4.0 AQUATIC RESOURCES MITIGATION PLAN

4.1 SABINE PASS LNG TERMINAL

While reviewing the potential construction locations for the SPLNG project, SPLNG considered a variety of environmental constraints, including aquatic resource impacts. During the planning phase of the terminal facility, it was SPLNG's intent to avoid aquatic resources to the maximum extent practicable. As such, the proposed location of the terminal and berth presented is situated primarily in an upland area and in a manner that minimizes impacts to aquatic resources and EFH to the maximum extent practicable. Although the proposed SPLNG terminal cannot avoid all aquatic resources located within the proposed SPLNG terminal area, impacts have been minimized to the greatest extent possible, and compensatory mitigation is proposed to offset the unavoidable impacts to aquatic resources.

The overall aquatic resources mitigation plan to offset impacts has not been finalized at this time; however, SPLNG has submitted an application to the U.S. Army Corps of Engineers, Galveston District ("USACE") and the Louisiana Department of Natural Resources Coastal Management Division ("LDNR") to obtain permits to impact the aquatic resources as well as to solidify a mitigation plan to offset the unavoidable impacts. Once the mitigation plan is executed, no net loss of aquatic resources, including EFH, will result from the proposed SPLNG terminal.

Based on the current wetland delineation as prepared by B. Arville Touchet on October 17, 2003, revised on November 17, 2003, and accepted by the USACE on December 8, 2003 (D-11192), the proposed terminal will temporarily impact a total of 56.46 acres of wetlands, of which 47.73 acres will be impacted on a permanent basis (Table 2.1-1).

In order to mitigate for the unavoidable 47.73 acres of permanent wetland impacts, SPLNG proposes to mitigate for the wetlands with in-kind wetlands creation within the limits of the terminal property. Furthermore, where appropriate, the wetland function and value will be enhanced. To date, Louisiana state resource agencies have indicated that a 1:1 mitigation ratio would be acceptable for the majority of the wetland impacts. Additionally, since the project construction schedule will occur over a two- to three-year timeframe, SPLNG is proposing to mitigate for all wetland impacts, temporary or permanent, at the same time. The mitigation proposed will compensate for any temporary loss of wetland function and value as well as any permanent impacts to the aquatic resources. Once the mitigation is completed, there will be no net loss of wetland function or value.

In addition to mitigating for the wetland impacts, SPLNG is also proposing additional mitigation to compensate for the temporary impacts to deepening of open-water habitat or EFH habitat located in the non-vegetated portions of the project. This mitigation was determined by evaluating the shallow portions

of the open-water habitat that will be deepened to facilitate the construction and operation of the proposed SPLNG terminal only. Since the pipeline portion of the project is located within vegetated areas, no open-water EFH mitigation is necessary. Additionally, since the shallow non-vegetated portions of the project will not be lost and the project will result in 35.3 acres of new open-water habitat, SPLNG determined that a 0.25:1 ratio of EFH mitigation would be suitable to compensate for the temporary impacts or deepening of the EFH habitat.

Based on this rationale and mitigation ratio, SPLNG will create 9.05 acres (71.5 acres of open-water habitat impacted – 35.3 acres of open-water habitat created × 0.25 = 9.05 acres of proposed open-water mitigation) of tidally-influenced open-water habitat interspersed within the wetland mitigation area. This will be accomplished by designing and constructing channels and small open-water areas at lower elevations scattered throughout the tidally-influenced wetlands creation area. These areas will be of sufficient depth to prevent vegetation growth but shallow enough to provide high-quality EFH within the mitigation area.

Based on conversations with the resources agencies, SPLNG proposed the following mitigation scenario:

- For all wetlands located within the existing DMPA where the LNG tanks will be constructed, wetland impacts will be mitigated for at a 3:1 ratio. SPLNG is proposing a 3:1 ratio as a result of the low quality seasonal wetlands located within this area. These wetlands will be constructed within an undisturbed area within the existing DMPA (Mitigation Area C on Attachment A) that is suitable to capture sufficient surface hydrology to support the wetlands. Additionally, the wetlands will be contained by a levee system to capture the surface water. These wetlands will be planted with fresh water aquatic species, if necessary, that can tolerate seasonal flooding and seasonal dry condition similar to the existing wetland conditions located within the project vicinity. Approximately 90.87 acres of wetlands will be created within this area, which corresponds to a 3:1 mitigation ratio for the 30.29 acres of wetlands impacted. Additionally, the wetland creation activity for these wetlands will be constructed within six months following initiation of construction within the aquatic resources located within the proposed LNG tank area.

