Chena River
Vulnerability Assessment and
Geographic Response Strategies

Fairbanks, Alaska

Technical Direction Documents: 13-03-0001 & 13-09-0008

May 2014

Draft Version 3.0 for the Interior Subarea Contingency Plan, February 2015)

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
222 West Seventh Avenue, #19
Anchorage, Alaska 99513

Prepared by:

ECOLOGY AND ENVIRONMENT, INC.
1007 West 3rd Avenue, Suite 201
Anchorage, AK 99501

Page intentionally left blank

Table of Contents

Figures: Chena River Vulnerability Assessment

Figures: Chena River GRS

List of Abbreviations and Acronyms

Acronym	Definition
ADEC	Alaska Department of Environmental Conservation
ADOT	Alaska Department of Transportation
APSC	Alyeska Pipeline Service Company
AST	aboveground storage tank
cps	cubic feet per second
CR	Chena River
CWA	Clean Water Act
dba	doing business as
DNR	Alaska Department of Natural Resources
E & E	Ecology and Environment, Inc.
EPA	United States Environmental Protection Agency
FNSB	Fairbanks North Star Borough
GIS	geographic information system
GRS	geographic response strategies
km	kilometer
mi	miles
START	Superfund Technical Assessment and Response Team
TAPS	Trans-Alaska Pipeline System
ULSD	ultra-low sulfur diesel
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
UST	underground storage tank

Introduction

Ecology and Environment, Inc. (E & E), the United States Environmental Protection Agency (EPA) Superfund Technical Assessment and Response Team (START) was tasked to conduct a vulnerability assessment of the Chena River in Fairbanks, Alaska. The assessment included oil and chemical storage facilities, transportation routes, drainage outfalls to the river, and an account of the local spill response resources within the Fairbanks North Star Borough (FNSB). Subsequently, START was tasked with identifying geographic response strategies (GRS) logistic locations, (see Section 2 below). In June 2013, EPA, START, and the Alaska Department of Environmental Conservation (ADEC) conducted a reconnaissance survey of the Chena River to identify access points for GRS locations.

Figures for both the vulnerability assessment and the GRS follow this report under separate tabs.

Chena River Location

The Chena River is a tributary of the Tanana River and is located in interior Alaska entirely within the Fairbanks North Star Borough. The city of Fairbanks, Alaska's second largest city, is located in the lower portion of the Chena River watershed. The headwaters of the Chena River begin in the White Mountains about 145 km (90 miles) east of Fairbanks. The river flows southwest from the confluence of North Fork Chena River and West Fork Chena River near Chena Hot Springs to its confluence with the Tanana River in Fairbanks. The maximum length of the watershed is 161 km (100 miles) and the maximum width is 64.5 km (40 miles). The Chena River drains an area of approximately 5,478 km^2 (2,115 mi^2).

Noyes Slough, located in the city of Fairbanks, is 8.85 km (5.5 miles) long and is a side branch to the Chena River. Deadman Slough, located west of Noyes Slough, is approximately 4.82 km (3 miles) long and meanders west and south to the Chena River near the Parks Highway (see Figure 1-4). The Noyes Slough branches off to the north from the Chena River and returns to the north bank of the Chena River, upstream of the confluence of the Chena River and the larger Tanana River (see Figure 1-5).

The Little Chena River is the largest tributary to the Chena River and flows into the river below Moose Creek Dam. The Little Chena River originates in the mountains to the northeast and flows south until it enters the Chena River approximately 11 km (7 mi) upstream of the city of Fairbanks. The Little Chena River watershed encompasses 1,062 km^2 (410 mi^2).

History of the Chena River Area

There are indications of early travel and exploration along the Chena River, and mammalian fossils have been found along the river banks. In the early 1900s, two brothers, Robert and Thomas Swan, discovered the Chena Hot Springs after learning that a U.S. Geological Survey crew had spotted steam rising from a valley on the upper Chena River. In July 1905, the brothers left on a boat in search of the hot springs, arriving at the North Fork of the Chena River. They traveled to the mouth of Monument Creek and ascended the creek to find the hot springs on August 5, 1905 (http://www.chenahotsprings.com/history/). The Chena Hot Springs development began in 1915 with construction of the hotel, cabins, and a bathhouse containing wooden hot tubs. People took the 124-mile round trip by sleigh to the hot springs. Construction of three roadhouses along the winter sled trail soon followed with one at the junction of the Little Chena River, one at the junction of Colorado Creek, and another at the Highway Milepost 48 (Gregg's Roadhouse).

