Duke Energy® Gas Transmission
Algonquin Gas Transmission Company

Islander East Pipeline Company

ISLANDER EAST PIPELINE PROJECT

OFFSHORE DREDGE DISPOSAL PERMIT AMENDMENT

Submitted to:

Connecticut Department of Environmental Protection
(Application Nos. 200200761 & 200300937)

U.S. Army Corps of Engineers, New England District
(Application No. 200103091)

July 29, 2003

ISLANDER EAST PIPELINE PROJECT
OFFSHORE DREDGE DISPOSAL PERMIT AMENDMENT

Algonquin Gas Transmission Company ("AGT") and Islander East Pipeline Company, L.L.C. ("Islander East") are submitting the following amendment to be included in the review of the Islander East Pipeline Project. This amendment requests approval to transport and dispose of up to 24,000 cubic yards of dredged material at the Central Long Island Sound Disposal Site.

Reason for Discharge

Islander East is proposing to install a 24-inch-diameter interstate natural gas pipeline from Connecticut to Long Island, New York, which will require trench excavation in Long Island Sound (see attached Project Drawings). Rather than sidecasting the spoil on the sea floor, Islander East will place material dredged between mileposts 10.9 and 12.0 (the horizontal directional drill ("HDD") exit area and the dredged trench section in water depths of 20 feet or less) onto barges for offshore disposal to reduce sediment dispersion and minimize benthic impacts and seafloor disturbance at the project site.

Type of Material Being Discharged

Islander East completed a sediment sampling program to characterize the physical and chemical properties of the sediment along the proposed pipeline route in Long Island Sound. The results are presented in the report entitled, *Report on Laboratory Soil Test Results*[1]. Samples were recovered from the bottom of Long Island Sound at approximately one mile intervals. A total of 23 samples were recovered and analyzed for soil classification, shear testing, grain size, soil resistivity, and pH. The sediments in the proposed dredge section, between approximate mileposts 10.9 and 12.0, are relatively fine grained and cohesive with relatively low water content and high bulk densities. Grain size analyses indicate a dominance of silts (~75%) and clays (~20%) with low to negligible concentrations of fine sands (<10%).

Sediment chemistry analysis was conducted to characterize the chemistry of sediment along the project route. Results of the analysis are presented in the *Vibratory Core Sampling Report*[2] in which samples were taken from the HDD exit area, dredged section, and subsea plow section. The vibratory coring taken at approximate milepost 11.8 (coring location VC10.b within the report) in the dredged section did not contain metals, PCBs, PAHs, pesticides, or other constituents that met or exceeded Effect Range-Low and Effects Range-Median sediment screening guidelines developed for the National Status and Trends program. This program, sponsored by the National Oceanic and Atmospheric Administration ("NOAA"), determines the current status and detects changes in the environmental quality of the Nations' estuarine and coastal waters.

Islander East provided the *Report on Laboratory Soil Test Results* to the U.S. Army Corps of Engineers ("COE") as Attachment J of the March 25, 2002 COE Application, and to the Connecticut Department of Environmental Protection ("CTDEP") in Attachment F of the February 13 and July 11, 2002 CTDEP Applications.

2 Islander East provided the *Vibratory Core Sampling Report* to the COE as Attachment M of the March 25, 2002 COE Application, and to the CTDEP in Attachment F of the February 13 and July 11, 2002 CTDEP Applications.

Amount of Dredge Disposal

The HDD exit area will require excavating approximately 6,000 cubic yards and the trench section will require excavating approximately 18,000 cubic yards, for a total of 24,000 cubic yards. Islander East plans to use barges to transport dredge material from the dredge site to the disposal site.

To properly install the pipeline, Islander East requires a trench that is approximately 10 feet wide at the bottom and of sufficient depth to bury the pipe. Islander East estimates that the top of the trench will be approximately 28 feet wide and will require dredging approximately 18,000 cubic yards of sediment, based on an average angle of repose of 2:1 for the trench. Islander East will not dredge more than is necessary to achieve the 10-foot-wide trench bottom; however, it is not possible to engineer the trench profile. The actual angle of repose will be determined by site specific conditions at the time of construction, which includes weather and tidal influences.

The May 2003 *Haley and Aldrich Engineered Backfill Study*[3] indicates that, due to the plasticity and shear strength of the existing seabottom material, the sidewalls of the trench have the potential to be excavated at a 1:1 angle of repose or steeper. The attached SK-19 drawing entitled "*Engineered Backfill Plan*", dated February 25, 2003, illustrates the width of the dredged trench with a 3:1, a 2:1, and a 1:1 angle of repose. As shown on the drawing, if the dredged trench walls are stable at a 2:1 angle of repose, then the trench will be approximately 28 feet at the top. If the angle of repose is 1:1, then the trench will be approximately 19 feet at the top.

Comparison of Dredging Methods

The evolution of dredging techniques has led to the development of two distinct types of dredging equipment: hydraulic and mechanical. Dredging techniques and the various types of equipment available are discussed in the following sections.

