Docket No. CP02- -000

Application of Iroquois Gas Transmission System, L.P. for a Certificate of Public Convenience and Necessity

Volume II
Environmental Resource Reports

IROQUOIS GAS TRANSMISSION SYSTEM, L.P.

NOVEMBER 2001

EASTERN LONG ISLAND EXTENSION PROJECT: PIPELINE SECTION RESOURCE REPORT 1

PROJECT DESCRIPTION

This report includes only the Eastern Long Island Pipeline Section of the Eastern Long Island Extension Project. For other proposed facilities in this project, please see Resource Reports attached to the end of this section.

Prepared for:

Iroquois Gas Transmission System, L.P.
One Corporate Drive, Suite 600
Shelton, CT 06484

SUMMARY OF FILING INFORMATION		
INFORMATION	Included in ER	To be filed
• Describe the purpose and need for the project facilities.	✓	
• Identify the project customers and the volumes of gas to be delivered to each.	✓	
• Provide a detailed description of the project facilities.	✓	
• For facilities in designated coastal zone management areas, a consistency determination or evidence that the owner has requested a consistency determination from the state's CZM program	Not required from states at this time	✓
• Provide the following supporting information: • a general location map; • current original U.S. Geological Survey (USGS) 7.5-minute-series topographic maps with mileposts showing the project facilities and the location and size of extra work/staging areas, pipe storage yards, and temporary and permanent access roads; • plot/site plans of compressor stations showing the location of the nearest noise-sensitive areas (NSAs) within 1 mile; and • plot site plans of all other aboveground facilities which are not completely within the ROW.	Figure 1.1-1 Appendix A See Res. Rpt. 9 ✓	
• Provide detailed typical construction ROW cross-section diagrams showing information such as widths and relative locations of existing ROWs, new permanent ROW, and temporary construction ROW.	✓	
• Summarize the total acreage of land affected by construction and operation of the project.	✓	
• Describe construction procedures to be used.	✓	
• Describe how compliance with mitigation measures would be ensured.	✓	
• Provide the start and end dates of construction, the number of pipeline spreads that would be used, and the workforce per spread.	✓	
• Describe general operation and maintenance procedures.	✓	
• Describe current or reasonable future expansion plans.	✓	
• Summarize the status and provide copies of all required federal, state, and local government permit approvals, other than those that must be obtained immediately before construction.	✓	
• Upon request from the FERC, provide the names and addresses of all landowners whose land would be crossed by the project facilities. Include the names and addresses of all residents adjacent to new or modified compressor stations.	Appendix C	
• Non-jurisdictional facilities have to be described and mapped. This has to be well defined with the customers and the siting/permitting of these facilities dovetailed with the Applicant's project.	✓ (As known)	
• Aerials need to be filed. If a looping project, the aerials can be older than 1 year, but they have to be hand marked to update the house locations. Aerials older than 1 year cannot be used if the land use changes in the area.	Appendix B	

IROQUOIS GAS TRANSMISSION SYSTEM

RESOURCE REPORT 1
PROJECT DESCRIPTION

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1.1 PROPOSED FACILITIES

Iroquois Gas Transmission System L.P. (Iroquois) is proposing the Eastern Long Island (ELI) Extension Project that would provide natural gas to consumers in Suffolk County, New York and other surrounding counties. The ELI Project involves installing an approximately 29.1-mile, 20-inch diameter natural gas pipeline that would begin from a tap off Iroquois' existing 24-inch mainline in Long Island Sound in New Haven County, Connecticut, continuing southerly onto the Long Island mainland at Shoreham, New York. From landfall, the pipeline would generally be co-located with the William Floyd Parkway and the Long Island Expressway to its terminus at a proposed cogeneration facility. In all, the ELI Project involves the construction or modification of the following facilities:

Mainline: 29.1 miles of new 20-inch Outer Diameter (OD) pipeline in New Haven County Connecticut and Suffolk County, New York;

Meter Stations: One new meter station is proposed along the ELI pipeline at approximate Milepost (MP) 29.1;

Ancillary Facilities: One marine tap interconnection and facilities for the attachment of a pig launcher in Long Island Sound in Connecticut state waters, three mainline valves (MP 17.5, 22.7, and 29.1), and one pig receiving facility that will be housed within the meter station layout at the project terminus;

Dover Compressor Station: A discharge gas cooler will be added to Iroquois' compressor station in Dover, Dutchess County, New York. Iroquois is currently seeking a FERC certificate (Docket No. CP00-232 for the construction of this station;

Devon Compressor Station: A new compressor station would be constructed at Iroquois' existing mainline valve site located in Milford, Fairfield County, Connecticut. The ISO rating would be approximately 20,000 Hp;

Brookfield Compressor Station: Piping and compressor and pipe modifications and ancillary facilities to accept natural gas from the AGT System would be performed at a compressor station that Iroquois is planning to construct in Brookfield, Connecticut. Iroquois has filed a separate Application with the FERC for construction of the compressor station in November 2001; and,

Temporary Facilities: Iroquois would also require pipe yards, storage yards, access roads, and contractor staging areas, which would be temporarily used during construction of this project.

Iroquois has prepared this Application and the supporting Environmental Report (ER) for review by the Federal Energy Regulatory Commission (FERC) in support of the ELI Project. This application includes the following information:

- **Volume I** – Iroquois' Section 7 Application;
- **Volume II** – Iroquois' ER for the ELI Project, which constitutes Resource Reports 1 through 12, where applicable. To simplify review, Iroquois has divided the ER into four separate documents:

(1) the pipeline and ancillary facilities (i.e., meter stations); (2) the Dover compressor station modifications; (3) the Devon compressor station; and (4) compressor and pipe modifications at the Brookfield compressor station. For all four documents, Resource Report 4 (Cultural Resources) has been marked "Privileged and Confidential" and provided under separate cover to the FERC staff;

Volume III – Iroquois' Biological Assessment (BA) for the Long Island Sound crossing;

- **Volume IV** – Iroquois' Offshore Hazard Survey Reports, Privileged and Confidential; and (based on preliminary design data - final design will vary); and

Volume V - Appendices to the Resource Reports.

The ER has been prepared in strict accordance with FERC Order No. 603, which governs the filing of applications for Certificates of Public Convenience and Necessity Authorizing the Construction and Operation of Facilities to Provide Service Under Section 7 of the Natural Gas Act. The information presented in this report is based on environmental and cultural resource surveys conducted in the project corridor where survey permission had been granted (over 88% of the onshore route and over 95% of the total system route), agency consultations, and review of available resource information. From its assessment of the project areas involved, Iroquois has developed preliminary route design and construction methods for sensitive areas crossed, which are presented in this report. Because of the amount of detailed information provided in this application, Iroquois hopes FERC staff would be able to immediately move forward in the Environmental Impact Statement (EIS) process to meet Iroquois' and their customers' schedule.

1.1.1 Purpose and Need

The purpose of the ELI Project is to provide 175,000 Dt/d of incremental firm transportation capacity to eastern Long Island to serve market growth on Long Island, and via displacement opportunities, New York City." Both the City of New York and Long Island are experiencing a substantial increase in the demand for gas fired electric generation, which is directly tied to the growth in population and demand in this particular region of the Northeast. Currently, there exists a shortage of generating capacity in these markets, as well as constraints with respect to transmission capacity that can deliver electricity into this particular region. By 2005, it is anticipated that Long Island and New York City will require upwards of 1,500 MW and 1,000 MW respectively. From a reliability perspective, the New York Independent System Operator ("NYISO") has mandated that installed generating capacity on Long Island and in New York City must equal at least 98% and 80% respectively of the peak demand in each of these load pockets. This mandate is one of the primary drivers for the development of new generation capacity in these particular market areas.

The natural gas that Iroquois proposes to deliver as part of this project is the preferred fuel to meet additional generating capacity, from both an environmental and economic perspective. The environmental benefits of using natural gas for electric generation are significant. Particulate emissions are virtually eliminated when burning natural gas as opposed to coal or oil. Producing electric power using today's gas fired combined cycle power plants is an economical way to meet the tough nitrogen oxide and carbon monoxide air emissions standards for ozone non-attainment areas such as New York City and Long Island.

Overall, the average annual growth rate in this particular region of the Northeast is projected to be approximately 2.7% per year (Long Island – 5.4%, New York City – 1.5%) between 2001 and 2010. For the near term, load growth on Long Island is projected to increase at a rate of 6% per year, due in large part to homeowner conversions to natural gas.

Iroquois' ELI Project will provide the incremental pipeline capacity necessary to meet the growing demands of this market area. Additionally, this project will offer customers on Long Island increased access to Sable Island gas through the backfeed of the Algonquin system, and, through displacement opportunities, access markets in New York City, thereby reducing costs associated with distribution facility upgrades.

1.1.2 Location and Description of Proposed Facilities

The following figures and alignment drawings have been prepared to show the locations of the proposed facilities:

Figure 1.1.2-1 shows the ELI project facilities with respect to Iroquois' mainline transmission system;

Figure 1.1.2-2 shows the ELI pipeline alignment, tap location, and associated mileposts in the Long Island Sound and Long Island;

United States Geological Survey (USGS) 7.5-minute series topographic maps, which show the locations of all ELI Project facilities and mileposts at 1:24,000 scale, are in Volume V - Appendix A; and

Photo alignment sheets are provided in Volume V - Appendix B.

1.1.2.1 Proposed Pipeline Facilities

The proposed 20-inch diameter pipeline would span approximately 29.1 miles, totaling approximately 17.1 miles in Long Island Sound and 12.0 miles on Long Island. The proposed pipeline would be designed for a maximum allowable operating pressure (MAOP) of 1,440 psig from the mainline tap in Long Island Sound to the meter station at the pipeline terminus. The facilities would be constructed and operated in accordance with 49 CFR, Part 192 of the United States Department of Transportation (DOT) regulations. The pipe would be constructed of high strength carbon steel and manufactured in compliance with American Petroleum Institute (API) specifications for High-Strength Line Pipe (API-5L).

The location of over 59 percent of the pipeline in Long Island Sound has substantially reduced the quantity and significance of the land-based environmental impacts and has reduced the number of affected landowners when compared to a route that is all land-based. Since a large portion of Iroquois' route is offshore, the route is much less intrusive than a route located entirely onshore to access the proposed power generation market area. A land-based route would impact additional waterbodies and commercial areas located across New York and Connecticut. In addition, Iroquois' preferred alternative involves tapping its existing mainline approximately two miles off the Connecticut shore, instead of onshore in Milford, Connecticut to avoid crossing sensitive shellfishing areas located on the nearshore.

This page 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.

The proposed onshore portion was selected to maximize the use of existing utility and transportation corridors, thereby minimizing potential impacts to landowners and sensitive lands. In all, over 90 percent of the onshore alignment is co-located with existing corridors, in particular, the William Floyd Parkway and the Long Island Expressway (see Resource Report 8 for co-location calculations). A preliminary survey has identified only seven residences located within 50 feet of the proposed project corridor. Other routing options to the west or east of the preferred route would have been in proximity to densely populated areas, and/or involved greater impacts to sensitive lands, including the Central Pine Barrens. Discussions and evaluations of alternative routes considered are presented in Resource Report 10.

The pipeline route, and associated construction workspace widths, and temporary staging and work areas for construction are discussed below.

Long Island Sound

Iroquois proposes to generally lower the marine pipeline to a depth of approximately six inches to approximately three feet below the seabed depending on site specific conditions encountered and subject to permit conditions and approvals. At certain locations (crossings above shallow buried cables or certain bed rock outcrop) it may be necessary for the top of the pipeline to be located above the seabed elevation.

Except for the Shoreham approach where Iroquois proposes to use conventional open-cut construction, Iroquois proposes to use plowing techniques to install the pipeline below the bottom where conditions allow. This will minimize the impacts to the benthic environment by limiting the disturbance and resulting sediment plume generally observed from other construction techniques. However, plowing is limited to site-specific conditions encountered along the route and other construction techniques may be required including jetting/trenching to install the pipeline. Which construction techniques will be employed along the route will be a function of permit conditions and approvals and site specific conditions. Iroquois will discuss which construction methods are appropriate during the permitting process with federal and state agencies.

KeySpan Access Road

From approximately MP 17.1 to MP 17.6 the pipeline will be located adjacent to an existing, seldom-used KeySpan access road that leads inland (to the south) from Long Island Sound. The proposed pipeline will be located approximately 15 feet from the edge of the road pavement. While there is no defined right-of-way (ROW) associated with this road, installing the pipeline in this manner will maximize use of the existing cleared area associated with the road, and will reduce the amount of new clearing required.

KeySpan Power Line

From approximately MP 17.6 to MP 17.8, the pipeline will be located adjacent to an existing KeySpan single-pole power line. There is no defined ROW for this power line because it is located entirely on KeySpan property. However, KeySpan considers their ROW to extend 30 feet from the poles toward the proposed pipeline. The pipeline will be located approximately 35 feet from the poles in order to maximize the overlap between the pipeline ROW and the power line corridor and maintain a safe distance between boomed construction equipment and the power lines.

KeySpan Access Road

From approximately MP 17.8 to MP 17.9, the pipeline will be located approximately 35 feet from the edge of an existing, paved KeySpan access road. Since this road is more heavily used, a 35-foot pipeline offset is proposed. A 35-foot offset will minimize clearing by including the road within the construction ROW, and will also allow construction to be conducted in a manner that will minimize damage to the pavement. Heavier, tracked construction equipment will use only the area between the pipe and the roadway. Only lighter vehicles will be allowed to use the road for access and delivery of construction materials.

