To: Harbor Safety Committee of the San Francisco Bay Region

Date: 12 March 2009

Subject: **Updated Harbor Safety Plan**

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Enclosed please find revised sections of the *San Francisco, San Pablo and Suisun Bays Harbor Safety Plan*, dated March 12, 2009. The state's Harbor Safety Committees are required to review and update their plans as needed on an annual basis, and to submit the approved plan to the Administrator of the Office of Spill Prevention and Response. The Administrator accepts or does not accept the revised Safety Plan.

In addition to an updated Executive Summary to reflect the Committee's activities from July 2007 through mid-February 2009, a number of changes were made throughout the plan text, including minor typographic corrections and cross references, etc. The substantively amended sections for your review and proposed approval are:

1. Chapter II: General Weather, Currents and Tides to include Best Maritime Practices for large vessels and tugs with tows navigating in severe weather or in limited visibility.

2. New Chapter XI: Small Passenger Vessels-Ferries features the adopted ferry traffic routing and guidelines for transit in limited visibility and severe weather.

3. Chapter XIV: Tug Escort/Assist for Tank Vessels to include guidelines for simulator training of tug crews in emergency operations.

4. Chapter XV: Pilotage to reflect the HSC's recommendations of the use of Portable Pilot Navigation Units, to be investigated by the Board of Pilot Commissioners.

5. New Appendix A: Best Maritime Practices summarizes guidelines developed by the Work Groups and adopted by the Harbor Safety Committee to improve navigation safety.

Although not included with this mailing, the following appendices were modified to reflect updated information and will appear in the final Harbor Safety Plan:

1. Appendix B: Membership of the HSC
2. Appendix E: Annual Work Reports
3. Appendix F: Tug Escort Violations Summary for 2007 and 2008
4. Appendices G, H and I: Clearing House reports for 2007 and 2008
5. Appendix L: Bridge Inventory and Bridge Allisions
6. Appendices M and N: USCG Bay Port Safety and Pollution Statistics for 2007 and 2008
7. Appendix O: Waterborne Petroleum Statistics for 2007 and 2008

Executive Summary 2007/2009

The San Francisco Bay Region Harbor Safety Committee is concerned with navigation, security and environmental issues that impact the San Francisco Bay Area. The period covered by this Harbor Safety Plan update was an exceptionally active time. On November 7, 2007, the cargo ship Cosco Busan struck the Bay Bridge in dense fog, spilling 53,000 gallons of bunker fuel into the Bay and beaches. Within days Governor Schwarzenegger directed that the state investigate the causes of the allision and make appropriate recommendations to prevent such an occurrence from happening again. The Office of Spill Prevention and Response (OSPR) called upon the Harbor Safety Committee to analyze the issues outlined in the directive and to make recommendations. After a series of many public work group meetings, the Harbor Safety Committee completed its report in July 2008, which was sent to the Governor.

Concurrently, the five California Harbor Safety Committees were directed by OSPR to adopt Best Maritime Practices that provide important guidelines for safe, reliable and environmentally sound vessel movements in each harbor. As a result of both processes, the Harbor Safety Committee adopted nine Best Maritime Practices addressing vessel movements during reduced visibility and severe weather, defined commute ferry routes, enhanced training for pilots on electronic navigation systems, and emergency training for tug escorting (see Appendix A). These guidelines are incorporated into the U.S. Coast Pilot, the Coast Guard Vessel Traffic Service (VTS) Manual and the San Francisco Bar Pilots Operations Manual.

During 2007-2009:

- The Tug Escort Work Group analyzed the Cosco Busan allision relative to tug operations, concluding there was no current evidence that tug escorting would have prevented the allision or similar incidents from occurring. The Work Group developed Best Maritime Practices for the use of simulator training for emergency tug escort response, for tugs with tows operating in reduced visibility and for operating during severe weather conditions. The Work Group also updated the Escort Plan document used by tankers for the Master/Pilot exchange prior to entering the Bay.

- The Navigation Work Group analyzed a number of components in the Governor's directive – speed limits, crew staffing requirements and Vessel Traffic Service authority over ship movements. In addition, the Work Group developed Best Maritime Practices for large vessels over 1600 gross tons operating in reduced visibility and in severe weather conditions and for enhanced training for licensed pilots in advanced electronic navigation systems. The Work Group worked with the Tug Escort and Ferry Operations Work Groups to craft similar guidelines for other vessels in the Bay.

- The Ferry Operations Work Group for commute ferries established a maneuvering zone radius for the San Francisco Ferry Building ferry terminals and a maneuvering zone protocol; agreed upon communication protocols en route; and identified and produced maneuvering routes for nautical charts. The Work Group developed Best Maritime Practices for commute ferries operating in reduced visibility and in severe weather conditions.

- The Prevention Through People Work Group continued distribution of 'Kayakers, Be Alert!' safety materials, updated the "Where the Heck is Collinsville?" brochure and, with the VTS, designed a poster about hoax "Mayday" calls at the request of the Coast Guard. In addition, the Harbor Safety Committee adopted the previously produced communication protocol for safe bunkering operations alongside cargo vessels as part of the Best Maritime Practices Program.

- The Physical Ocean Real Time System (PORTS) Work Group obtained funding, which continued the system's administration by the Marine Exchange. Additional funding was obtained from Tesoro to purchase and install a current and MET sensor on the Avon Wharf. Installation of additional PORTS sensors was begun as state funds became available to support deep draft vessel navigation, the commute ferry system and the marine community. PORTS completed re-activation and equipment upgrades as new funding became available.

II. General Weather, Currents And Tides

The majority of the background information presented here is derived from the National Weather Service and can be viewed in its entirety in the *U.S. Coast Pilot, Pacific Coast*, published by NOAA and available from the following website: http://nauticalcharts.noaa.gov/nsd/cpdownload.htm. The *Coast Pilot* information is augmented with observations from local sources.

Ships traveling into the Bay encounter diverse weather, currents, tides and bottom depths. Because of the often varied and changing set of harbor conditions, mariners must be observant about current conditions to navigate safely.

Weather

Bay Area weather is seasonably variable with three discernible seasons affecting the marine environment. The Bay Area has several climate regimes, or microclimates. Significant differences in temperature, winds, and fog patterns over relatively short distances are due to variations in airmass between land and sea and to the complex terrain of the coastal mountain ranges. Wind direction is generally west to east; however, there is a great deal of variation due to the complex geography.

Because of the many microclimates of the San Francisco Bay Area, mariners who navigate the waters from outside the Golden Gate, through the San Francisco Bay and Delta and into the Central Valley must be aware of how weather conditions can change significantly over short distances and over short periods of time. Mariners must also be aware of the unique weather conditions and weather hazards that are most prevalent during each season.

Winds

Winter. Winter is the season with the most significant seas, both in terms of locally driven wind waves as well as open ocean swells that are generated by long fetches of strong winds over the eastern Pacific. Winter winds from November to February shift frequently and have a wide range of speeds dependent on the procession of offshore high and low pressure systems. Calms occur 15 to 40 percent of the time inside the Bay and 10 to 12 percent outside. Extreme wind conditions of 50 knots gusting to 75 knots have occurred during the winter. The strongest winds tend to come from the Southeast to Southwest ahead of a cold front.

Seas are sometimes large enough to produce breakers across the San Francisco Bar, several miles west of the Golden Gate. These breaking waves in the open ocean present a significant danger to mariners, especially those unfamiliar with the area. Breakers across the bar are most common with a long period westerly swell around the time of maximum ebb current through the Golden Gate.

Spring. Spring is generally the windiest season, with average speeds in the Bay of 6-12 knots, with wind speeds of 17-28 knot winds up to 40 percent of the time. Wind speeds sometimes reach gale force over the coastal waters outside the Golden Gate, and approach gale force locally in northern San Francisco Bay. Wind direction stabilizes as the Pacific High Pressure System becomes the dominant weather influence. Northwesterly winds are generated and reinforced by the sea breeze. Inside the Bay, winds are channeled and vary from Northwest to Southwest.

Strong springtime winds over the coastal waters produce rough and choppy seas with a short period swell. The large long-period swells that are common during the winter months still roll through the coastal waters quite often during the early spring, but taper off considerably by late spring as the storm track across the Pacific becomes less active.

Summer. Summer winds are the most constant and predictable. The winds outside the Golden Gate are normally from Northwest to North and are generated by the strong Pacific High Pressure System. This condition lasts through October until the system weakens and the winter cycle starts again. Winds inside the Bay are local depending on the land contours acting on the onshore flow. One of the few occurrences that will alter this pattern is when a high pressure system settles over Washington and Oregon. When this happens a Northeast flow develops, bringing warm dry air and clearing away the summer fog.

Small craft advisory conditions (20 to 25 knots) occur nearly every day in summer through the central and northern San Francisco Bay and eastward through the Carquinez Strait. Wind speeds sometimes locally reach 30 knots in these areas. Gales are rare in summer, but can occur during an unusually intense onshore push.

During the summer months, seas in the coastal waters are mostly generated from local winds and therefore have a short period and tend to be choppy. Large, long-period swells from the open ocean contribute much less to the overall wave height than during the late fall to early spring time frame.

Safety Considerations in Severe Weather: Large Vessels and Tugs with Tows 1600 Gross Tons or Greater

Extreme wind conditions occasionally require the San Francisco Bar to be closed to vessel traffic. The following best practices apply to large vessels of 1600 gross tons or more and to tows with tugs of 1600 gross tons or more. They are meant to serve as guidelines, and are not meant to relieve the mariner of his or her responsibility to follow applicable rules and regulations addressing prudent seamanship.

Factors to consider when closing the Bar or limiting transits in the Bay. A number of factors must be considered when limiting transits in the Bay or closing the Bar due to severe weather, including sea state, tidal influences, visibility, traffic density, and wind advisories issued by NOAA. The size, class and condition of the vessels being addressed must also be considered. The HSC recommends a tiered approach, applying greater caution as conditions worsen.

Sustained winds exceeding 25 knots in the Bay

- Vessels should closely evaluate whether it is safe to transit in the Bay. Size, class and sail area of the vessel, tidal influences, visibility, and traffic density should all be considered.
- VTS San Francisco will establish regular communications with bridge watches of VTS users in Bay Area anchorages, and more closely monitor swing circles to ensure vessels are not drifting.

Sustained winds exceeding 40 knots in the Bay

- Transits to and from berths are not recommended.

Sustained winds exceeding 40 knots and/or seas exceed 12 ft at the Sea Buoy

- Bar traffic restrictions and closure should be considered. Size and class of the vessel, draft, swell period, tidal influences, visibility, and traffic density should all be considered. Strong ebb tides should be avoided, and a minimum of 10 feet under-keel clearance is recommended.

Procedures for Closing the Bar or Restricting Bar Traffic

- Bar closures are exercised on a situational basis without specifically defined weather or security conditions.

- The most recent San Francisco Bar Pilot over the Bar, inbound or outbound, shall make the recommendation to the dispatcher that the Bar should be considered for closure, or traffic limited to one-way traffic.
- In the event that the station boat is "boarded off," then the station boat captain will make the recommendation to the dispatcher.
- The dispatcher will then notify the Operations Pilot, who will notify the Port Agent.
- The Operations Pilot or Port Agent will then notify the U.S. Coast Guard VTS and Command Duty Officer at the Sector San Francisco Command Center.
- The Captain of the Port will consult with the Operations Pilot or Port Agent prior to closing the bar under Captain of the Port authority. The Coast Guard will then issue a Marine Safety Broadcast communicating the closure or traffic restriction.
- The procedure for lifting traffic restrictions or re-opening the Bar will be the same as that for restricting traffic or closing the Bar.
- Vessels under Federal Pilotage or Public Vessel may petition the Captain of the Port to transit the San Francisco Bar.

Safety Considerations in Severe Weather: Tugs with Tows Less Than 1600 Gross Tons

The winter months from November to February typically bring storm systems to the Bay area that result in high winds and adverse sea conditions. Extreme wind conditions of 50 knots gusting to 75 knots have occurred during the winter, occasionally requiring the San Francisco Bar to be closed to tug and tow traffic.

These best practices are meant to serve as guidelines, and are not meant to relieve the mariner of his or her responsibility to follow applicable rules and regulations addressing prudent seamanship. Furthermore, they are designed to address vessels in the service of routine cargo transport, and are not meant to prohibit tug rescue or salvage operations.

Factors to consider when closing the Bar or limiting transits in the Bay. A number of factors must be considered when limiting transits in the Bay or closing the Bar due to severe weather, including sea state, tidal influences, visibility, traffic density, and wind advisories issued by NOAA. The size and condition of the vessels being addressed must also be considered. The Tug Escort Work Group recommends a tiered approach, applying greater caution as conditions worsen.

Sustained winds exceeding 25 knots in the Bay

- Tugs with tows should closely evaluate whether it is safe to transit in the Bay. Size and sail area of the vessel, tidal influences, visibility, operator skill and traffic density should all be considered.

- VTS San Francisco will establish regular communications with bridge watches of VTS users in Bay Area anchorages, and more closely monitor swing circles to ensure vessels are not dragging.

Sustained winds exceeding 40 knots in the Bay

- Transits to and from berths are not recommended, but may be performed following a careful risk management evaluation by the vessel operator and vessel management.

Sustained winds exceeding 40 knots and/or seas exceed 12 ft at the Sea Buoy

- Bar traffic restrictions and closure should be considered for tugs and tows. Size of the vessel, draft, swell period, tidal influences, visibility, and traffic density should all be considered. Strong ebb tides should be avoided, and a minimum of 10 feet under-keel clearance is recommended.

Fog

Fog is a common occurrence in the Bay Area, particularly around the Golden Gate. It is most frequent during the summer, occasional during fall and winter, and infrequent during spring. Although daily and seasonal fog cycles are predictable, long-term fluctuations are not. Fog patterns can differ within the Bay region on the same day because of the unique geography of the Bay, which consists of two mountain ranges and the large expanse of bays and a major river system. Depending on the location, an area may experience high, dense or relatively little fog. The following is a brief summary of fog conditions in the Bay.

Winter. Winter fogs are usually radiation fog or “tule” fog. With the clear skies and light winds of winter, land temperature drops rapidly at night. In low, damp places such as the Delta and Central Valley (where tules and marsh plants grow), an inversion develops over the inland valleys. Widespread radiation fog will then develop if the surface is sufficiently moist (e.g., after soaking rains). Tule fog is notoriously thick and dense.

In the winter months from late November to early March, fog can develop in the Valley overnight. Visibilities often fall to near zero in the Delta, southern Sacramento Valley, and northern San Joaquin Valley, making marine navigation in these areas difficult. Lowest visibilities occur late during the night through mid-morning hours. Visibilities improve by late morning and often the fog layer lifts into a low overcast during the afternoon.

Sometimes, if there is a light offshore flow during a tule fog event, dense fog can drift westward from the Delta through the Carquinez Strait and into San Francisco Bay. Visibilities can drop below 0.5 mile and stay below 0.5 mile for many hours, and in worst cases, several days. In contrast to the summer fog that moves from sea to land at about 14 knots, the winter tule fogs move slowly seaward at about one knot.

Summer. Summer fog is dependent on several routine conditions. The Pacific High becomes well established off the coast and maintains a constant Northwest wind. It also drives the cold California Current south and causes an upwelling of cold water along the coast. Air closest to the surface becomes chilled so that the temperature increases with altitude. This process forms an inversion layer at 500-1500 feet, where the air is warmer at this level than the air below it. Moist, warm ocean air moving toward the coast is cooled first by the California Current, then more by cold coastal water. Condensation occurs and fog will form to the height of the inversion layer. This happens often enough to form a semi-permanent fog bank off the Golden Gate during the summer.

Under normal summer conditions a daily cycle is evident. A sheet of fog forms off the Golden Gate headlands during the morning and becomes more extensive as the day passes. As the temperature in the inland valleys rises, a local low pressure creates a steady onshore wind. By late afternoon, the fog begins to move through the Golden Gate at a speed of about 14 knots on the afternoon sea breeze. Once inside the Bay it is carried by local winds. In general, the northern part of the Bay is the last to be enveloped and the first to clear in the morning. There are times when the flow is strong enough to carry the sea fog as far east as Sacramento and Stockton. If this continues for a number of days, cooler ocean air replaces the warm valley air and causes the sea breeze mechanism to break down. Winds then diminish and the Bay Area clears for a few days; the valley then slowly reheats and the cycle begins anew.