- Although this mitigation area is mapped as jurisdictional wetlands, it is currently a dredge material placement area that was created by the USACE. Portions of this spoil area exhibit wetland conditions, but the majority of the area is either bare soil or consists of non wetland vegetation. Additionally, the area is managed to not retain water except in winter to support waterfowl hunting. Therefore, for the majority of the time, this area is dry and lacks suitable hydrology to support wetland conditions. Once the mitigation area is created, sustainable hydrology and wetland conditions will exist.

- For all non-tidal wetlands impacted outside the LNG tank area, the wetlands will also be mitigated for within the existing DMPA in conjunction with the mitigation for the LNG tank wetland impacts (Mitigation Area C). These wetlands will also be mitigated for at a ratio of 3:1.

  Approximately 22.35 acres of non-tidal wetlands will be created under this plan, which corresponds to the 3:1 mitigation ratio for the 7.45 acres of non-tidal wetlands impacted outside the LNG tank area. Overall, 113.22 acres of wetlands will be created or enhanced within the existing DMPA with the combination of the non-tidal wetlands and the wetlands located within the LNG tank area. The wetland creation activity for these wetlands will be initiated within six months following initiation of construction within the aquatic resources. Furthermore, a construction easement will be established within this mitigation area to ensure the mitigation area is protected in perpetuity.

- For all tidal wetlands and existing open-water habitat impacted, SPLNG is proposing a 1:1 mitigation ratio of high quality like wetland creation for the tidal wetlands and 0.25:1 for open-water habitat impacts. This wetland/open-water complex creation will be located within the immediate vicinity of the disturbance (Mitigation Area A or B in Attachment A) and will be connected to either the existing wetlands located on the project area or to the Sabine Pass estuary. These wetlands will be created by contouring and grading the landscape to accommodate a tidally-influenced wetland. The wetlands will be planted with brackish tolerant aquatic species (i.e., smooth cordgrass). In addition to the wetland vegetation, tidal channels and pools will be constructed to create open-water habitat or EFH scattered within the vegetated portions of the mitigation area. Overall, the total tidal wetland complex that will be created will be 27.77 acres. This area includes 18.72 acres of vegetated wetlands and 9.05 acres of tidal channels and pools. In addition to the impacts associated with the terminal, the 0.08 acre of wetlands permanently impacted by the Sabine Pipeline will be mitigated for within this wetland creation area. The wetlands that will be impacted by the Sabine Pipeline are of similar character, function, and value as the tidal wetlands; therefore, combing the wetland mitigation in one location will provide a larger, more contiguous wetland area. Total wetlands that will be created in this area will be 27.85 or 28 acres.

  The wetland creation activities associated within the tidally-influenced wetlands will be initiated once the construction activities are finalized within the main portion of the terminal property. The delay in constructing the wetlands is the result of a lack of suitable work space to construct the wetlands and the terminal at the same time. However, the majority of the wetlands impacted by the proposed project will be mitigated for within six months of starting construction within the aquatic resources, and all wetland creation activities will be completed within one year

following initiation of the wetland creation activities. Additionally, as the project is constructed and suitable space is available to construct the mitigation area, mitigation creation activities will begin. Every attempt will be made to initiate mitigation creation within six-months of wetland disturbance. Furthermore, a construction easement will be established within this mitigation area to ensure the mitigation area is protected in perpetuity.

Table 4.1-1 provides a summary of the proposed wetland mitigation as described above.