Hydraulic Dredging Methods

The three general hydraulic dredging methods are plain suction, cutterhead, and draghead. The plain suction hydraulic dredge uses the suction developed by a large centrifugal pump to lift a slurry of water and dredged material (approximately 90 % water and 10% dredged material) through a pipeline from the bottom, relying solely on the force of the incoming water to suck up the material. The suction line is supported by a boom or ladder which is raised, lowered, and laterally controlled by a crane and a series of winches on the floating barge deck. Typically, the suction line has a screened bell-shaped nozzle at its intake to protect the pump and increase efficiency. This type of hydraulic dredge is designed to dredge loose sands and silts and is not suited for compacted materials.

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[3] Islander East provided the *Haley and Aldrich Engineered Backfill Study* to the COE in the June 24, 2003 response to question 10 of the COE's May 21, 2003 request for additional information. Islander East provided this report to the CTDEP in the May 27, 2003 response to question 16 of the May 5, 2003 request for additional information.

The cutterhead hydraulic dredge is essentially the same as the suction type, except that an electrically or hydraulically driven rotating cutterhead is located at the intake end of the suction line. The cutterhead "chews up" the material thus enabling the dredge to excavate much harder materials than the suction type. Variations in the design of the cutterhead allow the dredge to excavate almost all types of material efficiently. The cutterhead is the most versatile of the hydraulic dredges and is the type owned by most dredging contractors.

The draghead hydraulic dredge utilizes a trailing or draghead type cutter that remains in contact with the ground while the dredge is moving. Draghead dredges are self-propelled; many have, as a principle feature, self-contained hoppers for containment and transport of the dredge spoil. These dredges are especially suited for long reaches of dredge work, such as channels, and are capable of dredging relatively hard, compact materials.

The hydraulic dredges are categorized in size by suction line diameters that range from 6 to 32 inches. The most commonly used dredge sizes in the New England are 10 to 12 inches. Typically, material dredged hydraulically is transported via a pipeline to either a nearby barge to a nearby landside containment area for dewatering.

Mechanical Dredging Methods

There are three commonly used types of mechanical dredges; dragline, dipper, and clamshell bucket.

The dragline is an open shovel or scoop suspended from a crane boom. The shovel is lowered to the bottom and dragged toward the crane, filling with scraped material as it travels. Draglines are typically used in shoreline operations in relatively shallow waters.

A dipper dredge is a backhoe or shovel mounted on a barge. The dipper dredge is effective in removing cemented sediments and other firm materials such as glacial till, boulders, and blasted rock. The length of the backhoe or shovel arms limits the depth of dredging. Effective dredging beyond a 30-foot water depth is uncommon using this method.

The most common dredge method used in the New England area is the clamshell dredge. This system consists of a barge-mounted crane with a cable driven clamshell bucket (typical bucket sizes varying from 10 to 26 cubic yards). The open bucket is lowered to the bottom where it is closed, grabbing and trapping sediment. The dredged material is then brought to the surface and deposited in an adjacent barge or, if in close proximity, on shore. The reach of the bucket is limited by the boom of the crane and the stability and buoyancy of the barge. Depth of dredging using this method is practically limitless. This dredge can be a customized vessel or merely a land crane secured to a barge deck. The buckets can be equipped or modified with different edges or teeth for different dredge material encountered. It is not uncommon to find several different buckets stored on a barge as they can be changed in a matter of minutes. This dredge is most effective in consolidated sediments, particularly cohesive materials.

Environmental Effects of Dredge Methodologies

Hydraulic dredging typically creates a slurry material that is 80 to 90 percent water. Dewatering of the material would be required and this is typically done on a nearby land site. No land site of a suitable size exists for this project. The action of the suction line disturbs the sea bottom thereby allowing a large quantity of sediment to be released into the water column. Also, hydraulically dredged masses have a tendency to disperse greatly when released from a barge at an open water disposal site.

Mechanical dredging is a proven and effective means of removing large cohesive sediment masses in Long Island Sound. A bucket loss of between 1.5 percent and 4 percent is typical for each "scoop." Agitation of the sea bottom is limited to the point of removal and the sediment removed can be placed on a barge with little or no dewatering required. Material dumped at an open water disposal site would not tend to disperse significantly before reaching bottom, therefore limiting the amount of sediments transported away from the disposal site.

Comparison of Disposal Sites

Several upland and open water disposal site alternatives were investigated. An assessment of the environmental effects and the economic feasibility of these disposal alternatives is presented below.

Land Disposal

Land disposal of dredge spoil encompasses several forms. The physical and chemical characteristics of the material dictate its potential use as does the proximity and accessibility of a suitable disposal site. Dredged materials are sometimes used for beach replenishment, or as construction material, or for structural/load bearing fills, or cover material in landfills.