KeySpan Power Line

From approximately MP 17.9 to MP 18.7, the pipeline will be located mostly adjacent to an existing KeySpan power line (a short deviation will be necessary immediately south of North Country Road to improve the alignment up a steep slope and to avoid guy wires at an angle structure). The KeySpan power line is a high-voltage, single-pole structure line. There is no defined ROW for the power line in this area since it is located entirely on KeySpan property; however, KeySpan considered their ROW to extend 30 feet from the power poles toward the proposed pipeline. The proposed pipeline will be installed approximately 35 feet from the power poles to allow for substantial overlap between the pipeline ROW and the power line corridor and maintain a safe distance between boomed construction equipment and the power lines.

William Floyd Parkway

From approximately MP 18.7 to MP 26.0, the pipeline will be generally located adjacent to the east side of the William Floyd Parkway (Suffolk County Route 46). The William Floyd Parkway is a four-lane, divided, limited access highway that serves as a main north-south thoroughfare for this part of Long Island. Traffic volume is often heavy, especially during the summer when pipeline construction is proposed. Therefore, a primary consideration in routing the pipeline adjacent to the Parkway is the safety of the general public and the construction work force and minimizing potential traffic impacts.

Accordingly, Iroquois has located the pipeline and construction ROW to minimize construction impacts on the roadway and traffic. With the exception of a relatively short section (approximately 0.5 mile), the pipeline will be generally located a minimum of 30 feet from the edge of the pavement from the paved travel lane of the Parkway. See Figures 1.1.2.1-1a-g, which show typical ROW configurations for the proposed 75-foot wide construction workspace. The construction ROW along the William Floyd Parkway will be set up such that spoil from the trench will be placed towards the roadway and the working side of the ROW will be furthest from the roadway. The berm of trench spoil will serve as a barrier between traffic on the road and construction activities. Safety measures such as placement of barricades and other traffic controls will be used as necessary. A traffic control plan will be prepared for approval by the Suffolk County Department of Public Works and implemented during construction. Accurate drawings of the road ROW were not available at the Suffolk County Department of Public Works. A more detailed discussion of the anticipated pipeline alignment and existing features along the Parkway is presented below.

From approximately MP 18.7 to MP 21.4, the pipeline route will be located parallel with the William Floyd Parkway. In most areas between these mileposts, the pipeline will be located approximately 30 feet from the edge of the pavement of this roadway. Two short deviations from this alignment will be necessary to avoid a steep road bank that slopes away from the roadway between MPs 19.5 and 19.6. In these areas, Iroquois

anticipates that a 50-foot offset between the pipeline and edge of the pavement will be necessary to avoid undermining the stability of the road. Generally, the spoil side of the construction right-of-way will be 25 feet wide, placing the edge of the right-of-way on the 8- to 12-foot-wide paved shoulder of the road. The existing William Floyd Parkway ROW is highly variable along this section of the route. Iroquois estimates that, at a minimum, there will be at least 25 feet of overlap and, at most, the entire 75-foot-wide construction ROW may be within the road ROW.

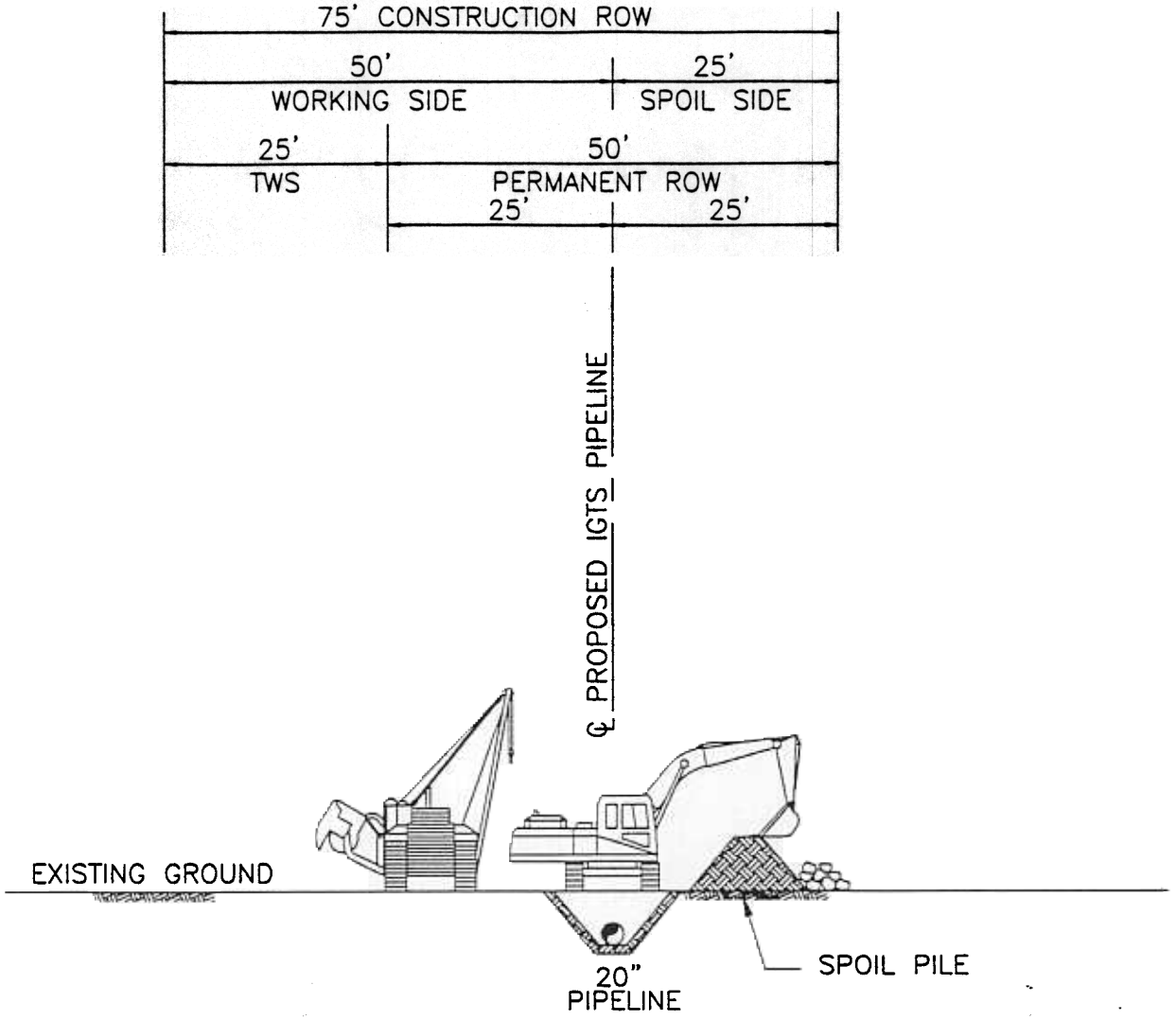
From approximately MP 21.4 to MP 21.9, a number of residences are located relatively close to the William Floyd Parkway. Additionally, existing utilities (such as a distribution power line and water line) are located between the roadway and the residences. Because the existing William Floyd Parkway ROW in this area is much narrower than elsewhere, Iroquois proposes to locate the new pipeline at the approximate edge of the road pavement to minimize impacts on the residential properties. Iroquois anticipates that it will be necessary to close one lane of the Parkway during construction. This will be the only area where Iroquois anticipates there will be direct impacts on the traffic lanes of the Parkway. Iroquois will work with the Suffolk County Department of Public Works to minimize these impacts and complete the work as rapidly as possible. Iroquois will continue to investigate alternative construction methods and space requirements that will minimize the clearing of vegetative screening for the residences along the Parkway.

From approximately MP 21.9 to MP 23, the pipeline enters an area dominated by the interchange between the William Floyd Parkway and New York State Route 25. The pipeline in this area follows a variety of on-and off-ramps and other smaller roads in a circuitous route around the interchange area. Direct impacts to the on- and off-ramps will be avoided; however, there will be direct impacts on the other smaller roads in the area, most of which are either lightly used or closed. The pipeline route will be aligned to minimize impacts on road traffic to the extent possible and to minimize the clearing of mature vegetation adjacent to nearby residences and commercial buildings.

From approximately MP 23 to MP 24.6, the pipeline will be located approximately 30 feet from the edge of the pavement of the travel lane on the William Floyd Parkway. Generally, the spoil side of the construction ROW will be 25 feet wide and within the paved shoulder of the road. Iroquois estimates that there will be at least 25 feet of right-of-way overlap between the pipeline and road ROWs.

From approximately MP 24.6 to MP 24.9, the pipeline route briefly leaves the edge of the William Floyd Parkway to avoid a recharge drainage basin and to minimize impacts on landscaping at the main entrance of the U.S. Department of Energy – Brookhaven National Laboratory. Iroquois anticipates there will be little or no overlap with the Parkway ROW in this area.

From approximately MP 24.9 to MP 25.8, the route will be parallel with the William Floyd Parkway, but at an increased offset of approximately 100 feet from the edge of the pavement of the travel lane. The increased offset will be necessary to avoid disturbing several large, steep, sandy road banks. If construction were to occur through the road banks, an extensive amount of grading would be required for safe operation of construction equipment, which would likely impact traffic on the William Floyd Parkway. As proposed, the pipeline will be placed on relatively level terrain away from the roadway. Iroquois anticipates that there will be little or no overlap between the pipeline and road ROWs.



1.1.2.1-1A

LOOKING D/S

1"=20'

NOTES

1. NO PUSH OUTS SHALL BE ALLOWED. ALL TIMBER AND GRADE STORAGE SHALL BE CONTAINED WITHIN THE 75 FOOT OF RIGHT-OF-WAY UNLESS SITE SPECIFIC ADDITIONAL TEMPORARY WORKROOM IS OBTAINED.
2. TOPSOIL SHALL BE REPLACED AFTER RECOUNTOURING OF SUBSOIL.
3. TOPSOIL STRIPPING CONFINED TO WORK AREA. SPOIL MATERIAL TO BE REMOVED FROM
4. THIS CONFIGURATION IS APPLICABLE FOR THE FOLLOWING: M.P. 17.1 TO M.P. 17.4 ; M.P. 17.5 TO M.P. 17.7
   M.P. 22.1 TO M.P. 22.1 ; M.P. 24.4 TO M.P. 24.6
   M.P. 24.6 TO M.P. 25.5 ; M.P. 26.0 TO M.P. 26.6
   M.P. 26.9 TO M.P. 27.1 ; M.P. 27.1 TO M.P. 27.9
   M.P. 27.9 TO M.P. 29.1
5. NO TREES SHALL BE TRIMMED, CUT, OR DAMAGED UNLESS PERMISSION IS RECEIVED IN WRITING FROM THE ENVIRONMENTAL INSPECTOR.
6. TRENCH WILL BE WIDER AT THE TIE-IN LOCATION TO ACCOMMODATE WELDING.
7. CONCEPTUAL: ACTUAL DIMENSIONS MAY VARY IN THE FIELD.
8. CONFIGURATION DOES NOT INCLUDE ADDITIONAL TEMPORARY WORKSPACE.

PLOT DATE: 09-26-01

REVISIONS						
REV.	DATE	DESCRIPTION	BY	CHK'D	ENG	APP

Iroquois
GAS TRANSMISSION SYSTEM
IROQUOIS PIPELINE OPERATING COMPANY, OPERATOR

APPROVED BY:

