



KANSAS GEOLOGICAL SURVEY

1930 Constant Ave., Campus West
The University of Kansas
Lawrence, Kansas 66047-3726
phone 785-864-3965
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Proposed Project for Application to the Kansas Department of Health and Environment for the Kansas Public Water Supply Loan Fund

Applicant: City of Olathe
42" Finished Water Transmission Main (City Project No. 51604c)
Contact Person: David E. Cox, P.E., Utilities Engineering Manager
Address: P.O. Box 768
Olathe, KS 66051-0768

Sent to the Kansas Geological Survey for environmental review.

Agency Review Comments:

The study for the proposed project appears to have adequately considered such geological issues as the depth to bedrock and character of the soils, and hydrologic issues such as runoff and stream locations. In general, the long-term benefits of the finished water transmission line to the water supply system should offset any short-term adverse environmental impacts during construction.

Recommended Action:

- ☒ Clearance of project should be granted
☐ Clearance of project should not be granted
☐ Clearance of project should be delayed until the issues or questions have been clarified
☐ Clearance of project should not be delayed, but the applicant (in the application) should address or clarify the questions or concerns indicated above

Donald Whittemore
Reviewer's Name

Geohydrology Section, Kansas Geological Survey
Division/Agency

9/12/06
Date


Reviewer's Signature

The above discussion represents our best assessment based on the information that the Kansas Geological Survey has about this locality and/or proposed project at the time of this writing. Other geologic conditions, not discussed herein, or for which the Kansas Geological Survey has no knowledge, may affect the viability or safe operation of this facility or property. The information provided in this letter is from regional or county-wide studies and should not be used as a substitute for detailed site characterization by a licensed geologist or engineer. It is the responsibility of the applicant to provide any required site characterizations.



August 11, 2006

**Kansas Geological Survey
University of Kansas
1930 Constant Avenue, Campus West
Lawrence, KS 66047**

Re: City of Olathe, Kansas
Kansas Public Water Supply Loan Fund
KDHE Project No. 2470
42" Finished Water Transmission Main (City Project No. 51604c)

To Whom It May Concern:

The City of Olathe, Kansas is preparing an application to the Kansas Department of Health and Environment for a loan from the Kansas Water Supply Loan Fund for the above referenced project.

This project will increase the transmission finished water capacity of the water from Water Plant No. 2 (WTP2), located in Lenexa on 83rd Street to the City of Olathe water system boundaries at 119th and Lone Elm Road. Improvements will consist of approximately 34,000 lineal feet of new 42" transmission main (PCCP, DIP or Steel).

A corridor study was completed by Burns & McDonnell which reviewed several alternatives for the waterline alignment, along with potential environmental impacts. A copy of the corridor study is attached for your reference.

It is the City's intent to have the waterline construction completed by late summer 2008. The engineering and construction costs for the improvements are estimated to be \$22,000,000.00. This loan is requesting funds of \$19,745,000.

We would appreciate your review of the project description and location, and any comments you may have, within 30 days from the date of this letter. A project review form and a plan reflecting the waterline alignment are enclosed for your use.

Please contact David Cox at (913) 971-9056 or via email at dcox@olatheks.org should you have any questions.

Sincerely,

David E. Cox, P.E.
Utilities Engineering Manager
City of Olathe

The following form may be used by the Review Agency/Commission for comments in response to the request for clearance from the proposed Public Water Supply Loan Fund Project.

☐ Army Corps of Engineers
☐ Kansas Biological Survey
☐ State Conservation Commission
☐ Kansas Corporation Commission
☐ Division of Water Resources/Kansas Department of Agriculture
☐ Kansas Geological Survey
☐ Kansas State Historical Society, State Historic Preservation Office
☐ Kansas Water Office
☐ Kansas Department of Wildlife and Parks
☐ US Dept. of Agriculture - Natural Resources Conservation Service
☐ Kansas Department of Health and Environment
☐ US Department of the Interior - Fish and Wildlife Service

Agency Review Comments: (to be completed by reviewing agency and returned to applicant contact person at name and address shown below)

Comments: _____

Recommended Action: (to be completed by the reviewing agency and returned to applicant contact person at name and address shown below.)

☐ Clearance of project should be granted

☐ Clearance of project should not be granted

☐ Clearance of project should be delayed until the issues or questions have been clarified

☐ Clearance of project should not be delayed, but the applicant (in the application) should address or clarify the questions or concerns indicated above.