Table 4.1-1
Mitigation Acreage by Wetlands Mitigation Location

Wetland Group	Impact Area (acres)	Mitigation Ratio	Area A or B (acres)	Area C (acres)
DMPA Wetlands	30.29	3:1	0	90.87
Non-tidal Wetlands	7.45	3:1	0	22.35
Tidal Wetlands	18.72	1:1	18.72	0
Open Water or EFH (non-wetland)	36.2	0.25:1	9.05	0
Sabine Pipeline Permanent Wetland Loss	0.08	1:1	0.08	0
TOTAL	92.74		27.85	113.22

Provided below are descriptions of Mitigation Areas A, B, and C that may be utilized for the creation of the tidal wetlands. Mitigation Area A is a 35.80-acre site located just east of the Sabine Pass Channel and just south of a tidal inlet. This location would be most conducive to aquatic resources mitigation plans for providing high-quality marsh. This site currently supports a 6.78-acre wetland, which may be temporarily impacted by construction activities for the facility. It is proposed that following the construction of the facility, the mitigation plan would be implemented to compensate for all temporarily and permanently impacted aquatic resources.

Mitigation Area B is a 31.70-acre site located east of the proposed basin construction site and just west of an existing unimproved road that leads to the Sabine Pass Lighthouse. This area currently lies directly north of an existing *Spartina alterniflora* marsh, which could be significantly enhanced with additional acreage and tidal connection. Additional hydrological connection would be provided with a culvert through the rearticulating mat to be used in the basin, which would allow for tidally-influenced waters to naturally affect the area. A gradual habitat shift from *Spartina alterniflora* marsh to higher marsh will provide a diversity of habitats.

Mitigation Area C is a 357.76-acre site located in the existing DMPA and consists of past dredge spoil with a mixture of vegetated and non-vegetated areas intermixed with bare soil. The wetlands will be constructed within an undisturbed area within the existing DMPA that is suitable to capture sufficient surface hydrology to support the wetlands. Additionally, the wetlands may be contained by a levee system to capture the surface water. These wetlands may be planted with fresh water aquatic species that can tolerate seasonal flooding and seasonal dry condition similar to the existing wetland conditions located within the project vicinity. If wetland vegetation growth is apparent without supplemental planting, additional planting may not be necessary.

Once the mitigation areas are constructed, SPLNG will initiate a mitigation monitoring plan to ensure the wetland mitigation is a success. The monitoring plan will include:

- A post-mitigation construction as-built will be generated to document the final created mitigation areas.
- Establish strategic vegetation sampling locations within all wetland creation areas. At these locations, vegetation diversity, dominance, percent cover, and survivability success criteria will be measured.
- Photos will be taken at each sample location to document the conditions of the mitigations areas during the monitoring period.
- Monitoring reports will be generated initially at six months post-construction and then annually for three years until the areas reach at least an 80 percent success or revegetation success as compared to a similar wetlands located within the immediate project vicinity. These reports will be submitted to the appropriate agencies for review and comment upon completion within 60 days of conducting the monitoring.
- Depending on the results of the monitoring, SPLNG will solicit recommendations from the resource agencies to improve the success of the mitigation area when and if required.

4.1.1 Dredged Material Placement Area Plan

Louisiana coastal use regulations require that dredged materials in excess of 25,000 cubic yards be put to beneficial use. To meet this requirement, SPLNG is planning to use the dredge material to augment the shoreline area along Louisiana Point, which lies on the Gulf of Mexico and adjacent to the Sabine Pass jetty, south of the terminal site. A plan has been developed for the placement of this material, pending concurrence of USACE, LDNR, Louisiana Department of Wildlife and Fisheries ("LDWF"), Coastal Management Division of LDNR, and the Louisiana Department of Culture, Recreation and Tourism,

Division of Archeology ("LDCRT"). NOAA Fisheries, USFWS, and LDCRT, have indicated that the proposed plan is acceptable to their respective agencies.

It is expected that the unconfined placement of dredged materials will begin about 1,500 feet east of the Sabine Pass east jetty and extend a distance of 5,000 to 10,000 feet parallel to the shoreline (see enclosed Attachment B). The width is being optimized, but is expected to be between 300 and 1,000 feet, not including the side slopes. The geotechnical investigation of the berth area indicates that the material to be dredged is 16-20 percent sand with the balance comprised mostly of soft clays. At 18 percent, there would be about 800,000 cubic yards of sand. When this material is pumped to the site, it is anticipated there will be considerable sediment spread, so relatively flat side slopes are expected. The selected width, along with the mounding characteristics, will determine the length. It is planned to place the material between the minus 4-foot and minus 8-foot contours with the bottom elevation raised 4 to 6 feet within the limits of the DMPA.