MANAGER OF ENGINEERING

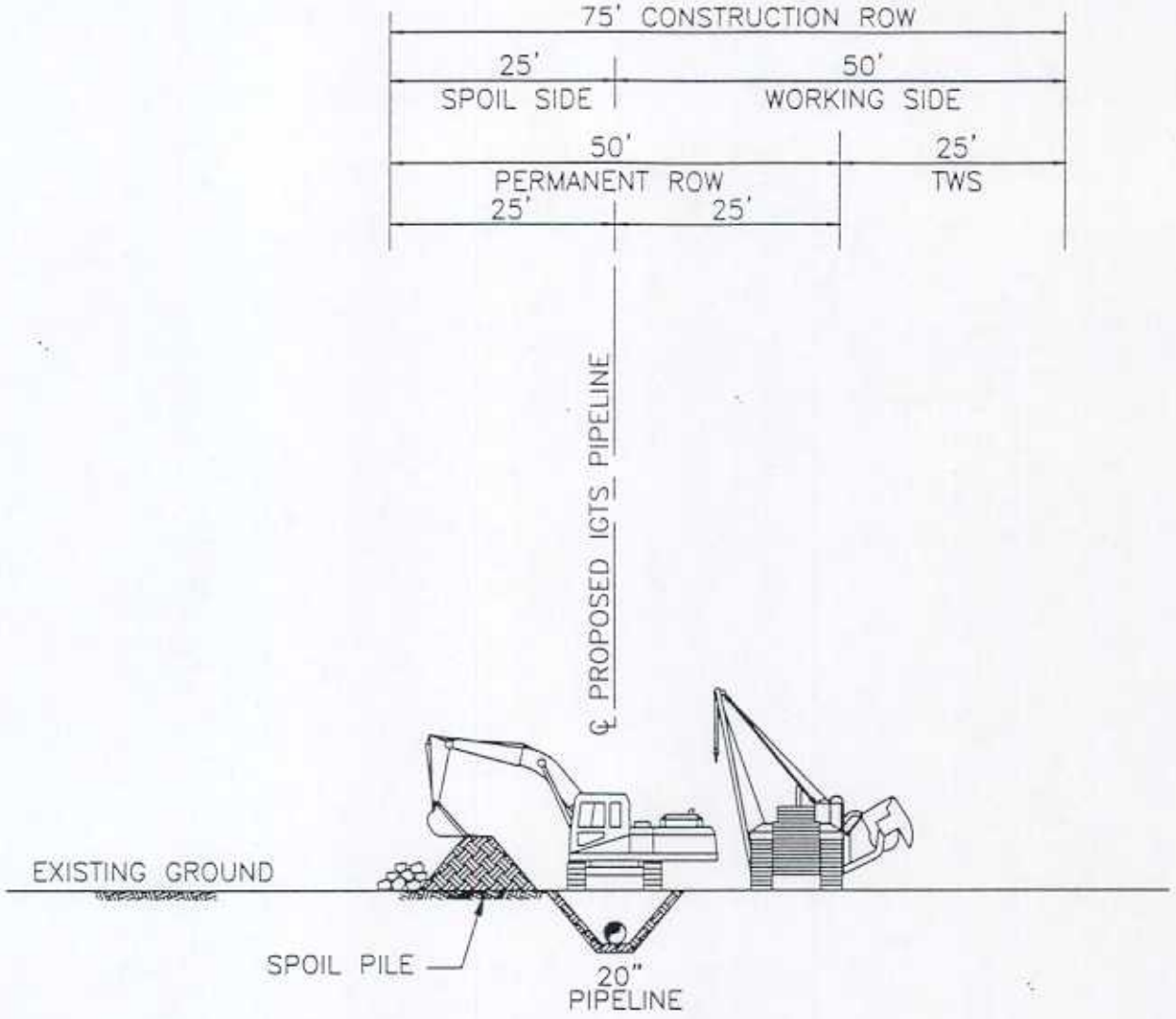
DRAWN BY	C&C	DATE 09/26
CHECKED BY		DATE
DRAFT. SUP.		DATE
ENGR.		DATE
APP'D		VALVE SECTION
FILE NO.		SCALE AS NOTED

IROQUOIS ELIE PROJECT
TYPICAL ROW CONFIGURATION
75' TOTAL WIDTH

BROOKHAVEN SUFFOLK COUNTY NEW YORK

DWG. NO.: 1.1.2.1-1A

REVISION 0



1.1.2.1-1B

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   M.P. 17.7 TO M.P. 17.9
   M.P. 17.9 TO M.P. 18.7
   M.P. 26.6 TO M.P. 26.9
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IROQUOIS PIPELINE OPERATING COMPANY
OPERATOR

APPROVED BY:

MANAGER OF ENGINEERING

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DWG. NO. 1.1.2.1-1B

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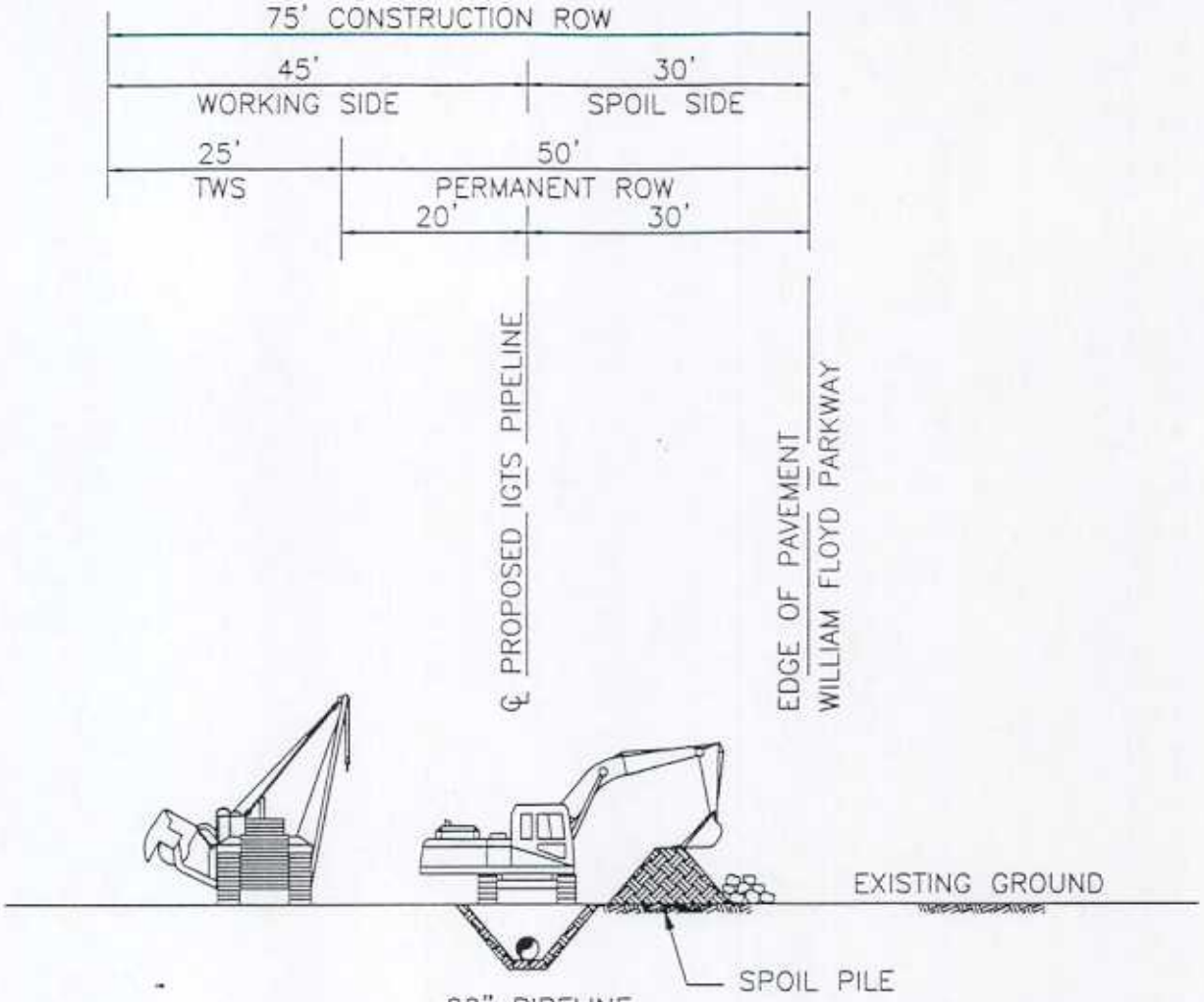

20" PIPELINE

1.1.2.1-1C

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Iroquois
GAS TRANSMISSION SYSTEM
IROQUOIS PIPELINE OPERATING COMPANY, OPERATOR

APPROVED BY:

MANAGER OF ENGINEERING

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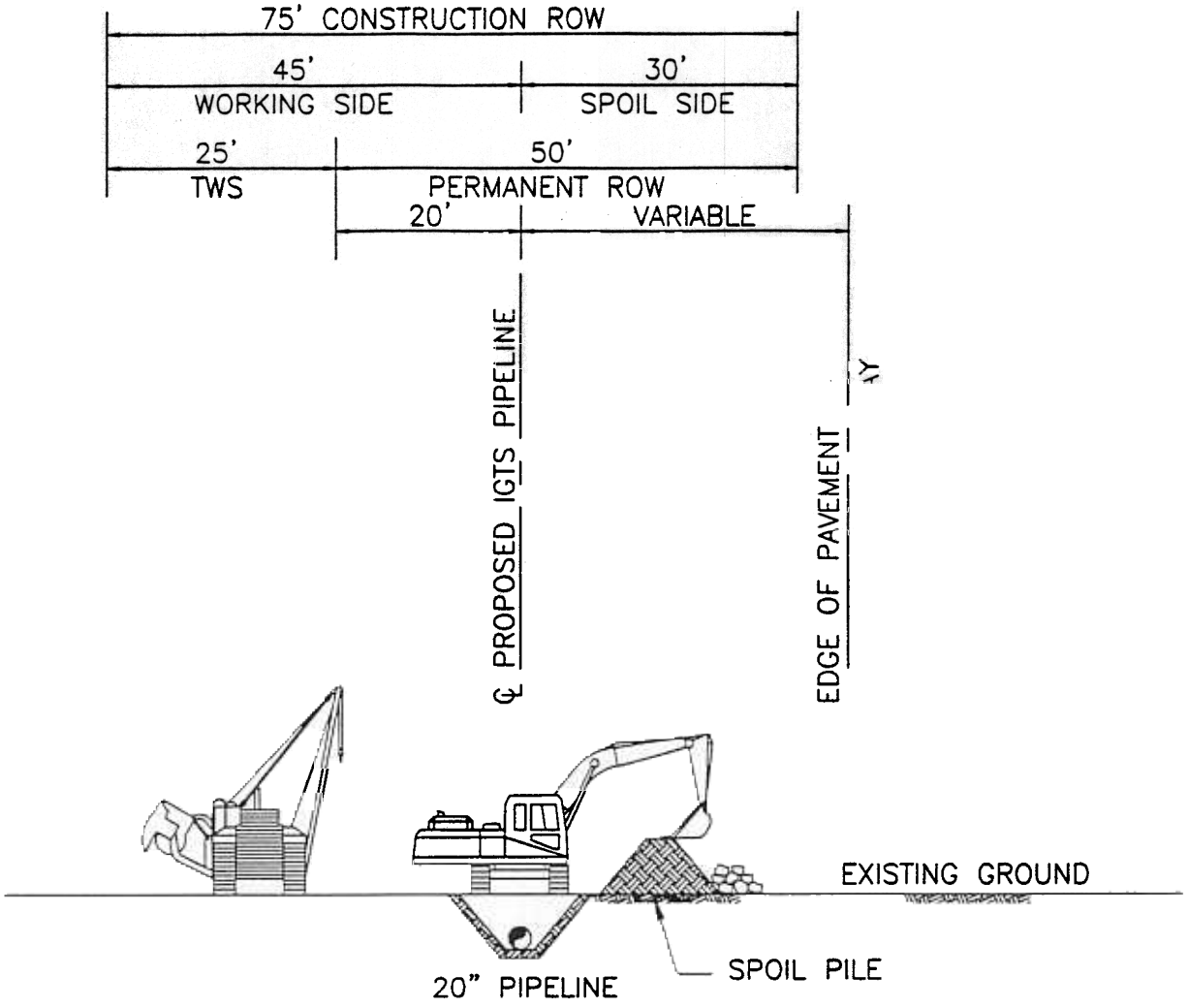

1.1.2.1-1D

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PLOT DATE: 09-25-01

REVISIONS						
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iroquois
GAS TRANSMISSION SYSTEM
IROQUOIS PIPELINE OPERATING COMPANY, OPERATOR

APPROVED BY:

MANAGER OF ENGINEERING

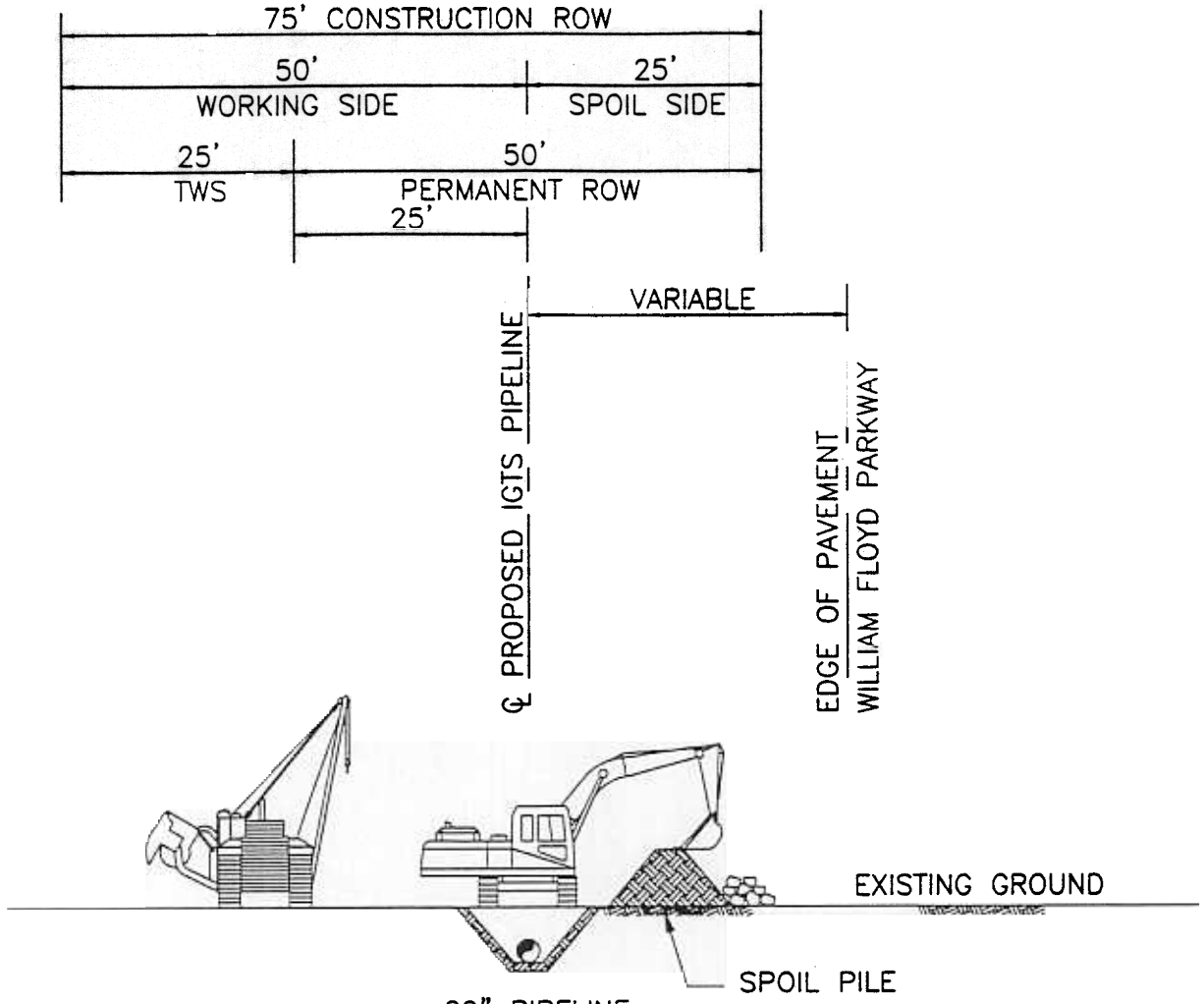
DRAWN BY	C.B.C.	DATE	09/25
CHECKED BY		DATE	
ENVIT. SUP.		DATE	
ENGR.		DATE	
APP'D		VALVE SECTION	
FILE NO.		SCALE	AS NOTED

