6. REGULATORY STATUS UPDATE

Unless otherwise noted, the observations and findings presented earlier in this report were the product of due diligence conducted from May 2005 through May 2006. LAI's assessment was conducted after Broadwater filed its Resource Reports at FERC, but prior to FERC's issuance of the DEIS on November 17, 2006, and the USCG's issuance of the WSR on September 21, 2006. LAI subsequently reviewed these documents as well as the GAO report on the public safety consequences of a terrorist attack on LNG vessels which was released in early March 2007. In this section we summarize the highlights of these documents. A synopsis of interventions and conferences / meetings for the Project is also included in addition to the latest developments at FERC and the USCG.

6.1. Interventions

Subsequent to the filing of Broadwater's application, the initial deadline for receipt of comments was March 10, 2006. Following FERC's issuance of the DEIS, the comment period was open until January 23, 2007. Despite these deadlines, interventions and comments have been filed almost daily. As of the middle of July 2007, there have been 1,535 filings at FERC, including 32 interventions and 1,180 comments / protests. The list of interveners is shown in Appendix 8. FERC received a large number of form-letter type submissions in the Broadwater proceedings. FERC does not individually index each of these filings, but may group them together and note in the description "Comments of (Individual) and 33 others…" Therefore each comment/protest could represent a large number of individuals. In the following sub-section, we summarize the main points in the intervention filed by Suffolk County.

6.1.1 County of Suffolk Intervention

In late August 2006, Suffolk County (the County) passed a law prohibiting the construction of floating LNG facilities in Long Island waters. Subsequently, the County intervened in the Broadwater docket with a filing submitted on November 17, 2006. The intervention focuses on Broadwater's application to the New York State Office of General Services (NYSOGS) for a submerged land easement to construct and operate a floating LNG terminal in Long Island Sound. The County finds that Broadwater's easement application is premature because it preceded FERC's issuance of the DEIS. Furthermore, the County believes that the State Environmental Quality Review Act (SEQRA) analysis should first be completed. The County asserts that the NYSOGS lacks the authority under the Public Lands Law to grant such easements, and Broadwater must instead petition the New York State Legislature. The County states that Broadwater fails to comply with the Requirements of NY Pub L§ 75 of the NYSOGS regulations, principally because Broadwater is not an adjacent upland property owner. The County also finds that an easement for Broadwater would violate the federal Long Island Sound Stewardship Act of 2006. The County asserts that the Broadwater Project is not in the public interest of the residents of Suffolk County since most of the LNG derived from the Project would not be used on Long Island. Furthermore, the County believes that the Project does not meet the NYSOGS regulatory standard since it is not "consistent with the public interest in navigation, commerce, public access, fishing, bathing, recreation and environmental and aesthetic protection."

The sizes of the hazard zones in the Sandia Report are based on large releases of LNG from carriers with individual tank capacities of approximately 25,000 m^3. The USCG scaled up the hazard zone distances to account for the much larger storage tanks of the FSRU and the new, larger LNG carriers. It is important to note that Zone 3 in the Sandia Report and also in the WSR is based on a simultaneous release from three tanks with a nominal breach of 5 m^2 and no immediate ignition source.[231]

Based on modeling conducted by FERC, all three zones from the Sandia Report were scaled up to account for the larger size of the Broadwater storage tanks relative to the storage tanks postulated in the Sandia Report:

- Zone 1 by 32-35%,
- Zone 2 by 16-18%, and
- Zone 3 by 95-114%.

The hazard zones defined by the USCG for Broadwater are summarized in Table 22 with a comparison to the Sandia Report.

Table 22 – Broadwater Hazard Zones[232]

	Zone 1 (≥ 37.5 kW/m^2)	**Zone 2 (≥ 5 kW/m^2)**	**Zone 3 (LFL)**
Sandia	500 m (546 yds)	1,600 m (1750 yds)	3,500 m (2.2 miles)
Broadwater FSRU	750 yds	2,100 yds	4.7 miles
250,000-m^3 LNG Carrier	750 yds	2,050 yds	4.3 miles

None of these hazard zones around the FSRU would impact any population centers due to their distance from land, shown in Figure 55.

[231] LAI notes that the USCG has used different size holes in its evaluation of the various deepwater port projects. In the Northeast Gateway DEIS, release scenarios assume breach sizes of 22.3-24 m^2 for a single storage compartment and 12 m^2 for an intentional event which damages two storage compartments. In the Cabrillo Port DEIS, release scenarios assume breach sizes of 1300 m^2 for a single storage compartment (of the Moss spherical type) and 7 m^2 for an intentional event which damages two storage compartments. For comparison sake, the hole blown into the side of the USS Cole was reported to be 40 ft high and 60 ft wide, or 223 m^2.

[232] Waterways Suitability Report, Table 1-3.

Based on a report entitled "Maritime Terrorist Threat" issued in February 2006 by the New York State Office of Homeland Security, the intervention outlines the safety and security concerns arising from the Project. The intervention finds the Project to be unsafe and environmentally destructive. Lastly, the County believes the NYSOGS should deny the application or schedule a public hearing to allow the public to understand, evaluate and comment on the Project.

6.2. Conferences and Meetings

A number of conferences and meetings concerning the Broadwater project were held in 2006 and 2007. LAI only attended the FERC Technical Conference on June 6, 2006, in Port Jefferson, New York, and the FERC Technical Meeting on August 22, 2006, in Washington, D.C. These meetings were not open to the public because of the critical energy infrastructure information and security issues discussed. Therefore, the technical issues discussed at the meetings are not reviewed herein.

In addition, FERC and the USACE New York District conducted four public comment meetings as follows: in New London, CT, on January 9, 2007; at Smithtown, NY, on January 10, 2007; at Shoreham, NY, on January 11, 2007; and, at Branford, CT, on January 16, 2007. Finally, the Office of Energy Projects conducted an interagency meeting with Connecticut state agencies and officials on January 16, 2007, in East Haven, CT.[230]

6.3. U.S. Coast Guard Waterways Suitability Report

The USCG Captain of the Port, Long Island Sound, released the WSR for the proposed Broadwater LNG facility on September 21, 2006. The USCG concluded that the waterway was suitable only with additional safety measures to responsibly manage risks to navigation safety or maritime security associated with LNG marine traffic and the operation of the FSRU. These safety measures include strategies to both reduce risk by reducing the potential that an accident or terrorist attack may be attempted, as well as to reduce consequences if there were a large release of LNG from either the proposed FSRU or an LNG tanker. The WSR recommended a safety zone around the FSRU with a radius of 1,106 m (1,210 yards), which is materially larger than what the USCG proposed for Cabrillo Port off the coast of southern California. The classified threat assessment found that the FSRU's remote location lessens its attractiveness as a target based on current terrorist target selection criteria.