The Chena Pumphouse is on the U.S. National Register of Historic Places. The website www.Waymarking.com cites the following description from the NRHP nomination form:

> *The Pump House was once an unprepossessing, tin-sheathed structure which housed the equipment used to pump water from the Chena River, over Chena Ridge to the Gold Dredging operations of the Fairbanks Exploration Company (F.E.CO.) on Cripple Creek, near Ester. It was around 1930 that the Chief Engineer of the Company, which was already operating on Creeks North of Fairbanks, evolved a scheme for mining Cripple Creek and its tributaries by pumping water from the Chena River up over Chena Ridge. This provided enough pressure to operate the hydraulic giants which were used to strip the overburden. The Pump House was completed and began operations in 1933. It was constructed by the F.E.CO., a subsidiary of United States Smelting, Mining and Refining Co. . . . Inside the building were ten, 14", double suction centrifugal pumps rated at 6000 gpm against a 220 ft, head and direct connected to 400 hp electric motors. These pumps were mounted in series, with two to each unit, making five units which delivered the water to the top of Chena Ridge through three, 26" pipelines against a total head of 440 ft. Water was delivered from there through a three mile ditch to the site of the mining operations where it was used for stripping and thawing and for make-up water for the dredge pond when needed.*

Logging has occurred for the past 50 years and continues in some areas. Timber of the Chena River provided wood for many buildings and homes constructed in Fairbanks, and the river provided a way to move the logs downriver.

Recreational uses of the Chena River include sport fishing (Arctic grayling, Chinook salmon, chum salmon and other species), boating and rafting, camping, and hiking, skiing, skijoring, dog mushing, and snowmachining.

Chena River Lakes Flood Control Project

In the summer 1967, the Chena and Little Chena rivers flooded more than 6 feet above their flood stage. Damage estimates in Fairbanks totaled more than $80 million. To prevent any more disasters, the Alaska District of the United States Army Corps of Engineers (USACE) proposed the "Chena River Lakes Flood Control Project." After Congress authorized the Flood Control Act of 1968, the Alaska District and the FNSB began planning and construction of the Moose Creek dam and floodway, the Tanana River levee, and drainage channels, sharing in the acquisition of lands needed for the dam and floodway and for the levee and channels, which are located about 32 km (20 miles) east of Fairbanks. Construction began in 1973 and the $256 million project was completed in 1979. The Moose Creek Dam divides the Chena River into an upper and lower reach, and the reduction of the peak flow of the Chena River and a decline in flow in the Chena Slough and Noyes Sough over the past 40 years is attributed to its construction. In 1987, the FNSB assumed responsibility for the operations and maintenance of the levee and drainage channels.

The Chena River Lakes Flood Control Project is operated only for flood control and does not permanently hold water upstream of the Moose Creek dam. During normal fluctuations of the Chena River, the outlet for the dam is open. Fish, boats, and water move through the open gates. During high water, the flood gates are closed and excess water is redirected to the Tanana River. The last time the gates were closed at the dam was in 2008. Then, water rose to 0.15 km (495.5 feet). A January 2010 article in the Fairbanks Daily News Miner reported that the largest impoundment of water at the dam was in 1992 when the USACE reduced the flow of the Chena River, diverting floodwaters to the Tanana River for 18 days. The

dam impounded water to 0.154 km (507.6 feet)—approximately 19% of its capacity. To reduce the risk of a breach underneath the dam the USACE lowered the height of the earthen wall at the flood control complex to allow more water to flow into the Tanana River during a flood.