IROQUOIS ELIE PROJECT
TYPICAL ROW CONFIGURATION
75' TOTAL WIDTH

BROOKHAVEN SUFFOLK COUNTY NEW YORK

DWG. NO.: 1.1.2.1-1D

REVISION: 0



20" PIPELINE

1.1.2.1-1E

LOOKING D/S

1"=20'

NOTES

1. NO PUSH OUTS SHALL BE ALLOWED. ALL TIMBER AND GRADE STORAGE SHALL BE CONTAINED WITHIN THE 75 FOOT OF RIGHT-OF-WAY UNLESS SITE SPECIFIC ADDITIONAL TEMPORARY WORKROOM IS OBTAINED.
2. TOPSOIL SHALL BE REPLACED AFTER RECOUNTOURING OF SUBSOIL.
3. TOPSOIL STRIPPING CONFINED TO WORK AREA. SPOIL MATERIAL TO BE REMOVED FROM
4. THIS CONFIGURATION IS APPLICABLE FOR THE FOLLOWING: M.P. 21.9 TO M.P. 22.1
5. NO TREES SHALL BE TRIMMED, CUT, OR DAMAGED UNLESS PERMISSION IS RECEIVED IN WRITING FROM THE ENVIRONMENTAL INSPECTOR.
6. TRENCH WILL BE WIDER AT THE TIE-IN LOCATION TO ACCOMMODATE WELDING.
7. CONCEPTUAL: ACTUAL DIMENSIONS MAY VARY IN THE FIELD.
8. CONFIGURATION DOES NOT INCLUDE ADDITIONAL TEMPORARY WORKSPACE.

PLOT DATE: 09-26-01

REVISIONS						
REV.	DATE	DESCRIPTION	BY	CHK'D	ENG	APP

Iroquois
GAS TRANSMISSION SYSTEM
IROQUOIS PIPELINE OPERATING COMPANY
OPERATOR

APPROVED BY:

MANAGER OF ENGINEERING

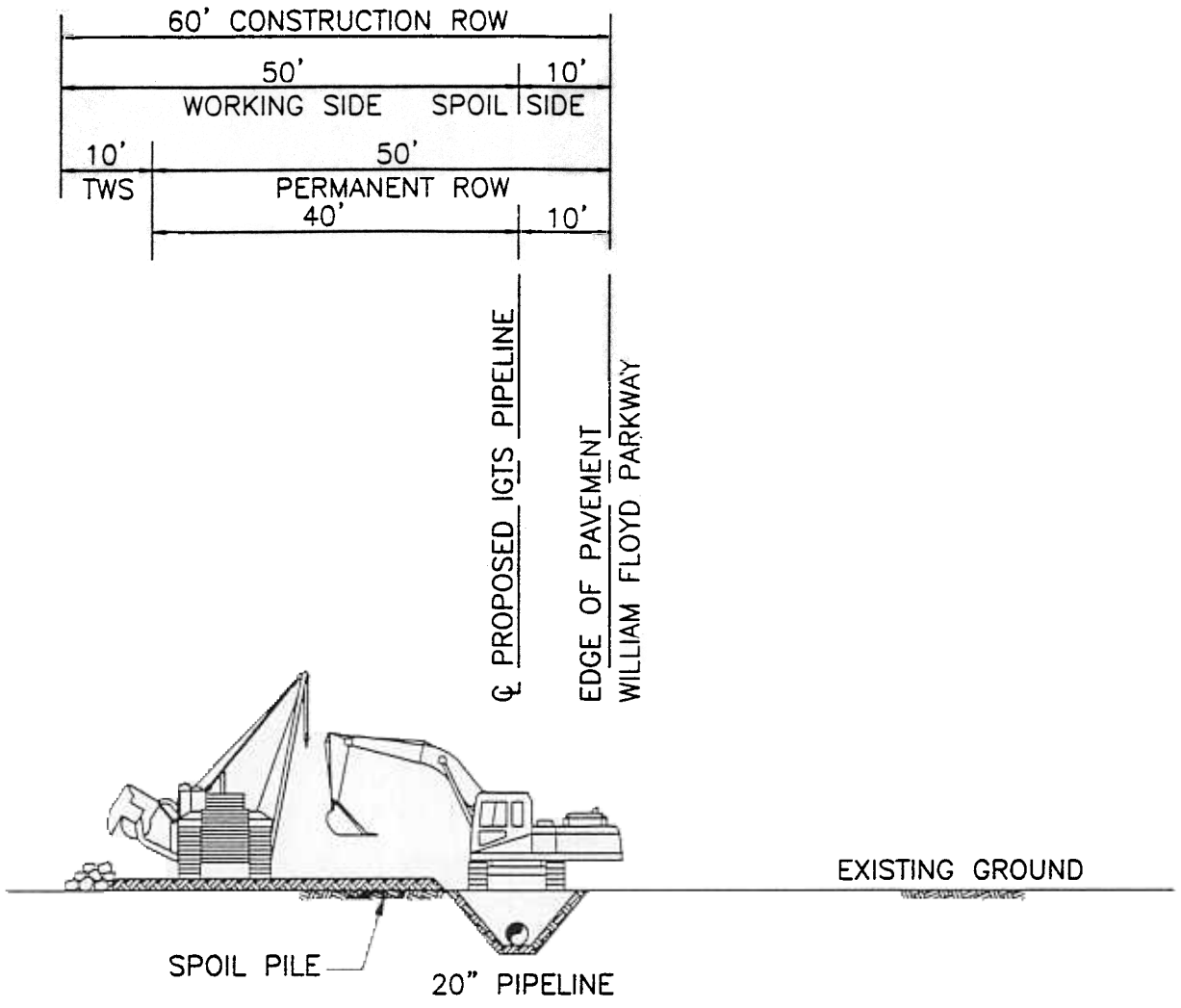
DESIGN BY	C&C	DATE 09/26
CHECKED BY		DATE
ENVIRT. SUP.		DATE
ENGR.		DATE
APP'D		VALVE SECTION
FILE NO.		SCALE AS NOTED

IROQUOIS ELIE PROJECT
TYPICAL ROW CONFIGURATION
75' TOTAL WIDTH

BROOKHAVEN SUFFOLK COUNTY NEW YORK

DWG. NO. 1.1.2.1-1E

REVISION 0



1.1.2.1-1F

LOOKING D/S

1"=20'

NOTES

1. NO PUSH OUTS SHALL BE ALLOWED. ALL TIMBER AND GRADE STORAGE SHALL BE CONTAINED WITHIN THE 60 FOOT OF RIGHT-OF-WAY UNLESS SITE SPECIFIC ADDITIONAL TEMPORARY WORKROOM IS OBTAINED.
2. TOPSOIL SHALL BE REPLACED AFTER RECOUNTOURING OF SUBSOIL.
3. TOPSOIL STRIPPING CONFINED TO WORK AREA. SPOIL MATERIAL TO BE REMOVED FROM
4. THIS CONFIGURATION IS APPLICABLE FOR THE FOLLOWING: M.P. 21.2 TO M.P. 21.8
5. NO TREES SHALL BE TRIMMED, CUT, OR DAMAGED UNLESS PERMISSION IS RECEIVED IN WRITING FROM THE ENVIRONMENTAL INSPECTOR.
6. TRENCH WILL BE WIDER AT THE TIE-IN LOCATION TO ACCOMMODATE WELDING.
7. CONCEPTUAL: ACTUAL DIMENSIONS MAY VARY IN THE FIELD.
8. CONFIGURATION DOES NOT INCLUDE ADDITIONAL TEMPORARY WORKSPACE.

PLOT DATE: 09-26-01

REVISIONS						
REV.	DATE	DESCRIPTION	BY	CHK'D	ENG	APP

Iroquois
GAS TRANSMISSION SYSTEM
IROQUOIS PIPELINE OPERATING COMPANY, OPERATOR

APPROVED BY:

MANAGER OF ENGINEERING

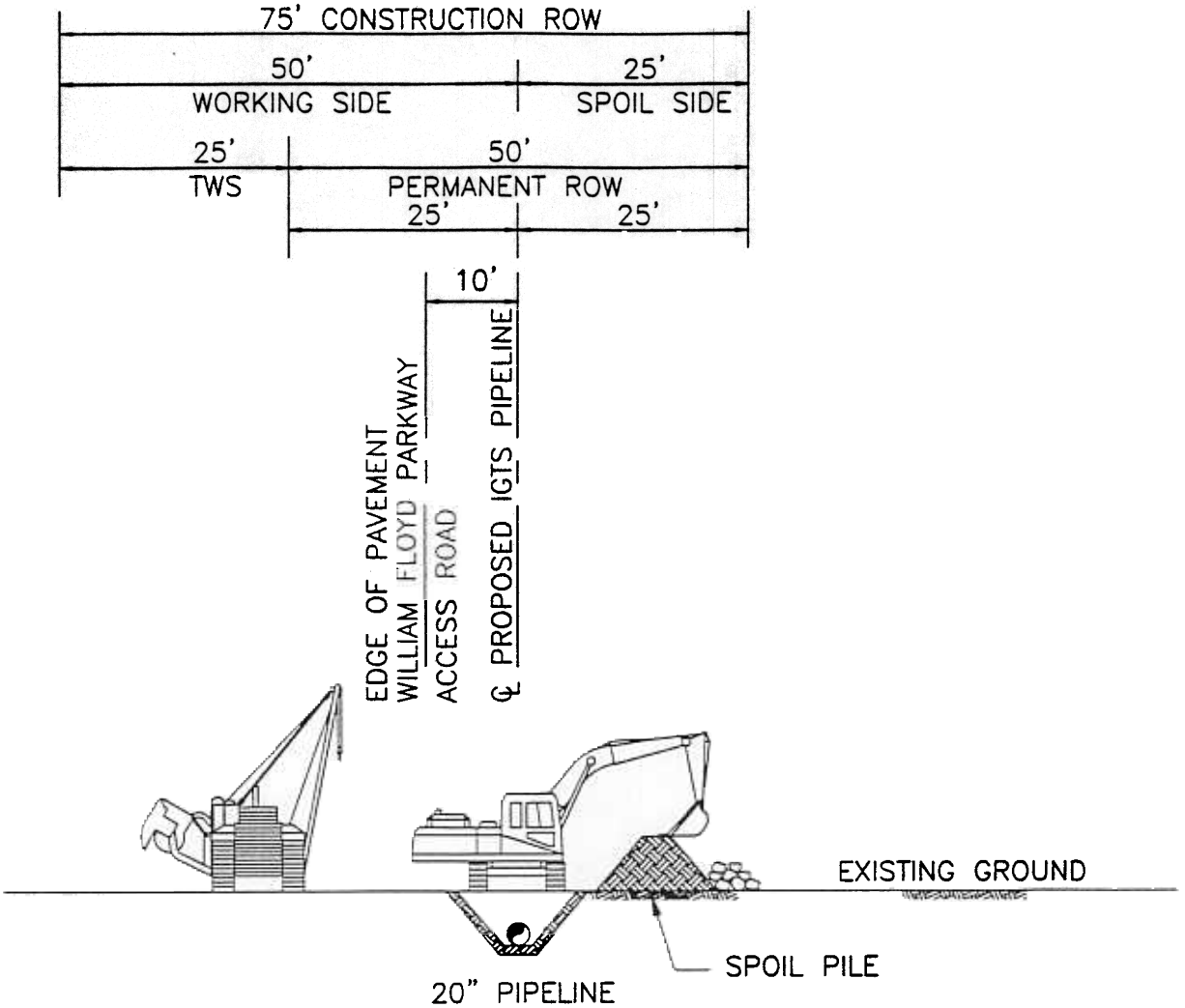
DESIGNED BY	C&C	DATE 09/26
CHECKED BY		DATE
DRAFT. SUP.		DATE
CHIEF		DATE
APE'S		VALVE SECTION
FILE NO.		SCALE AS NOTED

IROQUOIS ELIE PROJECT
TYPICAL ROW CONFIGURATION
60' TOTAL WIDTH

BROOKHAVEN SUFFOLK COUNTY NEW YORK

DWG. NO.: 1.1.2.1-1F

REVISION 0



1.1.2.1-1G

LOOKING D/S
1"=20'

NOTES

1. NO PUSH OUTS SHALL BE ALLOWED. ALL TIMBER AND GRADE STORAGE SHALL BE CONTAINED WITHIN THE 75 FOOT OF RIGHT-OF-WAY UNLESS SITE SPECIFIC ADDITIONAL TEMPORARY WORKROOM IS OBTAINED.
2. TOPSOIL SHALL BE REPLACED AFTER RECOUNTOURING OF SUBSOIL.
3. TOPSOIL STRIPPING CONFINED TO WORK AREA. SPOIL MATERIAL TO BE REMOVED FROM
4. THIS CONFIGURATION IS APPLICABLE FOR THE FOLLOWING: M.P. 21.8 TO M.P. 21.9
5. NO TREES SHALL BE TRIMMED, CUT, OR DAMAGED UNLESS PERMISSION IS RECEIVED IN WRITING FROM THE ENVIRONMENTAL INSPECTOR.
6. TRENCH WILL BE WIDER AT THE TIE-IN LOCATION TO ACCOMMODATE WELDING.
7. CONCEPTUAL: ACTUAL DIMENSIONS MAY VARY IN THE FIELD.
8. CONFIGURATION DOES NOT INCLUDE ADDITIONAL TEMPORARY WORKSPACE.