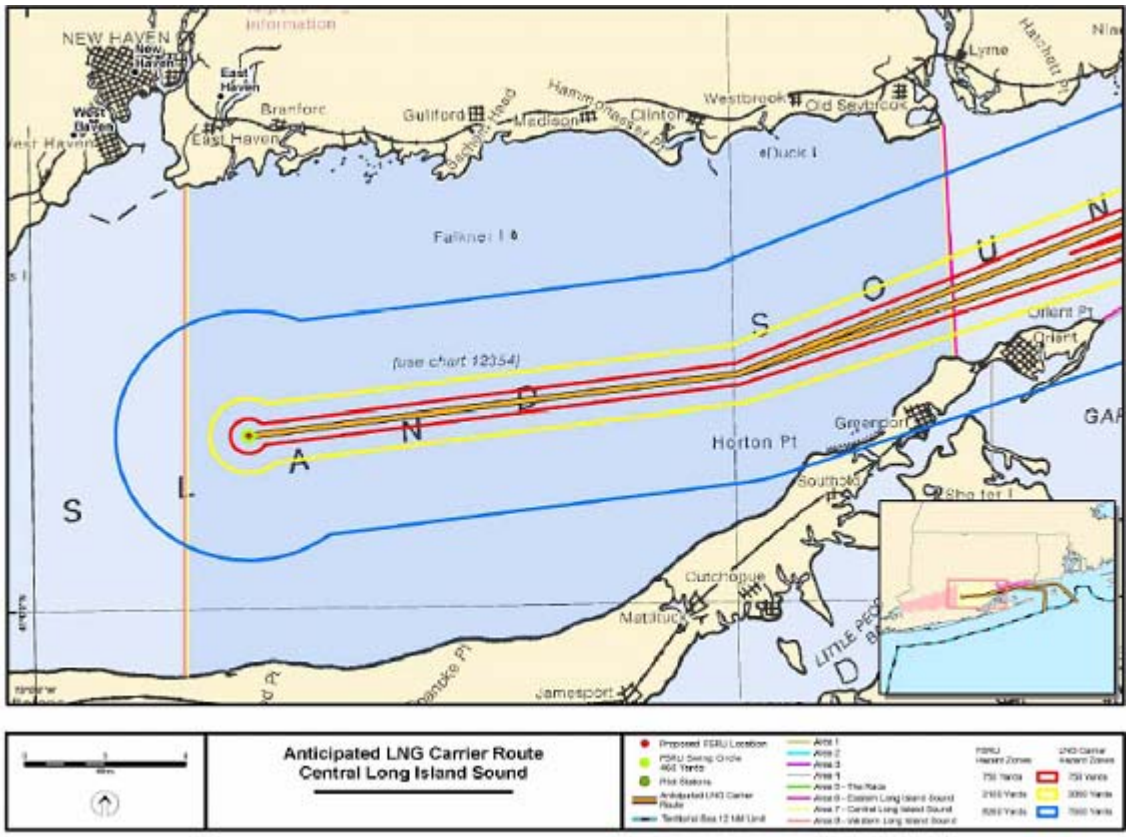
6.3.1 LAI Review of USCG Findings

Based on the guidelines in the Sandia Report, the USCG defined three hazard zone boundaries:

- Zone 1 – high potential for major injuries or significant damage to structures ($\geq$ 37.5 kW/m^2),
- Zone 2 – potential for injuries and some property damage ($\geq$ 5 kW/m^2), and
- Zone 3 – outer limit where LNG vapor can be ignited (methane $\geq$ 5%).

[230] LAI did not attend these public meetings.

Figure 55 – Anticipated LNG carrier transit route with Zone 1 (red), Zone 2 (yellow) and Zone 3 (blue)[233]



Neither hazard Zone 1 nor 2 would impact land along the proposed LNG tanker transit route. However, hazard Zone 3 surrounding the proposed LNG carrier transit route encompasses Fishers Island, Plum Island, and the eastern portion of Southold, NY, as well as small portions of coastal Connecticut and Block Island, RI.

Based on an assessment of the hazard zones, the USCG proposed security and safety zones. The purpose of a **security** zone is to protect the LNG carrier or FSRU from external threats, not to protect the public from a potential fire. The purpose of a **safety** zone is to protect the public and marine transportation system from the hazards associated with a breach of the LNG carrier's or FSRU's tanks. To ensure both the security of the LNG carrier or the FSRU and safety of the public, the necessary security zone should have dimensions of the greater of the two, in this case the safety zone, and would be considered a **combined** safety and security zone. The proposed safety / security zone around the FSRU is a circle centered on the mooring tower with a radius of 1,210 yards or 1,106 m (equal to Zone 1+ FSRU/mooring tower length, *i.e.* 750 yds + 460 yds). The area covered by the proposed safety/security zone (1.48 square miles) is approximately 0.12% of the total area (1,320 square miles) of Long Island Sound. The proposed safety / security zone around the LNG tanker while in Long Island Sound would extend 3.7 km (2.3

[233] Waterways Suitability Report, Figure 3.2-7.

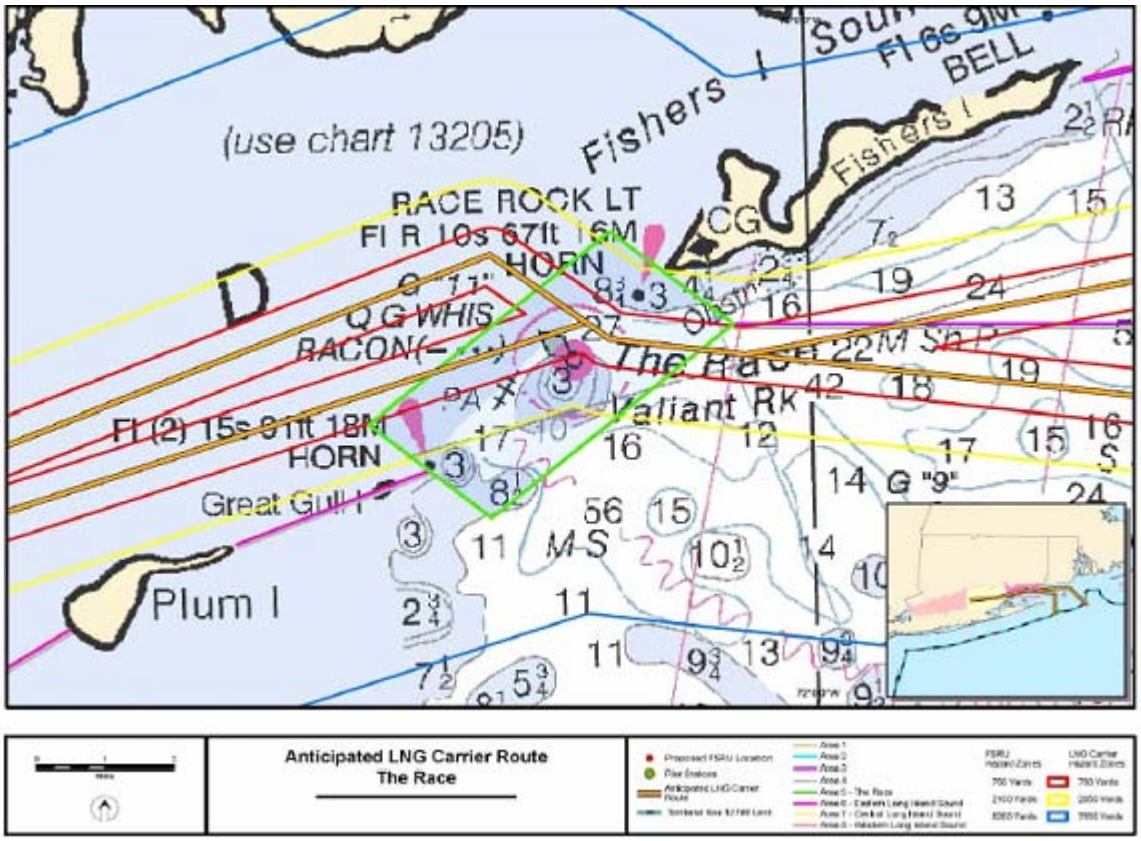
miles) ahead, 1.85 km (1.15 miles) astern, and 0.69 km (0.43 miles) to either side of the LNG tanker, similar to the safety / security zone in place around LNG carriers entering Boston Harbor (3.7 km ahead, 1.85 km astern, and 457 m on each side).