Biological Resources

The Chena River supports one of the largest Chinook salmon (also called king salmon) populations in the Alaska portion of the Yukon River drainage (USFWS 2013). All documented Chinook salmon spawning in the Chena River occurs upriver from the Moose Creek Dam (Brase 2009). In July 2013, the Alaska Department of Fish and Game (ADF&G) issued an emergency order closing the Chena River to king salmon fishing because of low counts of salmon escapement (number of salmon that reach the spawning grounds) and because the run strength was insufficient to sustain the incidental mortality that occurred during catch-and-release fishing. The Chena River escapement goals range from 2,800 to 5,700 king salmon. Escapements that are projected to be below this range may result in fishing restrictions. Similarly, escapements above this range allow higher numbers of fish to be caught per day.

The Chena River is a popular area for sport fishing for residents and for visitors. The mouth of the Chena River in particular is a popular area for sport fishing when the Chinook and chum salmon runs are in. According to the *ADF&G Fishery Management Report No. 14-14*, restrictions on the king salmon fishery have been imposed in the past couple of years due to low counts. Adult king salmon enter the Yukon River during or shortly after breakup and migrate into the Tanana River and appear in the lower Chena River between late June and the second week of July. King salmon spawn primarily upriver of the fishery and fishing for king salmon is closed above the dam (Brase and Baker 2014).

Other fish species present in the Chena River include chum salmon, Arctic grayling, Burbot, and northern pike. The State changed fishing regulations for Arctic grayling to catch and release only. The Arctic grayling fishery has been popular for nearly 60 years. Anglers fish for Arctic grayling throughout the road- and boat-accessible sections of the river and its tributaries. The Chena (also known as Badger Slough) and Piledriver sloughs provide rearing areas for lower river Arctic grayling and are easily accessible fishing locations (Brase and Baker 2014).

ADF&G designated the Fairbanks area of the Chena River as a "nonsubsistence use" area, defined as areas where "dependence upon subsistence (customary and traditional uses of fish and wildlife) is not a principal characteristic of the economy, culture, and way of life (AS 16.05.258(c))." http://www.adfg.alaska.gov/index.cfm?adfg=fishingSubsistencebyArea.nonSubsistenceUse

Moose and beaver often are viewed from the Chena Riverwalk, which is approximately 3.5 miles between Pioneer Park and Airport Way. Migratory birds pass through Fairbanks en route to/from nesting areas further north. Among many species of birds, sandhill cranes, snow geese, Canada geese, eagles, Northern Harriers, falcons, owls, mallards, pintails, trumpeter and tundra swans are common in the area.

1 – Vulnerability Assessment

1.1 Chena River Description

The Chena River is a meandering river, where the slope is gradual and stream channels develop a snakelike form, weaving across the landscape. The river's course has changed over time and resulting

riverbank erosion causes a large amount of brush, trees, and other debris to fall into the water, creating some hazards for navigation. The Alaska Department of Natural Resources Division of Parks & Outdoor Recreation *River Guide for the Chena River State Recreational Park* rates the Chena River as a Class II on the international scale of river difficulty due to hazards (*http://dnr.alaska.gov/parks/units/chena*). The river splits into two or more smaller channels. Upper portions of the river are generally more difficult than the lower portions. The outer portion of each meandering curve is subject to the fastest water velocity, causing the greatest scouring erosive action and often creating undercut banks. By contrast, the inner portion of the curve has the slowest water velocity and receives sediment fill, forming point bar deposits. High water after rains may increase the river's flow velocity. The soils in the Chena River watershed are dominated by silt.

At the Trans-Alaska Pipeline System (TAPS) crossing, the Chena River flows in a single channel with some highwater channels. The river normally freezes solid at the surface each winter; however, warm water effluent discharged from the municipal utility power plant creates persistent open water areas nearby and downstream of the power plant and two bridges.

1.2 Vulnerability Assessment Area

The vulnerability assessment area includes the Chena River from the western boundary of Fort Wainwright to the Tanana River confluence (13 miles), including Noyes Slough (5.5 miles) and Deadman Slough (2.75 miles). The study area is presented in Figures 1-1a, 1-1b, 1-1c and 1-2.