Beach replenishment requires relatively clean sand. The fineness and cohesive nature of the Project's dredge spoil make it unsuitable for use in this manner. Also, the physical nature of this spoil material precludes its use as a construction material.

Structural fills or load bearing fills are typically granular materials that are compactable and drain relatively quickly. The Project's dredge material lacks adequate strength for these uses. Also, because it is primarily composed of silt and clay sized particles, the rate of consolidation (compression by drainage of water from the soil) will be extremely slow. Settlement of the fill can be expected to continue at a decreasing rate over several years which precludes its use as a structural material.

Landfills often use soil for daily cover to comply with permit requirements. Dredge spoil is sometimes used as a landfill cap material, however, transport and deposition of the dredge spoil at an upland landfill operation is not a viable alternative for this project for a variety of reasons. In discussions with landfill operators, the majority of the landfills either do not accept this type of material or material generated outside of the municipalities in which the operations are located. Table 1.0 lists potential landfill sites and their availability for disposal of this type of material.

Table 1.0

ISLANDER EAST PIPELINE PROJECT
State of Connecticut, Department of Environmental Protection,
Active Landfill Sites

Town	Facility Address	Owner	Waste Type	Distance From Dredge Location (miles)	Dredge Material Suitable for Disposal	Comments
Branford	Tabor Drive	Municipal	Bulk Waste	3	No	
Clinton	Old Nod Road	Municipal	Bulk Waste	13	No	Limited Capacity
Hartford	Incinerator Road	Connecticut Resource Recovery Authority	MSW[a] Ash	44	No	Regional SRC[b]
Milford	Plains Road	Design Land Developers of Milford	Bulk Waste	19	No	Regional Closing By Stipulation Judgment 10/2003
Westbrook	McVeagh Road	Municipal	Bulk Waste	19	No	Soon To Close

[a] MSW = Municipal Solid Waste
[b] SRC = Significant Remaining Landfill Capacity

The only landfill site in Table 1.0 that could potentially accept the dredge material, from both an operational and capacity perspective, is the Connecticut Resource Recovery Authority's facility in Hartford. In discussions with Mr. Dave Bordendorf (Senior Environmental Engineer for the Hartford facility), he indicated that, based on his past experience, the facility has not accepted dredged material because the dewatered dredge material is usually too silty and fine, which prevents its use as daily cover material. However, if the physical properties of the material were acceptable (*i.e.*, coarse grained, sandy material) for disposal at the landfill, complete dewatering of the material would be required before it could be used as daily cover, as the landfill cannot accept any material containing free-flowing liquids. Mr. Bordendorf also said that staff from the landfill would have to inspect the material before it was approved for disposal and the CTDEP would also need to approve the material's use as daily cover. CTDEP's concern is for the potential risk of contaminant release when estuarine sediments are moved to land sites and are exposed to rainfall and runoff, as well as the potential for salt water intrusion into the groundwater.

Therefore, this dredge spoil would not satisfy the requirements for use as landfill cover. As indicated in the test reports, this material does not exhibit the desirable attributes required for cover material such as easy workability, moderate cohesion, and significant strength. The material to be dredged is primarily cohesive in nature, consisting of silt and clay, with little load bearing capacity.

Disposal at upland landfills is also logistically unrealistic and economically unfeasible. The material would have to be dewatered prior to transport (presumable by truck) to the upland disposal area. This would require the construction of a diked enclosure and stilling basin somewhere on shore in close proximity to the dredging. If dredged

hydraulically, another 40 to 60 percent in disposal containment volume would be required.

Other negative aspects of upland landfill disposal include noise, dust, and disruption to the residential neighborhoods by heavy truck traffic and the operation of heavy machinery.

In summary, land disposal of the type and volume of material anticipated from the proposed project is not a reasonable alternative. Disposing of the spoil at an upland site would be impractical for the following reasons:

lack of a suitable shoreside staging and dewatering area;
dredge material structurally unsuitable for landfill cover;
distance to only available site;
disruption to human environment; and
potential leakage along the transport route.

Since no suitable upland sites were found, it was concluded that the land disposal alternative was not a feasible option.

Open Water Disposal

Alternative offshore open water disposal locations in Long Island Sound were also analyzed. Currently, the COE has four designated dredged material disposal locations in Long Island Sound (see figure 1). These sites' overall characteristics and locations were analyzed and then compared to each other, relative to the proposed project.