The typical LNG carrier speed in the Sound would be 12 knots and result in the safety / security zone taking approximately 15 minutes to pass a given fixed point. Since LNG carriers in service always have some cargo on board to keep the storage tanks cold, the moving safety zone would apply to the LNG carriers both entering and leaving Long Island Sound.

Cabrillo Port's storage tanks are twice the size of the Broadwater storage tanks. However, in the Cabrillo Port DEIS, the Sandia safety zones were not scaled up to account for the larger storage tanks. The safety / security zone around the proposed Cabrillo Port FSRU is 500 m (the unscaled Sandia result) from the stern of the FSRU or 817 m (893 yds) from the mooring tower. We therefore conclude that Broadwater's safety / security zone is in effect 35% larger than the Cabrillo Port safety / security zone.

Although The Race, a 2,195 m wide channel, is considered a critical waterway for national defense, commerce and recreation, the impacts of the moving safety and security zone around the transiting LNG carriers on other waterway users is manageable according to the USCG. Assuming an LNG carrier travels in the middle of The Race, there would be approximately 389 m on each side of the safety zone where small craft could operate while LNG carriers are transiting The Race (Figure 56).

Figure 56 – LNG Carrier Anticipated Transit Route and Hazard Zones – The Race[234]

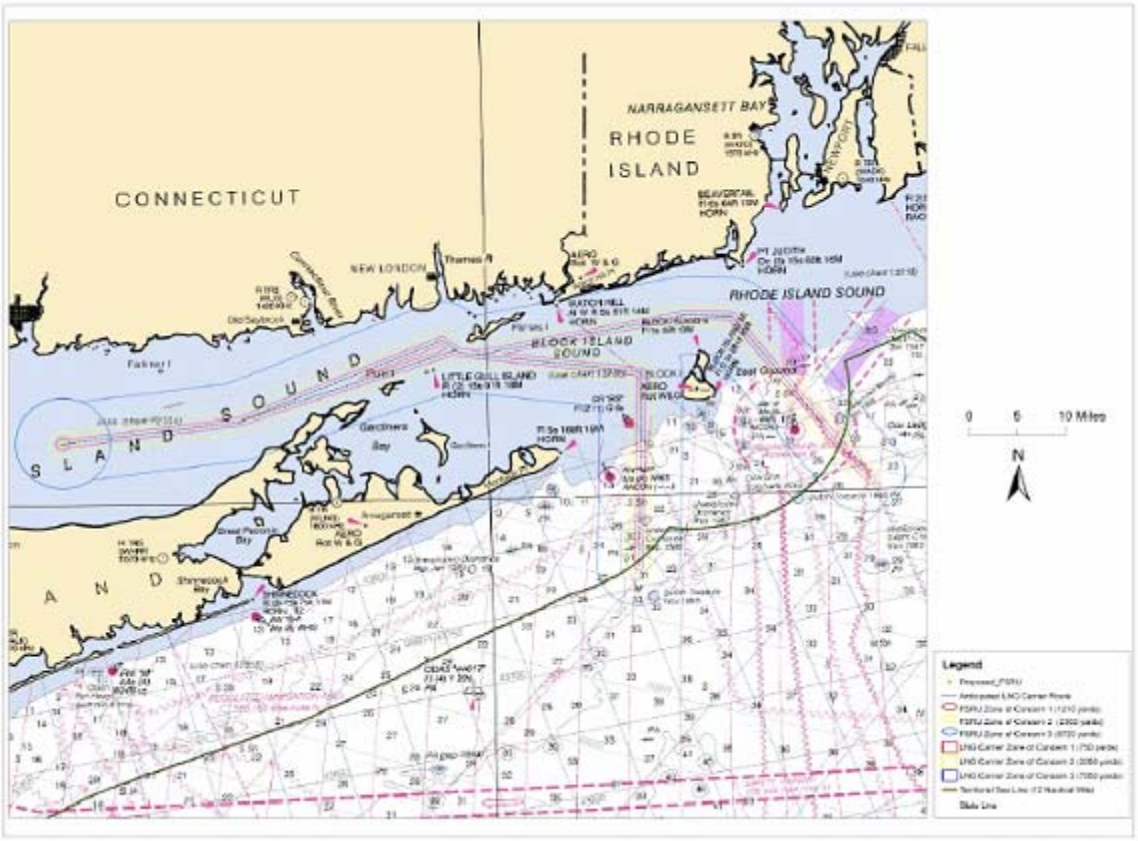


As seen in Figure 57 , the 1,106 m safety / security zone (Zone 1) around the FSRU crosses New York and Connecticut waters. Additionally, parts of Zones 2 and/or 3 around both the FSRU and LNG carriers cross New York, Connecticut and Rhode Island waters. Zone 3 crosses Fishers Island, Plum Island, and the eastern portion of the Town of Southold, NY, a sliver of coastal New London and Waterford, CT, and a very small portion of Block Island and Westerly, RI. Earlier this year, both the Commissioner of the CTDEP and the Connecticut Attorney General submitted letters to FERC requesting that Broadwater be required to file for a Coastal Zone Consistency determination with the CTDEP.[235] No Rhode Island agency has filed for permit authority at FERC.

[234] Waterways Suitability Report, Figure 3.2-5.

[235] In its April 17, 2007, response, FERC stated that the USCG is responsible for compliance with the Coastal Zone Management Act with respect to the safety / security zone.