The anticipated dredged material discharge pipeline route from the dredge site to the placement location is along the east side of the ship channel from the berth to the east jetty, and then along the jetty out beyond the shoreline. The pipeline will then cross the jetty and be parallel to the beach to the discharge location. Total maximum lay length will be approximately 32,000 feet. Dredging will be accomplished by a cutterhead suction dredge. Dredge size currently is unknown; however, because of the size of the LNG terminal berthing area and projected pumping distances, dredge size is anticipated to be between 20 and 30 inches in discharge pipeline diameter. Discharge pipe will be a combination of floating and submerged pipeline. Floating line will likely be used except where the pipeline must cross existing channels and/or where energy levels are too high for the floating pipeline to be stable, such as that portion of the line that would be in the Gulf of Mexico. The size of the dredge will determine if a booster pump is required. Pipeline length will vary depending on discharge location within the placement area. Operations are expected to continue 24 hours per day except during dredge maintenance and inclement weather.

Dredged sediments will likely be placed into a berm configuration (DMPA) with the end of the pipeline mounted on a barge that will enable the end of the pipeline to be maneuvered back and forth to allow uniform placement of the material. For the sediment to be distributed in the planned corridor of 300 to 1,000 feet, the discharge barge may need to make two or more passes along the discharge contours. Offshore placement will be done first, with subsequent passes made interior to the original line to help control spread.

The dredge contractor will be required to monitor pipeline activities at all times during the course of the dredging operations. Along with daily inspections of the entire pipeline length, the contractor will be required to have someone at the discharge location during all periods of operation. This individual will

have direct contact with the dredge operator and be able to report any change in the discharge that would indicate a break in the pipeline.

With any major leak or pipeline break, the dredge will shutdown immediately. Dredges may have small leaks at pipeline joints, without immediate shutdown. There are standard USACE practices to reduce this small leak problem. All submerged lines will be welded to reduce the potential of leaks, and small leaks in floating lines typically must be stopped within 24 hours. All leaks will be reviewed and an investigation conducted to determine the volume of sediment released, impacts to the environment, and appropriate clean-up and mitigation required, if any. Any significant leak would be reported to the USACE and agencies for their consultation and concurrence on proper clean-up and mitigation efforts. Each contractor will be required to have in place, and have a crew(s) trained in, a contingency plan for inadvertent discharges. Crew training at a minimum will include: how to determine if the line leaks or is broken, appropriate action plan and contact requirements. At this time, no revegetation is expected for the placement area.

The Louisiana Point disposal area is characterized as non-vegetated, permanently submerged, open Gulf bottom, which has no potential as nursery habitat. It is likely that marine species utilize this and the surrounding area as a foraging area. The dredge material placement plan will predict the ability of the disposal area to provide nutrient export and as a foraging area for mobile predators. Independent of the placement plan, it is highly unlikely, due to its location and circumstances (i.e., wave energy, turbidity, and light penetration) that this area could be established as a nursery site.

At the DMPA, key concerns expressed by the environmental agencies are being addressed. One important informal comment to date was to avoid piping plover habitat and sensitive marshes along the shore, which dictated that the dredge material pipeline placement and discharge be located completely offshore. This is a more difficult and expensive method than placement from shore. The site has also been located away from the important rock jetty habitat. The dredge material pipeline will be placed along the channel past the shoreline, and then over the jetty and parallel to the beach to the placement area. This avoids both disturbance of piping plover habitat and damage to marshes by the equipment and pipeline used to transport the dredged material.

Information gathered from a Corpus Christi Bay National Estuary Program publication from May 1998 identified anthropogenic and natural disturbances and their effects on benthic communities. The report states that, "Although benthic communities are removed by dredging and smothered by dredge spoil, soft-bottom benthic communities recover within a year." We feel that the existing offshore substrate, as well as the dredge material to be placed at the disposal site, is consistent with substrates studies in this publication. Therefore, it is expected that recovery will occur relatively quickly. Depending on the thickness of material placement, it is expected that the design of the placement will prohibit survivorship among existing benthic species.

There are two primary benefits of this long berm placement in front of the beach. The beach east of Sabine Pass, from a brief review of historical aerial photographs, appears to be erosional beginning about 1,900 feet east of the east jetty. The area immediately adjacent to the jetty shows the beach to be either stable or accreting. The DMPA berm will reduce the wave energy, especially of larger, more damaging waves, on the beach. The second benefit is adding the large quantity of sand into this erosional littoral system, which will renourish the beach.