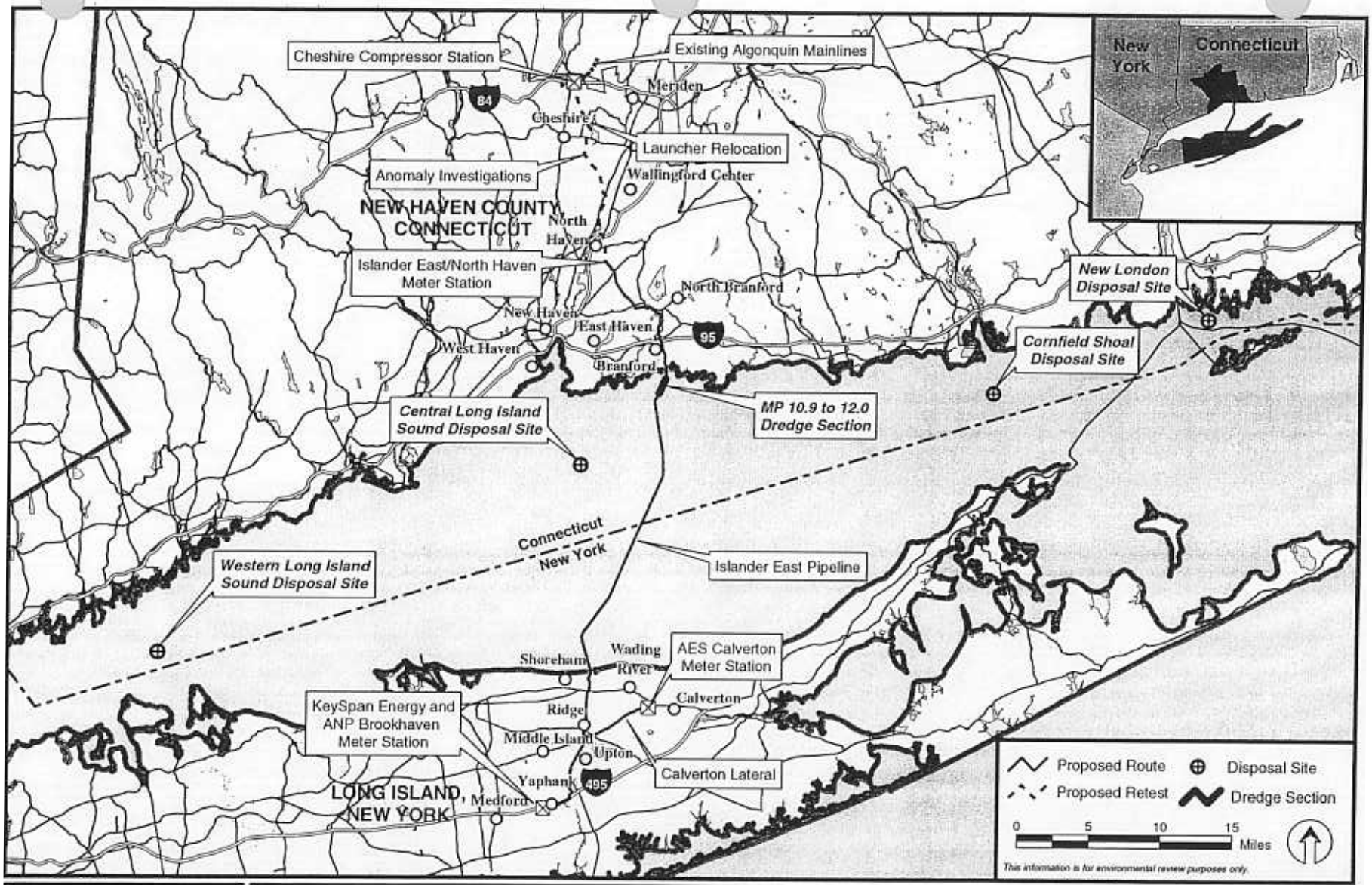
Open water disposal of dredged materials would involve transport via barge for deposition at one of the four authorized sites in Long Island Sound. The sites being considered are the New London Disposal Site, the Cornfield Shoals Disposal Site, the Central Long Island Sound Disposal Site, and the Western Long Island Sound Disposal Site. These four locations are described in the following sections.

New London Disposal Site

The New London Disposal Site is one square nautical mile in area and is located 2.9 nautical miles south of Eastern Point in Groton, Connecticut. The New London Disposal Site is approximately 33 nautical miles east of the Project. The natural bottom slopes to the south-southwest with depths ranging from 50 to 79 feet MLW.

Sediments consist primarily of soft cohesive materials, silts and clays, mixed with fine sands. Mean tidal average current velocities are 0.23 to 0.26 feet per second (fps) with the average highest near-bottom ebb velocity at 1.09 fps between 3 feet and 5 feet off the bottom.

Under the COE's Disposal Area Monitoring System, the site has been continuously surveyed and monitored since 1977. Materials deposited there tend to be unaffected by ocean dynamics. New London is classified as a containment site.



Islander East Pipeline Company

Figure 1
Open Water Disposal Sites

DATE: 7/18/03
REVISED: 7/23/03
SCALE: 1:600,000
DRAWN BY:RSMcGREGOR
M:\Clients\DEG\Islander_East_ArcGIS\2003\07\Disposal\DEG_IE_DSites.mxd

NATURAL RESOURCE GROUP, INC.