Figure 57 – LNG Carrier Anticipated Transit Route and Hazard Zones[236]



Unlike the proposed Cabrillo Port area off the California coast, Long Island Sound does not have defined commercial shipping lanes. Therefore, the WSR analyzed the amount, type, and patterns of both commercial and recreational vessel traffic in order to assess safety / security zone impacts to waterway usage and traffic flow. Figure 42 (Section 4.3) represents vessel tracks for a single day (5th day) during each month of 2005. The proposed location of the FSRU is in the vicinity of a commercial vessel thoroughfare with a predominance of east-west transits to the south of the proposed FSRU location. A small portion of the proposed safety/security zone overlaps with the traces of these east-west transits. There is also a concentration of north-south traffic to the east of the proposed facility, but these transits are generally more than 2 miles away from the boundary of the safety / security zone.

The USCG completed an initial risk assessment of the navigation safety accident scenarios that could result in a breach of the LNG containment on either the proposed FSRU or an LNG carrier. Several navigation accident scenarios were considered, including:

- collisions involving LNG carriers,
- allisions with the FSRU involving either LNG carriers or other vessels,[237]

[236] Waterways Suitability Report, Figure 1-1.

- allisions with structures other than the FSRU involving LNG carriers,
- groundings involving LNG carriers,
- failure of the YMS and the FSRU being set adrift, and
- collisions involving large commercial vessels transiting in the vicinity of the FSRU.

For the storage tank to be breached in a collision, the other vessel must have enough kinetic energy to breach both the outer and inner hull of the LNG carrier or the FSRU. There is a risk that the LNG containment could be breached if an LNG carrier were involved in a collision under all the following conditions:

- displacement tonnage of the other vessel is greater than 5,000 tons,
- speed of the other vessel greater than 3.5 knots,
- LNG carrier is struck in the cargo block, and
- angle of impact is 30-90 degrees.

The USCG concluded that there is the potential that a collision involving an LNG carrier resulting in minor or moderate consequences could occur once every 10-50 years and a collision resulting in major consequences could occur once every 50-100 years. Similarly, an allision with the FSRU involving an LNG carrier resulting in minor consequences could occur once every one to ten years, with moderate consequences every 50-100 years and with major consequences once in 100 years or more.

The greatest potential for the YMS to fail would be during heavy weather which is also the condition when assist tugs would not be able to take the FSRU in tow and control its movement. The USCG validated Broadwater's assertion that the stated design wind speed is equivalent to a Category 5 hurricane (one minute average wind speed of 198 mph). The worst hurricane in Long Island Sound history was a Category 3 event in 1938. If the mooring did fail, the FSRU would likely drift within 1.8 to 3.7 km of either the Long Island or Connecticut shoreline before running aground. It is unlikely that it would collide with transiting vessels since they would be advised of the FSRU's position while efforts were being made to take it in tow.

The Race is the portion of the route where it was determined that the highest risk for a vessel grounding existed due to the proximity of the route to shoal water. However, a New York or Connecticut licensed marine pilot will have embarked at one of the two possible pilot stations before The Race: Point Judith or Point Montauk.

The risk index number is a product of the threat score, the vulnerability score and the consequence score. The top ten (according to risk index number) ranked results of the assessment of navigation-related accidents are listed in Table 23.

[237] An allision is defined as vessel contact with a fixed object.

Table 23 – Ranked Navigation Safety Events[238]

Event	Portion of Route	Risk Index Number	% Cumulative Risk
Collision	The Race	11274.61	31.18%
Collision	Block Island Sound	6586.25	18.21%
Collision (small craft)	The Race	4816.07	13.32%
Allision of FSRU by non-LNG carriers	Waters adjacent to FSRU	3629.14	10.04%
Collision	Eastern LIS	3168.04	8.76%
Mooring tower failure (FSRU adrift)	Vicinity of FSRU	2279.80	6.30%
Collision with pilot boat	Vicinity of pilot station	1799.70	4.98%
Grounding	The Race	1022.30	2.83%
Collision	Vicinity of pilot station	924.43	2.56%
Collision	Vicinity of FSRU	591.72	1.64%

LAI did not have access to the classified threat assessment so we could not address the details concerning terrorist threats to Broadwater.

Potential risk management strategies, both prevention and consequence management, were found to be necessary to effectively manage potential risks to navigation safety. First and foremost, LNG carrier movements should not delay or impede the movement of naval vessels. Secondly, mitigation measures should minimize conflicts with other waterway users, both commercial and recreational. Third, a minimum of two assist tugs should be within the limits of the safety zone at all times while an LNG carrier is moored at the FSRU. Although there are no known, credible threats against the proposed Broadwater facility at present, periodic threat assessments must be conducted to ensure that the appropriate security measures are in place. Flight restrictions similar to the ones currently in place around LNG carriers as they enter Boston Harbor have been recommended around the FSRU and LNG carriers while in Long Island Sound.

The USCG is the lead federal agency responsible for maritime security concerning the Project. Enforcement of security zones is a law enforcement function and is the responsibility of the USCG with possible involvement of state law enforcement parties. Since local authorities do not currently operate at the proposed FSRU location in New York state waters, it is unclear how involved the county and local agencies will be as far as maritime security and emergency response. The outer limits of the safety / security zone around the FSRU would be marked with lighted buoys for the cardinal points and unlighted buoys for the inter-cardinal points. According to the Energy Policy Act (Section 311), the emergency response plan is required to include a cost-sharing plan that would require Broadwater to reimburse any state and local

[238] Waterways Suitability Report, part of Table 4-5.

agencies for direct costs from security and safety responsibilities either at the terminal itself or around the vessels that serve the facility.

6.4. Draft Environmental Impact Statement (November 17, 2006)

The DEIS finds the Project to result in fewer environmental impacts than any alternatives considered, and includes recommendations that would further minimize and avoid impacts. FERC asserts that the safety / security zone around the FSRU would not have a significant impact on recreational use and only minor impacts on commercial use. Although there is a potential for an increased risk to public health and safety, FERC and the USCG considered the potential risk to be "very low." These findings are in accord with LAI's review.

Since the FSRU incorporates design and engineering components of an LNG import terminal, an offshore marine facility and an LNG carrier, FERC and the USCG have recommended the use of a Certifying Entity for the design, plan review, fabrication, installation, inspection, maintenance, and oversight of the FSRU and the YMS. This recommendation would ensure that high levels of reliability, operability, and safety would be met throughout the life of the facility.

With respect to safety and security, the DEIS relies on the USCG WSR. The WSR assessed potential risks in terms of threats, vulnerabilities and consequences and found that the location of the Project has significant safety and security benefits associated with its remoteness. However, the WSR did find that the remote location would create some law enforcement challenges and that additional measures are necessary to responsibly manage the safety and security risks of the Project. Specifically, the USCG recommends a series of risk management strategies that would reduce the potential that an accident or terrorist attack would be attempted as well as reduce the potential consequences if there were a large release of LNG from either the proposed FSRU or an LNG tanker. Additional federal, state and local law enforcement resources would be needed to mitigate the safety and security risks of the Project.