Reviewer's Name

Division/Agency/Commission

Date

Project Title: Public Water Supply Loan Fund Application

Applicant: City of Olathe (KDHE Project 2470 - 42" Finished Water Transmission Main)

Contact Person: David Cox, Utilities Engineering Manager

Address: P.O. Box 768

City, State: Olathe, KS Zip: 66051 Phone: 913 971-9056





MEMORANDUM

Date: January 26, 2006

To: David Cox
Randy Freeman

From: David Oligschlaeger
Bryan Claxton
Tony Kempf
Ed Schlagel

Re: Phase I - 42" Finished Water Transmission Main
Evaluation of Alignment Alternatives



INTRODUCTION

This memorandum summarizes the evaluation of alignment alternatives for the 42" finished water transmission. The main originates at Olathe's Water Treatment Plant 2 located at 27065 W. 83rd Street and terminates within the City of Olathe distribution system at the intersection of Lone Elm Road and 119th Street. Due to the location of Olathe's Water Plant 2, the main traverses portions of the City of Lenexa. The main must also cross highways K7 and K10. Additionally, portions of the alignments traverse developed areas within the Cities of Olathe and Lenexa.

PURPOSE

Alternatives were evaluated to identify the optimum alignment for the main. Major factors utilized in the evaluation of alternative alignments included cost and constructability, disruption and public acceptance, environmental impacts, operation and maintenance, easement requirements, and regulations along with associated permitting requirements. Twenty-seven sub criteria were also utilized in the evaluation of alignment alternatives.

GIS MAPPING

The first step in the evaluation of alignment alternatives for the 42" finished water transmission line was to collect the latest data available for the study area. Data included hardcopy, CAD and GIS data for a study area that was approximately bounded by Cedar Niles Road on the West, Lone Elm Road on the East, 83rd Street on the North, and 119th Street on the South. The study area encompassed land within the City of Lenexa and the City of Olathe as well as areas and utilities that were managed by other entities such as the Kansas Department of Transportation (KDOT) and Water District No.1 of Johnson County (WaterOne). Therefore, the data collection process included coordination with many different data resources.

The majority of the study area resides within the City of Lenexa and a large amount of GIS and CAD data was collected from the City's GIS department. Base mapping,



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including aerial photos, parcels, road centerlines, and topography were collected in addition to more specialized data such as soils with depth of bedrock, future road centerline data, future land use data, and preliminary plat information. An analogous set of GIS data was collected from the City of Olathe's GIS department with the addition of water utility locations for all Olathe's water distribution mains within the study area and the 5 original alignment alternatives for the 42" transmission main. The GIS and CAD data collected from the two Cities was loaded into a project geodatabase to create a seamless set of data for the entire study area.

While the City's GIS data provided a good base for the routing analysis, other data sources needed to be included to characterize the existing and future utility and road alignments within the study area. WaterOne provided the location of all their water mains within the study area in GIS format and multiple hardcopy data sources were collected from KDOT and various improvement projects within the study area. This information was compiled and loaded into the project geodatabase with the City's data. A complete listing of all the files received and their source can be found in Appendix A of this document. At this point, sufficient data had been collected to begin to use the GIS to analyze the best route alternatives for the new 42" transmission main.

PRELIMINARY EVALUATION OF ALIGNMENT ALTERNATIVES

The evaluation of the 42" transmission main alignment alternatives was broken into two main phases. In the first phase of the analysis, a preliminary evaluation of the alignment alternatives was completed using the GIS in conjunction with the data collected from the sources discussed in the previous section. The preliminary analysis focused on quantitative items such as property costs, rock removal costs, and tunneling costs. This phase of the analysis was meant to determine if there were any major flaws with the alignments and determine if there was any other alignment that may be advantageous to add to the list of alternatives. Once the route alternatives had been filtered during the preliminary evaluation, the final two alignments were then analyzed in the field for detailed issues such as constructability and disturbance to the public that could not be easily measured within the GIS analysis.

The first phase of the route selection is shown graphically in the figure titled "Route Development Process" and also described in detail below.

When doing an overlay type analysis on routes within the GIS it is fundamental that the actual location of the route be accurately located within the base mapping. As an example, if an analysis is run to calculate the cost of purchasing easement across a property, it is fundamental that the route be plotted correctly along each property line so that the correct costs are assigned. Therefore the first step was to take the 5 alternatives



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delivered by the City of Olathe and overlay them on top of the base mapping data so that they could be adjusted to follow property lines, roads, etc....

The adjusted alignments were delineated based on visually inspecting the sides of properties and roads that would mitigate installation issues and then assumed offsets from property lines and road centerlines were used to place the route. Once the five original routes had been adjusted to fit with the base mapping, the study area was analyzed for any additional routes that would be advantageous. One routing option that was researched was the opportunity to utilize electrical transmission line corridors.

