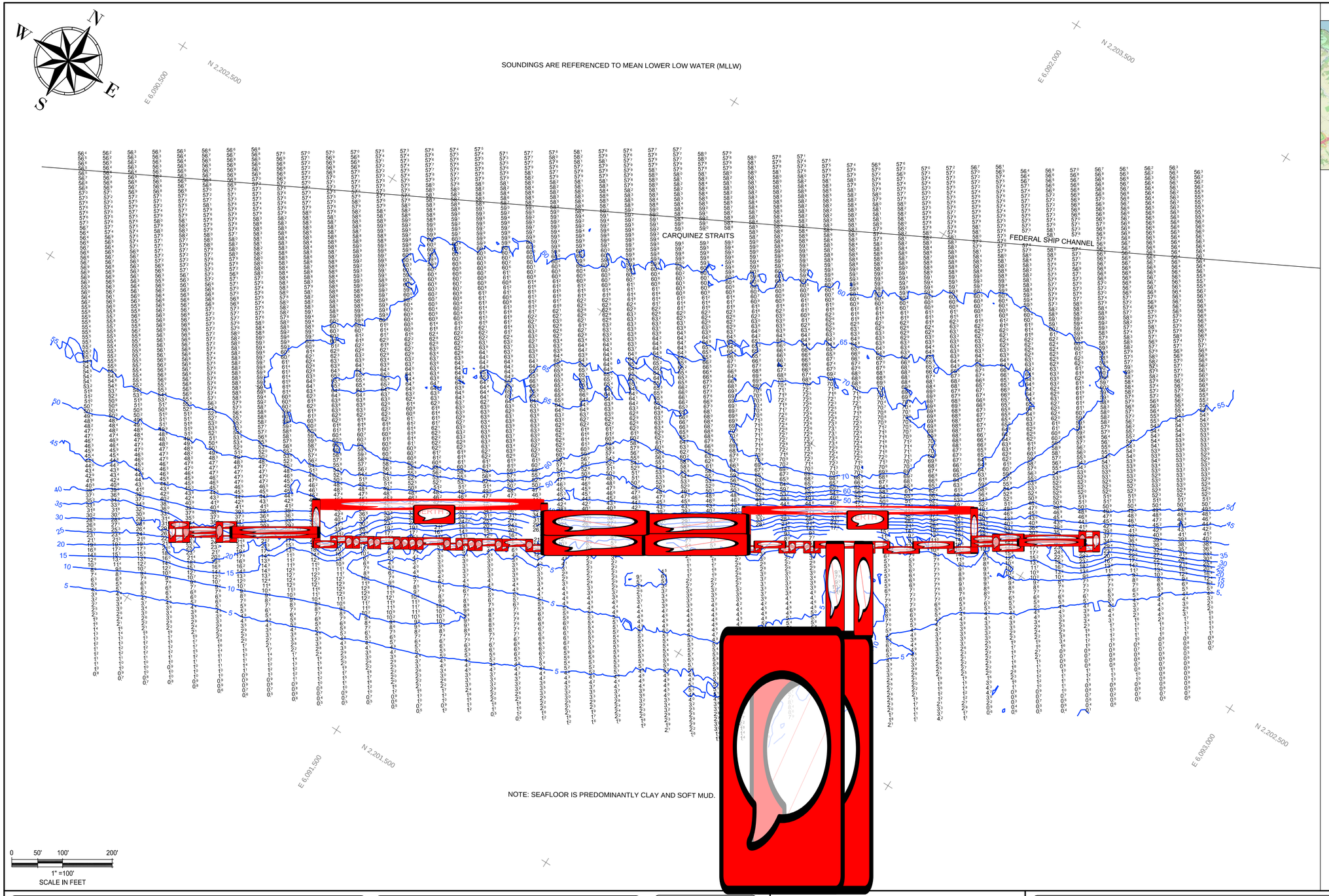
ATTACHMENT 3

SITE BATHYMETRY

SOUNDINGS ARE REFERENCED TO MEAN LOWER LOW WATER (MLLW)



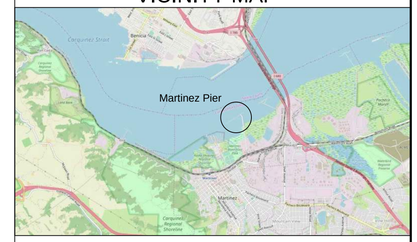
NOTE: SEAFLOOR IS PREDOMINANTLY CLAY AND SOFT MUD.

0 50' 100' 200'

1" =100'

SCALE IN FEET

VICINITY MAP



1. HORIZONTAL CONTROL IS NAD83(2011) 2010.00, CA SPC ZONE 03, U.S. SURVEY FEET HOLDING NOAA/NOS TIDAL BENCH MARK "941 5102 D" (PID:BBCZ49 / VM:20716) AS 2202470.49' N, 6095250.04' E.
2. VERTICAL CONTROL IS MEAN LOWER LOW WATER (MLLW=0.0') BASED ON THE NOAA/NOS TIDAL BENCH MARK LIST: "9415102 MARTINEZ-AMORCO PIER, CARQUINEZ STRAIT, CA" PUBLISHED 07/25/2018. THIS TIDAL DATUM IS BASED ON THE 1983-2001 TIDAL EPOCH AND IS REFERENCED BY HOLDING NOAA/NOS TIDAL BENCH MARK "941 5102 D" (PID:BBCZ49 / VM:20716) AS 30.55'.
3. VERTICAL TIES TO THE NATIONAL SPATIAL REFERENCE SYSTEM ARE BASED ON PUBLISHED NAVD88 (GEOID 12B) ELEVATIONS HOLDING NOAA/NOS TIDAL BENCH MARK "941 5102 D" (PID:BBCZ49 / VM:20716) AS 31.07'.
4. SOUNDINGS ARE IN FEET AND ARE MINUS UNLESS OTHERWISE INDICATED.
5. BATHYMETRY WAS COLLECTED NOVEMBER 07, 2019. SOUNDINGS WERE COLLECTED USING A RESON SEABAT T50 MULTIBEAM ECHOSOUNDER OPERATING AT 400 KHZ. SURFANCE SOUND VELOCITY WAS DETERMINED WITH A VALEPORT MINI SVS. SOUND VELOCITY THROUGH THE WATER COLUMN WAS DETERMINED WITH AN AML MINOS X SOUND VELOCITY PROBE. POSITION AND VESSEL ORIENTATION WERE MEASURED USING AN APPLANIX POS MV WAVEMASTER II SYSTEM RECEIVING RTK CORRECTIONS FROM A TRIMBLE R7 GNSS RECEIVER SET AT CONTROL STATION "941 5102 D". DATA WAS COLLECTED USING HYPACK 2017a AND PROCESSED USING QIMERA SOFTWARE.
6. THIS DRAWING INDICATES GENERAL CONDITIONS AT THE TIME OF THE SURVEY.
7. MAP SOUNDINGS ARE DISPLAYED ALONG LINES SPACED 50 FEET AND ARE MEAN VALUE. CONTOURS ARE BASED ON 12 FEET BINNED MEAN VALUE SOUNDINGS.

LICENSED LAND SURVEYOR
GREGORY W. GIBSON
8981
STATE OF CALIFORNIA

THIS HYDROGRAPHIC SURVEY WAS COMPLETED UNDER THE OVERSIGHT OF AN NSPS/THSOA CERTIFIED HYDROGRAPHER

Gregory W. Gibson (317)

NO.	REVISION DESCRIPTION	CHECKED BY	DATE
1	APPEARANCE REVISED TO RESEMBLE 2015 PLOT	FTC	11/13/2019

R.E.Y. ENGINEERS, INC.
Civil Engineers | Land Surveyors | LiDAR
905 Sutter Street, Suite 200 Folsom, CA 95630
Phone: (916) 366-3040 Fax: (916) 366-3303

DRAWING SCALE
HOR. SCALE: 1" = 100'
VERT. SCALE: 1:1

PREPARED FOR:

Shell Oil Products U.S.
P.O. Box 711
Martinez, CA 94553

Martinez, CA
Martinez Pier Berths 1 & 2
HYDROGRAPHIC SURVEY

CONTRA COSTA COUNTY CALIFORNIA

DRAWING INFO
DATE: 11-12-2019
DRAFTER: GWG
DESIGNER:
REVIEWER: FTC

PROJECT NO. 2749.001

SHEET NO. 1 OF 1

S:\2749 – Equilon (Shell)\001 – Martinez Pier Bathymetric Survey\10 – CAD Drawings\2749–001_Shell_Martinez_Pier_Bathymetric_Survey_22x34.dwg Nov 13, 2019 – 2:15pm, GGibson

ATTACHMENT 4

TERMINAL OPERATING LIMITS

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

PREPARED BY:
SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures

Simpson Gumpertz & Heger Inc.
1999 Harrison Street, Suite 2400
Oakland, California 94612
main: 415.495.3700 fax: 415.495.3550
www.sgh.com
SGH JOB NO. 137503.00

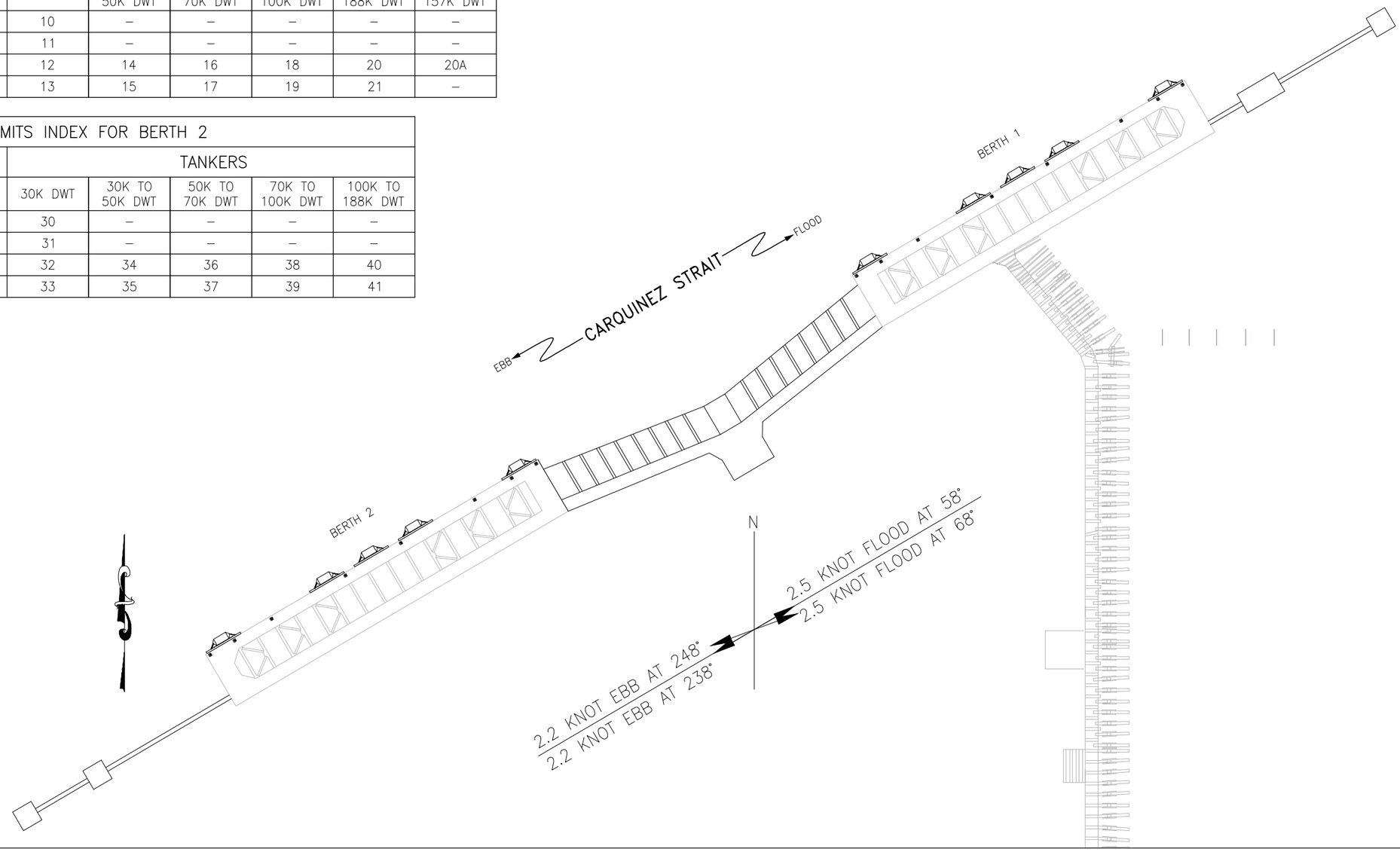
Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

REGISTERED PROFESSIONAL ENGINEER
RUNE IVERSEN
No. 76300
DATE SIGNED: 12/31/20
CIVIL
STATE OF CALIFORNIA

DATE:	DECEMBER 2020
NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

TERMINAL OPERATING LIMITS INDEX FOR BERTH 1										
LINE TYPE	ORIENTATION	BARGES			TANKERS					
		6K DWT	6K TO 20K DWT	20K TO 27.5K DWT	30K DWT	30K TO 50K DWT	50K TO 70K DWT	70K TO 100K DWT	100K TO 188K DWT	100K TO 157K DWT
SOFT LINES	PORT	2	4	6	10	–	–	–	–	–
	STARBOARD	3	5	7	11	–	–	–	–	–
STIFF LINES	PORT	–	–	8	12	14	16	18	20	20A
	STARBOARD	–	–	9	13	15	17	19	21	–

TERMINAL OPERATING LIMITS INDEX FOR BERTH 2									
LINE TYPE	ORIENTATION	BARGES			TANKERS				
		6K DWT	6K TO 20K DWT	20K TO 27.5K DWT	30K DWT	30K TO 50K DWT	50K TO 70K DWT	70K TO 100K DWT	100K TO 188K DWT
SOFT LINES	PORT	22	24	26	30	–	–	–	–
	STARBOARD	23	25	27	31	–	–	–	–
STIFF LINES	PORT	–	–	28	32	34	36	38	40
	STARBOARD	–	–	29	33	35	37	39	41



STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

6K DWT BARGE W/ SOFT LINES
BERTH 1 - PORT SIDE

2

PREPARED BY:
SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures

Simpson Gumpertz & Heger Inc.
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main: 415.495.3700 fax: 415.495.3550
www.sgh.com
SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	2
NO. OF AFT LINES:	2
NO. OF BREAST LINES:	0 FORWARD, 0 AFT
NO. OF SPRING LINES:	1 FORWARD, 1 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	87.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	85.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	6.5%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

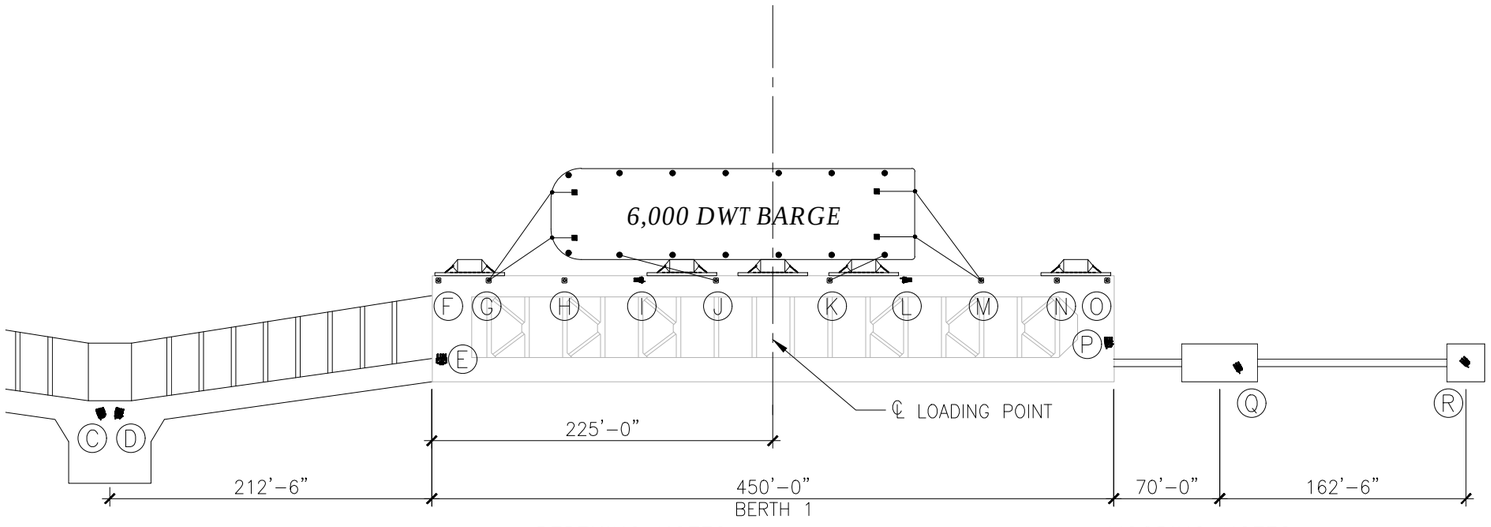
RANGE OF DWT:	UP TO 6,000 LT
MAXIMUM DISPLACEMENT:	7,054 LT @ 1.31 FT/SEC. MAX.
MAXIMUM LOA:	240.0 FT
MAXIMUM BEAM:	60.0 FT
MAXIMUM DRAFT:	18.5 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

DATE:	DECEMBER 2020
NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

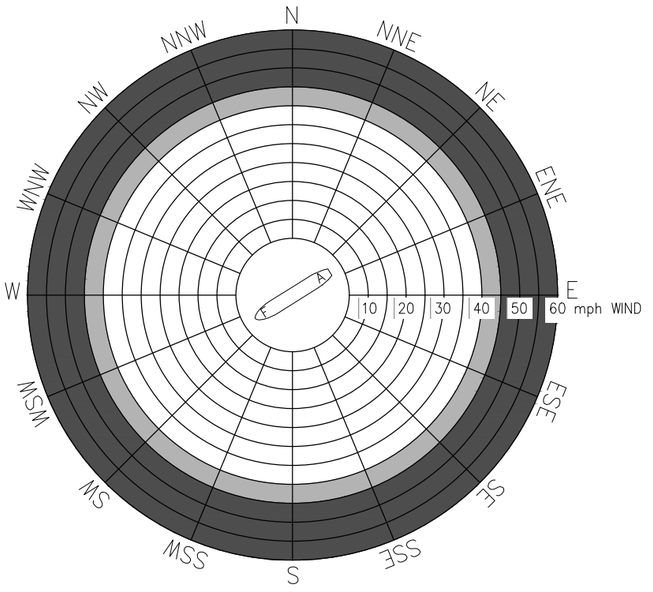
1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 15°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

REF: "Shell Martinez Refinery Marine Terminal, As–Built Fender Calculations", Prepared by Simpson Gumpertz & Heger, Inc., November 2012.
"Shell Martinez Refinery Marine Terminal, Supplemental Berthing Energy Calculations", Prepared by Simpson Gumpertz & Heger, Inc., December 2012.
"Shell Martinez Refinery Marine Terminal, MOTEMS Mooring Calculations", Prepared by Simpson Gumpertz & Heger, Inc., September 2014.
"Martinez Refining Company Marine Terminal, MRC Passing Vessel Mooring Calculations", Prepared by Simpson Gumpertz & Heger, Inc., December 2020.

LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

6K DWT BARGE W/ SOFT LINES
BERTH 1 - STARBOARD SIDE

3

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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	2
NO. OF AFT LINES:	2
NO. OF BREAST LINES:	0 FORWARD, 0 AFT
NO. OF SPRING LINES:	1 FORWARD, 1 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	87.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	85.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	6.5%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

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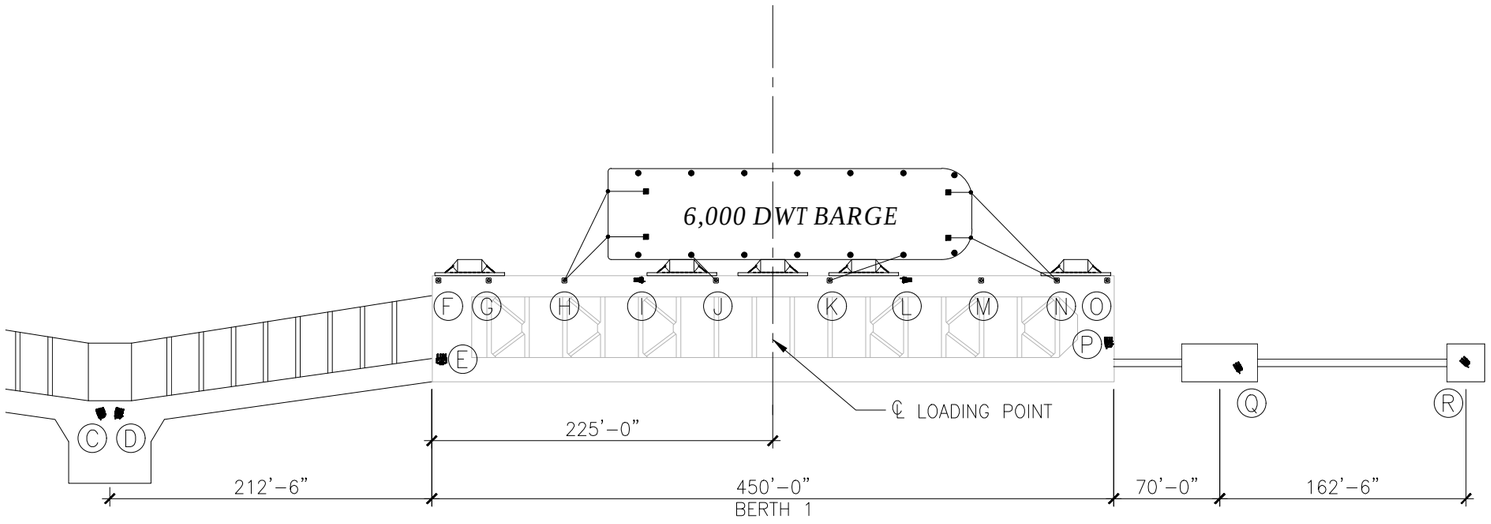
MAXIMUM LOA:	240.0 FT
MAXIMUM BEAM:	60.0 FT
MAXIMUM DRAFT:	18.5 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 15°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
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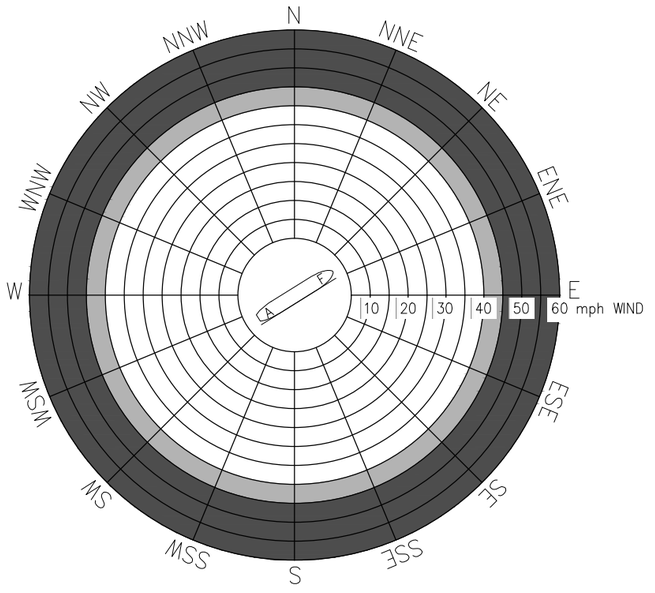

WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

20K DWT BARGE W/ SOFT LINES
BERTH 1 - PORT SIDE

4

PREPARED BY:
SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures

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1999 Harrison Street, Suite 2400
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main: 415.495.3700 fax: 415.495.3550
www.sgh.com
SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	1
NO. OF AFT LINES:	1
NO. OF BREAST LINES:	2 FORWARD, 2 AFT
NO. OF SPRING LINES:	1 FORWARD, 1 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	125.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	115.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	6.5%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

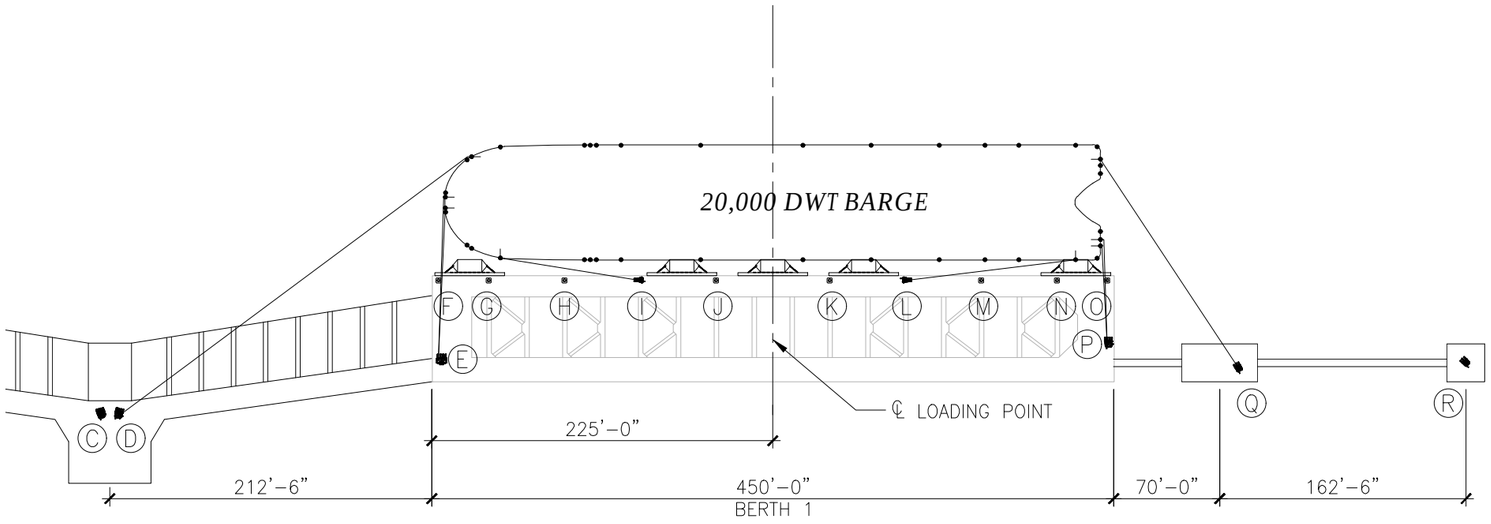
RANGE OF DWT:	6,000 LT TO 20,000 LT
MAXIMUM DISPLACEMENT:	19,534 LT @ 0.68 FT/SEC. MAX.
MAXIMUM LOA:	432.5 FT
MAXIMUM BEAM:	76.4 FT
MAXIMUM DRAFT:	25.6 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
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J	BOLLARD	91
K	BOLLARD	91
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M	BOLLARD	91
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O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

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MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
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6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
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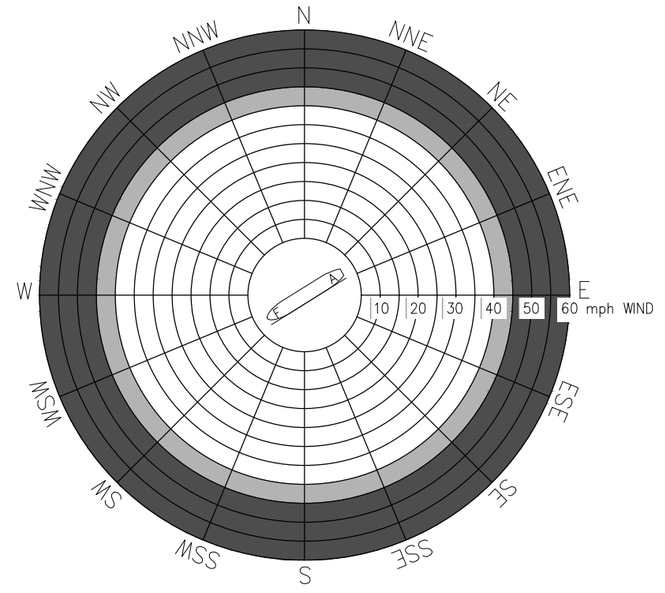

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LEGEND

OPERATIONAL CONDITION LIMIT:
TERMINATE PRODUCT TRANSFER

SURVIVAL CONDITION LIMIT:
DISCONNECT PRODUCT LINES

DEPARTURE CONDITION LIMIT:
CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

20K DWT BARGE W/ SOFT LINES
BERTH 1 - STARBOARD SIDE

5

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Boston
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New York
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DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	1
NO. OF AFT LINES:	1
NO. OF BREAST LINES:	2 FORWARD, 2 AFT
NO. OF SPRING LINES:	1 FORWARD, 1 AFT
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MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	115.0 KIPS
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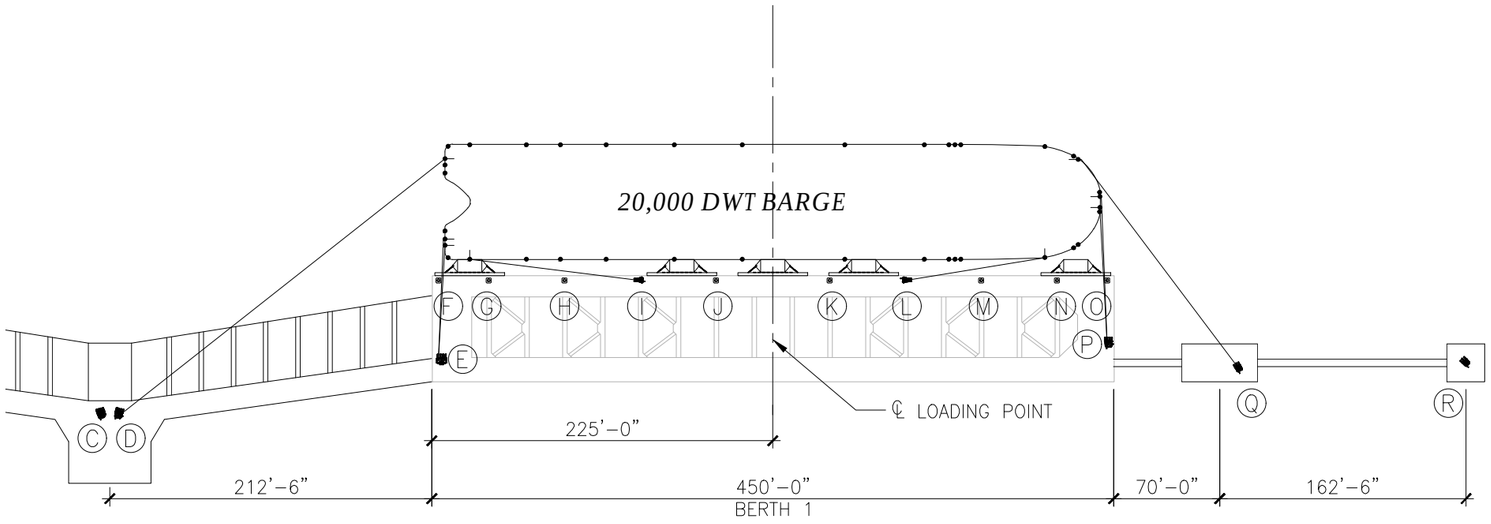

MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
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G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
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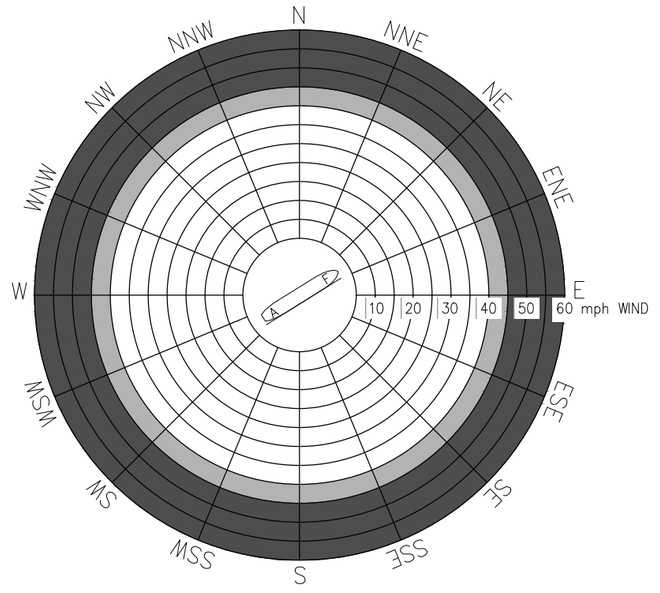

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
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STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

27K DWT ATB W/ SOFT LINES
BERTH 1 - PORT SIDE

6

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MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	1
NO. OF AFT LINES:	1
NO. OF BREAST LINES:	2 FORWARD, 2 AFT
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MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	155.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	6.5%
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VESSEL DESCRIPTION:

RANGE OF DWT:	20,000 TO 27,500 LT
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MAXIMUM BEAM:	74.0 FT
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BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
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DATE:	DECEMBER 2020
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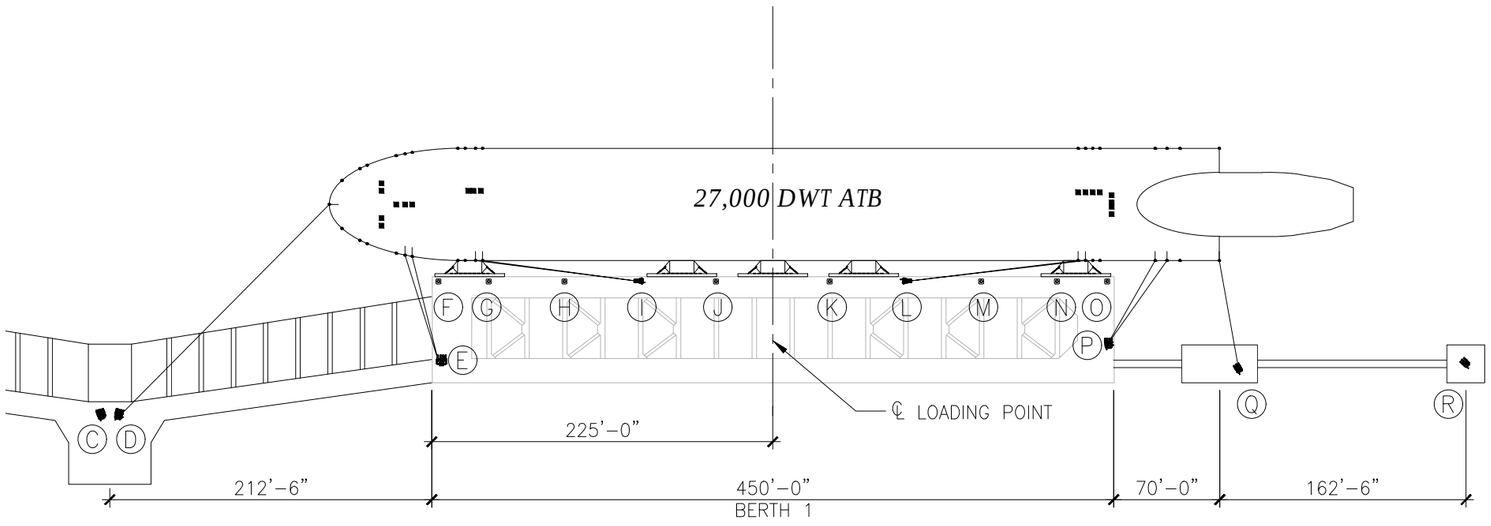

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C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
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G	BOLLARD	91
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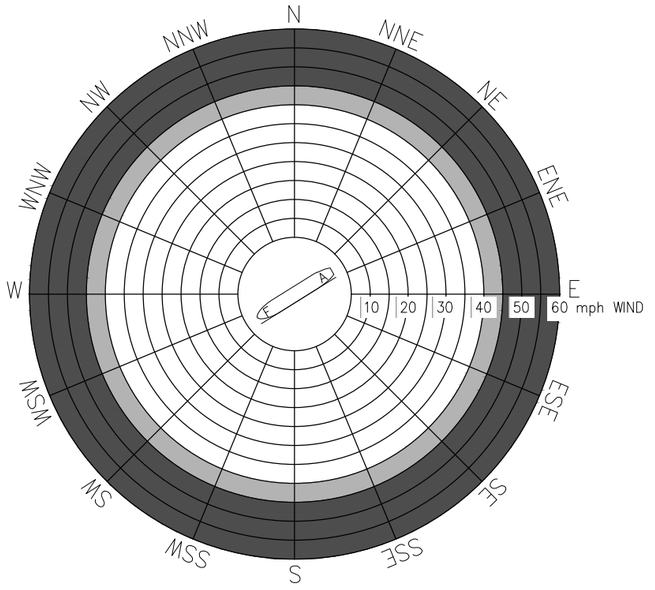

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STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

27K DWT ATB W/ SOFT LINES
BERTH 1 - STARBOARD SIDE

7

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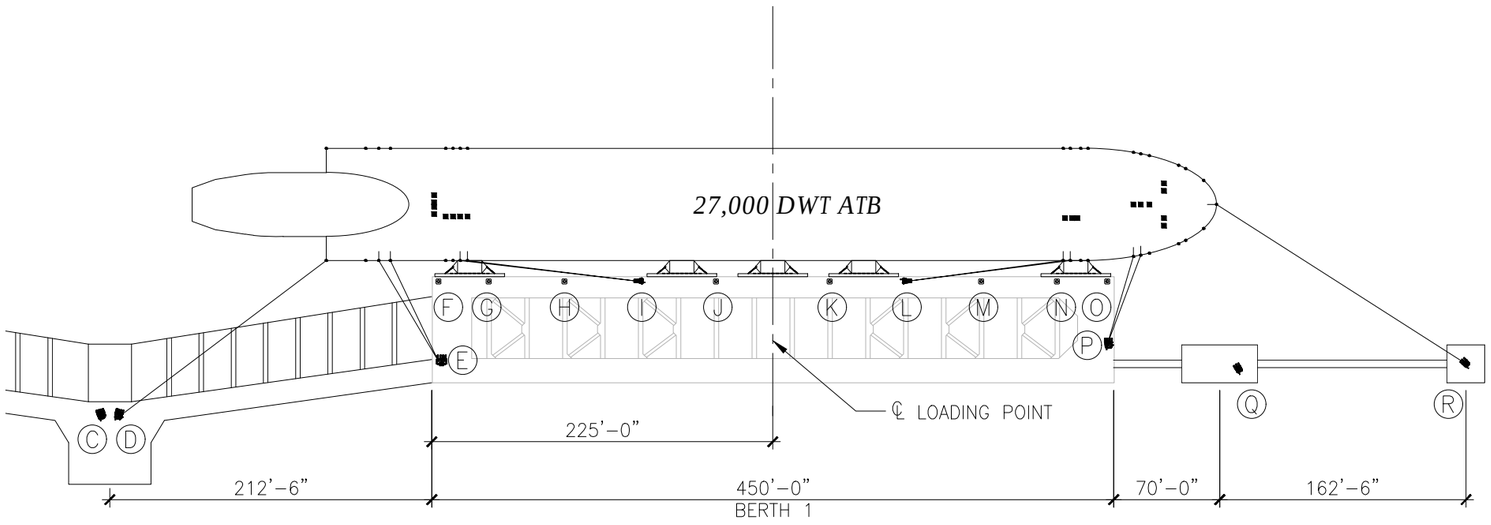

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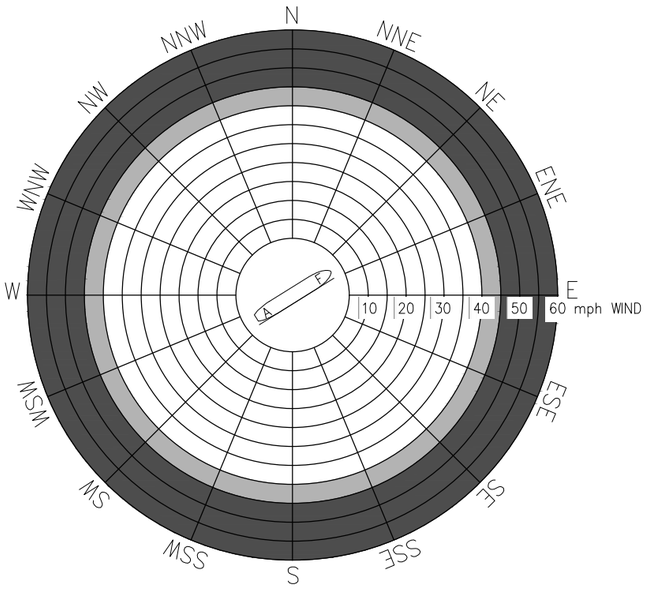

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STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

27K DWT ATB W/ STIFF LINES
BERTH 1 - PORT SIDE

8

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Engineering of Structures and Building Enclosures

Simpson Gumpertz & Heger Inc.
1999 Harrison Street, Suite 2400
Oakland, California 94612
main: 415.495.3700 fax: 415.495.3550
www.sgh.com
SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	1
NO. OF AFT LINES:	1
NO. OF BREAST LINES:	2 FORWARD, 2 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	107.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	96.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

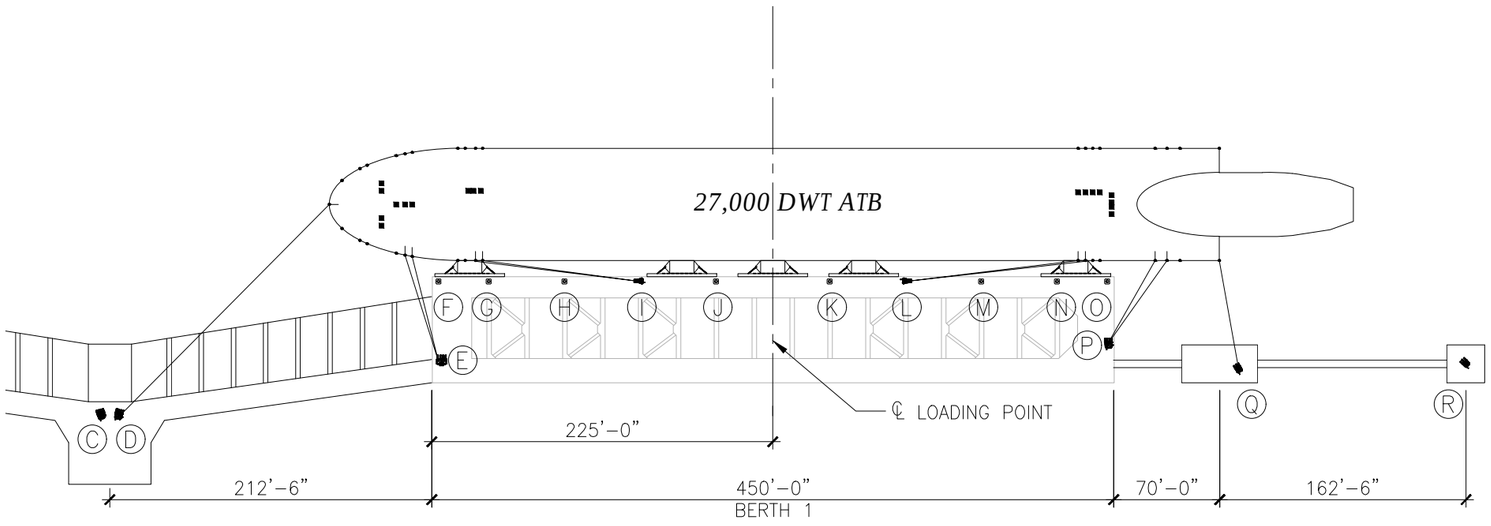
DWT:	20,000 TO 27,500 LT
MAXIMUM DISPLACEMENT:	36,358 LT @ 0.68 FT/SEC. MAX.
MAXIMUM LOA:	675.8 FT
MAXIMUM BEAM:	74.0 FT
MAXIMUM DRAFT:	30.3 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

DATE:	DECEMBER 2020
NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
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G	BOLLARD	91
H	BOLLARD	91
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K	BOLLARD	91
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P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 8°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
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4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
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6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
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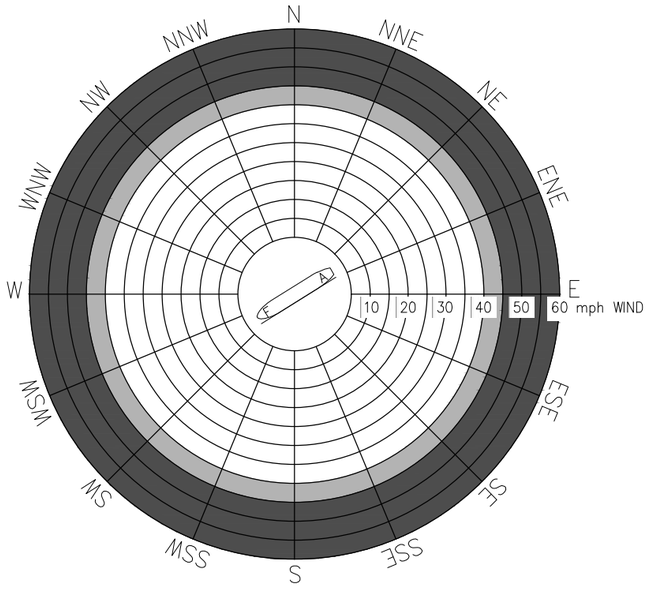

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LEGEND

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- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

27K DWT ATB W/ STIFF LINES
BERTH 1 - STARBOARD SIDE

9

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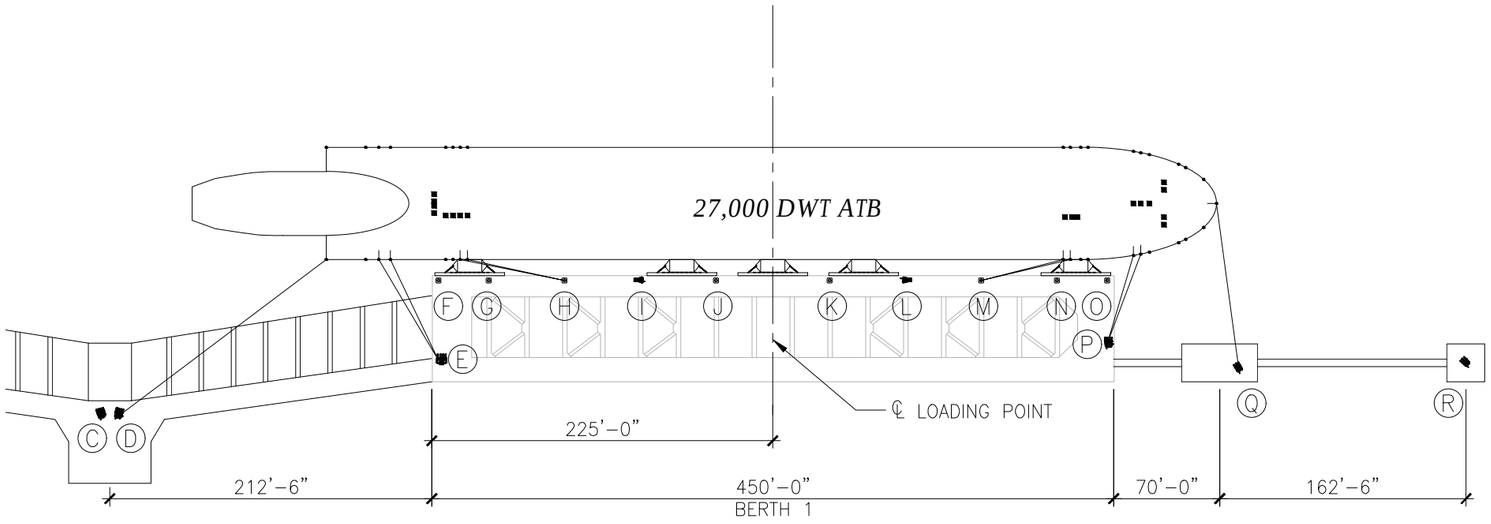

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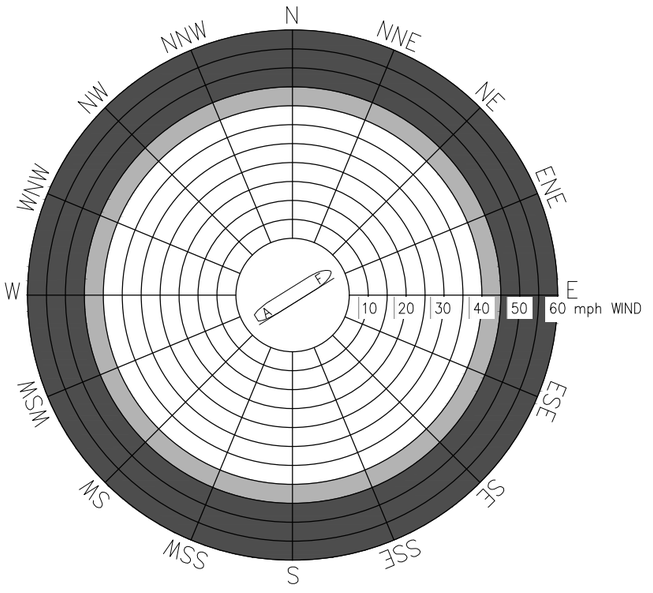

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STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

30K DWT TANKER W/ SOFT LINES
BERTH 1 - PORT SIDE

10

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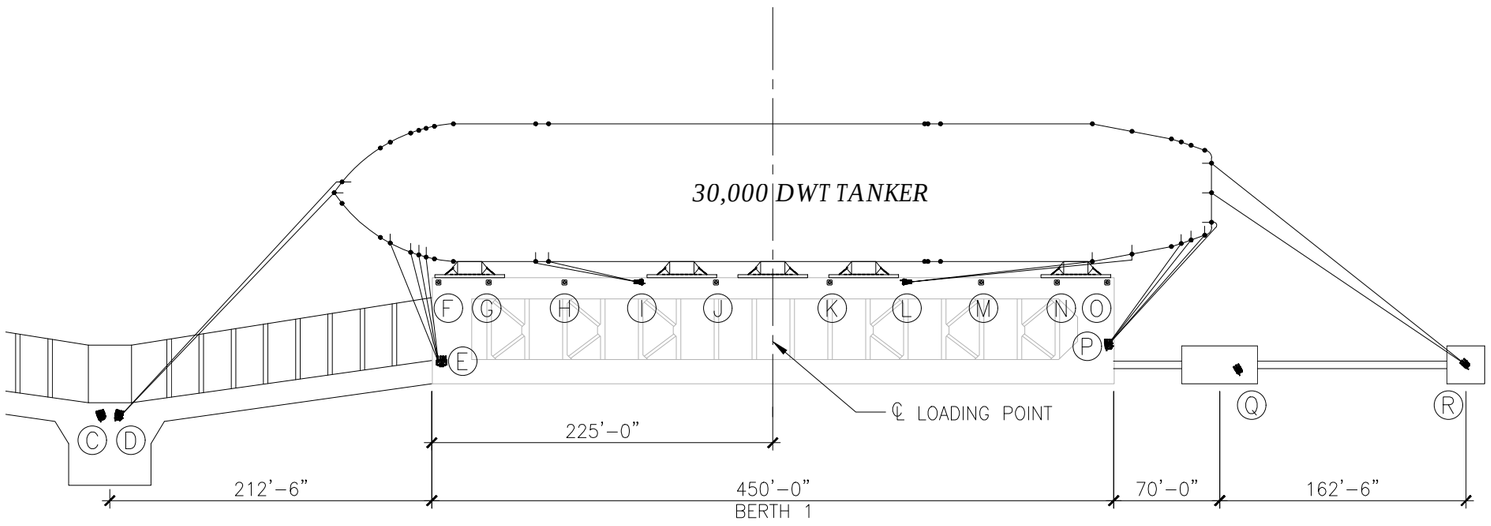

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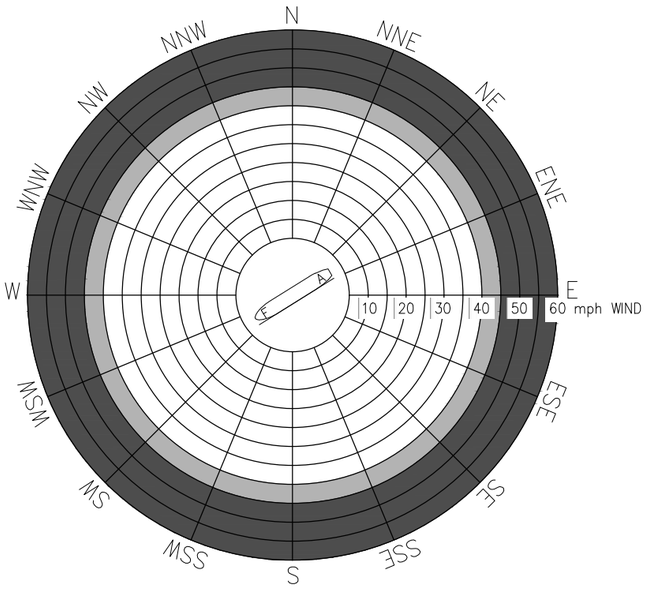

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STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

30K DWT TANKER W/ SOFT LINES
BERTH 1 - STARBOARD SIDE

11

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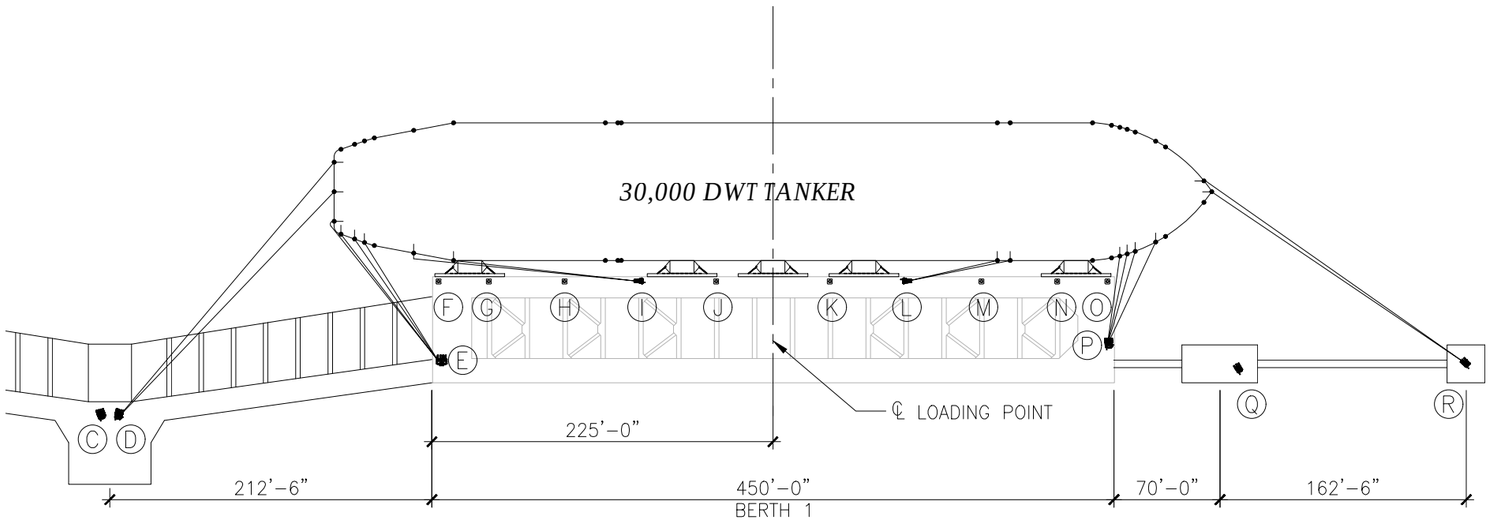

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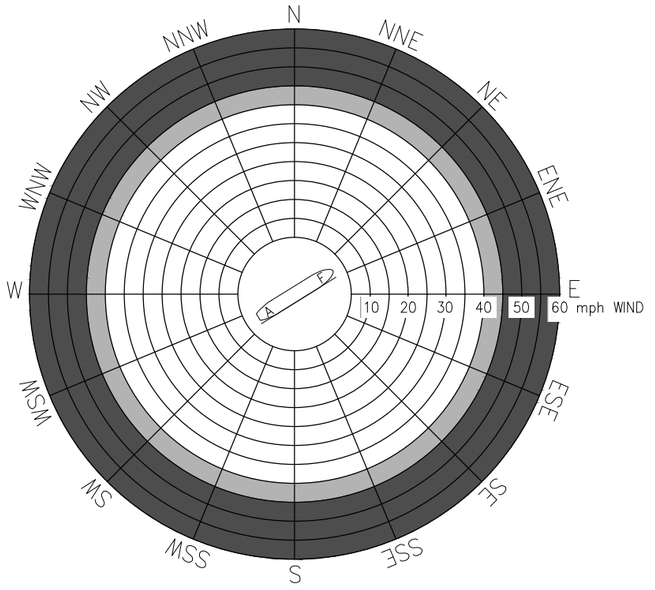

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FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

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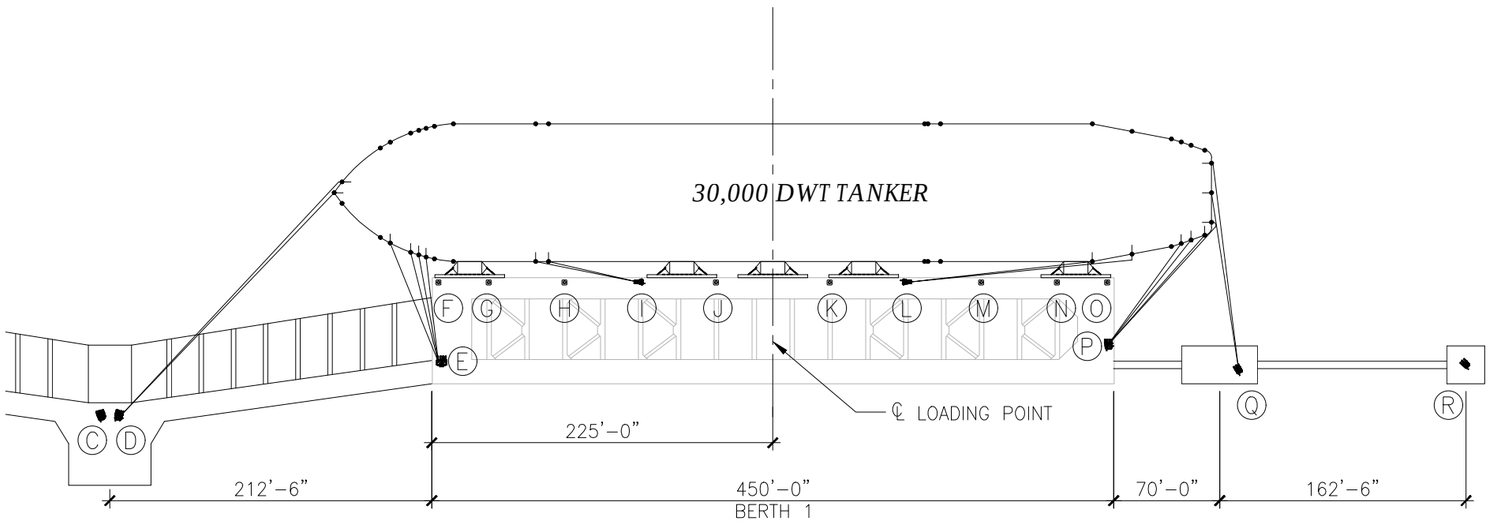


MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

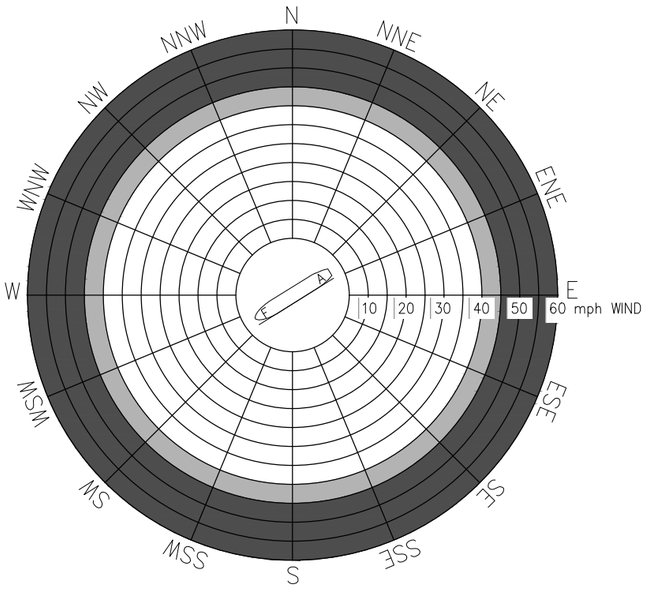
1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 8°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

REF: "Shell Martinez Refinery Marine Terminal, As–Built Fender Calculations", Prepared by Simpson Gumpertz & Heger, Inc., November 2012.
"Shell Martinez Refinery Marine Terminal, Supplemental Berthing Energy Calculations", Prepared by Simpson Gumpertz & Heger, Inc., December 2012.
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"Martinez Refining Company Marine Terminal, MRC Passing Vessel Mooring Calculations", Prepared by Simpson Gumpertz & Heger, Inc., December 2020.

LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

30K DWT TANKER W/ STIFF LINES
BERTH 1 - STARBOARD SIDE

13

PREPARED BY:
SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures

Simpson Gumpertz & Heger Inc.
1999 Harrison Street, Suite 2400
Oakland, California 94612
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www.sgh.com
SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	2
NO. OF AFT LINES:	2
NO. OF BREAST LINES:	4 FORWARD, 4 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	106.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	94.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

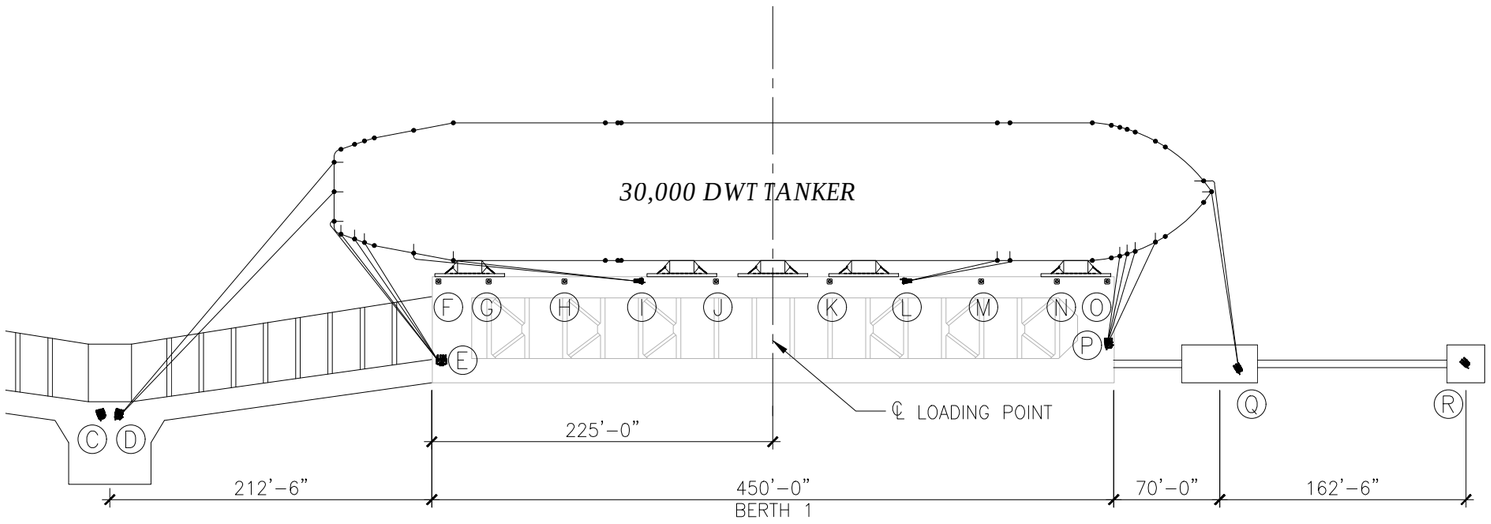
RANGE OF DWT:	UP TO 30,000 LT
MAXIMUM DISPLACEMENT:	38,351 LT @ 0.68 FT/SEC. MAX.
MAXIMUM LOA:	579.1 FT
MAXIMUM BEAM:	90.9 FT
MAXIMUM DRAFT:	31.2 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 8°.
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3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
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6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

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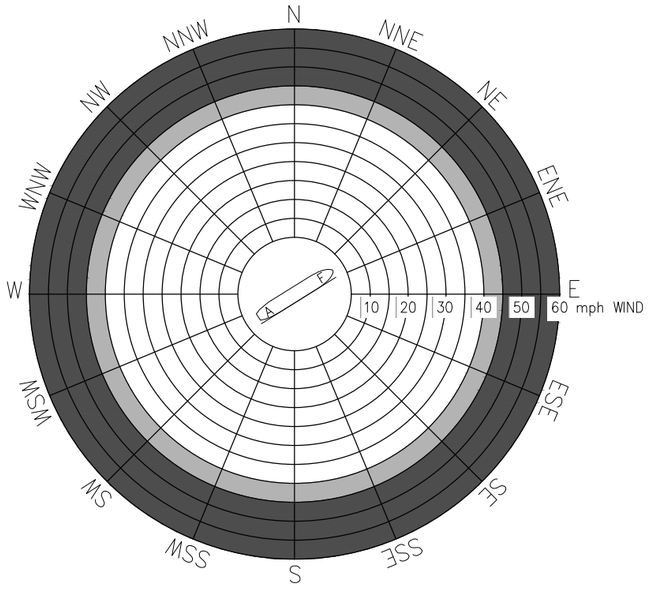
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

50K DWT TANKER W/ STIFF LINES
BERTH 1 - PORT SIDE

14

PREPARED BY:
SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures

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main: 415.495.3700 fax: 415.495.3550
www.sgh.com
SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020
NO. OF TRANSFERS/YEAR: > 90
OIL SPILL RISK: > 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION: HIGH
FACILITY FIRE HAZARD CLASSIFICATION: HIGH

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	2
NO. OF AFT LINES:	2
NO. OF BREAST LINES:	4 FORWARD, 4 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	135.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	115.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

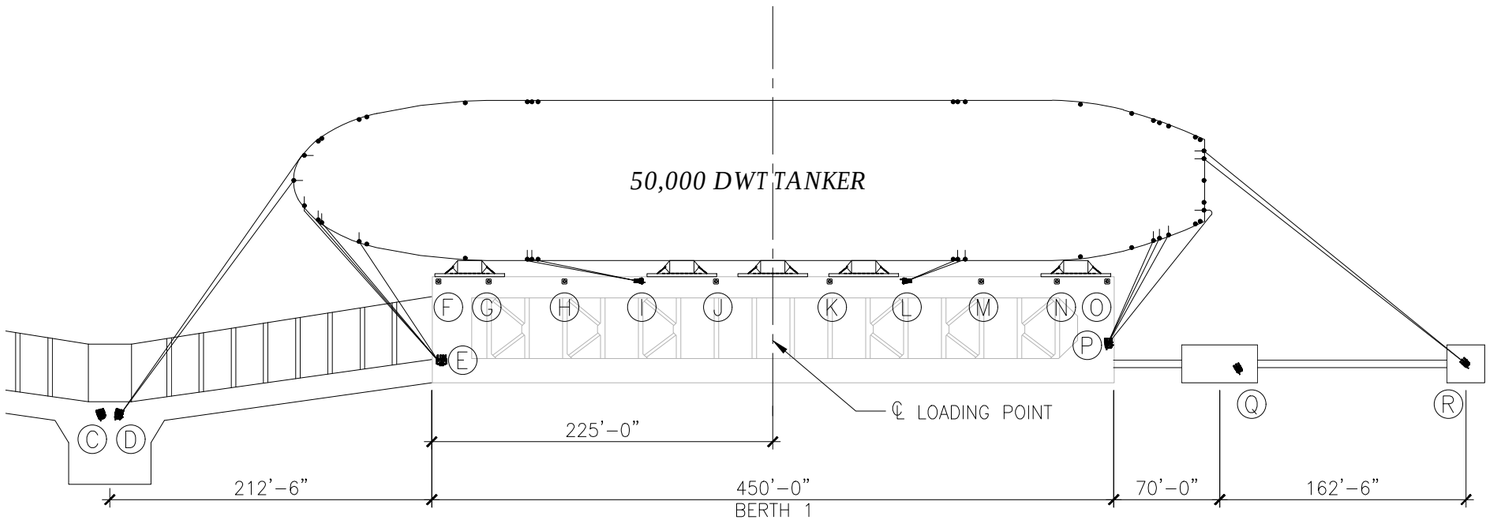
VESSEL DESCRIPTION:

RANGE OF DWT:	30,000 LT TO 50,000 LT
MAXIMUM DISPLACEMENT:	52,600 LT @ 0.59 FT/SEC. MAX.
MAXIMUM LOA:	600 FT
MAXIMUM BEAM:	105.6 FT
MAXIMUM DRAFT:	42.0 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 8°.
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MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
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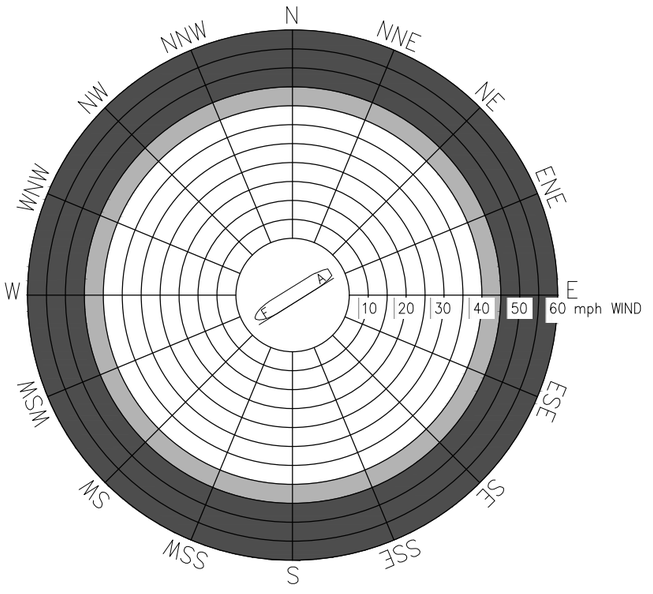
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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"Martinez Refining Company Marine Terminal, MRC Passing Vessel Mooring Calculations", Prepared by Simpson Gumpertz & Heger, Inc., December 2020.

LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

50K DWT TANKER W/ STIFF LINES
BERTH 1 - STARBOARD SIDE

15

PREPARED BY:
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Engineering of Structures and Building Enclosures

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www.sgh.com
SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	2
NO. OF AFT LINES:	2
NO. OF BREAST LINES:	4 FORWARD, 4 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	135.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

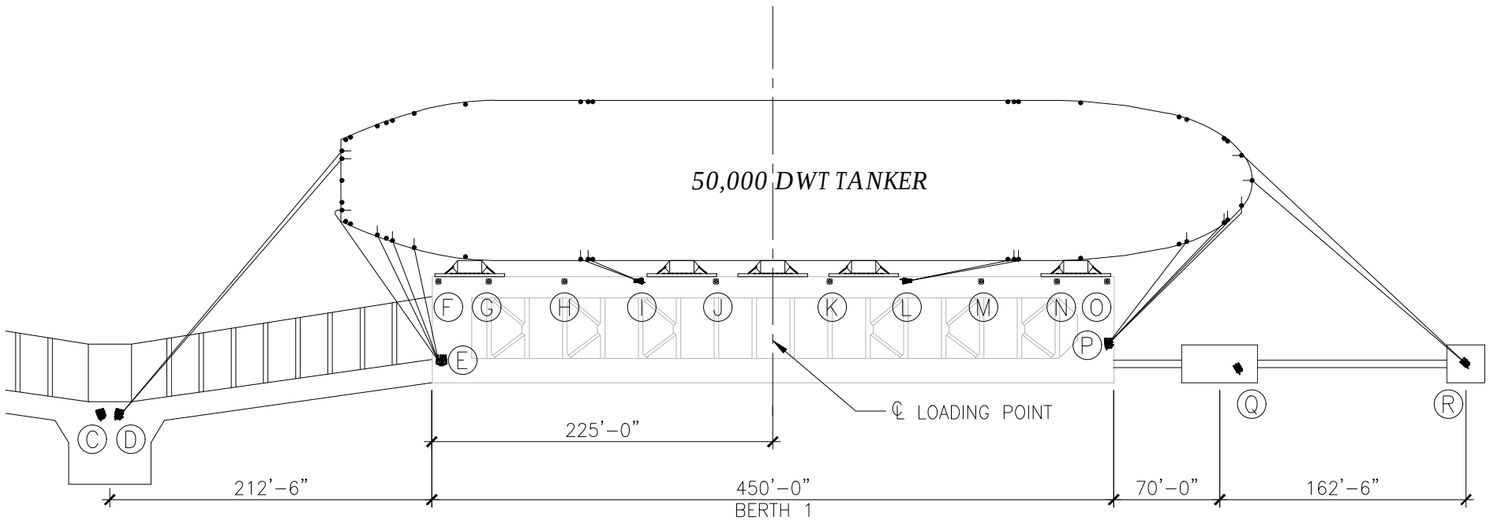
RANGE OF DWT:	30,000 LT TO 50,000 LT
MAXIMUM DISPLACEMENT:	52,600 LT @ 0.59 FT/SEC. MAX.
MAXIMUM LOA:	600 FT
MAXIMUM BEAM:	105.6 FT
MAXIMUM DRAFT:	42.0 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 8°.
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3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
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7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

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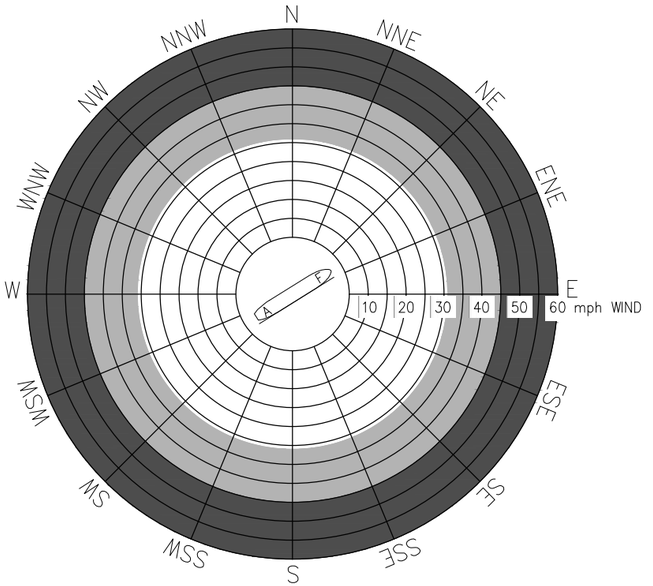
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

70K DWT TANKER W/ STIFF LINES
BERTH 1 - PORT SIDE

16

PREPARED BY:
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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	4
NO. OF AFT LINES:	3
NO. OF BREAST LINES:	2 FORWARD, 3 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	146.0 KIPS KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	127.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

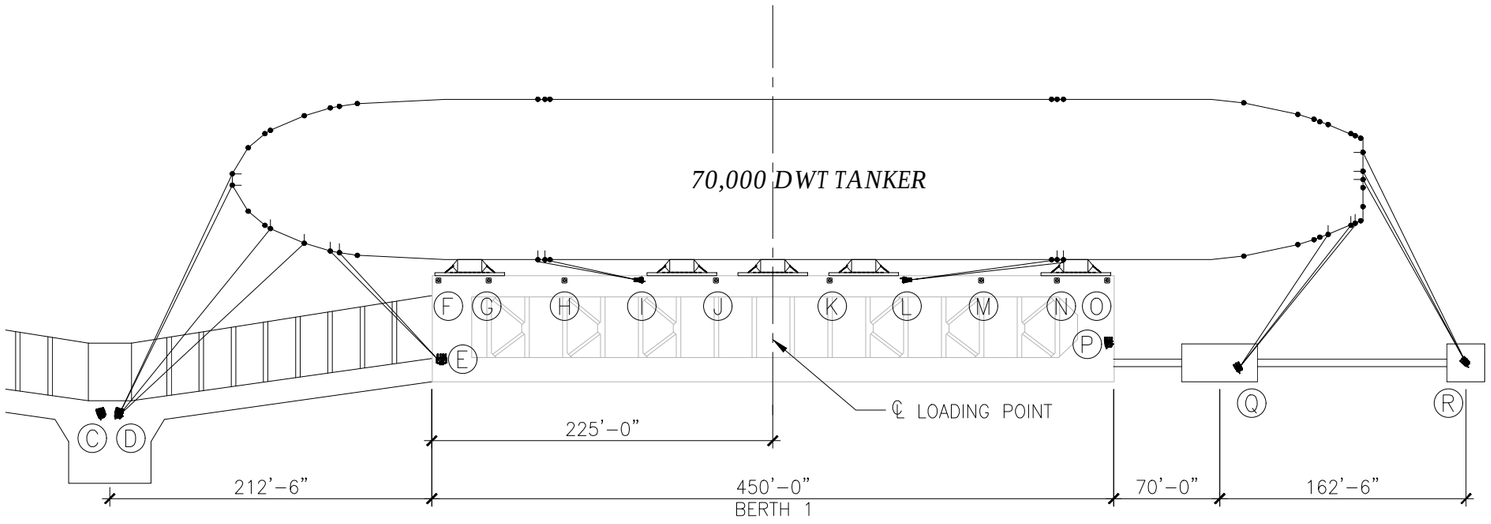
RANGE OF DWT:	50,000 LT TO 70,000 LT
MAXIMUM DISPLACEMENT:	71,000 LT @ 0.50 FT/SEC. MAX.
MAXIMUM LOA:	748.0 FT
MAXIMUM BEAM:	105.6 FT
MAXIMUM DRAFT:	44.7 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
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M	BOLLARD	91
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O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

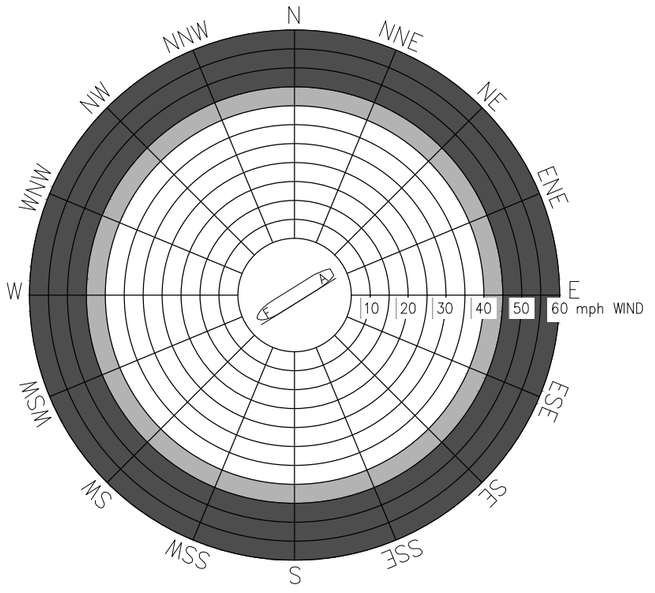
1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 6°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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"Martinez Refining Company Marine Terminal, MRC Passing Vessel Mooring Calculations", Prepared by Simpson Gumpertz & Heger, Inc., December 2020.

LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

70K DWT TANKER W/ STIFF LINES
BERTH 1 - STARBOARD SIDE

17

PREPARED BY:
SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures

Simpson Gumpertz & Heger Inc.
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Oakland, California 94612
main: 415.495.3700 fax: 415.495.3550
www.sgh.com
SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020
NO. OF TRANSFERS/YEAR: > 90
OIL SPILL RISK: > 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION: HIGH
FACILITY FIRE HAZARD CLASSIFICATION: HIGH

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	3
NO. OF AFT LINES:	4
NO. OF BREAST LINES:	3 FORWARD, 2 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	146.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

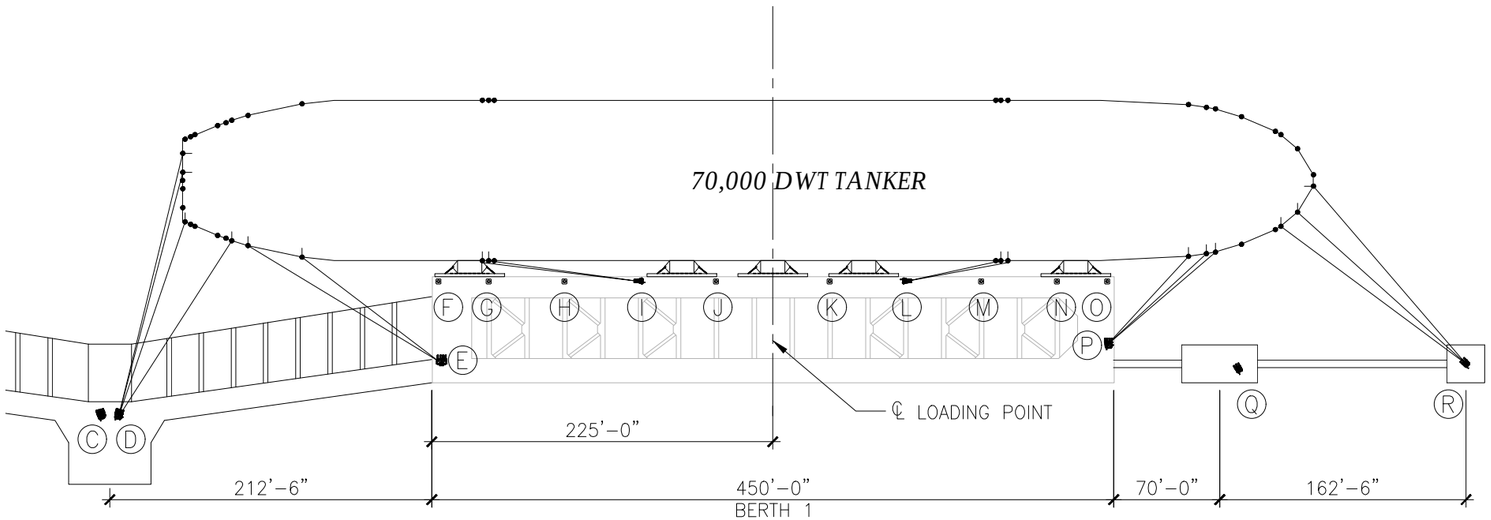
VESSEL DESCRIPTION:

RANGE OF DWT:	50,000 LT TO 70,000 LT
MAXIMUM DISPLACEMENT:	71,000 LT @ 0.50 FT/SEC. MAX.
MAXIMUM LOA:	748.0 FT
MAXIMUM BEAM:	105.6 FT
MAXIMUM DRAFT:	44.7 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 6°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
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ENVIRONMENTAL CONDITION LIMITS:

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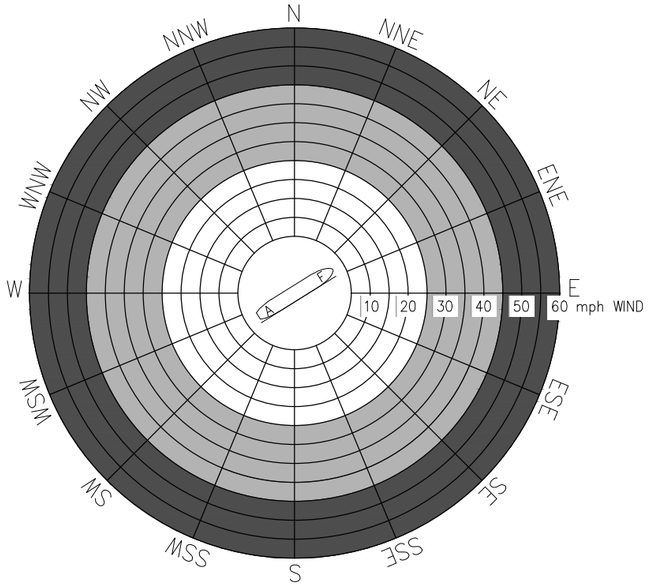
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

100K DWT TANKER W/ STIFF LINES
BERTH 1 - PORT SIDE

18

PREPARED BY:
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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	3
NO. OF AFT LINES:	3
NO. OF BREAST LINES:	3 FORWARD, 3 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	190.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	165.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

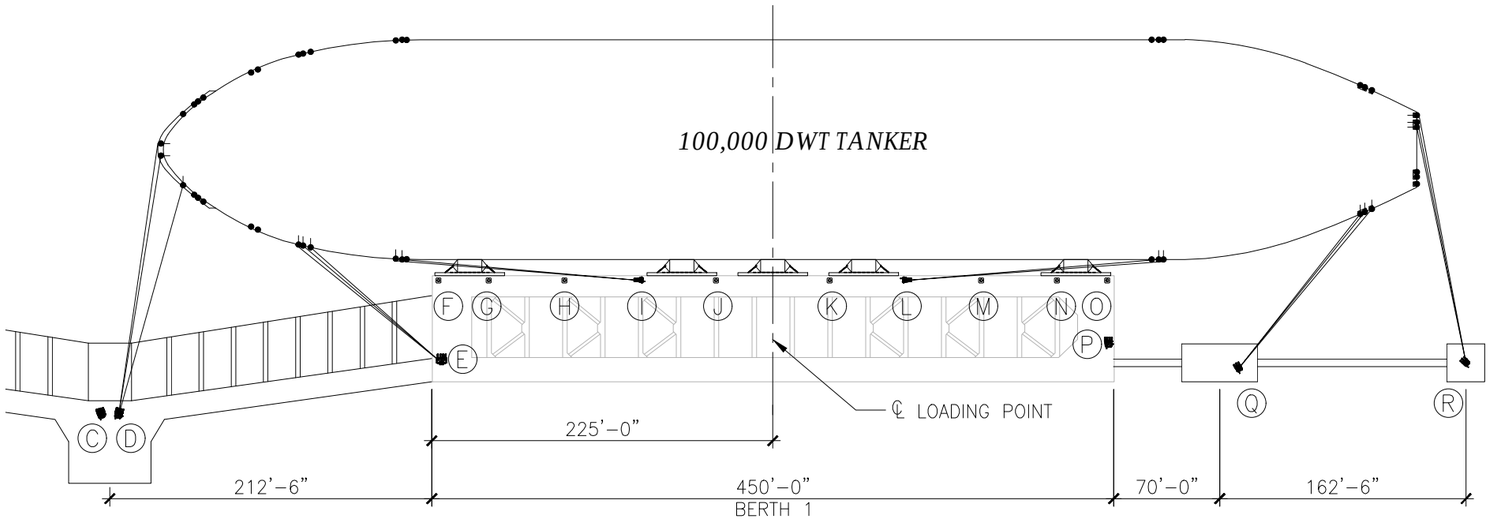
RANGE OF DWT:	70,000 LT TO 100,000 LT
MAXIMUM DISPLACEMENT:	102,550 LT @ 0.45 FT/SEC. MAX.
MAXIMUM LOA:	831.0 FT
MAXIMUM BEAM:	145.1 FT
MAXIMUM DRAFT:	42.1 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

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MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
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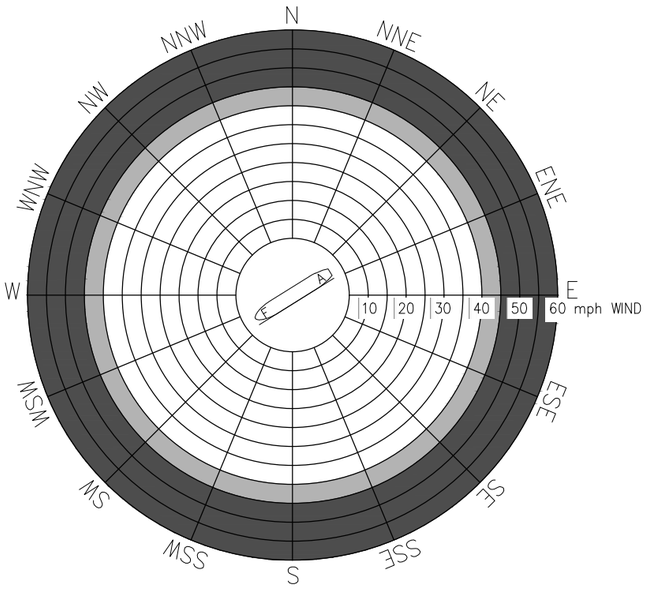
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

100K DWT TANKER W/ STIFF LINES
BERTH 1 - STARBOARD SIDE

19

PREPARED BY:
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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	3
NO. OF AFT LINES:	3
NO. OF BREAST LINES:	3 FORWARD, 3 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	190.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	165.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