There are two proposed safety and security zones:

- around the FSRU corresponding to 0.1% of the total area of Long Island Sound, and
- around the LNG carrier while in transit in Long Island Sound which would take approximately 15 min to pass a given point

Commercial and recreational activity would not be allowed at any time within the fixed safety and security zone around the Project. Since the FSRU location is outside typical shipping routes, only a few commercial shipping transits would have to adjust their routes slightly to the south. We presume that the commercial fishermen (estimated to be 5 lobster and 12 trawl fishermen) who would be excluded from using the area for the life of the Project would be compensated fully for the loss of livelihood by Broadwater.

The visual resource analysis found the Project to result in a moderate and long-term impact in parts of Long Island Sound which is not expected to change the public value of the viewshed or the value of shorefront property.

6.4.1 FSRU Reliability and Safety Issues

Since the FSRU has components of an LNG import terminal, an offshore marine facility and an LNG carrier, FERC staff and the USCG jointly conducted the cryogenic design review of the proposed facility.

Both U.S. regulations and international codes need to be applied to the design, construction and operation of the FSRU. FERC and the USCG require Broadwater to set up a process to determine the applicability and relative stringency for each standard when multiple standards are identified. This can be done by employing a Certifying Entity and Broadwater formally nominated ABS. Recently, Broadwater executed a formal agreement with ABS (Section 6.8). The DEIS recommends a long list of measures that should apply to the LNG terminal design and to construction details, most of which are considered Critical Energy Infrastructure Information and are not publicly available. It recommends additional measures that should apply during the operation of the facility, such as reporting to FERC within 24 hours any non-scheduled events or security related incidents.

The DEIS re-emphasized the USCG's concern about the reliability of the YMS which is critical to the reliability and safety of the FSRU. Excessive forces on the YMS due to weather or collisions could cause a number of failure scenarios such as the accidental detachment of the FSRU mooring structure from the yoke, the mechanical failure of the flexible jumpers and other mooring head equipment, the failure of control system cables from the FSRU to the YMS, or the failure of the mooring tower itself. The DEIS requires that the final design of the YMS be able to withstand a Category 5 hurricane and have no single point of failure.

The FSRU onboard spill control system includes the following important features:

- gravity drainage to the port side of the FSRU opposite the unloading arms;
- position sensors on each of the mechanical loading arms that monitor excessive movement between the FSRU and LNG carrier and initiate an automatic disconnect; and
- an emergency shutdown system which would stop transfers for high LNG tank levels, high LNG tank pressures, fire detection, loss of electrical power, loss of instrument air pressure, *etc.*

The DEIS presents thermal and vapor dispersion modeling results from a number of sources with a range of outcomes for a variety of scenarios. Unlike the Cabrillo Port DEIS, the Broadwater DEIS uses Btu/ft^2-hr instead of kW/m^2 to describe thermal radiation intensities and "ft" instead of "m" to delineate distance. For consistency, radiative fluxes in Btu/ft^2 have been converted to kW/m^2 in this report.[239] In some cases, the vapor dispersion distances are given to ½ LFL and in

[239] 5 kW/m^2 is equivalent to 1,600 Btu/ft^2-hr, 10 kW/m^2 is equivalent to 3,000 Btu/ft^2-hr, and 37.5 kW/m^2 is equivalent to 10,000 Btu/ft^2-hr.

other cases to LFL.[240] Using the distance to ½ LFL as a standard for safety instead of the distance to LFL will clearly increase the vapor dispersion distances considerably. For spills due to FSRU process equipment malfunctions, the worst case scenario is a 32-inch loading arm manifold break and results in a distance to 5 kW/m^2 of 360 m and a distance to ½ LFL of 2.5 miles. For hazard zones from an FSRU cargo tank breach with a 35,560 m^3 spill, FERC calculates the distances to 5 kW/m^2 of 980 m to 1,728 m for holes ranging from 0.8 m^2 to 12 m^2, respectively.[241] The fire durations for these spills range from 8 minutes for the 12 m^2 hole to 115 minutes for the 0.8 m^2 hole. The DEIS stresses that any event that would create a hole in the outer hull, inner hull and cargo containment area would most likely result in a number of ignition sources (sparks) which would lead to an LNG pool fire. Nevertheless, FERC staff calculates vapor dispersion distances for an FSRU cargo tank breach with a 1 m^2 diameter hole of 3.5 km to LFL and 4.9 km to ½ LFL. They also calculate a vapor dispersion distance of 7.6 km to LFL for a 5 m^2 breach for three of the FSRU storage tanks.

6.4.2 LNG Carrier Reliability and Safety Issues

The LNG carriers would travel 70 miles at 12 to 15 knots from the Point Judith / Montauk Point Pilot Stations to the Broadwater FSRU. This trip would take about 5-6 hours in total, but the moving safety and security zone around the LNG tanker would pass any given point in 15 minutes. Therefore, there would be temporary impacts on recreational and commercial vessels in the Sound. The USCG could provide a Notice to Mariners announcing the arrival and departure of LNG carriers as they do in other waterways during LNG carrier transits.

LNG vessels are designed to withstand low-energy type incidents that might occur during docking or other harbor incidents. The inner and outer hull of the LNG carrier is separated by 2-3 m. Hold spaces and insulation areas on the LNG carrier have low temperature alarms and gas detection in order to detect leaks. For fighting fires, the LNG carriers are equipped with a firewater system, dry chemical extinguishing systems and CO_2 smothering systems. Overpressure or underpressure within a cargo tank is monitored with an alarm system. The DEIS found the following events most likely to cause a significant release of LNG if they occur with sufficient impact to puncture an LNG cargo tank:

- a grounding,
- a vessel colliding with an LNG carrier in transit,
- a vessel striking an LNG carrier moored to the FSRU,[242] or

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[240] The distance to ½ LFL is recommended by NFPA 59A for onshore LNG facilities. NFPA 59A recommends that the average concentration of methane in air of 1/2LFL does not extend beyond the property line that can be built upon.

[241] ABS Consulting, "Consequence Assessment Methods for Incidents Involving Releases from Liquefied Natural Gas Carriers", (2004).

[242] Although the DEIS postulates a collision of a vessel with the LNG carrier while it is moored to the FSRU, there is no mention of simultaneous breaching of the LNG carrier and the FSRU in any of the hazard calculations. Since the Privileged and Confidential Broadwater documents are not available for review, the possible consequences of such a collision with associated simultaneous breaches in the FSRU and LNG carrier are not available. However,

- a deliberate attack on an LNG carrier.

Damage during a collision depends on the mass (displacement) and velocity of the striking vessel, its angle of impact and the point of impact. The DEIS presents a range of critical beam-on striking speeds (from 3 knots to 18 knots) for both membrane and spherical Moss LNG tankers for various angles of impact.