Safety Considerations in Reduced Visibility

Navigating the San Francisco Bay Region during periods of reduced visibility requires mariners to exercise additional caution and vigilance. The Bay region is one of the foggiest harbors in the United States. In-Bay distances are long. There is not a single regional climate, but a series of microclimates with variable fog. During summer, 30 to 40 percent of parts of the Bay may experience foggy conditions. In winter, the fog is generally denser tule fog.

Dense fog is defined by the National Weather Service as fog that reduces visibility to one-half mile or less on the San Francisco Bay or to one mile or less over the coastal waters. Spring and summer fog is not usually dense over the bays and into the Delta and Central Valley. However, fog can often be dense over the coastal waters when the marine layer is shallow (typically less than 1000 feet deep). During shallow marine layer

scenarios, the coastal mountains act as a barrier blocking fog and low clouds from moving inland. Even with a shallow marine layer, fog can still advect into the Bay through the Golden Gate. In this situation, dense fog is almost always limited to local sections of the San Francisco Bay, primarily from the Golden Gate to Berkeley.

Large Vessels and Tugs with Tows 1600 Gross Tons or greater. The following guidelines should be used by the mariner when planning, initiating or navigating a transit in the Bay during periods of reduced visibility. These guidelines acknowledge that large vessels are not as maneuverable as smaller vessels and therefore define "Large Vessels" as power driven vessels of 1600 gross tons or more, and tugs with tows of 1600 gross tons or more. Mariners are at all times to comply with the requirement of the International Regulations for Avoiding Collisions at Sea, or COLREGS.

Critical Maneuvering Areas (CMAs). There are areas within the Bay where additional standards of care are required due to the restrictive nature of the channel, proximity of hazards, or the prevalence of adverse currents. Large vessels should not transit through CMAs when visibility is less than 0.5 nautical miles.

Locations within the Bay identified as Critical Maneuvering Areas:

Redwood Creek

San Mateo-Hayward Bridge

Oakland Bar Channel*

Islais Creek Channel

Richmond Inner Harbor

Richmond-San Rafael Bridge, East Span

Union Pacific Bridge

New York Slough, up-bound

Rio Vista Lift Bridge

*Note: the Oakland Bar Channel is identified due to cross currents and its proximity to the Bay Bridge and Yerba Buena Island.

Vessels docked: Large vessels at a dock within the Bay should not commence a movement if visibility is less than 0.5 nautical miles at the dock.

Vessels proceeding to dock: Large vessels proceeding to a dock should anchor if visibility at the dock is known to be less than 0.5 nautical miles, unless, under all circumstances, proceeding to the dock is the safest option.

Tugs with Tows less than 1600 Gross Tons. These best practices should be used by the mariner when planning, initiating or navigating a transit in the Bay during periods of reduced visibility. They acknowledge that the size of a tug and tow have much to do with their maneuverability, and therefore, are limited to tugs with tows with a displacement of less than 1600GT. Finally, the best practices are meant to serve as guidelines, and are not meant to relieve the mariner of his or her responsibility to follow applicable rules and regulations addressing prudent seamanship including the requirement of the International Regulations for Avoiding Collisions at Sea, or COLREGS.

Critical Maneuvering Areas (CMAs): The areas within the Bay where additional standards of care are required due to the restrictive nature of the channel, proximity of hazards, or the prevalence of adverse currents, are listed above. Tugs with tows less than 1600GT should not transit through CMAs when visibility is less than 0.25 nautical miles. Tugs with tows in petroleum service should not transit through CMAs when visibility is less than 0.5 nautical miles.

Locations within the Bay identified as Critical Maneuvering Areas:

Redwood Creek

San Mateo-Hayward Bridge

Oakland Bar Channel*

Islais Creek Channel

Richmond Inner Harbor

Richmond-San Rafael Bridge, East Span

Union Pacific Bridge

New York Slough, up-bound

Rio Vista Lift Bridge

*Note: the Oakland Bar Channel is identified due to cross currents and its proximity to the Bay Bridge and Yerba Buena Island.

Vessels docked: Tugs with tows less than 1600GT at a dock within the Bay should not commence a movement if visibility is less than 0.25 nautical miles at the dock. Tugs with tows in petroleum service at a dock within the Bay should not commence a movement if visibility is less than 0.5 nautical miles at the dock.

Vessels proceeding to dock: Tugs with tows less than 1600GT proceeding to a dock should anchor if visibility at the dock is known to be less than 0.25 nautical miles, unless, under all circumstances, proceeding to the dock is the safest option. Tugs with tows in petroleum service proceeding to a dock should anchor if visibility at the dock is known to be less than 0.5 nautical miles, unless, under all circumstances, proceeding to the dock is the safest option.

Vessel pilots or operators should notify VTS upon determination that a scheduled movement will be delayed or cancelled. If underway, they shall make a sailing plan deviation report per VTS regulations. The operator's local knowledge should include an understanding of historic weather patterns during that time of year, current weather reports and checking with reporting stations along the route. This guidance acknowledges that the Bay region is a series of bays and rivers, in-Bay distances are long and there is not a single Bay region climate, but a series of many microclimates with variable fog. The Captain of the Port has the authority to prohibit movement of vessels within all or portions of the Bay during adverse weather conditions.

Because of the large size of the Bay (500 square miles), the longer distances traveled to the various ports, and the diverse weather conditions encountered in the Bay, mariners are dependent on accurate weather forecasting for vessel movements. The National Weather Service broadcasts marine weather information on VHF WX 1,2,3, and 4.

Currents And Tides

Currents

The currents at the entrance to San Francisco Bay are variable and can attain considerable velocity. Immediately outside the Golden Gate bar is a slight current to the North and West known as the Coast Eddy Current. The currents that have the greatest effect on navigation in the Bay and out through the Golden Gate are tidal in nature.

Golden Gate Flood Current. In the Golden Gate the flood or incoming current sets (direction of flow) straight in with a slight tendency to the northern shores and with heavy turbulence at both Lime Point and Fort Point when the flood is strong. This causes an eddy or circular current between Point Lobos and Fort Point.

Golden Gate Ebb Current. The ebb or outgoing current has been known to reach more than 6.5 knots between Lime and Fort Points. It sets from inside the northern part of the Bay toward Fort Point. As with the flood, it causes an eddy between Point Lobos and Fort Point, and a heavy rip and turbulence reach a quarter of a mile south of Point Bonita.

Golden Gate Current Maximums. In the Golden Gate the maximum flood current occurs about an hour-and-a-half before high water, with the maximum ebb occurring about an hour-and-a-half before low water. The average maximums are 3 knots for the flood and 3.5 knots for the ebb.

In-Bay Currents. Inside the Golden Gate the flood sets to the Northeast and causes swirls and eddies. This is most pronounced between the Golden Gate, Angel Island and Alcatraz Island. The current sets through Raccoon Strait (north of Angel Island), taking the most direct path to the upper Bay and the Delta area. The ebb current inside the Golden Gate is felt on the south shore first. The duration of the ebb is somewhat longer than the flood due to the addition of runoff from the Sacramento and San Joaquin Rivers.

Tides

Tides in the San Francisco Bay Area are semi-diurnal in that there are usually two cycles of high and low tides daily, but with inequality of the heights of the two. Occasionally the tidal cycle will become diurnal (only one cycle of tide in a day). As a result, depths in the Bay are based on "mean lower low water" (MLLW), or the average height of the lower of the two daily low tides. The mean range of the tide at the Golden Gate is 4.1 feet, with a diurnal range of 5.8 feet. During the periodic maximum tidal variations the range may reach as much as 9 feet and have lowest low waters 2.4 feet below mean lower low water datum.

Safety Considerations Associated with Current and Tide Conditions. In late 1991, the National Oceanic and Atmospheric Administration (NOAA) stopped publishing the local tidal current charts due to significant errors in predictions that exceeded NOAA standards. Because safe navigation is highly dependent upon accurate tidal and current information, the Physical Oceanographic Real Time System (P.O.R.T.S.) was installed to give near-real time tide and current data updated every six minutes. P.O.R.T.S. is managed by the Marine Exchange of the San Francisco Bay Region (SFMX) with technical assistance from NOAA/NOS. Consistent funding is still to be identified for long term operation of the system in the Bay.

P.O.R.T.S continues to be of great benefit to recreational boaters, commercial shippers, vessel masters and pilots in providing accurate knowledge of winds, currents and other environmental parameters used by the San Francisco maritime community.

Data from the sensors is collected and subject to automatic preliminary quality control at the Data Acquisition System (DAS) located at the SFMX. The data is quality-tested in much greater detail on a 24-hour/7-day per week basis under a program called the Continuous Operating Real Time Monitoring System or CORMS. CORMS employs knowledgeable oceanographers at NOAA's National Ocean Service headquarters in Silver Spring, Maryland, who monitor the data quality and sensor performance using data quality control tests and remote sensor and DAS diagnostics.

Management of P.O.R.T.S., including administration, field maintenance and repair and the DAS, was handed over to the SFMX, located at Lower Fort Mason Center in San Francisco. The P.O.RT.S. Advisory Workgroup is studying various funding options in order to continue operating the system, and has made a recommendation to request general State funding.

Access to P.O.R.T.S. information may be obtained by logging onto the SFMX website at www.sfmx.org or by contacting the automated voice response number: (866) 727-6787.

Marine Weather Services

The National Weather Service (NWS), a part of the National Oceanic and Atmospheric Administration (NOAA), provides marine weather warnings and forecasts to serve all mariners who use the waters for livelihood or recreation. The warning and forecast program is the core of the NWS's responsibility to mariners. Warnings and forecasts help the mariner plan and make decisions protecting life and property. The NWS also provides information through weather statements and outlooks that supplement basic warnings and forecasts. The following are the basic marine warning products the NWS offers:

Small Craft Advisory: Forecast winds of 22 to 33 knots and/or hazardous sea conditions (usually seas greater than 10 feet).

Gale Warning: Forecast winds of 34 to 47 knots.

Storm Warning: Forecast winds of 48 knots or higher.

Dense Fog Advisory: Visibility reduced to one-half mile or less in the bay. Visibility reduced to one mile or less in the coastal waters.

Special Marine Warning: Potentially hazardous over-water events of short duration (two hours or less) such as thunderstorms with strong gusty winds.

Advisories and warnings listed above are headlined in the Coastal Waters Forecast (CWF). In addition to headlining hazardous weather conditions, the CWF includes forecast information on wind speed and direction, waves, swell, and significant weather (including fog, rain or showers, and thunderstorms). Beginning in March 2006, NWS San Francisco Bay Area began issuing a specific forecast for the San Francisco Bar as part of the Coastal Waters Forecast (CWF) product. The bar forecast includes expected sea state conditions for the next two periods (e.g., tonight and tomorrow), times of maximum ebb current through the Golden Gate and across the bar, and expected hazards such as a small craft advisory for hazardous bar conditions and/or breaking waves on the bar. The bar forecast is updated four times a day along with the rest of the CWF.

Marine Warning and Forecast Dissemination

Marine weather observations, forecasts, and warnings are disseminated through a wide variety of methods, including those listed below.

NOAA Weather Radio (NWR): The NWR network provides voice broadcasts of coastal marine forecasts on a continuous cycle. Broadcast coverage extends across the bays and typically offshore about 25 nautical miles. When severe weather threatens, an alarm tone is sent to automatically turn on compatible NWR receivers in the transmitter's coverage area. Transmitters that broadcast in the San Francisco Bay Area include:

Frequency	Call Sign	Location
162.400 MHz	KHB-49	San Francisco (Mt. Pise)
162.500	KDX-54	San Francisco North Bay Marine (Big Rock Ridge)
162.550	KEC-49	San Jose/Monterey (Mt. Umunhum)
162.450	WWF-64	San Jose/Monterey Marine (Mt. Umunhum)
162.425	KZZ-75	East Bay/Delta (Mt. Diablo)

The Internet

- National Weather Service San Francisco Bay Area: weather.gov/sanfrancisco
- NWS San Francisco Bay Area marine forecast web page: www.wrh.noaa.gov/mtr/marine.php
- Point and Click Marine Forecast: The NWS now offers the opportunity to get a site-specific forecast instead of relying on a zone forecast: www.wrh.noaa.gov/firewx/fwpfm/fwpfm.php?wfo=mtr&interface=marine

  By selecting any spot on the interactive map, the web page user will receive a forecast table that will include specific information on winds, waves, swells and other parameters for the next seven days.

- Buoy and Coastal Observation Information: Wind and wave data from offshore buoys, as well as other coastal weather observations, can be found at: www.wrh.noaa.gov/mtr/buoy.php

Buoys data can also be obtained over the phone using the National Data Buoy Center's "dial-a-buoy" service: 1-888-701-8992.

Use the buoy number below when prompted to access the latest buoy observations.

Buoy #	**Lat/Long**	**Location**
46013	38.2N/123.3W	Bodega Bay
46026	37.8N/122.8W	San Francisco
46012	37.4N/122.9W	Half Moon Bay
46042	36.8N/122.4W	Monterey

XI. Small Passenger Vessels – Ferries

Small passenger vessels (ferries) operate year round on San Francisco Bay, San Pablo Bay and their tributaries, carrying nearly six million passengers on 240 transits per day. In total, passenger vessels made up nearly 60 percent of all transits tracked by the San Francisco USCG Vessel Traffic Service (VTS) in that year. Other ferries carry tourists and dinner cruises year round in the Central Bay.

In 2007, the state legislature established the San Francisco Bay Area Water Emergency Transportation Authority (WETA), as a regional agency with responsibility to develop and operate a comprehensive Bay Area public water transportation system and to increase the emergency response capability of waterborne transit. WETA is charged with: consolidating Vallejo and Alameda Ferry services under WETA, consistent with the provisions of a Transition Plan by July 1, 2009; coordinating emergency response activities for water transit services in cooperation with MTC and other agencies, consistent with the provisions of an Emergency Response Plan by July 1, 2009; and increasing regional mobility by adding seven new ferry routes to triple ferry ridership by 2025. The first new ferry route is proposed between South San Francisco's Oyster Point Marina and Oakland's Jack London Square and depending on funding availability will begin service in late 2010.

WETA is committed to using the most environmentally friendly ferries in the nation and setting a national air emissions standard with its fleet of ferries. By the end of 2009 WETA's first four 25 knot vessels will be operating in the Bay Area on existing regular commuter ferry routes and will be available as spare vessels in the event of an emergency. The first, Gemini, was delivered in December 2009 and is being used on the Tiburon and Alameda/Oakland ferry routes.

Because of concerns associated with an increasing number of commuter ferries sharing the Bay with large shipping vessels and recreational boaters, the HSC requested the Ferry Operations Work Group develop an approach and maneuvering scheme in the vicinity of the congested San Francisco Ferry Building, as well as a routing protocol in the Central Bay to decrease the risk of collision for commute ferries. The routing was adopted by the HSC in 2008, and is included at the end of this chapter.

Small Passenger Vessel Services

Small passenger vessels are defined as less than 100 gross tons that are inspected and certified by the U.S. Coast Guard to carry passengers for hire. "T" vessels carry fewer than 149 passengers, "K" vessels carry more than 149 passengers. One "H" vessel (larger than 100 gross tons) is based in San Francisco.

Note: This overview is meant to describe larger private and public vessel operators and does not include the sport fishing or smaller vessel operators that meet the definition of small passenger vessel.

Ferry: Regularly scheduled, operate year round, and provide point-to-point service.

Regularly-Scheduled and Excursion: Seasonal and year round scheduled service, including sightseeing tours, dining, and/or entertainment.

Geographical Scope. Ferry routes bring passengers from outlying cities in the region to the city of San Francisco. Excursion routes operate primarily in the central San Francisco Bay. The following are small passenger vessel terminal locations as of December 31, 2008:

- San Francisco Downtown Ferry Terminal
- Fisherman's Wharf, San Francisco
- San Francisco China Basin Ferry Terminal
- Larkspur Terminal
- Gateway Alameda
- Clay St. Oakland
- Harbor Bay Isle, Alameda
- Vallejo
- Sausalito
- Tiburon

Small passenger vessels also operate on an unscheduled basis out of marinas in Sausalito, Alameda, Oakland and Berkeley.

Small Passenger Vessel Safety Program

U.S. Coast Guard San Francisco Vessel Mutual Assistance Plan. The purpose of the San Francisco Vessel Mutual Assistance Plan (SF V-MAP) is to ensure that a sufficient level of safety exists. It is intended to enhance local capabilities to effectively manage a catastrophic, in port Search and Rescue incident. The objectives of the SF V-MAP are to:

1. Create a "sufficient level of safety" as required by 46 CFR 117.207(f).
2. Provide effective and expedient emergency support by member vessels for a marine search and rescue operation on San Francisco Bay involving a large number of victims or potential victims.
3. Ensure lifesaving equipment available on each member vessel is appropriate for the waters of San Francisco Bay.
4. Promote professionalism in emergency preparedness and response.
5. Provide, through mutual assistance, a more effective and timely means to rescue all persons in the water (PIW).

