

## 4.0 ALTERNATIVES

We evaluated alternatives to the ELI Project to determine whether they would be reasonable and have less environmental impact than the proposed action. These alternatives include the no-action or postponed-action alternative, system alternatives, route alternatives, route variations, and aboveground facility alternatives. The full range of alternatives considered is discussed below.

The evaluation criteria for selecting potential alternatives with less environmental impact are:

Technical and economic feasibility and practicality;

Significant environmental advantage over the proposed project<sup>1/</sup>; and

Meeting project objectives.

The FERC has three alternative courses of action in processing an application for a Certificate. It may: (1) grant the Certificate with or without condition; (2) deny the Certificate; or (3) postpone the action pending further study.

### 4.1 NO ACTION OR POSTPONED ACTION ALTERNATIVE

If FERC postpones or denies the application, the short-and long-term environmental impacts identified in this EIS would not occur. If FERC were to select the no-action alternative, however, the objectives of the proposed project would not be met and there would be an insufficient supply of natural gas for existing commercial, industrial, or domestic users. Although it would be purely speculative, and therefore beyond the scope of this EIS, to attempt to predict what actions may be taken by policy makers or end users in response to the no-action or postponed-action alternatives, the unmet demand on Long Island could be partially offset by conservation efforts. Conservation would probably reduce demand incrementally in response to increased prices and public awareness. In most cases, however, customers would either experience energy shortages or would substitute with alternative fuels. Options for alternative energy sources such as oil, wood, coal, solar, or wind are extremely limited on Long Island. Increased use of alternative fuels such as oil, wood, or coal would generally result in higher emission rates of NO<sub>x</sub> and SO<sub>x</sub> than would have been the case with natural gas. Replacement of the natural gas by other energy sources is also impracticable in the time frame required by the end users. Solar power, while very clean, is not a reliable energy source in the project area. Likewise, it is unlikely that wind power could be sufficiently developed in the project area to be a viable alternative to the proposed project. We do not consider liquified or compressed natural gas as viable alternatives to the proposed action because of the significant new infrastructure that would be required; the long lead time that would be needed to design, permit, and construct these facilities; and the fact that there are no such projects currently under consideration.

It is difficult to determine the impact of a pipeline project on greenhouse gas emissions; however, credible estimates of greenhouse gas emissions can be developed based upon reasonable

<sup>1/</sup> We defined "significant environmental advantage" based on guidelines provided in CEQ's *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* to include both the context and intensity of the environmental impacts being compared (see 40 CFR 1508.27).

assumptions regarding the use of the natural gas delivered by the pipeline and what energy resources would likely be utilized if the gas from the pipeline was not available. Iroquois's proposed project would provide 175,000 Dth/d of natural gas. If the 175,000 Dth/d were replaced with other fossil fuels, greenhouse emissions could potentially increase by 1,458,000 metric tons of carbon dioxide per year, depending on the alternate fuel assumption made in the analysis.

This analysis only evaluates the potential change in greenhouse gas emissions for the ultimate end user of the natural gas volumes associated with the project. Greenhouse gas emissions are also related to the production, processing, transmission, and distribution of natural gas as well as the alternative fossil fuels.

### 4.2 SYSTEM ALTERNATIVES

System alternatives differ from alternative pipeline routes (i.e., route alternatives or route variations) in that they make use of other existing, modified or planned pipeline systems to meet the stated objectives of the proposed project. A system alternative would make it unnecessary to construct all or part of the proposed project, although some modifications to another existing pipeline system may be required to increase its capacity or, conversely, another entirely new system may need to be constructed. Although these modifications or additions could result in environmental impacts, the impacts may be less, similar to, or greater than the impacts that would result from the proposed project. The purpose of evaluating system alternatives is to determine whether potential environmental impacts associated with construction and operation of the proposed facilities could be avoided or reduced, while still allowing the stated objectives of the proposed project to be met.

Iroquois has the only existing interstate natural gas pipeline from Connecticut to Long Island. However, another pipeline project we are evaluating is proposed by IEPC and AGTC known as the Islander East Pipeline Project (Docket No. CP01-384-000), and would also service the Long Island, New York market. The Islander East Pipeline Project would include 27.4 miles of existing pipeline in Connecticut, a new 12,028 hp compressor station, construction of approximately 45 miles of new 24-inch pipeline from Connecticut to Long Island, and construction of various aboveground facilities including meter stations and mainline valves. The Islander East Pipeline Project would be designed to initially provide 275,000 Dth/d of natural gas to two proposed power plants and other residential and commercial users service by KeySpan in Long Island and New York City. We look at system alternatives in sections 4.2.1, 4.2.2, and 4.2.3 that would use the Islander East Pipeline Project. We have also looked at a system alternative using the planned Tennessee Connecticut-Long Island Lateral Project in section 4.2.4, and system alternatives that avoid Connecticut by making deliveries through New York or New Jersey in section 4.2.5.

In a February 19, 2002 filing, Iroquois stated that it does not believe that current and future market data support building two pipelines to eastern Long Island (specifically Islander East and ELI Projects). Because the Commission has not yet determined if Islander East and ELI Projects are competing projects and has not issued a PD for the ELI Project, we have looked at two system alternatives. One would transport the total volume of gas (435,000 Mcf per day) from both proposals, and one would only transport Islander East's proposed firm volumes (260,000 Mcf per day, which is approximately equivalent to Iroquois' proposed deliveries through the ELI Project and Islander East's deliveries to the two proposed power plants).