The DEIS presents an array of spill scenarios for the LNG carrier and their respective distances to 5 kW/m^2 and distances to LFL based on a number of studies including the Sandia Report. Broadwater proposes to use LNG carriers that are twice as large as the 125,000 m^3 LNG carrier used in the Sandia Report. For hazard zones from an LNG carrier cargo tank breach with a 23,000 m^3 spill, FERC calculates the distances to 5 kW/m^2 of 640 m to 1,550 m for holes ranging from 0.8 m^2 to 12 m^2. The fire durations for these spills range from 6.5 minutes for the 12 m^2 hole to 94.1 minutes for the 0.8 m^2 hole. For the same spill, FERC staff also calculates vapor dispersion distances of 2,980 m to LFL and 4,380 m to ½ LFL. For a 250,000 m^3 LNG carrier with a 5 m^2 breach in three tanks, FERC calculates a distance of 6.9 km (4.3 miles) to LFL.

The DEIS restates the WSR conclusions that the radiation hazard zones from a 5 m^2 breach in a 250,000 m^3 LNG carrier would not touch upon land along the LNG carrier route but that the vapor dispersion hazard zones could impact land along some portion of the transit route. They also refer to the WSR for recommendations and mitigations necessary to make the waterway suitable for the Project.

6.4.3 Environmental

The FERC DEIS provides a comprehensive analysis of existing environmental conditions in the area of the Project, as well as its benefits and potential adverse impacts. In this document, FERC recommended mitigation methods that Broadwater should implement during the construction and operation of the Project. Some of these approaches were not incorporated in Broadwater's filed Resource Reports or other preliminary design documents. Broadwater has subsequently commented on these recommendations, and acknowledged that it is in "general agreement with the environmental analyses and recommended mitigation measures."[243] In its response to FERC, Broadwater provided clarifications to several of the issues and recommendations addressed in the DEIS.

In comments filed at FERC, state and federal agencies who are charged with issuing permits and/or reviewing the DEIS requested additional information and detail on a range of environmental and safety issues. Other stakeholders and interveners have also filed comments

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the amount of LNG that would be released during such an event would never exceed the total storage capacity of the FSRU because prior to the arrival of the LNG carrier, the FSRU would have regasified enough LNG to accommodate the new delivery.

[243] Letter from LeBoeuf, Lamb, Greene & MacRae, LLP, attorneys for Broadwater Energy LLC, to FERC, January 23, 2007, Docket Nos. CP06-54-000 and CP06-55-000.

and identified the need for additional information. The Environmental Information Requests from FERC have been substantial, and include but are not limited to:

- More details regarding FSRU and LNG carrier water intake and discharge design, and implications for impacts on ichthyoplankton impingement and entrainment and on EFH for locally important species;
- More details regarding the trench construction, and backfill methodology, the design for crossing existing marine cables, the physical and ecological impacts of pipeline construction (particularly on the lobster population), the methodology and results of modeling turbidity and sedimentation, and a contingency plan in the event that subsea plowing is not effective;
- Modeling of thermal impacts associated with FSRU water discharges and pipeline operations, including the impacts from the riser pipe connecting the mooring tower to the pipeline;
- More design details regarding the mooring tower and riser pipe construction, including target depth for the mooring tower piles and appropriate design criteria based on tidal and current data;
- A plan for monitoring construction impacts;
- Economic and social impact of safety zones around the FSRU and LNG carrier vessels on lobstering and on recreational and commercial fishing, and how displaced lobster and trawl fishermen would be compensated;
- Additional information regarding human and natural resources along the LNG carrier transit route, including within designated hazard zones to a radius of about 2050 yards from the center of the proposed route;
- Potential noise impacts associated with construction and impacts on marine resources,
- Additional mitigation measures to protect threatened and endangered sea turtles and whales who may be affected by pile-driving activities during construction of the mooring tower, or who may collide with construction vessels, the FSRU or LNG carrier vessels;
- Impact of FSRU lighting on EFH, and on migratory bird species, especially threatened and endangered bird species;
- Extensive detail regarding air emissions from construction vessels / equipment, the FSRU, LNG carriers, support vessels, the gas pipeline / compressor station, results of air dispersion modeling, and conformance with applicable air quality regulations;
- An analysis of the discharges associated with the periodic cleaning of the inert gas scrubber on the FSRU; and
- Information on the use and impacts of copper-based anti-fouling paint proposed to be used on the FSRU and mooring tower.

Broadwater has submitted an extensive series of responses to FERC, including some new data and modeling results.[244] We understand that a few of Broadwater's responses to FERC's Environmental Information Requests are still pending.[245] In accordance with federal and state regulations and their statutory authorities, FERC and the permitting agencies will continue to consider the information provided by Broadwater to address gaps in the environmental analysis, update recommendations with respect to mitigation, make permit determinations, and develop the FEIS. LAI's environmental review focuses on technical issues. Of critical importance, we have not commented on important public policy matters, such as whether the Project is an appropriate use of public trust land. With respect to environmental impacts, the significant technical issues that remain to be resolved are as follows:

- In concert with FERC and the other resource agencies, Broadwater is finalizing the detailed construction plan for installing the pipeline and the mooring tower. Several issues remain to be resolved, but they do not appear to be intractable. These include the feasibility of and alternatives to using a subsea plow across the Stratford Shoal area, the effectiveness of mid-line buoys to minimize anchor cable sweep, the benefits of active trench backfilling versus natural resedimentation, design of crossings over the Cross Sound Cable and AT&T cable, additional measures to protect threatened and endangered species, a lighting plan, and noise mitigation measures during construction and operation. It has been the experience of other marine infrastructure projects that unanticipated field conditions will inevitably arise during construction, and the design will need to be modified. Contingency plans incorporated into the final design will need to accommodate such flexibility while ensuring adequate protection of environmental resources.

- Compensation to displaced lobstermen and trawl fishermen remains to be negotiated through a settlement between Broadwater and the affected parties. FERC recommended that the final compensation plan be filed with the agency, whereas Broadwater prefers that the plan remain confidential.

- NYSDEC, the New York State Department of State, NYSOGS, USACE, and other agencies with permit jurisdiction and review authority will continue to assess the information provided by Broadwater regarding air emissions, water intake and discharge, construction methods and other aspects of the Project. In this review, LAI has not attempted to anticipate how the permitting agencies will analyze the body of data or what permit conditions may be imposed on the Project.

- Construction vessels and LNG carrier vessels transiting Block Island Sound, the Race and Long Island Sound have the potential to conflict with ferry, recreational boating, commercial, and military vessel traffic. The DEIS and the USCG WSR addressed the

[244] See, for example, Correspondence from LeBoeuf, Lamb, Green & MacRae, LLC, to FERC, March 26, April 30, May 7, May 15, May 31, June 5, June 20, and July 10, 2007, Docket Nos. CP06-54-000, CP06-55-000, and CP06-56-000.