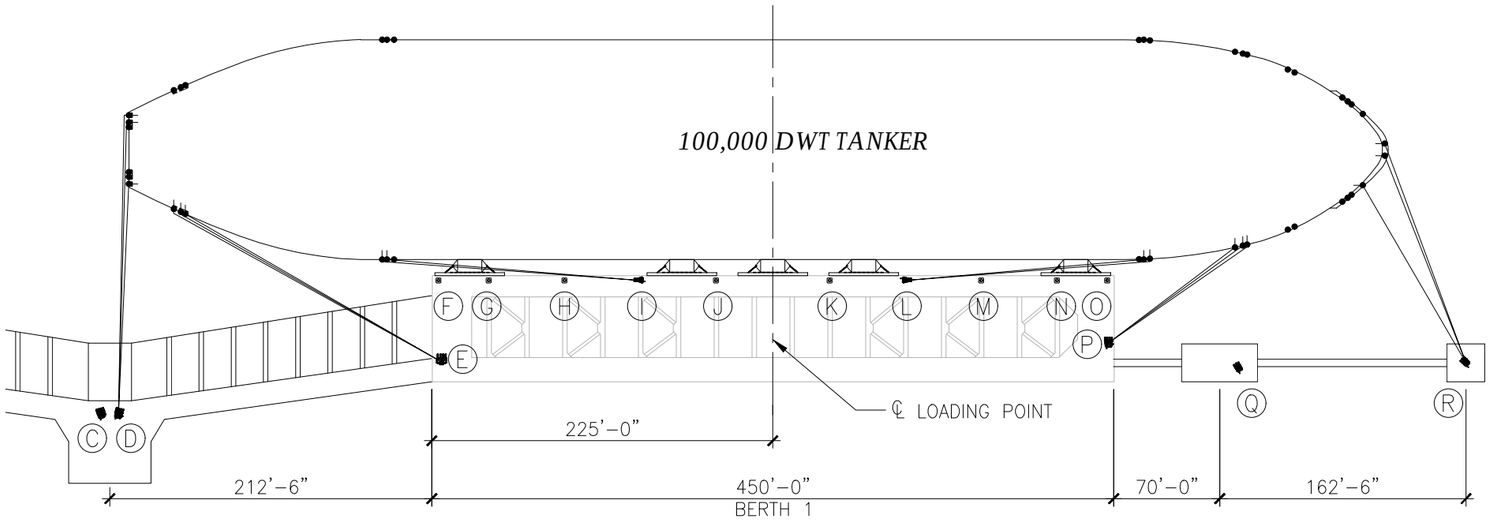
RANGE OF DWT:	70,000 LT TO 100,000 LT
MAXIMUM DISPLACEMENT:	102,550 LT @ 0.45 FT/SEC. MAX.
MAXIMUM LOA:	831.0 FT
MAXIMUM BEAM:	145.1 FT
MAXIMUM DRAFT:	42.1 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

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MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
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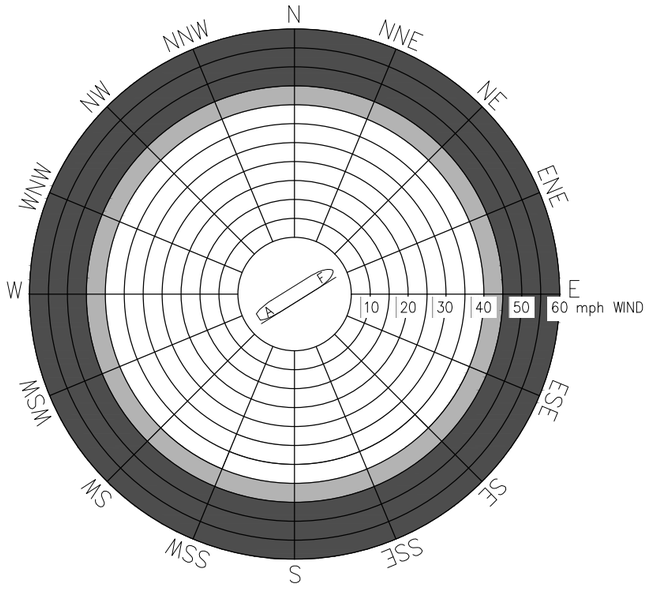
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

188K DWT TANKER W/ STIFF LINES
BERTH 1 - PORT SIDE

20

PREPARED BY:
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Boston
Chicago
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New York
San Francisco
Washington, DC

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	4
NO. OF AFT LINES:	3
NO. OF BREAST LINES:	2 FORWARD, 3 AFT
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MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	191.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	144.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

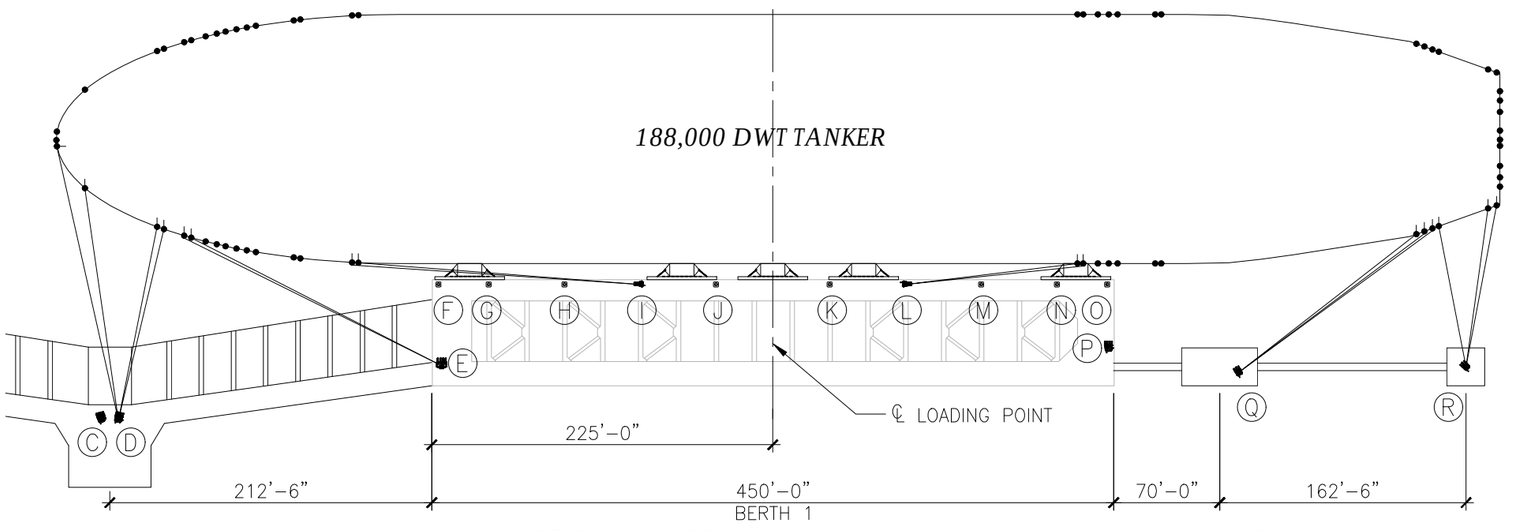
RANGE OF DWT:	100,000 LT TO 188,000 LT
MAXIMUM DISPLACEMENT:	142,345 LT @ 0.38 FT/SEC. MAX.
MAXIMUM LOA:	1,000 FT
MAXIMUM BEAM:	166.0 FT
MAXIMUM DRAFT:	59.3 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

DATE:	DECEMBER 2020
NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
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H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
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R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

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MOORING NOTES

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2. MAXIMUM VESSEL MOTIONS:
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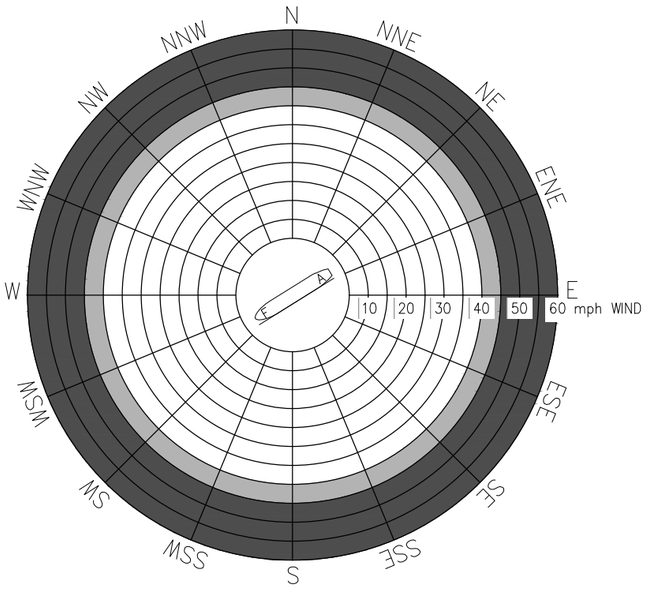

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"Martinez Refining Company Marine Terminal, MRC Passing Vessel Mooring Calculations", Prepared by Simpson Gumpertz & Heger, Inc., December 2020.

LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

157K DWT TANKER
BERTH 1 - PORT SIDE

20A

PREPARED BY:
SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures

Simpson Gumpertz & Heger Inc.
1999 Harrison Street, Suite 2400
Oakland, California 94612
main: 415.495.3700 fax: 415.495.3550
www.sgh.com
SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	4
NO. OF AFT LINES:	3
NO. OF BREAST LINES:	2 FORWARD, 3 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	185.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	140.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

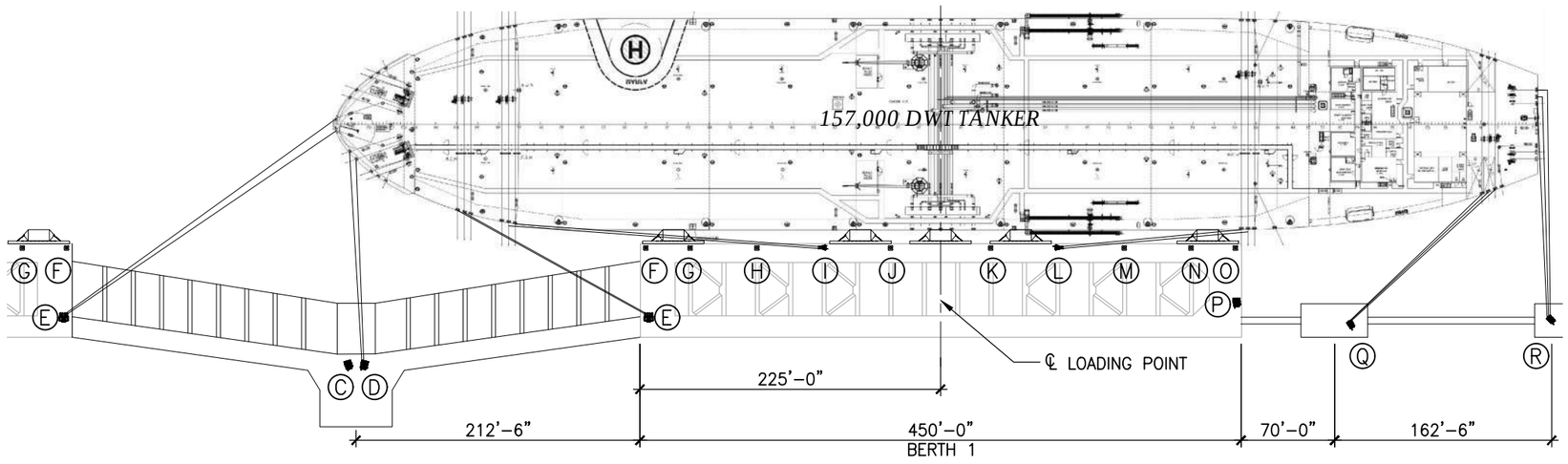
RANGE OF DWT:	100,000 LT TO 157,000 LT
MAXIMUM DISPLACEMENT:	125,498 LT @ 0.26 FT./SEC. MAX.
MAXIMUM LOA:	899.4 FT.
MAXIMUM BEAM:	157.4 FT.
MAXIMUM DRAFT:	56.5 FT.

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT. @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT.
MAXIMUM DRAFT ALLOWED:	38.0 FT.

DATE:	DECEMBER 2020
NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

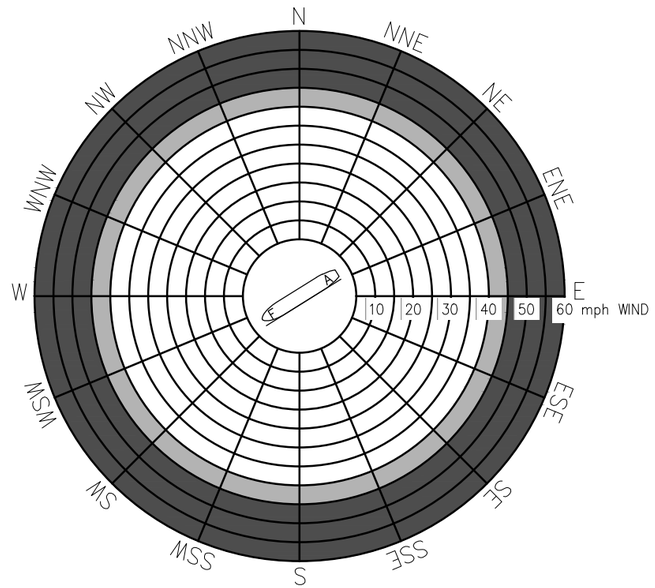
1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 6°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT. (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

188K DWT TANKER W/ STIFF LINES
BERTH 1 - STARBOARD SIDE

21

PREPARED BY:
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Boston
Chicago
Houston
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New York
San Francisco
Washington, DC

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	3
NO. OF AFT LINES:	4
NO. OF BREAST LINES:	3 FORWARD, 2 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	191.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

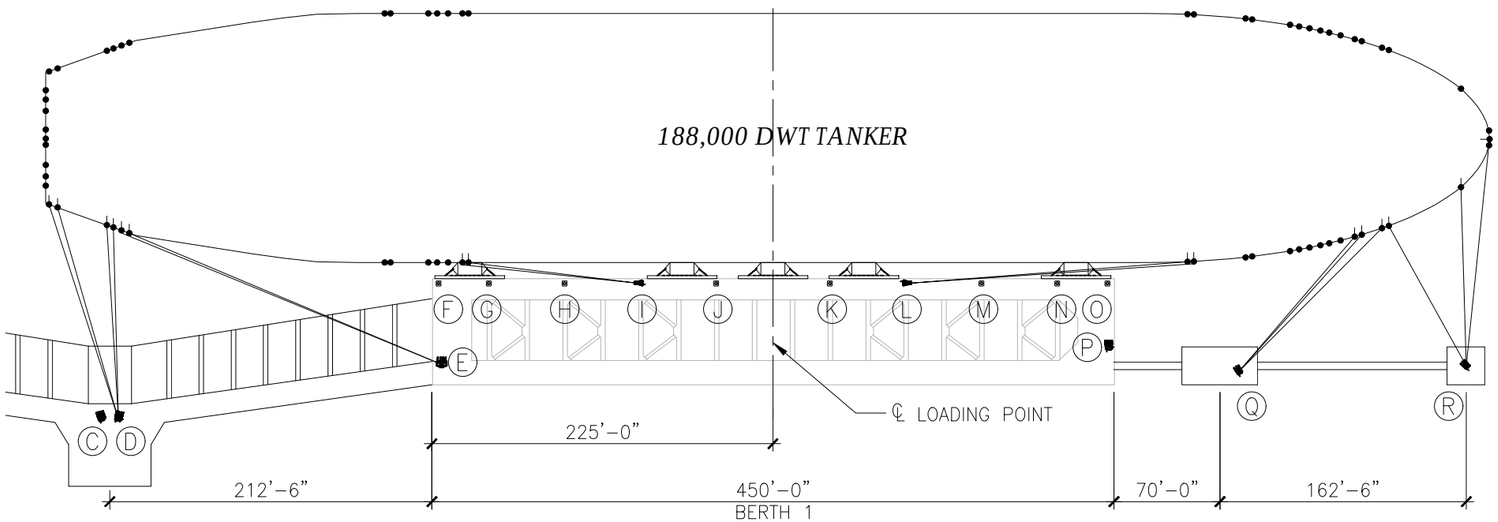
RANGE OF DWT:	100,000 LT TO 188,000 LT
MAXIMUM DISPLACEMENT:	142,345 LT @ 0.38 FT/SEC. MAX.
MAXIMUM LOA:	1,000 FT
MAXIMUM BEAM:	166.0 FT
MAXIMUM DRAFT:	59.3 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

DATE:	DECEMBER 2020
NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

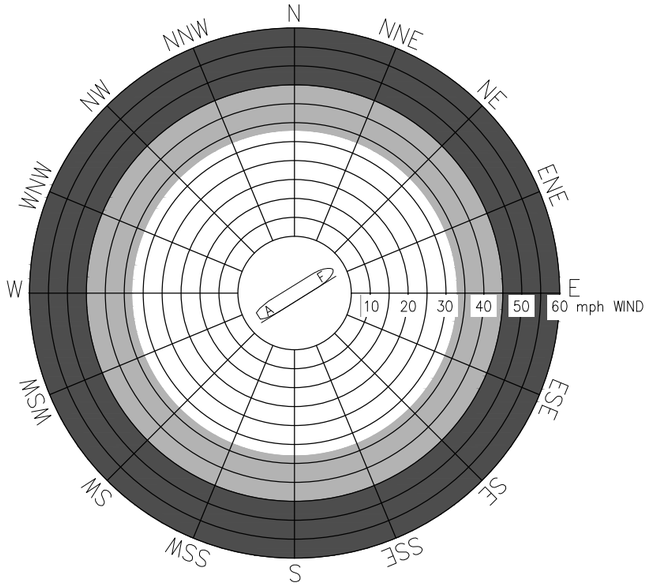
1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 6°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

6K DWT BARGE W/ SOFT LINES
BERTH 2 - PORT SIDE

22

PREPARED BY:
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Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	2
NO. OF AFT LINES:	2
NO. OF BREAST LINES:	0 FORWARD, 0 AFT
NO. OF SPRING LINES:	1 FORWARD, 1 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	87.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	85.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	6.5%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

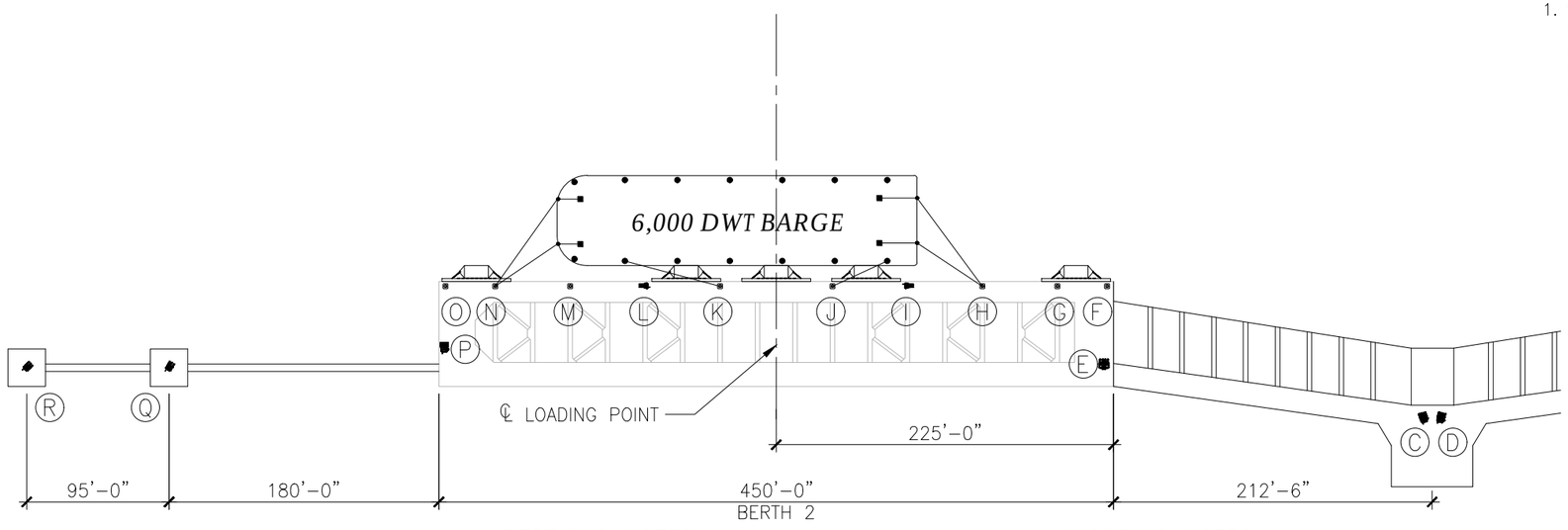
RANGE OF DWT:	UP TO 6,000 LT
MAXIMUM DISPLACEMENT:	7,054 LT @ 1.31 FT/SEC. MAX.
MAXIMUM LOA:	240.0 FT
MAXIMUM BEAM:	60.0 FT
MAXIMUM DRAFT:	24.0 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

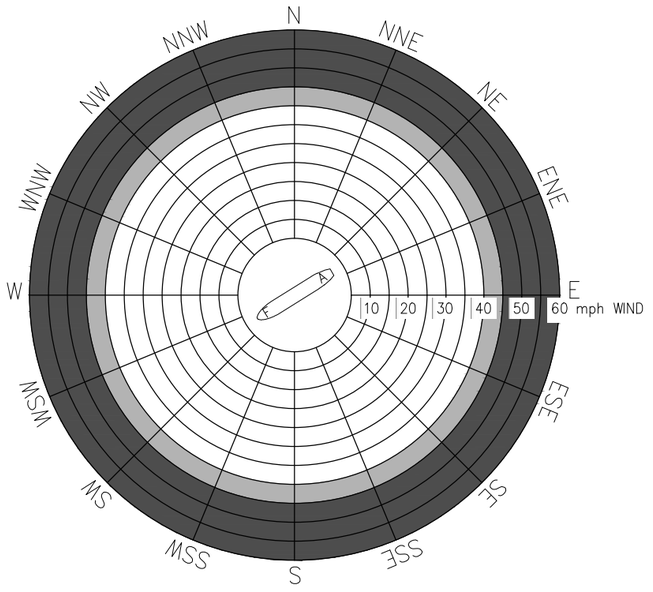
1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 15°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

6K DWT BARGE W/ SOFT LINES
BERTH 2 - STARBOARD SIDE

23

PREPARED BY:
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Boston
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New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	2
NO. OF AFT LINES:	2
NO. OF BREAST LINES:	0 FORWARD, 0 AFT
NO. OF SPRING LINES:	1 FORWARD, 1 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	87.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	85.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	6.5%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

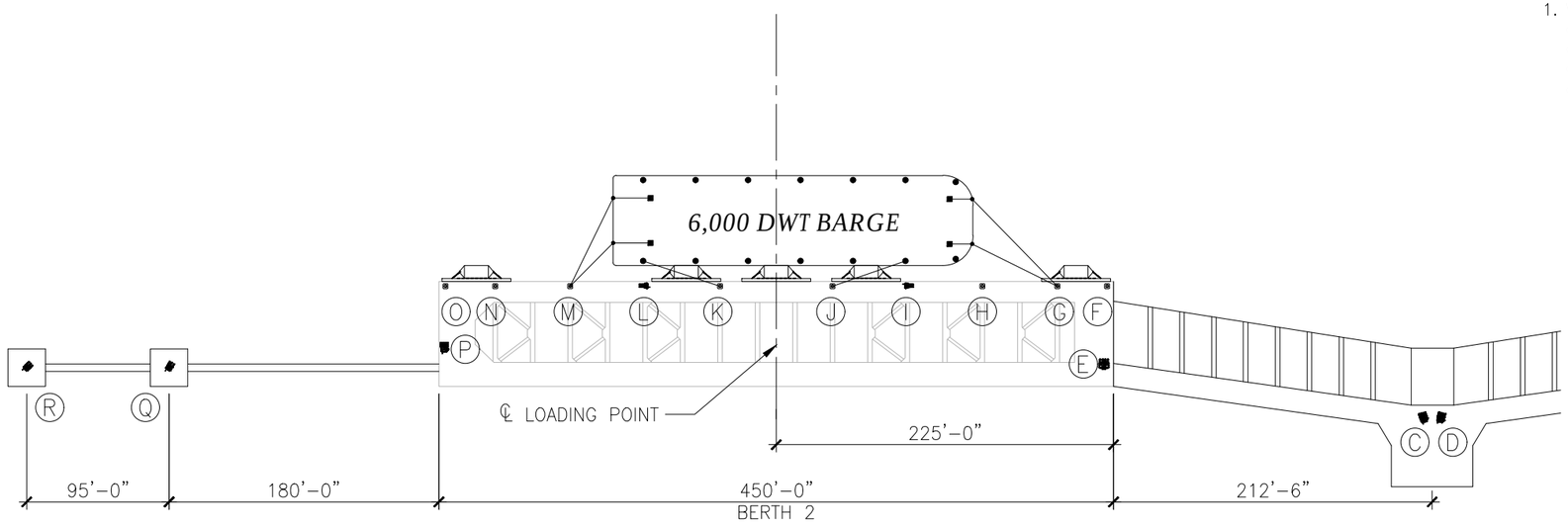
RANGE OF DWT:	UP TO 6,000 LT
MAXIMUM DISPLACEMENT:	7,054 LT @ 1.31 FT/SEC. MAX.
MAXIMUM LOA:	240.0 FT
MAXIMUM BEAM:	60.0 FT
MAXIMUM DRAFT:	24.0 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
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K	BOLLARD	91
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MOORING NOTES

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2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
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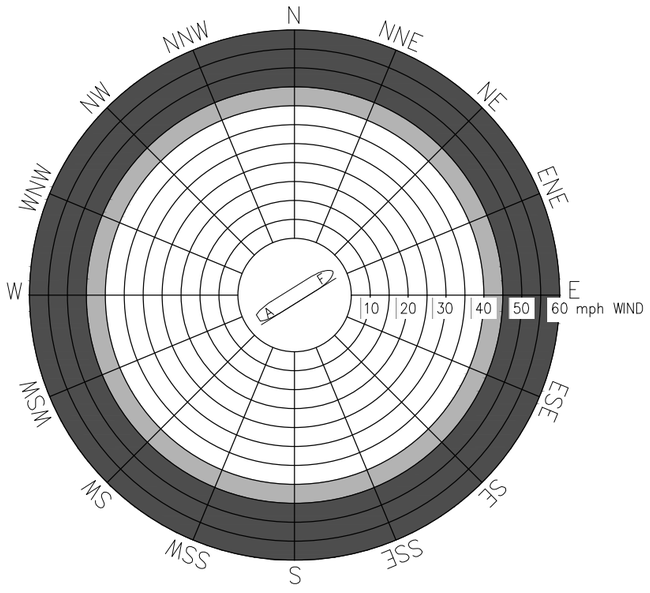
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

20K DWT BARGE W/ SOFT LINES
BERTH 2 - PORT SIDE

24

PREPARED BY:
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Boston
Chicago
Houston
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San Francisco
Washington, DC

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	1
NO. OF AFT LINES:	1
NO. OF BREAST LINES:	2 FORWARD, 2 AFT
NO. OF SPRING LINES:	1 FORWARD, 1 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	125.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	115.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	6.5%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

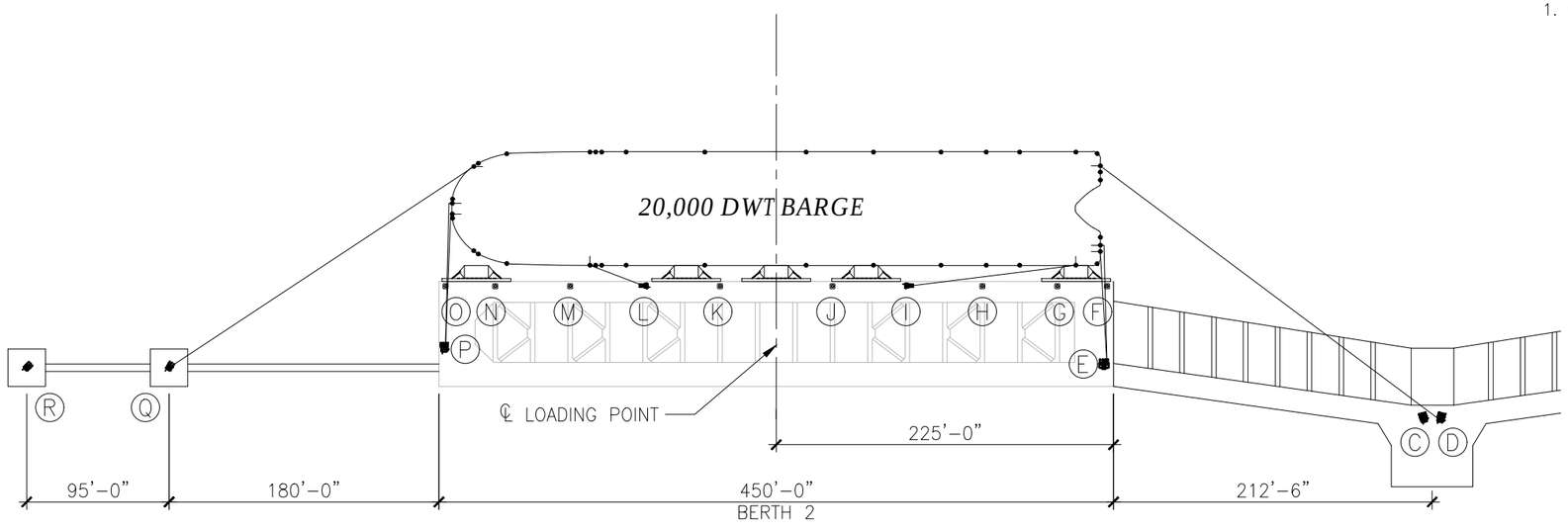
RANGE OF DWT:	6,000 LT TO 20,000 LT
MAXIMUM DISPLACEMENT:	19,534 LT @ 0.68 FT/SEC. MAX.
MAXIMUM LOA:	432.5 FT
MAXIMUM BEAM:	76.4 FT
MAXIMUM DRAFT:	25.6 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

