

Petition before the Massachusetts Energy Facilities Siting Board for

Analysis in Support of Approval of Holyoke Gas & Electric's Liquefied Natural Gas Infrastructure & Resiliency Project

EFSB 22-07



DECEMBER 7, 2022

Submitted by: Holyoke Gas & Electric 99 Suffolk Street Holyoke, MA 01040

In Association with: AWCO Engineering & Technical Services, LLC Sanborn Head & Associates, Inc. Epsilon Associates, Inc. Pierce Atwood LLP

COMMONWEALTH OF MASSACHUSETTS

ENERGY FACILITIES SITING BOARD

HOLYOKE GAS & ELECTRIC DEPARTMENT

EFSB 22-07

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4.0 PROJECT ALTERNATIVE ANALYSIS

4.1 Analysis Methodology for Reviewing Project Alternatives

After recognizing that the pipeline interconnection alternative with CMA was no longer feasible, HG&E performed an updated iteration of its project alternative analysis. HG&E employed its expertise and experience in the natural gas and electricity industries to identify and then evaluate a variety of potential alternatives for meeting the established need to ensure the continuing provision of reliable and safe service for its existing natural gas distribution customers. HG&E evaluated these potential alternatives by first considering their ability to meet the identified need and then weighing the reliability, environmental factors and cost considerations of the various, practical alternatives. The alternative; (ii) the proposed Project; (iii) the development of a second LNG facility; (iv) pipeline alternatives; (v) interconnection with neighboring utilities; (vi) a new propane-air or CNG facility; (vii) expanded energy efficiency or demand response; and (viii) accelerated electrification. HG&E then evaluated three alternatives that were able to theoretically meet the identified reliability need in terms of the ability to secure environmental, economic or reliability benefits.

4.2 Description of Project Alternatives

4.2.1 No-Build Alterative

Under the no-build alternative, no improvements would be made to HG&E's existing West Holyoke Facility or its natural gas distribution system and the identified reliability need described in Section 3.0 would not be met. HG&E must ensure that it is able to continue to provide reliable gas supply to its customers to meet firm customer demand under reasonably foreseeable conditions in an economic and safe manner while mitigating potential environmental impacts. With the no-build alternative, HG&E's approximately 11,500 customers would be dependent upon the increasingly challenging ability to replenish the West Holyoke Facility's LNG storage supply during peak demand periods. A short period of extreme cold weather, even as few as two consecutive days, would jeopardize service reliability to existing customers. Because the no-build alternative would not address the reliability need identified in Section 3.0, it was not considered further.

4.2.2 Proposed Project

The proposed Project was designed to ensure HG&E's continued provision of reliable natural gas distribution service. The Project will expand the existing on-site LNG storage capacity of the West Holyoke Facility enabling HG&E to dispatch LNG to meet demand needs over more extended periods of design weather while managing storage refill operations in a reasonable and prudent manner. An added benefit of the Project will enable HG&E to provide incremental natural gas service and, as a result, reduce emissions by strategically targeting customers likely to employ fuel oil or other fossil fuels while

also providing least cost services as HG&E continues its transition to net zero. Given these factors, this alternative was studied further.

4.2.3 Alternative Locations for Incremental LNG Storage

HG&E recognized that a second, parallel or independent LNG storage facility could potentially be constructed that would meet the identified purpose and need for incremental LNG storage capacity. To evaluate the merits of this alternative, HG&E performed a preliminary site identification process. The site identification process sought to identify parcels at least 10 acres in size so as not to exclude the analysis of potentially suitable alternatives. HG&E recognized that a more preferable LNG alternative would be a single, larger facility rather than two separate smaller facilities. Thus, a portion of the screening analysis focused upon sites of at least 25 acres that are potentially available for acquisition where a larger LNG storage facility could be sited and constructed.

