12. NAVIGATION RESOURCES

This section describes navigation resources and navigable waterways (navigable streams) that could be affected by construction and operation of rail line crossing structures along the proposed Port MacKenzie Rail Extension. Section 12.1 describes the regulatory setting for navigation, Section 12.2 defines the study area, Section 12.3 describes the analysis methodology, Section 12.4 describes the affected environment (existing conditions), and Section 12.5 describes potential environmental consequences (impacts) to navigation resources from the proposed rail line

12.1 Regulatory Setting

Federal, State of Alaska, and local agencies regulate project activities that have a potential to impact navigable waterways. Federal and state agencies have made navigability determinations regarding waterways in the project area. Navigability determinations are implemented through laws and regulations, as described in Section 12.1.1.

12.1.1 Federal Regulations

12.1.1.1 U.S. Coast Guard

The U.S. Coast Guard authorizes and issues permits for construction of bridges and causeways across navigable waterways in accordance with the General Bridge Act of 1946 (33 United States Code [U.S.C.] 525 *et seq.*) and Section 9 of the Rivers and Harbors Act (33 U.S.C. 401). U.S. navigable waterways, as they pertain to the Coast Guard permitting process, are defined in 33 Code of Federal Regulations (CFR) Part 2.05-25, and include:

(1) Territorial seas of the United States;

(2) Internal waterways of the United States that are subject to tidal influence; and

(3) Internal waterways of the United States not subject to tidal influence that:

(i) Are or have been used, or are or have been susceptible for use, by themselves or in connection with other waterways, as highways for substantial interstate or foreign commerce, notwithstanding natural or man-made obstructions that require portage, or

(ii) A governmental or non-governmental body, having expertise in waterway improvement, determines to be capable of improvement at a reasonable cost (a favorable balance between cost and need) to provide, by themselves or in connection with other waterways, highways for substantial interstate or foreign commerce.

This regulatory definition of navigability has been expanded by legal precedent to include historic and modern use for recreation and tourism (e.g., fishing or sightseeing) or by inflatable

rafts (*Alaska v. United States*, 662 F.Supp.455 [D. Alaska 1986]; *Alaska v. Ahtna, Inc.*, 892 F.2d 1401 [9th Cir. 1989]).

Bridges and causeways over waterways meeting the definition of navigable cannot legally be constructed without prior Coast Guard approval of the plans for and locations of such structures. The Coast Guard has stated that certain crossings of waterways and their side channels discussed in this chapter would require individual bridge permits pursuant to Section 9 of the Rivers and Harbors Act.

12.1.1.2 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers requires permits and authorizations for the placement of structures or work in or affecting U.S. navigable waterways. Corps of Engineers regulations also define U.S. navigable waterways for the purpose of regulating the discharge of dredge or fill material into these waterways. The Corps of Engineers definition of navigability is similar to that of the U.S. Coast Guard, pursuant to 33 CFR Part 329.4, as follows:

> Navigable waterways of the United States are those waterways that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the waterbody, and is not extinguished by later actions or events which impede or destroy navigable capacity.

In addition, Section 10 of the Rivers and Harbors Act (33 U.S.C. Section 403) requires authorization from the Corps of Engineers for the construction of any structure in, over, or under any U.S. navigable water, the excavation/dredging or deposition of material in these waters or any obstruction or alteration in "navigable water" (USACE, 2008).

12.1.2 State Regulations

The Alaska Constitution contains numerous provisions embracing principles of the Public Trust Doctrine that require the state to exercise authority to ensure that the right of the public to use navigable waters for navigation, commerce, recreation, and related purposes is protected. In Alaska, the Public Trust Doctrine extends beyond those submerged lands to which the state holds title to include all navigable waters. The state's waters are themselves reserved to the people for common use (ADNR, 2008a).

The Alaska Constitution (Article VIII, Sections 1, 2, 3, 6, 13, and 14) and Alaska Statutes (AS) 38.05.127 and 38.05.128 contain some of the provisions that are the legal basis for applying the Public Trust Doctrine in Alaska. In Alaska, this doctrine guarantees the public's right to engage in activities such as commerce, navigation, fishing, hunting, trapping, and swimming, while also providing for the protection of areas for ecological study (ADNR, 2008b).