DATE:	DECEMBER 2020
NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

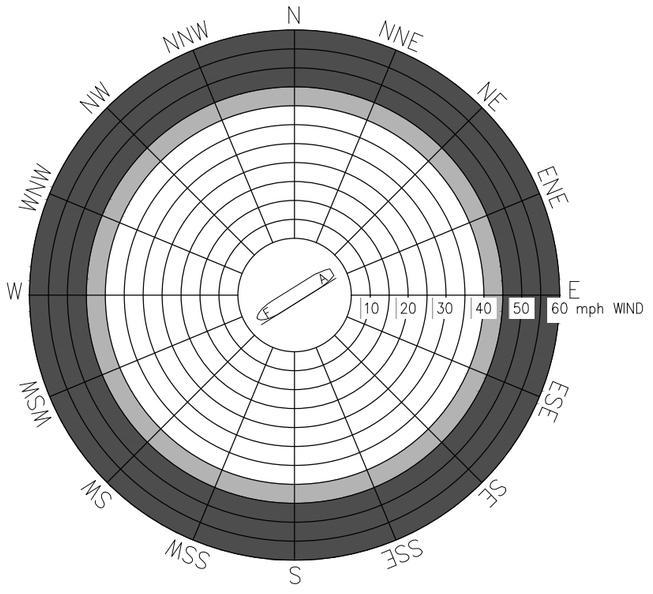
1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 8°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

20K DWT BARGE W/ SOFT LINES
BERTH 2 - STARBOARD SIDE

25

PREPARED BY:
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Engineering of Structures and Building Enclosures

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www.sgh.com
SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	1
NO. OF AFT LINES:	1
NO. OF BREAST LINES:	2 FORWARD, 2 AFT
NO. OF SPRING LINES:	1 FORWARD, 1 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	125.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	115.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	6.5%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

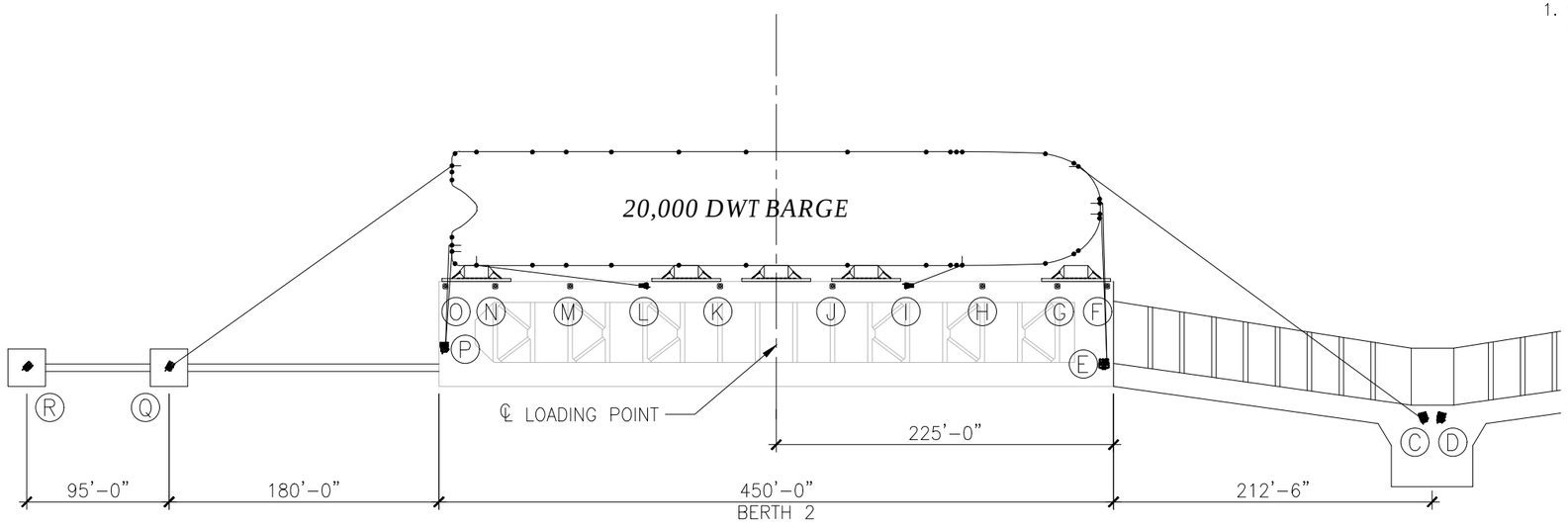
RANGE OF DWT:	6,000 LT TO 20,000 LT
MAXIMUM DISPLACEMENT:	19,534 LT @ 0.68 FT/SEC. MAX.
MAXIMUM LOA:	432.5 FT
MAXIMUM BEAM:	76.4 FT
MAXIMUM DRAFT:	25.6 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

DATE:	DECEMBER 2020
NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
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H	BOLLARD	91
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K	BOLLARD	91
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M	BOLLARD	91
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O	BOLLARD	91
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Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

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MOORING NOTES

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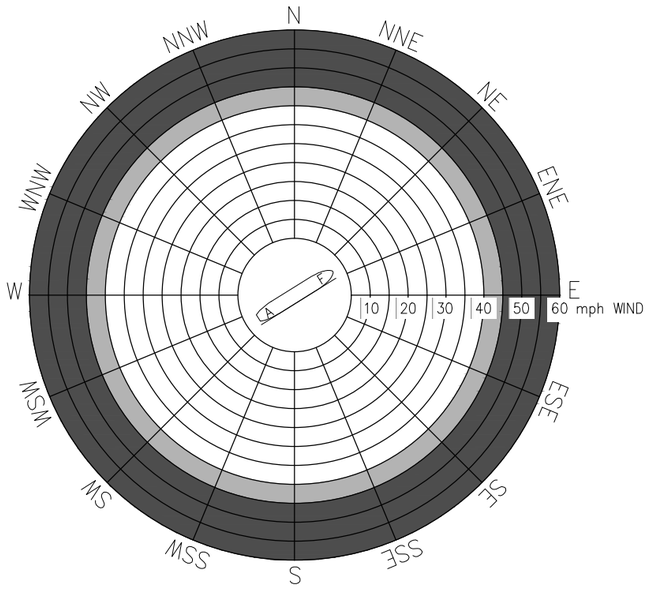
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

27K DWT ATB W/ SOFT LINES
BERTH 2 - PORT SIDE

26

PREPARED BY:
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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	1
NO. OF AFT LINES:	1
NO. OF BREAST LINES:	2 FORWARD, 2 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	175.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	155.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	6.5%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

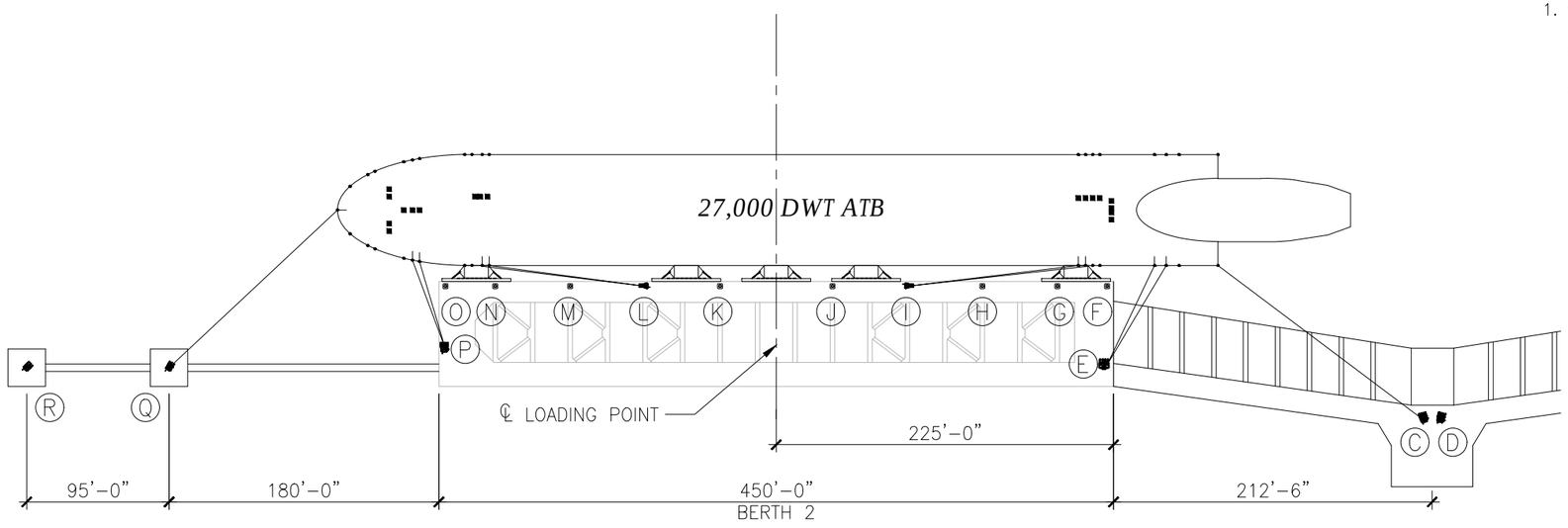
RANGE OF DWT:	20,000 TO 27,500 LT
MAXIMUM DISPLACEMENT:	36,358 LT @ 0.68 FT/SEC. MAX.
MAXIMUM LOA:	675.8 FT
MAXIMUM BEAM:	74.0 FT
MAXIMUM DRAFT:	30.3 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

DATE:	DECEMBER 2020
NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
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BERTHING NOTES

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MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
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   - SURGE: ±10 FT
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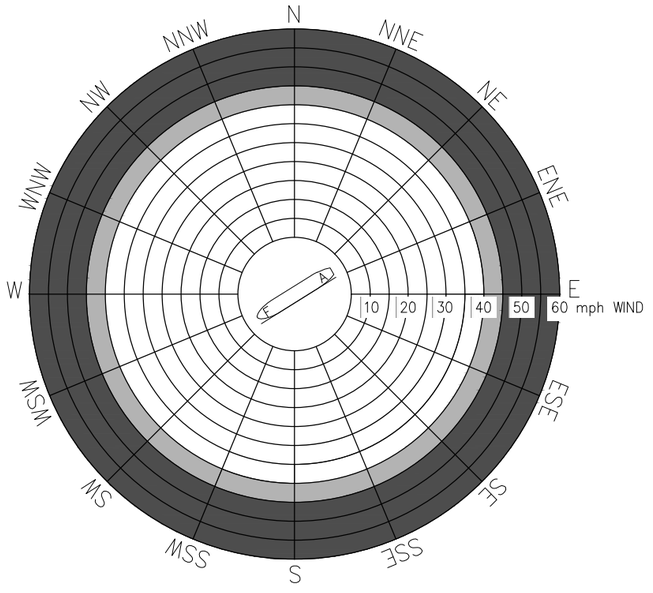
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

27K DWT ATB W/ SOFT LINES
BERTH 2 - STARBOARD SIDE

27

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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	1
NO. OF AFT LINES:	1
NO. OF BREAST LINES:	2 FORWARD, 2 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	175.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	155.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	6.5%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

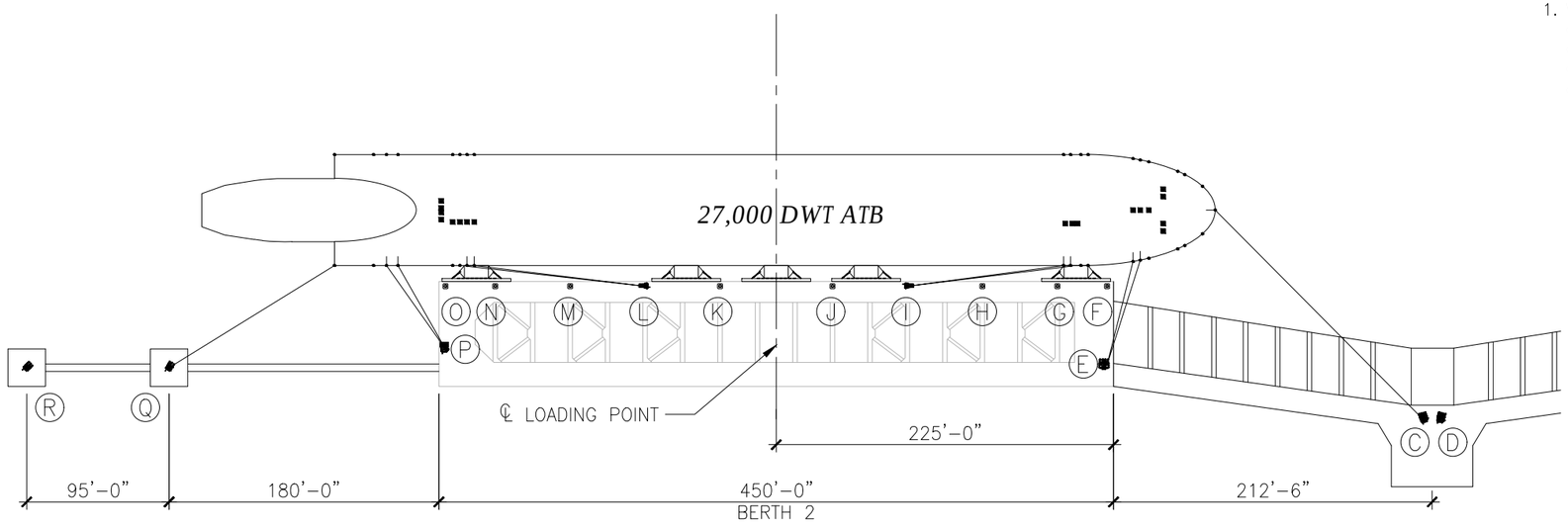
RANGE OF DWT:	20,000 TO 27,500 LT
MAXIMUM DISPLACEMENT:	36,358 LT @ 0.68 FT/SEC. MAX.
MAXIMUM LOA:	675.8 FT
MAXIMUM BEAM:	74.0 FT
MAXIMUM DRAFT:	30.3 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
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N	BOLLARD	91
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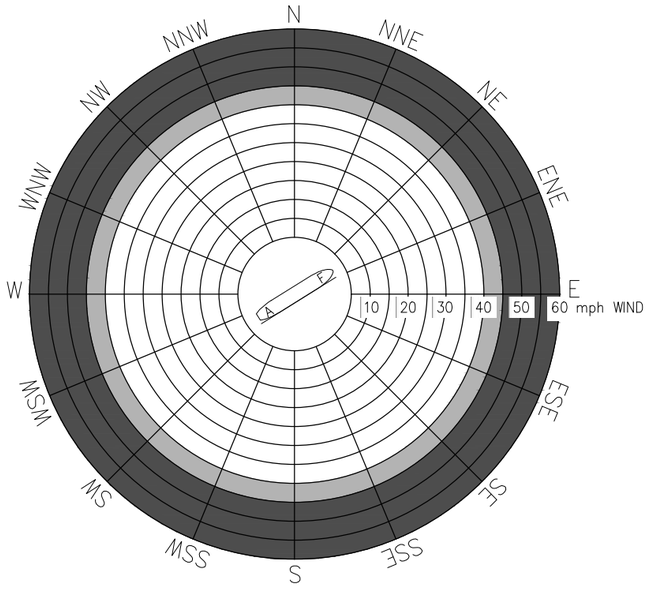

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STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

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MINIMUM LINES:	
NO. OF HEAD LINES:	1
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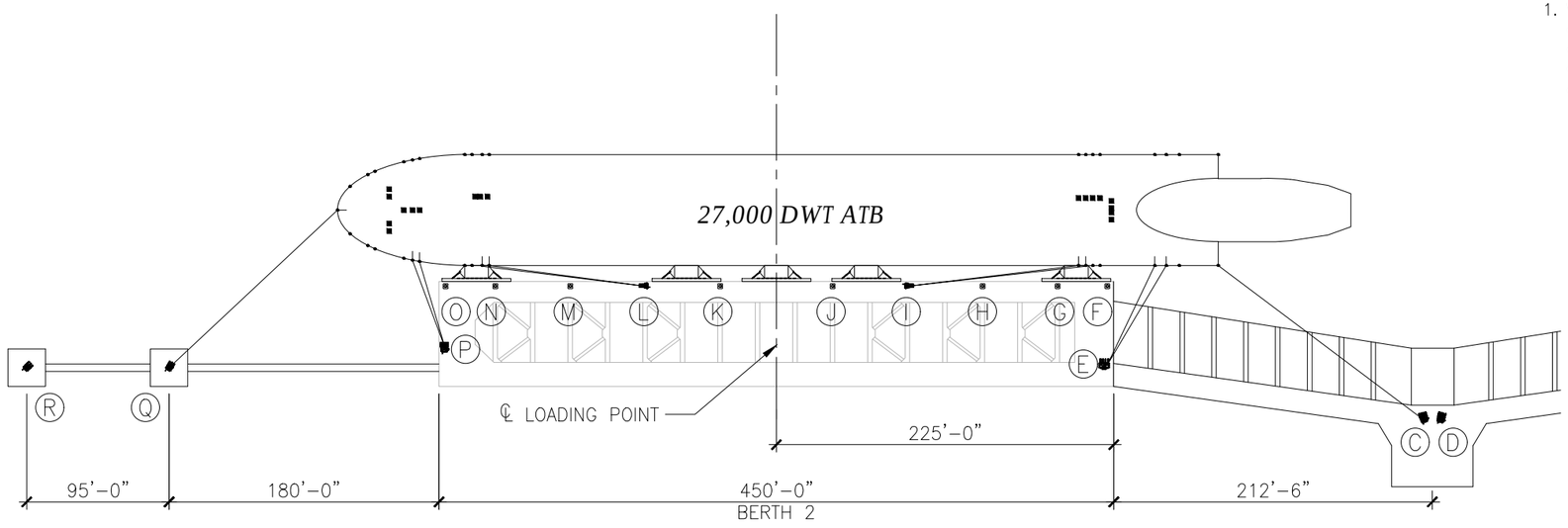

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MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
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D	QUAD QUICK–RELEASE HOOK	60
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3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
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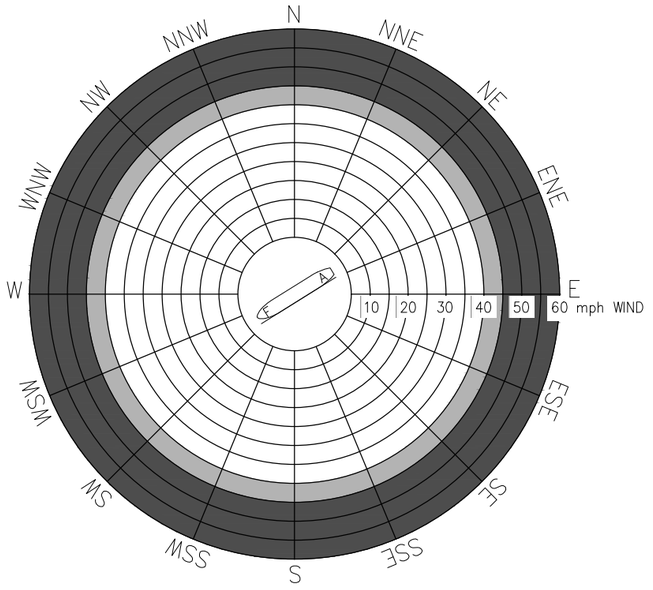
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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"Martinez Refining Company Marine Terminal, MRC Passing Vessel Mooring Calculations", Prepared by Simpson Gumpertz & Heger, Inc., December 2020.

LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

27K DWT ATB W/ STIFF LINES
BERTH 2 - STARBOARD SIDE

29

PREPARED BY:
SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures

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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	1
NO. OF AFT LINES:	1
NO. OF BREAST LINES:	2 FORWARD, 2 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	107.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	96.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

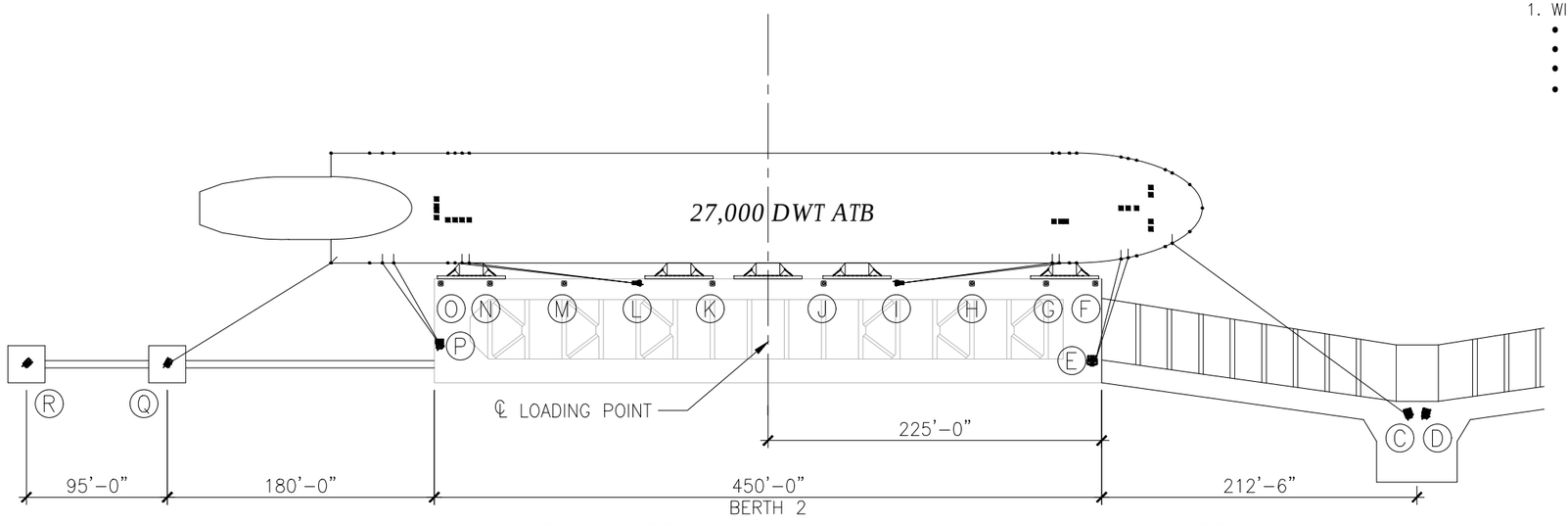
DWT:	20,000 TO 27,500 LT
MAXIMUM DISPLACEMENT:	36,358 LT @ 0.68 FT/SEC. MAX.
MAXIMUM LOA:	675.8 FT
MAXIMUM BEAM:	74.0 FT
MAXIMUM DRAFT:	30.3 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

DATE:	DECEMBER 2020
NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

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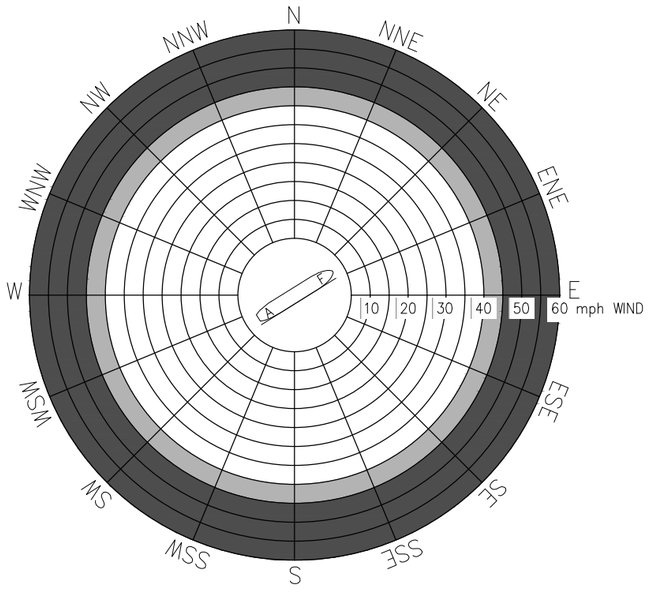

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

30K DWT TANKER W/ SOFT LINES
BERTH 2 - PORT SIDE

30

PREPARED BY:
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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020
NO. OF TRANSFERS/YEAR: > 90
OIL SPILL RISK: > 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION: HIGH
FACILITY FIRE HAZARD CLASSIFICATION: HIGH

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	2
NO. OF AFT LINES:	2
NO. OF BREAST LINES:	4 FORWARD, 4 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	135.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	115.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	6.5%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

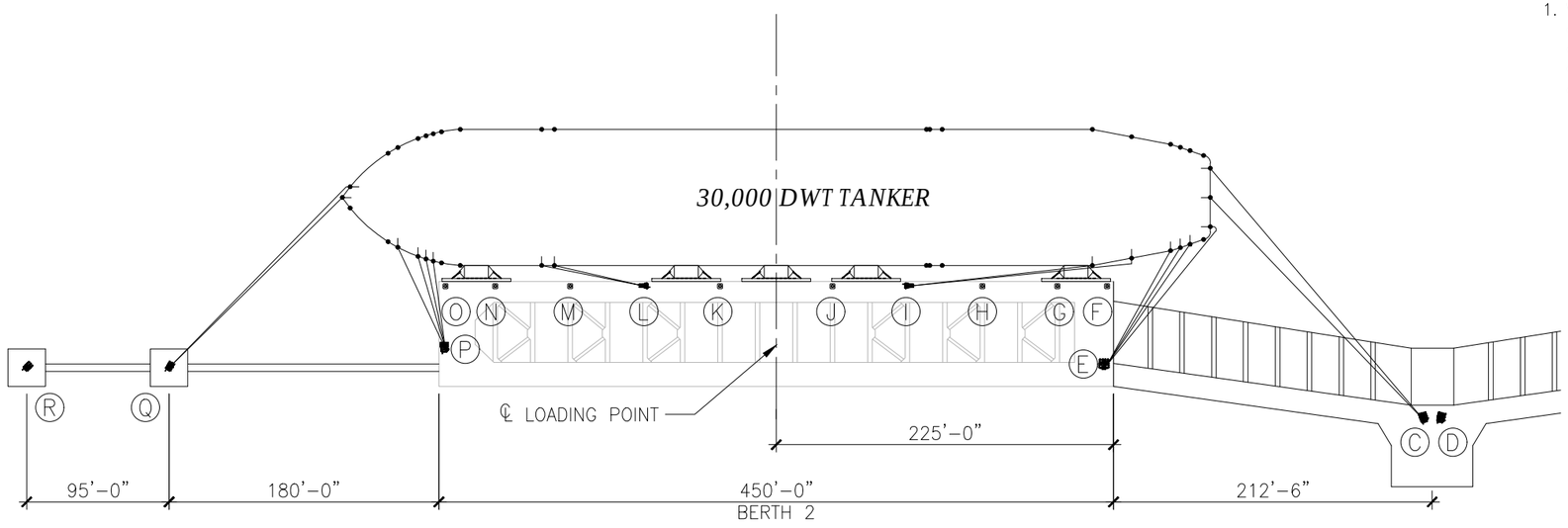
VESSEL DESCRIPTION:

RANGE OF DWT:	UP TO 30,000 LT
MAXIMUM DISPLACEMENT:	38,351 LT @ 0.68 FT/SEC. MAX.
MAXIMUM LOA:	579.1 FT
MAXIMUM BEAM:	90.9 FT
MAXIMUM DRAFT:	31.2 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
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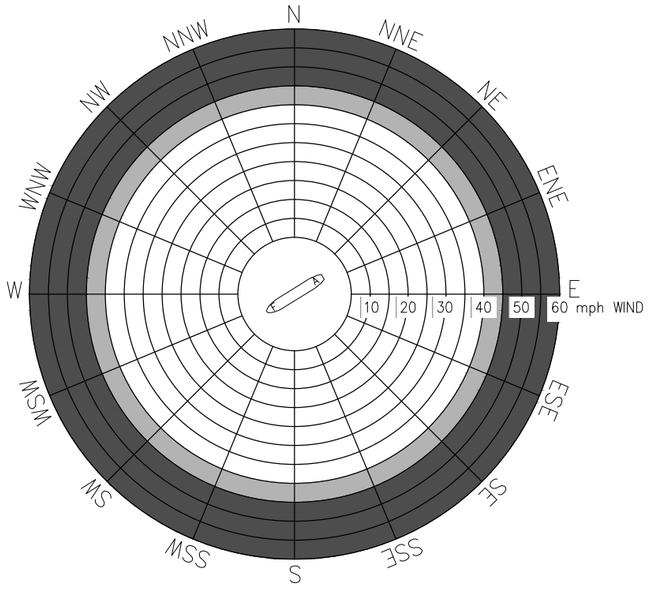

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

30K DWT TANKER W/ SOFT LINES
BERTH 2 - STARBOARD SIDE

31

PREPARED BY:
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Engineering of Structures and Building Enclosures

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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	2
NO. OF AFT LINES:	2
NO. OF BREAST LINES:	4 FORWARD, 4 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	135.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	115.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	6.5%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