Cornfield Shoals Disposal Site

The Cornfield Shoals Disposal Site is one mile square in area and is located approximately 3.3 nautical miles south of Cornfield Point, Connecticut. Cornfield Shoals Disposal Site is approximately 20 nautical miles east of the Project. Water depths average 115 feet in this area that has a bottom sloping towards the south and east. Sediments at the site have been reported as being primarily sand gravel with traces of shell fragments. Bottom current velocities achieve a rate of 2.5 fps with a primary direction of north-northwest. It is the only dredged material disposal site managed as a dispersive site. At a dispersive site, unlike a containment site, dredged material disposed at the site is expected to be transported out of the area. Therefore, the dredge material disposed at this site must be clean and have a high sand content. Since 1982, 1,198,000 cubic yards of dredged material, mostly sand, have been disposed of at the site.

Central Long Island Sound Disposal Site

The Central Long Island Sound Disposal Site is a two square nautical mile area located approximately 5.6 nautical miles south of South End Point, East Haven, Connecticut. The site is approximately 7 nautical miles west of the Project. It has a generally flat bottom except for a major mound in the north central portion of the site and secondary mounds to the southwest.

Historically, the Central Long Island Sound Disposal Site has been one of the most active disposal sites in the New England region. Sediments deposited at the Central Long Island Sound Disposal Site have been dredged from New Haven, Bridgeport, Stamford, and Norwalk Harbors, as well as other adjacent coastal areas.

This site is similar to the New London Disposal Site and has been subject to extensive monitoring since 1972. This monitoring has included baseline and post disposal investigations, bathymetric studies, current measurement, sediment and water quality analyses, photo and scuba investigations, and benthic and biochemical studies. Materials deposited at this site tend to be unaffected by ocean dynamics; therefore, Central Long Island Sound Disposal Site is classified as a containment site.

Western Long Island Disposal Site

The Western Long Island Sound Disposal Site is located 2.8 nautical miles south of Long Neck Point, Noroton, Connecticut between three historic dredged material disposal sites (Stamford, South Norwalk, and Eaton's Neck). The site is approximately 34 nautical miles west from the Project. This 2.0 square nautical mile site has accepted small to moderate volumes of dredged material originating from Stamford, Norwalk, and other coastal communities of Connecticut and New York. Since 1982, 1,716,000 cubic yards of dredged material have been deposited at the site.

Comparative Disposal Site Analysis

Land Disposal Sites

Land disposal sites were examined and no suitable sites were found as discussed in the previous section. Therefore, it was concluded that the land disposal alternative was not a feasible option.

Open Water Disposal

The Cornfield Shoals Disposal Site alternative can be eliminated from consideration due to its function as a sediment dispersal site. The project sediment's physical and chemical nature is unsuitable for placement at a dispersal site and require disposal at a site with a high ability to retain material in or near its original dumping location.

While the remaining three alternative disposal sites can physically accommodate the project's 24,000 cubic yards of dredge material, the comparative costs between each alternative would differ greatly because overall project costs for each of the dredging/disposal alternatives are a function of disposal site distance from dredging source. The Central Long Island Sound Disposal Site is located approximately 7 nautical miles from the dredging location. In contrast, the Western Long Island Sound Disposal Site and the New London Disposal Site are located approximately 34 nautical miles and 33 nautical miles from the dredging location, respectively. The greater distance to the Western Long Island Sound and New London disposal sites would slightly increase transportation costs associated with dredge disposal.

Therefore, the preferred disposal site in terms of proximity to the project location, the size of the disposal area, the sediment transport characteristics of the area and the cost is the Central Long Island Sound Disposal Site. Its proximity to the dredge area would result in lower unit costs for dredging and disposal due to the shorter haul time and a greater flexibility in equipment selection. The longer round trip times associated with disposing the dredge material at the Western Long Island or New London Disposal Sites increases the cost and lowers the efficiency of the operation.

Method, Location, and Schedule of Disposal

Dredging Method

The prevalent method of dredging in Long Island Sound has historically been the barge-mounted clamshell dredge. This technique is suited for this project for several reasons. The use of large volume clamshell buckets will generally result in the efficient removal of relatively large, cohesive sediment masses. In comparison with the slurry created by hydraulic dredges, the excavation and disposal of mechanically dredged sediment results in lower turbidity levels. Islander East plans to use barges to transport the dredge material from the dredge site to the disposal site.

Disposal Location

Open water disposal of the dredge spoil is the most practical, economical, and environmentally preferable alternative. The preferred area is the Central Long Island

Sound Disposal Site in New Haven. Intensive monitoring at the site has shown it to be a true containment site under normal conditions and that re-suspension of sediments appears to be no higher than surrounding areas during storm events. This disposal site is also the most easily accessible and closest to the proposed dredging activity.

Dredging and Disposal Schedule

Dredging and disposal are scheduled to occur during the first quarter of 2004.