The design of any new "greenfield" LNG storage facility would reflect the characteristics and limitations of the particular site. HG&E identified two alternative sites in Holyoke that were of sufficient size for the design and construction of a new LNG storage facility as well as a third theoretically potential site in Southampton. These sites are located off Whiting Farm Road (approximately 10.98 acres) and Apremont Highway (approximately 25 acres) in Holyoke and off County Road just north of the Holyoke line in Southampton (approximately 50 acres). All three potential locations for an alternative LNG facility (as well as a pipeline alternative described below) are depicted on Figure 4-1.¹

The Whiting Farm Road alternative site has a smaller area available for development due to its location closer to the population center of Holyoke and the limited sizes of the parcels. That site would only support a single 70,000-gallon tank together with all other required operational elements including truck unloading, vaporization, odorant and metering equipment. Beyond the capital cost of this alternative, HG&E would incur increased operations and maintenance costs by needing to operate two distinct facilities to meet its natural gas demand.

The Apremont Highway site and the Southampton site were both large enough to support a larger, fielderected tank with a capacity of approximately 1,700,000 gallons, together with related equipment needed to operate such a facility. Each such facility would be designed to be filled prior to the winter and not require refilling during winter months except during more extreme weather. The West Holyoke Facility would be retired once the Apremont Highway or Southampton options were constructed and operational.

¹ Two of these sites (both of which are in Holyoke) were necessarily reconsidered during HG&E's site selection analyses. The West Holyoke Facility is the only available location where needed construction would be limited essentially to the addition of a single tank. <u>See</u> Section 5.0.

The Southampton site was eliminated from further examination by HG&E due to the following constraints:

- The parcel is not currently under the ownership of Holyoke;
- The site would require an approximately 2.5-mile long pipeline extension to tie into the existing HG&E primary gas distribution system at a substantial cost to HG&E and with associated operational challenges given the design and operation of the distribution system;
- Zoning exemptions or a special permit would be required to build the new facility, which would be more challenging than for sites in Holyoke given the Holyoke zoning ordinance and nature of HG&E as a municipal entity;
- The location was the least attractive in terms of truck access and traffic concerns; and
- This alternative project would result in material changes to land use in the area and substantial impacts to the natural environment.

HG&E's initial engineering and design reviews of the two Holyoke alternative sites concluded that these sites would require substantially higher development and operating costs than the proposed Project, far greater construction and permanent impacts to the environment and community as well as additional operational challenges. A new LNG facility at the Whiting Farm Road site would have a capital cost of approximately \$20,500,000 as well as increased annual operating costs over the existing West Holyoke Facility. The Apremont Highway site with the larger, field-erected tank would require capital costs of approximately \$70,150,000 and, due to the nature of the facilities, would have somewhat higher annual operating costs as compared to the West Holyoke Facility. A new LNG facility at the Whiting Farm Road site with a single 70,000-gallon tank would have similar operating costs as the West Holyoke Facility site, approximately doubling existing LNG-related operating costs as two LNG facilities would need to be maintained. The Apremont Highway site would increase LNG-related operating costs over current levels, but this facility would end up as the single LNG facility on the HG&E system. In addition, although any alternative involving added LNG storage provides similar strategic opportunities as HG&E manages its transition toward electrification and a net zero future, HG&E's customers would be exposed to a substantially greater potential stranded cost as such transition moves forward.

The location of all four LNG alternatives is shown in greater detail on Figure 4-2. Aerial photographs of the West Holyoke Facility, the Whiting Farms Road site, the Apremont Highway site and the Southampton site are reflected in Figures 4-3, 4-4, 4-5 and 4-6, respectively.

HG&E concluded that a new LNG storage facility alternative was only practicable at either the Whiting Farm Road or Apremont Highway locations in Holyoke and that these locations should be analyzed further. HG&E recognized that these sites would have substantially higher costs and impacts as compared to the Project. The alternative locations for incremental LNG storage alternative were deemed appropriate for further consideration in HG&E's analysis but were not expected to be superior to the proposed Project.

