

4.16 SUMMARY OF IMPACTS

The analyses of potential impacts associated with construction and normal operation of the proposed Project suggest that significant impacts to most resources are not expected along the proposed Project route assuming the following:

- TransCanada Keystone Pipeline, LP (Keystone) would comply with all applicable laws and regulations;
- Keystone would, if the Presidential Permit is granted, incorporate into the proposed Project and into its manual for operations, maintenance, and emergencies, which is required by 49 Code of Federal Regulations 195.402, the set of Project-specific Special Conditions developed by the Pipeline Hazardous Material Safety Administration (PHMSA);
- Keystone would incorporate the mitigation measures that are required in permits issued by environmental permitting agencies into the construction, operation, and maintenance of the proposed Project;
- Keystone would construct, operate, and maintain the proposed Project as described in this Final Supplemental Environmental Impact Statement (EIS); and
- Keystone would implement the measures designed to avoid or reduce impacts described in its application for a Presidential Permit and supplemental filings with the U.S. Department of State (Department); the additional measures identified in Chapter 4, Environmental Consequences, of this Final Supplemental EIS; the Special Conditions recommended by PHMSA, mitigation measures recommended in the Battelle and Exponent risk reports, and additional mitigation measures discussed in Appendix B, Potential Releases and Pipeline Safety; and the methods described in the Project Construction, Mitigation, and Reclamation Plan presented in Appendix G. A compiled summary of these mitigation measures is presented in Appendix Z, Compiled Mitigation Measures.

The remainder of this section summarizes the potential impacts of the proposed Project on a resource-by-resource basis. Table 4.16-1 provides a brief summary of the proposed Project's impacts on all resources considered.

Table 4.16-1 Summary of Potential Impacts

Resource	Construction	Operation	Connected Actions^a
Geology	Breakup and removal of rock material could occur along approximately 202 miles of the proposed Project route. Due to depth to bedrock, there would be minimal impacts to geologic resources along the remainder of the proposed Project route.	No effects	Negligible impacts
Soils and Sediments	Potential impacts c (to varying degrees) could include soil erosion, compaction, mixing, and/or contamination; loss of topsoil; and changes in soil productivity. The proposed Project avoids the Nebraska Department of Environmental Quality-identified Sand Hills Region and sand hills-like soils in Keya Paha County, Nebraska; however, approximately half of the overall proposed Project route would cross highly erodible soils (most of which are water-erodible).	Maintenance and repair of pipeline would be similar to construction, but less extensive and widespread.	Negligible or similar to the proposed Project
Water Resources: Groundwater	Potential impacts could occur due to fuel spills from construction equipment. These effects could be similar to operation, but less extensive due to smaller potential spill volumes. Water withdrawals for hydrostatic testing could have minor temporary impacts.	Potential impacts could occur due to releases of crude oil. Releases could potentially impact groundwater where the overlying soils are permeable and the depth to groundwater is shallow. Analyses in Section 4.13, Potential Releases, suggest that large crude oil releases that do reach groundwater systems (including the Ogallala Aquifer) could result in oil spreading on the water table as far as 1,214 feet, and dissolved components of the crude oil, such as benzene, could spread as much as an additional 1,050 feet.	Limited potential impacts due to small potential volumes of spills during construction; a spill from the Bakken Marketlink project during operations would potentially impact similar receptors as the proposed Project; leaks or spills from storage tanks would likely be contained within the regulatory-required berm or containment systems

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Water Resources: Surface Water	Potential impacts could occur during construction of waterbody crossings, ranging from temporary (sedimentation and stream flow changes) to long-term (changes in channel morphology). Additionally, potential impacts could occur due to fuel spills from construction equipment (similar but smaller in volume to operations spills).	Potential impacts could occur due to spills of crude oil. Spills could potentially impact open waterbodies such as rivers, lakes, and ponds, and the ecosystems that rely on them. Analyses in Section 4.13, Potential Releases, suggest that crude oil releases that do reach surface waters are expected to be no greater than 1,214 feet from the release point; if the release enters flowing water or other surface water features, the extent of the release could become large. Depending on the river's flow and the time to respond to the spill, the spill could potentially affect miles of river and shoreline. Releases to a river would not float on water indefinitely and would have the potential to be submerged introducing additional potential impacts and recovery challenges.	Similar to, but less extensive than, potential waterbody crossing impacts of the proposed Project
Wetlands	Construction would impact approximately 262 acres of wetlands. Impacts would be site-specific, and could be negligible or more substantial—with some requiring post-construction reclamation. Additionally, potential impacts could occur due to fuel spills from construction equipment (similar but smaller in volume to operations spills).	Operation would impact approximately 120 acres of wetlands, including approximately 18 acres permanently converted to uplands. Most other wetland areas affected during operations would continue to be functional wetlands. Additionally, potential impacts could occur to wetland ecosystems due to crude oil spills.	Similar to the proposed Project, but generally temporary.
Terrestrial Vegetation	Most impacts would affect cropland and grassland/pasture. Some vegetation removed from the construction and permanent right-of-way (ROW) could require 5-15 years, and up to 50 years, to re-establish. Tree removal would be permanent within the permanent ROW. Noxious and invasive plants could delay re-establishment of natural communities.	Potential impacts would be the same as construction, but effects would be limited to the operation ROW. Increased soil temperature from the operating pipeline could affect some species, including prairie grasses.	Similar to, but less extensive than the construction impacts from the proposed Project
Wildlife	Potential impacts due to habitat loss and fragmentation, direct and indirect mortality, reduced breeding success, and reduced survival. Proposed Project route would cross more than 200 miles of important wildlife habitats.	Maintenance and repair of pipeline would be similar to construction, but less extensive.	Primary concerns involve habitat fragmentation and direct mortality due to avian species collision with electrical lines.