PLOT DATE: 09-26-01

REVISIONS						
REV.	DATE	DESCRIPTION	BY	CHK'D	ENG	APP

Iroquois
GAS TRANSMISSION SYSTEM
IROQUOIS PIPELINE OPERATING COMPANY, OPERATOR

APPROVED BY:

MANAGER OF ENGINEERING

DESIGN BY	C&C	DATE	09/26
CHECKED BY		DATE	
ENVT. SUP.		DATE	
ENGR.		DATE	
APV'D		VALVE SECTION	
FILE NO.		SCALE	AS NOTED

IROQUOIS ELIE PROJECT
TYPICAL ROW CONFIGURATION
75' TOTAL WIDTH

BROOKHAVEN SUFFOLK COUNTY NEW YORK

DWG. NO.: 1.1.2.1-1G

REVISION: 0

From approximately MP 25.8 to MP 26, the pipeline will be located approximately 30 feet from the edge of the pavement of the travel lane on the William Floyd Parkway. Generally, the spoil side of the construction right-of-way will be 25 feet wide, placing the edge of the ROW within the paved shoulder of the road. Iroquois estimates that there will be at least 25 feet of right-of-way overlap between the construction and road ROWs.

From approximately MP 26 to MP 26.9, the route parallels existing, seldom-used roads near the Long Island Expressway (Interstate 495). While there is no defined ROW associated with these roads, the proposed pipeline location, which will be approximately 15 feet off the edge of the road, will minimize clearing and allow maximum use of the existing cleared area for both the construction and permanent ROWs.

Long Island Expressway and Utilities

From MP 26.9 to MP 29.1, the pipeline follows an existing KeySpan fiber optic communications cable and an existing Suffolk County water pipeline which in turn parallels a KeySpan Energy Delivery gas main and the Long Island Expressway. The proposed pipeline will be offset 25 feet from these buried utilities.

1.1.2.2 Proposed Aboveground Facilities

The proposed ELI Project would involve the installation of several aboveground facilities along the pipeline route. These facilities are described below and summarized in Table 1.1.2.2-1 as well as Table 8.1.2-1 of Resource Report 8. Refer to the separate ERs prepared for compressor station work proposed in Dover, New York, and Milford and Brookfield, Connecticut.

TABLE 1.1.2.2-1
SUMMARY OF PROPOSED ABOVEGROUND FACILITIES
FOR THE EASTERN LONG ISLAND EXTENSION PROJECT

State	County	Facility	Approximate Milepost	Description
Connecticut	New Haven	Marine Tap Interconnection	0.0	Includes interconnection for operational pigging.
New York	Suffolk	MLV-2	17.5	Mainline valve within a security chain link fence.
	Suffolk	MLV-3	22.7	Mainline valve within a security chain link fence.
	Suffolk	MLV-4	29.1	Mainline valve within a security chain link fence.
	Suffolk	Receiver Facility	29.1	Meter building and pig receiver.
	Suffolk	Meter Station	29.1	Meter building and pig receiver.

Mainline Valves

Three onshore buried, mainline block valves will be located within the operational pipeline ROW at the Point of Beginning (POB) at MP 17.5, 22.7, and MP 29.1, respectively. The onshore mainline block valve assemblies would include a remotely operable mainline block valve; a bypass line to allow re-pressuring or pressure equalization prior to opening the main line valve; and associated pipe and fittings. An aboveground communications satellite dish for all onshore mainline valves will be located on a pole near the area and/or telephone lines, which would be used to allow remote operation of the valve. A chain link perimeter security fence will surround the onshore valves. See Figure 1.1.2.2-1 for a typical mainline valve assembly configuration.

Meter Stations

The project includes one metering point that would be connected at the ELI pipeline interconnection location at the project terminus (MP 29.1). This station would be located on the southern side of the Long Island Expressway. See Figure 1.1.2.2-2 for a conceptual plot plan of the proposed meter station. The proposed meter station site would include the following major components:

Security chain link fence;
Meter and Control building;
Flow control valve;
Gas measurement flow devices;
Meter station isolation, maintenance, and by-pass valves;
SCADA equipment and communications link; and,
Appurtenant or related facilities.

Certain non-jurisdictional facilities would also be constructed at the meter station site including:

Pressure regulation;
- Pressure regulation building;

Gas heaters where required; and
Other facilities.

Marine Tap Interconnection

The proposed ELI Project will include one marine tap interconnection with the existing Iroquois' 24-inch mainline located at MP 0.0 within Long Island Sound. The offshore marine tap interconnection would include a hottap tee and associated valve, a dog-leg spool piece with check valve and isolation valve to connect the new pipeline to the mainline; and associated pipe, valves and fittings to allow for operational in-line inspection (pigging) of the pipeline. Figure 1.1.2.2-3 represents a typical marine tap interconnection facility.

This page 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.

1.2 LAND REQUIREMENTS

The construction of the proposed onshore pipeline and ancillary facilities, including the meter stations, would require approximately 140.4 acres for construction and 73 acres for operation. The construction and operational land requirements for the offshore and onshore segments are discussed below.

1.2.1 Land Requirements for Pipeline Construction and Operation

Table 1.2.1-1 and Tables 8.1.1-2 and 8.1.1-3 of Resource Report 8 summarize land requirements for construction and operation of the proposed ELI Project onshore pipeline facilities, including mileage of the proposed pipeline in each state and the construction and permanent ROW acreage.

1.2.1.1 Offshore Land Requirements

Permanent/Operational ROW

Iroquois plans to acquire an easement for the offshore areas in New York; no easement would be needed for the Connecticut portion. The New York State Office of General Services grants easements in the navigational waterways of New York State. Iroquois plans to acquire the 30-foot wide easement for offshore areas in which the pipeline is laid. The 30-foot wide permanent easement is not reflective of indirect impacts associated with potential sedimentation from the construction process. At this time, no other permanent land requirements in association with the offshore pipeline are anticipated.

Temporary ROW

Iroquois does not anticipate the need for a temporary pipe storage yard and support base to support the offshore portion of the project. Iroquois intends to deliver the marine pipeline material by barge from the concrete coating plant and offload directly to the lay barge to minimize handling. Therefore an onshore storage yard and support base will not be required to support the offshore pipelay. If in the future it is determined that a storage yard for the offshore portion of the project is needed, Iroquois will notify FERC and conduct the appropriate clearances.

1.2.1.2 Onshore Land Requirements

The total land requirement for the onshore pipeline facilities (not including aboveground facilities) is estimated at approximately 136.5 acres within the construction ROW and approximately 72.7 acres within the permanent ROW (See Table 1.2.1-1 and Table 8.1.1-2 of Resource Report 8). Iroquois bELIves the proposed ROW widths are the minimum necessary to provide adequate safety conditions for workers. The large diameter pipe would require large construction equipment and would create large volumes of stockpiled subsoil (spoil) on the ROW. Temporary extra workspaces would also be needed in certain areas (e.g., road crossings, stream crossings, and mainline valve locations).

TABLE 1.2.1-1
LAND REQUIREMENTS FOR OFFSHORE AND ONSHORE PIPELINE FACILITIES OF THE EASTERN LONG ISLAND EXTENSION PROJECT[1]

State	Land Use	MP	Length (miles)	Construction ROW (acres)	Operational ROW (acres)	Temporary Construction ROW[3]
Connecticut[2]						
Offshore	Open Water	0.0-0.04[4]	0.04	1.4	0.13	1.27
		0.04-7.54[5]	7.5	90.93	27.26	63.64
New York[2]		7.54-15.72[5]	8.2	99.2	26.75	69.43
Offshore		15.72-16.8[6]	1.1	26.2	3.92	22.26
		16.8-17.0[4]	0.2	7.3	0.72	6.55
		17.0-17.1[4]	0.1	3.6	0.36	3.27
Total Offshore						
New York						
Onshore	Beach	17.13-17.15	0.02	3.19	0.41	2.78
	Forest	17.15-17.53	0.38	4.18	2.35	1.83
	Road ROW	17.53-17.54	0.01	0.03	0.03	0.00
	Forest	17.54-17.89	0.35	3.43	2.1	1.33
	Road ROW	17.89-17.90	0.01	0.06	0.06	0.00
	Forest	17.90-18.69	0.79	7.95	4.8	3.15
	Road ROW	18.69-21.95	3.26	28.5	19.73	8.77
	Forest	21.95-22.08	0.13	1.48	0.82	0.66
	Road ROW	22.08-24.20	2.12	19.8	12.83	6.97
	Forest	24.20-24.58	0.38	3.46	2.31	1.15
	Open Space	24.58-24.61	0.03	0.54	0.20	0.34
	Road ROW	24.61-24.62	0.01	0.09	0.09	0.00
	Open Space	24.62-24.66	0.04	1.06	0.17	1.89
	Forest	24.66-25.57	0.91	8.46	5.53	2.93
	Road ROW	25.57-25.98	0.41	3.82	2.44	1.38
	Forest	25.95-26.06	0.08	0.89	0.53	0.36
	Open Space	26.06-26.30	0.24	2.17	1.45	0.72
	Road ROW	26.30-26.63	0.33	2.98	1.99	0.99
	Contractor Pipeyard	26.63	--	13.8	0.0	13.8
	Road ROW	26.63-26.95	0.32	4.25	1.95	2.3
	Forest	26.95-27.11	0.16	1.85	1.03	0.82
	Road ROW	27.11-27.13	0.02	0.09	0.09	0.00
	Forest	27.13-27.64	0.51	5.32	3.1	2.22
	Cemetery (Open Space)	27.64-27.68	0.04	0.57	0.24	0.33
	Forest	27.68-27.89	0.21	1.97	1.23	0.74
	Road ROW	27.89-27.90	0.01	0.06	0.06	0.00
	Agriculture	27.90-28.61	0.71	7.74	4.31	3.43
	Forest	28.61-29.08	0.47	8.77	2.87	5.9

TABLE 1.2.1-1
LAND REQUIREMENTS FOR OFFSHORE AND ONSHORE PIPELINE FACILITIES OF THE EASTERN LONG ISLAND EXTENSION PROJECT[1]

State	Land Use	MP	Length (miles)	Construction ROW (acres)	Operational ROW (acres)	Temporary Construction ROW[3]
Total Onshore			12.0	136.5	72.72	63.79
Project Total						

Source: ENSR

[1] Excludes proposed permanent ROW for pipeline sections to be installed by HDD and boring where no land disturbance would occur.
[2] Land affected during construction reflects a 30-foot wide easement area. It is not reflective of indirect impacts associated with sedimentation from the construction process.
[3] Includes temporary and extra workspaces.
[4] Construction ROW in offshore areas defined as the amount disturbed during construction, assuming a 300-ft construction ROW.
[5] Construction ROW in offshore areas defined as the amount disturbed during construction, assuming a 100-ft construction ROW.
[6] Construction ROW in offshore areas defined as the amount disturbed during construction, assuming a 200-ft construction ROW.

Permanent/Operation ROW

The onshore portions of the ELI Project would be buried within a new 50-foot-wide permanent easement. The remaining portion of the construction ROW would be temporary and returned to landowners for their use after appropriate restoration efforts are complete.

Temporary Workspace Areas

The total land requirements for additional temporary workspace is estimated at approximately 63.8 acres. Iroquois bELIves the proposed workspaces are the minimum necessary to provide adequate safety conditions for construction workers. The large diameter pipe would require large construction equipment and would create large volumes of stockpiled subsoil (spoil) on the ROW. Temporary extra workspace would be required in certain areas such as at road crossings, stream crossings, and mainline valve locations.

Extra Workspace Areas

Preliminary extra workspaces required for the construction of the ELI Project are shown on the aerial based alignment sheets. Temporary extra workspaces would be set back approximately 50 feet from the edges of waterbodies and wetlands, except as requested otherwise by Iroquois due to topographic or other site-specific factors. Locations of any additional temporary extra workspaces would be filed with the Secretary of the Commission prior to construction for review and approval prior to use. Temporary extra workspaces along the construction ROW would be required at the following locations:

Directional drilling workspace;
Where the pipeline crosses under buried features such as foreign pipelines, utility lines, drain tiles, irrigation systems, etc;

- On both sides of roads, railroads, and waterbodies;
- Areas where full ROW topsoil segregation may be required;
- Areas where the route moves offshore or comes onshore; and,

Other areas as determined by site-specific conditions required to provide extra space for spoil storage and construction activities.