Monitoring of the Dredge and Disposal Operations

Dredge Monitoring

To ensure that dredged material does not exceed 24,000 cubic yards, Islander East intends to monitor the barge filling. Islander East will conduct primary monitoring of the volume of dredged material placed onboard the barge. The dredge barge will be equipped with a dredge survey system that is capable of tracking the location and depth from which the bucket is lifting the spoil. The dredge operator will monitor this system on a continual basis to keep the unit volume of dredged material placed on each barge within the designated parameters.

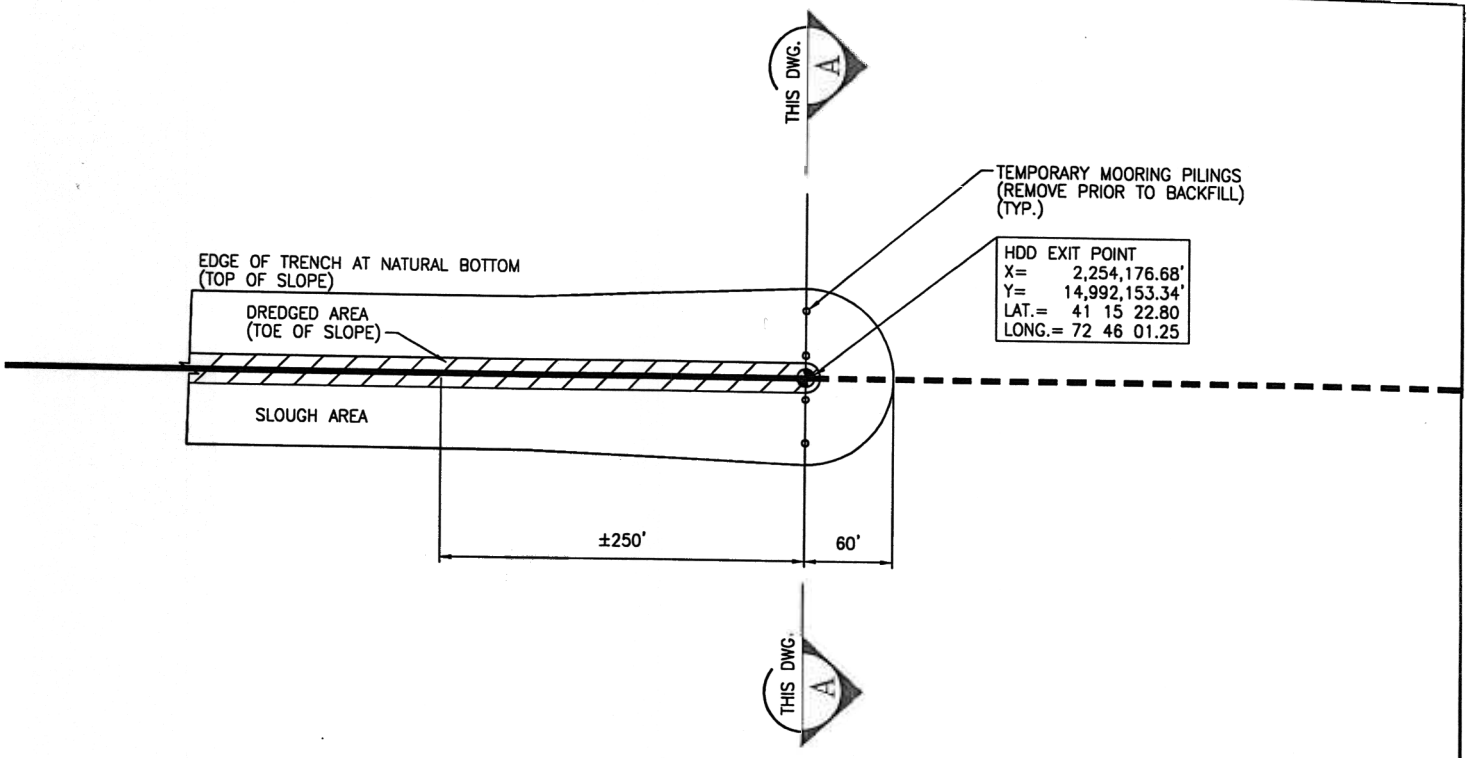
In addition, Islander East will use a chart-recording echo sounder to provide back-up data on dredging operations. Islander East will complete the echo sounder surveys along 500-foot transects over the area to be dredged. The echo sounder charts developed during these surveys will be inspected and the cross-section area of the trench will be determined. The volume of the trench will then be calculated from these areas.

If an excess of 24,000 cubic yards of sediment is dredged, the sediment will be returned to the HDD exit area during backfilling. During the April 15, 2003 multi-agency meeting, Islander East indicated to Federal and state agencies that it would be feasible to return up to approximately 3,000 cubic yards of dredged material to the HDD exit area. The excess dredged material will be held on a barge during the period of construction, and then placed in the exit area and capped.