### 4.2.1 One-Pipe System Alternative

The information used in our analysis on this system alternative is the same information that was available to the FERC for use in preparing its final EIS for the Islander East Project. The specific locations of the facilities required for the One-Pipe System Alternative are speculative, since numerous facility configurations and loop locations could provide the same capacity. However, in order to analyze the system alternative we must choose a configuration. Since no company has proposed to construct a system alternative, we are choosing the configuration for which we have the most information.

We have examined the One-Pipe System Alternative as an alternative to building both the ELI Project and the Islander East Project. This alternative would transport the total volume of gas proposed in both projects, about 435,000 Mcf per day. Additional information will be included in the final EIS.

The One-Pipe System Alternative would require the construction of:

16 miles of 36-inch-diameter pipeline loop between Brookfield and Milford, Connecticut paralleling Iroquois's existing pipeline;

29.1 miles of 24-inch-diameter pipeline starting in Long Island Sound near Milford, Connecticut and ending in Brookhaven, New York (the onshore portion of this alternative is nearly identical to Islander East's route);

5.6 miles of 24-inch-diameter pipeline lateral in Suffolk County, New York (the Calverton Lateral as proposed by Islander East);

a new 20,000 hp compressor station and gas cooler in Milford, Connecticut;

reconfiguration of the Brookfield Compressor Station in Brookfield, Connecticut, and

meter stations in Brookhaven and Calverton, New York.

Figure 4.2.1-1 shows the location of the Long Island Sound crossing and the Milford Compressor Station and Figure 4.2.1-2 (includes maps 1-7) shows the location of the loop.

Table 4.2.1-1 compares the facilities required for the One-Pipe System Alternative with the facilities required for both the ELI and the Islander East Projects. The only facility required for the system alternative which has not been proposed in either the ELI Project or Islander East project would be the 16 miles of 36-inch-diameter pipeline loop in Connecticut.

Using the One-Pipe System Alternative would eliminate the construction of dual, parallel pipelines across LIS and also on Long Island. Since the Long Island portion of this system alternative is identical to Islander East's proposal (12 miles of 24-inch-diameter mainline and the Calverton Lateral) the environmental impact would be as described in the Islander East FEIS issued

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.

TABLE 4.2.1-1  
 Comparison of the Facilities Required for the One-Pipe System Alternative with the  
 Facilities Required for Both the ELI and Islander East Projects

Facility	Location	One-Pipe System Alternative	ELI Extension and Islander East Projects
Mainline Pipeline	Onshore Connecticut	none	10.2 miles
	Onshore New York	12.0 miles	24 miles
Mainline Pipeline	Offshore Connecticut	7.5 miles	18.5 miles
	Offshore New York	9.6 miles	21.2 miles
Lateral	Onshore New York	5.6 miles	5.6 miles
Looping	Onshore Connecticut	16.0 miles	none
Compressor Stations	Connecticut	1-20,000 hp (Milford) <sup>1/</sup>	2-totaling 30,310 hp (Milford and Cheshire)
Meter Stations	Connecticut and New York	2	4

<sup>1/</sup> Any system alternative would also require reconfiguration to the Brookfield Compressor Station

in August 2002 (FERC/EIS - 0143F). All 435,000 Mcf per day would be transported through one 24-inch-diameter mainline pipeline following the shorter offshore Iroquois route.

Compared to the Connecticut on-shore portion of Islander East (Iroquois has no pipeline construction onshore in Connecticut), the One-Pipe System Alternative would require the construction of a larger 36-inch diameter and longer (by 5.8 miles) pipeline loop through areas of steep, largely forested terrain. The steep slopes would require extra workspace and increase the potential for erosion and sedimentation. Substantial portions of the route have been developed for residential uses subsequent to the 1991 installation of the Iroquois mainline and are characterized by shallow depth to bedrock. The One-Pipe System Alternative would increase the potential for adverse environmental effects in Connecticut by utilizing larger (36-inch-diameter) pipe over a longer (16-mile)-distance.

The 16-mile loop would traverse four Fairfield County communities: the Town of Brookfield, Town of Newtown, Town of Monroe and the City of Shelton. Numerous new developments, requiring approximately 38 road, utility, and railroad crossings, would be impacted by the 16-mile loop, which could result in siting issues and require multiple easements. Data from Census 2002 indicates that Newtown experienced a 20.5 percent increase in population over the past decade, the greatest growth in terms of net population gain and population change of any community in Connecticut. A majority of this growth has been concentrated in the northern and eastern portions of the town, which are the areas through which Iroquois' mainline traverses.

Based on data included in Iroquois' 1991 D & M Plan, blasting would be required along about 6.3 miles of the new loop, including through areas near existing residential development. This is approximately 5 times the length that blasting is anticipated for under the proposed route for the ELI Project and Islander East Project.

A review of Iroquois' mainline route adjacent to which the 16-mile loop would be located indicates that about 3.4 miles of wetlands would be crossed. Prior to the installation of the Iroquois mainline, most of these wetlands were forested. Installation of the One-Pipe System Alternative would affect additional portions of the same forested wetlands. Extensive forested wetlands associated with the Means Brook watershed would be among those crossed. The loop would also traverse 66 perennial and intermittent streams, including Pond Brook, the Pootatuck River, Halfway River, and Boys Halfway River. Some of these streams (*e.g.*, Pond Brook, Pootatuck River) support coldwater fisheries and approximately 25 have a water quality classification of A or AA. The proposed ELI and Islander East projects route would cross only 12 waterbodies, 10 of which are classified as Class A. For approximately 2 miles in Newtown, the One-Pipe System Alternative would traverse the federally-designated Pootatuck Sole Source Aquifer. This aquifer is one of only two sole source aquifers in Connecticut that have been designated by the U.S. Environmental Protection Agency (EPA) pursuant to the Safe Drinking Water Act. No aquifers would be crossed along the proposed ELI or Islander East pipeline project route in Connecticut.