4.2.4 Pipeline Alternatives

HG&E also evaluated alternative pipeline supply solutions. First, HG&E determined that the addition of a large-scale natural gas transmission pipeline delivering incremental capacity to the region was not an available option. HG&E then considered potential modifications to existing delivery facilities. HG&E is supplied pipeline gas at its sole gate station that ties into the Northampton Lateral. The existing lateral was installed in the 1950s to provide cleaner natural gas to the region as utility systems transitioned away from dirtier manufactured gas. This lateral is currently operating at capacity and cannot provide additional supply without expansion of the TGP system. Installation of a second pipeline parallel and adjacent to the existing Northampton Lateral ("looping") to facilitate an increase of capacity to HG&E's gate station was identified and evaluated to address the identified reliability need.

For HG&E's lateral capacity to be increased, TGP would need to install an approximately 1.7-mile "loop" of large-diameter (minimum 12-inch), coated-steel, high-pressure pipe infrastructure within or alongside the existing TGP lateral right-of-way (ROW). The location of the necessary TGP line is also shown in Figure 4-1. A more detailed USGS map for this alternative is provided in Figure 4-7. This project alternative would substantially impact the neighboring communities of Southwick and Westfield, Massachusetts during construction and would involve acquisition of new easements from affected landowners as well as substantial environmental permitting challenges. The pipeline alternative also involves substantial cost; over the 20-year initial term of the required capacity contract where TGP would recover its costs of lateral expansion, HG&E would be required to pay at least \$70 million in demand fees for capacity and associated carrying costs for necessary commodity (HG&E expects commodity-related costs would be comparable for all practical alternatives). This alternative would also be expected to increase the prospect of substantial stranded costs over time.

While the pipeline alternative could meet the identified reliability need and facilitate the addition of strategic, incremental service, this alternative would have a much higher cost and involve more substantial environmental and community impacts. HG&E elected to continue the evaluation of this alternative but expected it to be a far less attractive alternative as compared to the proposed Project.

4.2.5 Interconnection Alternative

As described, HG&E had previously elected to seek to address its identified reliability need by executing an MOU with CMA. While this original transaction structure is no longer available, HG&E again considered the use of existing natural gas distribution system interconnects with other natural gas utilities in the region for system reliability. An interconnect is a point where two natural gas utilities integrate piping systems for the purpose of natural gas supply through negotiated means. HG&E has and maintains interconnections with two neighboring utility natural gas distribution systems, namely Westfield Gas & Electric (WGE) and Eversource (the former CMA). Utility interconnects are typically designed to permit natural gas flow into each utility's respective system during emergency events or planned maintenance activities. While providing a valuable resource to maintain system operations during emergencies or maintenance, the interconnects are not sufficient to provide peak demand relief. These existing interconnections are located at system points where HG&E's gas distribution system operating pressure is higher than at the respective utility's interconnect point. As a result of this pressure differential, HG&E would be required to lower system operating pressure to receive natural gas supply from these interconnects. The need to lower system pressure when operating under peak demand would frustrate this alternative's ability to meet the need as lower pressures impact the operation of system pressure regulating stations and further limit the gas supply to HG&E's customers. In sum, any incremental benefits that might be secured by the interconnection would be more than offset by the consequences of the necessary operational pressure reduction. As such, an interconnection with WGE or Eversource would not effectively address the identified reliability need due to physical and design limitations of existing and available system interconnections. Because the pipeline interconnection alternative would not address the identified reliability need, it was not considered further.

4.2.6 CNG or Propane-Air Alternatives

HG&E also identified and considered the use of CNG or propane-air facilities for injection into HG&E's gas distribution system. CNG is natural gas that is stored under extremely high-pressure and can be used as a supplemental fuel. The CNG must be processed through regulation equipment to lower its pressure before it can be safely injected into HG&E's distribution system. CNG is transported pursuant to tractor trailers and each trailer can hold only approximately 400 Dth and the CNG would need to be processed from the trailer during the entire dispatch operation. To provide the storage capacity offered by the Project, at least 10 trailers would be required to be on-site during a peak demand period. This could be theoretically accomplished by "staging" of trailers or continuous delivery to replace depleted units. The limited storage availability of the trailers and the reliance of continuous trucking during the winter season would not meet the identified reliability need. HG&E will continue to review opportunities to employ CNG for temporary system reinforcement or scheduled maintenance activities.