The Alaska Constitution provides that "free access to the navigable or public waters of the state, as defined by the legislature, shall not be denied to any citizen of the United States or resident of the state, except that the legislature may by general law regulate and limit such access for other

beneficial uses or public purposes." The Alaska Supreme Court has concluded "the provisions in Article VIII [of the Constitution] were intended to permit the broadest possible access to and use of state waters by the general public" (*Wernberg v. State*, 516 P. 2d 1191, 1198-9). The Alaska legislature has broadly defined the navigable and public waters available for public use in AS 38.05.965. Moreover, the legislature has endorsed a broad interpretation of the Public Trust Doctrine in Article VIII of Alaska's Constitution in finding that:

> Ownership of land bordering navigable or public waters does not grant an exclusive right to the use of the water and any rights of title to the land below the mean high water line are subject to the rights of the people of the state to use and have access to the water for recreational purposes or any other public purposes for which the water is used or capable of being used consistent with the public trust (Sec. 1, Ch. 82, SLA 1985).

12.1.2.1 Alaska Department of Natural Resources

The Alaska Department of Natural Resources (ADNR) issues permits and authorizations governing construction and other activities in or associated with navigable and public waterways pursuant to Alaska law (AS 38.05.128), which mandates:

> A person may not obstruct or interfere with the free passage or use by a person of any navigable water unless the obstruction or interference is: authorized by a Federal agency and a state agency; authorized under a Federal or state law or permit; exempt under 33 U.S.C. 1344(f) (Clean Water Act); caused by the normal operation of freight barging that is otherwise consistent with law; or authorized by the commissioner after reasonable public notice.

ADNR is also responsible for determining the need for and reviewing the designs of bridges, culverts, and other drainage structures. ADNR issues determinations regarding the navigability of waterways as set out in Alaska law (AS 38.05.965), defining navigable water as:

> Any water of the state forming a river, stream, lake, pond, slough, creek, bay, sound, estuary, inlet, strait, passage, canal, sea or ocean, or any other body of water or waterway within the territorial limits of the state or subject to its jurisdiction, that is navigable in fact for any useful public purpose, including but not limited to water suitable for commercial navigation, floating of logs, landing and takeoff of aircraft, and public boating, trapping, hunting waterfowl and aquatic animals, fishing, or other public recreational purposes.

ADNR is in the process of establishing a statewide method to determine the navigability of Alaska streams. At present, the ADNR has a provisional map of navigable waterways based on U.S. Army Corps of Engineers, U.S. Coast Guard, and U.S. Bureau of Land Management (BLM) determinations. BLM navigability determinations were made on Federal lands prior to conveyance of those lands to Alaska upon statehood. ADNR provides current and historical documentation on whether navigation has been possible.

Alaska law (AS 38.05.127) also mandates the circumstances under which navigability will be determined and safeguards public access to navigable waterways:

> Before the sale, lease, grant, or other disposal of any interest in state land adjacent to a body of water or waterway, the commissioner [of natural resources] shall determine if the body of water or waterway is navigable water, public water. Upon finding that the body of water or waterway is navigable or public water, provide for the specific easements or rights-of-way necessary to ensure free access to and along the body of water, unless the commissioner finds that regulating or limiting access is necessary for other beneficial uses or public purposes.

ADNR planning documents for the project area also include guidance regarding bridge clearance on navigable waterways for boats, wildlife, and riders on horseback, and along the banks of navigable rivers and lakes. Section 13.2 identifies and describes these planning documents

12.1.3 Local Agencies

Alaska boroughs and cities have the authority to provide for planning, platting, and land use regulations defined by Alaska laws (AS 29.35 and 29.40). The Matanuska-Susitna Borough (MSB or the Borough), as a second class borough, is required to provide for area-wide planning, platting, and land use regulations The Borough may delegate these powers to a city within the Borough (AS 29.40.010).