Prominent land use features adjacent to or crossed by the new loop include the Paugussett State Forest in Newtown; Pomperaug Trail along the Boys Halfway River in Monroe; and Jones Tree Farm and the Shelton Land Trust in Shelton. The One-Pipe System Alternative would traverse about a mile through Shelton Land Trust properties located both north and south of Leavenworth Road (*i.e.*, State Route 110).

The original Iroquois mainline traversed areas that were found to be highly sensitive for the location of archaeological sites. Prior to the 1991 Iroquois construction, impacts to various significant sites were avoided or minimized through minor route changes or by data recovery (excavation) along the ROW prior to construction. However, significant archaeological sites may remain adjacent to the existing Iroquois ROW, in areas that would be disturbed by the construction of the One-Pipe System Alternative. Detailed field investigations by qualified archaeologists would be required to determine the specific significance of potential cultural resource impacts.

Table 4.2.1-2 compares the environmental factors affected by construction of the One-Pipe System Alternative with the environmental factors affected by the construction of both the Iroquois ELI Extension and the Islander East Pipeline Projects. This table does not include the impacts associated with the construction of the Calverton Lateral, since it would be constructed in either case and the impacts would be the same in either case.

Using this configuration, the One-Pipe System Alternative would require the construction of less pipeline, about 28.8 miles, than the combined ELI Extension and Islander East Projects. Offshore, the system alternative would avoid the dual crossing of Long Island Sound which would be required by the construction of the two proposed projects. It would also reduce the crossing of shellfish leases by about 6,141 feet.

Onshore, the system alternative would cross fewer parks and land trust properties. It would also require less compression which would result in fewer emissions. It would cross more streams (46) and wetlands (20), although the length crossed would be similar to constructing the two proposed projects. The One-Pipe System Alternative would be within 50 feet of more residences (33) than the ELI Extension and Islander East Projects. The system alternative would also cross more areas potentially requiring blasting than the two proposed projects.

**TABLE 4.2.1-2  
Comparison of Environmental Factors Affected by the One-Pipe System Alternative and  
the Islander East and ELI Projects**

Environmental Factor	Unit	One-Pipe System Alternative	Islander East Project + ELI Project
<b>Onshore</b>			
Length onshore <sup>a</sup>	mi.	28	34.2
Adjacent to existing right-of-way	mi.	26.8	28.8
Permanent right-of-way (onshore)	ac.	176	239
Construction right-of-way (onshore)	ac.	312	428
Stream crossings	no.	66	20 <sup>b</sup>
Sole source aquifer crossings	no.	2	2 <sup>c</sup>
Wetland crossings	no.	63	43 <sup>d</sup>
Wetlands traversed	mi.	3.4	3.6
Residences within 50 feet of construction right-of-way	no.	74	41 <sup>e</sup>
Estimated areas of blasting	mi.	6.3	1.2
Special land uses crossed (parkland/land trusts)	no.	8	16
<b>Offshore</b>			
Length Offshore	mi.	17.1	39.7
Construction right-of-way (offshore)	ac.	2930	6036
Length Shellfish lease crossing	ft.	936	7,077

- a The Calverton Lateral is not included in any of these totals since it would be constructed in either case and the information would be the same in both cases.
- b Includes two separate crossings of the Peconic and Carmans Rivers.
- c Includes two separate crossings of the same aquifer.
- d Includes two separate crossings of the same wetlands on Long Island.
- e Seven of these residences may be disturbed on two separate occasions if both projects are constructed.

Based on our analysis, the One-Pipe System Alternative could be environmentally acceptable and may have less environmental impact than building both the ELI Project and the Islander East Project. It would reduce areal disturbance in Long Island Sound and Suffolk County, New York by about 60 percent. However, it would increase onshore impacts in Connecticut from the looping required on Iroquois' mainline, and some of this looping would occur near congested residential areas and steep terrain.

Iroquois is not proposing to build this system alternative and there is no application for this alternative before the Commission. In addition, the FEIS for the Islander East Project concludes that Islander East's proposal would be environmentally acceptable with appropriate mitigation. However, there are a number of non-environmental factors in addition to environmental impacts that the Commission will consider in its overall analysis of the public convenience and necessity before making its decision whether to approve the proposed action or any alternative instead of it.

#### 4.2.2 ELI System Alternative

In the event that the Commission decides one pipeline could serve the market for eastern Long Island, we have examined using Iroquois' proposed ELI Project instead of the Islander East Project to deliver 260,000 Mcf per day. Since the Commission has already issued a PD for the Islander East Project, the market volume was assumed to be 260,000 MCF per day. Additionally, since Islander East has one customer (AES Calverton) which could not be served by Iroquois' proposed facilities we are including the Calverton Lateral as part of this system alternative.

Because the volume of gas needed would be less than the One-Pipe System Alternative, less looping and a smaller diameter pipe across Long Island Sound is required for this system alternative. The ELI System Alternative would require the construction of:

7.0 miles of 36-inch-diameter pipeline loop between Brookfield and Sandy Hook, Connecticut; and

reconfiguration of the Brookfield Compressor Station in Brookfield, Connecticut;

The ELI System Alternative would involve the same types of environmental issues as described for the One-Pipe System Alternative discussed in section 4.2.1. However, because this alternative would involve only 7 miles (rather than 16) of new mainline loop, the environmental impacts would be substantially less than those described for the One-Pipe System Alternative. The new pipeline loop would cross through numerous new residential subdivisions, as well as 21 waterbodies (including Pond Brook and the Pootatuck River), about 27 wetlands for 0.9 mile, and 18 roads and utilities. The 7-mile loop would still cross areas of steep slopes and shallow depth to bedrock as described for the One-Pipe System Alternative and blasting would be required along an estimated 2.3 miles of this looping route.

