

### 3.0 ALTERNATIVES

As required by NEPA, FERC policy, and CWA 404(b)(1) guidelines, we evaluated alternatives to the proposed LX and RXE Projects to determine whether an alternative would be environmentally preferable and/or technically and economically feasible to the proposed actions. We evaluated the no-action alternative, energy alternatives, system alternatives, route alternatives and variations, and aboveground facility alternatives. We compared each alternative to the corresponding segment of the proposed LX and RXE Projects using the following three key criteria:

1. Does the alternative have the ability to meet the objectives of the proposed action?
2. Is the alternative technically and economically feasible and practical?
3. Does the alternative offer a significant environmental advantage over the Projects?

With regard to the first criterion, Columbia Gas' and Columbia Gulf's stated objectives of the LX and RXE Projects are to:

- deliver up to a total of 2,121,000 Dth/d of natural gas supply from the existing production region to areas of higher demand, premium markets;
- provide additional pipeline capacity, as needed, to connect these existing gas-producing regions with market areas within and outside of Ohio;
- abandon in-place and replace the capacity thereby increasing the integrity to both the Columbia Gas system and its storage customers (LX Project); and
- increase the capacity of Columbia Gulf's existing pipeline system by adding compression to provide natural gas transportation and compression services (RXE Project).

It is important to note that not all conceivable alternatives are technically feasible or practical. Some alternatives may be incapable of being implemented due to limits on existing technologies, constraints of system capacities, or logistical considerations, while others may be impractical because sites are unavailable or cannot be developed for the proposed use. Additionally, it is necessary to recognize the environmental advantages and disadvantages of the proposed action in order to focus the analysis on reasonable alternatives with the potential to provide a significant environmental advantage over the LX and RXE Projects. Some alternatives may reduce impacts on resources that are not relevant to the analysis or do not provide a significant environmental advantage over the proposed action. Other alternatives may reduce impacts on one resource but increase impacts on others.

Our analysis of each alternative as described in the subsections below is based on information provided by Columbia Gas and Columbia Gulf and reviewed by FERC staff; our review of aerial photographs, U.S. Geological Survey(USGS) topographic maps, National Wetlands Inventory (NWI) maps, data from the National Land Cover Database, and other publicly available information.

For the proposed LX Project, Columbia Gas participated in our pre-filing process (see section 1.3) during the preliminary design stage. This process emphasizes identification of potential stakeholder issues early in the development of a project, as well as identification and evaluation of alternatives that may avoid or minimize these issues. During this process, Columbia Gas made multiple modifications to its proposed pipeline route and other LX Project components to address stakeholder or landowner concerns that would be directly affected by the proposed Project facilities. The majority of route changes were made to avoid conflicts with existing or planned land uses or to increase the distance of the pipeline route from residences and commercial businesses, recreation areas, or other infrastructure. These changes were subsequently made part of Columbia Gas' proposed route when it filed its FERC application and supplements, and are presented in this EIS.

### **3.1 NO-ACTION ALTERNATIVE**

When processing applications under section 7 of the NGA, the Commission has two courses of action: 1) deny the requested action (the no-action alternative), or 2) grant the Certificate, with or without conditions. If the no-action alternative is selected by the Commission, the proposed facilities would not be constructed, the impacts identified as a result of the proposed project would not occur, and the objectives of the project would not be met. This alternative would eliminate additional pipeline capacity to allow the transportation of natural gas production out of the pipeline capacity-constrained basin to areas of higher market demand, causing existing and potential users of natural gas to either pursue other means of natural gas supply, to rely on other fuels (such as heating oil), or to seek other means to meet or curtail their energy needs.

If Columbia Gas' proposed LX facilities are not constructed, the Project shippers may need to obtain an equivalent supply of natural gas from new or existing pipeline systems. In response, Columbia Gas or another natural gas transmission company would likely develop a new project or projects to provide the volume of natural gas contracted through the project's binding precedent agreements with the project shippers. If the RXE Project is not constructed, Columbia Gulf would not have the ability to meet its obligations to its customers to increase the capacity of its existing pipeline system by adding compression at an existing station to provide natural gas transportation and compression services. Alternatively, customers of the project shippers could seek to use alternative fuel or renewable energy sources, which could require new facilities. While these projects could potentially deliver equivalent amounts of energy, they would not fulfill the purpose and need of the LX and/or RXE Projects, which as stated in section 2.0, which is to provide additional pipeline capacity, as needed, to connect existing gas-producing regions with market areas within and outside of Ohio for both Projects' shippers. Additionally, construction of new pipelines or other non-natural gas energy infrastructure would result in environmental impacts that could be equal to or greater than those of the Projects.

For these reasons, the no action alternative for either project would not be preferable to or provide a significant environmental advantage over the LX and RXE Projects.

### **3.2 SYSTEM ALTERNATIVES**

#### **3.2.1 Leach XPress**

##### **3.2.1.1 Existing Transportation System Alternatives**

System alternatives would make use of other existing, modified, or proposed pipeline systems (or other transportation systems) to meet the stated objectives of the LX Project. A system alternative would make it unnecessary to construct all or part of the proposed LX Project, although some modifications and/or additions to other existing pipeline systems may be required to increase its capacity, or another entirely new system may need to be constructed to meet the Project's purpose and need. Such modifications or additions would result in environmental impact that could be less than, similar to, or greater than those associated with construction of the proposed Project. The purpose of identifying and evaluating system alternatives is to determine whether potential environmental impacts associated with the construction and operation of the proposed facilities could be avoided or reduced while still meeting the basic objectives of the Project.