The MSB Coastal Zone Management District (ADNR, 2006a) covers the entire proposed Port MacKenzie Rail Extension project area. All rail line alternatives, including proposed crossings of navigable and public waterways would be subject to consistency review under the Alaska Coastal Management Program, the MSB Coastal Management Plan, and the Coastal Management Plan's associated Point MacKenzie Area Which Merits Special Attention Plan (adopted by the MSB in 1993 and amended in 2006) (ADNR, 2006b). Section 13.1.1.3 describes the MSB Coastal Management Plan in more detail.

12.2 Study Area

The navigation resources study area is in the Susitna River Valley and occupies an area from Point MacKenzie north to Little Willow Creek between the Susitna River, Cook Inlet, Knik Arm, and the existing Alaska Railroad Corporation (ARRC or the Applicant) main line. The study area includes several designated and possibly navigable waterways the rail line would cross.

12.3 Analysis Methodology

The analysis of potential impacts to navigation resources utilizes data and information available from the Coast Guard, Army Corps of Engineers, ADNR, BLM, MSB, and ARRC. SEA also reviewed documents, maps, aerial photos, and imagery from these and other sources to determine the location of navigable waterways. SEA contacted regulatory agency staff to verify information or gather additional information. SEA field crews visited the project area during summer and fall 2008 to assess the areas where ARRC proposes crossing structures as part of proposed rail line construction. Crossing structures would consist of bridges and culverts. Crossing structures identified as "drainage structures" would be determined by the Applicant during the final design process and could include multi-plate culverts, pre-cast arches, and single

or multiple short-span bridges. Field crews identified and characterized streams during these field investigations. Analysis of data from regulatory agencies, new field data, and ARRC data using Geographic Information System technology has produced reports and maps illustrating potential impacts to navigable waterways that could be caused by proposed project infrastructure.

12.4 Affected Environment

Table 12-1 lists ADNR-identified navigable and potentially navigable waterways in the study area that the proposed rail line segments would cross.

Table 12-1
Navigable and Potentially Navigable Waterways the Proposed Port MacKenzie Rail Extension Segments would Cross[a] (page 1 of 2)

Water Body	Bureau of Land Management Navigation Status	State of Alaska Navigation Status	U.S. Coast Guard Navigation Status	U.S. Army Corps of Engineers Navigation Status
The Little Susitna River	Navigable through T18N, R1W, S.M.	Navigable through T18N, R1W, S.M.	Navigable to Schrock Road Bridge	Navigable to Schrock Road Bridge
Willow Creek	Not navigable	Determination needed; (50-foot public easement from mean high water line)	Navigable	Navigable to Parks Highway Bridge
Little Willow Creek	Not navigable	Determination needed; (50-foot public easement from mean high water line)	Entire waterway navigable	No determination
Fish Creek Draining Redshirt Lake	Not navigable	Determination needed; recreation use documented	Navigable	No determination
Fish Creek Draining Big Lake	No determination	Navigable per letter in file	No determination	Not navigable
Little Meadow Creek	No determination	Determination needed	No determination	No determination
Lucille Creek	Not navigable	Determination needed	No determination	No determination
Goose Creek	No determination	Determination needed; (50-foot public easement from mean high water line)	No determination	No determination
Lake Creek	Not navigable	Determination needed; recreational use documented	Navigable	No determination

Table 12-1
Navigable and Potentially Navigable Waterways the Proposed Port MacKenzie Rail Extension Segments would Cross[a] (page 2 of 2)

Water Body	Bureau of Land Management Navigation Status	State of Alaska Navigation Status	U.S. Coast Guard Navigation Status	U.S. Army Corps of Engineers Navigation Status
Rodgers Creek	Not navigable	Determination needed; recreation use documented	No determination	No determination
Unnamed Water Body	Navigable	Navigable	Navigable	Navigable
Tributary to Little Willow Creek (crossing for flood overflow from Little Willow Creek)	Not navigable	Determination needed; (50-foot public easement from mean high water line)	No determination	No determination
Tributary to Little Susitna River – from Horseshoe Lake	Not navigable	Determination needed	No determination	No determination
Tributary to Little Susitna River – draining area south of Diamond Lake	Not navigable	Determination needed	No determination	No determination
Tributary to Lake Creek	Not navigable	Determination needed	No determination	No determination
Tributary to Rolly Creek	Not navigable	Determination needed	No determination	No determination

[a] Source: ADNR, 2008c.