In addition to the dredged material generated from the marine berthing facility, approximately 69,000 cubic yards of material will be initially dredged for the facility construction dock. The construction dock area will be dredged utilizing a small hydraulic dredge or clamshell. With the small hydraulic dredge, the dredged material will be pumped via pipeline to a temporary dredged material placement area located within the limits of the proposed berth area. With the clamshell, this material will be transported via truck over the project site to the same area. Subsequent hydraulic dredging of the main berth area will pump the dredged material from the berth, as well as the previously dredged material from the construction dock basin, via pipeline down the Sabine Pass Channel and eastward into the proposed DMPA off of Louisiana Point.

4.2 SABINE PASS PIPELINE

Wetlands dominate the regional ecosystem of southwest Louisiana; therefore, impacts to wetlands due to the proposed pipeline are unavoidable. However, during the pipeline routing analysis, the pipeline was routed along existing pipeline corridors in an attempt to minimize impacts to wetlands or other Waters of the U.S., and avoid wooded cheniers, residential areas, and other existing land uses to the greatest extent practicable. Although the resulting pipeline right-of-way will have impacts to wetlands, every attempt to avoid and minimize impacts was made during the planning process. Where avoidance was not possible and minimization was employed, wetland restoration or possible creation of new wetland habitat was considered.

During the routing analysis, Sabine Pipeline considered various ways to minimize impacts to wetlands, of which construction techniques, right-of-way width, and placement of the pipeline provided the greatest chance of minimizing impacts. As a result of evaluating various wetland construction techniques, Sabine Pipeline has proposed to utilize conventional open-cut technology in areas where the soil consistency could support heavy equipment while still minimizing impacts to the environment. With this technique, the pipeline trench is excavated with backhoe equipment and the soil is temporarily side cast to allow the pipe to be installed. During the trench excavation activities, the topsoil, or upper 12 inches, is separated from the subsoil to protect the seed source found in the topsoil. During the backfilling of the trench, the subsoil is placed first in the trench and the topsoil is placed back on top of the trench to facilitate increased restoration success of the pipeline right-of-way. If soils are saturated but can still support

construction equipment, wood mats are placed along the right-of-way to support the equipment and further minimize impacts to the soil.

In areas where the soils are saturated and may not be as capable of supporting heavy equipment, Sabine Pipeline is proposing the push/pull technique for pipeline construction. This technique requires a trench to be excavated, but the pipeline is installed in long push/pull sections from strategically-placed workspace locations. The topsoil and subsoil can still be separated, but the construction equipment through the wetlands can be minimized. Once the pipe segments are pushed/pulled into the trench, they are welded together and the trench is backfilled in the same manner as the conventional techniques. The greatest advantage and reduction of impacts with this technique involves the reduction of construction time within the wetlands and further reduction of soil mixing. Sabine Pipeline has proposed the push/pull construction technique through the majority of permanently saturated wetlands where push/pull segments can be fabricated in long enough segments to facilitate the technique (from MP 2.0 to MP 7.1). However, final selection of push/pull locations will be determined at the time of construction and would depend on the soil conditions at the time of construction.

Sabine Pipeline also evaluated different right-of-way widths to construct the pipeline. During the analysis, the soils were evaluated and it was determined that a 120-foot construction right-of-way was necessary to safely and efficiently construct the pipeline. The soils in the Sabine Pipeline project area are typically saturated and are permanently saturated at depths as shallow as 7 feet for the length of the pipeline right-of-way (in upland or wetland areas). The pipeline trench will be excavated to depths greater than 7 feet; therefore, the Sabine Pipeline project will require a large work area to accommodate the excessive trench width and to store the saturated spoil materials. Typically with saturated soils, trench walls will assume a near 1:1 slope of repose and excessive width at the top of the trench. The excavated trench spoil does not stay consolidated in mounds and tends to expand when unconfined on the trench bank. Although the volume of soil has not increased, the particle spacing within the soil increases, decreasing the consistency or cohesiveness of the soil, making it more difficult to control. During the construction process, the spoil material is placed in spoil mounds along the edges of the construction workspace, and with the large amount of soil that will be excavated with the 42-inch pipe and saturated soil conditions, a large work area is required. The height of the mounds will be constructed to avoid or reduce the potential for sloughing and spill out of the right-of-way or into the trench or work area, which will reduce environmental impacts and safety hazards. The maximum time spoil/topsoil will be stored in the right-of-way will be 90 days.