HG&E also evaluated the alternative of employing a propane-air facility to meet the identified reliability need. Similar to an LNG facility, liquid propane may be vaporized and mixed with air to be injected into a gas distribution system. HG&E previously operated a propane-air system for peaking at the West Holyoke Facility, but that system was decommissioned in 2005 due to increasing natural gas interchangeability concerns. The use of propane-air involves a number of operational challenges, in part due to propane's higher heat content as compared to natural gas. Safe propane-air operations require the employment of an air stabilization system to lower the heat content of the propane vapor to match or complement the energy value of natural gas to avoid safety concerns for downstream users. In addition, the propane-air injection point must be located on the gas distribution system where there is a high demand (flow) and the propane-air mixture can only supplement the existing gas supply up to 50% of the volume in the gas distribution system in order to avoid the risk of damage to customers' gas fired equipment. These same interchangeability issues are not a concern with LNG as it is natural gas in its

liquid form and, thus, there are no limitations with the amount of vaporized LNG that can be injected in the HG&E gas distribution system.

Because neither CNG nor propane-air would address the identified reliability need, these alternatives were not considered further.

4.2.7 Energy Efficiency, Demand Response and Accelerated Electrification

HG&E evaluated energy efficiency programs as a potential alternative to the Project and concluded that expanded energy efficiency measures cannot meet the reliability need identified in Section 3.0. The beneficial load reductions from HG&E's comprehensive energy efficiency programs are already fully reflected in HG&E's determination of its load requirements, effectively reducing such requirements for planning purposes. Beyond this, HG&E, in its resource planning process, identifies and evaluates energy efficiency options on an equal basis with available supply or facility options and incorporates the results of its successful energy efficiency programs into its forecast.

HG&E's energy efficiency programs have been in place for decades and enable HG&E to provide valuable tools, incentives and information to help customers understand and reduce their energy usage. Reductions in customer energy usage have been and will continue to be gained from raising awareness through home energy audits, the replacement of aging systems with the installation of higher efficiency equipment, building efficiency improvements (weatherization) and the use of programmable thermostats to optimize energy use practices. According to the American Gas Association (AGA), the average American home consumes 40% less natural gas than it did 40 years ago, a result of energy efficiency improvements. HG&E estimates that it is has achieved actual annual savings of over 4,000 Dth in the last three years. Given peak day non-pipeline requirements, the amount of achieved demand reduction equates to only approximately 43 Dth or less than one percent of LNG send-out. To date, the overall impact during a peak natural gas event has been minimal with annual peak day savings only averaging 10 to 15 Dth.

As a result, energy efficiency measures alone cannot achieve the level of demand reduction necessary to meet the identified need. While energy efficiency remains an attractive option to reduce annual demand and employ natural gas more efficiently, it is not a practical solution for addressing an ongoing system contingency that could involve a loss of supply to a substantial portion of HG&E's customers. Energy efficiency measures will continue to help to reduce demand for natural gas and are reflected in HG&E's current design day forecast, but they do not match the timing, reliability or cost of the added reliability that can be provided by the Project. For these reasons, this alternative was not considered further.

HG&E evaluated demand responses as a potential alternative to meet the identified need. HG&E recognized that demand response programs are at a very preliminary stage of development and not advanced sufficiently to serve as a means to meet the identified need within the projected schedule. For load management or demand response to be a meaningful alternative, there must be an identified firm,

large volume natural gas resource that a customer is willing to reduce service on or interrupt. Several regional utilities are pursuing pilot programs such as the promotion of controllable thermostats. These programs may secure limited demand reductions over a brief period of time, but would not result in sufficient demand reductions to eliminate the need for supplemental natural gas during a protracted cold snap. HG&E will continue to monitor the development of this resource option but determined that demand response would not meet the identified need or schedule and, therefore, was not considered further.