Best Practices

S.F. Bay Area ferry operators participated in the Harbor Safety Committee Ferry Operations Work Group to develop common best maritime practices for safe passenger vessel operation in the Bay.

San Francisco Bay Area Ferry Operation in Inclement Weather. As described in the Harbor Safety Plan, localized microclimates can alter visibility along an entire route or a portion of a route. During summer, channel fog is prevalent in the central San Francisco Bay with outer areas clear. In winter months Tule fog can be widespread, dense in the morning with clearing later in the day.

The Master of a ferry is the person in charge of the vessel, responsible for the safety of the passengers and crew at all times, and has the authority to decide if it is safe to get underway or to proceed.

In reduced **visibility** and **inclement weather conditions**, the following practices are followed:

- A go or no-go decision to get underway is made by the vessel Master or the company Operation Manager, based on conditions along the entire route, using all available information including the experience of the Master and operations manager.
- Look-outs: the vessel Master assigns crewmembers for look-out duty based on the existing or anticipated conditions; the applicable regulations are found in the Navigation Rules and Regulations, Rule 5 Look-out (text attached).
- Safe speed: the vessel is required to proceed at a speed appropriate to the prevailing circumstances and conditions, which include state of visibility and the manageability of the vessel with special reference to stopping distance and turning ability. Other factors include participation in fixed ferry routes, wind advisories issued by NOAA, sea state, traffic density, and applicable Navigation Rules and Regulations (see attached verbiage from Rule 6 Safe Speed).
- Equipment: each ferry is required to have at minimum one radar; commuter ferry vessels generally have two operational radars onboard; the vessel Master is required to have a radar observer license endorsement. Global Positioning Satellite, Automatic Identification System and Electronic Charting navigation systems are also installed and used to assist navigation.

In conditions of **high wind and waves**:

- Go/no-go decision is made by the vessel Master or the company Operation Manager, based on conditions along the entire route, using all available information including the experience of the Master and operations manager. Factors to be considered include size of the vessel, direction of the winds and seas, orientation of departure and arrival piers to prevailing conditions, and limitations of ferries to travel at slower speeds.
- Passenger safety: Captain can maneuver the vessel to minimize wave effects. Crew duties include rough weather announcements and passenger safety management.

High Speed Ferry Operations (over 30 Knots). U.S. Coast Guard Navigation and Vessel Inspection Circulars (NAVIC) 5-01 and 5-01 Change 1 provide specific guidance for high speed passenger vessels and include approved vessel operation manuals, training programs and risk assessment tools (matrix).

- Vessel equipment: operators have exceeded minimum requirements for navigation electronics including dual radar, Global Position Satellite and electronic charting with Automatic Identification System overlay.
- Manning/Training: Vessels traveling at high speed are required to have a minimum of two qualified watch-standers during normal operations. Vessel operators have developed approved training programs for high speed navigation in compliance with NAVIC 5-01 and 5-01 Change 1.

Ferry Traffic Routing Protocol

The Bay Area's commute ferry companies/agencies agreed to work with the Harbor Safety Committee, Coast Guard Vessel Traffic Service (VTS), the Water Transit Authority and maritime stakeholder to develop a protocol for ferry navigation in the San Francisco and San Pablo Bays.

The Ferry Operations Work Group conducted a two-year process to develop an approach and maneuvering scheme in the vicinity of the congested San Francisco Ferry Building, as well as a routing protocol in the Central Bay to decrease the risk of collision for commute ferries. The Work Group agreed to protocols and referred them to the Harbor Safety Committee, which adopted the Work Group findings and recommendations in May 2008.

The Ferry Traffic Routing Protocol consists of planned routes and communications procedures for improving ferry navigation safety. When ferries follow routes, the Closest Point of Approach (CPAs) with other ferries is greatest at points where speeds are typically greatest. The adopted routes cross at predetermined locations at nearly right angles, enabling ferries to predict crossing situations and plan ahead.

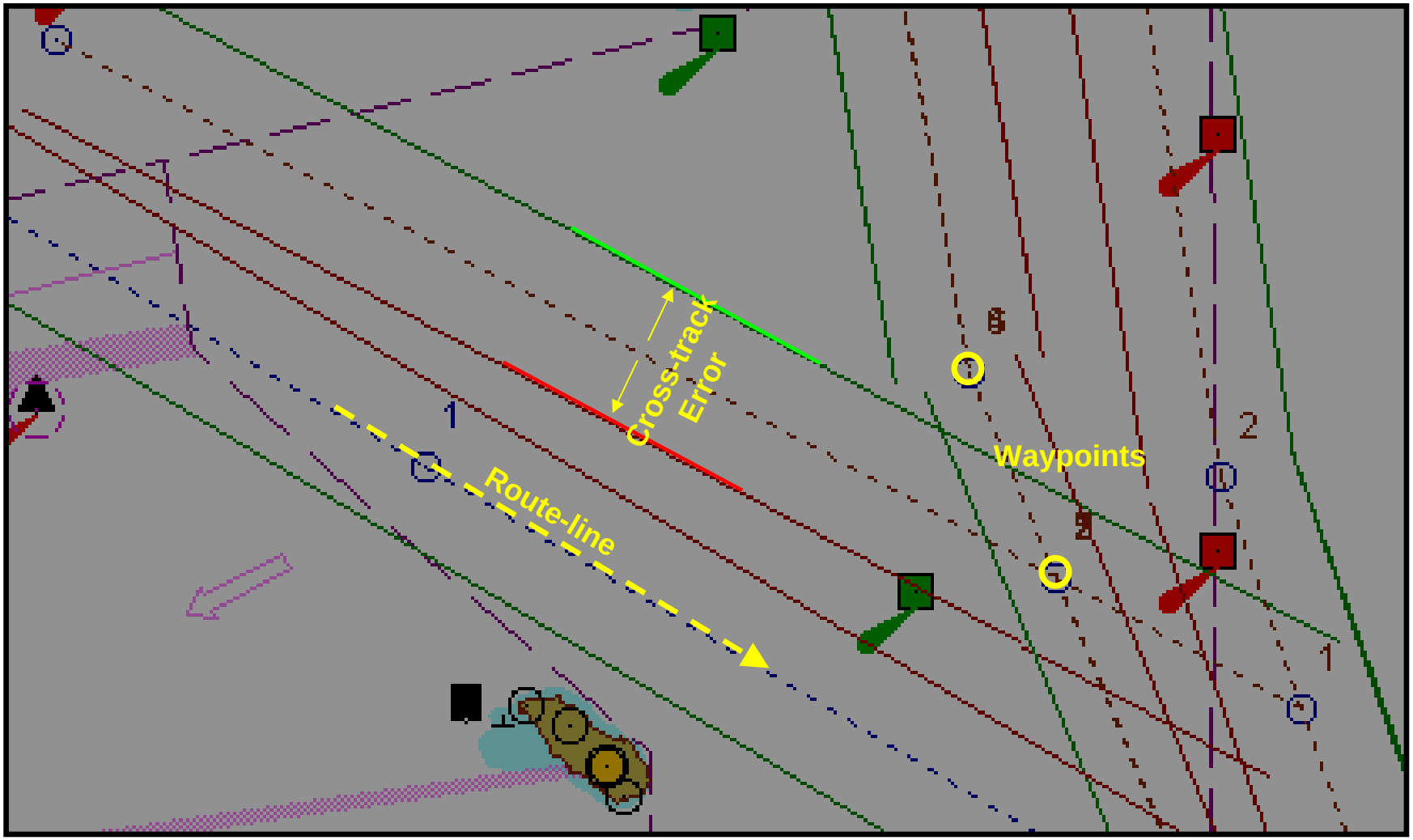
Within an approximately one-half nautical mile zone around the San Francisco Ferry Building, the protocol calls for port-to-port meeting and heightened radio communications. For inbound Ferry Building ferries, the protocol requires planning far enough in advance to avoid getting within approximately one-half nautical mile from the Ferry Building if another ferry is still at the inbounder's dock.

This reduces crowding around the Ferry Building. With ferry routes charted on nautical charts, other types of vessels can more easily predict the locations of ferries and steer clear. The Ferry Traffic Routing Protocol supports aggressive use of electronic nautical charts (ENCs) with intergraded Automatic Identification System (AIS). When all ferries consistently update their AIS data and follow routes, the protocol will ultimately lead to reduced VTS-ferry communications.

Ferry routes and the Ferry Building Approach Zone are shown in Figures 1-7, attached, and are incorporated herein. Diagrams are screen print files from vector-based electronic nautical charts (ENCs). Additional lines and labels were added to the screen print files for emphasis and clarity. For more information contact:

Scott Humphrey
Training Director
Sector San Francisco Vessel Traffic Service
Phone: +1 415 399 7444
Email: scott.humphrey@uscg.mil

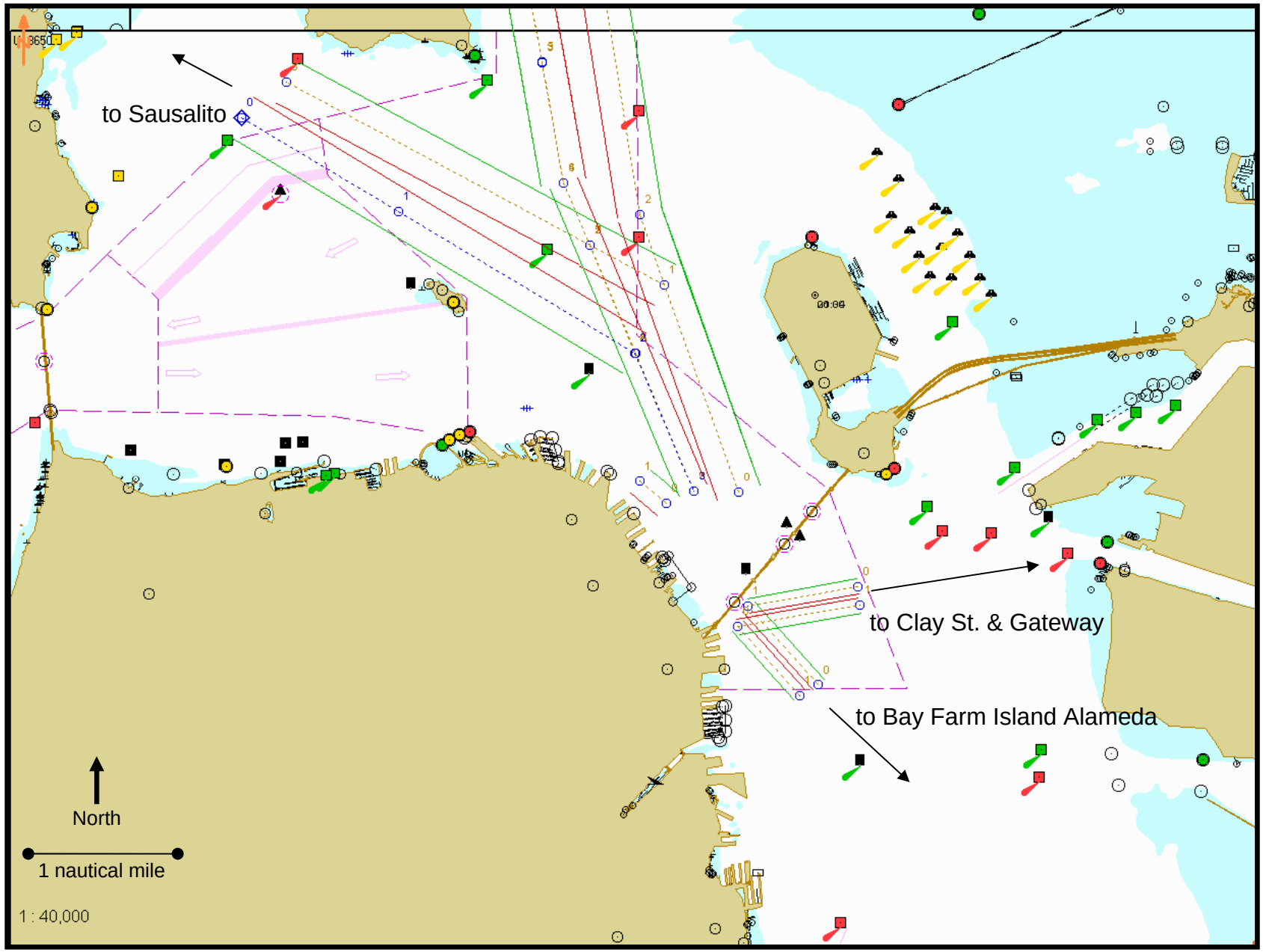
Diagram Key



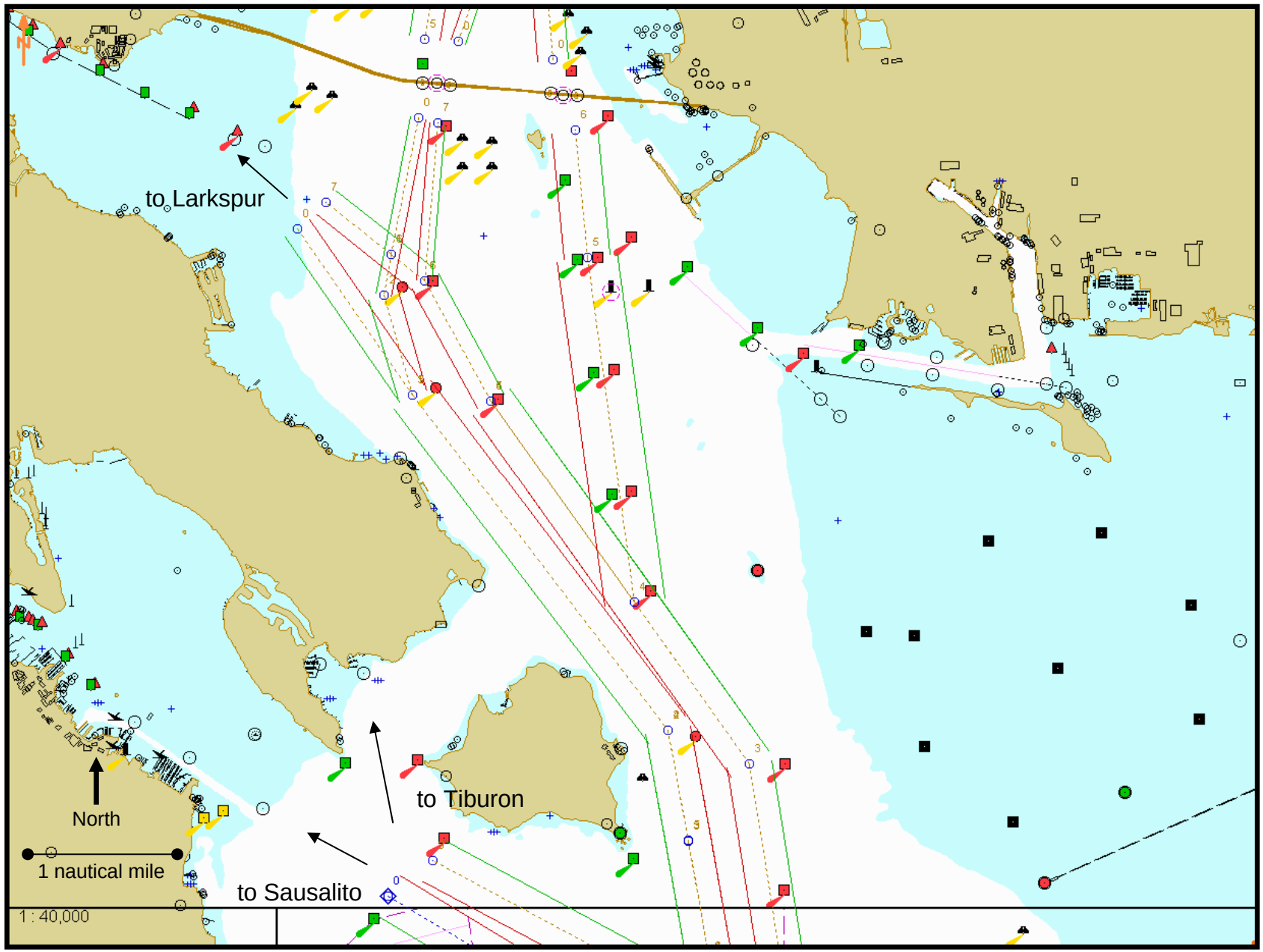
The following chart features are highlighted above.