The total land requirements for extra workspace is estimated to be approximately 27.60 acres. Locations of extra workspaces are summarized below in Table 1.2.1-2.

TABLE 1.2.1-2
LAND REQUIREMENTS AND LAND USE FOR EXTRA WORKSPACE AREAS ASSOCIATED WITH THE EASTERN LONG ISLAND EXTENSION PROJECT

Milepost	Land Use	Dimension of Work Area (sq. ft)	Acreage Affected (ac)	Reason For Workspace
		15.923 sq. ft.	0.37	
24.58 to 24.62		10.140 sq. ft.	0.23	Staging area
24.60 to 24.61		438 sq. ft.	0.01	Staging area
24.62 to 24.65		19.765 sq. ft.	0.45	Staging area
24.63 to 24.66		15.048 sq. ft.	0.35	Staging area
24.78 to 24.80		65 x 100	0.15	Staging area
25.94 to 25.95		50 x 130	0.15	Road crossing of William Floyd Parkway
25.98 to 25.99		50 x 100	0.11	Road crossing of William Floyd Parkway
26.63 to 26.92		400 x 1500	13.78	Proposed pipeyard

TABLE 1.2.1-2 (continued)
LAND REQUIREMENTS AND LAND USE FOR EXTRA WORKSPACE AREAS
ASSOCIATED WITH THE EASTERN LONG ISLAND EXTENSION PROJECT

Milepost	Land Use	Dimension of Work Area (sq. ft)	Acreage Affected (ac)	Reason For Workspace
26.81 to 26.86	Open Space/ Upland Forest	44,741 sq. ft.		Spoil storage and staging area
26.86 to 26.89	Open Space/ Upland Forest	55 x 220	0.28	Spoil storage and staging area
26.89 to 26.92	Open Space/ Upland Forest	25 x 160	0.09	Spoil storage and staging area
26.95 to 26.98	Upland Forest	25 x 90	0.05	Road crossing of the Long Island Expressway
26.95 to 26.97	Upland Forest	50 x 150	0.17	Road crossing of the Long Island Expressway
27.09 to 27.11	Upland Forest	50 x 85	0.10	Road Crossing of Middle Island Road
27.12 to 27.15	Upland Forest	50 x 130	0.15	Road Crossing of Middle Island Road
27.36 to 27.39	Upland Forest	50 x 200	0.23	Equipment and material storage
27.51 to 27.52	Upland Forest	50 x 100	0.11	Carmans River crossing
27.55 to 27.56	Upland Forest	50 x 100	0.11	Carmans River crossing
27.64 to 27.68	Open Space/ Upland Forest	50 x 200	0.23	Equipment and material storage
27.87 to 27.89	Open Space/ Upland Forest	50 x 90	0.10	Road crossing of Yaphank Avenue
27.90 to 27.92	Open Space/ Upland Forest	50 x 120	0.14	Road crossing of Yaphank Avenue
27.97 to 28.61	Open Space/ Upland Forest	15 x 3380	1.16	Topsoil Stripping
28.95 to 29.03	Upland Forest	20 x 360	0.17	Equipment and material storage
28.95 to 29.02	Upland Forest	60 x 370	0.51	Equipment and material storage
29.08 to 29.17	Upland Forest	168,168 sq. ft.	3.86	KeySpan tie-in point

Pipe/Material Storage Yards and Contractor Yards

Contractor yards and pipe/material storage yards (which will be both referred to as yards in this document) would require extra workspaces located off the construction ROW. Primary locations of yards are included in this application. There would be one contractor warehouse/staging yard located along the proposed pipeline at MP 26.6 approximately 200 feet west of the proposed pipeline route.

Field investigations and negotiations with city and port agencies as well as commercial landowners would determine the location of pipeyards required for the offshore construction if required.

Access Roads

Access roads are required for construction so the contractor may move personnel, equipment and material to the pipeline ROW. Public roads would be used for access roads to the greatest extent possible. Where private roads are required for construction, Iroquois would seek Commission approval for their use.

There are a total of five access roads that have been requested for use during the construction of the ELI Project. Of this total, three are permanent and two will be temporary. Permanent access roads will be retained and used to allow access to service the pipeline and for routine inspections. Temporary access roads will not be used after the completion of construction. The first permanent access road is located at approximate MP 17.5 (PAR-1). This road is private and located within the KeySpan property. The second permanent access road (PAR-2) is also private, being located from approximate MP 26.3 to 26.7. The third permanent access (PAR-3) road is located at MP 29.1. This is a private road, which will be constructed from Sills Road to the proposed meter station. The first temporary access road (TAR-1) is located on KeySpan property at approximate MP 17.7 while the second temporary access road is located at approximate MP 26.6. This access road will provide access to the contractor pipeyard adjacent to the pipeline alignment.

1.2.2 Land Requirements for Aboveground Facility Construction and Operation

Temporary and permanent land requirements for all aboveground facilities are shown below in Table 1.2.2-1

TABLE 1.2.2-1
SUMMARY OF LAND REQUIREMENTS FOR ABOVEGROUND FACILITIES FOR THE EASTERN LONG ISLAND EXTENSION PROJECT

State	County	Facility	Approximate Milepost	Permanent/ Operation ROW (acres)	Temporary/ Construction ROW (acres)	Total Construction ROW
NY	Suffolk	Meter Station	29.1	0.23	3.63	3.86
		MLV-2[1]	17.5	NA	NA	NA
		MLV-3[1]	22.7	NA	NA	NA
		MLV-4[1]	29.1	NA	NA	NA
		Receiver Facility[2]	29.1	0.23	3.63	3.86
		Project Total		**0.23**	**3.63**	**3.86**

[1] No additional acreage impact as this facility lies within the pipeline permanent ROW.
[2] This acreage is combined with impacts for the meter station. Pig receiver will be housed within the meter station area; hence this acreage has not been added into the project total.

1.2.2.1 Valve Sites

Three onshore mainline valves would be installed in Brookhaven as shown in Table 1.2.2-1. The construction workspace for each valve would be located within the footprint of the pipeline construction ROW and, therefore, valve construction would not involve any additional land disturbances. Each valve site would also be located entirely within the pipeline permanent ROW. Each valve would be installed in accordance with DOT requirements and to facilitate the operation, repair and emergency shutdown of the pipeline system.

The valve sites at MP 17.5, 22.7, and 29.1 would include a graded area for adequate drainage, a mainline valve, blowdown and bypass valves. Iroquois proposes to install a perimeter fence around the above ground piping at these valve sites. The areas outside the valve sites would be totally re-vegetated and a

landscaping plan would be developed for the site, as required to reduce aesthetic impact to nearby residents or view sheds.

1.2.2.2 Meter Stations

One meter station would be constructed and connected to the ELI pipeline interconnection location with the cogeneration pipeline facilities located at the project terminus (MP 29.1). The construction workspace for this meter station would be located within a footprint of 168,168 sq. ft (3.86 ac). Upon completion of construction, the meter station will be located on an approximate 100-ft by 100-ft area. The temporary workspace used in the construction of the meter station would be allowed to revert back to pre-construction vegetative conditions. This meter station would include a graded area for adequate drainage and to house the meter and control buildings as well as a security chain link fence, flow control valve, gas measurement flow devices, meter station isolation, maintenance, and by-pass valves, SCADA equipment and communications links, and appurtenant or related facilities.

1.2.2.3 Marine Tap Interconnection

One marine tap facility would be constructed to interconnect the ELI pipeline to Iroquois' 24-inch mainline in Long Island Sound. The construction workspace for this interconnection would be located within a footprint of 60,000 sq. ft (1.4 acres). Upon completion of construction, the marine tap interconnection will be located on an approximate 5,625 sq. ft (0.13 acre) area (Table 1.2.1-1). The temporary workspace use in the construction of the interconnection would be allowed to revert back to pre-construction conditions.

1.3 ENVIRONMENTAL COMPLIANCE, TRAINING, AND INSPECTION

Iroquois would incorporate environmental requirements in construction documents, would conduct environmental training, would employ environmental inspectors, and would provide routine monitoring during all phases of construction, clean up and restoration.

Iroquois would develop spread-specific environmental requirements that would be part of the construction bid documents. These environmental documents would include the FERC Wetland and Waterbody Construction and Mitigation Procedures (with approved exceptions), the FERC Upland Erosion Control and Revegetation Plan (with approved exceptions), the FERC certificate conditions, and other environmental conditions and requirements. During pre-bid meetings with construction contractors, Iroquois would communicate to prospective contractors the environmental requirements for this project. Pre-bid communication with contractors, combined with the proposed contents of the construction contracts, would assist contractors to incorporate applicable requirements into their bids. If a contractor is in violation of an environmental requirement during execution of duties on the behalf of Iroquois, Iroquois would demand immediate correction of the problem, issue a stop work order if necessary, resolve any discipline issue with the contractor, and make appropriate agency notifications as needed.

Before construction begins on each spread, Iroquois would conduct environmental training for the inspectors to familiarize them with the specific conditions and issues associated with the particular spread. Separate training of contractor personnel would also be performed to familiarize personnel with the environmental requirements of this project. As new personnel are assigned to a particular spread, Iroquois would conduct training for these personnel as well.

Iroquois considers the role of the Environmental Inspection group to be a critical part of the Construction Management Team. During construction, Environmental Inspectors have the authority to assess and evaluate any construction related activity to confirm compliance to the environmental conditions of local, state or federal agency permits or certificates.

Environmental Inspectors would observe and report on the day-to-day activities of the Construction Contractors that relate or may affect a condition of an environmental permit or certificate. Environmental Inspectors would attend daily meetings as necessary. Environmental Inspection for this project would report to Iroquois Environmental Resources Department and would keep the Chief Construction Inspector aware of environmental related activities of the construction contracts. The Environmental Inspectors and members of Iroquois' Environmental Resources Department have stop work authority during all phases of construction.

Iroquois would be responsible for the selection, training, employment and guidance of the personnel on the Environmental Inspection Team. The duties of the Environmental Inspectors are to monitor and report on those activities designated as environmental scope of work in the construction contracts such as erosion control, re-vegetation, wetland signage, environmental permit compliance, threatened and endangered species protection, and fencing at environmentally sensitive sites.

1.4 CONSTRUCTION PROCEDURES (Note: This section is for descriptive purposes only. Actual equipment and methods may vary in the field.)

1.4.1 Offshore Construction Procedures

This section describes the processes required to install the offshore portion of the project. Where construction methods are described, actual equipment and techniques may vary in the field. In broad terms, after receipt of appropriate permits, the following construction operations will commence: site preparation, pipeline installation (including welding), non-destructive examination, coating of completed welds, pipeline lowering, hydrostatic testing, and dewatering. Potential additional tasks that require construction techniques specifically addressed within this Resource Report may include sandbagging and placement of concrete mats at foreign pipeline and cable crossings.

1.4.1.1 Mitigation of Underwater Features along Proposed Route

The process of selecting the proposed Iroquois pipeline route was based on information obtained in numerous data gathering surveys in the field, results of literature searches, review of public records, discussions with installation contractors, and conversations with various regulatory and citizen groups. This work enabled Iroquois to refine the design of the proposed route to minimize disturbance to marine life and commercial/recreational activities in consideration of the constructability of the facilities. The results of the field surveys are summarized in the Hazard Route Survey Reports (Volumes IV of this application). Geophysical and geotechnical survey vessels were employed along the route. Experienced survey engineers and geophysicists modified the route on a real-time basis as the survey data came in from the field.

1.4.1.2 Crossings

General

The marine pipeline would cross several existing communications cable utilities, termed foreign lines herein. The following types of foreign lines would be crossed:

Detection of Foreign Lines

The marine survey carried out in 2001 included a magnetometer survey along the entire pipeline corridor. The highly sensitive magnetometer used was capable of detecting any object causing a change in the local magnetic field on or below the seabed. This included ferro-magnetic objects such as pipelines, cables, debris, magnetic fields induced by electric current, and changes in the natural magnetism of the underlying rocks. In addition, sidescan sonar was used to obtain high-resolution images of the seabed surface. This instrument was able to detect foreign lines on or above the seabed. It also detected the trenches in which some foreign lines have been buried. The magnetometer and sidescan surveys were correlated with the known positions of foreign lines, as reported on the NOAA charts and other sources.

Following are the most important foreign lines detected (confirmed or under investigation) (see Table 1.4.1.2-1):

TABLE 1.4.1.2-1
FOREIGN LINES IDENTIFIED DURING THE HAZARD SURVEYS

Cable	Approximate Milepost	Easting	Northing	Water Depth (ft)	Crossing Intersection (Degrees)
ATT[1]	7.8	2204653.53	14927941.3	93	50-60°
Flag Atlantic[2]	10.8	2213233.84	14914692.6	114	60-70°
MCI[1]	14	2222521.20	14900352.3	82	70-80°

[1] These cables provided no magnatometer response (cable positions only approximate).
[2] This cable had a magnatometer response from 5-12 gammas. A plow scar was identified indicating the cable is newly installed

Crossing of Foreign Lines

The owners of confirmed foreign lines would be contacted, as would the authorities having regulatory authority. After initial fact-finding sessions, Iroquois would propose detailed crossing methods to the appropriate foreign line owner/operator or regulatory authority.