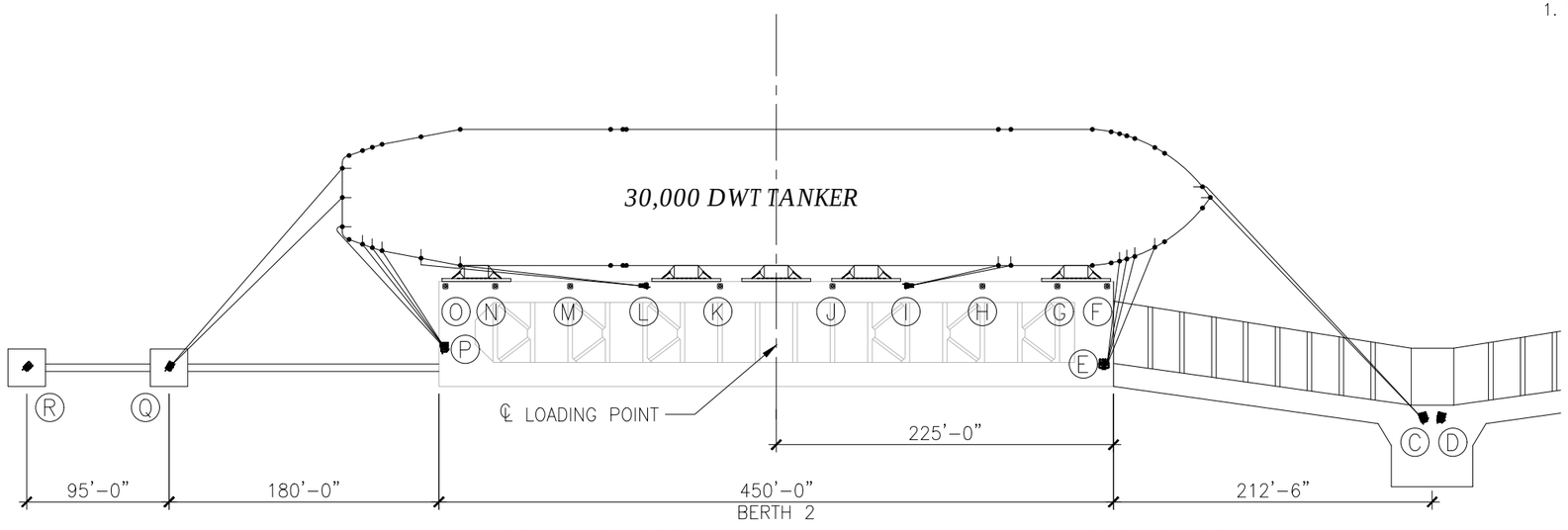
RANGE OF DWT:	UP TO 30,000 LT
MAXIMUM DISPLACEMENT:	38,351 LT @ 0.68 FT/SEC. MAX.
MAXIMUM LOA:	579.1 FT
MAXIMUM BEAM:	90.9 FT
MAXIMUM DRAFT:	31.2 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
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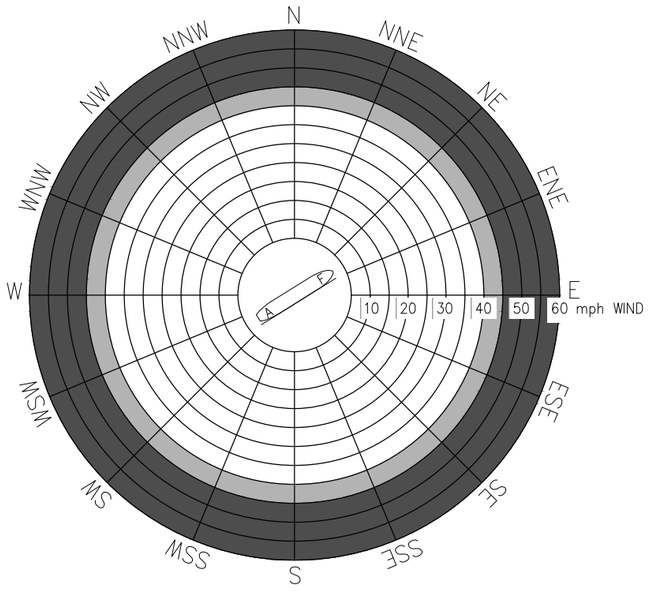

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LEGEND

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STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

30K DWT TANKER W/ STIFF LINES
BERTH 2 - PORT SIDE

32

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Boston
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DATE: DECEMBER 2020

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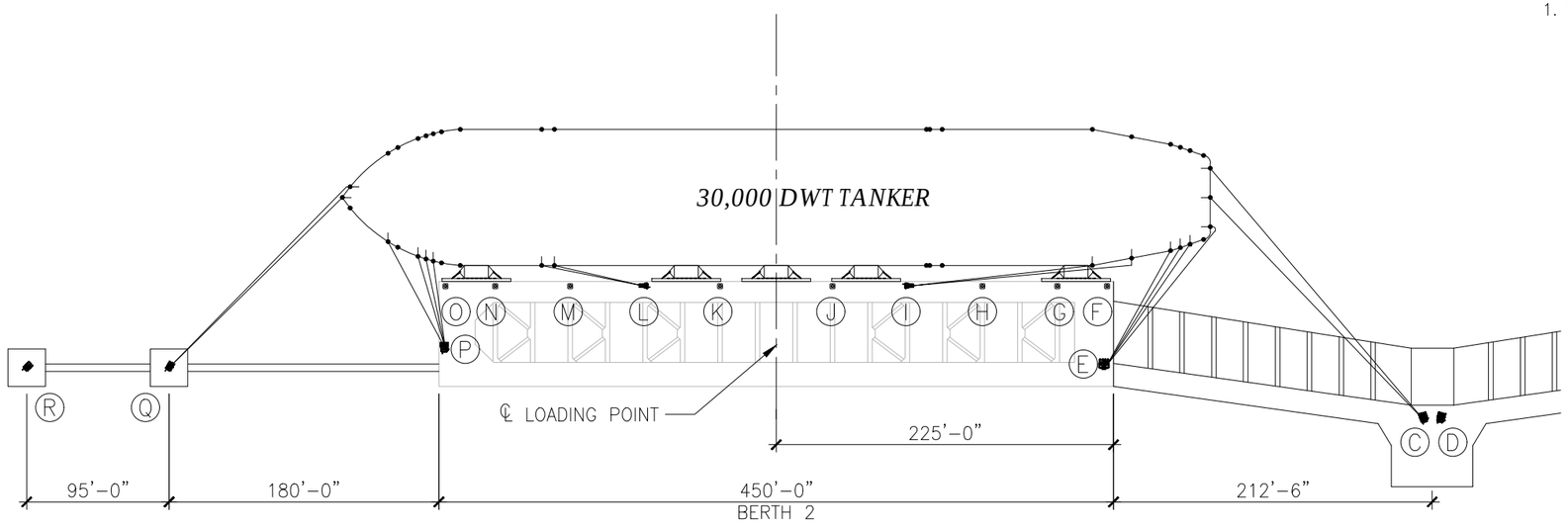

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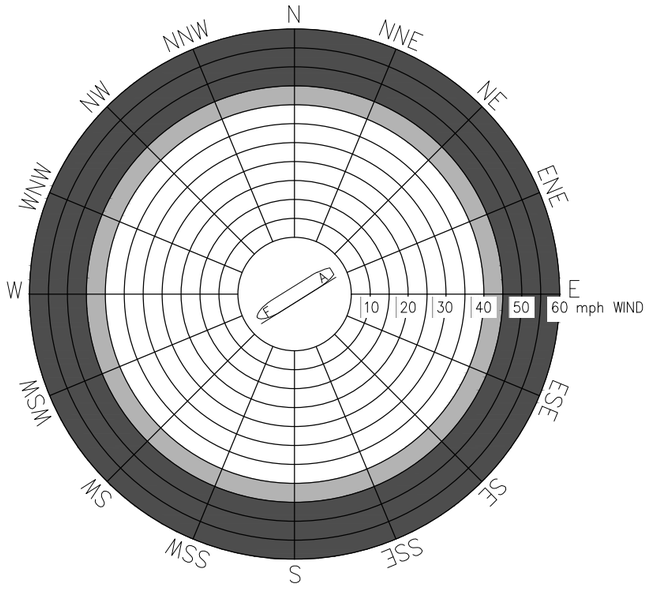
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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"Martinez Refining Company Marine Terminal, MRC Passing Vessel Mooring Calculations", Prepared by Simpson Gumpertz & Heger, Inc., December 2020.

LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

30K DWT TANKER W/ STIFF LINES
BERTH 2 - STARBOARD SIDE

33

PREPARED BY:
SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures

Simpson Gumpertz & Heger Inc.
1999 Harrison Street, Suite 2400
Oakland, California 94612
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www.sgh.com
SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	2
NO. OF AFT LINES:	2
NO. OF BREAST LINES:	4 FORWARD, 4 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	106.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	94.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

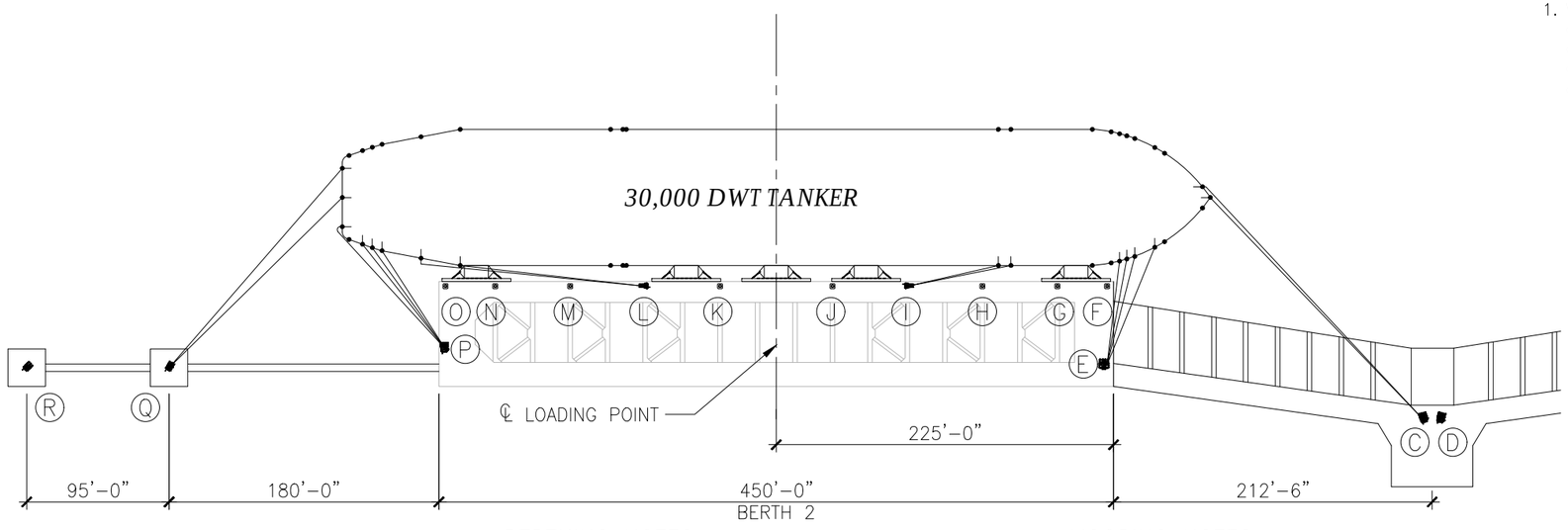
RANGE OF DWT:	UP TO 30,000 LT
MAXIMUM DISPLACEMENT:	38,351 LT @ 0.68 FT/SEC. MAX.
MAXIMUM LOA:	579.1 FT
MAXIMUM BEAM:	90.9 FT
MAXIMUM DRAFT:	31.2 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

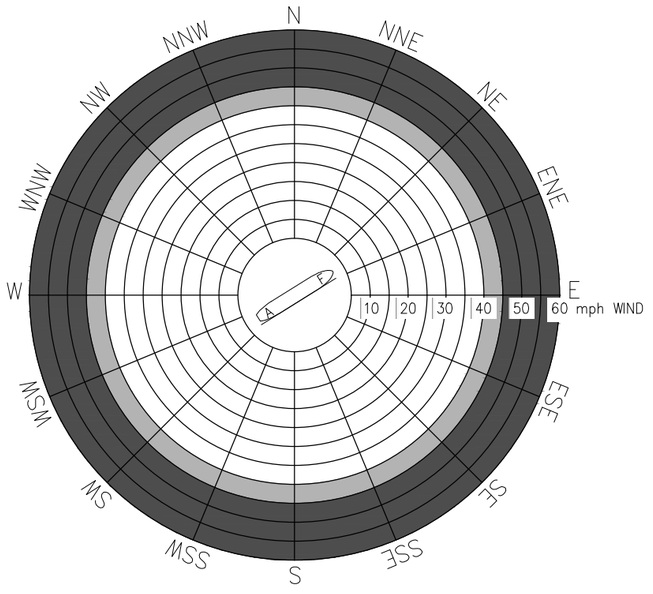
1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 8°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

50K DWT TANKER W/ STIFF LINES
BERTH 2 - PORT SIDE

34

PREPARED BY:
SIMPSON GUMPERTZ & HEGER
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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	2
NO. OF AFT LINES:	2
NO. OF BREAST LINES:	4 FORWARD, 4 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	135.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	115.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

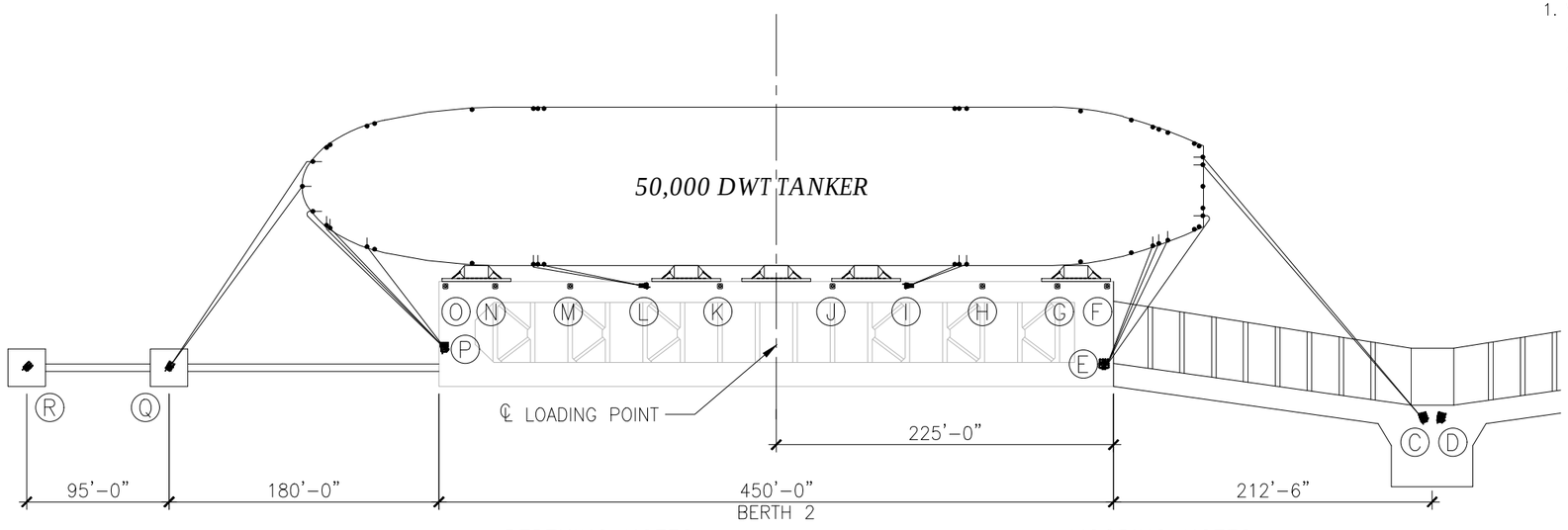
RANGE OF DWT:	30,000 LT TO 50,000 LT
MAXIMUM DISPLACEMENT:	52,600 LT @ 0.59 FT/SEC. MAX.
MAXIMUM LOA:	600 FT
MAXIMUM BEAM:	105.6 FT
MAXIMUM DRAFT:	42.0 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

DATE:	DECEMBER 2020
NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

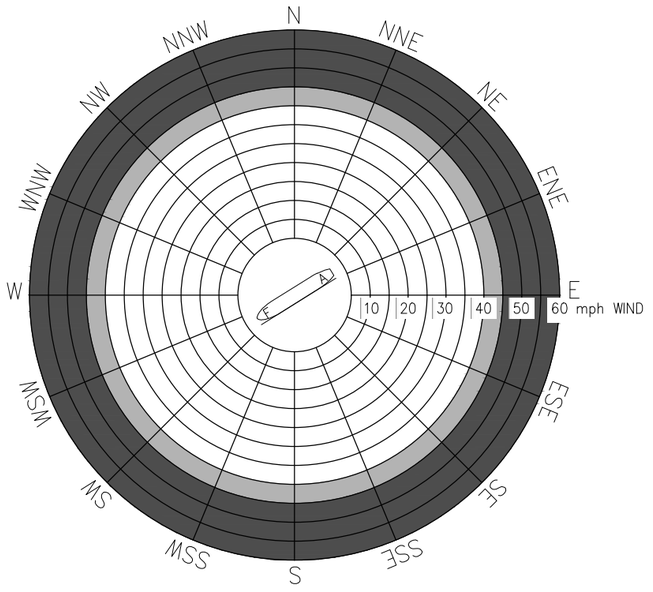
1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 8°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

50K DWT TANKER W/ STIFF LINES
BERTH 2 - STARBOARD SIDE

35

PREPARED BY:
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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	2
NO. OF AFT LINES:	2
NO. OF BREAST LINES:	4 FORWARD, 4 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	135.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

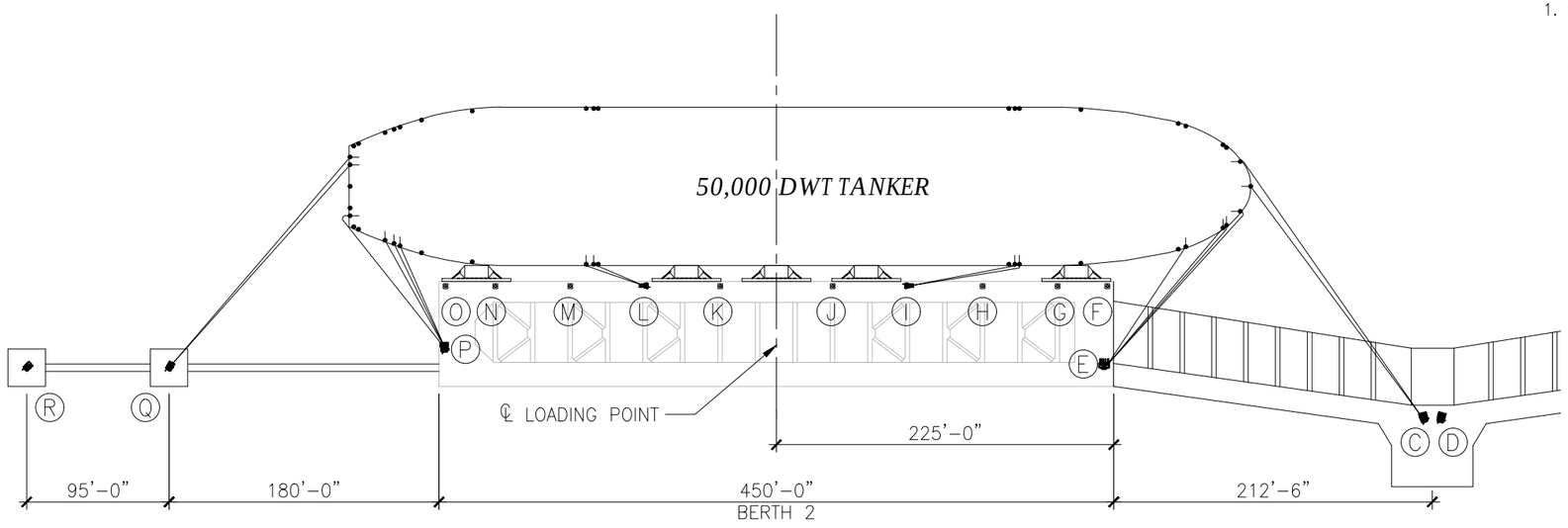
RANGE OF DWT:	30,000 LT TO 50,000 LT
MAXIMUM DISPLACEMENT:	52,600 LT @ 0.59 FT/SEC. MAX.
MAXIMUM LOA:	600 FT
MAXIMUM BEAM:	105.6 FT
MAXIMUM DRAFT:	42.0 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

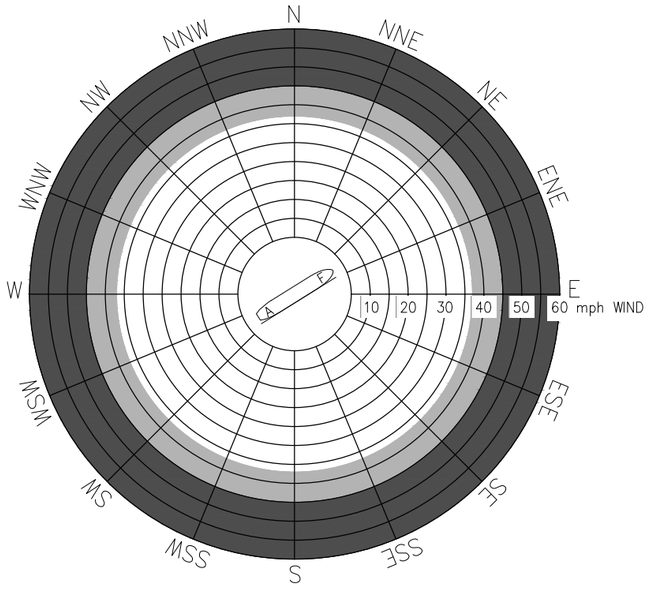
1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 8°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

70K DWT TANKER W/ STIFF LINES
BERTH 2 - PORT SIDE

36

PREPARED BY:
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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	3
NO. OF AFT LINES:	4
NO. OF BREAST LINES:	3 FORWARD, 2 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	146.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	127.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

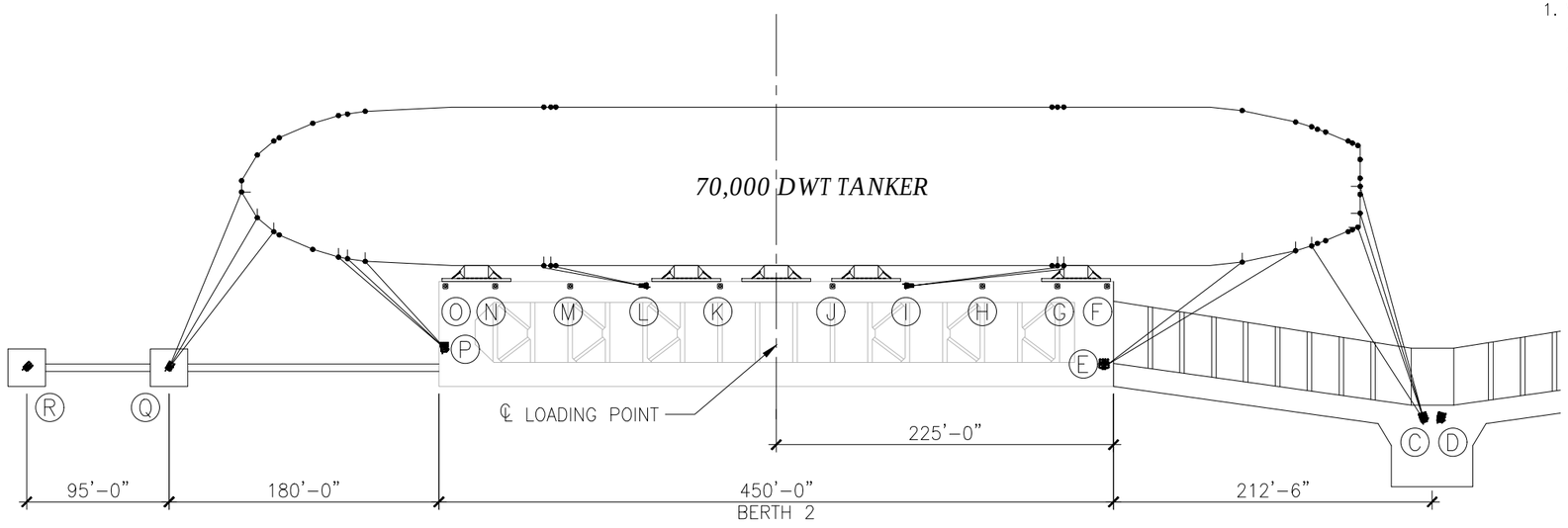
RANGE OF DWT:	50,000 LT TO 70,000 LT
MAXIMUM DISPLACEMENT:	71,000 LT @ 0.50 FT/SEC. MAX.
MAXIMUM LOA:	748.0 FT
MAXIMUM BEAM:	105.6 FT
MAXIMUM DRAFT:	44.7 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 6°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
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MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
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6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
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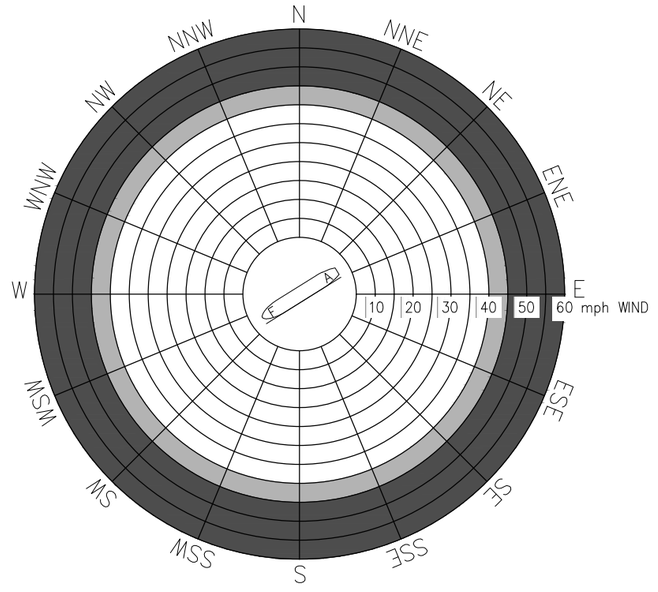

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

70K DWT TANKER W/ STIFF LINES
BERTH 2 - STARBOARD SIDE

37

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New York
San Francisco
Washington, DC

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	4
NO. OF AFT LINES:	3
NO. OF BREAST LINES:	2 FORWARD, 3 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	146.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

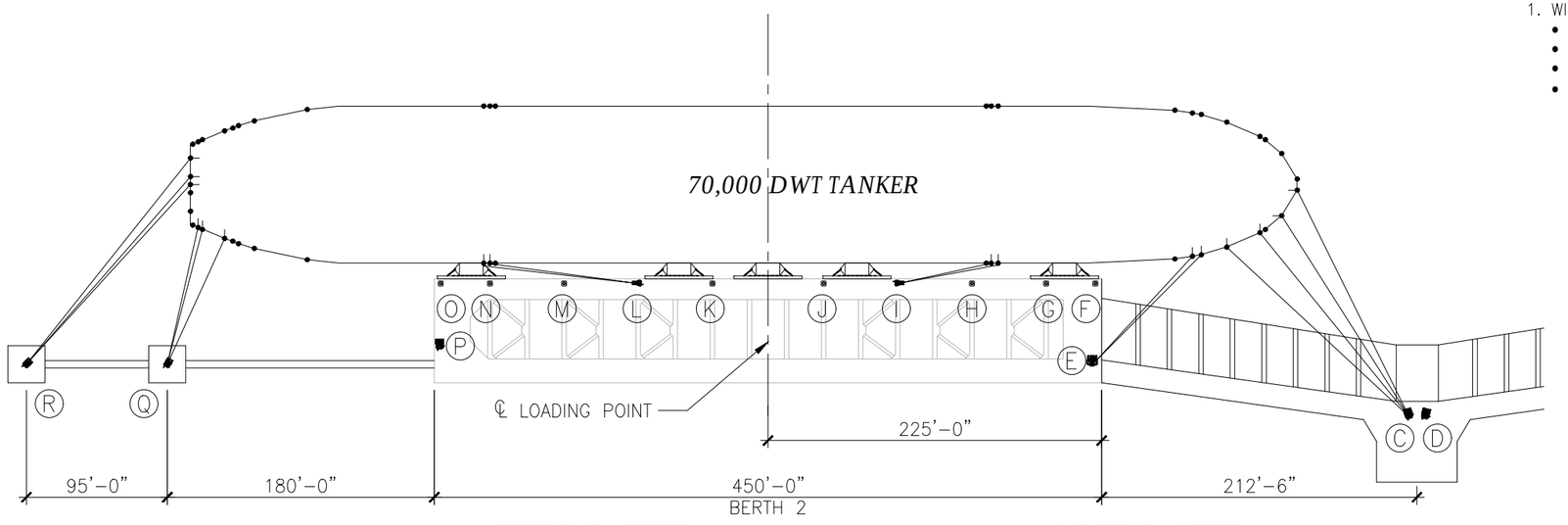
RANGE OF DWT:	50,000 LT TO 70,000 LT
MAXIMUM DISPLACEMENT:	71,000 LT @ 0.50 FT/SEC. MAX.
MAXIMUM LOA:	748.0 FT
MAXIMUM BEAM:	105.6 FT
MAXIMUM DRAFT:	44.7 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

DATE:	DECEMBER 2020
NO. OF TRANSFERS/YEAR:	> 90
OIL SPILL RISK:	> 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION:	HIGH
FACILITY FIRE HAZARD CLASSIFICATION:	HIGH

PHYSICAL BOUNDARIES OF BERTHING SYSTEM:



MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 6°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

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   - WAVE PERIOD: T < 4.0 SEC
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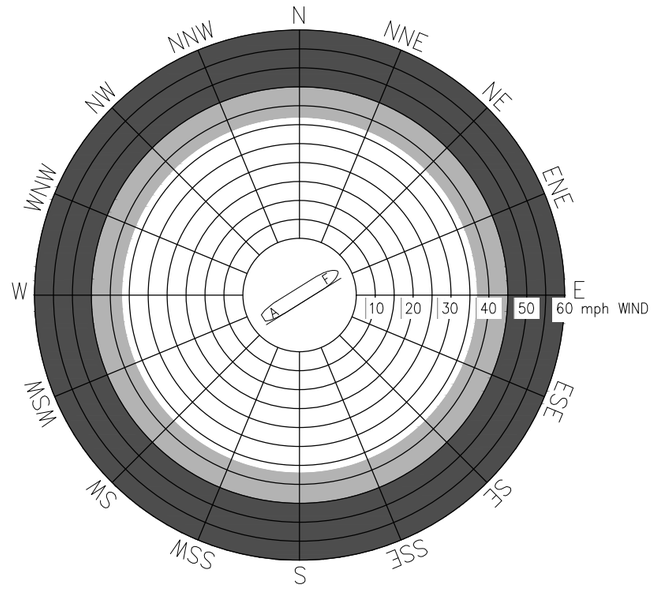

WIND RESTRICTION DIAGRAM (1–MIN AVG.)