- Route-line: Centerline of the ferry route.
- Cross-track Error: Left and right of route-line tolerance.
- Waypoints: Turns, route crossing points, and communications points.

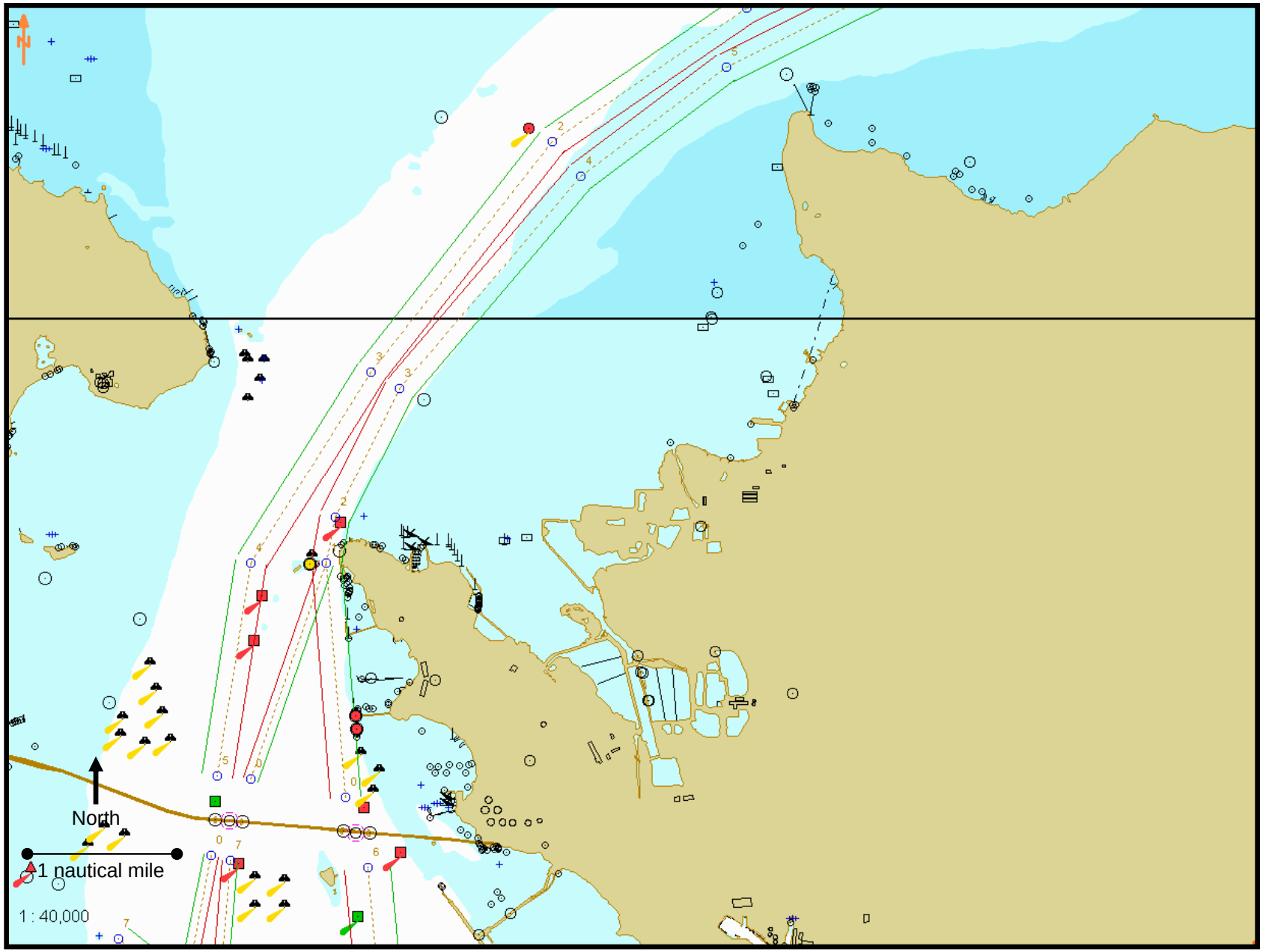
Central Bay and South San Francisco Bay



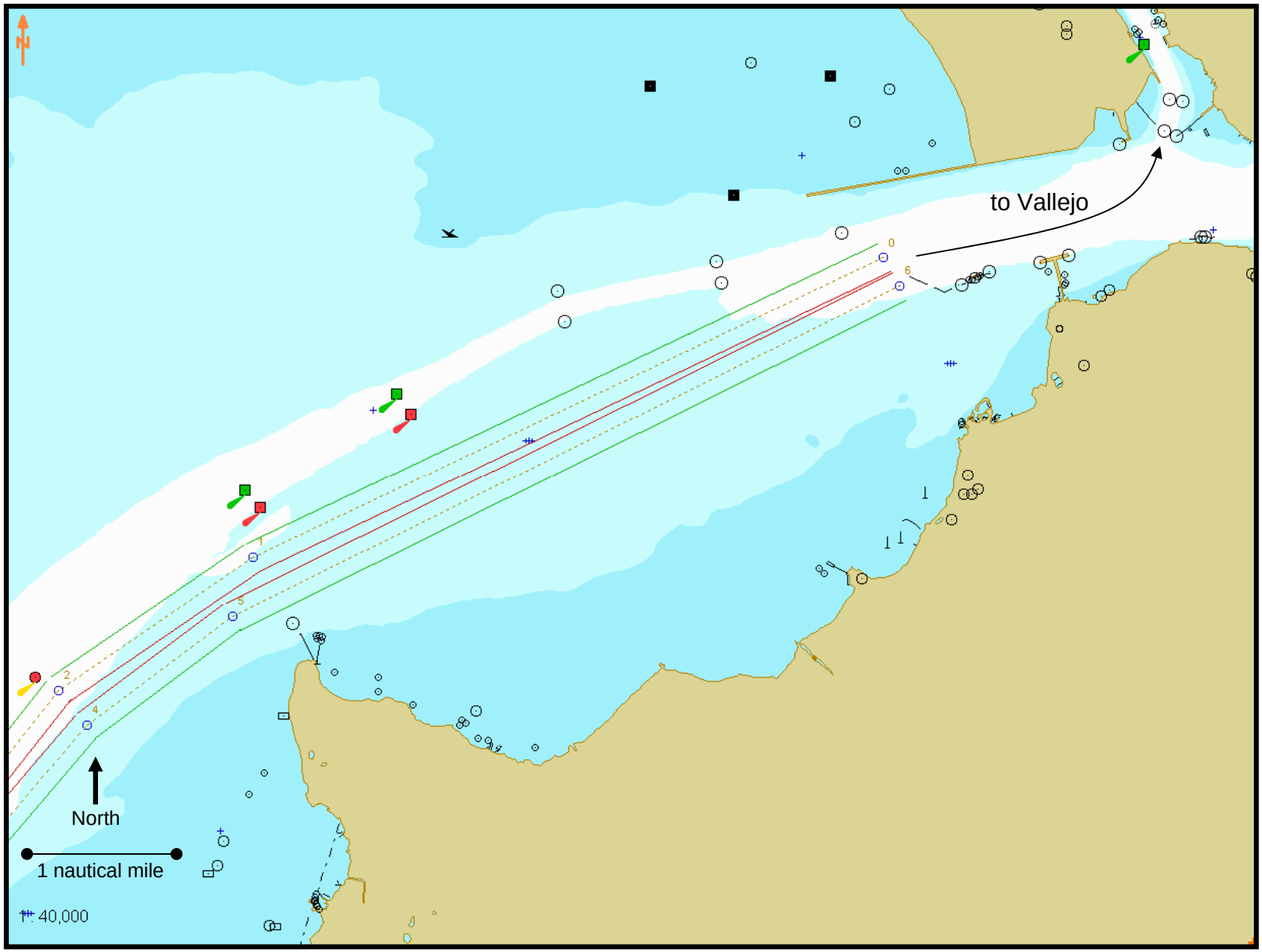
North Channel and Southampton Shoal Channel



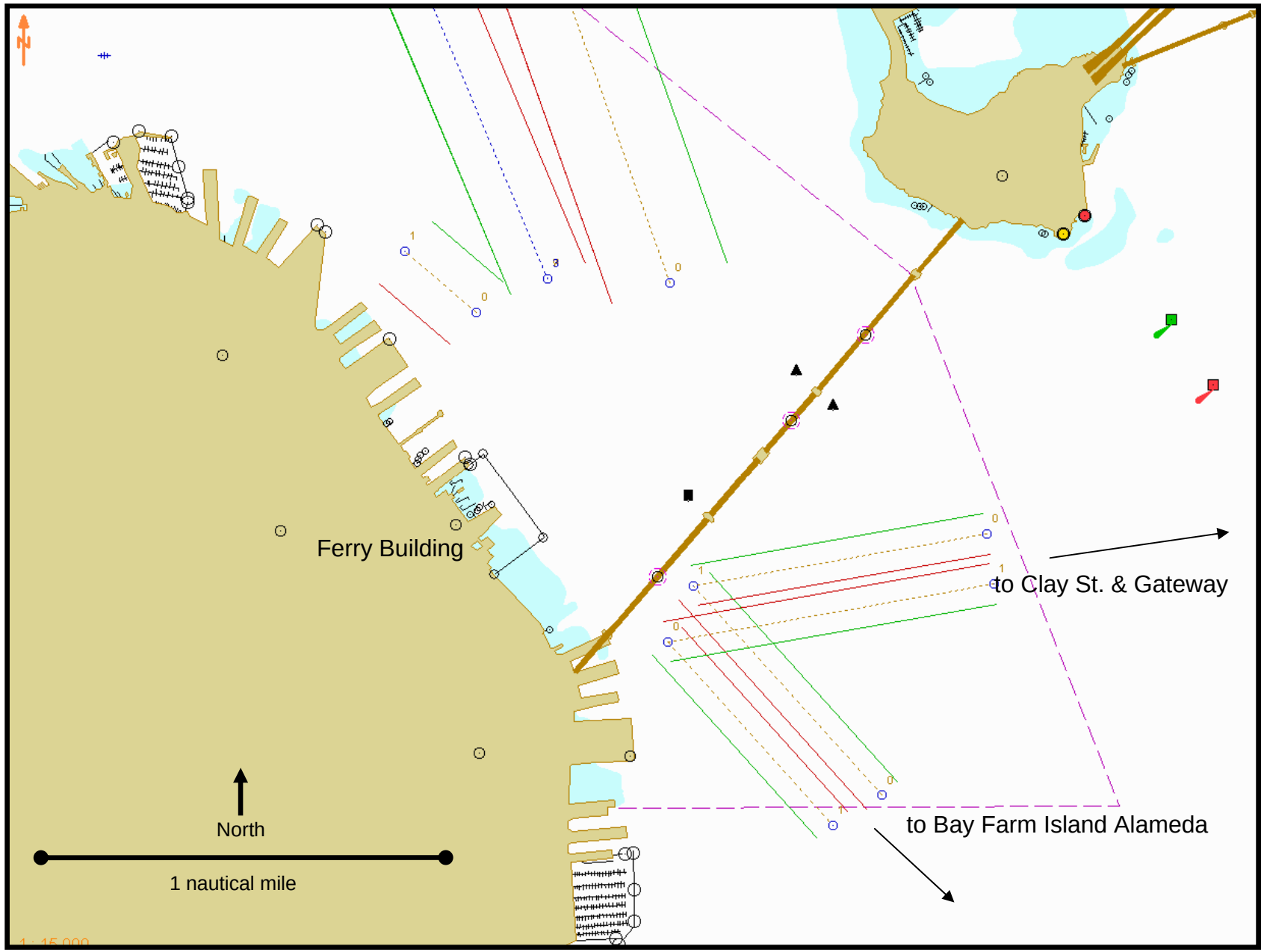
San Pablo Strait Channel



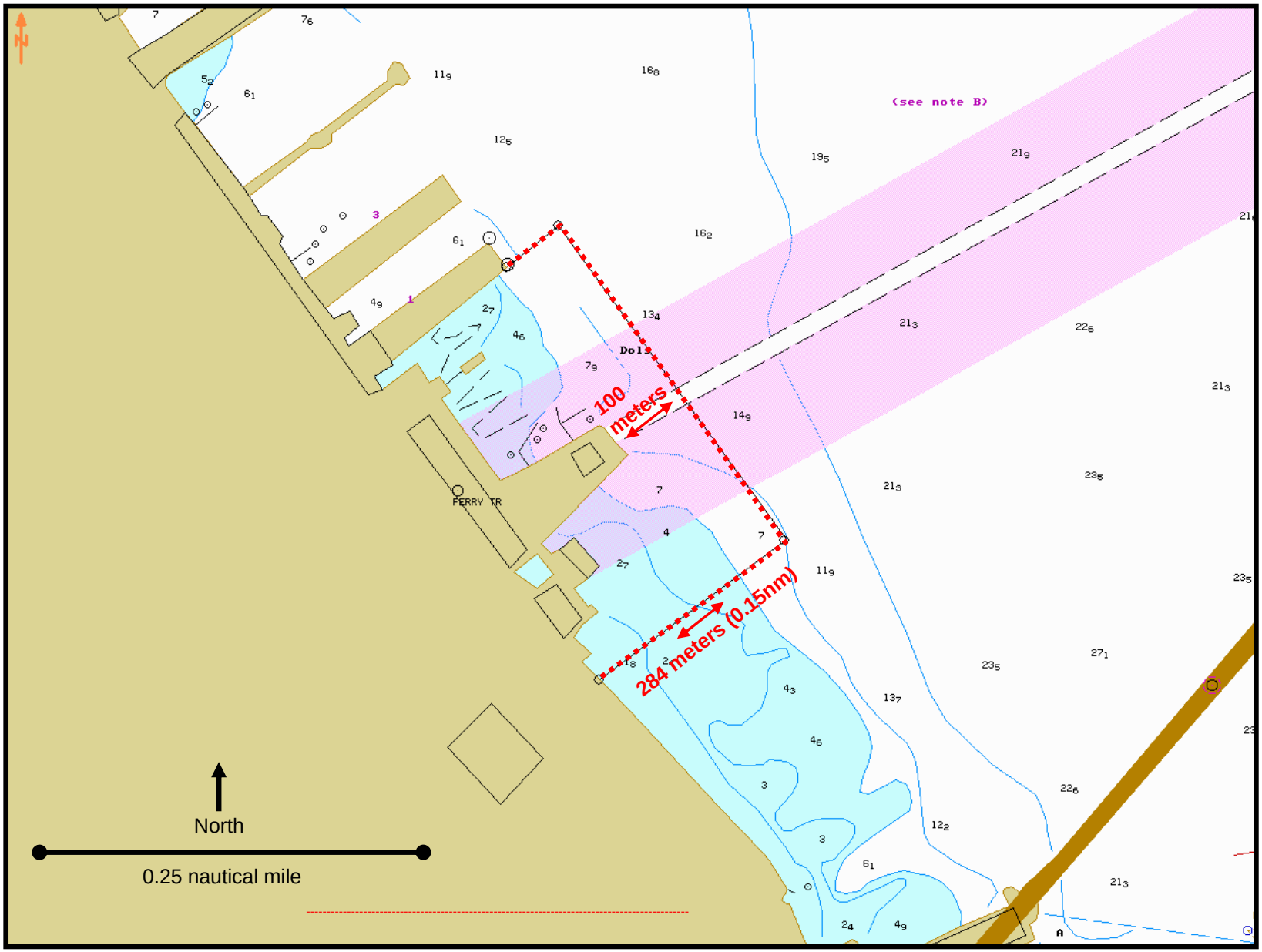
San Pablo Bay and Mare Island Strait



Ferry Building Approach/Departure Zone



Ferry Building Maneuvering Area



Source and Contact Information

Diagrams are screen print files from vector-based electronic nautical charts (ENCs).

Additional lines and labels were added to the screen print files for emphasis and clarity.