1.4.1.3 Site Preparation

Iroquois anticipates that preparation of the offshore construction ROW prior to arrival of pipelaying equipment would be limited to locations of proposed pipeline crossings and locations of irregular bottom relief.

1.4.1.4 Pipeline Installation

The pipeline would be installed by a laybarge designed especially for this type of marine construction. See Section 1.4.1.8 for descriptions of the laybarge and its support vessels.

Normal Pipelay in Open Water (Note: For descriptive purposes only, actual equipment and methods may vary in the field)

The laybarge would be a floating work platform. The pipe joints would be moved on assembly-line conveyors and welded together to make one continuous pipeline. Each pipeline weld would be inspected to verify its integrity.

At welds, corrosion coating will be added and the gap in the concrete coating at welded field joints would be filled with quick-setting concrete or other suitable material. The purpose of the filler would be to replace weight lost by the gap in the concrete, and to provide a continuous protective coating around the pipeline.

At designed intervals, a pipe joint with a pre-installed sacrificial anode would be inserted into the pipeline. The anodes are almost flush with the outside diameter of the concrete coating. The anodes provide cathodic protection, which protects the pipeline against corrosion. Where each station in the assembly line has completed its task, the laybarge would advance, a new pipe would be added to the line, and the assembly process would be repeated.

The laybarge would advance by pulling on mooring anchors. The anchors would be placed in the desired position by anchor-handling tugs. Bow anchors usually extend some several thousand feet ahead of the laybarge. These provide most of the traction for pulling the barge forward. In addition, breast anchors and stern anchors provide lateral stabilization and holdback, respectively.

If necessary, an escort vessel may accompany the laybarge. Its purpose would be to ensure pleasure craft and commercial vessels sharing the site are kept fully aware of the construction work and any temporary clearances they may have to observe.

Pipelay Installation at Shoreham Shore Crossing

The process above describes normal advance of the laybarge in open water. However, special procedures would be used where the pipeline crosses the shoreline at Shoreham. For a discussion on the trench excavation methods see Section 1.4.1.5. When the open-cut trench has reached the design depth, the laybarge would position itself aligned with the intended route of the pipeline. A pipeline string would be made up on the laybarge (as described above). One end of a steel cable would be attached to a pullhead at the start of the string, the other end to a winch placed onshore. (Alternatively, the cable may be passed around a return sheave onshore and back to a winch on the laybarge). As pipe joints are welded on, the winch pulls the pipeline off the barge into the prepared trench. The barge remains stationary during this pipe pull. When the pullhead reaches the shore, the process is modified: the pipeline remains stationary while the laybarge moves away, laying pipe as it goes.

1.4.1.5 Pipeline Lowering

The term "pipeline lowering" refers to the processes used to install the pipeline below the natural bottom of the seabed where applicable. The methods for lowering pipelines include dredging prior to pipeline installation, jetting or plowing from a towed or moored vessel, diver hand jetting and mechanical pumping of the bottom material.

The marine pipeline will generally be installed below the natural seabed level. In certain locations, the pipeline may be covered with material, such as clay, silt, sand, or stone to fill the trench over the pipeline. These measures will be taken based on the consideration of pipeline protection with regard to wave and current forces, seabed erosion, damage by foreign objects, and other secondary loading events.

The terms used in this Section are defined below:

Trenching: Removal of material from the seabed along the pipeline alignment, to a specified elevation below the natural seabed level. Trenching does not imply that the pipeline will be backfilled. The depth of trenching is measured from the bottom of the pipeline to the original seabed level.

Pre-trenching: Trenching prior to pipelay is used when the pipeline has to be installed in a prepared trench such as a shore approach or a narrow trench through stiff material.

Post-trenching: Trenching after pipelay. In this case, the pipeline is present on the seabed during the work. The trenching equipment would ride over the pipeline or on it while removing soils from underneath it and from both sides.

Backfill: Placement of soil by construction equipment (as opposed to allowing it to fill by natural processes). The type of backfill would vary, and may be the soil material temporarily stockpiled adjacent to the trench during dredging, or soil of a different type brought in from another location. Backfill may or may not restore the seabed to its original elevation relative to the surrounding undisturbed grade.

Burial: Trenching followed by backfill. Burial implies that the pipeline is covered at least partially.

Cover: The depth of backfill above the pipeline, measured from the top of the pipe to the natural seabed grade.

Depth of burial: Same as cover.

Natural infill: Filling in of the pipeline trench by natural processes such as transport of sediment on the seabed by ambient currents, or settlement of suspended sediment from the water column. The time taken for natural infill is measured in months to years.

The trenching methods for each specific zone of the pipeline will ultimately be determined during construction as to ensure the ability to complete the project on a timely basis. It is important to preserve the flexibility to select from a variety of trenching methods dependent on actual conditions encountered in the field. The seabed soils along the marine pipeline vary significantly along the route. This range includes clays, silts, sands (loose on surface, firmer at depths of 5-10 feet and greater), glacial till (mixture of clay, silt, sand, gravel and boulders, and crystalline rock (mainly gneiss and schists).

Trenching Methods

Because of the variability in seabed material, different trenching methods may be used in different areas. The trenching methods to be considered are listed and described below. Actual methods used will be dependant upon results achieved in the field and subject to variability of site conditions. Because it is not feasible to mobilize many different types of dredging equipment, Iroquois' construction contractor will select the methods most likely to result in timely project completion prior to contract award. It shall be the responsibility of the construction contractor to be capable of providing alternate trenching methods as required depending upon actual conditions encountered in the field.

Dredging

Dredging is accomplished by cutting action followed by removal of material by pumping or mechanical displacement. Cutting heads are varied to suit the soils conditions along the route. Dredging can be used in soil conditions except rock.

Dredging can only be used for pre-trenching (before pipeline is laid). Dredges can be deployed in a wide range of ways to suit site conditions and environmental restraints. Floating dredges are best deployed in sheltered waters (close to shore) of less than 100-foot depth. Clamshells used for dredging may be deployed from a floating vessel (workbarge), from a fixed work platform atop the sheetpile wall (for as shore approach) or simply from tracked vehicles working on the beach (upper sections of shore approach).

Trenching Machine

A self-powered, usually tracked vehicle would pass over the seabed, forcing a cutting device into the soil or soft rock. The dislodged material is lifted by mechanical action or (hydraulic) suction and deposited to either side of the trench. A trenching machine is most suitable for use in stiff soils or poorly consolidated (weak) rock, or in areas not accessible to dredges and not hard enough to justify blasting.

Jetting

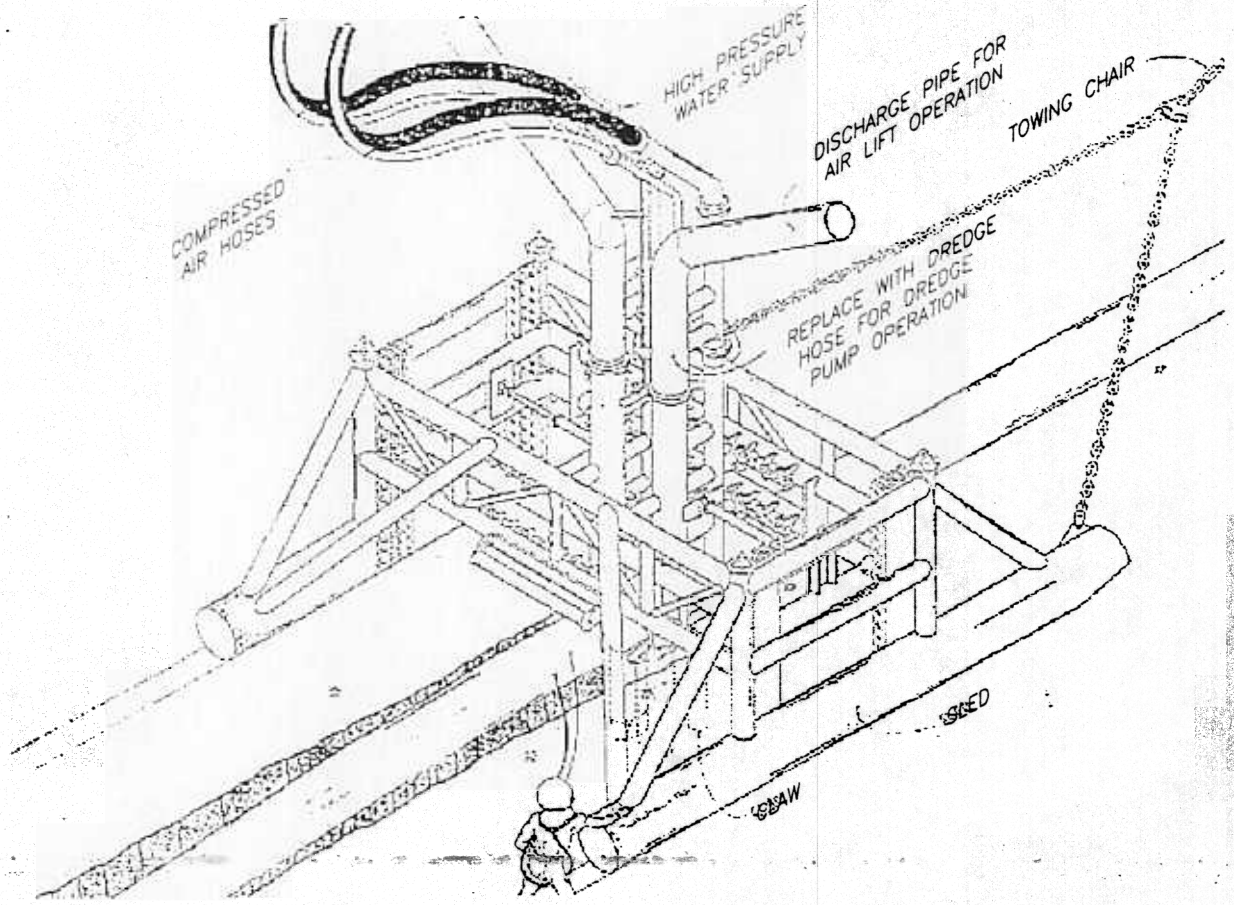
The jetting method would be used after the pipeline is laid on the sea bottom. Jetting requires water to be pumped at high pressure through pipe nozzles, which partially encompass the pipeline, to displace the soil around the pipeline. A high volume of air may be used in conjunction with the high-pressure water. The air is pumped into "air lifts" which are located adjacent to the water jet nozzles. The rising column of air bubbles creates a vacuum at the base of the airlift that assists the water jets by lifting the soil away from the pipe. The displacement of the soil around the pipeline would allow the pipeline to settle to the bottom of the trench. During jetting operations, localized infilling of the trench occurs immediately behind the jetting operation, providing early partial burial of the pipe. The longer-term flushing influence of the tidal currents and wave action generated from storm activity will also provide natural infilling of the trench.

The jetting equipment may be towed behind a barge. The jetting nozzles and air lifts are mounted on a pivoting arm which is suspended either over the side or through an open slot on the barge (Figure 1.4.1.5-1).

Other methods, which may be used to lower the pipeline below the seafloor, particularly close to foreign pipeline crossings, include hand jetting and use of a submersible pump. Similar to the jetting equipment, a diver can use high-pressure water jets and/or airlifts to remove soil from around the pipeline In this case, a submersible pump is normally an open-bottomed, centrifugal pump driven by either an electric or hydraulic motor. The soil is pulled off the bottom by the suction created by the spinning impeller. A hose is used to discharge the soil a short distance away. These pumps can be effectively utilized either before or after the pipeline has been installed. This method is limited in terms of the amount of pipeline trenching that can be accomplished in a given period of time and would accordingly be used on a limited basis. If feasible, plowing of the pipeline may be attempted using a fabricated plow structure to create a pipeline trench.

Jetting causes soils to be fluidized by water jets, and the soil-water medium is removed by suction pump or air lifts. The fluidized soil is jetted clear of the trench. Jetting is appropriate where sand is the principal jetting material. The range may be extended to silty clays, although no single tool operates equally well in these materials. Jetting is not suited to so-called "sugar sand" (granular, cohesionless, well-rounded sand) because it tends to flow too easily back into the trench. In certain soils, jetting also achieves backfill, making it in effect a trenching method. This is achieved in liquefiable soils (such as silty, fine sands), where the pipeline's weight causes it to sink into the soil.

Jetting equipment consists of two main components: floating work barge and submerged jetting machine. The work barge supplies power, control and pressurized water to the jetting machine on the seabed. Water for fluidizing the soils is provided by high-pressure pumps. Alternatively, submerged dredge pumps may be fitted on the jetting machine.



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LEGEND

IROQUOIS EASTERN LONG ISLAND EXTENSION
JET SLED DETAIL

Iroquois
GAS TRANSMISSION SYSTEM

Figure 1.4.1.5-1

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The jetting machine either rides on the seabed (a jet sled) or rides on the pipeline guided by rollers. In either case, the work barge provides the pull force for forward motion. The jetting machine lifts the pipeline upwards as it moves. Material is removed from underneath and from the sides of the pipeline by the water jets and pumps, as described above. At the end of the pass, the pipeline is lowered several feet (depending on soils conditions). Multiple passes are required if trenching depths greater than about 3 feet are required. The extent of trenching that can be achieved during a single pass is dependent upon actual soil conditions and pipe freestress bending properties.