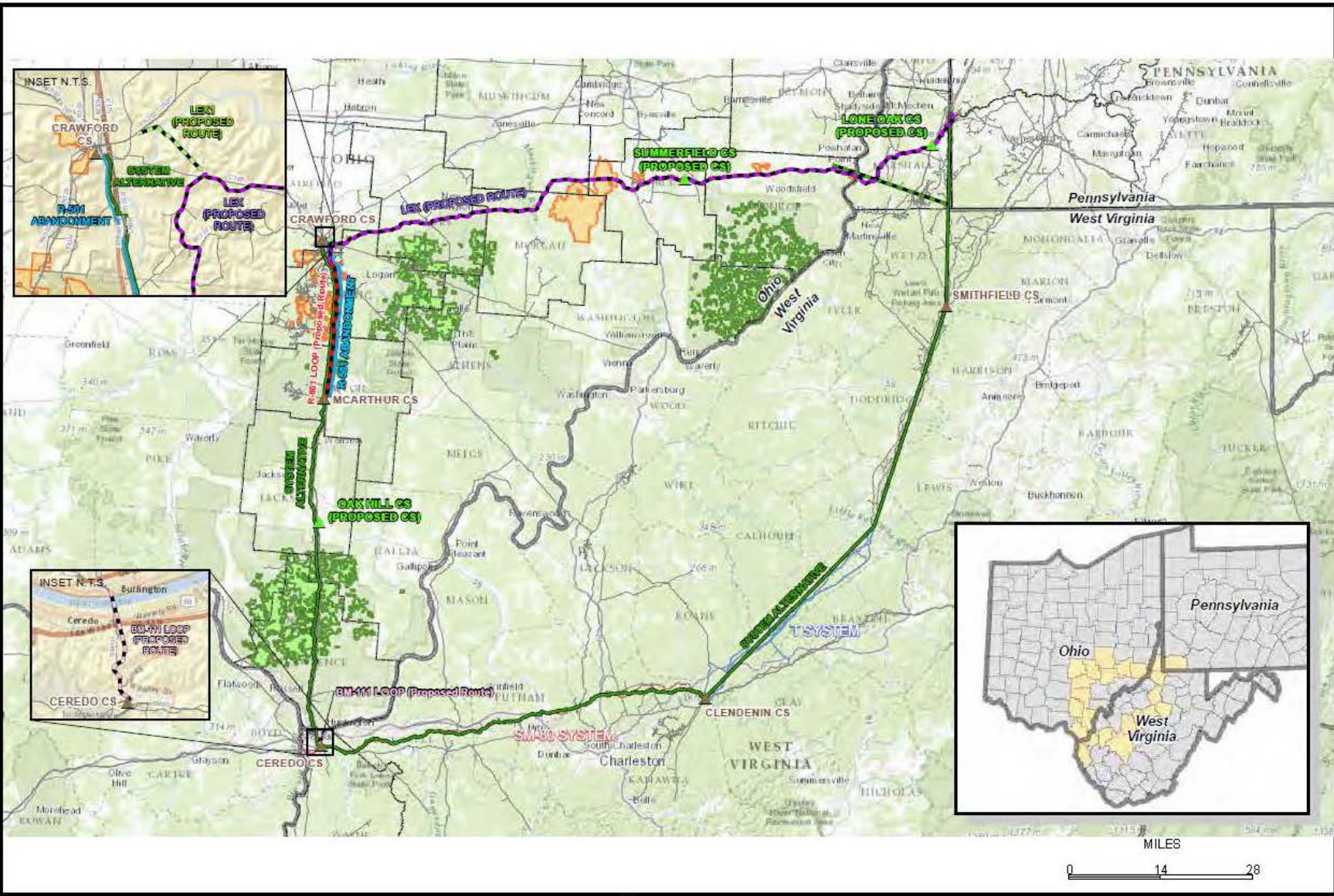
To be a practicable system alternative to the LX Project, other systems or modified systems would need to meet Columbia Gas' stated objectives (section 3.0) and be both technically feasible and practicable. The objectives crucial to the evaluation of system alternatives would be their ability to:

- deliver up to 1,500,000 Dth/d of natural gas supplies from connections to Columbia Gas' existing pipeline system and third-party systems in the Majorsville, West Virginia, and Clarington, Ohio areas to the existing R-System located near the Crawford CS in Fairfield County, Ohio;
- transport additional portions of the new capacity from central Ohio to the existing Ceredo CS in Wayne County, West Virginia for further transport southwest to various markets and interconnect points on Columbia Gas' system;
- abandon 28.2-miles of Line R-501 to improve operational reliability of the R-System;
- be constructed and placed into service within a timeframe reasonably similar to the LX Project; and
- meet the criteria above with reduced environmental impacts when compared with the LX Project.

Figure 3.2.1-1 provides a geographic overview of the proposed project area for the LX Project. Figure 3.2.1-1 also illustrates the relative locations of other existing interstate natural gas pipelines in the vicinity of the LX Project. The status of existing systems is described below in section 3.2.2.

### **3.2.1.2 Expansion of Existing Pipeline Systems**

We reviewed an alternative to the proposed LX Project facilities involving expansion of Columbia Gas' existing T- and SM-80 systems, as depicted in figure 3.2.1-1. This would allow shippers participating in the proposed LX Project area to obtain transportation for natural gas via Columbia Gas' existing pipeline systems located near the Crawford CS in Fairfield County, Ohio and the Ceredo CS in Wayne County, West Virginia.



- ▲ NEW COMPRESSOR STATION (CS)
- ▲ EXISTING COMPRESSOR STATION (CS)
- LEX (131.32 miles)
- R-601 LOOP (24.16 miles)
- LEX1 (1.22 miles)
- BM-111 LOOP (2.85 miles)
- SYSTEM ALTERNATIVE (GREENFIELD)
- SYSTEM ALTERNATIVE (CO-LOCATED)
- R-601 ABANDONMENT (28.21 miles)
- EXISTING COLUMBIA PIPELINE
- ODNR MANAGED AREAS
- WAYNE NATIONAL FOREST

**Figure 3.2.1-1**  
Leach XPress Project  
Systems Alternatives Map

Providing new capacity from Columbia Gas' system in Majorsville, West Virginia, and Clarington, Ohio to the existing T- and SM-80 systems would likely require construction of two new pipelines. Transporting the proposed volumes at the operating pressures needed at the Ceredo CS for markets outside of Ohio would require looping of the entire T- and SM-80 systems. Looping would also occur along the Line BM-111 in addition to the entirety of the existing R-System from the Ceredo CS north to the point of connection near the Crawford CS to supply the Ohio customers.