HG&E further evaluated the potential of accelerated system electrification as a Project alternative. Consistent with the Commonwealth's commitment and Holyoke's residents' interest in clean and renewable energy, HG&E has established a pathway to a net zero carbon future. As noted, HG&E already secures a substantial portion of its electricity from renewable and carbon-free resources, including the material deployment of hydro and solar generation as well as electric battery storage. HG&E's role as a provider of both electricity and natural gas service will facilitate this transition on a cost-effective basis and enable HG&E to build upon its record of substantial achievement.

To achieve the Commonwealth's statewide GHG reduction goals, many technologies that currently operate with fossil fuels will need to convert to cleaner sources, such as electricity. HG&E currently offers rebates and other financial incentives for various electrification measures and will continue to explore additional programs to help customers to convert from the highest emitting fossil fuels to electricity.

A major variable to meeting accelerated electrification is that HG&E's electric distribution system will require costly and substantial infrastructure upgrades to accommodate an increase in electric load. Current system forecasts project an increase of up to three times the existing peak summer load with a new system peak load occurring during the winter heating season. The necessary upgrades to HG&E's electric distribution system are expected to be completed over the course of at least 15 to 20 years and are designed mainly to address the electrification of homes and the transportation sector at an estimated cost of \$150 million in 2022 dollars based upon a preliminary or rough estimate. See Appendix H. HG&E is in the process of developing a targeted electrification outreach to residents currently consuming higher emitting fuel sources. This approach requires a financial commitment from the resident and, while incentives and rebate programs are in place, current inflationary impacts are expected to further limit the scale of participation in such a program roll-out. This analysis does not include necessary generation and transmission infrastructure improvements that will be required to satisfy the increased electric demand for the region. As previously mentioned, customers will also require sufficient time to plan for costly, customer-owned system upgrades to be able to switch to electric equipment or appliances.

HG&E will continue to achieve greater and increasing customer participation in future years as implementation costs are reduced and the electric distribution system advances to reliably meet the growing demand. While these electric system upgrades will be strategically implemented, HG&E has an obligation to maintain reliable and least-cost gas distribution service and notes that the small,

incremental capacity available with the proposed Project will enable the immediate displacement of certain fossil fuel uses and the orderly transition to electrification for customers.

Reliance upon electrification is not a comparable alternative to the Project in terms of taking timely and cost-effective actions to enable HG&E to continue to provide reliable service to its existing natural gas customers for the near future and, therefore, this alternative was not considered further.

4.2.8 Conclusions on Initial Analysis of Project Alternatives

HG&E determined that three project alternatives would be able to meet the identified reliability need by providing peak day or cold snap gas capacity and should be examined more comprehensively: (i) addition of an additional tank at the West Holyoke Facility; (ii) construction of a new LNG facility with added storage capacity; and (iii) expansion of a portion of the Northampton Lateral. These project alternatives all provided additional strategic flexibility for the limited displacement of fuels such as oil that are not available under the ongoing moratorium. These project alternatives were evaluated based upon their comparative cost, reliability or operational benefits and environmental impacts.

4.3 Comprehensive Analysis of Practical Alternatives

4.3.1 Cost Analysis

HG&E performed detailed cost comparison of the three practical alternatives. The proposed Project would cost approximately \$4.4 million to construct. If the cost of certain unrelated improvements to the West Holyoke Facility were included, total construction cost would be approximately \$7.8 million. There would be no material change to HG&E's operating costs of the West Holyoke Facility. The Project was the least cost alternative due to its established ownership, level grade, limited civil and environmental mitigation requirements, existing infrastructure and a more favorable permitting and design process. Given HG&E's plan to incorporate the additional safety and reliability enhancement, HG&E considered all West Holyoke Facility costs in the project alternative analysis.