For more information contact:

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U.S. Coast Guard Authority to Regulate Vessel Speed

The Federal Ports and Waterways Safety Act of 1972 (33USC1223) grants authority to the Coast Guard to further regulate vessel speed, and specifically states:

> [The Coast Guard] may control vessel traffic in areas subject to the jurisdiction of the United States which the Secretary [of the Department of Homeland Security] determines to be hazardous, or under conditions of reduced visibility, adverse weather, vessel congestion, or other hazardous circumstances by a number of means, including establishing vessel traffic routing schemes and by establishing vessel size, speed, draft limitations and vessel operating conditions.
>
> Under 33 Code of Federal Regulations (CFR) 161.11, the Coast Guard may, through the Vessel Traffic System (VTS), issue measures or directions to enhance navigation and vessel safety and to protect the marine environment, including establishing vessel traffic routing schemes.

International Regulations for Prevention of Collisions at Sea (COLREGS)

Maritime practices accepted worldwide are codified under the International Regulations for Prevention of Collisions at Sea (COLREGS), which address look-outs, safe transit speed, risk of collision, and conduct of vessels in restricted visibility.

Rule 5, Look-outs, states that "Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision."

Rule 6 states, in part, that, "Every vessel shall at all times proceed at a safe speed so that the vessel can take proper and effective action to avoid collision and be stopped within distance appropriate to the prevailing circumstances and conditions." Rule 6 continues, stating that factors to be taken into account in determining a safe speed include, but are not limited to, the state of visibility and the manageability of the vessel with special reference to stopping distance and turning ability in the prevailing conditions.

Rule 7 addresses risk of collision, and states, in part, that, "Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt such risk shall be deemed to exist."

Rule 19, Conduct of Vessels in Restricted Visibility, states, in part, that, "Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility [and] every vessel shall have due regard to the prevailing circumstances and conditions of restricted visibility when complying with the Rules...."

XIV. Tug Escort / Assist For Tank Vessels

In 1990, Senate Bill 2040 (the Oil Spill Prevention and Response Act) established that tug escorting was beneficial for tanker operations and directed expeditious development of escorting regulations for San Francisco Bay. The requirement is based on the legislative finding that there is a navigational safety advantage of tug escorts. Tug escorts can improve tanker safety in at least two ways. Tug escorts can serve as emergency maneuvering aids in the event of loss of steering or propulsion, and a tug escort may also assist as an independent aid in the navigation of a tanker.

The Final Report of the States/British Columbia Oil Spill Task Force (1990) concluded that the risk of an oil spill could be reduced by eight to 11 percent with the mandatory use of tug escorts. That report, endorsed by the State of California, suggested that the escorts be highly maneuverable, have speed complementary to the tanker with sufficient power to control tanker direction, and that the power and number of escort tugs should be proportionate to the deadweight tonnage of the tanker.

The Harbor Safety Committee (HSC) established a Tug Escort Subcommittee, which created Interim Guidelines for tug escorting in San Francisco Bay. The Interim Guidelines recommended: minimum requirements for tug escort equipment and crews; a formula for matching tugs to tankers; establishing a central Clearing House to measure bollard pull and monitor and document compliance with the regulations; setting tug escort zones in the Bay; and various operational considerations. OSPR caused emergency regulations to be established in the winter of 1992 based on the Interim Guidelines.

In the spring of 1993, the HSC adopted a revised set of Permanent Guidelines to supersede the emergency regulations. The Permanent Tug Escort Guidelines differed from the Interim Guidelines in a number of significant respects. The Permanent Guidelines altered the formula for matching tugs to vessels by changing the bollard pull formula from ahead static bollard pull equal (or greater) than the dead weight tonnage of a regulated vessel to the astern static bollard pull in the same ratio. Additionally, performance standards for stopping a tanker; equipment standards and inspection of tugs; positioning of regulated vessels; and training requirements for tug escort crews were established. During the State's administrative process, OSPR chose to reject the permanent guidelines on the basis of their lack of rationale and scientific basis for matching tugs to tankers.

The subcommittee began what grew into a two-year process of preparing a scientific study of how to match escort tugs to tankers, with the assistance of a consultant and by holding extensive public hearings on the results of the study. Based on state funding concerns and time limitations, industry volunteered to engage a consultant in conjunction with an industry-based Technical Advisory Group and the Tug Escort Subcommittee acting as a policy board. Glosten Associates was hired to prepare a professional study focusing on the specifics of tug escorting on San Francisco Bay. Additionally, the State funded a peer reviewer, Michael M. Baristas of the University of Michigan, to review the consultant's work and to mitigate concern regarding bias. Their reports were completed in the winter of 1994.

The Glosten Study had adopted a dual-failure standard (the simultaneous loss of both propulsion and steering) as the basis for measuring the force (tanker demands) required to recover from the tanker machinery failure and remain within the tactical area of performance. Further, the tactical area was based on the ninety-fifth percentile of success in stopping the tanker within the available reach and transfer. After review of the enabling scope of work and industry concerns regarding the likelihood of a dual failure and the attendant tanker demands, the dual standard was thought to be unreasonable. The subcommittee set up various working groups to review failure probability, waterway characteristics, and commercial and navigational safety implications of demand standards and requested that Glosten calculate demands based on single failures.

These efforts resulted in a second Glosten Study and reports on failure probability and waterway specific characteristics. The subcommittee reviewed these reports and adopted a single failure standard for the development of matching criteria.

The process involved close involvement and participation by the interested public and OSPR. On August 10, 1995, the full Harbor Safety Committee reviewed and adopted the Tug Escort Subcommittee's guidelines on a vote of twelve to one. The HSC promptly transmitted the new guidelines and recommendations to OSPR for implementation.

The Committee publicly reviewed the regulatory language proposed by OSPR. During the review of the regulations, several issues were identified as not being in compliance with the Committee's recommendations. The most critical issues were related to the intended use of checklists to review and develop a transit-specific plan versus OSPR's new requirements that plans be filed with OSPR thirty days in advance. OSPR subsequently agreed to modify its proposed language to comply with the intent of the Committee's guidelines, which the Committee adopted in January 1996.

OSPR held a public hearing on the proposed permanent tug escort regulations on March 19, 1996. Approximately 15 people testified at the hearing. Most supported the new regulations but a sizable group protested the use of a single-failure standard instead of a dual-failure standard. Many of those who commented also suggested minor modifications to the regulations, such as individualized, company-specific check lists and reducing pilot liability. Written comments were also received.

In addition to the public hearing process on regulations, OSPR is required by law to have regulations reviewed by the State Inter-Agency Oil Spill Prevention Committee, which reviewed and approved the regulations for implementation, and by the OSPR Technical Advisory Committee, which is purely advisory and has no approval or disapproval authority. The issue of dual- versus single-failure standard was again debated and it was concluded to continue with the single-failure standard.

The Tug Escort regulations became effective January 1, 1997. (See Appendices for current list of certified tug escorts, the current Clearing House Report on escorted vessel movements and for Amended Tug Escort Regulations.) There have been no significant issues in implementing the regulations.

It should be noted that the 1997 Tug Escort regulations require that:

> The OSPR Administrator shall review the matching criteria and other program elements within two years of the effective date of this subchapter. The program review will include a survey of the tanker-related incidents in U.S. waters to determine the types of failures that have occurred, an assessment of tug technology and any advances made in design and power, and the tug escort organizations. At the conclusion of the review, the Administrator will determine whether it is necessary to modify the tug/tanker matching criteria or any other provision of the program requirements....

The OSPR review to determine whether any changes should be made to the tug/tanker matching formula met the January 1, 1999 deadline; however, the regulations did not require a report and none was prepared. Rather than conduct a review every two years, the HSC, on behalf of the Administrator, reviews incidents on an ongoing basis at its monthly meetings. If further evaluation is warranted, issues are referred to the appropriate Work Group for additional analysis. Any findings and recommendations are brought before the full Committee for discussion and vote.

Subsequently, in 2001-2002, the HSC Tug Escort Work Group initiated a "sunshine" review of the entire tug escort regulations for the San Francisco Bay Region. The Work Group met for a one-and-a-half year period. The meetings were well attended by representatives of tanker operators, tug operators, the San Francisco Bar Pilots, marine terminal operators, the U.S. Coast Guard, OSPR, State Lands Commission, the San Francisco Marine Exchange and a host of other local maritime professionals.

The cornerstone of the regulatory review was a thorough examination of the tug/tanker matching matrix. The Work Group met with Dr. David Gray, Naval Architect of Glosten Associates from the Seattle-based company that developed the original tug/tanker matching matrix. Dr. Gray reviewed the assumptions upon which the matching formula was based and the present mix of tankers that call in the Bay. After much deliberation, the Work Group concluded that the tug/tanker matrix remains valid and should not be modified (determination made at the January 15, 2002 Work Group meeting and reported to the HSC at its February 14, 2002 meeting).

Training for Tug Escort Crews. As a result of its study of the tug/tanker matching matrix, the Work Group determined that in order for tug escorts to be effective in an emergency, training of escort tug and ship crews under pilot direction should be addressed. The Work Group concluded that training exercises could not be mandated by regulation, as the training exercises must be individual to the tugs and vessels because of the wide variety of tankers, barges and tugs and variety of conditions on the Bay. The Work Group prepared guidelines entitled "Recommendations for Conducting Escort Training on San Francisco Bay," which outlines procedures for tug and ship crews, as well as pilots, to participate in live training exercises under agreed-upon, non-emergency conditions. A draft of the Recommendations was circulated to various tug, tanker, and barge companies and to the S.F. Bar Pilots.

The guidelines were adopted by the full Committee on May 9, 2002 (see Appendices). The HSC Secretariat, through the Marine Exchange, then sent a letter to all affected parties in the maritime community, encouraging companies to adopt the Recommendations. The Tug Escort Work Group reports that tug escort emergency maneuvers are being conducted on a voluntary basis in accordance with the HSC's Recommended Guidelines.

In September 2008, the Tug Escort Work Group was given a presentation of a Simulator Training Program for Tugs and Pilots that is being used in Puget Sound for tug captains, Puget Sound Pilots and B.C. Pilots. Over the years it has become evident that the opportunity for on-the-water exercises involving tankers and tugs has been extremely limited at best, with few individuals trained for actual events. However, with maritime

simulators becoming more sophisticated in their ability to replicate a variety of situations and with a California Maritime Academy (CMA) simulator operational within a few months, the Work Group decided to explore the opportunity for simulating local conditions on a cost-effective basis to the maritime community within the San Francisco Bay Area.

The Work Group concluded that in addition to promoting simulator training for tugs escorting tankers, simulator training is applicable to tugs assisting and docking container ships, bulk carriers and chemical ships – thus providing industry-wide benefits for safe navigation.

The Harbor Safety Committee encourages the maritime industry to provide simulator training for tug personnel with pilot participation for emergency tug operations, based on local conditions. The training will improve communication between pilots and tug masters, offer in-house training to tug industry personnel, and provide valuable "lessons learned" for emergency situations in a controlled environment.

Escorts for Non-petroleum Tankers. In 2003, the Harbor Safety Committee rescinded its prior recommendation to propose state legislation requiring tug escorts for vessels "carrying certain dangerous chemical cargoes in enough quantities to pose a risk" in San Francisco Bay, based on the following:

- It was extremely difficult to define dangerous cargoes and quantities that could be translated into legislation.
- Thorough analysis of this category of vessels in the Bay in calendar year 2001 did not reveal a pattern of problems or inadequate ship design.
- The Coast Guard has the authority through Port State Control to require tug escorts and to detain "problem ships" if necessary.

In 2004, State legislation (SB 1480) was proposed that would allow "[t]he OSPR Administrator, in consultation with the harbor safety committees, to adopt regulations governing tugboat escorts for other vessels carrying hazardous materials that are entering, leaving, or navigating in the harbors of the state."

The Harbor Safety Committee opposed SB 1480 and companion legislation AB 2777 because:

1. The Tug Escort Work Group carefully reviewed the nine-year record of Coast Guard Casualty reports for Chemical Tankers, the seven-year record of Coast Guard Captain of the Port (COTP) orders to require Chemical Tankers to be tug escorted, and Chemical Tanker arrivals in the Bay for the year 2003. Of 23

reported casualties, only four were for loss of steering or power; four were for the same ship, and seven were tankers carrying oil. The other casualties were minor in nature because of the broad definition of a reportable Marine Casualty.

Similarly, of the COTP orders for seven Chemical Tankers, five vessels carried oil and the other two most likely carried oil. The major increase in the number of Chemical Tankers was due to the change in definition of tankers by Lloyds of London. Also noted was the fact that most chemical tankers are double-hulled ships subject to strict standards and close vetting review.

2. The definition of "hazardous materials" is too broadly written to be meaningful in pinpointing the most dangerous chemicals and quantities hazardous to the public and the environment. As written, the legislation would affect almost every ship in the Bay, from cargo ships to tankers, and would not enhance safety.

3. The Work Group was concerned that, because the definition of hazardous materials is so broadly written, permanent broad powers would be granted to the OSPR Administrator with no criteria or analysis upon which to base his/her decision.

The Harbor Safety Committee sent its recommendation to the OSPR Administrator. The legislation was vetoed by the Governor.

XV. Pilotage

Pilotage is of primary import to Bay shipping because of complex local conditions consisting of narrow navigation channels, many bridges, swift tides and currents, variable weather patterns, and large numbers of ships and small vessels. For more than one-hundred-fifty years, the State has regulated pilotage over the Golden Gate bar through the State Board of Pilot Commissioners, which was created in 1850.

San Francisco Bar Pilots. This category of pilots is also referred to as Bar Pilots. A state license is required for a Bar Pilot to handle vessels entering the Bay and operating inside the Bay. A federal pilot's license is also required. The State Board of Pilot Commissioners regulates the number, licensing, training and disciplining of Bar Pilots for the Bays of San Francisco, San Pablo and Suisun.

Federal Pilots. Federal pilots are licensed by the U.S. Coast Guard to handle U.S. flag vessels under enrollment. State licenses for these pilots are not required.

Inland Pilots. An inland pilot is required to have both a state license and a federal license to pilot vessels solely inside of the Golden Gate. The State Board of Pilot Commissioners regulates inland pilots.

Ports of Stockton and Sacramento. The Ports of Stockton and Sacramento have separate pilotage authority from the Board of Pilot Commissioners. In practice, these ports issue commissions to certain pilots licensed by the state.

Docking Pilots. Section 1179 of the Harbors and Navigation Code allows shipping companies who expressed their intent to the Board of Pilot Commissioners before July 1, 1983, to have their own employees used as pilots in lieu of Bar Pilots. In the Bay, a grandfathering clause allows one shipping company to use its own employee(s) who are not subject to State Board of Pilot Commission regulations as pilots for docking. These employees are federally licensed.

Vessel Movements. The decision-making process by the Master and the Pilot to move a vessel should consider all relevant factors, including, but not limited to:

- The characteristics of the vessel, such as maneuverability, size and draft;
- The capabilities of the vessel's navigation equipment;
- Tide, current and wind conditions on the intended route;
- Time of the day in relation to whether the fog may be in a cycle of "burning off" or lifting;

- Possible hazards along the route, such as bridges, and amount and nature of vessel traffic; and
- Visibility conditions at the dock, en route and at the destination, and assessment of whether these conditions are changing.

Harbors and Navigation Code Preventing Unlicensed Person from Performing Pilotage. State legislation requires the use of pilots on San Francisco Bay and provides penalties to prevent unlicensed persons from performing pilotage. The penalty for acting as a pilot while not holding a pilot license was increased to a maximum of $25,000 (Harbors and Navigation Code Section 1126).

Navigation Technology

Following the Cosco Busan allision and spill in November 2007, the Governor directed OSPR to investigate the potential role of navigational technology in reducing the risk of vessel collisions in the San Francisco Bay Region. The HSC Navigation Work Group agreed to coordinate its review with the work of the Board of Pilot Commissioners, which formed a Navigation Technology Committee to develop recommendations for the enhancement of pilots' ability to safely navigate using shipboard and portable electronic navigation systems.

Over the course of several months, in investigating different types of navigation systems found on ships calling on the San Francisco Bay Area and the sufficiency of pilot training in the use of such systems, the Pilot Commission Technology Committee considered presentations by experts in navigation technology and in the education of mariners in the use of the technology. The committee also evaluated portable electronic navigation chart systems that can be brought aboard by pilots, various comprehensive reports on their use, liability issues and interface with shipboard equipment and how portable pilot units are regulated in other jurisdictions.

The HSC Navigation Work Group reviewed the recommendations adopted by the Pilot Commission and developed recommendations to the Harbor Safety Committee. The Work Group noted that prudent mariners rely on an array of informational sources when navigating, including paper charts, electronic charts, Army Corps of Engineers charts, USCG Notices to Mariners, etc.