1.3 Hydrology

Sources of water for the Chena River are precipitation, upstream flows, and groundwater from unconfined aquifers. The river flow at Fairbanks ranges from 100 to 74,400 cubic feet per second (cfs), with an average flow of 1,344 cfs,High flows occur in the summer months (May through September) and low flows occur in the winter months (November to April). River velocity also varies by season, with 1-2 mph common during summer months, 2-4 mph during floods are during breakup after the ice moves. When temperatures are below freezing, the velocity drops to 0-1 mph. Ice forms on the river in October and breaks up in April and May, with the highest flow usually occurring in May following spring rains and snow and ice-melt. During flood periods, the width of the Chena River may exceed 1 mile. The river width at normal flow is 150 to 200 feet and at high flow is 200 to 600 feet (Tetra Tech 2011 and APSC 2011)

Based on data for the Chena River at Fairbanks from the U.S. Geological Survey (USGS) Surface Water Monthly Statistics for Alaska, the mean of monthly discharge is as follows:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cubic feet per second (CFS)	343	284	261	493	3,480	2,450	2,040	2,430	2,140	1,190	596	443
Knots												

Notes: Monthly mean is in cfs (for calculation period May 1, 1948 to April 30, 2013).

The *Alyeska Pipeline Service Company Trans Alaska Pipeline System Pipeline Oil Discharge Prevention and Contingency Plan*, Volume 3 Tactics Manual "Hydrology of Major Drainages" (APSC 2011)

provides the stream flow information on the Chena River, including stream discharge and velocity by season.

Season	Condition	Discharge (CFS)	Velocity (MPH)
Summer	Low Flow Rain Floods	500-10,000 10,000-25,000	1-2 2-4
Freezeup	Without Ice Cover With Ice Cover	400-1,500 400-1,000	0-1 0-1
Winter	Under Ice Flow *Aufeis* Potential: Low	200-800	0.5-1
Breakup	Before Ice Movement After Ice Movement	500-3,000 3,000-25,000	1-2 2-4

1.4 Storm Water Drainage and Discharge

Information on the storm water drainage system in Fairbanks was provided by the City of Fairbanks and the FNSB. This included geographic information system (GIS) data on the storm water drains, drainage network of pipes, ditches and culverts, and discharge locations into the Chena River (see the FNSB online storm drain mapping tool at http://gis.co.fairbanks.ak.us/website/stormwater/viewer.htm). The developed drainage system is primarily in an area bounded by the Parks Highway to the west and south, College Road to the north, and Fort Wainwright to the east. However, much of this area and elsewhere in Fairbanks is without a drainage system and relies on surface flow draining to the rivers or other low points. These features are illustrated on Figure 1-3.

The FNSB, City of Fairbanks, and City of North Pole, working collectively with the Alaska Department of Transportation & Public Facilities and the University of Alaska Fairbanks, developed a comprehensive storm drain map for the Fairbanks area.

The Fairbanks area's storm drain system conveys this surface water runoff away from public street rights-of-way and commercial and residential properties to nearby water bodies. The system comprises thousands of culverts and storm drain inlets, hundreds of miles of ditches and buried storm drain pipe, and hundreds of outfalls that serve as discharge points to nearby water bodies.

The developed drainage system is primarily in an area bounded by the Parks Highway to the west and south, College Road to the north, and Fort Wainwright to the east. However, much of this area and elsewhere in Fairbanks is without a drainage system and relies on surface flow draining to the rivers or other low points. The data on the Chena River area provided by the FNSB indicate that there are 116 storm water drainage and discharge points into the Chena River, sloughs, and tributaries.

1.5 History of Spills or Releases

The Chena River is highlighted in the EPA's *Water: Nonpoint Source Success Story* as an improved water body. In 1994, ADEC added a 15-mile-long segment of the Chena River to the 1994 Clean Water Act (CWA) section 303(d) list of impaired waters for petroleum hydrocarbons/oil, grease and sediment. Later investigations indicated that contaminated sites on the Fort Wainwright military base were contributing to most of the petroleum products in the Chena River. In the mid-1990s, the U.S. Army cleaned up several contaminated areas. Between 1995 and 1997, the Army cleaned up a drum storage yard next to the Chena River that contained diesel fuel, gasoline, jet fuel, solvents, asphalt, pesticides, and lubricants. The Chena River also flows near an unlined landfill, which was installed in the 1950s. Data from 1993 indicate that the groundwater below the landfill was contaminated by numerous pollutants, including hydrocarbons that might be seeping into the Chena River.