Based on conversations with pipeline contractors experienced with constructing pipelines in the area, as well as discussions with pipeline engineers, any reductions of workspace (less than 120 feet) in the saturated soils for the proposed 42-inch diameter pipe would compromise the safety of the work area or could lead to increased accidents and environmental damages.

On several occasions, Sabine Pipeline personnel met with Louisiana resource agencies to determine acceptable route variations that could minimize impacts, including an on-site field review with the agencies (January 31, 2004). The focus of the field review was to evaluate the proposed route for placement of the pipeline and to modify the route to further minimize impacts to wetlands and other sensitive resources. During the meetings and field review, the agencies informed Sabine Pipeline that the upland areas along the Sabine Pipeline project are often associated with chenier formations and that they typically harbor cultural resources, provide natural erosion barriers to flood events, and provide unique wildlife habitat interspersed within the aquatic resources habitats. Of importance, cheniers containing oak trees provide unique wildlife habitat that should be avoided. Cultural resource surveys and studies were conducted to identify potential issues along the Sabine Pipeline route. Habitat evaluations were made to avoid sensitive upland habitats.

Based on the results of the planning process, field surveys and agency correspondence, Sabine Pipeline identified a route that will temporarily impact 104.48 acres of wetland habitat, 0.84 acre of forested wetland, and 103.64 acres of non-forested wetland (Table 2.2-1). However, based on observations during the field visit held by Sabine Pipeline and comments from the resources agencies, the wetlands that will be impacted are expected to recover rapidly with proper construction and restoration techniques.

Although 104.48 acres of wetlands will be impacted by the proposed Sabine Pipeline project, the impacts to the majority of these wetlands will be temporary and will not result in a permanent loss of wetlands or EFH. Permanent impacts to wetlands will include the conversion of 0.17 acre of forested wetlands to non-forested wetlands, and 0.08 acre of non-forested wetlands to uplands.

With the conclusion that wetlands could not be avoided, and considering the construction techniques and construction right-of-way width selected, Sabine Pipeline focused on the best techniques to restore the Sabine Pipeline project area to further minimize wetlands and EFH impacts. During the agency meetings and field review, it was determined that the wetlands that will be impacted are very healthy wetlands that are expected to withstand the construction activities. The recovery of the wetlands is further demonstrated by the number of pipeline corridors within the Sabine Pipeline project area that are not apparent when looking across the wetlands landscape. The wetlands that will be impacted all provide dense stands of various wetlands species. The wetlands appear to provide a large natural seed source (as apparent from the dense stands and observations of seed heads on the plants during the environmental surveys). The wetlands plants are also known to propagate naturally via stolons, rhizomes, rootstock, and crown division. With the abundance of the seed/plant source and the segregation of the topsoil or upper 12 inches of soils to protect the natural seed/plant source, the Sabine Pipeline project area is expected to rapidly and successfully naturally revegetate. This prediction is also supported by the agencies that attended the field review during the March 31, 2004, field meeting.

To compensate for the 0.08 acre of wetland loss associated with the Sabine Pipeline project, the impacts will be mitigated or wetlands created in conjunction with the aquatic resources creation proposal for the SPLNG terminal portion of the project. The 0.08 acre will be added to the aquatic resources acreage created on the SPLNG terminal property.

The 0.17 acre of PFO wetlands conversion associated with the Sabine Pipeline project is not proposed to be mitigated since this acreage will not be lost as a result of the Sabine Pipeline project. Additionally, the PFO wetlands are currently dominated by Chinese tallow-trees (*Sapium sebiferum*) that are considered an exotic invasive nuisance species with limited or low wetland habitat value. As a result, the clearing of the trees and subsequent restoration of the wetlands to herbaceous wetlands is anticipated to increase the habitat potential and quality of the wetlands. During operation of the proposed pipeline, this converted area will be maintained in an herbaceous or shrub/scrub community type, thus resulting in a long-term benefit to the wetlands.