Portable electronic navigation chart systems that can be brought aboard by pilots, or Portable Pilot Units ("PPUs"), are an additional navigational tool proposed to be carried by Pilot Commission-licensed pilots in San Francisco Bay. These units cannot supplant onboard systems; however, their use is appropriate in the Bay due to its variety of microclimates and periods of dense fog.

To further navigational safety, the Work Group agreed to support international efforts to standardize symbols used on onboard charts. Confusion can result when piloting the more than 900 different ships that transit the Bay, many of which carry different charting systems featuring proprietary symbology. Future training of Pilot Commission-licensed pilots in advanced electronic navigation systems will include symbology used on different charts.

In July 2008, the HSC adopted the following specific recommendations:

1. Urge the Board of Pilot Commissioners, as a near-term priority, to work with the San Francisco Bar Pilots to incorporate in the Pilot training program enhanced training in advanced electronic navigation systems, providing exposure to a greater number of systems and variety of presentations.

2. Support adoption by the Board of Pilot Commissioners of a regulation to require that pilots licensed by the Pilot Commission be equipped with, and trained in the use of, portable electronic navigation equipment, commonly known as Portable Pilot Units ("PPUs"). The regulation should require that pilots be equipped with PPUs at all times while piloting except when the pilot deems that embarking on or disembarking from a vessel while carrying a PPU may present an unacceptable safety hazard to the pilot or when circumstances would prevent its use.

Such PPUs shall, at a minimum, have the following capabilities:

(a) Displaying approved electronic navigation charts (ENCs) issued by the cognizant U.S. government authority;

(b) Displaying the vessel's position and heading on such ENCs to the accuracy required by the International Maritime Organization (IMO) for Automatic Identification Systems (AIS); and

(c) Displaying other navigational information as provided through the vessel's AIS pilot plug.

Appendix A - Best Maritime Practices

Background. The container ship Cosco Busan allided with the Oakland Bay Bridge November 7, 2007, releasing approximately 53,000 gallons of fuel oil. Shortly afterward Governor Schwarzenegger issued a directive to investigate and make recommendations on the navigational and operational aspects of the Cosco Busan allision. The HSC was assigned this task by OSPR. HSC Work Groups discussed the issues at length, and based on facts known of the incident at the time, developed recommendations to improve vessel transit in the Bay. The findings and recommendations developed by the Harbor Safety Committee in light of the allision covered a number of topics, some of which are now included in the Harbor Safety Plan.

Additionally, prior to the Cosco Busan incident, OSPR directed the five Harbor Safety Committees in California to adopt Best Maritime Practices for each harbor to ensure that vessels in transit will be aware of the guidelines of operation in California harbors, to be incorporated into each Harbor Safety Plan. During 2008 and early 2009, the S.F. Harbor Safety Committee developed a number of Best Maritime Practices ("BMPs") for safe navigation in the San Francisco Bay Region. These guidelines, summarized below, provide important information necessary for safe, reliable and environmentally sound vessel movements in and around San Francisco Bay. The BMPs also are available on the Marine Exchange website: www.sfmx.org/support/hsc/introhscbestpractices.htm.

INDEX - Best Maritime Practices **Page No.**

Large Vessels and Tugs with Tows ≥ 1600 GT: Speed Restrictions on San Francisco Bay

Large Vessels are power driven vessels of 1600 gross tons or more, and tugs with tows of 1600 gross tons or more. Specific areas where a **15 knot speed limit** applies within the San Francisco Bay region are prescribed in 33 CFR 165.1181:

- Golden Gate Traffic Lanes, which include the westbound and eastbound lanes west of the Golden Gate Precautionary Area
- Golden Gate Precautionary Area
- Central Bay Traffic Lanes, which include the Deep Water Traffic Lane, the east-bound lane (south of Alcatraz Island) and the westbound lane (south of Harding Rock
- Central Bay Precautionary Area
- North Ship Channel between North Channel Lighted Buoy "A" and the Richmond-San Rafael Bridge
- Southampton Shoal Channel including the Richmond Long Wharf maneuvering area
- Richmond Harbor Entrance Channel
- Oakland Harbor Bar Channel including the Outer and Inner Harbors Entrance Channels
- San Pablo Strait Channel
- Pinole Shoal Channel
- Benicia-Martinez Railroad Drawbridge

Additionally, power driven vessels of 1,600 or more gross tons shall have their engines ready for immediate maneuver and shall not operate in control modes or with fuels that prevent an immediate response to any engine order ahead.

Note: In instances where a slower speed than the 15 knot RNA limit is required for safe navigation, the COLREGS will prevail.

See Harbor Safety Plan Chapter VII: Vessel Speed and Traffic Patterns for discussion.

Large Vessels and Tugs with Tows ≥ 1600 GT: Guidelines for Navigating in Reduced Visibility

Large Vessels are power driven vessels of 1600 gross tons or more, and tugs with tows of 1600 gross tons or more. Mariners are at all times to comply with the requirements of the COLREGS.

Critical Maneuvering Areas (CMAs): There are areas within the Bay where additional standards of care are required due to the restrictive nature of the channel, proximity of hazards, or the prevalence of adverse currents. Large vessels should not transit through CMAs when visibility is less than 0.5 nautical miles. Locations within the Bay identified as Critical Maneuvering Areas:

- Redwood Creek
- San Mateo-Hayward Bridge
- Oakland Bar Channel*
- Islais Creek Channel
- Richmond Inner Harbor
- Richmond-San Rafael Bridge, East Span
- Union Pacific Bridge
- New York Slough, up-bound
- Rio Vista Lift Bridge

*The Oakland Bar Channel is identified due to cross currents and its proximity to the Bay Bridge and Yerba Buena Island.

Vessels docked: Large vessels at a dock within the Bay should not commence a movement if visibility is less than 0.5 nautical miles at the dock.

Vessels proceeding to dock: Large vessels proceeding to a dock should anchor if visibility at the dock is known to be less than 0.5 nautical miles, unless, under all circumstances, proceeding to the dock is the safest option.

Note: Vessel pilots or operators should notify VTS upon determination that a scheduled movement will be delayed or cancelled. If underway, they shall make a sailing plan deviation report per VTS regulations.

Adopted March 2008. See Harbor Safety Plan Chapter II: General Weather, Currents and Tides for discussion.

Large Vessels and Tugs with Tows ≥ 1600 gross tons: Guidelines for Navigating in Severe Weather

A number of factors must be considered when limiting transits in the Bay or closing the Bar due to severe weather, including sea state, tidal influences, visibility, traffic density, and wind advisories issued by NOAA. The size, class and condition of the vessels being addressed must also be considered. The HSC recommends a tiered approach, applying greater caution as conditions worsen.

Sustained winds exceeding 25 knots in the Bay

- Vessels should closely evaluate whether it is safe to transit in the Bay. Size, class and sail area of the vessel, tidal influences, visibility, and traffic density should all be considered.
- VTS San Francisco will establish regular communications with bridge watches of VTS users in Bay Area anchorages, and more closely monitor swing circles to ensure vessels are not dragging.

Sustained winds exceeding 40 knots in the Bay

- Transits to and from berths are not recommended.

Sustained winds exceeding 40 knots and/or seas exceed 12 ft at the Sea Buoy

- Bar traffic restrictions and closure should be considered. Size and class of the vessel, draft, swell period, tidal influences, visibility, and traffic density should all be considered. Strong ebb tides should be avoided, and a minimum of 10 feet under-keel clearance is recommended.

Procedures for Closing the Bar or Restricting Bar Traffic

- Bar closures are exercised on a situational basis without specifically defined weather or security conditions.
- The most recent San Francisco Bar Pilot over the Bar, inbound or outbound, shall make the recommendation to the dispatcher that the Bar should be considered for closure, or traffic limited to one-way traffic.
- In the event that the station boat is “boarded off”, then the station boat captain will make the recommendation to the dispatcher.
- The dispatcher will then notify the Operations Pilot, who will notify the Port Agent.

- The Operations Pilot or Port Agent will then notify the U.S. Coast Guard VTS and Command Duty Officer at the Sector San Francisco Command Center.
- The Captain of the Port will consult with the Operations Pilot or Port Agent prior to closing the bar under Captain of the Port authority. The Coast Guard will then issue a Marine Safety Broadcast communicating the closure or traffic restriction.
- The procedure for lifting traffic restrictions or re-opening the Bar will be the same as that for restricting traffic or closing the Bar.
- Vessels under Federal Pilotage or Public Vessel may petition the Captain of the Port to transit the San Francisco Bar.

Adopted January 2009. See Harbor Safety Plan Chapter II: General Weather, Currents and Tides for discussion.

Tugs with Tows <1600 Gross Tons: Guidelines for Navigating in Reduced Visibility

Critical Maneuvering Areas (CMAs): There are areas within the Bay where additional standards of care are required due to the restrictive nature of the channel, proximity of hazards, or the prevalence of adverse currents. Tugs with tows should not transit through CMAs when visibility is less than 0.25 nautical miles. Tugs with tows in petroleum service should not transit through CMAs when visibility is less than 0.5 nautical miles.

Locations within the Bay identified as Critical Maneuvering Areas:

- Redwood Creek
- San Mateo-Hayward Bridge
- Oakland Bar Channel*
- Islais Creek Channel
- Richmond Inner Harbor
- Richmond-San Rafael Bridge, East Span
- Union Pacific Bridge
- New York Slough, up-bound
- Rio Vista Lift Bridge

*Note: the Oakland Bar Channel is identified due to cross currents and its proximity to the Bay Bridge and Yerba Buena Island.

Vessels docked: Tugs with tows at a dock within the Bay should not commence a movement if visibility is less than 0.25 nautical miles at the dock. Tugs with tows in

petroleum service at a dock within the Bay should not commence a movement if visibility is less than 0.5 nautical miles at the dock.

Vessels proceeding to dock: Tugs with tows proceeding to a dock should anchor if visibility at the dock is known to be less than 0.25 nautical miles, unless, under all circumstances, proceeding to the dock is the safest option. Tugs with tows in petroleum service proceeding to a dock should anchor if visibility at the dock is known to be less than 0.5 nautical miles, unless, under all circumstances, proceeding to the dock is the safest option.

Note: Vessel captains or operators should notify VTS upon determination that a scheduled movement will be delayed or canceled. If underway, they shall make a sailing plan deviation report per VTS regulations.

Adopted February 2009. See Harbor Safety Plan Chapter II: General Weather, Currents and Tides for discussion.

Tugs with Tows <1600 Gross Tons: Guidelines for Navigating in Severe Weather

A number of factors must be considered when limiting transits in the Bay or closing the Bar due to severe weather, including sea state, tidal influences, visibility, traffic density, and wind advisories issued by NOAA. The size and condition of the vessels being addressed must also be considered. The Tug Escort Work Group recommends a tiered approach, applying greater caution as conditions worsen.

Sustained winds exceeding 25 knots in the Bay

- Tugs with tows should closely evaluate whether it is safe to transit in the Bay. Size and sail area of the vessel, tidal influences, visibility, operator skill and traffic density should all be considered.
- VTS San Francisco will establish regular communications with bridge watches of VTS users in Bay Area anchorages, and more closely monitor swing circles to ensure vessels are not dragging.

Sustained winds exceeding 40 knots in the Bay

- Transits to and from berths are not recommended, but may be performed following a careful risk management evaluation by the vessel operator and vessel management.

Sustained winds exceeding 40 knots and/or seas exceed 12 ft at the Sea Buoy

- Bar traffic restrictions and closure should be considered for tugs with tows. Size of the vessel, draft, swell period, tidal influences, visibility, and traffic density should all be considered. Strong ebb tides should be avoided, and a minimum of 10 feet under-keel clearance is recommended.

Adopted February 2009. See Harbor Safety Plan Chapter II: General Weather, Currents and Tides for discussion.

Emergency Training for Tug Escorting

A set of recommendations for conducting Escort Training on San Francisco Bay is included in the Harbor Safety Plan (Appendix J). The guidelines anticipated live escort training exercises; however, few opportunities arise for on-water exercises involving tankers and tugs, with few individuals trained for emergency events. With maritime simulators becoming more sophisticated in their ability to replicate a variety of situations and with a California Maritime Academy simulator soon operational, the HSC found simulating local conditions to be a cost-effective alternative to on-water exercises.

The Work Group concluded that in addition to promoting simulator training for tugs escorting tankers, simulator training is applicable to tugs assisting and docking container ships, bulk carriers and chemical ships – thus providing industry-wide benefits for safe navigation.

The HSC recommends the use of simulators to improve communication between pilots and tug masters, offer in-house training to tug industry personnel, and provide valuable "lessons learned" for emergency situations in a controlled environment.

Adopted November 2008. See Harbor Safety Plan Chapter XIV: Tug Escort/Assist for Tank Vessels for discussion.

S.F. Bar Pilots: Use of Portable Navigation Units

The SF HSC recommends that San Francisco Bar Pilots be trained in the use of and equipped with Portable Pilot Units (PPUs) at all times while piloting, except when the pilot deems that embarking on or disembarking from a vessel while carrying a PPU may present an unacceptable safety hazard to the pilot or when circumstances would prevent its use.

Such PPUs shall, at a minimum, have the following capabilities:

(a) Displaying approved electronic navigation charts (ENCs) issued by the cognizant U.S. government authority;

(b) Displaying the vessel's position and heading on such ENCs to the accuracy required by the International Maritime Organization (IMO) for Automatic Identification Systems (AIS); and

(c) Displaying other navigational information as provided through the vessel's AIS pilot plug.

Adopted July 2008. See Harbor Safety Plan Chapter XV: Pilotage for discussion.

Small Passenger Vessels - Ferries: Recommended Guidelines for Navigating in Reduced Visibility and Severe Weather

Safety Practices

The Master of a ferry is the person in charge of the vessel, responsible for the safety of the passengers and crew at all times, and has the authority to decide if it is safe to get underway or to proceed.

In reduced visibility and inclement weather conditions, the following practices are followed:

- A go or no-go decision to get underway is made by the vessel Master or the company Operation Manager, based on conditions along the entire route, using all available information including the experience of the master and operations manager.
- Look-outs: the vessel Master assigns crewmembers for look-out duty based on the existing or anticipated conditions; the applicable regulations are found in the Navigation Rules and Regulations, Rule 5 Look-out (text attached).
- Safe speed: the vessel is required to proceed at a speed appropriate to the prevailing circumstances and conditions, which include state of visibility and the manageability of the vessel with special reference to stopping distance and turning ability. Other factors include participation in fixed ferry routes, wind advisories issued by NOAA, sea state, traffic density, and applicable Navigation Rules and Regulations (see attached verbiage from Rule 6 Safe Speed).
- Equipment: each Ferry is required to have at minimum one radar; commuter ferry vessels generally have two operational radars onboard; the vessel Master is required to have a radar observer license endorsement. Global Positioning Satellite, Automatic Identification System and Electronic Charting navigation systems are also installed and used to assist navigation.

In conditions of high wind and waves:

- Go/no-go decision is made by the vessel Master or the company Operation Manager, based on conditions along the entire route, using all available information including the experience of the master and operations manager. Factors to be considered include size of the vessel, direction of the winds and seas, orientation of departure and arrival piers to prevailing conditions, and limitations of ferries to travel at slower speeds.
- Passenger safety: Captain can maneuver the vessel to minimize wave effects. Crew duties include rough weather announcements and passenger safety management.

High Speed Ferry Operations (over 30 Knots)

U.S. Coast Guard Navigation and Vessel Inspection Circulars (NAVIC) 5-01 and 5-01 Change 1 provide specific guidance for high speed passenger vessels and include approved vessel operation manuals, training programs and risk assessment tools (matrix).

- Vessel equipment: operators have exceeded minimum requirements for navigation electronics including dual radar, Global Position Satellite and electronic charting with Automatic Identification System overlay.
- Manning/Training: Vessels traveling at high speed are required to have a minimum of two qualified watch-standers during normal operations. Vessel operators have developed approved training programs for high speed navigation in compliance with NAVIC 5-01 and 5-01 Change 1.