Monitoring data collected at the Chena River between 2005 and 2009 show that petroleum hydrocarbon levels now meet water quality standards, and the State removed the Chena River from Alaska's 2010 CWA section 303(d) list. The river remains on the list of impaired waters for sediments. Spills occurring from 1995 to 2011 in this vulnerability assessment's area of focus are summarized by substance and total volume in Table 1-1 (EPA 2013).

Table 1-1 Spills Reported from 1995 to 2011*

Spill Substance (1995-2011)	Volume in Gallons
Diesel	29,319
Engine Lube Oil	1,100
Ethylene Glycol	14,737
Gasoline	4,100
Glycol, Other	5,000
Hazardous Bases	300
Hazardous Drag Reducing Agent	1,000
Hazardous Other	2,300
Non-crude Other	500
Propylene	2,240
Used Oil	550

*Spills reported within area of focus for this report as illustrated in Figure 1-1a.

1.6 Bulk Fuel and Chemical Storage

E & E START queried the ADEC Underground Storage Tank (UST) database and the 2011 Tier Two database to determine oil storage and other hazardous material storage facilities near the Chena River. Facilities were identified in four zones: less than 0.25 miles; 0.25 to 0.5 mile; 0.5 to1.0 mile and more than 1.0 mile from the Chena River. Figures 1-4 through 1-9 show the locations of the facilities.

The greater-than-1 mile zone includes only the identified facilities located in the Chena River watershed and downstream of a Fort Wainwright western boundary and, as such, does not include all of the facilities within the City of Fairbanks or the FNSB. Further, a source of data for the bulk fuel and chemical storage facilities, the Tier Two database, is based on reports submitted by the facilities. The reporting requirements do not provide for consistent data and have been presented in the tables as they were submitted by the facilities.

Table 1-2 lists the significant bulk fuel storage facilities. Table 1-3 lists the number of facilities and total (maximum) amount of petroleum product in the four zones.

Table 1-2: Significant Bulk Fuel Storage Facilities

Facility	Aboveground Storage Tank (AST) Capacity (gallons)
University of Alaska Fairbanks, Power Plant, 802 Alumni Drive	262,845
Petro Star, dba Sourdough Fuel, Illinois Street facility	210,805
Golden Valley Electric Association Headquarters, 758 Illinois Street	145,388
Alaska Aerofuel, Inc., Fairbanks International Airport, 5904 Old Airport Way	141,251
University Redi-Mix, 3070 Phillips Field Rd	82,000
Great Northwest, Inc., 2975 Van Horn Rd	55,600
Seekins Ford, 1625 Seekins Ford Dr	37,000
Simard Automotive, 5200 Aeronca Ave	11,415
Alaska Department of Transportation, Fairbanks International Airport, 6450 Airport Way	11,000

Table 1-3 Facilities/Total Volume of Bulk Petroleum Product

Distance from Chena River	Number of Bulk Fuel and Chemical Storage Facilities	Volume of Bulk Fuel and Other Petroleum Hydrocarbons (in approximate gallons)
Less than 0.25 mile	39	405,000
0.25 – 0.5 mile	23	1,098,000
0.5-1.0 mile	29	572,000
Greater than 1.0 miles	77	976,000

1.7 Transportation of Bulk Fuel and Chemicals

In addition to the chemical storage, this assessment examined the transportation of fuel and other chemicals in the assessment area. The primary overland routes include the major roads and highways and the Alaska Railroad. The petroleum products transported include mostly light and middle distillate range fuels (gasoline, diesel, kerosene, heating fuel, naphtha, and jet fuel). Much of these fuels stored or transported through the area are produced at the Flint Hills Refinery in North Pole, located about 14 miles southeast of Fairbanks. Hot asphalt is also produced at the Flint Hills Refinery and transported throughout the region. There are 17 road and highway bridges crossing the Chena River, Noyes Slough, or Deadman Slough downstream of Fort Wainwright.