The data delivered by the City of Lenexa included the electrical transmission pole locations and from this data the electrical transmission line routes for the study area were developed. It was determined that a sixth route alternative could be developed that followed electrical transmission line corridors heading southeast to Lone Elm Road and then continuing south parallel to Lone Elm Road to the terminus point at 119th street. This alternative provided several initial advantages in the form of shorter route distance because of the ability to cross property at an angle in the existing power corridor and the opportunity to possibly use existing power corridor as part of the construction easement for the transmission main.

Upon completion of the six alternatives a meeting was held with the City of Lenexa to discuss the future growth in the study area and any concerns they had with any of the alignments. After the meeting, it was determined that it would be useful to develop hybrid routes that used parts of multiple route alternatives to get from the treatment facility to the terminus point. This method was possible because of the amount of route overlap between the 6 different routes.

In order to account for this possibility, each route was broken into unique segments. All the duplicate segments that were created because of overlapping routes were removed and one unique route segment was created. Additionally, each route segment was broken to reflect any tunneling that would be required to cross any roadways. The result of this process was the creation of a network of segments that could be utilized within any route. The last information that was developed to make it possible to analyze the route segments was an installation cost for each segment within the study area.

The total installation cost for a route segment was determined by five main factors:

- Cost per foot to install pipe
- Cost per foot for rock removal
- Cost per foot for tunneling
- Cost per square foot of permanent easement
- Cost per square foot of temporary easement



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Cost per foot to install pipe

In order to calculate the cost associated with the installation of a segment of 42" transmission main, Garney Construction developed a unit cost of \$350.00 per linear foot of pipe. The unit cost included pipe, fittings, and normal installation (no rock) for a foot of 42" transmission main. The unit cost was combined with the GIS representation of all of the route segments, containing the length of each segment in feet, to calculate the total pipe installation cost for each segment.

Cost per foot for rock removal

The first step in determining the cost of rock removal for a segment was the GIS overlay of the route segments with the depth to bedrock data layer. The overlay analysis provided exactly which segments intersected rock and how many linear feet of that segment would be affected by the rock. The route segments were then reviewed by Garney Construction to determine if blasting or hoe ramming would be used to remove the rock. Additionally, a unit cost for rock removal using hoe ramming of \$90.00 per linear foot and a unit cost for rock removal using blasting of \$55.00 was developed by Garney Construction. Each segment that intersected rock was assigned a rock removal method and the linear feet of segment affected by rock was then combined with the unit costs to determine a total cost for rock removal for each route segment.

Cost per foot for tunneling

When the route segments were created it was assumed that all road crossings would need to be tunnels and would not be open cut. When the route segments were split for the tunnels special attention was paid to try to create segments that represented the appropriate length and location of the actual tunnel. These segments were specially noted within the database as tunnel segments so that the proper unit costs could be applied. Just as with open cut installation, the presence of rock is significant when determining the cost of tunneling. Therefore, when the route segments were overlayed with the depth to bedrock data later to determine rock removal it was also possible to determine if the tunneling process would be in soil or rock. Garney Construction developed a unit cost of \$1250.00 per foot for a tunnel in soil and \$2000.00 per foot for a tunnel in rock. These unit costs were combined with the results of the overlay analysis depicting the length of rock in a tunneling effort to develop the total cost for each tunnel segment.

Cost per square foot for permanent easement

Through discussions with Garney Construction and WaterOne an assumed permanent easement width was developed. It was determined that thirty feet was a reasonable assumption for permanent easement width and this width would be adjusted during field verification of the last two alignments. With the easement

width known for each segment, it could be combined with the length of each segment to determine the square footage of easement required for each segment. The costs of easements were discussed among the project team and a unit cost of \$0.75 per square foot for property West of Clare Road and \$1.10 per square foot for property East of Clare Road was developed. The route segments were divided by Clare Road and assigned the correct unit cost so that the square footage of easement could be used to determine the total cost for permanent easements per segment.

Cost per square foot for temporary easement

The temporary easements were developed by working with Garney Construction and WaterOne. It was determined that fifty feet was a reasonable assumption for the temporary easement width. The square footage of temporary easement for each segment was then determined using the same method as the permanent easements. The unit costs for the temporary easements were once again split by the area West of Clare Road and the area East of Clare Road. The cost per square foot was determined to be approximately 40% of the permanent easement costs. Therefore, for segments West of Clare Road a unit cost of \$0.30 per square foot was used and for areas East of Clare Road a unit cost of \$0.44 was used. The unit costs were then applied to the route segments using the same procedure as the permanent easements and the total cost for temporary easement was calculated for each segment.