TABLE 4.2.2-1

**Comparison of the Construction and Operational Impacts of the Milford and Brookfield Compressor Stations and the Cheshire Compressor Station**

<b>Environmental Factor</b>	<b>Milford Compressor Station (ELI System Alternative)</b>	<b>Brookfield Compressor Station (ELI System Alternative)</b>	<b>Cheshire Compressor Station (Islander East Project)</b>
<b>Noise</b>			
Nearest NSA	1,300 feet	600 feet	750 feet
Projected Noise Level at Nearest NSA	52 L <sub>dn</sub>	45L <sub>dn</sub> (attributable to new unit)	52 L <sub>dn</sub>
<b>Air Quality</b>			
SO <sub>2</sub>	5.7 tons per year (tpy)	0.3 tpy	1.4 tpy
NO <sub>x</sub>	47.7 tpy	24.1 tpy	39.1 tpy
CO	77.3 tpy	41.2 tpy	47.6 tpy
VOC	1.1 tpy	2.9 tpy	2.2 tpy
PM <sub>10</sub>	4.7 tpy	2.5 tpy	2.8 tpy
Existing Land Use	Industrial	open	Agricultural

Islander East's Connecticut mainline would be within 50 feet of 33 residences and cross about 12 streams. The onshore portion of this system alternative in New York is identical to Islander East's proposal. The environmental impacts of this segment are described in section 3.1 to 3.11 of the Islander East Final EIS issued in July 2002.

Our preliminary analysis of the ELI System alternative offshore pipeline indicates the crossing of Long Island Sound would be reduced by 5.5 miles compared to the Islander East Project. It also appears that the ELI System Alternative would avoid all but 935 feet of shellfish beds along the Connecticut coast.

As shown on Table 4.2.2-1 the emissions from the Milford Compressor Station would be greater than from the Cheshire Compressor Station. However, the noise level would be the same. The Milford Compressor Station would be in an industrial area which included a railroad, a landfill, and an asphalt plant. The Cheshire Compressor Station is in an agricultural field, bordered by forest and Interstate 91.

Based on our preliminary analysis, if the ELI System Alternative was constructed instead of either the proposed ELI Project or Islander East Project, the impacts would be similar, but they would only occur once on Long Island. Air emissions would increase due to the greater amount of compression at Milford (versus Cheshire). In Connecticut the impacts would be moved from the landowners along the Islander East mainline to those along the Iroquois loop. Impacts to Long Island

should be reduced since the crossing length would be reduced by 5.5 miles. However, the 7-mile loop in Connecticut would be located in heavily residential areas, resulting in a high potential for impacts to residences, siting issues, and requiring multiple easements. Therefore, we do not recommend this ELI System Alternative.

However, we also looked at a variation of the ELI System Alternative that includes additional compression instead of looping to provide the same service. Iroquois has stated it could do this alternative with additional compression, but has not supported this assertion with the amount or the location that would be needed to produce these volumes. Table 4.2.2-2 compares the facilities that would be required for the ELI System Alternative with the facilities required for the Islander East Project.

**TABLE 4.2.2-2  
Comparison of the Facilities Required for the ELI System Alternative with the Facilities  
Required for the ELI Project and Islander East Project**

Facility	Location	ELI System Alternative	ELI Project	Islander East Project
Mainline Pipeline	Onshore Connecticut	none	none	10.2 miles
	Onshore New York	12.0 miles	12.0 miles	12.0 miles
Mainline Pipeline	Offshore Connecticut	7.5 miles	7.5 miles	11.0 miles
	Offshore New York	9.6 miles	9.6 miles	11.6 miles
Lateral	Onshore New York	5.6 miles	5.6 miles	5.6 miles
Compressor Stations	Connecticut	1-21,000 hp (Milford)	20,000 hp (Milford)	10,300 hp (Cheshire)
Additional Compression	Connecticut	10,000 hp <sup>1/</sup> (Brookfield)	none	
Meter Stations	Connecticut and New York		2	3

<sup>1/</sup> The ELI Project would also require a reconfiguration of the Brookfield Compressor Station from mainline function on the Iroquois mainline, to a transfer function from the existing Algonquin mainline into the Iroquois mainline.

Using the ELI System Alternative with the additional compression scenario would eliminate the construction of 10.2 miles of new onshore mainline in Connecticut. However, it would require the construction of a new compressor station and the addition of a new compressor unit at an existing compressor station.

Since the onshore portion of this proposal in New York is identical to Islander East's proposal the environmental impact of this segment is described in section 3 of the Final EIS for the Islander East Pipeline Project (Docket No. CP01-784-000).

Our analysis of the system alternative offshore pipeline indicates the crossing of the Sound would be the same length. The ELI System Alternative and ELI Extension Project would open-cut about 1,000 feet of shellfish leases, avoiding direct impacts to other leases by tapping into Iroquois' existing pipeline offshore. Therefore, the offshore impacts would be the same for the ELI System Alternative (compression scenario) and the ELI Project. Islander East would open-cut about 2,216 feet of shellfish leases. As shown on table 4.2.2-1 the emissions from the Milford and Brookfield Compressor Stations would still be greater than from the Cheshire Compressor Station.