Resource	Construction	Operation	Connected Actions^a
Fisheries	Potential impacts associated with open-cut stream crossings and hydrostatic testing include changes in the benthic invertebrate community, mortality, feeding difficulty, and reduced productivity and spawning due to increased suspended sediments, temperature changes, physical disturbance of streambeds, and changes in oxygen content.	Potential temperature increases around stream crossings, especially in low flow situations.	Similar to, but less extensive than the construction impacts from the proposed Project.
Threatened and Endangered Species	Same types of potential impacts exist as to wildlife (see above). Thirteen federally listed or candidate species could be affected, but only the American burying beetle (<i>Nicrophorus americanus</i>) is likely to be adversely affected. Thirteen state-listed species could potentially be affected.	Same types of potential impacts exist as to wildlife (see above); however, maintenance and repair of pipeline may affect, and is likely to adversely affect, the American burying beetle.	Similar to the proposed Project, but fewer species affected, and to a lesser extent
Land Use, Recreation, and Visual Resources	Potential Impacts include a temporary change of land use within the construction ROW and at the locations of proposed aboveground facilities, as well as some potential reduction in use of recreational resources near proposed Project facilities under construction.	Permanent change in land use at the site of aboveground facilities. Some changes in visual character.	Negligible temporary changes in land use during construction; potential long-term changes in visual character (in the case of transmission lines)

Resource	Construction	Operation	Connected Actions ^a
Socioeconomics	<p>Construction contracts, materials, and support purchased directly in the United States would total approximately \$3.1 billion, with another \$233 million spent on the construction camps. Including direct, indirect, and induced effects, this spending would support (over a 1 to 2 year construction period):</p> <ul style="list-style-type: none"> • Approximately \$3.4 billion to the U.S. Gross Domestic Product; • Approximately 42,100 jobs^b across the United States, of which approximately 16,100 would be direct jobs at firms that are awarded contracts for goods and services, and approximately 3,900 would be direct construction jobs in the proposed Project area (3,900 over 1 year of construction, or 1,950 per year if construction took 2 years); • Approximately \$2.05 billion in employee earnings across the United States, of which approximately \$840 million would be received by employees in firms directly supplying Keystone with materials and services; • Approximately \$4 million in property taxes from construction camps; and • Approximately \$66 million from sales and use taxes. <p>Other impacts include minor increases in demand for utilities and public services (e.g., police, fire, and emergency medical services), some temporary traffic delays, and minor and temporary impacts on environmental justice populations.</p>	<p>Potential impacts include 35 permanent jobs and 15 temporary contractor positions that would result in negligible earnings effects. The total estimated property tax from the proposed Project in the first full year of operations would be about \$55.6 million spread across the pipeline <i>situs</i> counties. Operation of the proposed Project is not expected to have an impact on residential or agricultural property values and would not significantly affect traffic or the capacity of roads. The proposed Project operation is not expected to disproportionately adversely impact minority or low-income populations.</p>	<p>Similar to, but less extensive than the proposed Project</p>

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Cultural Resources	Four historic properties would be adversely affected. Temporary indirect visual effects exist to structures eligible for inclusion in the National Register of Historic Places due to placement of construction materials, vehicle traffic, and dust.	Negligible effects	No direct effects to historic properties; similar temporary indirect visual impacts as the proposed Project
Air Quality	Potential impacts would include temporary and localized fugitive dust and other emissions (criteria pollutants and hazardous air pollutants) from construction equipment.	Minimal volatile organic compound and fugitive dust emissions associated with pump stations and other aboveground facilities	Construction emissions similar to, but less extensive than, the proposed Project; minimal operations emissions
Noise	Potential impacts would include localized and intermittent noise due to construction activity.	Potential noise impacts would occur on a few residences located within 0.5 mile of each pump station (4 of the 20 pump stations are within 0.5 mile of residences). Noise from infrequent use of aircraft for maintenance purposes would be localized, intermittent, and short-term.	Extent of impacts not known, but not anticipated to be significant
Climate Change and Greenhouse Gases (GHGs)	<i>Direct Project GHG Emissions:</i> Construction GHG emissions are estimated to be 0.24 million metric tons of CO ₂ equivalents (MMTCO ₂ e). This is equivalent to annual GHG emissions from combusting fuels in approximately 50,000 passenger vehicles, the CO ₂ emissions from combusting fuels used to provide the energy consumed by approximately 12,000 homes for 1 year, or the annual CO ₂ emissions of 0.07 coal fired power plants.	<i>Direct Project GHG Emissions:</i> Operating emissions are estimated to be 1.44 MMTCO ₂ e per year. This is equivalent to annual GHG emissions from combusting fuels in approximately 300,000 passenger vehicles, the CO ₂ emissions from combusting fuels used to provide the energy consumed by approximately 72,000 homes for 1 year, or the annual CO ₂ emissions of 0.4 coal fired power plants.	The GHG emissions are deemed minimal relative to the proposed Project.