Two of Columbia Gas' existing compressor stations would require installation of additional compression, including about 12,600 hp of new compression at the Smithfield CS in Wetzel County, West Virginia and about 20,200 hp at the Clendenin CS in Kanawha County, West Virginia. To support supply pressure for further transportation through central Ohio, Columbia Gas would have to install additional compression at the existing Crawford CS in Fairfield County, Ohio. Additionally, this alternative would require the construction of a new 14,100 hp compression station along Columbia Gas' existing R-System in Jackson County, Ohio.

This system alternative would be 148.5 miles longer than the proposed route and would affect 20 percent more forested land. Looping of the systems would increase land disturbance and would delay the in-service schedule. Additionally, this alternative would cross the Wayne National Forest multiple times, including two scenic byways that transect the park. This alternative would also affect more populated areas than the proposed LX Project.

Due to increased land disturbance, construction duration as a result of the increase in pipeline length, and overall costs as well as the potential for increased impacts on residential properties and sensitive resources, we do not consider the expansion of Columbia Gas' existing T- and SM-80 systems to be preferable to the proposed route.

### **3.2.1.3 Modification of Existing Pipeline Systems**

We evaluated the feasibility of using Columbia Gas' existing R-System pipelines, in addition to construction of new 20-inch-diameter pipeline looping, to increase capacity of natural gas from the connection with the proposed LX pipeline in Fairfield County, Ohio south to markets outside of Ohio. However, this alternative would not address the proposal to abandon in-place a 28.2-mile segment of Line R-501, which is one of the goals of the proposed LX Project to improve the overall operational reliability of the R-System. Additionally, increasing the pipeline diameter from 20 to 36 inches, as proposed, would increase the overall capacity of the R-System via construction of a single new relay compressor station near Oak Hill, Ohio. Via Columbia Gas' Modernization Program,<sup>16</sup> Columbia Gas' existing customers have agreed to share in the cost of the abandonment of this segment of the Line R-501, thereby generating benefits to both existing customers and customers associated with the proposed LX Project. Therefore, because this alternative would not meet the LX Project or system objectives, it was dismissed from further consideration.

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<sup>16</sup> Columbia Gas Transmission, LLC, Order Approving Contested Settlement, 142 FERC ¶ 61,062 (2013).

### **3.2.2 Rayne XPress Expansion**

To be a viable system alternative to the RXE Project, potential system alternatives must meet the following criteria:

- capable of transporting up to 621,000 Dth/d of natural gas to the Gulf Mainline Pool;
- capable of being constructed and placed into service within a timeframe reasonably similar to the RXE Project; and
- able to meet the criteria above with reduced environmental impacts when compared to the RXE Project.

Shippers participating in the proposed RXE Project are primarily seeking transportation for natural gas to the southern region via the existing Columbia Gulf Main Line pipeline system. Existing facilities along the Columbia Gulf's pipeline system would not be capable of delivering 621,000 Dth/d without new pipeline, compression, or looping in some combination. We evaluated varying numbers of compressor stations that would need to be modified to meet the purpose and need of the RXE Project, but none offered any significant environmental advantage over the proposal, so none were considered further in this analysis.

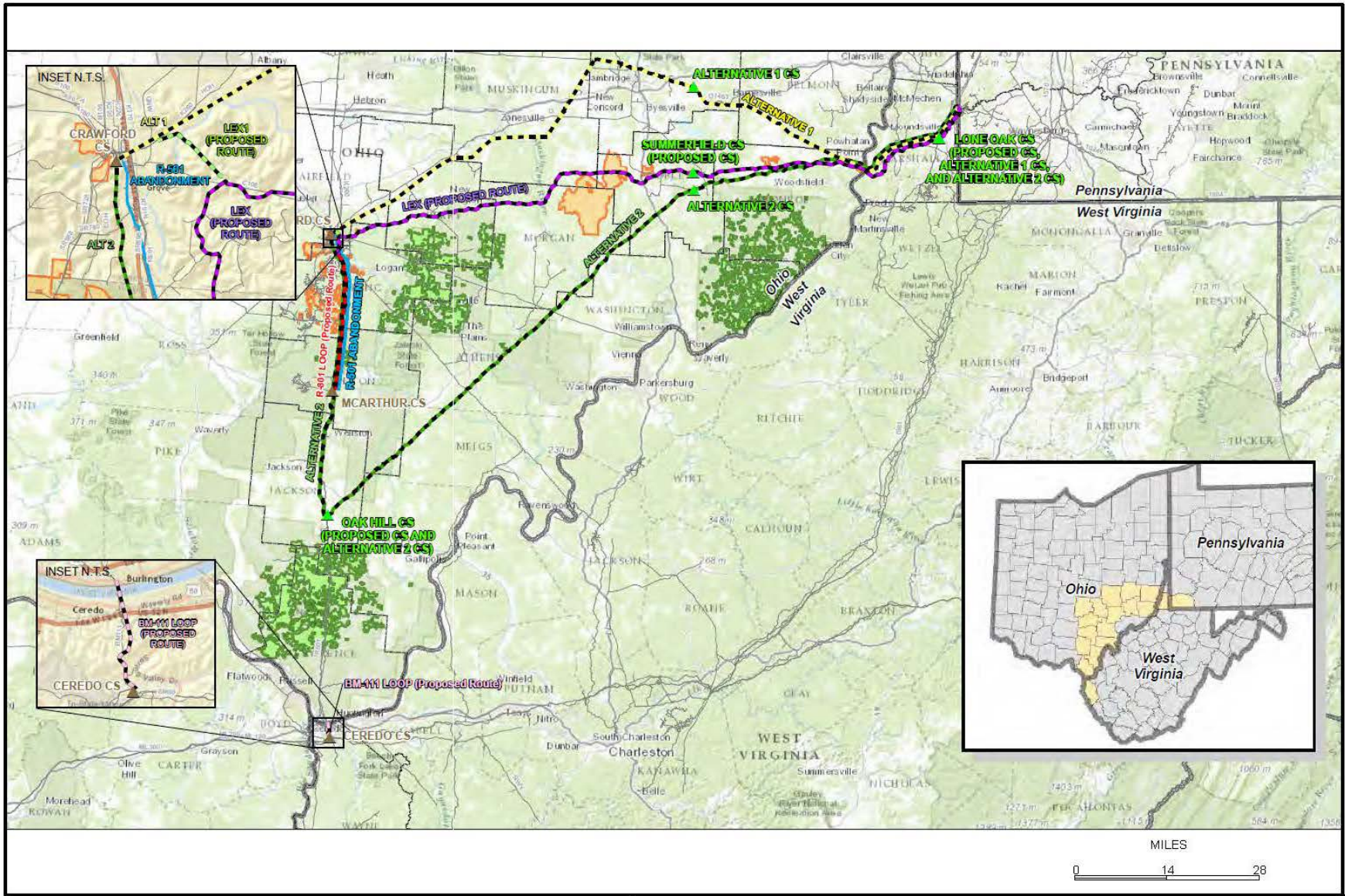
### **3.3 MAJOR ROUTE ALTERNATIVES AND MINOR ROUTE ALTERNATIVES**