Based on our analysis, if the ELI System Alternative was constructed instead of the ELI Project, the impacts on Long Island would still be similar, and would only occur once. The onshore impacts in Connecticut would be limited to construction at the compressor station sites, noise, and air emissions. Air emissions would increase due to the greater amount of compression at Milford and Brookfield (versus Cheshire). Noise levels would also increase at these two sites. Impacts to the Sound should be reduced since the crossing length would be reduced by 5.5 miles.

Based on our environmental analysis, the ELI System Alternative with the additional compression scenario would be superior to the ELI system alternative with 7 miles of loop, and would be environmentally the same as the ELI Project as proposed, except for emissions. However, there are other policy-related considerations and/or factors that may make this alternative less desirable. Such considerations are beyond the scope of this EIS. The Commission will address these issues when it considers the entirety of Iroquois' proposal.

In Southern Natural Gas Company, the Commission stated that a determination of the public convenience and necessity connoted a flexible balancing process in which all factors -- environmental, competitive, and operational benefits -- are weighed prior to a final determination<sup>2/</sup>.

### 4.2.3 Long Island System Alternative

Since both the Iroquois ELI Project and the Islander East Project use the same route on Long Island we have examined using a single pipeline on the island to reduce environmental impacts, if the Commission were to approve both projects. In this system alternative each company would construct its own facilities in Connecticut and across Long Island Sound. At Shoreham, New York, a new 5,000 hp compressor station would be required. From this point the facilities would be nearly the same as proposed in the Islander East Pipeline Project: the Calverton Lateral, meter stations, and a single 12-mile-long, 30-inch-diameter pipeline. The single pipeline would deliver the volumes proposed in both projects.

Since the Long Island system alternatives assumes both the ELI Project pipeline and the Islander East Project pipeline would be constructed across Long Island Sound, the marine impacts described for these two projects would also occur. Construction impacts to Long Island Sound with the Islander East pipeline would involve activities associated with the exit location off the HDD of Connecticut; approximately 1.1 miles of dredged pipeline installation, 10 miles of plowed pipeline installation, and the crossing of 2,488 feet of shellfish bed leases. Construction impacts to Long Island Sound with the ELI Project would involve activities associated with the subsea interconnect structure located about 10 feet below the sea floor at the tie-in location; disturbance of approximately

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<sup>2/</sup> 79 FERC ¶ 61,289 (1997)(mimeo at p. 20).

1.4 acres of shellfish beds to construct the tie-in; 16.5 miles of plowed pipeline installation; and 0.6 miles of dredged pipeline installation across 936 feet of shellfish leases (211 feet by dredge and 725 feet by plow). The marine impacts for the ELI Project activities are described in Chapter 3 of this Draft EIS; the Islander East Project marine impacts are described in Chapter 3 of the Islander East Final EIS.

Except for the compressor station in Shoreham, the environmental impacts of the Long Island System Alternative would be as previously described in this Draft EIS and the Islander East Final EIS. Although the size of the pipeline would increase from 24-inch-diameter to 30-inch-diameter, the width of the construction (75 feet) and the permanent (50 feet) ROW would remain the same. In determining the impacts of constructing both pipelines we assumed a 50 foot overlap of construction ROW would be required, along with a 25 foot overlap of permanent ROW. The impacts resulting from the construction of the Calverton Lateral and the meter stations proposed by Islander East would not change.

It should be noted that while Islander East has a proposed in-service date of late 2003, Iroquois has a proposed in-service date of late 2004. This means that if both projects were to be approved as stand alone projects, the areas disturbed by Islander East's construction would again be disturbed by Iroquois' construction the following year.

Constructing a single 12-mile-long, 30-inch-diameter pipeline instead of dual pipelines would result in a reduction of environmental impacts as shown on table 4.2.3-1. Since the total width of the construction and permanent ROW would be reduced by 25 feet there would be an overall reduction in ground disturbance. The main environmental benefit of this system alternative is that it limits the number of times streams and wetlands would be crossed. It would also reduce the impact on nearby residences and traffic, particularly on the William Floyd Parkway, since construction would occur only once.

However, the Long Island System Alternative would also require the construction of a 5,000 hp compressor station near landfall in Shoreham, New York. We have identified a potential site for the compressor station on property owned by KeySpan adjacent to the KeySpan Access Road. Construction of the compressor station would disturb about 15 acres, assuming the physical lay-out would be similar to the proposed Cheshire Compressor Station proposed by Islander East. After construction about 10 acres would be used for operation of the compressor station. The site we have identified is reasonably level and totally forested upland, and leveling and grading would be required. It appears that no streams or wetlands would be affected. The nearest residence appears to be at least 800 feet from the site. Emissions and noise from the compressor station would be similar to the Cheshire Compressor Station.