The jets are usually located facing to the front on the leading edge of the machine, also extending under the pipeline. The water is emitted from nozzles typically 1/2 inch to 7/8-inch diameter. Discharge pipes have inlets under the pipeline. The outlets are elevated above the pipeline and are pointed upward and sideways, to cast the soils away from the trench on both sides. This removal of material may be affected by air lift, water eduction, or submerged dredge pumps.

Plowing

Plowing involves passive displacement of soils by the plowshare as it is pulled forward. Plowing uses pull-barge force to overcome resistance of the plow being drawn through soil and is best suited to consistent silty clay. Plowing may not be feasible in highly variable or certain unsuitable soil conditions. Plowing can be used for pre-trenching or post-trenching. The pull force is supplied by a special pull barge, or the laybarge itself (if construction sequence permits). Steering is normally accomplished by offset of tow angle of the ship, or by articulated steering.

Pre-trenching plows are pulled along the required pipeline centerline, riding on flat sleds (skids). The plowshare penetrates the seabed and opens the trench, depositing the material to either side in a heaped "windrow". Post-trenching plows ride on the pipeline, supported by rollers.

Blasting with Shape Charges

Shape charges are placed directly on the seabed and detonated. The charges penetrate and fragment the rock and displace it upwards and outwards. This material is then removed by conventional trenching methods such as rock-bucket dredge, grab or air lift. A cushion of granular material such as sand, about 1 foot thick, is placed in the bottom of the trench to provide even support for the pipeline. Shape charges are used in cemented conglomerates, sandstone, siltstone, limestone, soft and fractured rock. Divers working from a support vessel overhead carry out the operation. The charges are placed on the seabed using a frame or template producing a pattern of about 3-foot by 3-foot spacing. The detonation of the charges is followed by dredging to remove the loosened material from the bottom of the trench. Increased depth is achieved by placing a second or third frame. This operation is generally confined to calm seas in sheltered areas.

Drill and Blast

Drill and blasting is similar to that of shape charges, but the explosive is confined inside the holes drilled into the rock. This method is used only where shaped charges are not effective, for example in hard, crystalline rock (granite) and for relatively short sections, where re-routing is not an option.

Rock Saw

The rock saw establishes a trench in hard rock without using explosives. The rock is parted by cutting action using extremely hard-surfaced metal tools. The loosened rock fragments would then be removed similar to conventional dredging methods.

Backfilling

Backfilling, where desired, may occur concurrently with trenching (see Definitions above) or separately. The clamshell (described above) places the backfill material directly on the pipeline. Material can also be placed by cutter-suction or trailing suction dredge. The dredge would in effect reverse the process, pumping material into the trench. The material may be taken from spoil material temporarily stockpiled alongside the trench, or from hoppers on the vessel, or from a storage vessel moored alongside. Backfilling may also be accomplished by use of a burial plow. At most locations, the pipeline within the trench will be allowed to backfill naturally through sediment deposition.

1.4.1.6 Subsea Connections

Mid-line Tie-ins

Since the laybarge must remain floating clear of the shoreline, pipelay must proceed from the shore outwards at both ends. Thus at least one mid-line tie-in must be made. In the base-case plan, this tie-in would be the one joining the main pipeline to the Shoreham shore crossing. If other mid-line tie-ins should be required, the procedure would be essentially the same as that at Shoreham. If necessary in this case, an additional work vessel may provide extra lift to the pipeline to ensure the lengths are fully supported.

The marine section of the pipeline would be pressure tested to test its capability to withstand operating stresses with ample safety margin. For scheduling reasons, it is anticipated that the marine pipeline would be tested separately from the overland pipeline.

1.4.1.7 Work Force

Iroquois anticipates that the total work force to construct the offshore component would be approximately 250 workers. This total would consist of approximately 200 workers on the marine lay barge

spread, about 40 workers supporting the operations onshore, and about 10 inspection and management personnel overseeing the offshore operations.

1.4.1.8 Pipeline Installation Spread

The pipeline would be installed by a laybarge designed especially for this type of marine work. A laybarge of the type likely to be used on this project are shown in Figures 1.4.1.8-1 and 1.4.1.8-2.

The laybarge and its support vessels are termed the pipeline spread. It includes:

Laybarge;
Survey vessel;
Two or more anchor handling tugs;
Two or more pipe supply barges;
Escort boats (if required);
Personnel carriers; and,
Utility launches and other marine support equipment as required.

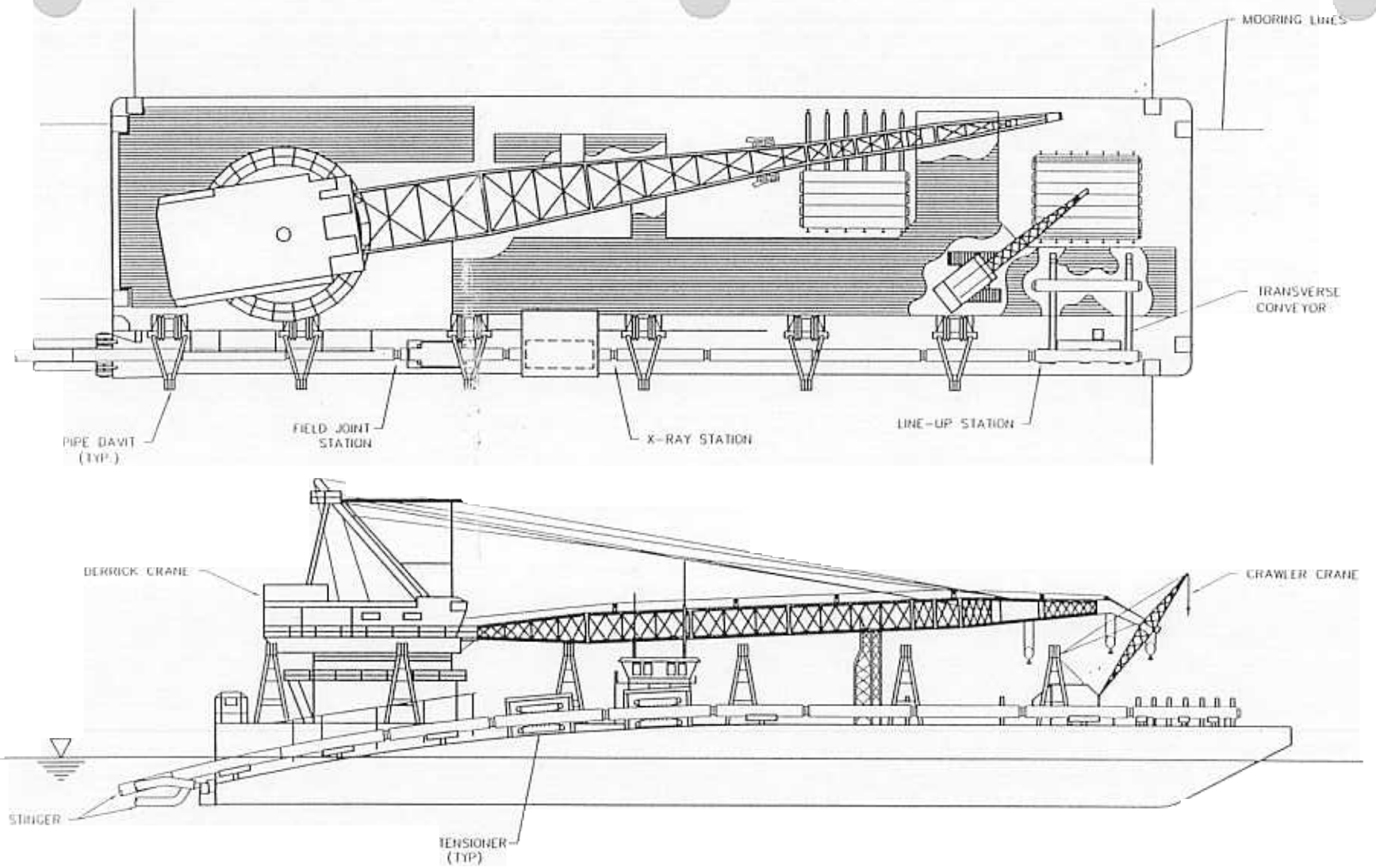
Laybarge

The laybarge has a wide range of highly specialized marine construction equipment. The principal equipment usually includes:

Heavy-duty derrick (crane);
Pipe storage racks;
Pipe conveyor system;
Welding and non-destructive testing stations;
Hydraulic Pipe tensioner (s);
Hinged support ramp for lowering pipeline off the stern (the stinger);
High-capacity pulling winch;
Pipe lifting davits; and,
Diving support facilities.

The vessel is highly autonomous and can work offshore for months without port calls. It has sleeping quarters, messing, medical, recreation and other facilities necessary to support continuous work offshore. It works round-the-clock, usually alternating in two 12-hour shifts.

The core operating crew specializes in offshore pipeline construction and typically has performed similar work in many U.S. and overseas locations. Most of the crew lives aboard. Personnel and materials are brought to the laybarge by support vessels or by helicopter.



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LEGEND

IROQUOIS EASTERN LONG ISLAND EXTENSION
TYPICAL OFFSHORE PIPELINE
DERRICK/PIPE LAY BARGE

Iroquois
GAS TRANSMISSION SYSTEM

Figure 1.4.1.8-1

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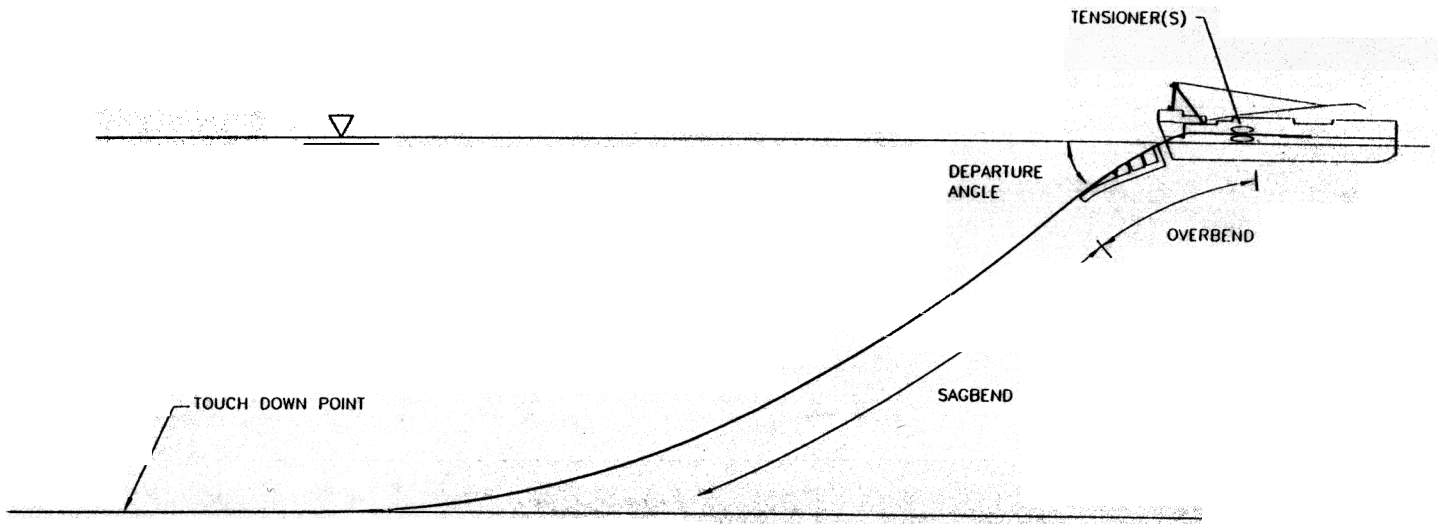

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LEGEND

IROQUOIS EASTERN LONG ISLAND EXTENSION
OFFSHORE PIPELINE
TYPICAL LAYBARGE PROFILE

Iroquois GAS TRANSMISSION SYSTEM

Figure 1.4.1.8-2

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PLOT DATE: 10/06/01

Survey Vessel

The survey vessel is anticipated to be in the 125-foot class or smaller. Survey vessels of this type are typically equipped with the following basic survey instruments:

High-accuracy radio positioning
Echosounder
Sidescan sonar
Magnetometer
Pipeline and cable locator
Navigation and positioning equipment and other survey support equipment

Anchor Handling Tug

The anchor handling tug would likely be in the 2,500-hp class. Its main function is to deploy and pick up mooring anchors, but it is also used to tow material barges, for emergencies, and other tasks. These tugs typically have the following equipment:

Navigation and positioning equipment
Heavy-duty winch capable of lifting mooring anchors
Heavy-duty wire rope and shackling and other support equipment

Pipe Supply Barge

The pipe supply barges are usually simple flat-top barges that range from 100 to 300 ft in length. They typically have no propulsion, but are hauled by the anchor handling tugs. Line pipe and other materials are loaded onto the barges at a suitable port, hauled offshore to the laybarge, and offloaded by the barge's derrick.

Escort Boat

The escort boat would likely be a vessel in the class of a harbor pilot boat. It accompanies the pipelay vessel, if deemed necessary, to keep other vessels fully aware of the barges' movements. Should any vessel (such as a pleasure yacht) inadvertently enter the construction area, the escort boat may sail out to that craft and advise safety procedures.

Personnel Carriers and Utility Launches

These are common utility vessels of small class capable of transporting personnel and light materials to and from shore. They are typically chartered from local areas.