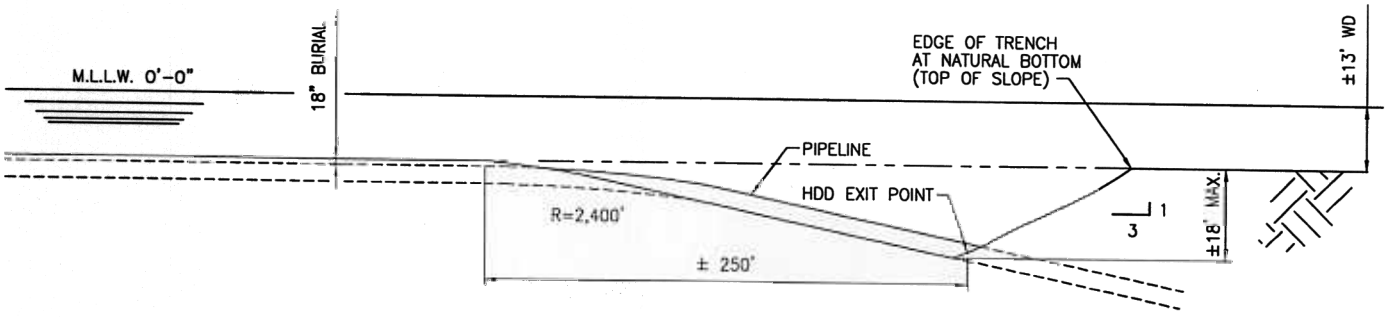
Central Long Island Sound Disposal Site Monitoring

Islander East understands that monitoring may be required at the disposal site to document that sediment disposal occurs at the specified areas in accordance with permit conditions.

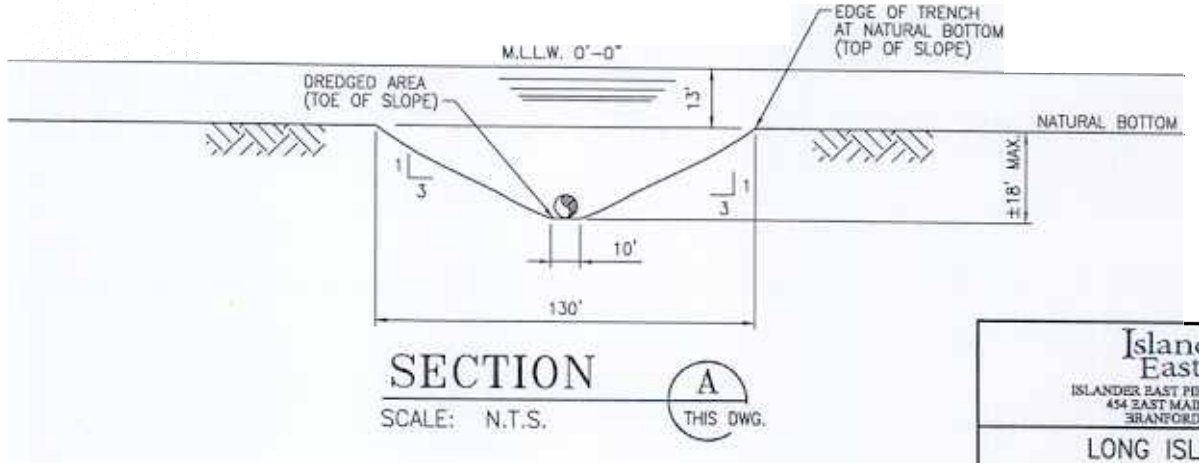
This document involves pipeline location information and is not available at this Internet site due to homeland security-related considerations. This portion of the Islander East consistency appeal administrative record may be reviewed at NOAA's Office of General Counsel for Ocean Services, 1305 East-West Highway, Silver Spring, Maryland.



PLAN



PROFILE



SECTION A

SCALE: N.T.S.

THIS DWG.

NOTES:

1. VOLUME OF DREDGED AREA ± 6,000 CU. YDS.
2. EXCAVATED SPOIL WILL BE PLACED ON BARGES

NO.	DATE	DESCRIPTION	BY	CHK'D.	APPRV.
H	6-20-03	REVISED DESCRIPTION	K.M.A.	J.H.E.	
G	6-10-03	REVISED DESCRIPTION	K.M.A.	J.H.E.	
F	3-12-03	REMOVED SPOIL MOUNDS	K.M.A.	J.H.E.	
E	8-23-02	ADDED COORDINATES	J.E.F.	J.H.E.	