The Alaska Railroad route crosses the Chena River 1.7 river miles upstream of the study area boundary, on Fort Wainwright, and crosses Noyes Slough near the intersection of Johansen Parkway and College Road. A railroad spur serves the Fairbanks International Airport, where substantial volumes of bulk fuel are transferred. In 2011, the Alaska Railroad transported more than 1.8 million tons of fuel (ARRC 2012). Most of this fuel came from the Flint Hills Refinery to Fairbanks or Anchorage, although some fuel, mostly ultra-low sulfur diesel fuel (ULSD) was transported north from Anchorage to Fairbanks. Figure 1-3 provides an overview of the major roads in Fairbanks. Figures 1-4 to 1-9 show the major hazardous material transportation corridors as well as the storage facilities.

The TAPS is located at the upstream extent of the focus area, crosses the Chena River near Nordale Road in North Pole, Alaska. According to the APSC, in 2012 the pipeline carried 17 million gallons per day of North Slope crude oil (APSC 2013). Figure 1-9 illustrates the location of the pipeline river crossing.

2 – Geographic Response Strategies

2.1 Geographic Response Strategies (GRS)

Proposed GRS for the Chena River from Fort Wainwright to the confluence with the Tanana River are intended to assist oil and hazardous substances spill response strategies for inland waters of Alaska. These GRS ultimately will supplement the *Interior Subarea Contingency Plan*. GRS provide unified priorities for the public, responders, and agencies as well as response strategies that protect selected sensitive areas and aid first responders to an oil spill. As the development of Inland GRS continues, the GRS will list additional sensitive resources of an area and the response strategies, equipment, personnel, and logistical information needed to protect the sensitive areas will be included. To test these GRS and ensure that the strategies are the most effective in protecting the resources at risk at a site, sites may be visited and equipment deployed . If changes are indicated by site visits, drills, or actual use during spills, the strategies and this document may be revised.

2.2 GRS Area of Focus

For the purpose of the GRS, the area of focus for the Chena River is from the western border of Fort Wainwright to the confluence of the Chena River and the Tanana River. The river access sites selected by the EPA, with concurrence of the ADEC, for development of GRS are meant to identify the logistics of accessing the river. These locations and deployment of strategies are intended to be flexible to allow spill responders to modify them, as necessary, to fit the prevailing conditions at the time of a spill.

2.3 Response Resources

Nine facilities, agencies, or or organizations with spill response resources are located in the Fairbanks area:the State of Alaska, the Alaska Railroad Corporation (ARRC), the FNSB Hazardous Materials Response Team, the City of Fairbanks, the University of Alaska Fairbanks Fire Departments, two State-approved response action contractors (Emerald Alaska and Inland PetroService), Alaska West Express, and Arctic Fire & Safety. Some of these organizations have available personnel, equipment, hazmat/emergency response training, and supplies; other sources have only equipment and supplies. The APSC, which operates the TAPS, has significant quantities of spill response equipment and trained personnel located in Fairbanks; however, these assets are dedicated to the pipeline.

Response equipment available for oil spill response in the Fairbanks area sources and contacts are listed in Table 2-1. Table 2-2 lists the spill-response resources specific to fast water responses on the Chena River and its tributaries in the GRS area. This is not a complete list of response resources.

Table 2-1 Spill Response Equipment and Services Locations and Contacts in Fairbanks, Alaska