[245] Correspondence from LeBoeuf, Lamb, Greene & MacRae, LLP, attorneys for Broadwater Energy LLC, to FERC, July 10, 2007, Docket Nos. CP06-54-000, CP06-55-000, and CP06-56-000.

extent to which transit routes and schedules would need to be adjusted. The USCG will be responsible for developing and implementing a traffic management plan.

6.5. GAO Report (released on March 14, 2007)

As a final safety update to this report, LAI was asked to review the public version of the GAO Report on maritime security entitled "Public Safety Consequences of a Terrorist Attack on a Tanker Carrying Liquified Natural Gas Need Clarification."[246] The GAO report also has a more comprehensive but classified version which is not available to the public. The study had two goals. The first goal was to describe the results of recent unclassified studies on the consequences of an LNG spill. The GAO team reviewed six unclassified studies including the Sandia Report, the Quest study,[247] the ABSC report[248] and three scientific papers referred to by their first authors as Pitblado,[249] Fay,[250] and Lehr,[251] respectively. These studies were designed and conducted for different purposes and therefore made different assumptions about key LNG spill parameters. The second goal was to identify the areas of agreement and disagreement among experts concerning the consequences of a terrorist attack on an LNG tanker. For this task, 19 experts from government, academia, consulting, research organizations and industry were chosen including one author from each of the six studies listed above.

One key finding of the GAO Report is that DOE should examine the potential for cascading failure of LNG tanks in their ongoing LNG research. DOE recently funded a Sandia research study on small and large scale LNG fire experiments to improve models that calculate the heat flux from large LNG fires.[252] This conclusion was based on the views of the panel of 19 experts who generally agreed on most issues concerning the public safety impact of an LNG spill but wanted clarification on the uncertainties associated with heat impact distances and cascading failure. Both the cryogenic damage from spilled LNG and the hot temperatures of an LNG fire could significantly damage the tanker and cause multiple tanks to fail in sequence. Experts did not agree on the number of storage tanks involved in this cascading failure as presented in the Sandia Report.[253]

Comparing the six studies revealed that the differences in the calculated distance to 5 kW/m^2 are partly due to differing assumptions about hole size, wind and waves, volume of LNG spilled, the

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[246] GAO-07-316 (February 2007).

[247] Quest Consultants, Inc., "Modeling LNG Spills in Boston Harbor", Norman, OK 73609 (2003); Letters from Quest Consultants to DOE (October 2, 2001 and October 3, 2001).

[248] ABS Consulting, "Consequence Assessment Methods for Incidents Involving Releases from Liquefied Natural Gas Carriers", (2004).

[249] R.M. Pitblado, J. Baik, G.J. Hughes, C. Ferro and S.J. Shaw, "Consequences of LNG Marine Incidents", CCPS Conference, Orlando (June 29-July 1, 2004).

[250] J. Fay, "Model of spills and fires from LNG and oil tankers", Journal of Hazardous Materials, Vol. B96, pp. 171-188, (2003).

[251] W. Lehr, D. Simecek-Beatty, "Comparison of Hypothetical LNG and Fuel Oil Fires on Water", Journal of Hazardous Materials, Vol. 107, pp. 3-9, (2004).

[252] This work will be completed in 2008.

[253] The Sandia Report concludes that only three out of five storage tanks would be involved in a cascading failure.

surface emissive power of the fire and whether or not there is cascading failure of neighboring tanks. Although it is believed that the surface emissive power will be lower for large fires because of insufficient oxygen for complete combustion, experiments on large LNG fires (such as those funded by DOE) are needed to confirm this hypothesis. Hole size ranged from 0.79 to 20 m^2 for the various studies including the three (Sandia, Quest and Pitblado) that specifically addressed LNG spills caused by terrorist attacks. There appears to be no consistency between the studies concerning hole size in an LNG storage tank due to a terrorist attack.

The GAO report's analysis of expert opinion concerning the public safety impacts of an LNG spill was valuable in identifying areas of disagreement and point to areas where further research is necessary. The definition of thermal hazard zones is particularly relevant to LAI's review. 42.11% of the experts believe that 5 kW/m^2 is the appropriate end point for a thermal hazard zone, while 10.53% found 1.6 kW/m^2 to be the appropriate level. 15.79% of the experts did not have the expertise to respond to the question and 31.58% believe in some "other" definition.

The experts uniformly agreed that an LNG vapor within the flammability range is likely to ignite if it encounters a cigarette lighter or a strong static charge. They also agree that asphyxiation and freezer burns are threats to personnel on the LNG tanker or in vessels near the tanker but not threats to the public. The experts agree that RPTs would probably not have a direct effect on the public. Wind speed and direction will affect the tilt of the flames increasing the amount of heat felt downwind and decreasing the heat felt upwind. The experts mostly agreed that an LNG vapor cloud fire could cause secondary fires that would continue to present a hazard to the public even after the initial vapor cloud fire ended. Experts did not agree on the speed of the LNG vapor cloud flame front in a confined space (range 0 to 2,000 m/s) or an unconfined space (range 5 to 50 m/s.

Although DOE's new study on large scale LNG fire experiments addresses some of the research areas suggested by the expert panel, it is not clear how much of the current uncertainty in predicting heat hazard distances will be reduced by additional experiments. A comprehensive model of an LNG fire needs to not only model each individual process accurately but also the complex interactions between the processes which change over time. As the LNG fire burns, the pool composition changes as do the surface emissive power of the fire and the effects of the wind and waves, possibly causing material failure and another source of spilled LNG. There is a considerable amount of research necessary before all these phenomena are properly accounted for so that a model can accurately predict a safe distance from a spill.

6.6. MARAD's Decision on the Cabrillo Port Project

Under section 1508 of the Deepwater Port Act, adjacent coastal state Governors must indicate their approval, approval with conditions, or disapproval of a Deepwater Port license application within 45 days of the last public hearing.[254] On March 15, 2007, the final EIS for the Cabrillo Port Project was issued and the final public hearing was held on April 4, 2007. The Governor of California, Arnold Schwarzenegger, indicated his disapproval of the project in a letter dated May

[254] The Deepwater Port Act of 1974, as amended in 1984, 1996, and 2002, establishes a licensing system for ownership, construction, and operation of deepwater ports located seaward of State territorial waters.

18, 2007, citing concerns that the project as proposed would result in significant and unmitigated environmental impacts to air quality and marine life. Based on the Governor of California's disapproval of the project, on June 5, 2007, MARAD denied Cabrillo Port's Deepwater Port license application as submitted.

6.7. New York State Department of State's Request for Additional Alternatives Analysis

On June 20, 2007, Broadwater filed a response to an information request by the New York State Department of State (NYSDOS) concerning potentially feasible south shore and Atlantic sites for the Project. Six additional pipeline routes based on four additional Atlantic locations south of Long Island were evaluated by Broadwater in this information request.[255] All of these sites are possibly in deeper water and Broadwater remains inconclusive on the technical feasibility of the mooring tower.[256] All of these pipeline alternatives involve shore crossings in the coastal zone and therefore would have more environmental issues than the Long Island Sound FSRU location. Moreover, all of these pipeline alternatives have longer pipeline sections than the preferred Broadwater location in Long Island Sound.