Major route alternatives include those that deviate from the LX Project's proposed LEX pipeline route for a significant distance, often a majority or more of the proposed route's length, and which provide a substantially different pathway from the source area to the delivery area. Minor route alternatives deviate from the proposed route less substantially than major route alternatives, are often designed to avoid large environmental resources or engineering constraints, and typically remain within the same general area as the proposed route. Minor route alternatives are typically site-specific and may allow for avoidance of certain localized features such as a home or wetland.

This assessment includes route alternatives identified by FERC staff, landowners, municipalities, and other stakeholders. Our assessment of the environmental consequences of the route changes already incorporated by Columbia Gas into its proposed route is included as part of our environmental analysis of the proposed LX Project in section 4.0.

#### **3.3.1 Major Route Alternatives**

We evaluated two major route alternatives to the proposed LEX pipeline route to identify the most environmentally sound and technically feasible route for the transportation of natural gas from the proposed connections in the Majorsville, West Virginia and Clarington, Ohio areas to the proposed connection with Columbia Gas' existing R-System located near the Crawford CS in Fairfield County, Ohio. These route alternatives are shown in figure 3.3.1-1, and discussed in section 3.3.1.1 below.



- ▲ NEW COMPRESSOR STATION (CS)
- ▲ EXISTING COMPRESSOR STATION (CS)
- LEX (131.32 miles)
- R-801 LOOP (24.16 miles)
- LEX1 (1.22 miles)
- BM-111 LOOP (2.85 miles)
- ALTERNATIVE 1
- ALTERNATIVE 2
- R-501 ABANDONMENT (28.21 miles)
- EXISTING COLUMBIA PIPELINE
- ODNr MANAGED AREAS
- WAYNE NATIONAL FOREST



**Figure 3.3.1-1**  
Leach Xpress Project  
Pipeline Alternatives Map

We also considered the need for route alternatives to the R-801 Loop or BM-111 Loop, as discussed here. However, construction of the proposed R-801 Loop would provide optimal discharge pressure required for a system design to accommodate additional capacity created by the proposed LX Project through construction of one new relay compressor station near Oak Hill in Jackson County, Ohio. Construction of the BM-111 Loop would expand the capacity of the existing Line BM-111 near the existing Burlington Meter Station in Lawrence County, Ohio, which serves as a point of connection for lines R-500, R-601, and R-70, as required to accommodate the new capacity associated with the proposed LX Project. Additionally, the use of co-location with the R-801 Loop and the BM-111 Loop further minimizes environmental impacts. Therefore, in our review, we did not identify any preferable route alternatives that had an environmental advantage to constructing the R-801 Loop and the BM-111 Loop.

### **3.3.1.1 Alternative 1**

Alternative 1 was evaluated to assess the potential environmental impacts associated with routing the proposed LEX pipeline through flatter terrain to arrive at a comparable endpoint near the existing Crawford CS. Alternative 1 consists of 138.9 miles of new 36-inch-diameter natural gas pipeline from the proposed launcher facility located at the existing MarkWest Plant, extending to the existing Crawford CS. Alternative 1 deviates from the proposed route at MP 28.3 where it turns northwest and extends through Belmont and Guernsey Counties, Ohio and around the city of Cambridge. Alternative 1 turns southwest across Muskingum, Perry, and Fairfield Counties, Ohio, before terminating at the existing CS. Constructed aboveground facilities for this alternative would be comparable to those of the proposed route. Alternative 1 would disturb about 123.0 more acres of land than the current proposed route. A comparative analysis of environmental impacts of the proposed route and Alternative 1 is presented in table 3.3.1-1.

Alternative 1 would be 6.5 miles longer than the corresponding segment of the proposed route. Additionally, Alternative 1 would affect a greater amount of forested land than the proposed route. Alternative 1 would cross the Blue Rock State Forest twice, affecting 1.2 miles of the area, whereas the proposed route would not affect the Blue Rock State Forest. The Blue Rock State Forest consists of about 4,500 acres of land and contains sensitive forest ecosystems and recreational areas managed by the Ohio Department of Natural Resources (ODNR) Division of Forestry (ODNR, 2011). Alternative 1 would affect 103 residences within 100 feet, as opposed to the 6 residences that occur within 100 feet of the proposed route. As a result of increased impacts on environmental resources and residential areas, we have removed Alternative 1 from further consideration, as this alternative does not offer a significant environmental advantage.