Agency/Facility	Contact	Comments
Alaska Department of Transportation 2301 Peger Road	Sam Myers 907-451-5291	2 ADEC Spill Connexes at DOT Yard on Peger Road and 2 Connexes at ADEC's main parking lot off University Avenue
Alaska Department of Environmental Conservation 610 University Avenue	Wes Ghormley 907-451-2164 wes.ghormley@alaska.gov	
Environmental Compliance Consultants (ECC) 2517 Old Richardson Highway (North Pole, AK 99705)	Darrin Sommer 907-385-0677 fox@eccalaska.com	HazMat response personnel, equipment and supplies
Emerald Alaska 1315 Queens Way	Ian Combes 907-457-2566 ianc@emeraldnw.com	State-approved Response Action Contractor
Inland Petroservice 3960 Braddock Street	Lisa Masheff 907-451-1905 lisa@inlandpetroservice.com	
Alaska West Express 1095 Sanduri Street	Tyler Bones 907-452-4355 tbones@awe.lynden.com	HazMat response personnel, equipment and supplies
Arctic Fire and Safety 702 30th Avenue	Pate White 907-452-7806 patearcfire@yahoo.com	HazMat response equipment and supplies
Alaska Railroad Corporation 1888 Fox Avenue	Matt Kelzenberg 907-265-2384 24-HR Dispatch 907-265-2330 kelzenbergm@akrr.com	HazMat response equipment and supplies
University of Alaska Fairbanks Fire Department 611 North Chandalar Drive	Chief Douglas Schrage 907-474-7681 drschrage@alaska.edu	Mulit-gas detectors, HazCat Kit
Fairbanks North Star Borough Hazmat Response Team 3175 Peger Road	Chief Tyler Bones 907-459-1481 tbones@awe.lynden.com	HazMat response personnel, equipment and supplies
City of Fairbanks Fire Department 1101 Cushman Street	Chief Keith Berrian 907-450-6600 kwberrian@ci.fairbanks.ak.us	Minimal Response Supplies; 14 Three-gas MSA Solaris monitors

Table 2-2 Chena River Spill Response Resources

Description	Quantity	Unit	Location	Source
Boom buoys with clips	10	EA	University Ave	ADEC
Boom, 25' fast response	10	EA	University Ave	ADEC
Danforth anchorage, 22 lbs.	3	EA	University Ave	ADEC
Secondary containment portable dyke (500 gal)	1	EA	University Ave	ADEC
Absorbent pad	7	BDL	University Ave	ADEC
Absorbent boom	1	BDL	University Ave	ADEC
Snare boom, 40' in wooden crate	1	EA	University Ave	ADEC
Teel diaphragm pump, Tag #18-3344, Model #3P613	1	EA	University Ave	ADEC
4" suction hose	50	FT	University Ave	ADEC
2" suction hose	25	FT	University Ave	ADEC
4" discharge hose	75	FT	University Ave	ADEC
Hand bilge pump, 6 per box	2	BX	University Ave	ADEC
Fast tanks	2	EA	University Ave	ADEC
80-gal overpack drum	1	EA	University Ave	ADEC
500-gal storage tank in wooden crate	1	EA	University Ave	ADEC
Supersacks	6	EA	University Ave	ADEC
Fast tank Rapide 400 support tote	1	EA	University Ave	ADEC
PIG® absorbent wringer (large)	1	EA	University Ave	ADEC
3" diameter absorbent sock	10	FT	University Ave	ADEC
Absorb W	2	BG	University Ave	ADEC
PIG® drum wringer (large)	1	EA	University Ave	ADEC