In addition to the 0.08 acre of wetlands lost and the 0.17 acre of wetlands converted from PFO to PEM, the Sabine Pipeline project will also temporarily impact 0.67 acre of PFO wetlands that are dominated by Chinese tallow-trees. The construction of the proposed Sabine Pipeline project is anticipated to temporarily increase the quality of the wetland communities identified as PFO by reducing the amount of low-quality Chinese tallow-tree dominated wetlands in the Sabine Pipeline project vicinity. Therefore, no replanting of the trees is proposed for the PFO aquatic resources impacted by the proposed Sabine Pipeline project. Although there will be a temporary increase in wetland quality in the PFO wetlands, the Chinese tallow-trees are expected to re-establish within several years due to their invasive nature. Without an overall Chinese tallow-tree control plan established in the Sabine Pipeline project region, controlling the regrowth within the temporary workspace areas associated with the PFO wetlands is impossible. Therefore, the Sabine Pipeline project area/vicinity will experience a short-term increase in wetland quality and an eventual reestablishment of low-quality Chinese tallow-tree dominated wetlands.

During the field review and discussions with the agencies, Sabine Pipeline agreed to implement best management practices during construction and has agreed to the following aquatic resources mitigation plan to minimize unavoidable wetland impacts associated with the proposed pipeline:

- Segregate the topsoil or upper 12 inches of soil during construction and replace the spoil in the order it was removed.
- Restore the Sabine Pipeline project area to its pre-construction contours and elevations.
- Chip or remove all woody vegetation within wetlands (or burn the debris in upland areas).

- Allow the Sabine Pipeline project area to revegetate naturally unless after one year the Sabine Pipeline project area or portions of the Sabine Pipeline project area are not regrowing with at least 50 percent regrowth. If the Sabine Pipeline project area is not recovering, Sabine Pipeline will replant or seed the work area or portion of the work area until the project area exhibits a minimum of 80 percent recovery as compared to an undisturbed area adjacent to the Sabine Pipeline project area.

- Submit monitoring reports beginning after the first year following restoration with subsequent reports provided every six months until 80 percent recovery is achieved.

Pursuant to the NOAA Fisheries letter dated May 14, 2004, Sabine Pipeline also agreed to and will implement the following additional mitigation measures in areas designated as EFH (however, all wetlands will be treated the same during construction):

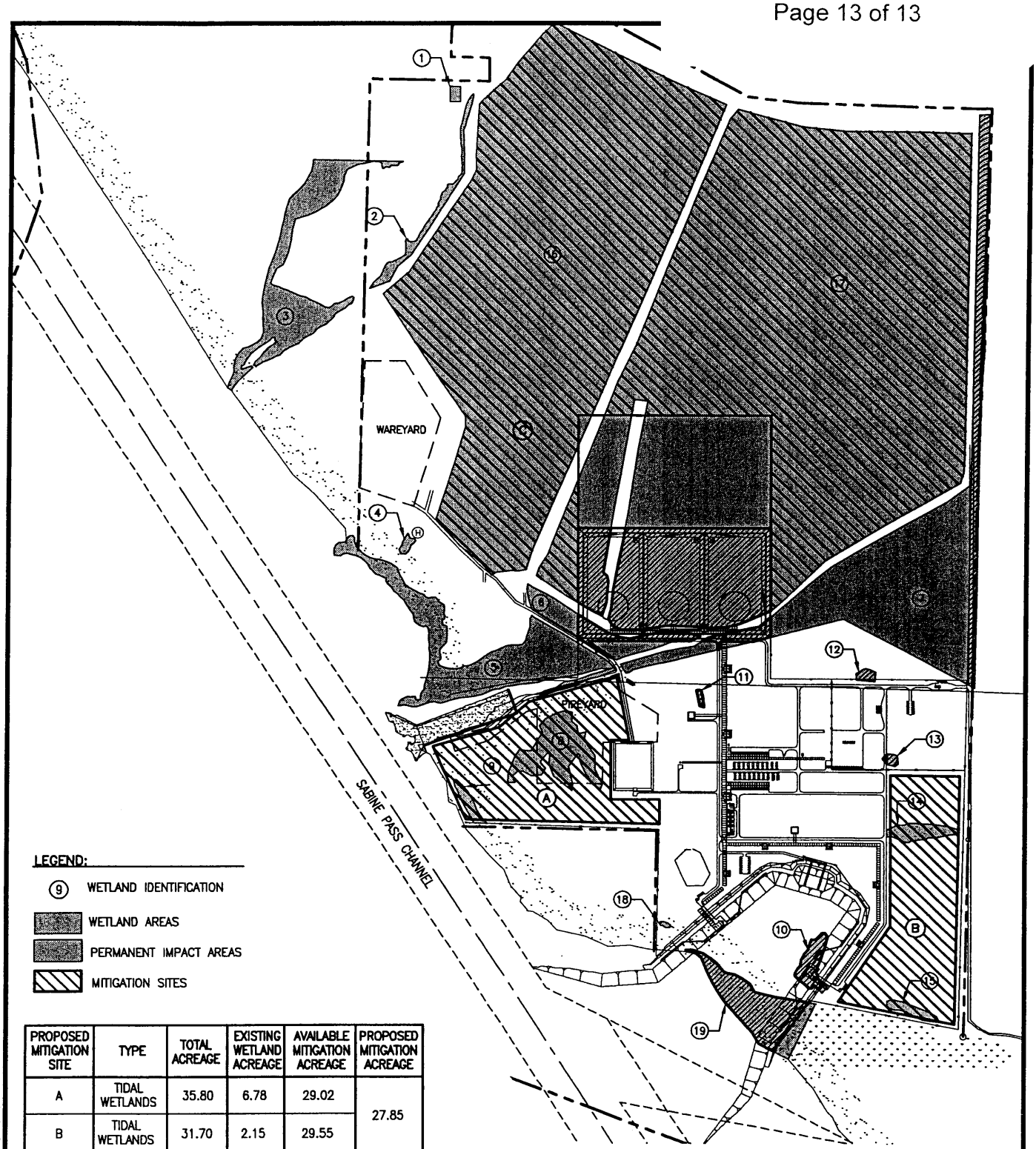
- Limit the number of passes through the wetlands to the minimum number necessary to ensure safe and efficient construction of the proposed pipeline.