The proposed rail line segments would include 30 stream crossings that have been determined to be or that might be considered navigable waterways. The stream crossings described in Table 12-2 include all crossings classified as *navigable*, where one or more agencies has made a determination of navigability, or *possible,* where characteristics of a navigable stream are present but there has not been an agency determination regarding navigability. The waterways the proposed rail line segments would cross that are designated as *possible* are in areas where streams might be candidates for a determination of navigable, but neither the Coast Guard, Army Corps of Engineers, ADNR, nor BLM have determined them to be so. Typically, the Coast Guard and ADNR will provide a determination of navigability on streams when the design of the crossings is complete for review prior to permit approvals. As required by the General Bridge Act of 1946, ARRC would submit final designs for all crossing structures and crossing locations to the Coast Guard for review prior to the start of construction. Based on this information, the Coast Guard would make a final determination regarding its jurisdiction for particular crossings.

Table 12-2
Navigable and Possible Navigable Stream Crossings by Rail Line Segment[a] (page 1 of 2)

Rail Line Segment	Mile Post	Water Body Name	Drainage Structure Type[b]	Number of Drainage Structures	Stream Width (feet)	Bank Width (feet)	Navigable Status
Southern Segments							
Connector 1 **(Total)**	C1-2.6	Tributary to the Little Susitna River	Culvert	**1**	2.0	d	Possible
Mac West	MW-11.0	Unnamed Stream	Culvert	1	11.0	17.0	Possible
Mac West	MW-4.6	Tributary to Cook Inlet	Culvert	1	0.0[c]	d	Possible
Mac West **(Total)**				**2**			
Mac East **(Total)**	ME-4.5	Unnamed Stream	Culvert	**1**	6.0	d	Possible
Northern Segments							
Willow	MP-190.3	Tributary to Little Willow Creek	Bridge	1	12.3	50.0	Possible
Willow	MP-189.0	Rogers Creek	Bridge	1	36.3	d	Navigable
Willow	W-24.0	Willow Creek	Bridge	1	97.5	180.0	Navigable
Willow	W-20.9	Tributary to Susitna River	Culvert	1	7.4	11.4	Possible
Willow	W-16.7	Tributary to Rolly Creek	Culvert	1	32.0	124.0	Possible
Willow	W-14.4	Tributary to Rolly Creek	Culvert	1	1.0 to 2.0	d	Possible
Willow	W-10.0	Fish Creek	Drainage Structure	1	15.0	10.0	Possible
Willow	W-0.6	The Little Susitna River	Bridge	1	d	d	Navigable
Willow **(Total)**				**8**			
Big Lake	B-18.3	Inlet to Long Lake	Drainage Structure	1	<1	d	Possible
Big Lake	B-17.4	Unnamed Stream	Drainage Structure	1	d	d	Possible
Big Lake	B-16.6	Inlet to Long Lake	Drainage Structure	1	6.5	10.0	Possible
Big Lake	B-15.9	Little Meadow Creek	Drainage Structure	1	28.0	100.0	Possible
Big Lake	B-15.2	Lucille Creek	Drainage Structure	1	11.5	11.5	Possible
Big Lake	B-15.1	Tributary to Lucile Creek	Culvert	1	0.0[c]	d	Possible
Big Lake	B-14.8	Wetland	Culvert	1	0.0[c]	d	Possible
Big Lake	B-14.3	Wetland	Culvert	1	1.0 to 2.0	d	Possible
Big Lake	B-9.0	Fish Creek	Drainage Structure	1	d	d	Possible
Big Lake	B-6.4	Goose Creek	Drainage Structure	1	6.0	d	Possible

Table 12-2
Navigable and Possible Navigable Stream Crossings by Rail Line Segment[a] (page 2 of 2)