**TABLE 3.3.1-1  
Pipeline Route Alternative 1 Comparison for the LX Project**

<b>Category</b>	<b>Proposed Route</b>	<b>Alternative 1</b>
Route Length (miles)	132.4	138.9
Total Land Disturbance (acres) <sup>a</sup>	1,796.2	1,919.3
Percent Adjacent to Existing Right-of-Way	32	32
Roads Crossed		
Minor Roads Crossed	109	181
Major Roads Crossed	40	36
Total Road Crossings	149	218
Residences within 100 feet <sup>b</sup>	6	103
Federal Lands Crossed <sup>c</sup>	0	0
Federal Lands within 0.25 mile <sup>b</sup>	0	0
State Lands Crossed <sup>c</sup>	1	2
State Lands within 0.25 mile <sup>b</sup>	1	1
Land Use (percent)		
Agriculture	31	27
Forest	55	60
Wetland	1	<1
Open Water	<1	<1
Open	12	7
Developed	1	6
Waterbodies Crossed <sup>d</sup>		
Minor Waterbody Crossings	460	367
Intermediate Waterbody Crossings	55	31
Major Waterbody Crossings	5	5
<i>Total Waterbody Crossings</i>	<i>520</i>	<i>403</i>
Wetland Impact (percent)		
Non-forested (PEM) Wetland	1	<1
Forested (PFO) Wetland	<1	<1
<i>Total Wetland Impact</i>	<i>1</i>	<i>&lt;1</i>

<sup>a</sup> Impacts for the proposed and alternative routes are based on a 125-foot construction corridor for the first 40 miles and a 110-foot construction corridor for the remaining pipeline length. Impacts for the alternative routes do not account for reduction of workspace in wetland areas or workspace associated with aboveground facilities.

<sup>b</sup> Distance is measured from the pipeline centerline.

<sup>c</sup> Includes only lands crossed by the pipeline centerline.

<sup>d</sup> Includes only waterbodies crossed by the pipeline centerline.

### **3.3.1.2 Alternative 2**

We evaluated Alternative 2 to assess the potential environmental impacts associated with routing the proposed LEX pipeline parallel to an existing Texas Eastern Transmission, LP pipeline. Alternative 2 follows the proposed route until MP 28.2, where it continues slightly northwest then southwest for 117.6 miles across Monroe, Noble, Morgan, Washington, Athens, Meigs, Vinton, and Gallia Counties. It then intersects with the proposed Oak Hill CS in Jackson County, Ohio. To connect to the existing Crawford CS in Fairfield County Ohio, an additional 51.4 miles of pipeline loop north along the R-System would have to be installed. Alternative 2 would still require the construction of the Lone Oak CS and a new compressor station with comparable specifications to the Summerfield CS. Additional compression would be needed at the existing Crawford CS but would not require a new compressor station near Oak Hill, Ohio. A comparative analysis of environmental impacts of the proposed route and Alternative 2 is presented in table 3.3.1-2.

While a majority of Alternative 2 is adjacent to existing pipeline easements, an additional 67.9 miles of construction corridor, compared to the proposed route, would be required. Due to the extended length of pipeline needed, this alternative would have a greater land impact. Additionally, Alternative 2 would cross 0.9 mile of the Cooper Hollow Wildlife Area in Jackson County, Ohio. The Cooper Hollow Wildlife Area contains more than 5,420 acres of land, with over 50 percent composition of forested areas and is managed by the ODNR for wildlife species associated with these forested habitats as well as for recreational purposes. Construction within the wildlife area would require tree clearing in addition to potentially affecting recreational areas supported by area (ODNR, 2012).

We have removed Alternative 2 from consideration due to the potential for greater impacts on forested areas, other wildlife habitat, and protected public resources associated with crossing the Cooper Hollow Wildlife Area, as this alternative does not offer a significant environmental advantage.

### **3.3.2 Minor Route Alternatives**

Although they can extend for several miles, minor route alternatives deviate from the proposed route less substantially than major route alternatives. Minor route alternatives are often designed to avoid large environmental resources or engineering constraints, and typically remain within the same general area as the proposed route.

We evaluated one route alternative, known as Deviation H, which was developed to evaluate areas in which two foreign FERC-regulated pipeline projects (the Energy Transfer Rover Pipeline Project and the Texas Eastern Appalachian Lease Project) have proposed routes similar to that of the LEX Pipeline segment in Monroe County, Ohio. Deviation H is discussed below and comparative analyses relative to the proposed route are provided.

Deviation H consists of 21.8 miles of reroute between LEX MP 30.4 and LEX MP 52.0 of the proposed route. It begins at MP 30.4 of LEX, continues for 0.4 mile, and rejoins LEX at MP 30.8. Deviation H then follows the proposed route until LEX MP 32.7 where it deviates until LEX MP 41.8. At this point, it connects to the proposed route for 1.1 miles and deviates again at LEX MP 42.9 for 2.1 miles. From this point, Deviation H follows the proposed LEX route for 1.3 miles, deviates at MP 46.2, and rejoins at MP 52.0. A comparison of impacts between Deviation H and the proposed route is presented in table 3.3.2-2. As shown in this table, Deviation H would result in similar impacts as the proposed route. Therefore, we do not recommend inclusion of Deviation H, as it provides no significant environmental advantage.

**TABLE 3.3.1-2  
Pipeline Route Alternative 2 Comparison for the LX Project**

<b>Category</b>	<b>Proposed Route</b>	<b>Alternative 2</b>
Route Length (miles)	132.4	199.2
Total Land Disturbance (acres) <sup>a</sup>	1,796.2	2,703.4
Percent Adjacent to Existing Right-of-Way	32	59
Roads Crossed		
Minor Roads Crossed	109	243
Major Roads Crossed	40	41
Total Road Crossings	149	284
Residences within 100 feet <sup>b</sup>	6	2
Federal Lands Crossed <sup>c</sup>	0	0
Federal Lands within 0.25 mile <sup>b</sup>	0	0
State Lands Crossed <sup>c</sup>	1	2
State Lands within 0.25 mile <sup>b</sup>	1	3
Land Use (percent)		
Agriculture	31	24
Forest	55	56
Wetland	1	<1
Open Water	<1	<1
Open	12	12
Developed	1	6
Waterbodies Crossed <sup>d</sup>		
Minor Waterbody Crossings	460	460
Intermediate Waterbody Crossings	55	52
Major Waterbody Crossings	5	2
<i>Total Waterbody Crossings</i>	<i>520</i>	<i>514</i>
Wetland Impact (percent)		
Non-forested (PEM) Wetland	1	<1
Forested (PFO) Wetland	<1	<1
<i>Total Wetland Impact</i>	<i>1</i>	<i>&lt;1</i>

<sup>a</sup> Impacts for the proposed and alternative routes are based on a 125-foot-wide construction corridor for the first 40 miles and a 110-foot-wide construction corridor for the remaining pipeline length. Impacts for the alternative routes do not account for reduction of workspace in wetland areas or workspace associated with aboveground facilities.