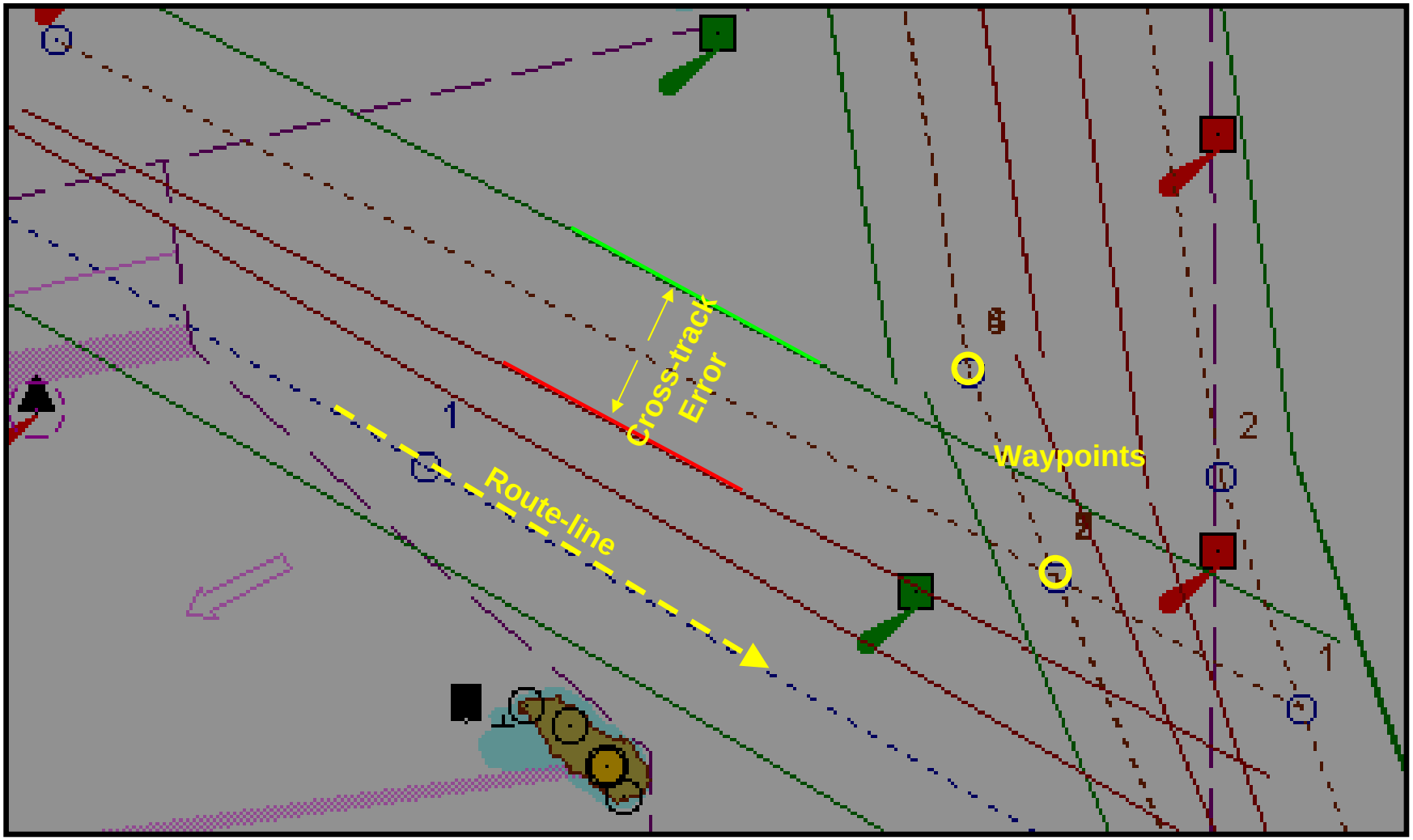
Adopted February 2009. See Harbor Safety Plan Chapter XI: Small Passenger Vessels - Ferries for discussion.

Passenger Ferry Traffic Routing Protocol

To avoid future possible ferry collisions, particularly in light of expanded fast ferry service, a protocol for ferry navigation in the San Francisco and San Pablo Bays includes routes and a Ferry Building Approach Zone, as shown in Figures 1-7 below.

Adopted May 2008. See Harbor Safety Plan Chapter XI: Small Passenger Vessels - Ferries for discussion.

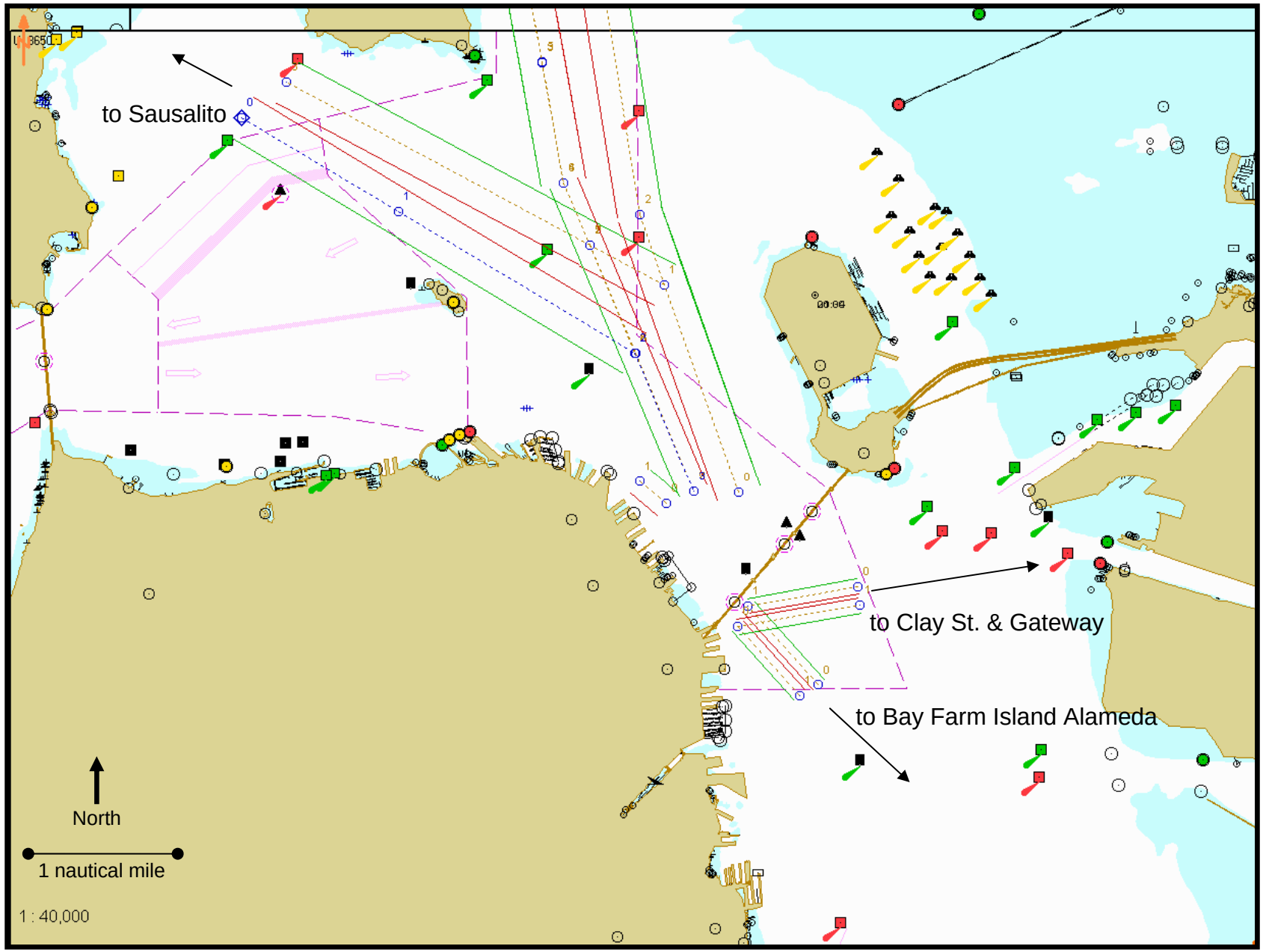
Diagram Key



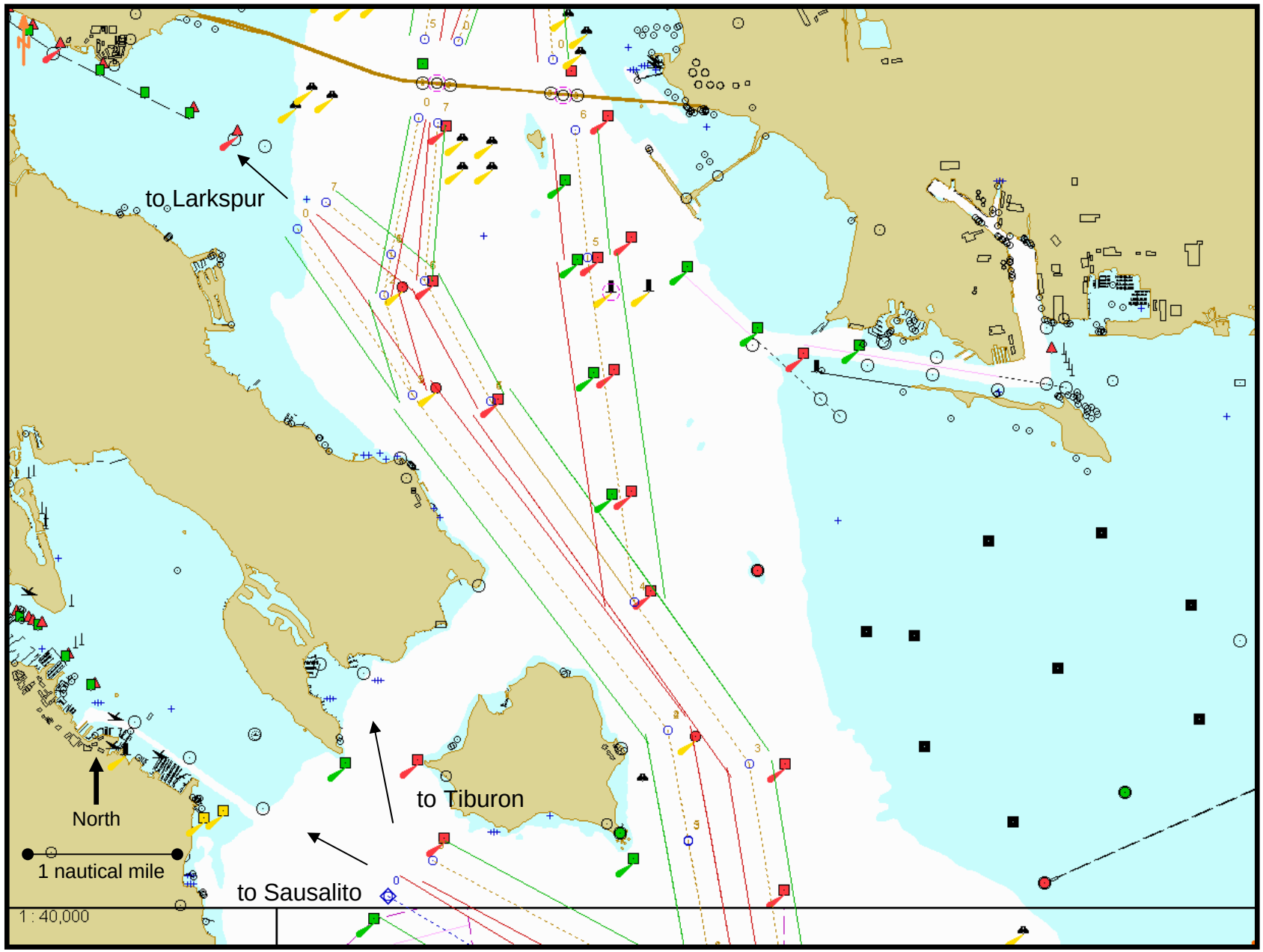
The following chart features are highlighted above.

- Route-line: Centerline of the ferry route.
- Cross-track Error: Left and right of route-line tolerance.
- Waypoints: Turns, route crossing points, and communications points.