Rail Line Segment	Mile Post	Water-body Name	Drainage Structure Type[b]	Number of Drainage Structures	Stream Width (feet)	Bank Width (feet)	Navigable Status
Northern Segments (continued)							
Big Lake **(Total)**				**10**			
Houston	H-9.6	Outflow of Muleshoe Lake	Culvert	1	3.6	4.0	Possible
Houston	H-6.3	Tributary to the Little Susitna River	Drainage Structure	1	16.0	16.0	Possible
Houston	H-4.3	Tributary to the Little Susitna River	Culvert	1	d	d	Possible
Houston	H-0.8	Outflow of Diamond Lake	Drainage Structure	1	d	d	Possible
Houston North	HN-3.2	Little Susitna River	Bridge	1	97.5	108.0	Navigable
Houston North	HN-4.4	Lake Creek	Drainage Structure	1	d	d	Navigable
Houston North	HN-4.8	Tributary to Lake Creek	Culvert	1	20.0	22.0	Possible
Houston-Houston North **(Total)**				**7**			
Houston	H-9.6	Outflow of Muleshoe Lake	Culvert	1	3.6	4.0	Possible
Houston	H-6.3	Tributary to the Little Susitna River	Drainage Structure	1	16.0	16.0	Possible
Houston	H-4.3	Tributary to the Little Susitna River	Culvert	1	d	d	Possible
Houston	H-0.8	Outflow of Diamond Lake	Drainage Structure	1	d	d	Possible
Houston South	MP-174.3	The Little Susitna River	Bridge	1	46.5	112.5	Navigable
Houston-Houston South **(Total)**				**5**			

[a] Sources: ADNR, 2008c (Navigability); ARRC, 2008 (Crossings); Noel *et al.*, 2008 (Stream Data).

[b] Drainage structure types have been proposed by the Applicant for each crossing location and include bridges, culverts and drainage structures. Those crossing structures that are designated as "drainage structures" would be determined by the Applicant during the final design process and could include multi-plate culverts, pre-cast arches, and single or multiple short-span bridges.

[c] No defined stream channel present.

[d] No available data.

Table 12-2 lists potential rail line crossings of navigable streams. The table also lists proposed crossings of streams that are identified as possible navigable and would require a determination of navigability. The table lists rail line crossings of streams by segment and Mile Posts, and lists the stream name, stream data, and numbers and types of drainage structures proposed. Figure 12-1 depicts proposed crossings of navigable and possible navigable streams.