Once all the costs for each route segment were developed a total cost that included all five factors was developed and added to each route segment. The new total cost value represented the complete cost expected to install that segment of 42" transmission main. The GIS was used to analyze all the independent route segments based on their connectivity and total installation cost to determine routes from the treatment facility to the terminus point that represented the most economical options.

Upon completion of the GIS routing analysis two routes were identified as the most desirable options to route the 42" transmission main from the treatment facility to the terminus point. The two remaining routes were then ready to have field verification done to determine if there were any issues that weren't found within the GIS analysis dealing with constructability or public disruption/acceptance. The evaluation of the final two routes is discussed in the following section of the memo.

DETAILED EVALUATION OF FINAL TWO ALIGNMENT ALTERNATIVES

Upon completion of the first phase of the route selection process a detailed assessment of the final two alignments was undertaken. An evaluation matrix was developed in



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conjunction with the City of Olathe including six major factors and twenty-eight sub criteria with each of the factors and sub criteria assigned a relative weight.

Field surveys were then conducted to further refine the final two alignments within their routing corridors and to evaluate the two alignments in detail. The final alignments are indicated in Figure 1. The following text summarizes the evaluation undertaken in determining a score for each of the sub criteria. Each sub criteria was scored from 1 to 5 with the value of 5 representing the most desirable rating and a score of 1 representing the least desirable rating. For example, using the first sub criteria of "Access" under the "Constructability" factor, a score of 5 would be representative of excellent assess along the alignment for construction purposes while a score of 1 would be indicative of poor construction access.

The completed evaluation matrixes for the two alignments are included at the back of this technical memorandum. The total score for each alignment is summarized as follows:

<u>Alignment</u>	<u>Total Score</u>
1	354
2	320

As indicated by the higher score of 354 points, Alignment 1 appears to be the more desirable alignment when evaluated using the selected factors and sub criteria, although not my a wide margin.

Alignment 1 (Red)

Constructability

Access

Alignment 1 runs between existing two lane roads along the northwestern portion, then within existing power line right of way and existing streets as it makes its way south. On the southern portion, it continues along existing streets and power line right of way. Access should be good for the majority of the project.

Geotechnical

With the information currently available to us, it appears that there is limited rock on Alignment 1 in the north portion of the project. The majority of the rock is indicated to be just north and south of Hwy K-10. Overall, the anticipated rock excavation required looks to be minimal for this alignment.



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Equipment Necessary

The equipment necessary to construct the project will be the same for both alignments. There appears to be no advantage for either alignment as it relates to the equipment required to build the work.

Horizontal/Vertical Work Area

In most cases, 80 feet of work area (30' permanent easement and 50' temporary easement) will be available along Alignment 1. One area of concern as it relates to horizontal work area is along the road north of 95th Street (Prairie Star Parkway) for approximately 2000'. The easement in this area appears to be limited and appears to have existing utilities that may require working around.

Disruption and Public Acceptance

Number of Homes Affected

Alignment 1 currently only affects 4 homes and 1 farm office/maintenance barn. There appear to be some future homes that may be affected by the time the project is actually constructed north and south of 95th Street.

Traffic Impact

There appears to be limited traffic impact utilizing Alignment 1. At this point we anticipate that all streets will be jack & bored/tunneled therefore we do not anticipate any street closings. The portion of the alignment north of 95th Street for approximately 2000' may require a lane closure during construction.

Commercial Impact

Alignment 1 appears to have no commercial impact.

Alignment 1 will require coordination with the power company to determine the best routing in the vicinity of its facility just north of Hwy K-10.

Public Areas

Alignment 1 passes thru the north portion of Olathe School District's College Boulevard Athletic Complex at 107th Street. Where the line runs east and west in this location it will have to lay either on the north or south side of the existing power lines. If it runs along the north side, there is a row of trees that will require removal to install the pipe line. If the line is to go on the south side of the power lines, it will require laying the line through a portion of the parking lot in this area. There appear to be no other Public Areas affected.



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Local Government Support

Meetings have been held with the City of Lenexa to discuss various Transmission Line Alignments. The City has provided positive feed back and information that has been utilized in the route selection process. The professional engineering and planning staff of Lenexa reviewed the routings to determine if there are potential impacts to future plans. Based on these meetings, Alignment 1 and Alignment 2 were adjusted to accommodate Lenexa's comments. Due to working closely with the City of Lenexa in the planning process, it is anticipated that both routes should be acceptable

Alignment 1 has been modified east of Clare Road showing a curvilinear configuration to shadow a City planned street location. The curvilinear alignment also takes into consideration possible plans by the City to construct a storm water retention basin North and adjacent to the power lines.