<sup>b</sup> Distance is measured from the pipeline centerline.

<sup>c</sup> Includes only lands crossed by the pipeline centerline.

<sup>d</sup> Includes only waterbodies crossed by the pipeline centerline.

<b>TABLE 3.3.2-1 Minor Route Deviation H Comparison for the LX Project</b>			
<b>Category</b>	<b>Corresponding segment of Proposed Route</b>	<b>Deviation H</b>	<b>Difference (if applicable)</b>
Route Length (miles) <sup>a</sup>	21.6	21.8	0.2
Total Land Disturbance (acres) <sup>b</sup>	300.5	305.8	5.3
Percent Adjacent to Existing ROW	74	53	-21
Roads Crossed			
Minor Roads Crossed	26	45	19
Major Roads Crossed	5	5	0
Total Road Crossings	31	50	19
Residences within 100 feet <sup>c</sup>	4	5	1
Federal Lands Crossed <sup>d</sup>	0	0	0
Federal Lands within 0.25 mile <sup>c</sup>	0	0	0
State Lands Crossed <sup>d</sup>	0	0	0
State Lands within 0.25 mile <sup>c</sup>	0	0	0
Land Use (percent)			
Agriculture	34	36	2
Forest	51	53	2
Wetland	1	1	0
Open Water	0	0	0
Open	13	7	-6
Developed	1	3	2
Waterbodies Crossed <sup>e</sup>			
Minor Waterbody Crossings	67	62	-5
Intermediate Waterbody Crossings	11	11	0
Major Waterbody Crossings	0	0	0
<i>Total Waterbody Crossings</i>	78	73	-5
Wetland Impact (percent)			
Non-forested (PEM) Wetland	1	1	0
Forested (PFO) Wetland	0	0	0
<i>Total Wetland Impact</i>	1	1	0
<sup>a</sup>	Proposed Project is based on the total length of new natural gas pipelines associated with the proposed Project, including LEX, LEX1, the R-801 Loop, and the BM-111 Loop.		
<sup>b</sup>	Impacts for the proposed Project are based on a 125-foot-wide construction corridor for the first 40 miles and a 110-foot – wide construction corridor for the remaining pipeline lengths. Impacts for the system alternative are based on a 110-foot-wide construction corridor. Impacts for the System Alternative do not account for reduction of workspace in wetland areas or workspace associated with aboveground facilities.		
<sup>c</sup>	Distance is measured from the pipeline centerline.		
<sup>d</sup>	Includes only lands crossed by the pipeline centerline.		
<sup>e</sup>	Includes only waterbodies crossed by the pipeline centerline.		

### 3.3.3 Minor Route Variations

In addition to the route alternatives described above, minor route variations that are much smaller in scale, are typically shorter in length and involve minor shifts in the pipeline alignment to avoid a site-specific resource issue or concern. These site-specific issues included proximity to homes and property boundaries, avoidance of forested land, waterbodies, wetlands, side slopes, special agricultural areas, and addressing impacts on other construction-related, environmental, or landowner concerns.

Columbia Gas is coordinating with landowners who have requested minor route variations across their own properties that do not affect other landowners. Additionally, Columbia Gas is coordinating with affected property owners and agencies to accommodate constructability and safety concerns. These requests have been filed with the Secretary and posted to the docket. Columbia Gas is investigating potential route variations and/or modification of construction methods for addressing the ongoing landowner concerns are outlined in table 3.3.3-1. In order to address outstanding landowner concerns, we recommend that:

- **Prior to the end of the draft EIS comment period, Columbia Gas should further assess the minor route variations for the tracts identified in table 3.3.3-1 of the draft EIS in coordination with the landowners and either incorporate a route that avoids the resources of concern, or otherwise explain how potential impacts on resources have been effectively avoided, minimized, or mitigated.**

We evaluated three minor route variations, known as Deviation P, Deviation B-2, and Deviation D-2, which were included in Columbia Gas' supplemental information filed on March 18, 2016, shortly before we went to print with the draft EIS. We are including our analysis of these variations in this draft EIS because Columbia Gas recently notified us that it intends on incorporating these new variations into its proposed route. These route variations were developed in response to agency correspondence and landowner negotiations, and are discussed below, and comparative analyses relative to the proposed route are provided. We find these newly identified route variations acceptable.

Deviation P occurs in Marshall County, West Virginia at MP 7.4 of LEX, extending 0.9 mile south and 0.9 west, turning 0.3 mile southwest before reconnecting with the proposed route at MP 9.5. This deviation was developed in response to correspondence with the West Virginia DOT. The original LX Project route would have crossed a soil nail reinforcement project that had been completed to stabilize slopes. West Virginia DOT recommended the proposed route avoid this area. Incorporation of this deviation would reduce the total pipeline route by 0.1 mile. This route variation would result in a minor increase in forested impacts and minor waterbody crossings, but would avoid the soil nail reinforcement project. Additional impacts are outlined in table 3.3.3-2.