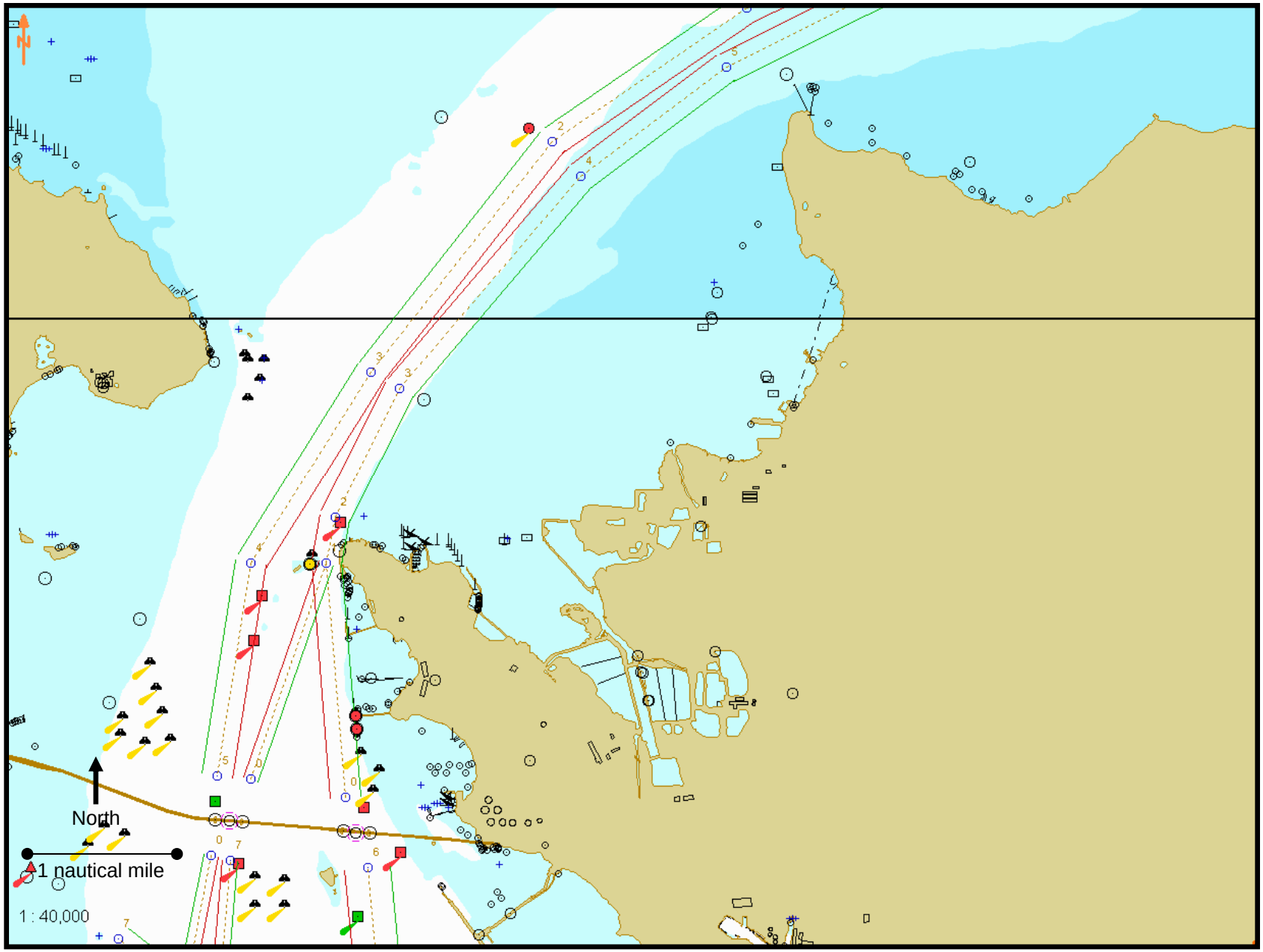
Central Bay and South San Francisco Bay



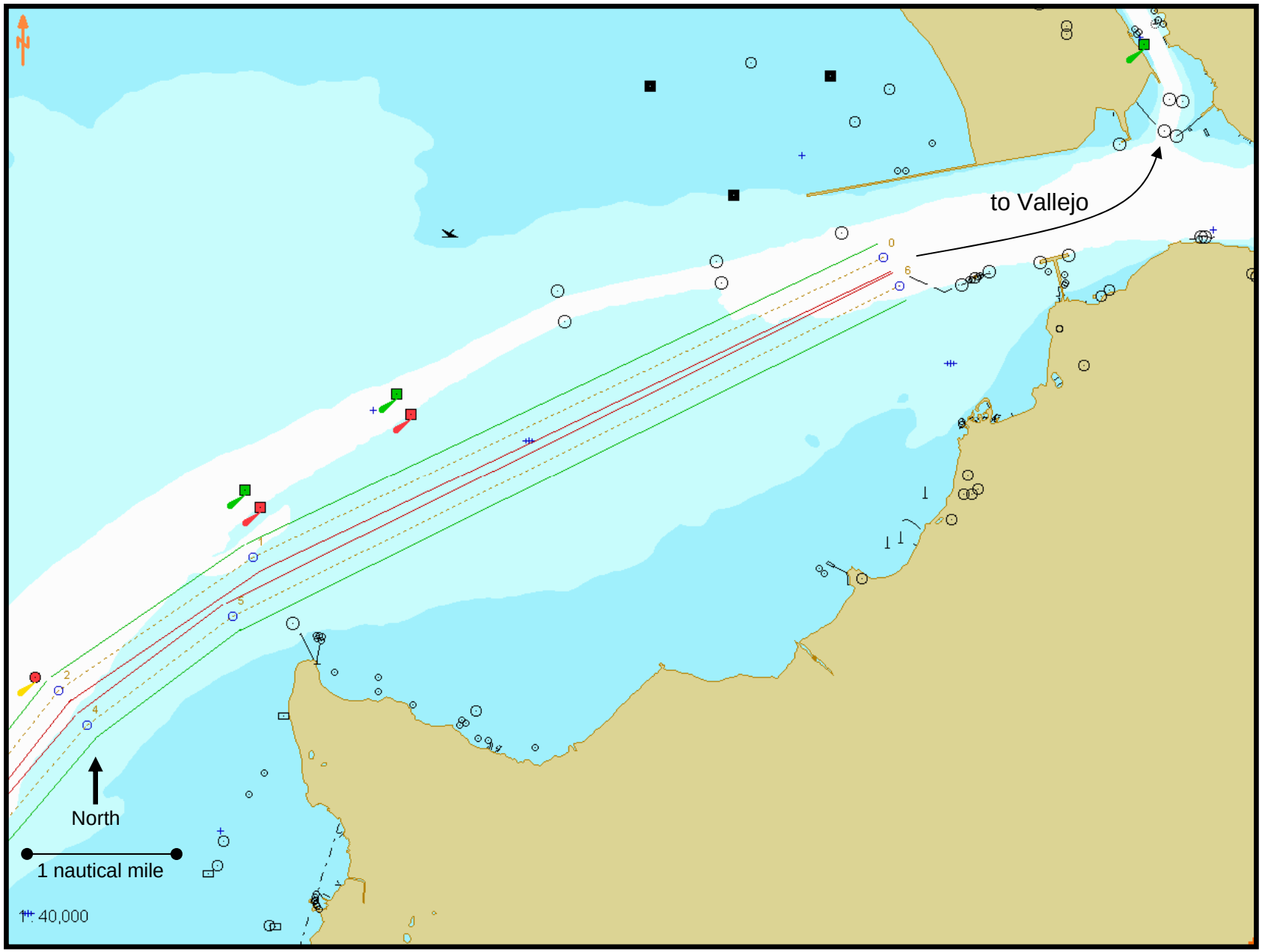
North Channel and Southampton Shoal Channel



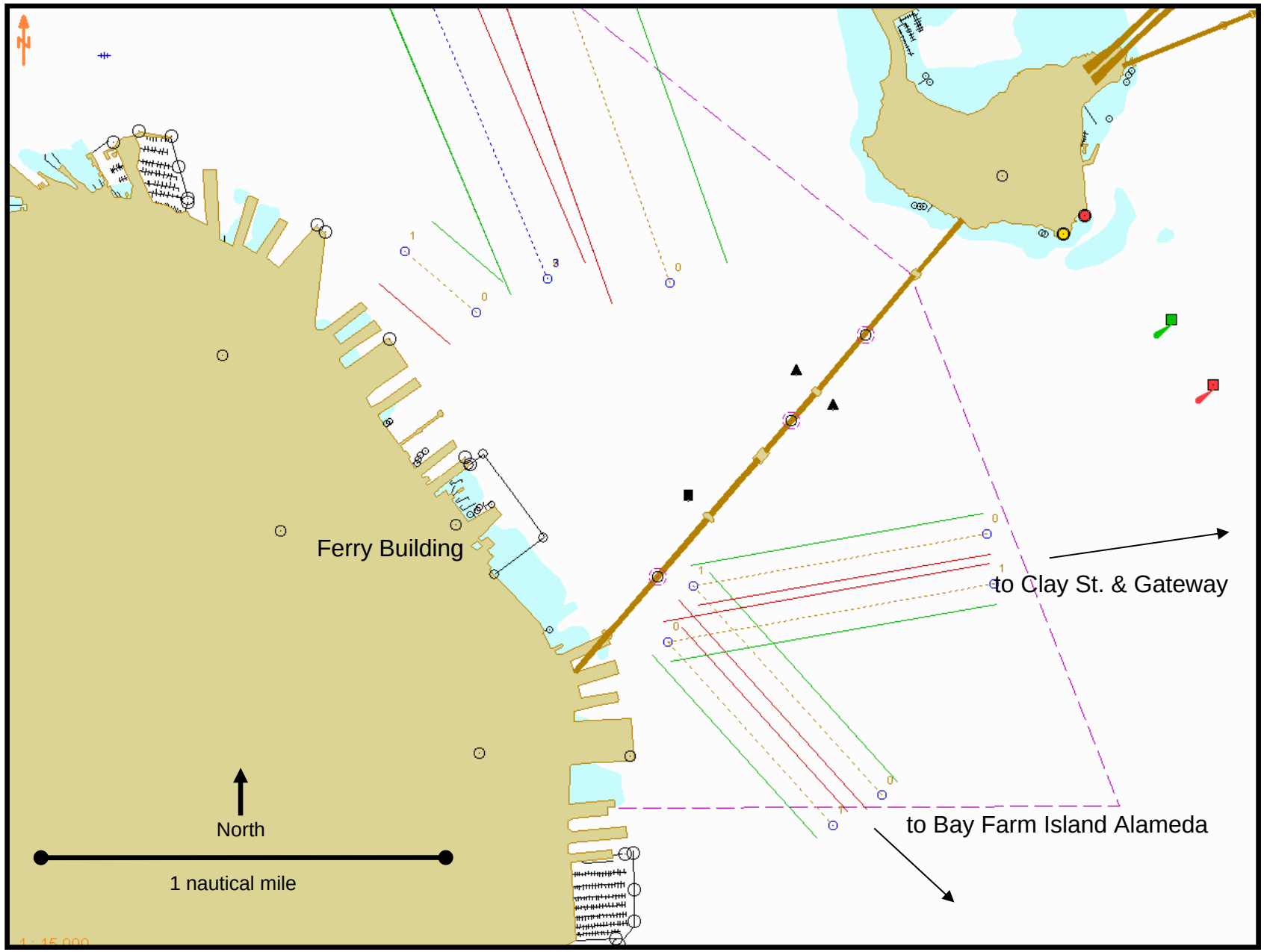
San Pablo Strait Channel



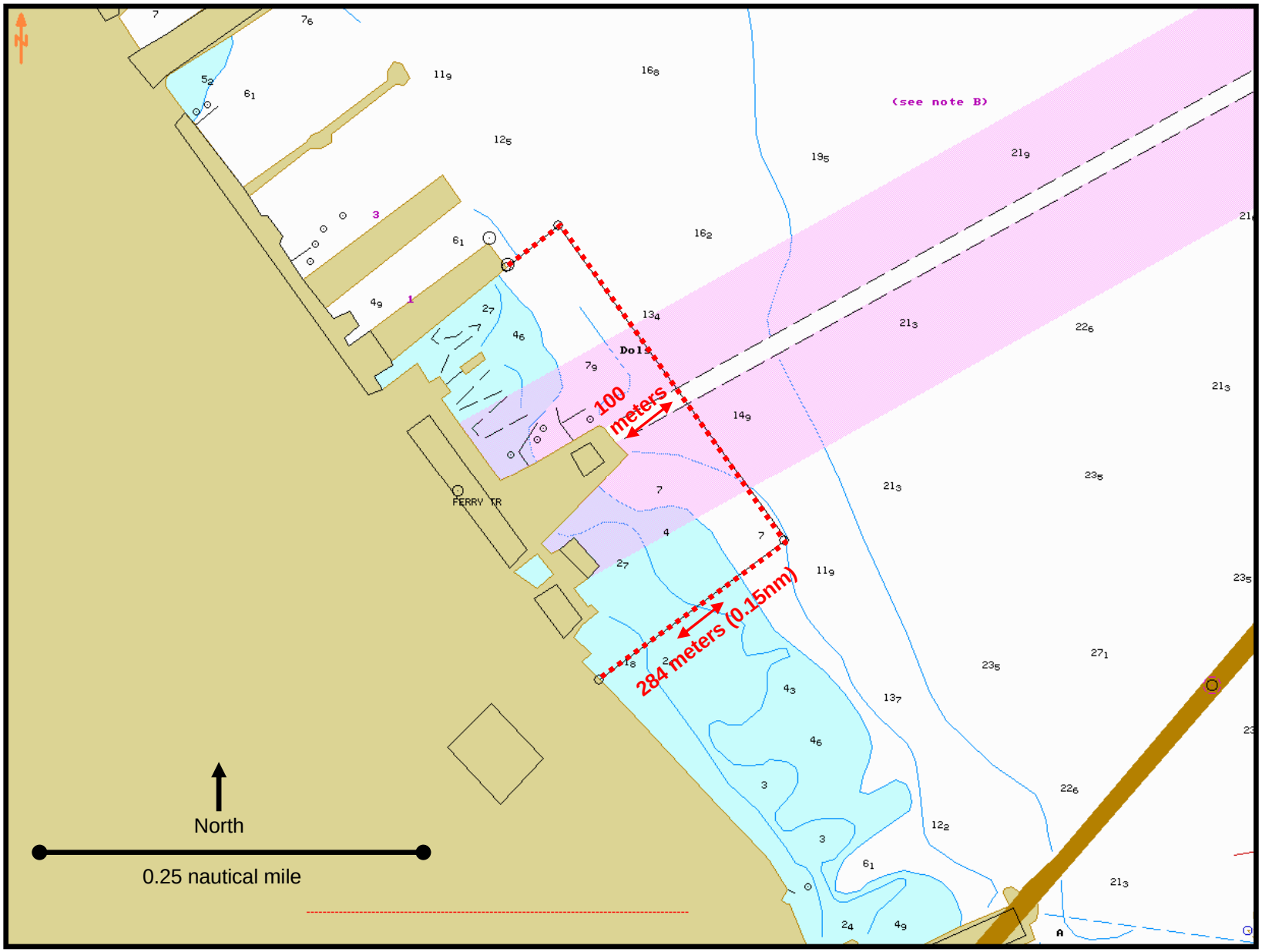
San Pablo Bay and Mare Island Strait



Ferry Building Approach/Departure Zone



Ferry Building Maneuvering Area



Source and Contact Information

Diagrams are screen print files from vector-based electronic nautical charts (ENCs).

Additional lines and labels were added to the screen print files for emphasis and clarity.

For more information contact:

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Communication Procedures to Improve Safety During Bunker Barge Transfer Operations Alongside Container Vessels

Container Vessel Bunker Barge Safety Program and Delivery Notice. This document outlines the process for essential communication between the agents, bunker barge operators (tankermen) and terminal's Marine Department to ensure a safe and productive work environment. The Container Operator has adopted this Best Management Practices Program and has instituted it to assist all parties involved in the vessel operations when vessel bunkering is involved in the operation.

The "Bunker Delivery Notice" appears at the end of this section. The Agent will e-mail the notice to the Ship, Terminal and the Bunker Barge operator prior to the stevedoring operation. The terminal, ship and barge operator will reply to the E-mail by including the contact phone/cell number of the person working that vessel/shift. This will be the cross check that all parties are aware of during a planned bunkering operation.

Essential Communications: Contact between the Tankerman and Terminal

- The Bunker Barge Operator (Tankerman/Person in Charge (PIC)) must contact the Designated Facility Contact prior to beginning the barge operation.
- This will allow the Tankerman/PIC to learn the planned stevedore operation in the CFS/CLO and highlight any possible conflicts. (A Check Sheet shall be used for this function.)
- The Bunker Barge representative (Tankerman/PIC), must communicate with the Designated Facility Contact, and Chief Engineer/Chief Mate, (vessel PIC) prior to beginning the barge operation. This will allow the Tankerman to learn the planned stevedore operation and highlight any possible conflicts so they may be eliminated.

Essential Communications: Tankerman Check Sheet

a. What are the bay designations directly forward and aft of the house on this vessel that overlap the bunker barge?
b. Is there any planned loading, discharging, or lashing in these bays?
c. When does the terminal plan to work these bays?
d. Is any of the work in these bays going to extend into the two or three offshore positions?
e. Can these positions be worked in a specific time frame so possible conflicts are avoided?
f. What time periods is the stevedore going to shut down cargo operations for breaks, lunch, etc.?

Understanding the Bunkering Process #1

- Vessels contract for Bunkers
  - Oil Companies notify barge operators
  - Agents coordinate delivery notifications with barge operators and terminals
  - Bunker Barge arrival time and duration of pumping is established

Understanding the Bunkering Process #2

- Vessel Arrives for Cargo Operations
- Agent Coordinates bunker barge arrival
- Terminal plans operations
- Cargo Flow Sheet or Crane letter of Operations (CFS or CLO) is prepared
  - Outlines what cargo is to be moved in what sequence
  - Terminal will plan around bunker operations if possible
- Terminal gives CFS/CLO to Agent to pass to Chief Engineer/PIC and Tankerman/PIC

Understanding the Bunkering Process #3

- Bunker Barge Arrives for Bunker Ops
  - Optimal placement to minimize exposure.
  - Vessel insures BUNKER OPERATION SIGN is posted.
  - DOI is signed by Chief Engineer/PIC and Tankerman/PIC.
  - Tankerman/PIC /Chief Mate/Chief Engineer/PIC will have a copy of Cargo Flow Sheet or Crane letter (CFS/CLO).
- Tankerman/PIC should understand what cargo adjacent to the barge is to be handled and when.
- Tankerman/PIC shall have contact with the vessel Superintendent at all times.

Understanding the Bunkering Process #4

- Vessel cargo operations commence.
  - Lashers sent aboard to unlash containers.
  - Crane lowered over hold/hatch to be worked.
- Work commences in accordance with CFS/CLO
  - Lashers sent aboard to re-lash containers
- Bunker operations could start before, during or after cargo operations
  - Tankerman/PIC, Chief Mate & Superintendent must understand where the stevedoreoperator is relative to the Cargo Flow Sheet or Crane letter and the bunkering process.

Area or Zone of Concern

- Tankerman/PIC, Terminal Personnel, (Superintendents, Foremen, Lashers, Crane Operators) and Vessel Personnel (Chief Mate and Engineer/PIC) all must be mindful of and take particular care when lashing or cargo operations take place in the outer three stacks of containers in bays adjacent to the bunker barge if the transfer is in progress.

Essential Communications: Bunker Delivery Notice

- To inform all concerned parties of the planned bunkering operations, the Vessel Agent (or other carrier assigned representative), will complete a "Bunker Delivery Notice".

- The Agent will forward the notice by E-mail to BOTH the terminal and the bunker barge operator prior to the start of any stevedoring operation.

Post Incident Response

- It is expected that the Tankerman will be alert to the crane working near the barge and the cargoflow that has been planned.

- It is expected that the Tankerman/PIC will determine the proper action to take regarding oil transfer process should any incident occur which affects the safety of the operation.

- Any incident will require direct communications between the parties involved who shall be readily available. This will allow for adjustments to working plans to correct conflicts.

Long Term Incident Resolution

- It is expected that the Operations Department's management personnel, vessel representative, and the barge operator will discuss mutually agreeable adjustments to minimize Tankerman exposures that may be determined as the result of the incident and the post incident investigation.

- Ideas and lessons learned will be shared among all parties including the other Port Terminals.

Adopted February 2009.

Bunker Delivery Notice

Date:	**Port:**	
Vessel:	**Voyage:**	
Reference #:		
Bunker Barge Co.		
& Phone:		
Name of Bunker Barge:		
Name of Bunker Barge PIC:		
Contact Phone # of Barge PIC:		
Bunker Barge Emergency Contact #:		
Amount and type to be bunkered:		
Delivery Time of Bunkers:		
Location of Delivery of Bunkers:		
Bunker Barge to Land Side to as Vessel (select Port or Starboard):	**Port**	**or Starboard**
Estimated duration of bunker delivery:		
Designated Facility Contact:		
Terminal Emergency Phone #:		
Name of Vessel PIC for bunkers:		
Telephone number of vessel:		
Location of Bunker Manifold/Riser:		
Agent for Vessel:		
Agent Cell Phone #:		
Agent 24 Hour Contact #:		