Future Development

Western Lenexa is rapidly growing and expanding with residential developments on both sides of Highway 7. Most of the projects under construction are in the planning stages and located on to the west side of Kansas State Highway 7 and north of Kansas State Highway 10.

Both Line routes take into consideration the proposed plans for these developments and the alignments have been modified to include the projects in this area.

Alignment 1 is paralleling the electric transmission line near the Northwest Corner of Kansas Highway 10 and Kansas Highway 7. Sharing the easement or closely paralleling the easement would minimize the impact to a future business park that may be located within this 480 acres area. It is anticipated that the business park would be up to 3 times the size of Corporate Woods. It is anticipated that the land owners could have opposition to any new right of way taking at this location.

Reportedly, Pulte Homes acquired the tract of land East of Clare Road and has started plans for a residential development that could start construction within 24 months. Prior to finalizing Alignment 1 or 2 east of Clare Road additional coordination would be required regarding the location of future retention basins, housing development design status and the future street alignments.

Emergency Services

There is a new Lenexa public Safety Facility at 95th Street (Prairie Star Parkway). Coordination in this area would be critical to that facility. Other than this, there appear to be no other emergency services in the area.



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Environmental

Water Quality Impacts

Alignment 1 parallels existing residential development for much of the northwestern portion of the route. In addition, two large commercial properties (Honeywell and Aldi) as well as Olathe Northeast High School and Athletic fields are located along the southeastern portion of the route. These areas contain previously disturbed soils and increased acreages of impermeable surfaces that would likely produce greater storm runoff volumes and negatively affect water quality. According to the 1979 U. S. Soil Conservation Service Johnson County Soil Survey, no soils that are likely to adversely impact water quality are located along the proposed pipeline alignment. Disturbance of developed areas would have the potential to temporarily impact water quality more severely than pipeline placement in undeveloped areas.

Terrestrial Habitat

Overall, Alignment 1 is dominated by agricultural land and non-native grassland corridors. The proposed pipeline alignment follows existing roadways or electric transmission corridors where possible. Only a small amount of terrestrial habitat is represented by the existing pasture land and riparian corridors associated with the stream crossings. As a result, Alignment 1 is expected to impact a greater amount of terrestrial habitat (than Alignment 2) as it passes through a larger extent of non-residential, non-commercial terrestrial habitat.

Aquatic Habitat

Seven stream crossings will be impacted by the development of Alignment 1. Even though access was limited, each of the streams appeared to be small intermittent drainages with narrow riparian corridors surrounded by agricultural fields. In addition, two ponds will likely to be impacted by development of Alignment 1. These ponds have the potential to provide aquatic habitat for waterfowl and fish as well as livestock water.

Wetlands

No wetlands were identified on Alignment 1 during the field survey. However, an initial review of U.S. Fish and Wildlife Service (FWS) National Wetland Inventory (NWI) maps indicated that some jurisdictional wetlands could be located at some of the stream crossings. The exact amount of wetlands impacted at the stream crossings would be determined during formal wetland delineation. The potential of additional wetlands occurring in other areas that were not accessible during the field review of Alignment 1 is slight given the existing contour of the land and the relatively large amount of residential and commercial development along the alignment. At this time, it is anticipated that a U.S. Army Corps of Engineers Section 404 Nationwide Permit would be sufficient.



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Cultural Resources

Generally, Alignment 1 passes through a large amount of agricultural uplands which are less developed or disturbed; as a result, archaeological site density on these upland areas is expected to be low. The seven intermittent streams that the alignment crosses offer a low to moderate possibility of containing archaeological sites. There are scattered farmsteads in the vicinity of the proposed alignment which may be encountered as archaeological sites or as standing structures. These sites or structures can normally be easily avoided by minimal pipeline realignments or adjustments.

Operation and Maintenance

Access

Alignment 1 has good access along power line right of ways or along existing streets. The alignment should offer good access for future maintenance.

Personnel

The personnel required to perform maintenance on either Alignment should be the same and there appears to be no advantage for either Alignment.

Equipment

The equipment required to perform maintenance on either Alignment should be the same and there appears to be no advantage for either Alignment.

Location Under Pavement

The assumption to date has been made that all street crossings will be done utilizing tunnels or jack and bores. The routing along W. Valley Pkwy could be affected depending on where it is determined to lay the line. There is the possibility of laying the line in the current right of way which could possibly put it under a future roadway.