**TABLE 3.3.3-1  
Minor Route Variations**

<b>Project Segment</b>	<b>Parcel Number or Reroute ID</b>	<b>MP</b>	<b>Requested Minor Route Variation</b>	<b>Columbia Gas' Analysis / Response</b>
LEX	N/A	Launcher Facility	Landowner requested proposed structure relocation	Negotiations are ongoing with the landowner regarding this property
LEX	WV-MA-194.000	Not specified	Landowner requested pipeline be moved to avoid forest and property impacts	Columbia Gas is coordinating with the landowner to address concerns regarding forest impacts
LEX	WV-MA-095A.000	7.4	WVDOT recommended avoiding a soil nail reinforcement project	Columbia Gas routed LEX west and north of previously proposed route between MP7.4 and MP 9.6. Reroute would impact residence that has been agreed upon with the landowner for demolition of the structure.
LEX	18.64 RR-4	18.4	Landowner requested relocation of MLV on property	Columbia Gas routed LEX southeast and south of originally proposed route to accommodate new location of MLV
LEX	56.02 RR-7	54.5	Ohio DOT recommended avoiding corrugated metal culvert on Highway 78	Columbia Gas routed the pipeline southwest for 0.6 mile and northwest for 0.9 mile to avoid this area.
LEX	OH-MO-208.000	51.5	Consider adjusting route across property	Workspace modifications are not proposed at this time; however, Columbia Gas will evaluate potential changes if specifically requested by the landowner during easement negotiations
LEX	OH-MO-207.000	Not specified	Landowner requested deviation to avoid residences, utilities, and farming operations	Columbia Gas is coordinating with the landowner to address concerns and is in the process of evaluating a potential route alternative in this area
LEX	OH-NO-001.003; OH-NO-001.004; OH-NO-001.005	Not specified	Landowner requested pipeline be moved to avoid forested and wildlife habitats	Columbia Gas is coordinating with the landowner to address concerns for forest and wildlife impacts
LEX	OH-NO-097.000	60.7	Landowner requested alternative route across property	Modified workspace configuration to reduce impacts on property and is continuing landowner coordination
LEX	OH-MU-071.000	82.9	Consider adjusting route across property	Workspace modifications are not proposed at this time; however, Columbia Gas will evaluate potential changes if specifically requested by the landowner during easement negotiations
LEX	OH-MN-120.001	N/A	Landowner requested route adjustment across property	Unrelated route alternative incorporated into the proposed route prior to issuance of DEIS has eliminated impacts on this property
R-801 Loop	OH-HO-239.000	8.9	Consider adjusting route across property	Workspace modifications are not proposed at this time; however, Columbia Gas will evaluate potential changes if specifically requested by the landowner during easement negotiations

<b>TABLE 3.3.3-2 Minor Route Deviation P Comparison for the LX Project</b>			
<b>Category</b>	<b>Corresponding Segment of Previously Proposed Route <sup>a</sup></b>	<b>Deviation P</b>	<b>Difference (if applicable)</b>
Route Length (miles)	2.2	2.1	-0.1
Total Land Disturbance (acres) <sup>b</sup>	32.1	29.7	-2.4
Percent Adjacent to Existing ROW	9	58	49
Roads Crossed			
Minor Roads Crossed	1	1	0
Major Roads Crossed	1	1	0
Total Road Crossings	2	2	0
Residences within 100 feet <sup>c</sup>	1	1	0
Federal Lands Crossed <sup>d</sup>	0	0	0
Federal Lands within 0.25 mile <sup>c</sup>	0	0	0
State Lands Crossed <sup>d</sup>	0	0	0
State Lands within 0.25 mile <sup>c</sup>	0	0	0
Land Use (percent)			
Agriculture	17	12	-5
Forest	69	75	6
Wetland	1	<1	0
Open Water	0	0	0
Open	12	11	-1
Developed	1	2	1
Waterbodies Crossed <sup>e</sup>			
Minor Waterbody Crossings	10	15	5
Intermediate Waterbody Crossings	0	0	0
Major Waterbody Crossings	0	0	0
<i>Total Waterbody Crossings</i>	10	15	5
Wetland Impact (percent)			
Non-forested (PEM) Wetland	<1	<1	0
Forested (PFO) Wetland	1	0	-1
<i>Total Wetland Impact</i>	1	<1	0
<sup>a</sup> Previously Proposed Route corresponds with the proposed route presented in the FERC supplemental filing. <sup>b</sup> Impacts for the proposed Project are based on a 125-foot-wide construction corridor for the first 40 miles and a 110-foot – wide construction corridor for the remaining pipeline lengths. Impacts for the system alternative are based on a 110-foot-wide construction corridor. Impacts for the System Alternative do not account for reduction of workspace in wetland areas or workspace associated with aboveground facilities. <sup>c</sup> Distance is measured from the pipeline centerline. <sup>d</sup> Includes only lands crossed by the pipeline centerline. <sup>e</sup> Includes only waterbodies crossed by the pipeline centerline.			

Deviation B-2 occurs in Marshall County, West Virginia at MP 18.4 of LEX, extends slightly southeast, extends south, and rejoins LEX at MP 18.6. This route variation was developed to accommodate a new location for MLV #2 in response to a landowner request. Incorporation of this deviation would have similar impacts compared to the corresponding segment of the proposed route as outlined in table 3.3.2-3.

<b>TABLE 3.3.3-3 Minor Route Deviation B-2 Comparison for the LX Project</b>			
<b>Category</b>	<b>Corresponding Segment of Previously Proposed Route <sup>a</sup></b>	<b>Deviation B-2</b>	<b>Difference (if applicable)</b>
Route Length (miles)	0.2	0.22	<0.1
Total Land Disturbance (acres) <sup>b</sup>	3.2	3.08	-0.1
Percent Adjacent to Existing ROW	0	0	0
Roads Crossed			
Minor Roads Crossed	1	1	0
Major Roads Crossed	0	0	0
Total Road Crossings	1	1	0
Residences within 100 feet <sup>c</sup>	0	0	0
Federal Lands Crossed <sup>d</sup>	0	0	0
Federal Lands within 0.25 mile <sup>c</sup>	0	0	0
State Lands Crossed <sup>d</sup>	0	0	0
State Lands within 0.25 mile <sup>c</sup>	0	0	0
Land Use (percent)			
Agriculture	42	47	5
Forest	49	43	-6
Wetland	0	0	0
Open Water	0	0	0
Open	7	9	2
Developed	1	1	0
Waterbodies Crossed <sup>e</sup>			
Minor Waterbody Crossings	1	1	0
Intermediate Waterbody Crossings	0	0	0
Major Waterbody Crossings	0	0	0
<i>Total Waterbody Crossings</i>	<i>1</i>	<i>1</i>	<i>0</i>
Wetland Impact (percent)			
Non-forested (PEM) Wetland	0	0	0
Forested (PFO) Wetland	0	0	0
<i>Total Wetland Impact</i>	<i>0</i>	<i>0</i>	<i>0</i>
<sup>a</sup>	Previously Proposed Route corresponds with the proposed route presented in the FERC supplemental filing.		
<sup>b</sup>	Impacts for the proposed Project are based on a 125-foot-wide construction corridor for the first 40 miles and a 110-foot – wide construction corridor for the remaining pipeline lengths. Impacts for the system alternative are based on a 110-foot-wide construction corridor. Impacts for the System Alternative do not account for reduction of workspace in wetland areas or workspace associated with aboveground facilities.		
<sup>c</sup>	Distance is measured from the pipeline centerline.		
<sup>d</sup>	Includes only lands crossed by the pipeline centerline.		
<sup>e</sup>	Includes only waterbodies crossed by the pipeline centerline.		