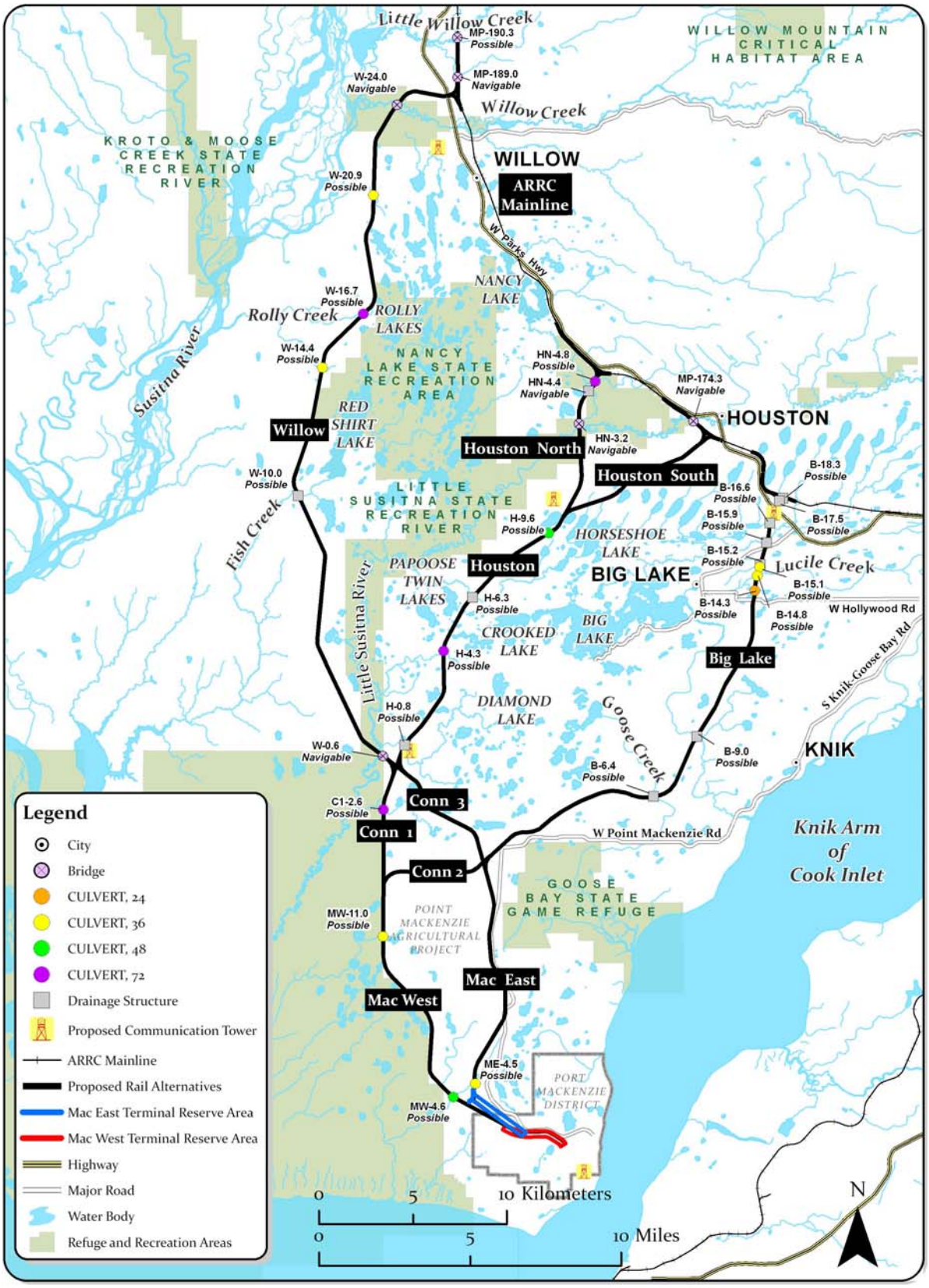

Figure 12-1. Navigable Waters near the Proposed Port MacKenzie Rail Extension

12.5 Environmental Consequences

12.5.1 Proposed Action

12.5.1.1 Common Impacts

Common impacts are those that could occur throughout the project area and would not be associated with any specific rail line segment. The descriptions of impacts are general and based on existing preliminary information regarding planned bridges, culverts and drainage structures. The final design of these facilities would be determined only during the permitting and agency review processes. Therefore, the impact determinations for the facilities and structures identified in this section are based on the available project information.

Construction Impacts

Construction impacts to navigation resources would be associated with facilities that were adjacent to and crossing navigable rivers and streams and their associated tributaries. Bridges proposed at larger rivers and streams would include one or more spans of 28-foot standard ARRC deck girder bridges. Drainage structures could include pre-cast arches and single or multiple short-span bridges that could be designed to accommodate navigation of certain watercraft, but culverts would generally not be designed to accommodate navigation. Bridge lengths and the design of all drainage structures would be determined during the final design process and permitting, which would require closer examination of stream-crossing sites. Potential impacts during construction of bridges and drainage structures include the following:

- Navigability along waterways located within the actual rail line right-of-way (ROW) would be temporarily impeded by construction materials and equipment during the construction process. The construction zone would exclude the public for safety and trespass reasons. These impediments would affect navigability along public waterways and all types of water transportation, including boats, float planes, winter dog sleds, motorized vehicles (e.g., automobiles, all-terrain vehicles, snow machines), and others.
- The proposed construction of bridges over navigable waterways could result in temporary closure to navigability of waterways. In addition, normal bridge construction activities (e.g., setting piers and construction equipment operation) could temporarily impede navigation.

12.5.1.2 Impacts by Rail Line Segment

Connector 2 and 3 Segments would not include crossings of navigable or possible navigable streams. All other segments would include such crossings, as described below.