Of these six sites, of particular interest to LIPA is site S3-1 (Figure 58) which is an eastern facility location with an offshore pipeline route coming into Fire Island and an onshore pipeline route through Smith Point with a tie-in to Iroquois' proposed Brookhaven Lateral project at the Caithness Long Island Energy Center. This site seems to have fewer negative impacts than the other five pipeline routes. The pipeline would be 33 miles long, would only affect 10 residences adjacent to the construction ROW and involve three major shore crossings.

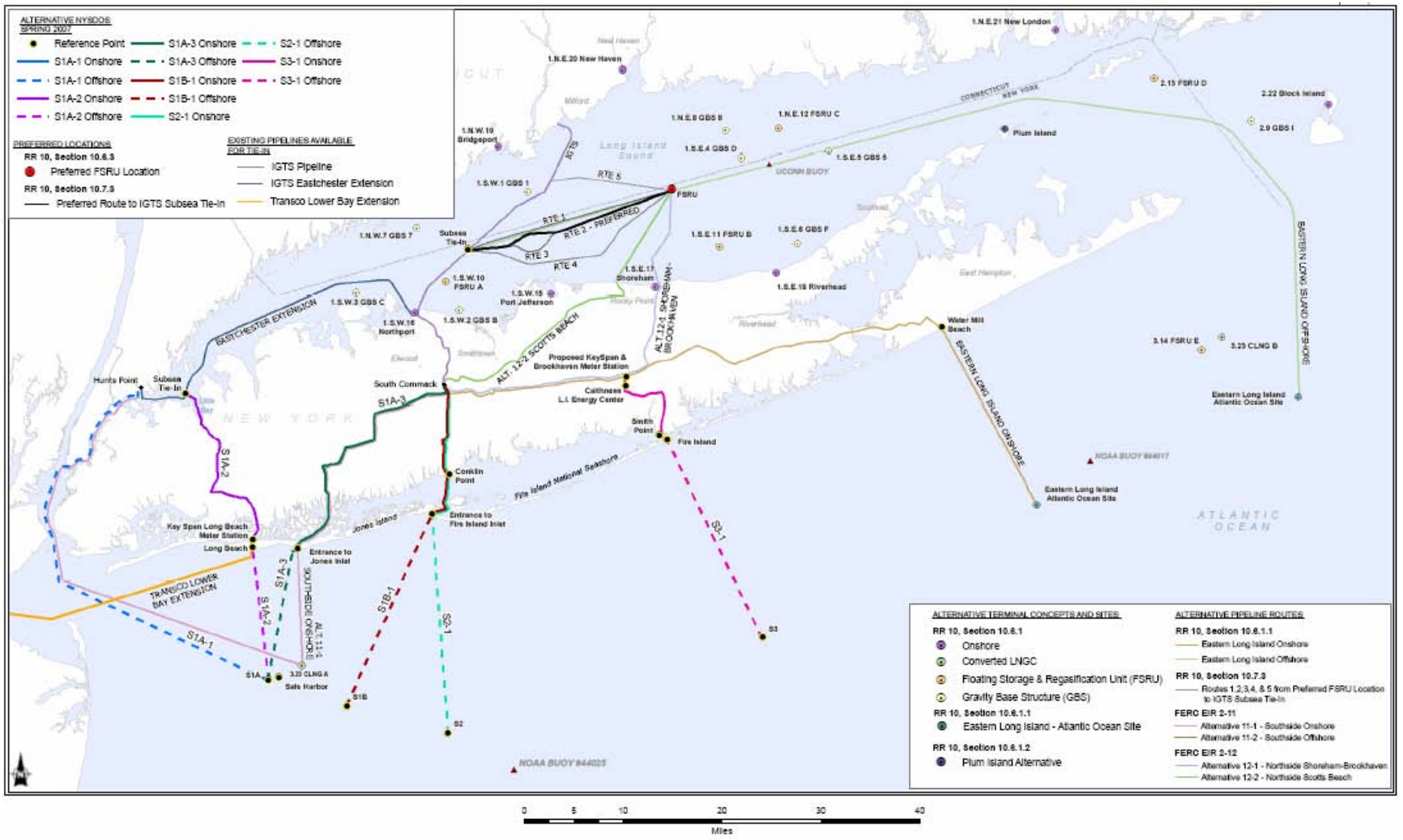
Broadwater also addressed the issue of whether SRVs could replace the FSRU or be used in conjunction with the FSRU. They referred to Resource Report 10 where alternatives to the FSRU are considered. In order to achieve the Project objectives, including the delivery 1 Bcf of gas per day, three offloading buoys would need to be constructed. The major disadvantage of the SRV technology is lack of storage which means that any disruption of the shipping supply could result in an inability to deliver a reliable supply of natural gas.

The NYSDOS responded to Broadwater's June 20, 2007 filing on July 3, 2007 citing a number of concerns. First, NYSDOS questions Broadwater's assertion that the Iroquois pipeline is the preferred alternative in the region and proposes a subsea interconnection with the Transco Long Beach pipeline for some of the Atlantic sites. Second, they request additional information on the technical feasibility of an Atlantic mooring tower able to withstand wave events greater than 10 m in height. Finally, NYSDOS finds the footprint of the FSRU versus an SRV to be significantly underestimated because the safety and security zones recommended by the USCG are not included.

[255] These Atlantic locations are in addition to the locations already discussed in Resource Report 10 – Alternatives.

[256] Neither Broadwater nor the NYSDOS discuss water depth at the Atlantic alternative sites. The YMS is designed for water depths ranging from 20-50 m but other water depths may be possible. Water depth at the Atlantic alternative sites appears to be in the 25-60 m range.

Figure 58 – Alternative Terminal Sites and Pipeline Routes Considered by Broadwater



6.8. Certifying Entity

On June 28, 2007, Broadwater informed FERC that they had executed an agreement with ABS under which ABS will act as a third party Certifying Entity for the Project. As discussed in the DEIS, the USCG recommended the use of a Certifying Entity for the design, plan review, fabrication, installation, inspection, maintenance, and oversight of the FSRU and the YMS. The Certifying Entity would ensure that high levels of reliability, operability, and safety would be met throughout the life of the facility. In an August 17, 2006 letter from FERC to Broadwater, FERC requests the submission by ABS of a statement of Organizational Conflicts of Interest (OCI) Disclosure or Representations in order to approve ABS's nomination as the Certifying Entity. ABS filed their OCI with FERC on September 8, 2006. Finally, on February 16, 2007, FERC informed Broadwater that they had accepted the recommendation of ABS as the third party Certifying Entity.