- Provide NOAA Fisheries and other natural resource agencies with pre-construction and post-construction aerial LIDAR photography in lieu of the color infrared photography. This type of photography will allow Sabine Pipeline and SPLNG to accurately document the pre-construction elevations and conditions of the wetlands as well as to ensure that the restoration activities result in similar conditions (contours and elevations) following construction. The aerial LIDAR photography will be provided at a minimum scale of 1 inch equals 400 feet with topographic contours and will illustrate all construction work areas.

- Aerial LIDAR photography was acquired for the proposed pipeline route in February of 2004 and will be updated following the first complete growing season post-restoration of the proposed right-of-way.

- Provide the imagery on CD to NOAA Fisheries and other natural resource agencies by October 30 of the year in which the pipeline route is flown (the preconstruction photography will be provided to NOAA on or before October 30, 2004).

- Commit to hosting an interagency field inspection within 30 days following the first monitoring report and post-construction aerial LIDAR photography submittal, which will occur after the first growing season post-restoration of the proposed right-of-way to evaluate the results of the restoration activities.



PROPOSED MITIGATION SITE	TYPE	TOTAL ACREAGE	EXISTING WETLAND ACREAGE	AVAILABLE MITIGATION ACREAGE	PROPOSED MITIGATION ACREAGE
A	TIDAL WETLANDS	35.80	6.78	29.02	27.85
B	TIDAL WETLANDS	31.70	2.15	29.55	
C	NON-TIDAL WETLANDS	357.76 ①	357.76	357.76 ②	113.22

① LOW QUALITY WETLANDS / NON-WETLANDS LOCATED WITHIN EXISTING DMPA.

② WETLAND CREATION AND/OR ENHANCEMENT.

1 – 19

PROPOSED MITIGATION AREAS

SCALE: GRAPHIC

0 600' 1200'

ACTIVITY: DREDGE BASIN, CONSTRUCT DOCKS, SHORELINE PROTECTION, APPROACH, MOORING AND BREASTING STRUCTURES FOR OFF-LOADING OF LIQUID NATURAL GAS (LNG)

APPLICANT: CHENIERE LNG (SABINE) DATUM: NAVD'88

DATE: 4/04 REV. DATE: 8/04

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SMA Job No: 200.30176.02 SHEET 19 of 21

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