Easements

Permanent

Other than a couple of areas (along Lone Elm Road on the south end and along W. Valley Pkwy), the assumption has been made that permanent easement will be required for the entire alignment. It is currently estimated that 62 parcels of property owned by 38 separate entities will be crossed and require permanent easements. Of the 38 property owners 26 are located in the City of Lenexa.

Temporary

Other than a couple of areas where right of way may be available as temporary easement (along Lone Elm Road on the south end and along W. Valley Pkwy), the assumption has



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been made that temporary easement will be required for the entire alignment. In the areas that the line runs along current power line right of way, temporary easement within this right of way may be cheaper/easier to acquire.

Time Restrictions

Alignment 1 passes through agricultural areas and consideration should be given to the agricultural activities that take place on different agricultural tracts. If crop lands are damaged during planting, growing or harvesting of crops impact fees are typically granted. The crop damage fees, however, are relatively small compared to the cost of construction.

Acquisition Time

It is anticipated that condemnation proceedings may be required for Alignment 1. The acquisition time by condemnation will take between 6 and 9 months.

Regarding existing utilities, Enbridge and Conoco-Phillips have gas line easements in Western Lenexa near Gleason Road. Alignment 1 crosses the gas lines. Enbridge has taken 4 to 6 months to acquire a subordination agreement. Conoco-Phillips has historically taken 3 to 6 weeks. Alignment 1 has the most interfaces with the gas transmission lines as it parallels Gleason.

Alignment 1 also crosses and parallels existing electrical utility easements which will require subordination agreements. WaterOne has recently received approval for sharing easements with the same electrical utilities. The City of Olathe may wish to pursue this option in order to minimize conflicts with land owners.

Regulations and Permitting

Kansas Department of Health and Environment (KDHE)

Design of the pipeline must conform to the standards of KDHE, particularly regarding pressure and leakage testing, disinfection, and separation distances from sources of pollution. Because the pipeline exceeds one mile in length, the project must be submitted to KDHE for review. A "Public Water Supply Permit Application" must be notarized and filed along with appropriate filing fee and drawings and specifications to KDHE for approval prior to any construction work. Because it is a pipeline project, KDHE does not require a preliminary report in advance, nor will they perform a final inspection. However, KDHE should be notified when the project is complete. Submitting the preliminary plan would also serve to hasten receipt of final KDHE approval. Neither alternative differs in this regard.



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U. S. Army Corps of Engineers (COE)

Although no wetlands were identified for Alignment 1, there is the potential for some jurisdictional wetland to be located at some of the stream crossings. A single request for "Section 404 Permit" that covers the entire project and pipeline alignment should be prepared and submitted to the Corps Kansas City District Office. It is anticipated that a Section 404 Permit will be granted by the Corps stating that a Nationwide Permit 12 for Utilities is adequate for this work. Seven streams and two ponds will be impacted by Alignment 1.

Kansas Department of Transportation (KDOT)

It is proposed to cross all streets and highways with the 48-inch carrier pipe installed in a casing, constructed by tunneling or by jack and bore. A KDOT permit is required to install and maintain the pipeline across a highway right-of-way or a city connecting link. The pipeline design at these crossings of a highway or city connecting link must comply with the latest edition of the "KDOT Utility Accommodation Policy". The permit is a "Highway Permit – Use of Highway Right-of-Way" (KDOT Form 304) which should be prepared and submitted to the KDOT Office for District I, Area 6. The permit must be accompanied by appropriate drawings and details. Both alternatives are similar in that they both will require a KDOT highway permit to cross Kansas Highways K-7 and K-10.

Municipalities

Prior to any construction work being accomplished, three permits must be obtained to perform the work within the City limits of Lenexa. An "Excavation Permit" must be obtained from the Public Works Department to excavate in the public street right-of-way. Of concern are approved backfill materials, compaction requirements, temporary traffic control, and construction limits. This permit will be required for those casings installed under City Streets and not subject to the above defined KDOT requirements. Timely communication with Lenexa's Right-of-Way Manager is important to keep the City advised of progress. A filing fee is required.

A "Land Disturbance Permit" is required from Lenexa, as more than 5,000 square feet will be disturbed and/or more than 100 cubic yards of soil will be moved. This permit must be obtained from the Planning and Zoning Department in accordance with Article 4-1-N "Land Disturbance Provisions" of the City Codes, which is quite extensive. Drawings and soils reports must be submitted and an "Erosion and Sediment Control Plan" developed for the project. A significant filing fee will be required.

Blasting for the purpose of construction excavation is allowed within the City of Lenexa by licensed blasters. A city "Blasting Permit", issued by the Fire Department, is required.