The major drawback to the Long Island System Alternative is that it would not reduce impacts to Connecticut or Long Island Sound, since both Iroquois and Islander East would still need to construct all of their proposed facilities in Connecticut and the Long Island Sound. It would also require a new compressor station to be built on Long Island. In addition, with Islander East's proposed mitigation and our recommended conservation and mitigation measures, including: HDD and bored crossings of the Carmans and Peconic Rivers, respectively; installation of the landfall at Shoreham, NY by HDD; HDD for several pipeline segments in the Central Pine Barrens; reduction

**TABLE 4.2.3-1**  
**Comparison of the Long Island System Alternative to Constructing Dual Pipelines on Long Island**

Environmental Factor	Unit	Dual Pipelines on Long Island	Single Pipeline on Long Island
Area Disturbed by Construction	(ac)	273.8	237.4
Total Width Construction ROW	(ft)	100	75
Total Width of Permanent ROW	(ft)	75	50
Waterbody Crossing	(no.)	4	2
NWI-mapped Wetlands Disturbed	(ac)	2.5	1.9
NWI-mapped Forested Wetlands Disturbed	(ac)	2.5	1.9
Existing Residences within 50 feet of Construction ROW	(no.)	6 <sup>a/</sup>	6

<sup>a/</sup> The same 6 residences are within 50 feet of the construction right-of-way of both pipelines.

of the forest clearing and ROW through the Central Pine Barrens; and HDD in the vicinity of several residences, the potential impacts on Long Island would be significantly reduced.

Although the Long Island System Alternative would have some environmental benefits, we don't believe it has significant environmental advantages. We believe that the mitigation proposed by Iroquois, with our recommended conservation measures, of which many would also be applicable to the Islander East Project, would significantly reduce the impact to sensitive areas, including the Central Pine Barrens, residences, and waterbodies.

#### 4.2.4 Tennessee Connecticut-Long Island Lateral Project System Alternative

Several members of the public suggested that we examine Tennessee Gas Pipeline Company's (Tennessee) planned Connecticut-Long Island Lateral project. At this time, Tennessee has not filed an application for this project and has not indicated that it still plans to pursue this project. A system alternative using Tennessee's route would require the construction of 110 miles of pipeline. We do not believe that the construction of a system alternative that is 65 miles longer than the proposed project would be a reasonable alternative.

#### 4.2.5 New York/New Jersey System Alternatives

Based on our reviews of the comments received during the public review of the Islander East Project Draft EIS, we examined making deliveries to Long Island through New York or New Jersey

thereby avoiding impacts to Connecticut and Long Island Sound. Specific projects mentioned included the Cross Bay and Millennium Pipeline Projects, as possible delivery systems. Other suggestions included that a new pipeline be built from New Jersey to New York. We have not studied these system alternatives in depth because we do not believe that they are reasonable alternatives to the ELI Project since they would not meet the purpose of the project.

One of the purposes of the ELI Project is to enhance supply diversity and reliability. Both Cross Bay and Millennium would rely on gas supply from the western United States and Canada. The same would be true for a new pipeline built from New Jersey to New York City. While gas supplies for ELI may come from the same source, its system would also have the ability to access gas supplies from Eastern Canada increasing the diversity and reliability of the supply.

Further, ELI's proposed in service date is November 1, 2004. The planned capacity of the Cross Bay Project is less than the volume proposed by ELI. That project, which has been withdrawn, would need to be redesigned to be able to deliver the increased volumes. Millennium would also need to be redesigned to include the ELI volumes. Neither of these projects would be able to meet ELI's proposed in service date. A new pipeline project from New Jersey to New York could not be designed, studied, approved, and constructed by November 1, 2004.

### **4.3 ROUTE ALTERNATIVES**

Geographic or major route alternatives are identified to determine if these alternatives could avoid or reduce impacts on environmentally sensitive resources, such as large population centers, scenic areas, conservation areas and larger wetland complexes that would be crossed by the proposed pipeline. The origin and delivery points of a major route alternative are generally the same as for the corresponding segment of a proposed pipeline. However, the alternative could follow routes significantly different from the proposed pipeline. Route alternatives would not modify or make use of an existing or modified pipeline system as would a system alternative.

#### **Connecticut**

We examined three route alternatives for the proposed ELI Project in the state of Connecticut's waters within Long Island Sound. The locations of these alternative routes are shown in figure 4.3-1.

#### **4.3.1 Looping Route Alternative**

The Looping Route Alternative was identified by Iroquois to allow maximum operating potential by eliminating pressure drop along the pipeline system, and provide a second crossing of Long Island Sound for reliability purposes. This route alternative would deviate from the proposed route by connecting the pipeline at the mainline valve location onshore in Milford, Connecticut instead of at the proposed subsea tie-in location (MP 0.0). The Looping Route Alternative would be longer than the proposed route with approximately 1.5 miles of additional offshore pipeline and 1 mile of onshore pipeline. This route alternative would also require an open-cut shore approach at Milford, Connecticut. The Looping Route Alternative would impact shellfish bed leases that are avoided by the proposed route and subsea tie-in.

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While the Looping Route Alternative could provide pipeline system operational benefits, we believe the environmental impacts associated with the open-cut shore approach at Milford and the shellfish beds outweigh the operational advantages, and we do not recommend the use of the Looping Route Alternative.

#### 4.3.2 Charles Island Route Alternative

We also examined the Charles Island Route Alternative considered by Iroquois that would achieve the system operational benefits sought in the Looping Route Alternative, but would avoid the shellfish bed impacts and open-cut shore approach impacts at Milford, Connecticut. The Charles Island Route Alternative would connect to the existing Iroquois mainline valve at Milford, Connecticut. Approximately 1 mile of additional pipe would be constructed to reach the beach area at Milford following the same route as the Looping Route Alternative. However, instead of an open-cut at the beach and burying the pipeline offshore, the Charles Island Route Alternative would involve two long (approximately 6,000 feet each) HDDs; one from shore to a point west of Charles Island; the second from west of Charles island to a location southwest of Charles Island. From this point the pipeline would follow the Iroquois proposed route across Long Island.