A new LNG facility that would expand HG&E's peak storage capacity would require a range of complementary equipment including truck-unloading, vaporization, metering, odorant and ancillary electrical and safety systems depending upon the site. HG&E would most likely construct a larger LNG facility at the Apremont Highway alternative site and retire the West Holyoke Facility. Permitting, construction and mitigation costs would be substantially higher. The construction cost of this type of LNG facility with a larger, field-erected tank is estimated at \$70.1 million. Operating costs would be higher than current costs associated with the West Holyoke Facility. A smaller LNG storage facility at Whiting Farm Road would cost approximately \$20.5 million and would be expected to double annual operating costs associated with LNG operations or increase costs by approximately \$720,000. See Figure 5-2 for a summary of capital costs and Figure 5-3 for a comparison of operations costs.

The "looping" of a portion of the Northampton Lateral would cost at least \$70 million based upon a preliminary cost estimate from TGP. HG&E would expect actual costs to be higher at the time of construction. Operating costs would be comparable to current conditions as the West Holyoke Facility would continue to be operated on certain peak days, although fewer truck deliveries would be scheduled during the winter season due to the expanded firm pipeline capacity.

In sum, the proposed Project would be substantially less costly than other practical alternatives. An additional benefit is that the related risk of stranded costs would also be lower with the Project, an important consideration as HG&E continues to transition its customers to expanded electrification and a net zero future.

4.3.2 Reliability and Operational Analysis

The proposed Project and either of the two alternative new LNG facilities would address the identified reliability concern on peak or near peak days by expanding LNG storage capacity on HG&E's existing system. Thus, reliable service can be maintained if LNG deliveries needed to replenish tank volumes are delayed or affected by adverse weather. This greater flexibility and reliability will ensure the protection of the health and safety of existing natural gas customers. The Northampton Lateral expansion will increase daily available capacity, including on peak or design days. The Northampton Lateral expansion reduces HG&E's dependence upon LNG deliveries but increases its dependency on a single gas source off that lateral; the Project would enable HG&E to serve its full requirements in the event of a gas supply issues associated with the TGP system. The Project also enjoys one material, additional beneficial feature in that the limited scope of work does not require extensive environmental permitting and may allow HG&E to complete the Project in a more timely manner.

All three alternatives enhance HG&E's operational flexibility to secure other economic and environmental benefits for customers. All three alternatives enable HG&E to add new customer load, which would be managed strategically to reduce short-term emissions from other fuel sources such as heating oil while also complementing HG&E's process toward electrification. One means to facilitate electrification is to add to rate stability while needed new investments in the electric distribution infrastructure are pursued, which goal is best advanced with the Project.

HG&E determined that all three practical alternatives are largely comparable in terms of reliability and operational flexibility. The Project at the West Holyoke Facility provides the most flexibility during an energy transition. As electrification adoption increases over the next twenty years, more so in the latter half, natural gas usage is anticipated to decrease. The Project offers scalability that the two alternative sites cannot, particularly related to stranded costs. HG&E can retire aging assets at the West Holyoke facility if system demand is reduced. The Whiting Farm Road LNG storage facility alternative provides some capability in terms of scalability but would involve higher stranded costs. The new LNG storage facility project at Apremont Highway with a larger, field-erected tank would eventually become "oversized" while the pipeline alternative requires execution of long-term contracts.

Although all three practical alternatives are comparable in terms of reliability and operational flexibility, HG&E determined that the Project is superior due to its flexibility and long-term scalability, thereby providing a greater overall operational benefit to HG&E.

4.3.3 Environmental Analysis

HG&E conducted a preliminary analysis of potential environmental impacts followed by detailed and comprehensive comparative analysis based upon a range of factors related to construction and operation. The analysis relied upon mapping resources and field inspections. Appendix L, Figures 1, 2, 3 and 4 contain overlay maps and location depictions for a variety of factors considered in the environmental evaluation of project alternatives.