Southern Segments

Mac West-Connector 1 Segment Combination

The Mac West-Connector 1 Segment Combination would intersect the flow path of multiple unnamed smaller streams that drain adjacent lakes and convey local surface water to navigable waterways, including the Little Susitna River and Cook Inlet. The segment combination would

include three culverts that would cross possible navigable waterways. Two of the three culverts (C1-2.6 and MW-4.6) would cross streams with widths of 2 feet or less. In addition, no defined stream channel is present at MW-4.6. If these streams were later classified by regulation as navigable waterways prior to the Applicant completing related permitting, design of crossing structures would be modified in order to ensure navigability through compliance with Federal and state regulations, standards, and specifications for crossings of navigable waterways. As a result, while navigability could be temporarily impacted during construction of crossing structures, final design of structures would be required to retain navigability.

Mac West-Connector 2 Segment Combination

The Mac West-Connector 2 Segment Combination would intersect the flow path of multiple unnamed smaller streams that drain adjacent lakes and convey local surface water to navigable waterways, including the Little Susitna River and Cook Inlet. The segment combination would include two culverts that would cross possible navigable waterways. One of the culverts (MW-4.6) would cross a stream with no defined stream channel. If these streams were later classified by regulation as navigable waterways prior to the Applicant completing related permitting, design of crossing structures would be modified in order to ensure navigability through compliance with Federal and state regulations, standards, and specifications for crossings of navigable waterways. As a result, while navigability could be temporarily impacted during construction of crossing structures, final design of structures would be required to retain navigability.

Mac East-Connector 3 Segment Combination

The Mac East-Connector 3 Segment Combination would extend from Port MacKenzie north along the eastern boundary of the Point MacKenzie Agricultural Project. It appears that this segment combination would follow the drainage boundary of regions flowing to Cook Inlet and the Little Susitna River. The segment combination would include one culvert crossing a possible navigable waterway. If these streams were later classified by regulation as navigable waterways prior to the Applicant completing related permitting, design of crossing structures would be modified in order to ensure navigability through compliance with Federal and state regulations, standards, and specifications for crossings of navigable waterways. As a result, while navigability could be temporarily impacted during construction of crossing structures, final design of structures would be required to retain navigability.

Northern Segments

Willow Segment

The Willow Segment would intersect the flow path of multiple unnamed smaller streams, possible navigable streams, and navigable streams that drain adjacent lakes, watersheds, and major watersheds. The segment would include one bridge, three culverts, and one drainage structure crossing possible navigable waterways. One of the culverts (W-14.4) would cross a stream with a width of 2 feet or less. If these streams were later classified by regulation as navigable waterways prior to the Applicant completing related permitting, design of crossing structures would be modified in order to ensure navigability through compliance with Federal

and state regulations, standards, and specifications for crossings of navigable waterways. As a result, while navigability could be temporarily impacted during construction of crossing structures, final design of structures would be required to retain navigability. The segment would cross three navigable streams – the Little Susitna River, Rogers Creek, and Willow Creek. The proposed bridges would not impact navigation if vertical and horizontal clearances below the bridges provided adequate clearance for boats to pass unimpeded. Specifications for planned bridge clearances are not yet available.

Big Lake Segment

The Big Lake Segment would cross Little Meadow Creek, Lucile Creek, Fish Creek, Goose Creek, and multiple unnamed streams. The segment would include three culverts and seven drainage structures crossing possible navigable waterways. All three culverts (B-15.1, B-14.8, and B-14.3) would cross streams with widths of 2 feet or less. In addition, one of the drainage structures (B-18.3) would cross a stream with a width of less than 1 foot. This segment would also relocate approximately 2,500 feet of stream channel between B-17.1 to 17.6 to a 2,400 foot long channel at B-18.3 with unknown channel dimensions. If these streams were later classified by regulation as navigable waterways prior to the Applicant completing related permitting, design of crossing structures would be modified in order to ensure navigability through compliance with Federal and state regulations, standards, and specifications for crossings of navigable waterways. As a result, while navigability could be temporarily impacted during construction of crossing structures, final design of structures would be required to retain navigability.