REVISIONS

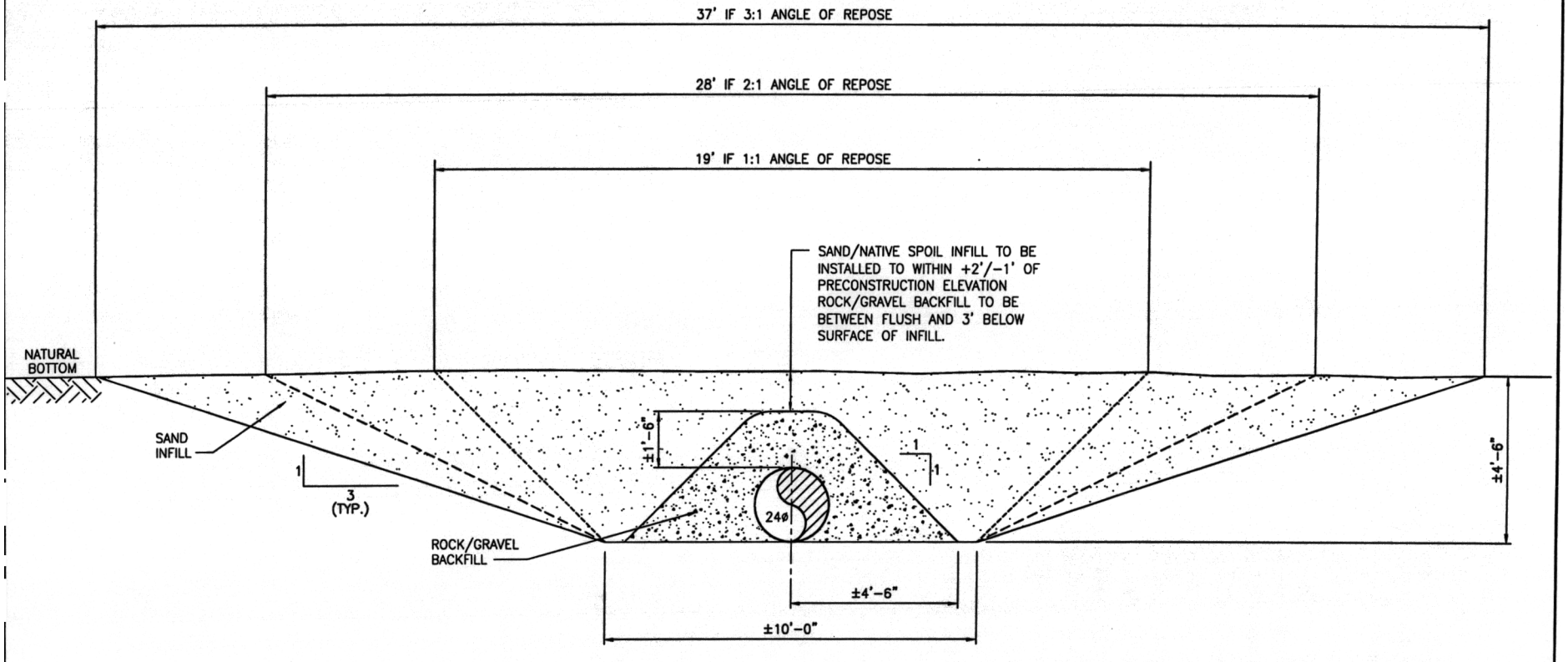
Islander East

ISLANDER EAST PIPELINE COMPANY, L.L.C.
454 EAST MAIN STREET, ROUTE 1
BRANFORD, CONNECTICUT

LONG ISLAND SOUND
NEARSHORE CONNECTICUT
DRILLED CROSSING EXIT POINT

DRAWN BY: K.M.A.	CHK'D. BY: J.H.E.
DATE: 1-2-02	APPRV. BY:

DWG. NO. SK-10 REV H



NOTES:

1. ROCK/GRAVEL BACKFILL NOT TO EXCEED 4 INCHES IN SIZE.
2. ENGINEERED BACKFILL FOR DREDGED TRENCH SECTION BETWEEN MP 10.9 AND THE 20 FOOT WATER DEPTH CONTOUR NEAR MP 12.0.
3. BACKFILL TOLERANCE OF +2'/-1' FROM AMBIENT SEAFLOOR.
4. ACTUAL ANGLE OF REPOSE WILL BE DETERMINED BY SITE-SPECIFIC CONDITIONS AT TIME OF CONSTRUCTION.

Islander East Pipeline Company
ISLANDER EAST PIPELINE COMPANY, L.L.C.
454 EAST MAIN STREET, ROUTE 1
BRANFORD, CONNECTICUT

NO.	DATE	DESCRIPTION	BY	CHK'D.	APPRV.
E	7-11-03	PRELIMINARY	K.M.A.	J.H.E.	
D	6-10-03	PRELIMINARY	K.M.A.	J.H.E.	
C	5-13-03	PRELIMINARY	K.M.A.	J.H.E.	

REVISIONS

LONG ISLAND SOUND CONNECTICUT DREDGED TRENCH ENGINEERED BACKFILL PLAN

DRAWN BY: J.E.F.	CHK'D. BY: J.H.E.
DATE: 2-25-03	APPRV. BY:
DWG. NO. SK-19	REV E

07-11-03 9:32 D1139\SK 9 K.M.A.