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
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STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

100K DWT TANKER W/ STIFF LINES
BERTH 2 - PORT SIDE

38

PREPARED BY:
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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020
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OIL SPILL RISK: > 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION: HIGH
FACILITY FIRE HAZARD CLASSIFICATION: HIGH

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	3
NO. OF AFT LINES:	3
NO. OF BREAST LINES:	3 FORWARD, 3 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
MINIMUM LINE BREAKING STRENGTH (WIND ROSE):	190.0 KIPS
MINIMUM LINE BREAKING STRENGTH (30 MPH OPERATIONAL WIND, 35 MPH SURVIVAL):	165.0 KIPS
MAXIMUM LINE ELONGATION AT 50% BREAKING STRENGTH:	1.9%
DESIGN LINE BREAKING STRENGTH:	243.0 KIPS

VESSEL DESCRIPTION:

RANGE OF DWT:	70,000 LT TO 100,000 LT
MAXIMUM DISPLACEMENT:	102,550 LT @ 0.45 FT/SEC. MAX.
MAXIMUM LOA:	831.0 FT
MAXIMUM BEAM:	145.1 FT
MAXIMUM DRAFT:	42.1 FT

BERTH DESCRIPTION:

MINIMUM WATER DEPTH:	42.0 FT @ MLLW
MINIMUM UNDERKEEL CLEARANCE:	3.0 FT
MAXIMUM DRAFT ALLOWED:	38.0 FT

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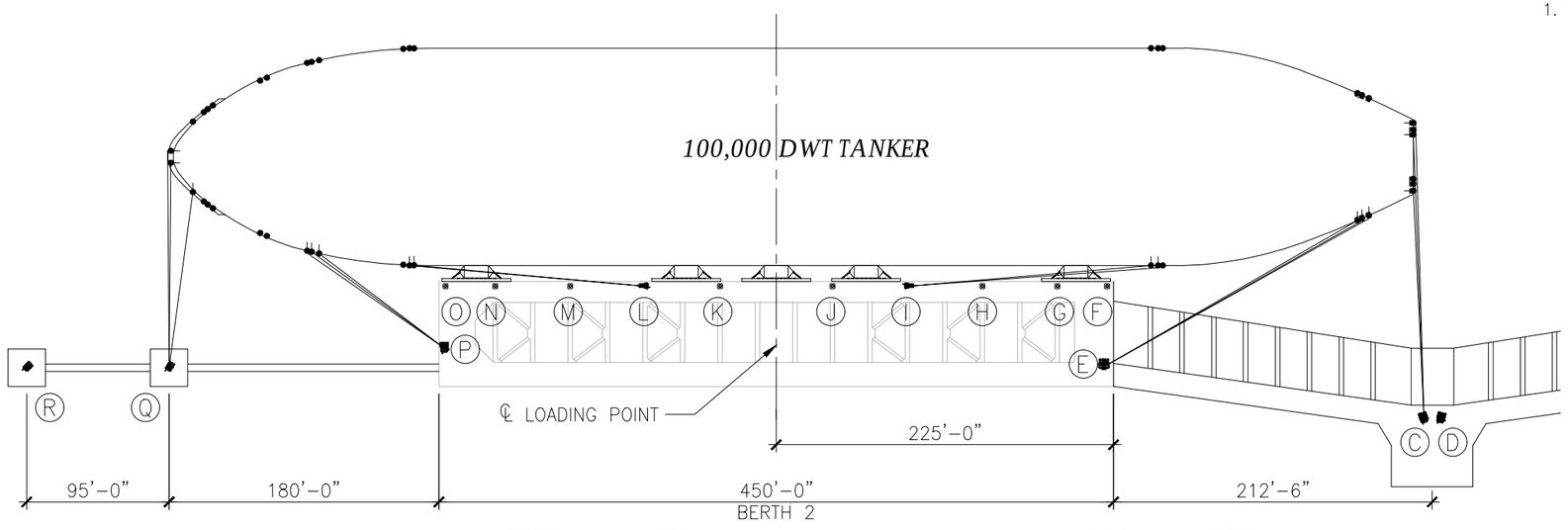

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H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
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Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

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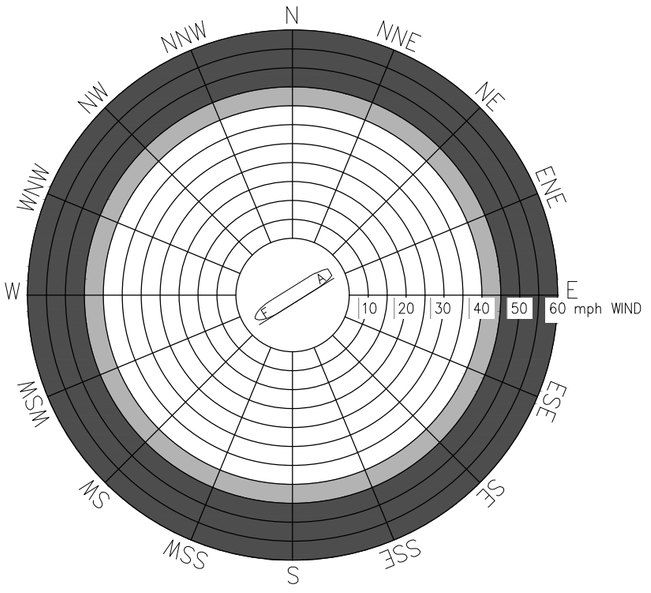

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
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STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

100K DWT TANKER W/ STIFF LINES
BERTH 2 - STARBOARD SIDE

39

PREPARED BY:
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SGH JOB NO. 137503.00

Boston
Chicago
Houston
Los Angeles
New York
San Francisco
Washington, DC

DATE: DECEMBER 2020

MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	3
NO. OF AFT LINES:	3
NO. OF BREAST LINES:	3 FORWARD, 3 AFT
NO. OF SPRING LINES:	2 FORWARD, 2 AFT
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MAXIMUM DRAFT ALLOWED:	38.0 FT

NO. OF TRANSFERS/YEAR:	> 90
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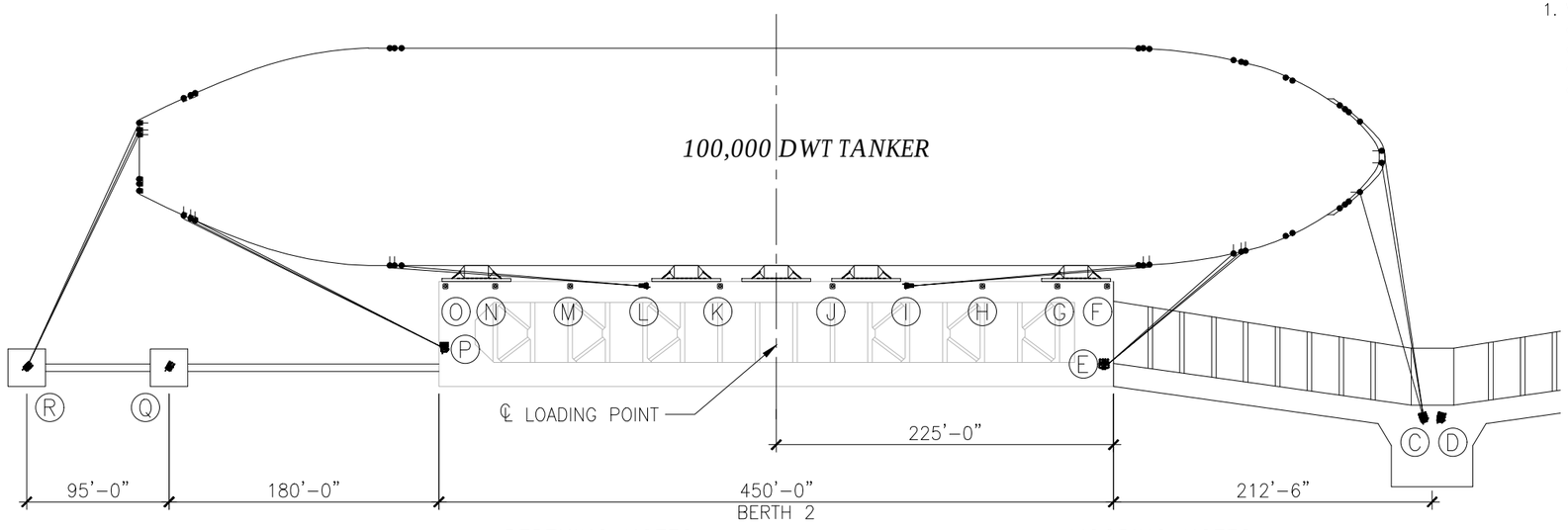

MOORING DEVICE INFORMATION		
MOORING POINT	DEVICE TYPE	SWL (METRIC TONS)
C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
E	QUAD QUICK–RELEASE HOOK	75
F	BOLLARD	91
G	BOLLARD	91
H	BOLLARD	91
I	DOUBLE QUICK–RELEASE HOOK	75
J	BOLLARD	91
K	BOLLARD	91
L	DOUBLE QUICK–RELEASE HOOK	75
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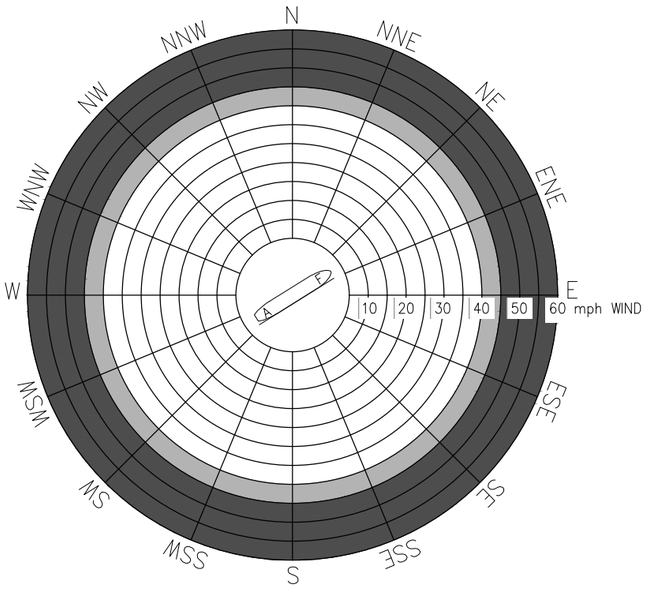

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LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
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STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

188K DWT TANKER W/ STIFF LINES
BERTH 2 - PORT SIDE

40

PREPARED BY:
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OIL SPILL RISK: > 1,200 BBLS
FACILITY SEISMIC CLASSIFICATION: HIGH
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MOORING LINE DESCRIPTION:

MINIMUM LINES:	
NO. OF HEAD LINES:	3
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BERTH DESCRIPTION:

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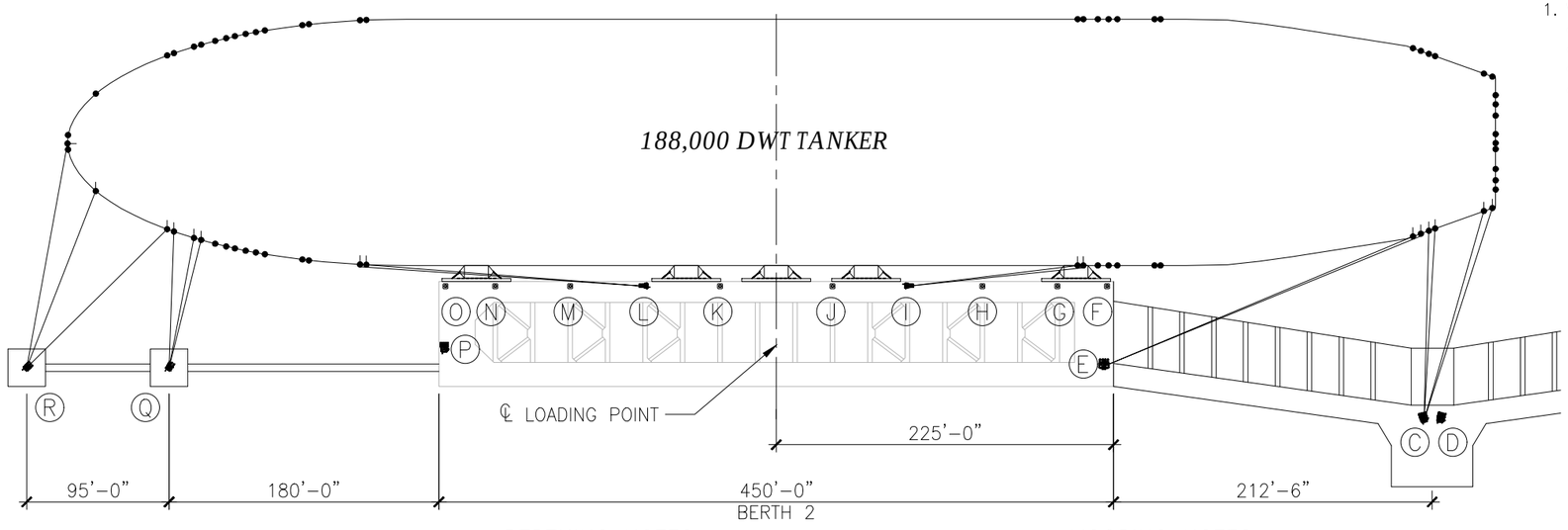

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C	QUAD QUICK–RELEASE HOOK	60
D	QUAD QUICK–RELEASE HOOK	60
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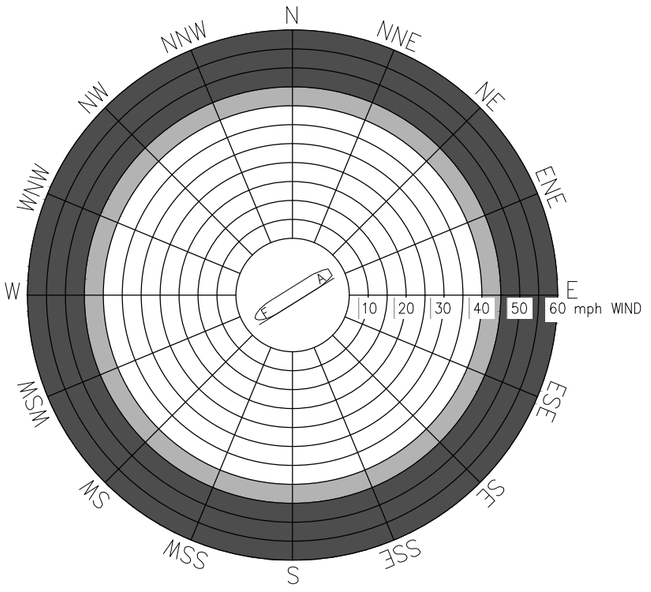

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STATEMENT OF TERMINAL OPERATING LIMITS

Martinez Refining Company Marine Terminal

Martinez, California

188K DWT TANKER W/ STIFF LINES
BERTH 2 - STARBOARD SIDE

41

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Boston
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DATE: DECEMBER 2020

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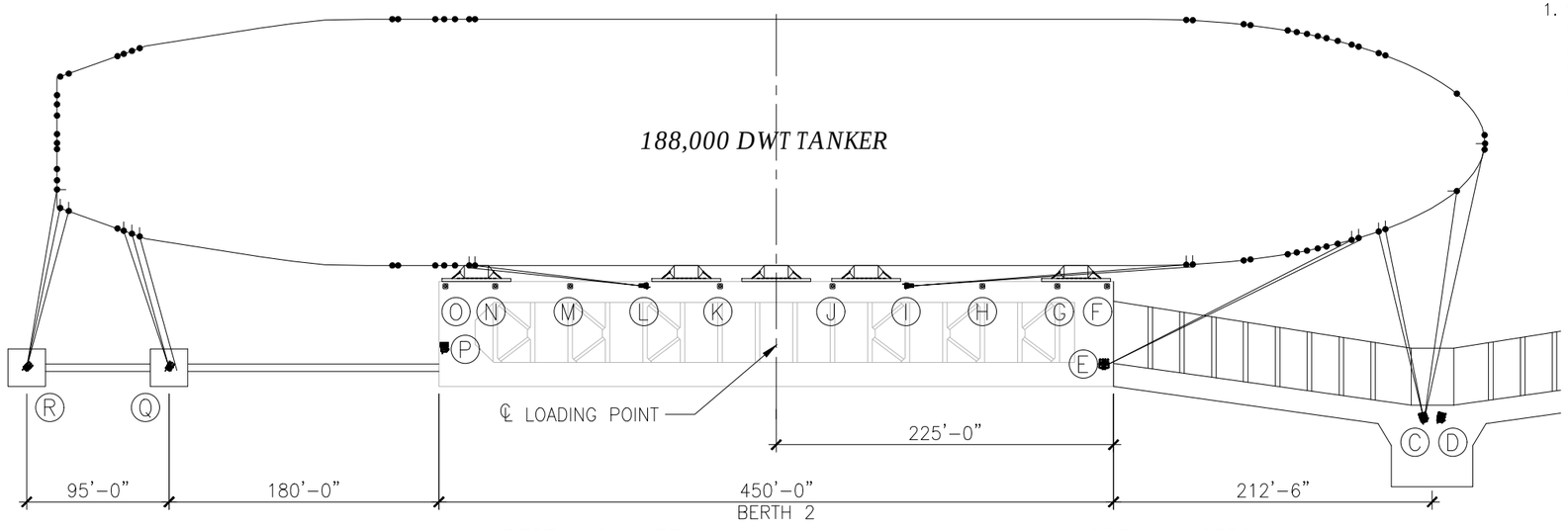

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M	BOLLARD	91
N	BOLLARD	91
O	BOLLARD	91
P	QUAD QUICK–RELEASE HOOK	75
Q	TRIPLE QUICK–RELEASE HOOK	45
R	TRIPLE QUICK–RELEASE HOOK	45

BERTHING NOTES

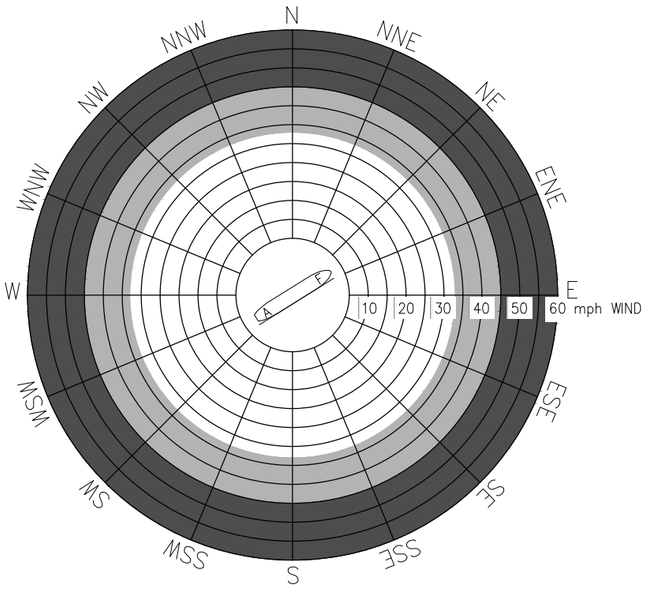
1. BERTHING IS NOT ALLOWED AT AN APPROACH ANGLE GREATER THAN 6°.
2. NO BERTHING OPERATIONS WILL TAKE PLACE WITH WIND VELOCITIES GREATER THAN OR EQUAL TO 38 KNOTS (43.7 MPH) OR CURRENTS GREATER THAN OR EQUAL TO 2 KNOTS.
3. MINIMUM WATER DEPTH STATED IS PERMITTED DEPTH OF BERTH. ACTUAL WATER DEPTH MAY VARY. REGULARLY VERIFY WATER DEPTH AND RESTRICT VESSEL DRAFT AS NEEDED.

MOORING NOTES

1. PASSING VESSEL EFFECTS ARE CONSIDERED.
2. MAXIMUM VESSEL MOTIONS:
   - SURGE: ±10 FT
   - SWAY: ± 2 FT
3. THE MOORING ARRANGEMENT SHOWN IS GENERIC AND CONSIDERED TO BE MINIMUM REQUIREMENTS FOR MOTEMS COMPLIANT OPERATIONS FOR THE RANGE OF VESSELS CONSIDERED. ADDING LINES OR USING OTHER MOORING POINTS WITH EQUAL OR GREATER STRENGTH THAN THOSE SHOWN IS ACCEPTABLE AS LONG AS OVERALL LINE GEOMETRY DOES NOT CHANGE SIGNIFICANTLY.
4. DO NOT EXCEED MORE THAN ONE LINE PER HOOK.
5. ANALYSIS ASSUMES AN AVERAGE MUDLINE ELEVATION OF –55 FT MLLW AT BERTH 1 AND –50 FT MLLW AT BERTH 2.
6. DESIGN LINE BREAKING STRENGTH IS BASED ONLY ON MOTEMS EQUATION 3–21.
7. BOLLARDS ARE ONLY TO BE USED BY BARGES 10K DWT OR SMALLER.

ENVIRONMENTAL CONDITION LIMITS:

1. WIND RESTRICTION DIAGRAM IS APPLICABLE FOR:
   - MAXIMUM EBB CURRENT: 2.2 KNOTS FROM 0° TO BERTH FACE TO 10° TOWARDS BERTH FACE
   - MAXIMUM FLOOD CURRENT: 2.5 KNOTS FROM 10° OFF BERTH FACE TO 0° TO BERTH FACE
   - WAVE PERIOD: T < 4.0 SEC
   - CHANGE IN DRAFT: < 6.0 FT (INCL. TIDE)



WIND RESTRICTION DIAGRAM (1–MIN AVG.)

REF: "Shell Martinez Refinery Marine Terminal, As–Built Fender Calculations", Prepared by Simpson Gumpertz & Heger, Inc., November 2012.
"Shell Martinez Refinery Marine Terminal, Supplemental Berthing Energy Calculations", Prepared by Simpson Gumpertz & Heger, Inc., December 2012.
"Shell Martinez Refinery Marine Terminal, MOTEMS Mooring Calculations", Prepared by Simpson Gumpertz & Heger, Inc., September 2014.
"Martinez Refining Company Marine Terminal, MRC Passing Vessel Mooring Calculations", Prepared by Simpson Gumpertz & Heger, Inc., December 2020.

LEGEND

- OPERATIONAL CONDITION LIMIT: TERMINATE PRODUCT TRANSFER
- SURVIVAL CONDITION LIMIT: DISCONNECT PRODUCT LINES
- DEPARTURE CONDITION LIMIT: CALL FOR TUG ASSISTANCE AND PREPARE TO DEPART BERTH

ATTACHMENT 5

RISK ASSESSMENT

CARB At-Berth Feasibility Risk Assessment Report

Date: February 8, 2023

Location: MTR CR MOB 1133 and via TEAMS

Attendees:

Gayle Johnson, SGH, Facilitator
John-Paul Nepote, MRC
Bruce Potter, MRC
Sera Kim, MRC
Gail Strzepa, MRC Consultant
Roy Mathur, MRC
Charles Han, MRC
Brandon Yee, YEI Engineers

Agenda:

1. Review Charter for Assessment
2. Review Draft Scenarios
3. Brainstorm New Scenarios
4. Assign Consequence and Likelihood Levels
5. Summarize Recommendations

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Refining Company

CARB At-Berth Feasibility Risk Assessment

Assessment Charter

Purpose:	To identify risks that might prevent implementation of a technically feasible and safe CARB Approved Emission Control System (CAECS) at the MRC Wharf by the regulatory deadline of January 1, 2027.
Scope:	The team will review the CAECS approaches that might be implemented at the MRC Wharf and identify potential risks that might prevent implementation. The team will identify a series of potential roadblocks, and then qualitatively rank the likelihood of each roadblock preventing implementation, and the potential consequences of that roadblock.
Boundaries:	The team will identify possible roadblocks and evaluate risk based on the following considerations: • Health and Safety consequences • Environmental consequences • Regulatory requirements / regulations • Operational consequences The following items will be excluded from evaluation of feasibility: • Consideration of cost The Team may identify roadblocks where the risk cannot be reasonably evaluated due to reasons beyond the control of MRC.

Process:	***Before the Risk Assessment Session*** • Prepare the charter for the risk assessment. • Prepare a draft assessment based on known MRC practice, results from similar risk assessments, and knowledge of this specific terminal gained through site visits and investigations • Distribute pre-read material to the participants; ▪ Risk Assessment Charter ▪ Draft Risk Assessment ***During the Risk Assessment Session*** • Review the risk assessment process and techniques to be used. • Present an overview of the risk assessment matrix. • Review the pre-developed list of scenarios and identify (brainstorm) any additional scenarios. • For each scenario, review, discuss, and agree upon the description of the concern, consequence level, and likelihood of mitigation of this concern prior to the regulatory implementation date. • Document team findings ***After the Risk Assessment Session*** • Prepare a Final Risk Assessment Report • Incorporate findings into CARB At-Berth Feasibility Study

RISK MATRIX

CONSEQUENCES	LIKELIHOOD: Low	LIKELIHOOD: Med	LIKELIHOOD: High
Low	L	L	M
Med	L	M	H
High	M	H	H

CONSEQUENCE DEFINITIONS

	Safety	Environmental	Regulatory	Operational
Low	Minimal safety issues	Minor / Little or No response needed	No regulatory impact	CAECS can be implemented
Medium	Possible injury to personnel	Serious / Significant response needed	Possible regulatory impact	Potentially possible to implement CAECS
High	Possible loss of life	Major / Extended duration / Full-Scale response	Regulatory impact will prevent implementation	Not possible to implement CAECS

LIKELIHOOD DEFINITIONS

Low	Likely to be resolved by 2027 deadline
Medium	Possible to be resolved by 2027 deadline
High	Highly Unlikely to be resolved by 2027 deadline

Risk Analysis for Shore Power

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
1	Shore Power	Tankers not available that are capable of accepting shore power.	• MRC does not own or charter their own fleet. • Relies on tanker owners to make costly improvements to their vessels. • Terminal has little leverage over the tanker fleet to force vessel improvements by the compliance date, possibly significantly limiting the pool of available tankers. • Alternative is to accept tankers not capable and risk non-compliance with regulation. • To our knowledge, new-build tankers are not being outfitted for shore power.	H	H	H
2	Shore Power	Voltage and frequency incompatibility between shipboard power and shore power. Tankers don't have standardized voltage to accept shore power	• There are incompatibilities between where the ship can put a transformer and where the terminal can place the shore power system. • For tankers, the nominal voltage level is normally 440 V AC. Some tankers may use 6.6 kV / 11.0 kV AC. A voltage step-down transformer may be needed onboard the tankers for transforming the voltage to be compatible with the ships' needs. • Smaller tankers may have space constraints.	M	H	H

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No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
3	Shore Power	Range of ship sizes and berthing configurations may limit access to shore side power supply due to space and strength limitations of existing wharf structures.	• Cable Management Systems could only range to about 150' under current designs. • Moveable system not feasible on existing wharf due to wharf design and lack of open space. • Tankers berth both port-to and starboard-to at the wharf. • IEC/IEEC 80005 standard doesn't permit the use of extension cables, due to possible safety risks associated with the additional connecting plugs, cable design, and maintenance. • May require separate shore power structures behind wharf. • New shore power structure would need to be length of berths to accommodate all size vessels and berthing orientations. • Highly unlikely structures could be designed, permitted, and constructed within compliance period.	H	H	H

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
4	Shore Power	Connection points need to be outside of tanker hazardous zones.	• Shore power equipment is not currently commercially available for use in classified areas. • Entire wharf is within classified zone. • Stern of the tanker is typically non-hazardous. • Electrical installations in hazardous areas must be listed or labeled for use in hazardous areas. • There are currently no marine-use sockets that comply with explosion-proof requirements. • The terminal is classified as Class 1, Div2, groups C&D. Equipment installed on the wharf must be approved by a NRTL (national recognized testing laboratory), such as UL, FM, etc. per OSHA 1910.307. • Equipment for shore power is not commercially available for installation in hazardous areas. • May require separate shore power structures with same concerns as previous item.	**H**	**H**	**H**

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
5	Shore Power	There is no national or international standard for shore power connections to oil tankers.	• An international standard exists through the International Electrotechnical Commission (IEC) IEC/IEEE 80005-1 for shore power systems at container and cruise terminals. However, the committee progressing this standard has not started the chapter pertaining to shore power connections for oil tankers. • The standard will need to develop prescriptive requirements for the connection point on a tanker before shore power can be safely implemented at the terminal. • Lacking unified standards for shore power, especially the plugs and sockets, a tanker might not use the shore power connection due to its worldwide operation profile.	**M**	**H**	**H**
6	Shore Power	The existing electrical infrastructure at the wharf does not have spare capacity to provide shore power to vessels The energy grid may need upgrades in capacity and reliability for shore power to be a reliable compliance method.	• Requires 7-10 MW of service • Would require a new substation near wharf • PG&E does not have a PG&E substation within a 1.5 mile radius from the MRC wharf • An electrical feasibility study will have to be initiated to assure that shore power demand can be provided safely and reliably from the MRC main subs – located approximately 2 miles away • PG&E requires 1-1/2 years to perform a feasibility study of their grid. • The reliability of service is out of the terminal's control.	**H**	**H**	**H**

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
7	Shore Power	The shore power system must not inhibit the vessel's ability to get underway within 30 minutes in an emergency scenario.	• A tanker must be able to get underway within 30 minutes during an emergency, such as a fire, earthquake, or tsunami, per California Code of Regulations 2 CCR 2340 (c) (28) • This is a unique law applying to tankers only, not containers and cruise ships. • From experience, disconnect takes ~1 hour. Electricians are required to do this, and are not stationed at the dock 24/7 during operations. • Also, from cold engine to "fired up", restarting engines takes 30-60 minutes. The law requires departure under their own power, not with tugs.	H	H	H
8	Shore Power	The accidental or unexpected power loss of shore power may impact the safety and cargo operations.	• The consequence of this event may be a loss of power during loading or unloading. • On loss of power, the tanker loses all control and monitoring capabilities, including safety shutdown systems. This creates a serious risk of explosion or release to the environment. • Furthermore, power may be lost on the tanker only, on the shore only, or on both the tanker and the shore. • During loading, this presents safety and community risks, mainly due to spill, fire, and explosion. • During unloading, the risk is to the community and environment, mainly due to spill.	H	M	H