The Charles Island Route Alternative would be longer than the proposed route by approximately 1 mile. While this route alternative would potentially avoid the shellfish bed leases, we believe that the alternative would be more difficult to construct due to the two HDDs discussed above, due to the length and the need for an HDD exit point and another entrance/exit point within the Long Island Sound. We believe that the difficulty of successfully completing the two long and complex HDDs, the related additional construction impacts to marine habitat within the Long Island Sound, and the additional 1 mile of onshore pipeline, are significant drawbacks that outweigh the potential benefits of this alternative.

#### 4.3.3 Option 1 and 2 Subsea Tap Route Alternatives

We examined two offshore subsea tap route alternative off the existing Iroquois mainline for the Connecticut side of Long Island Sound. The Option 1 Route Alternative would tie-in to Iroquois' existing mainline approximately 5 miles further offshore in Long Island Sound and proceed southeasterly to Shoreham, New York (see figure 4.3-1). The Option 2 Route Alternative would begin approximately 2.5 miles further west than Option 1 in Long Island Sound at an existing subsea tee on Iroquois's mainline. The Option 2 Route Alternative would then proceed eastward parallel to Iroquois' existing mainline for approximately 2.5 miles and join with the Option 1 route and proceed to Shoreham. Both route alternatives would rejoin the proposed route offshore of Shoreham between MP 15 and MP 16 of the proposed route.

The Option 1 Route Alternative would be slightly shorter than the proposed route by approximately 1 mile. Option 2 would be slightly longer (approximately 1.5 miles) than the proposed route. The Option 1 Route Alternative tie-in is located in a lobster nursery areas that contains a high percentage of female lobsters. The proposed route crosses no lobster nursery areas. Both Option 1 and Option 2 Route Alternative tie-ins are located in water greater than 70 feet as opposed to the proposed tie-in at MP 0.0 which is at 30 to 40 feet deep. Both Option 1 and Option 2 tie-in locations also are in topographic and geologic settings that present engineering concerns with placement of

the tie-ins (i.e., erosion, non-depositional, or sediment sorting sedimentary environment, which indicates the area would be less stable for pipeline construction).

While the Option 1 Route Alternative would potentially be shorter than the proposed route, we believe that the potential impacts to the lobster nursery area outweighs this advantage. Both Option 1 and Option 2 Route Alternatives would be more difficult to construct and provide no environmental advantage over the proposed route. Therefore, we not recommend the use of either the Option 1 or Option 2 Route Alternatives.

## New York

The ELI Project proposed route consists of an alignment from Milford, Connecticut to Shoreham, Long Island (see figure 4.3-1). The proposed 20-inch diameter pipeline would span approximately 29.1 miles, totaling 17.1 miles in Long Island Sound and 12.0 miles on Long Island. Approximately 58 percent of the pipeline would be in Long Island Sound. Iroquois' preferred alternative involves tapping its existing mainline approximately 4 miles off the Connecticut shore, instead of onshore in Milford, Connecticut, to avoid crossing sensitive shellfish bed leases located on the nearshore.

The proposed onshore portion maximizes the use of existing utility and transportation corridors, thereby minimizing potential impacts to landowners and sensitive lands. Approximately 90 percent of the onshore alignment is collocated with existing corridors, in particular, the William Floyd Parkway and the Long Island Expressway. Most routing options to the west or east of the proposed route would have been in proximity to densely populated areas, and/or involved greater impacts to sensitive lands, including the Central Pine Barrens. However, we examined one route alternative for the onshore segment in New York, shown in figure 4.3.4-1.

### 4.3.4 Power Corridor Route Alternative

The Power Corridor Route Alternative was identified by Iroquois as an alternative to the proposed onshore route in Long Island. The Power Corridor Route Alternative would be approximately 13.2 miles long and begin at the Shoreham landfall and proceed west of and parallel to the proposed route adjacent to an existing utility corridor in a southerly direction to the Long Island Expressway at the junction with the proposed route. The Power Corridor Route Alternative would then follow the proposed route in a southwesterly direction and follow the Expressway to the terminus.

The Power Corridor Route Alternative would be about 1.2 miles longer than the proposed route, and require approximately 7 miles of additional forest land clearing along the existing utility corridor to construct. The Power Corridor Route Alternative would also cross 5.3 miles of the USFWS designated Peconic River-Pineland Complex that would be avoided by the proposed route. Both the Power Corridor Route Alternative and the proposed route cross designated significant fish and wildlife habitat along the Carmans River approximately 1.5 miles from the project terminus, however, the Power Corridor Route Alternative would also cross designated significant fish and wildlife habitat along the Peconic River. The Power Corridor Route Alternative would increase the amount of Central Pine Barrens CPA that would have to be crossed compared to the proposed route.

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This route alternative also crosses approximately 1.8 miles of the newly designated Upton Ecological Reserve, which contains about 27 state-listed species that are endangered, threatened, or of concern

The Power Corridor Route Alternative passes through three Volatile Organic Compound (VOC) plumes identified on the southern edge of property owned by the BNL along the Expressway. The proposed route would not pass through any of these contaminated areas.

Wetlands would be crossed by both the Power Corridor Route Alternative and the proposed route. The Power Corridor Route Alternative would cross four wetlands and the proposed route would cross two wetlands. The Power Corridor Route Alternative would cross an additional 1,499 feet of wetland.

Based on our review, this alternative would likely have greater impacts to Federal or state listed threatened and endangered species, the Central Pine Barrens CPA, and would be longer than the proposed route. Therefore, we do not recommend use of the Power Corridor Route Alternative.