Deviation D-2 occurs in Noble County, Ohio along the LEX segment. This route variation was developed in response to the Ohio DOT recommendation to avoid construction under an existing corrugated metal culvert located at the previous crossing of Highway 78, and extends from MP 54.5, extends southwest for 0.6 mile, turns northwest for 0.9 mile, and reconnects with the original proposed LEX route at MP 55.8. Incorporation of this route would result in similar impacts on forested land and waterbodies, and avoids impacts on wetlands crossed by the former route. Additional impacts are outlined in table 3.3.3-4



<b>TABLE 3.3.3-4 Minor Route Deviation D-2 Comparison for the LX Project</b>			
<b>Category</b>	<b>Corresponding Segment of Previously Proposed Route <sup>a</sup></b>	<b>Deviation D-2</b>	<b>Difference (if applicable)</b>
Route Length (miles)	1.3	1.5	0.2
Total Land Disturbance (acres) <sup>b</sup>	17.5	20.3	2.8
Percent Adjacent to Existing ROW	0	0	0
Roads Crossed			
Minor Roads Crossed	1	1	0
Major Roads Crossed	1	1	0
Total Road Crossings	2	2	0
Residences within 100 feet <sup>c</sup>	0	0	0
Federal Lands Crossed <sup>d</sup>	0	0	0
Federal Lands within 0.25 mile <sup>c</sup>	0	0	0
State Lands Crossed <sup>d</sup>	0	0	0
State Lands within 0.25 mile <sup>c</sup>	0	0	0
Land Use (percent)			
Agriculture	54	19	-35
Forest	43	43	0
Wetland	<1	0	0
Open Water	0	0	0
Open	2	38	36
Developed	1	<1	0
Waterbodies Crossed <sup>e</sup>			
Minor Waterbody Crossings	4	4	0
Intermediate Waterbody Crossings	0	0	0
Major Waterbody Crossings	0	0	0
<i>Total Waterbody Crossings</i>	4	4	0
Wetland Impact (percent)			
Non-forested (PEM) Wetland	<1	0	0
Forested (PFO) Wetland	0	0	0
<i>Total Wetland Impact</i>	<1	0	0
<sup>a</sup>	Previously Proposed Route corresponds with the proposed route presented in the FERC supplemental filing.		
<sup>b</sup>	Impacts for the proposed Project are based on a 125-foot-wide construction corridor for the first 40 miles and a 110-foot – wide construction corridor for the remaining pipeline lengths. Impacts for the system alternative are based on a 110-foot-wide construction corridor. Impacts for the System Alternative do not account for reduction of workspace in wetland areas or workspace associated with aboveground facilities.		
<sup>c</sup>	Distance is measured from the pipeline centerline.		
<sup>d</sup>	Includes only lands crossed by the pipeline centerline.		
<sup>e</sup>	Includes only waterbodies crossed by the pipeline centerline.		

### 3.4 ABOVEGROUND FACILITY SITE ALTERNATIVES

#### 3.4.1 Leach XPress Project

We evaluated the locations of the proposed aboveground facilities to determine whether environmental impacts would be reduced or mitigated by the use of alternative facility sites. Our evaluation involved inspection of aerial photography and mapping, as well as our own field work along the proposed LX Project’s corridor and location.

As is discussed throughout section 4 of this draft EIS, the proposed Lone Oak and Summerfield CSs, regulator stations, and odorization stations would not result in any significant environmental impacts. Also, no comments or concerns were received about impacts from these facilities or requests to relocate them. Therefore, we find that the proposed locations for these facilities are environmentally preferable. Further, the proposed modifications at the Crawford CS and Ceredo CS would occur at existing facility sites and on property owned by Columbia Gas. Alternative sites for this additional compression would result in greater environmental impact associated with the development of entire compressor stations (e.g. compression, control buildings, suction and discharge piping, etc.). Therefore, expanding the existing facilities is preferable.

In response to comments received about the Oak Hill CS, we evaluated two alternatives. Alternative Site 1 would be located about 0.6 mile northwest of the proposed Oak Hill CS site and Alternative Site 2 would be located about 0.5 mile west of the proposed Oak Hill CS site. While both alternative sites would affect less prime farmland and reduce the length of the suction/discharge lines, these alternative locations would be closer to significantly more NSAs. Therefore, the alternative sites do not offer a significant environmental advantage, and have been eliminated from further consideration.

### **3.4.2 Rayne XPress Expansion Project**

We evaluated the locations of the proposed Grayson CS and Means CS facilities to determine whether environmental impacts would be reduced or mitigated by the use of alternative facility sites. Our evaluation involved inspection of aerial photography and mapping of the proposed compressor station locations, as well as coordination with the FWS.

As is discussed throughout section 4 of this draft EIS, the proposed Grayson CS and Means CS, would not result in any significant environmental impacts. Also, no comments or concerns were received about impacts from these facilities or requests to relocate them. Therefore, we find that the proposed locations for these facilities are environmentally preferable.