Resource	Construction	Operation	Connected Actions^a
Climate Change and GHGs	<i>Indirect Lifecycle GHG Emissions: N/A</i>	<p><i>Indirect Lifecycle GHG Emissions:</i> The total lifecycle emissions associated with production, refining, and combustion of 830,000 barrels per day (bpd) of oil sands crude oil transported through the proposed Project are approximately 147 to 168 MMTCO₂e. The equivalent annual lifecycle GHG emissions from 830,000 bpd of the four reference crudes (representing crude oils currently refined in Gulf Coast area^c refineries) examined in this section are estimated to be 124 to 159 MMTCO₂e. Therefore, the range of incremental GHG emissions (i.e., the amount by which the emissions would be greater than the reference crudes) for crude oil that would be transported by the proposed Project is estimated to be 1.3 to 27.4 MMTCO₂e annually. This is equivalent to annual GHG emissions from combusting fuels in approximately 271,000 to 5,708,000 passenger vehicles, the CO₂ emissions from combusting fuels used to provide the energy consumed by approximately 65,000 to 1,369,000 homes for 1 year, or the annual CO₂ emissions of 0.4 to 7.8 coal fired power plants. These estimates represent the potential increase in emissions attributable to the proposed Project if one assumed that approval or denial of the proposed Project would directly result in a change in production of 830,000 bpd of oil sands crudes in Canada. However, as set forth in Section 1.4, Market Analysis, such a change is not likely to occur. Section 1.4 reaffirms the conclusion of the 2013 Draft Supplemental EIS that approval or denial of any one crude oil transport project, including the proposed Project, remains unlikely to significantly impact the rate of extraction in the oil sands, or the continued demand for heavy crude oil at refineries in the United States.</p>	<p>The assessment assumes a conservative approach that 830,000 bpd of WCSB crude oil would be transported in the proposed Project; therefore, the indirect lifecycle GHG emissions from the Bakken Marketlink project are already accounted for in the analysis.</p>

Resource	Construction	Operation	Connected Actions^a
Climate Change and GHGs	<i>Climate Change:</i> Climate change would have no substantive effects on construction of the proposed Project.	<i>Climate Change:</i> Climate change would have no substantive effects on operation of the proposed Project, and any effects would be even further reduced by implementation of the PHMSA-approved design and operation conditions. In addition, the affected environment and the identified environmental consequences were also considered in the context of a potential change in climate; in general, the exacerbating effects of climate change would be accommodated within the proposed Project’s design, construction, and operation.	Climate change is not expected to have substantive effects on connected actions.
Potential Releases	See Water Resources: Groundwater, above.	Spills associated with the proposed Project that enter the environment are expected to be rare and relatively small. The most frequent spill size associated with the proposed Project that could enter the environment is small (less than 50 barrels), although there is a chance for larger, less frequent spills. Industry standards and practices (including the Project-specific Special Conditions developed by PHMSA) provide a level of protection above that of other pipeline systems in existence. Modeling shows that, exclusive of topography and groundwater flow, large spills (up to 20,000 barrels) could spread up to 1,214 feet on the ground surface or on the water table, and up to 1,050 feet dissolved in groundwater. Spills reaching surface water could be transported greater distances.	No effect, except for the Bakken Marketlink project, which would be similar to the proposed Project

^a Connected actions are those that 1) automatically trigger other actions which may require environmental impact statements, 2) cannot or will not proceed unless other actions are taken previously or simultaneously, 3) are interdependent parts of a larger action and depend on the larger action for their justification.

^b The word *job* means a position that is filled for 1 year, or 1 person-year. This is done to account for the fact that not all jobs associated with the proposed Project would comprise a full year of employment. A *worker* is a person working full or part time in a job. Elsewhere in this Final Supplemental EIS, the socioeconomic sections refer to these jobs as *average annual jobs*. An *average annual job* could consist of two positions filled for a period of 6 months each, three positions filled for 4 months each, or any combination that sums to a year of employment.

^c Unless otherwise specified, in this Final Supplemental EIS the Gulf Coast area includes coastal refineries from Corpus Christi, Texas, through the New Orleans, Louisiana, region. See Section 1.4, Market Analysis, for a description of refinery regions.