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
9	Shore Power	Long-term impacts of Public Safety Power Shutoffs (PSPS) and other actions (including by the Governor) may require curtailment of shore power electricity consumption during peak statewide demand	• The consequence of this event may be a loss of power during loading or unloading. • On loss of power, the tanker loses all control and monitoring capabilities, including safety shutdown systems. This creates a serious risk of explosion or release to the environment. • Furthermore, power may be lost on the tanker only, on the shore only, or on both the tanker and the shore. • During loading, this presents safety and community risks, mainly due to spill, fire, and explosion. • During unloading, the risk is to the community and environment, mainly due to spill.	M	M	M
10	Shore Power	Ships cranes may not have capacity or reach for handling cables.	• New crane may be needed on the ship or on the wharf.	M	M	M
11	Shore Power	Personnel injuries during handling of heavy shore power connections	• Suitable material handling equipment is required for operation to avoid potential injuries induced by handling heavy cables.	M	L	L
12	Shore Power	Personnel injuries from exposure to electrical equipment and operation	• The qualification and safety training of the shore side and shipboard crew, e.g., high voltage operation and dedicated training on using shore power technology with appropriate working procedures (including potential LOTO training) and PPE, will be needed	M	L	L

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
13	Shore Power	Language barriers between terminal personnel and Ship operators may lead to miscommunication and misalignment of work.	• Procedures will need to be developed for the connection and disconnection of shore power	**M**	**L**	**L**

Risk Analysis for Barge-Based Capture and Control

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
1	Barge-Based C & C	The site has unique and challenging Metocean conditions including strong currents that may preclude the use of self-propelled barges, as being designed for Southern California sites.	• Any barge system will need to be adequately designed and tested to confirm it can safely operate in these conditions. • Likely that a spud-barge system will be required.	M	H	H
2	Barge-Based C & C	If self-propelled barges are used, they may be subject to loss of power or an underpowered propulsion system in extreme weather or currents.	• Would be unable to keep station.	H	M	H

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
3	Barge-Based C & C	Movement of tanker relative to barge with spuds due to motions from wind, current, or passing vessels.	• TOLs for MRC allow surge of +/- 10 ft, and sway of +/- 2 ft. • Vessel movement could cause impact with barge using spuds that remains stationary. • Vessel movement could cause electrical short circuit due to contact of stack adaptor to stack. • The C&C technology is designed to operate the stack adaptor in a non-hazardous zone. However, the metal-to-metal contact between that stack adaptor and a tanker's stacks may induce electrical short circuits, resulting in unfavorable sparks, ignition, or fire. • May require clearance between barge and tanker to be incorporated in barge design and operations. This offset will push barges further towards shipping channels.	H	M	H

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
4	Barge-Based C & C	The capture and control system must not inhibit the vessel's ability to get underway within 30 minutes in an emergency scenario.	• A tanker must be able to get underway within 30 minutes during an emergency, such as a fire, earthquake, or tsunami, per California Code of Regulations 2 CCR 2340 (c) (28) • This is a unique law applying to tankers only, not containers and cruise ships. • Marine contractors familiar with the site report that it takes 30-60 minutes to safely lift and securely stow spuds for evacuation. • Additional time required to get tugboat to site to evacuate, as there are no self-propelled spud barges. • Additional time required to lift and stow the placement boom. • Currently has not been demonstrated that the 30-minute evacuation requirement can be successfully achieved for this technology on tankers	**H**	**H**	**H**
5	Barge-Based C & C	Potential operation of 'hazardous zone' non-compliant placement boom within hazardous zones	• Per, CAEM, the placement boom should approach the stack at the stern of the tankers which is out of the main hazardous zone around the cargo hold areas and the manifold. However, it may still run into the localized hazardous zones around the battery room, paint store, chemical room, etc. Also, mooring configurations for some vessels use lines at the stern, preventing locating the barge there. • Requires controls on route of placement boom operations and station location.	**H**	**M**	**H**

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
6	Barge-Based C & C	Potential damage to underground pipelines or cables if spud-based technology is used.	• Spudding activity could cause damage to underground pipelines or cables. • Potential obstacles would need to be identified and spudding operations arranged to avoid this potential. • May limit use for some vessels, depending on extent and proximity of interferences.	H	M	H
7	Barge-Based C & C	Geotechnical conditions at the site may not be adequate for spud-barge operations.	• A spud barge may require anchors or mooring lines to a fixed structure to provide adequate support during operations. • A spud barge with anchors will require further study to evaluate risk of anchor line conflicts with tankers, vessel traffic, and Benicia-Martinez bridge maintenance and repair activities.	M	M	M
8	Barge-Based C & C	Possible interference with shipping channels.	• Barge placement location will impact travel lanes for shipping in the river, which are on the MRC side of the Carquinez Strait. • Barge location may need to be on the shore side of the wharf where there is limited depth.	M	M	M
9	Barge-Based C & C	Possible encroachment into or interference with operations of Amorco terminal when deploying barge-based C&C.	• Will need to coordinate with Amorco.	M	M	M

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
10	Barge-Based C & C	There may be some vessels that cannot be accepted during the vessel vetting process due to geometry or location of vessel stacks that are not compatible with the capture hood system.	• May exceed limits in regulations	**M**	**M**	**M**
11	Barge-Based C & C	The schedule to procure and commission a barge is delayed due to high demand.	• This event is a supply and demand and supply chain issue. • The vessel becomes noncompliant if the CAECS is not available.	**M**	**M**	**M**
12	Barge-Based C & C	Unless a barge is purchased or a long-term service agreement is in place, there is a risk that the service is not available when required.	• This event is a supply and demand and supply chain issue. • The vessel becomes noncompliant if the CAECS is not available.	**M**	**M**	**M**
13	Barge-Based C & C	Relies on third party operators at the terminal for compliance.	• This is not a unique issue to tankers or oil terminals.	**L**	**L**	**L**
14	Barge-Based C & C	There is a risk that the barge based mechanical equipment experiences downtime.	• The likelihood of this cannot be evaluated by the team at this time. • Will be dealt with contractually. • Not unique to tankers.	**M**	**L**	**L**
15	Barge-Based C & C	There is a risk that a barge vendor goes out of business.	• The likelihood of this cannot be evaluated by the team at this time. • The vessel becomes noncompliant if the CAECS is not available.			**TBD**

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
16	Barge-Based C & C	There is a risk that barge vendors do not develop a barge solution that is acceptable for safe operation on oil tankers at this location.	• The likelihood of this cannot be evaluated by the team at this time. • The vessel becomes noncompliant if the CAECS is not available.			**TBD**
17	Barge-Based C & C	There is a risk the barge vendor does not develop a barge solution that achieves CARB approval.	• The likelihood of this cannot be evaluated by the team at this time. • The vessel becomes noncompliant if the CAECS is not available.			**TBD**
18	Barge-Based C & C	The CARB regulation may change in the future requiring upgrades or modifications to the barge treatment system.	• The likelihood of this cannot be evaluated by the team at this time. • The vessel becomes noncompliant if the CAECS is not available.			**TBD**

Risk Analysis for Shore/Terminal-Based Capture and Control

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
1	Shore-Based C & C	Shore-based location not feasible due to distance from vessels and loss of efficiency.	• Will require locating equipment on existing wharf structures or new structures.	H	H	H
2	Shore-Based C & C	Due to the site geometry and required location of C&C equipment, the system may be within the vessel hazardous area for some vessels.	• Equipment currently not suitable for use in classified zones. The timing of equipment that is designed by the manufacturers that is rated for use in hazardous areas is unknown. • Entire wharf structures are in hazardous zones. • Would require new structures be built if equipment cannot be made suitable for use in classified zones.	H	H	H
3	Shore-Based C & C	Range of ship sizes and berthing configurations may limit access to terminal-based C&C due to space and strength limitations of existing wharf structures.	• C&C range limited under current designs. • Moveable system not feasible on existing wharf due to wharf design and lack of open space. • Tankers berth both port-to and starboard-to at the wharf. • New C&C structure would need to be length of berths to accommodate all size vessels and berthing orientations. • Highly unlikely structures could be designed, permitted, and constructed within compliance period.	H	H	H

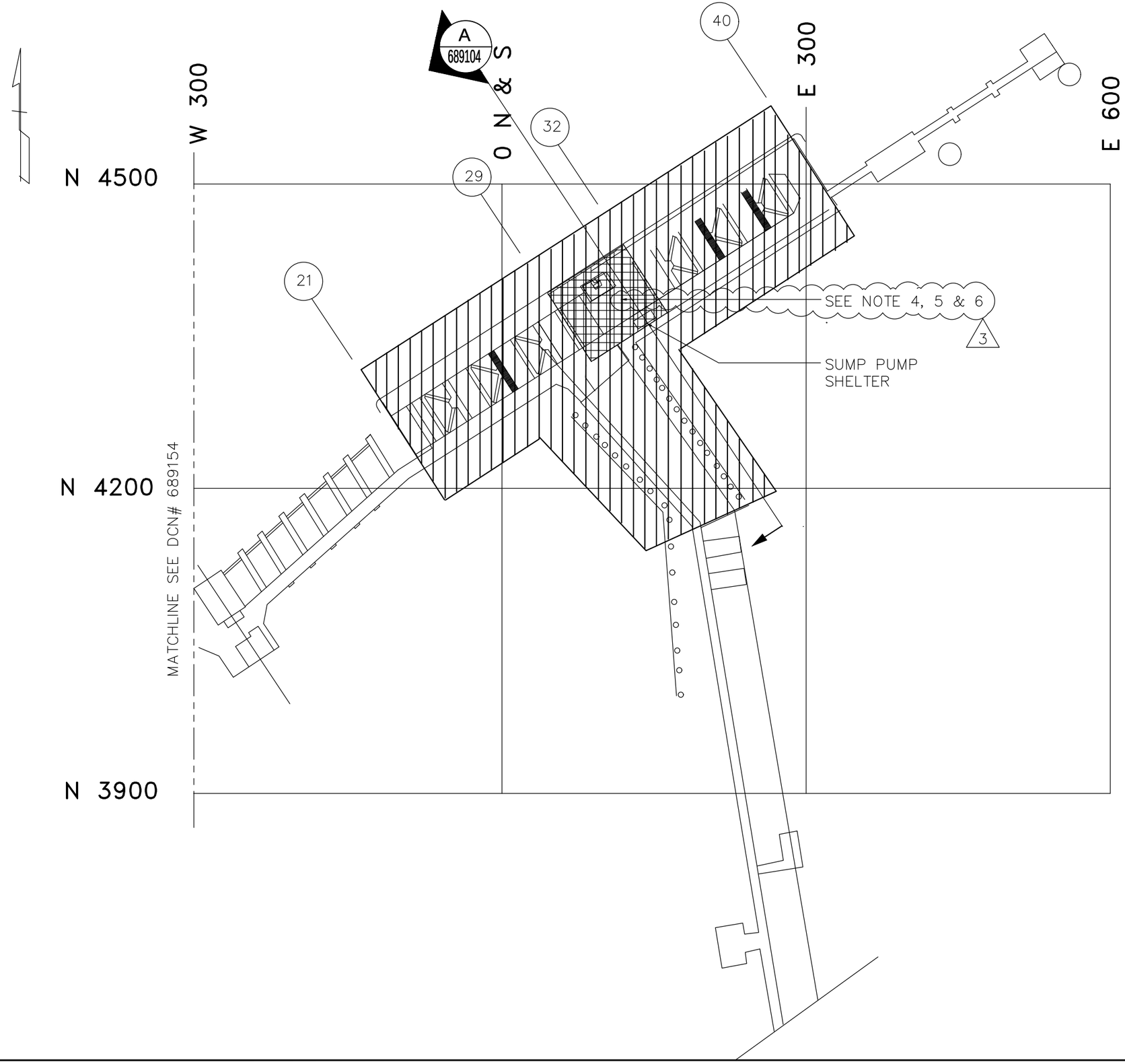
Martinez Refining Company

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
4	Shore-Based C & C	The capture and control system must not inhibit the vessel's ability to get underway within 30 minutes in an emergency scenario.	• This risk will need to be studied in more detail if this option is further pursued. • The vessel becomes noncompliant if it is unable to get underway within 30 minutes during an emergency, such as a fire, earthquake, or tsunami.	M	M	M
5	Shore-Based C & C	Some vessels at the terminal may have a missed connection due to incompatibility between the vessel stacks and the capture hood and/or the operator or terminal may elect not to attempt a connection for safety reasons.	• Not unique to this location.	M	M	M
6	Shore-Based C & C	The accidental or unexpected power loss of shore-based C&C may impact safety and cargo operations	• Environmental exceedance	M	M	M
7	Shore-Based C & C	Long-term impacts of Public Safety Power Shutoffs (PSPS) and other actions (including by the Governor) may require curtailment of shore power electricity consumption during peak statewide demand	• Loss of power during the loading or unloading activity results in environmental exceedance.	M	L	L

No.	CAECS	Potential Roadblock	Considerations	Consequence Level	Likelihood Level	Risk
8	Shore-Based C & C	The CARB regulation may change in the future requiring upgrades or modifications to the shore/terminal-based treatment system.	• The likelihood of this cannot be evaluated by the team at this time. • The vessels become noncompliant if the CAECS is not available.			**TBD**

ATTACHMENT 6

TERMINAL HAZARDOUS AREA CLASSIFICATION DRAWINGS



REFERENCE DRAWINGS	
DRAWING NO.	DESCRIPTION
	2002 NATIONAL ELECTRICAL CODE – FIGURE 515.3
	NATIONAL FIRE PROTECTION AGENCY 30 – FIGURE 5.7.16
	1997 API RECOMMENDED PRACTICE 500 – FIGURE 19

NOTES

1. UNLESS OTHERWISE NOTED PLOT WILL BE CLASSIFIED CLASS 1, GROUP D, DIVISION 2. DIVISION 2 AREA TO EXTEND 25FT ABOVE POTENTIAL SOURCE OF HYDRCARBONS AND 50FT HORIZONTAL DISTANCE FROM EQUIPMENT CONTAINING GROUP D MATERIAL.
2. BASIS FOR AREA CLASSIFICATION IS NEC 2002 EDITION ARTICLE 515 – BULK STORAGE PLANTS SEE NEC FIGURE 515.3 [NFPA 30, FIGURE 5.7.16] MARINE TERMINAL HANDLING FLAMMABLE LIQUIDS.
3. OPENINGS BELOW GRADE SUCH AS OPEN PITS, SUMPS & MANHOLES SHALL BE CLASSIFIED AS DIVISION 1.
4. THE MOST FLAMMABLE MATERIAL HANDLED IS GASOLINE. AUTO IGNITION TEMPERATURE, 280°C. THE TEMPERATURE OF THE EQUIPMENT SHALL NOT EXCEED THE MAXIMUM SURFACE TEMPERATURE (T CODE) T2A, 280°C.
5. SEE DCN. NO. 689104 FOR CLASS 1 DIV, 1 DEPTH AND DCN. NO. 561041, BERTH 1 FOR COMPRESSOR MODULE AND ANALYZER HOUSE.
6. ALL REFERENCE DRAWINGS HAVE BEEN REVIEWED AND ARE IN COMPLIANCE WITH API RP 500 AND NFPA 497.

3

LEGEND

INDICATES CLASS 1, GROUP D, DIVISION 1, T CODE T2A

INDICATES CLASS 1, GROUP D, DIVISION 2, T CODE T2A

INDICATES UNCLASSIFIED

0 10 200 300 400 500

SCALE: 1" = 100'

NO.	DATE	PROJECT NO.	DESCRIPTION	BY	APPROVED
3	01–27–10	COST–380141	WHARF AREA CLASSIFICATION (30129)	VDT	CMC/GJS
2	3–4–09	MA01–C70055	AS BUILT (50520)	ARF	CMC/JJ
1	9/4/08	MA01–C70055	REVISED AS NOTED (50520)	ARF	CMC/JJ
0	1/30/02		NEW DRAWING	BLF	BLF

REVISION

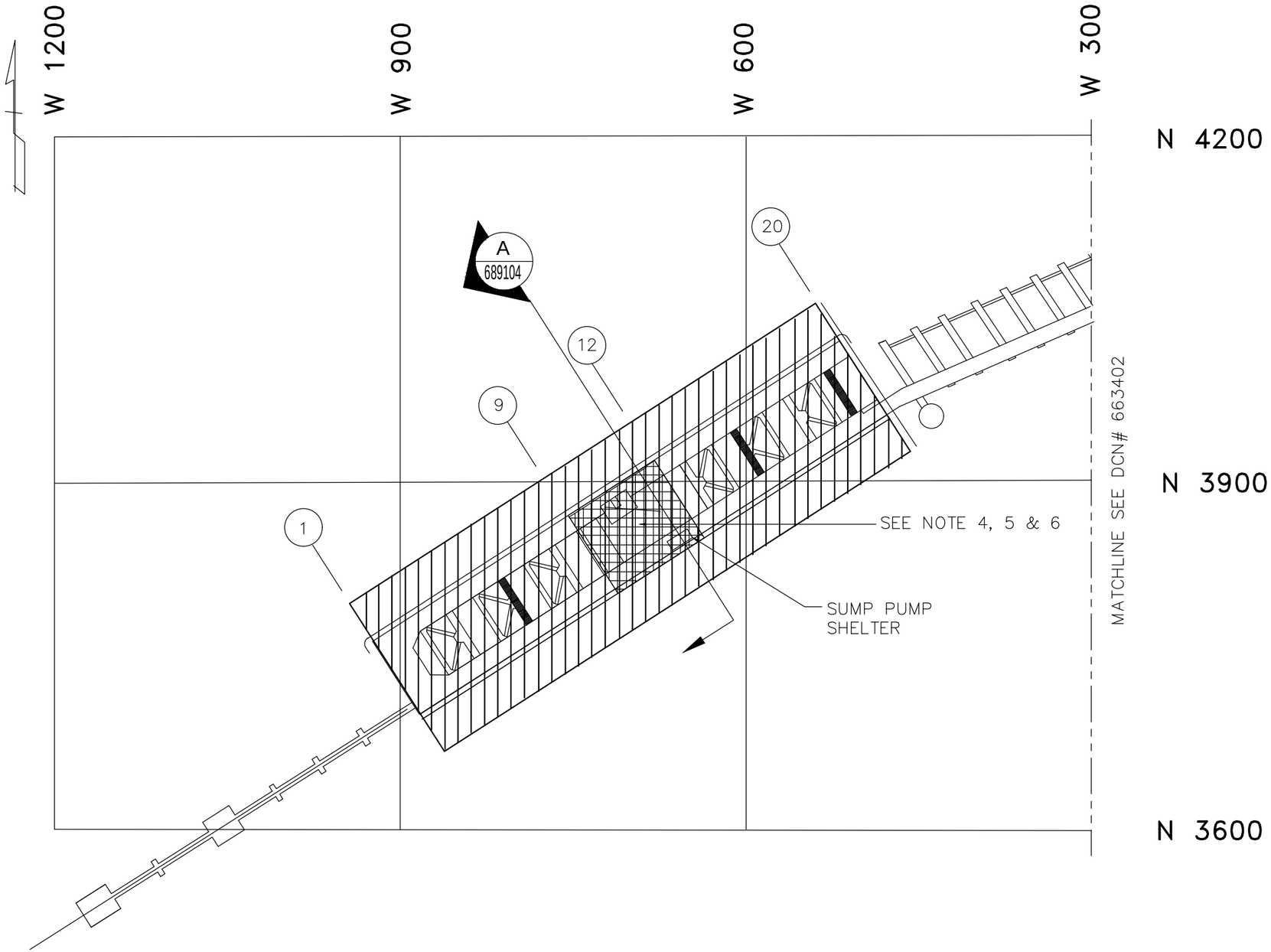
PROJECT NO.:
DATE: 1/30/02
SCALE: NONE
DRAWN BY: BLF
PROJ. ENG.:
CHECKED: BLF
APPROVED: BLF
OUTPUT SIZE: D

SHELL MARTINEZ REFINING COMPANY
MARTINEZ MANUFACTURING COMPLEX

ELECTRICAL
AREA CLASSIFICATION PLAN, BERTH NO. 1
WHARF AREA

PLANT:ALL – 61.01 AREA: WHARF

DRAWING NUMBER	SHEET	CLASS	DOC. CTRL. NO.	REV.
663402	1 OF 1	15	663402	3



REFERENCE DRAWINGS	
DRAWING NO.	DESCRIPTION
	2005 NATIONAL ELECTRICAL CODE – FIGURE 515.3
	2008 NATIONAL FIRE PROTECTION AGENCY 30 – FIGURE 29.3.22
	1997 API RECOMMENDED PRACTICE 500 – FIGURE 19

NOTES

1. UNLESS OTHERWISE NOTED PLOT WILL BE CLASSIFIED CLASS 1, GROUP D, DIVISION 2. DIVISION 2 AREA TO EXTEND 25FT ABOVE POTENTIAL SOURCE OF HYDRCARBONS AND 50FT HORIZONTAL DISTANCE FROM EQUIPMENT CONTAINING GROUP D MATERIAL.
2. BASIS FOR AREA CLASSIFICATION IS NEC 2005 EDITION ARTICLE 515 – BULK STORAGE PLANTS SEE NEC FIGURE 515.3 [NFPA 30, FIGURE 29.3.22] MARINE TERMINAL HANDLING FLAMMABLE LIQUIDS.
3. OPENINGS BELOW GRADE SUCH AS OPEN PITS, SUMPS & MANHOLES SHALL BE CLASSIFIED AS DIVISION 1.
4. THE MOST FLAMMABLE MATERIAL HANDLED IS GASOLINE. AUTO IGNITION TEMPERATURE, 280°C. THE TEMPERATURE OF THE EQUIPMENT SHALL NOT EXCEED THE MAXIMUM SURFACE TEMPERATURE (T CODE) T2A, 280°C.
5. SEE DCN. NO. 689104 FOR CLASS 1 DIV, 1 DEPTH AND DCN. NO. 561042, BERTH 2 FOR COMPRESSOR MODULE AND ANALYZER HOUSE.
6. ALL REFERENCE DRAWINGS HAVE BEEN REVIEWED AND ARE IN COMPLIANCE WITH API RP 500 AND NFPA 497.

LEGEND

INDICATES CLASS 1, GROUP D, DIVISION 1, T CODE T2A

INDICATES CLASS 1, GROUP D, DIVISION 2, T CODE T2A

INDICATES UNCLASSIFIED

0 10 200 300 400 500

SCALE: 1" = 100'

NO.	DATE	PROJECT NO.	DESCRIPTION	BY	APPROVED
0	01/27/10	COST-380141	WHARF AREA CLASSIFICATION (30129)	VDT	CMC/GJS

REVISION

PROJECT NO.:	
DATE: 1/30/02	
SCALE: NONE	
DRAWN BY: BLF	
PROJ. ENG.:	
CHECKED: BLF	
APPROVED: BLF	
OUTPUT SIZE: D	

SHELL MARTINEZ REFINING COMPANY
MARTINEZ MANUFACTURING COMPLEX

ELECTRICAL
AREA CLASSIFICATION PLAN, BERTH NO. 2
WHARF AREA

PLANT:ALL – 61.01 AREA: WHARF

DRAWING NUMBER	SHEET	CLASS	DOC. CTRL. NO.	REV.
689154	1 OF 1	15	689154	0

REFERENCE DRAWINGS	
DRAWING NO.	DESCRIPTION
	2002 NATIONAL ELECTRICAL CODE – FIGURE 515.3
	NATIONAL FIRE PROTECTION AGENCY 30 – FIGURE 5.7.16
	1997 API RECOMMENDED PRACTICE 500 – FIGURE 19
663402	AREA CLASSIFICATION BERTH 1, WHARF AREA
689154	AREA CLASSIFICATION BERTH 2, WHARF AREA

2

NOTES

1. AREA CLASSIFICATION AS SHOWN IS PER A.P.I. RECOMMENDED PRACTICE 500, FIGURE 19, "MARINE TERMINAL HANDLING FLAMMABLE LIQUIDS."
2. MATERIAL HANDLED: GASOLINE, AUTOIGNITION TEMPERATURE: 280°C.
3. SOURCE POINT: SUMP PUMP DISCHARGE, CLASS 1 GROUP D DIVISION 2, 3' IN ALL DIRECTIONS, PLUS 18" ABOVE GRADE AND 10' RADIUS, PER NFPA 497, FIGURE 5.10.1(a), 1997 EDITION. THE SOURCE FLOW IS 63 GPM AND THE PRESSURE IS 110 PSI.
4. THE DRAWING HAS BEEN REVIEWED AND IS IN COMPLIANCE WITH API RP 500 AND NFPA 497.

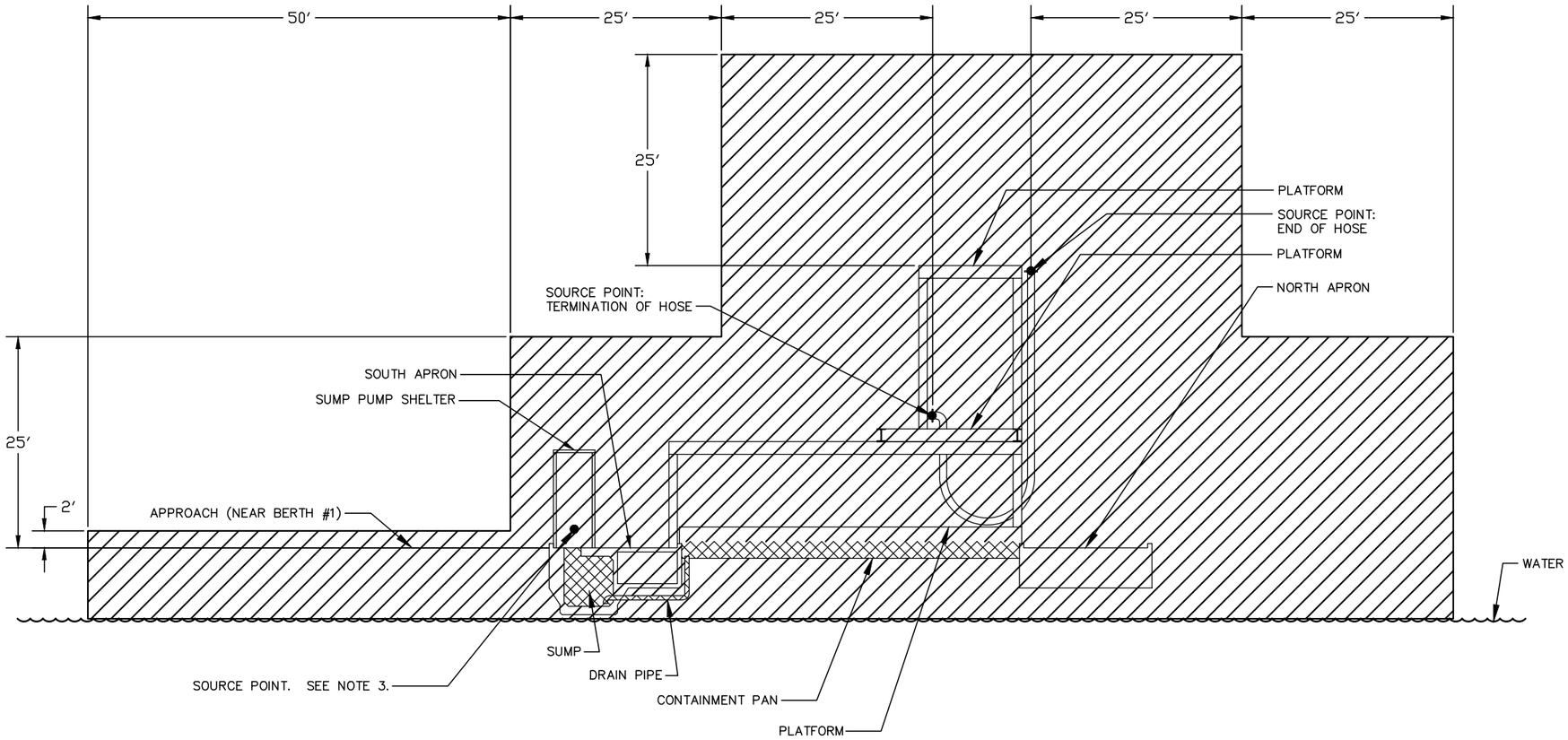
2

LEGEND

INDICATES CLASS 1, GROUP D, DIVISION 1

INDICATES CLASS 1, GROUP D, DIVISION 2

INDICATES UNCLASSIFIED



DETAIL A
AREA CLASSIFICATION
SECTION THROUGH BERTH #1 AND BERTH #2

SCALE: 1/8" = 1'-0"

REFER TO DRAWING 663402 AND 689154

5 0 5 10 15 20 25

SCALE: 1/8" = 1' – 0"

NO.	DATE	PROJECT NO.	DESCRIPTION	BY	APPROVED
			REVISION		
2	01/27/10	COST–380141	REVISED AS NOTED (30129)	VDT	CMC/GJS
1	3/4/09	MA01–C70055	AS BUILT (50520)	ARF	CMC/JJ
0	9/4/08	MA01–C70055	ISSUED FOR CONSTRUCTION (50520)	ARF	CMC/JJ

PROJECT NO.:	MA01–C70055
DATE:	9/4/08
SCALE:	1/8" = 1'–0"
DRAWN BY:	ARF
PROJ. ENG.:	CMC
CHECKED:	JJ
APPROVED:	
OUTPUT SIZE:	D

SHELL MARTINEZ REFINING COMPANY
MARTINEZ MANUFACTURING COMPLEX

ELECTRICAL
AREA CLASSIFICATION DETAIL
WHARF AREA

PLANT: 61–01 AREA: WHARF

DRAWING NUMBER	SHEET	CLASS	DOC. CTRL. NO.	REV.
689104	1 OF 1	15	689104	2