#### 4.4 ROUTE VARIATIONS

Route variations differ from system or route alternatives in that they are identified to reduce impacts on specific, localized resource issues (including isolated wetlands and residences), resolve landowner requests, and avoid construction constraints because of terrain conditions. Although some variations can be several miles long, most are short and relatively close to the proposed route. We analyzed locations where site-specific issues warranted analysis of route variations. Each of these route variations is analyzed in comparison with the corresponding segment of proposed route. In addition to the route variation identified, it is expected that minor shifts in alignment may continue to be required during construction to accommodate site-specific routing constraints related to engineering, landowner, and environmental concerns.

##### 4.4.1 Starting Point Variation

The Starting Point (SP) Variation was identified to avoid potential impacts on the shellfish bed known as lease No. L580 in Connecticut. The SP Variation would deviate from the proposed beginning point (MP 0.0) by moving it approximately 0.25 to 2 miles further south and west (see figure 4.4.1-1). This variation would not substantially add to the pipeline length.

The SP Variation would avoid the shellfish bed No. L580 and eliminate approximately 936 feet of direct construction impacts expected from the proposed beginning point. Although shellfish bed impacts would be avoided by this variation, there are a number of engineering and topographical/geologic issues that are outstanding. From an engineering and constructability perspective, the SP Variation would require construction in deeper water (>50 feet) under reduced visibility conditions resulting in an increase in risk to diving operations during construction. In addition, by locating the SP Variation 0.25 to 2 miles south and west of the proposed route, the location would be moved outside of the preferred sand shelf (where the proposed interconnect is located at MP 0.0) and into an area identified as very soft organic silt. This material is considered to be unsuitable foundation material for the interconnect location due to its lack of sheer strength, and would also have a greater potential for increased turbidity and water quality impacts during tie-in construction activities. Because of the safety and engineering concerns associated with constructing

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the interconnect tie-in facilities on a very soft organic silt seabed, and the greater depth and associated risks during diving operations, we do not recommend the SP Variation.

#### 4.4.2 William Floyd Parkway Crossover Variations

The William Floyd Crossover Variations were identified during the site visit of the proposed route to minimize clearing and construction impacts within the Central Pine Barren's CPA. Two potential crossover locations were identified: Variation (A), located approximately 950 feet north of the proposed crossing (MP 25.95) at an existing ROW that crosses the road; and Variation (B), which would cross even further north, directly across from Yaphank Woods Boulevard at MP 25.5, before rejoining the proposed route alignment on the west side of William Floyd Parkway.

Based on our review of available alignment photos, both of the William Floyd Crossover Variations would increase clearing impacts within the Central Pin Barrens, but would reduce forest and clearing impacts to the CPA. Variation A and B would not increase the length of the pipeline substantially over the proposed route. Because of the linear alignment of the pipeline along existing ROW within the Central Pin Barrens, potential impacts from forest clearing are expected to be minimal resulting in an edge reduction along the alignment. Fragmentation of forest areas within the Central Pin Barrens would not occur and long-term significant impacts are not expected. However, because Variation B would reduce forest clearing impacts within the CPA by 2.74 acres, we believe this route variation would be preferable to the proposed route. Therefore, we recommend that:

**Iroquois should incorporate the William Floyd Parkway Crossover Variation (B) into the proposed route.**

TABLE 4.4.2-1  
William Floyd Parkway Crossover Variation Compared to Proposed Route

William Floyd Parkway Crossing Location	Estimated Clearing CPA (acres)	Estimated Clearing outside of CPA, but within CPB (acres)	Total (acres)
Proposed Route MP 25.2 to MP 25.9	5.00	0	5.00
Variation A	3.57	2.08	5.65
Variation B	2.26	3.91	6.17

#### 4.4.3 Other Site-Specific Variations

During the project site visits conducted on April 24, 2002, we identified two route variations to the proposed route to minimize environmental impacts and/or residential impacts. The following is a brief description of the variation proposed and the reason why each variation is not recommended and was eliminated from further consideration.

The staff ask Iroquois if locating the pipeline within an unused, unnamed road owned and maintained as part of the Brookhaven National Laboratory between Deer Leap Road and Upton Road (MP 22.75) would avoid or reduce the amount of tree clearing on either side of the road. The proposed route along this segment was selected to take advantage of the existing road to facilitate construction and avoid clearing the main forest area on the east side of the road. However, moving the pipeline alignment as suggested to the center of the existing road would require clearing more trees east of the road to provide working space for the equipment and construction activities. Placing the pipeline in the roadway would also have operational and maintenance concerns, and could restrict future use of the road. Therefore, we do not recommend this route variation.

The staff also asked Iroquois to consider installing the pipeline under the Middle County Road at MP 22 (State Route 25) by HDD construction to reduce impacts to residences in the neighborhoods at Deer Leap and Dew Flag Roads (approximately MP 21.9 to MP 22.6). Iroquois has stated that this crossing is not a good candidate for an HDD, because the drill would require that a horizontal bend be used in conjunction with vertical bends and compound bends of this nature would complicate the drill and reduce the possibility of it being successful. In addition, the glacial nature of the deposits in this area indicate that large boulders could be located in the drill pathway. This combined with the length of the HDD (approximately 3,700 feet) would also reduce the likelihood of the HDD being successful. However, based on information submitted by the Islander East Pipeline Company on their proposed route at the same location, we believe that the HDD may be feasible and would significantly reduce environmental impacts at this location. Therefore, we recommend that:

**Iroquois should conduct further studies to determine the feasibility of HDD at the interchange of William Floyd Parkway and Middle County Road (MP 22) and file this information with the Director of OEP, prior to issuance of the final EIS.**