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There is no fee required for the blasting permit, but the contractor must issue the City of Lenexa a certificate of insurance in the amount of \$500,000.

The City of Olathe has similar requirements for the contractor to obtain a permit for excavation work by filing a "Right-of-Way Permit Application" with the Engineering Department. Requirements include approval of drawings and specifications by the Public Works Department and Contractor provided Performance and Payment Bond for the benefit of the City. An "Explosive Permit" is also required to store magazines and perform blasting in Olathe by a certified blaster. Application to the City of Olathe cannot be made until the certified blaster files an "Application for Explosive Storage Site Permits" and has received approval from the Kansas State Fire Marshall. A permit fee is required.

Alignment 2 (Blue)

Cost and Constructability

Access

Alignment 2 runs between existing two lane roads along the northwestern portion, then within existing power line right of way and existing streets as it makes its way south. On the southern portion, it continues along existing streets. Access should be good for the majority of the project.

Geotechnical

Alignment 2 appears to have limited to no rock excavation required along the north portion of the project. From Hwy K-7 east, there appears to be significant rock excavation required until just east of Monticello Road. There is additional rock excavation showing along Lone Elm Road from Prairie Star Pkwy south to 101st Street. The remaining portion of the project south shows no rock excavation required.

Equipment Necessary

The equipment necessary to construct the project will be the same for both alignments. There appears to be no advantage for either alignment as it relates to the equipment required to build the work.

Horizontal/Vertical Work Area

In most cases, 80 feet of work area (30' permanent easement and 50' temporary easement) will be available along Alignment 1. Areas of concern as they relate to horizontal work area are along Lone Elm Road from Prairie Star Pkwy to 101st Street and from 107th Street north past the Middle School. The easement available in these areas appears to be limited.



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Disruption and Public Acceptance

Number of Homes Affected

Alignment 2 currently only affects 4 homes and 1 farm office/maintenance barn. The alignment just south of Prairie Star Parkway along Lone Elm will run along the back side of several residential lots. However, the line would be in public right of way in this area.

Traffic Impact

The assumption has been made that all street crossing will be completed by tunnel or jack and bore method. Therefore, no road closures are anticipated. There may be some lane closures required along Lone Elm Road during construction activities.

The future Lone Elm Interchange could have an impact on the routing and traffic control issues for Alignment 2.

Commercial Impact

Alignment 2 could potentially affect the nursery on the west side of Hwy K-7. The alignment could be routed to the north to avoid the nursery in its current location. There appear to be no other commercial properties affected.

Public Areas

Alignment 2 does not appear to affect any public areas.

Local Government Support

The City of Lenexa has suggested Alignment 2 could be run along the west side of Lone Elm Road and is agreeable to locating the water line within the street right of way. The City of Lenexa is planning to improve the roadway from 2 to 4 lanes. This line routing would need to take into consideration the proposed grades and widths of proposed street improvements and also address the possibility of the water main being located beneath future roadway pavement.

Future Development

In addition to the previously mentioned improvements along Lone Elm Road, an interchange is planned at Kansas State Highway 10 with the planned overpass located west of the current Lone Elm alignment.

East of Clare Road there is some potential for a future storm water retention facility in this area. However, the plans for this are in the preliminary discussion stages and may not go forward.



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Emergency Services

There appear to be no emergency services affected by Alignment 2.

Environmental

Water Quality Impacts

Land areas on Alignment 2 are generally in agricultural use or remain undeveloped today. For example, Alignment 2 parallels two residential developments for short distances – one is along Lone Elm Road and the second is a new residential development still under construction west of State Highway 7. In addition, Alignment 2 does not intersect or border any commercial developments. Because the majority of Alignment 2 would pass through undeveloped or agricultural lands, very little increase in stormwater runoff volumes would be expected to originate from the small area of developed lands. According to the 1979 U. S. Soil Conservation Service Johnson County Soil Survey, no soils that are likely to adversely impact water quality are located along the proposed pipeline alignment. As a result, adverse water quality impacts are not expected to occur as frequently with the development of Alignment 2.

Terrestrial Habitat

For the most part, Alignment 2 passes through residential land and non-native grassland corridors. As with Alignment 1, Alignment 2 follows an existing electric transmission corridor and roadway where possible. As a result, the alignment is expected to impact less undeveloped or undisturbed terrestrial habitat. Although about 2000 feet of forested land is found between State Highway 7 and Monticello Road, nearly the entire terrestrial habitat has already been cleared along the transmission pipeline corridor. Only a small amount of terrestrial habitat is associated with the agricultural land and riparian corridors along the five stream crossings.