The Project was not anticipated to have substantial environmental impacts during either construction or operations given the nature of the site and its existing use. There are no wetland resources, cultural resources or rare species concerns at the West Holyoke Facility. Site preparation requirements are minimal based on the existing facility and prepared area for the additional LNG storage tank. The West Holyoke Facility enjoys substantial buffering from abutters and established vegetation which provides screening for the adjacent neighborhood. There is also substantial community acceptance for the West Holyoke Facility given its current and longstanding use. Finally, the Project provides incremental benefits for the consideration of future enhancements such as the employment of renewable natural gas or nonfossil fuels.

A new LNG facility developed on a raw land site would involve more substantial construction and operational impacts as such a facility would likely result in a material change to current land use in the area. More expansive and extensive construction would be required due to the necessary site preparation including clearing of forested areas and grading, increasing impacts during construction. The Apremont Highway site has substantial areas of exposed and subsurface bedrock which would require extensive rock removal through mechanical (hammering) or blasting construction techniques. The sites considered for this alternative would likely be able to be successfully permitted but would take significant time and would also likely result in more substantial impacts to environmental resources and adjacent landowners. For example, the Apremont Highway site would result in impacts to forested land, drinking water supply protection areas and rare species habitat and also be subject to Article 97 provisions (conversion of designated public land). The Whiting Farms Road site would also require substantial site preparation and is located within close proximity to an Environmental Justice population. Community acceptance concerns would also be more substantial with these alternative locations.

The looping of the existing Northampton Lateral would result in substantially greater environmental and landowner impacts than any of the discrete site alternatives. Construction of a 1.7-mile pipeline with a nominal workspace width of 100 feet would result in over 20 acres of new land alteration with approximately half of that maintained as new, permanent right-of-way. This would result in permanent conversion of forested land and modify the existing land uses along the alignment. A portion of the loop

alignment also crosses land with shallow depth to bedrock which would result in blasting or hammering to remove rock. Additionally, the route would impact wetland resource areas as well as a property designated for open space and subject to Article 97 protections. Most importantly, the new pipeline would affect a minimum of 24 properties and, unless routed away from the existing pipeline, would require construction within close proximity to existing residences.

HG&E's comprehensive assessment was that the Project involved, by far, the least construction-related impacts of all practical alternatives and also the least incremental operational impacts.

4.4 Conclusion on Analysis of Alternatives

HG&E identified and evaluated several potential alternatives to meet the identified need to provide additional supply capacity on a peak day or extended periods of cold weather to continue to provide reliable service to its existing natural gas customers. HG&E's analysis considered if each alternative was feasible, could meet the identified need and, for appropriate alternatives, compared the reliability and flexibility of service, potential impact to environmental factors and cost. HG&E's analysis of alternatives considered: (i) the no-build alternative; (ii) the Project; (iii) alternative LNG facility options; (iv) the expansion of the Northampton Lateral; (v) interconnections with neighboring gas distribution systems; (vi) CNG and propane-air; and (vii) energy efficiency, demand response and accelerated or targeted electrification. HG&E's alternative analysis demonstrated that, consistent with the Siting Board's standards and precedent, the proposed Project is the superior alternative to meet the identified need in a reliable, least-cost and least-environmental impact manner.



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HG&E LNG Infrastructure & Resiliency Project

Project Alternative Sites

Alternative Sites

- Preferred Site West Holyoke Facility Site
- Alternative Site Apremont Highway Site
- Alternative Site Whiting Farms Road Site
- Alternative Site Southampton Site

Project Alternative

Pipeline "Loop"



The information depicted on this map is for planning purposes only. It is not suitable for engineering applications or site work nor should the data be used to determine absolute location of utilities. Please use this information as a guide and field verify all locations before instituting any plan or policy.











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