Houston-Houston North Segment Combination

The Houston-Houston North Segment Combination would cross the Little Susitna River, Lake Creek, and five unnamed tributaries. The segment combination would include one bridge on the navigable Little Susitna River, one drainage structure on the navigable Lake Creek, and three culverts and two drainage structures crossing possible navigable waterways. One of the culverts (H-9.6) would cross a stream with a width of less than 4 feet. The proposed bridge across the Little Susitna River and the drainage structure on Lake Creek would not impact navigation if vertical and horizontal clearances below the bridge and drainage structure provided adequate clearance for boats to pass unimpeded. Specifications for planned bridge and drainage structure clearances are not yet available. If these streams were later classified by regulation as navigable waterways prior to the Applicant completing related permitting, design of crossing structures would be modified in order to ensure navigability through compliance with Federal and state regulations, standards, and specifications for crossings of navigable waterways. As a result, while navigability could be temporarily impacted during construction of crossing structures, final design of structures would be required to retain navigability.

Houston-Houston South Segment Combination

The Houston-Houston South Segment Combination would cross the navigable Little Susitna River and four possible navigable unnamed tributaries. As in the previous segment, one of the culverts planned along this segment (H-9.6) would cross a stream with a width of less than 4 feet. The proposed bridge across the Little Susitna River would not impact navigation if vertical

and horizontal clearances below the bridge provided adequate clearance for boats to pass unimpeded. Specifications for planned bridge clearances are not yet available. If these streams were later classified by regulation as navigable waterways prior to the Applicant completing related permitting, design of crossing structures would be modified in order to ensure navigability through compliance with Federal and state regulations, standards, and specifications for crossings of navigable waterways. As a result, while navigability could be temporarily impacted during construction of crossing structures, final design of structures would be required to retain navigability.

12.5.1.3 Summary of Impacts by Alternative

Table 12-3 provides a comparative summary of navigable stream crossings by rail line alternative. Impacts to navigation from each potential crossing would be negligible if structures crossing navigable streams provided vertical and horizontal clearances adequate for watercraft to pass unimpeded. Specifications for planned bridge and drainage structure clearances are not yet available. However, structures crossing navigable streams would have to be designed and constructed in compliance with Federal and state regulations, standards, and specifications for crossings of navigable waterways (see Section 12.1). Depending on alternative, the proposed rail line ROW would intersect from 0 to 3 navigable waterways and from 5 to 12 possible navigable waterways.

Table 12-3
Summary of Impacts to Navigation by Rail Line Alternative

	Mac West-Connector 1-Willow	Mac West-Connector 1-Houston-Houston North	Mac West-Connector. 1-Houston-Houston South	Mac West-Connector 2-Big Lake	Mac East-Connector 3-Willow	Mac East-Connector 3-Houston-Houston North	Mac East-Connector 3-Houston-Houston South	Mac East-Big Lake
Navigable Crossings	3	2	1	0	3	2	1	0
Possible Navigable Crossings[a]	8	8	7	12	6	6	5	11
Totals	**3 to 11**	**2 to 10**	**1 to 8**	**0 to 12**	**3 to 9**	**2 to 8**	**1 to 6**	**0 to 11**
Major Navigable Stream Crossings	The Little Susitna River, Rogers Creek, Willow Creek	The Little Susitna River, Lake Creek	The Little Susitna River	None	The Little Susitna River, Rogers Creek, Willow Creek	The Little Susitna River, Lake Creek	The Little Susitna River	None

[a] Possible Navigable Crossings occur where the characteristics of a navigable stream are present and the waterway might be a candidate for a determination of navigable, but neither the Coast Guard, Army Corps of Engineers, ADNR, nor BLM have determined them to be so.

Both the Mac West-Connector 2-Big Lake and Mac East-Big Lake alternatives could be constructed without crossing any waterways currently designated as navigable. Of those waterways whose navigability is as yet undetermined, the Mac West-Connector 2-Big Lake Alternative would cross 12 possible navigable waterways and Mac East-Big Lake Alternative would cross 11 possible navigable waterways. The Mac West-Connector 1-Willow and Mac East-Connector 3-Willow alternatives each cross three waterways currently designated as

navigable. Of those waterways whose navigability is as yet undetermined, Mac West-Connector 1-Willow would also cross eight possible navigable waterways, and Mac East-Connector 3-Willow would cross six.

12.5.2 No-Action Alternative

Under the No-Action Alternative, ARRC would not construct and operate the proposed Port MacKenzie Rail Extension, and there would be no impacts to navigation from the project.