Aquatic Habitat

Five stream crossings will be crossed by Alignment 2. One of the stream crossings, for example, is located near the intersection of Prairie Star Parkway and Lone Elm Road and has been impacted by construction of a residential development. A second stream crossing is an unnamed perennial tributary to Coon Creek; the riparian corridor found along this stream is the most extensive found along either alignment. A third stream crossed by Alignment 2 is intermittent, with a very narrow riparian corridor surrounded by agricultural lands. No ponds were found to be within Alignment 2; as a result, no impact to waterfowl or fish habitat is expected.



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Wetlands

Wetlands associated with the unnamed tributary to Coon Creek could be impacted by Alignment 2. Although wetlands were not directly observed along the alignment, potential wetlands were observed to the south along Prairie Star Parkway on the same stream, where signage identifying the "Lake Lenexa Wetlands" was observed. An initial review of the FWS NWI maps indicated that some jurisdictional wetlands could be located at some of the stream crossings. The exact amount of wetlands impacted at the stream crossings would be determined during formal wetland delineation. No other wetlands were observed along Alignment 2 nor appear to be present on the FWS NWI maps. As a result, wetland permitting needs would probably be satisfied with a Section 404 Nationwide Permit from the U.S. Army Corps of Engineers, Kansas City District.

Cultural Resources

As mentioned above, there are five streams that would be crossed with the development of Alignment 2. Only one, an unnamed tributary to Coon Creek, appears to have a permanent flow of water. Areas on either side or bank of this unnamed tributary have a moderate potential to contain archaeological sites. On the remainder of the alignment, Alignment 2 passes through upland terrain, where archaeological site density is expected to be low. Historic farmsteads are located near the proposed pipeline corridor and may be encountered. These archaeological sites or standing structures can normally be easily avoided by minimal specific realignments.

Operation and Maintenance

Access

Alignment 2 has good access along power line right of ways or along existing streets. The alignment should offer good access for future maintenance.

Personnel

The personnel required to perform maintenance on either Alignment should be the same and there appears to be no advantage for either Alignment.

Equipment

The equipment required to perform maintenance on either Alignment should be the same and there appears to be no advantage for either Alignment.

Location Under Pavement

The assumption to date has been made that all street crossings will be done utilizing tunnels or jack and bores. The routing along Lone Elm Road just south of Prairie Star Parkway could be affected depending on where it is determined to lay the line. There is



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the possibility of laying the line in the current right of way which could possibly put it under a future roadway.

Easements

Permanent

Other than a couple of areas (along Lone Elm Road on the south end and along Lone Elm Road between K-10 and Prairie Star Parkway), the assumption has been made that permanent easement will be required for the entire alignment. Currently, it appears easements will be required on 44 parcels of land with 30 different owners. 24 of the 30 property owners are located in the City of Lenexa.

Temporary

Other than a couple of areas that right of way may be available as temporary easement (along Lone Elm Road on the south end and along Lone Elm Road between K-10 and Prairie Star Parkway), the assumption has been made that permanent easement will be required for the entire alignment. In the areas that the line runs along current power line right of way, temporary easement within this right of way may be cheaper/easier to acquire.

Time Restrictions

Alignment 2 also passes through agricultural areas and again consideration should be given to the agricultural activities that take place on different agricultural tracts.

Acquisition Time

It is anticipated that condemnation proceedings may be required for Alignment 2 also with acquisition times similar to Alignment 1.

Alignment 2 also crosses Enbridge and Conoco-Phillips gas line easements in Western Lenexa near Gleason Road. Alignment 1 also crosses and parallels existing electrical utility easements which will require subordination agreements.

Additionally, Alignment 2 traverses property located west of Monticello Road and north of Prairie Star Parkway where the owner has historically been opposed to granting easements and has previously gone through several condemnation proceedings. In may be particularly advantages in this area to obtain easement within the existing electrical utility easement.



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Regulations and Permitting

Alignment 2 will require the same permits as Alignment 1. While there is more impact to wetlands associated with Alignment 2, the impacts are not major.

Construction Costs

Preliminary opinions of probable cost were developed for Alignments 1 and 2 by applying the previously described unit prices to the final two alignments. The Cost Opinions are summarized as follows:

<u>Alignment</u>	<u>Preliminary Cost Opinion</u>
1 (Red)	\$16,600,000
2 (Blue)	\$16,300,000

As indicated, the difference in the Preliminary Cost Opinions for the two alignments is approximately 2% which is within the level of accuracy for the preliminary cost opinions.