Table 2-2 Chena River Spill Response Resources

Description	Quantity	Unit	Location	Source
Absorbent pads	14	BDL	University Ave	ADEC
8” absorbent boom (white)	8	EA	University Ave	ADEC
12” Absorbent boom	3	BDL	University Ave	ADEC
5” Absorbent boom	5	BDL	University Ave	ADEC
Sorb-oil non sinking oil absorbent	1	BG	University Ave	ADEC
Small drum wringer	1	EA	University Ave	ADEC
10’ intake hose	1	EA	University Ave	ADEC
4” diameter, 50’ discharge hose	1	EA	University Ave	ADEC
2” diameter, 25’ black discharge hose	1	EA	University Ave	ADEC
2” diameter, 10’ intake hose	1	EA	University Ave	ADEC
Drum pump, manual	2	EA	University Ave	ADEC
Supersacks	7	EA	University Ave	ADEC
Action packer	1	EA	University Ave	ADEC
GNPF-MP hazmat fine fiber pads. Perforated 100 per bale 16” x 20”	14	EA	Peger Rd	DOT Yard
WR 144H oil only 38” x 140’ roll absorbent	7	EA	Peger Rd	DOT Yard
Absorbent pads	62	BLS	Peger Rd	DOT Yard
Poly liner, 20’ x 100’ x 0.006”	2	RL	Peger Rd	DOT Yard
500 gal plastic storage tank, polyethylene skid mounted, Tag #10066581	1	EA	Peger Rd	DOT Yard
Salvage overpack metal drum, yel/blk	2	EA	Peger Rd	DOT Yard
20’ x 100’ black heavy mil liner, Geotech	1	EA	Peger Rd	DOT Yard
Vacuum Truck, 3000-gal	1	EA	North Pole	ECC
Vacuum Truck, 1500-gal	1	EA	North Pole	ECC
Floating Skimmer	1	EA	North Pole	ECC
Drum-It Mini Vacuum	1	EA	North Pole	ECC
Backhoe	1	EA	North Pole	ECC
Pumps (various)		EA	North Pole	ECC
White absorbent (oil only) pads	6	EA	Fairbanks	Emerald Alaska
Gray absorbents (comprehensive) pads	6	EA	Fairbanks	Emerald Alaska

Table 2-2 Chena River Spill Response Resources

Description	Quantity	Unit	Location	Source
Gray absorbents roll	1	EA	Fairbanks	Emerald Alaska
White absorbents roll	1	EA	Fairbanks	Emerald Alaska
Clay absorbents	18	EA	Fairbanks	Emerald Alaska
Boom absorbents (5” x 10’)	4	EA	Fairbanks	Emerald Alaska
Rags	2	EA	Fairbanks	Emerald Alaska
Sodium bicarbonate (acid neutralizer)	1	EA	Fairbanks	Emerald Alaska
Squeegees and brooms	4	EA	Fairbanks	Emerald Alaska
Buckets	5	EA	Fairbanks	Emerald Alaska
Brushes	2	EA	Fairbanks	Emerald Alaska
Shovels	4	EA	Fairbanks	Emerald Alaska
Plastic scoop shovel	1	EA	Fairbanks	Emerald Alaska
Drum, open top 55-gal	11	EA	Fairbanks	Emerald Alaska
Supersacks, bulk bags	4	EA	Fairbanks	Emerald Alaska
Oily waste bags	1	CS	Fairbanks	Emerald Alaska
Poly coat Tyvek suits	2	CS	Fairbanks	Emerald Alaska
Tyvek booties	12	PR	Fairbanks	Emerald Alaska
Respirators and cartridges Defender stack	4	EA	Fairbanks	Emerald Alaska
Safety glasses	6	EA	Fairbanks	Emerald Alaska
Nitrile gloves	1	CS	Fairbanks	Emerald Alaska
Leather gloves	12	PR	Fairbanks	Emerald Alaska
Hand toolbox, sockets, etc.	1	EA	Fairbanks	Emerald Alaska
Cordless drill, saw tools tool bag	1	EA	Fairbanks	Emerald Alaska
Decon supplies (waterless cleaning)	2	EA	Fairbanks	Emerald Alaska
Traffic cones	3	EA	Fairbanks	Emerald Alaska
Lighted barricade	1	EA	Fairbanks	Emerald Alaska
Caution tape	1	EA	Fairbanks	Emerald Alaska
Duct tape and electrical tape	5	EA	Fairbanks	Emerald Alaska
Flood lights	2	EA	Fairbanks	Emerald Alaska
3K generator and fuel can	1	EA	Fairbanks	Emerald Alaska
Pump and hose, Little Giant	1	EA	Fairbanks	Emerald Alaska
NIOSH, ERG, DOT CFR 49 manuals	1	SET	Fairbanks	Emerald Alaska
First Aid Kit & Eye wash station	1	EA	Fairbanks	Emerald Alaska
Fire extinguishers	2	EA	Fairbanks	Emerald Alaska
Electrical cords, 12 ga., 50-ft	2	EA	Fairbanks	Emerald Alaska
Ropes	1	EA	Fairbanks	Emerald Alaska
Tow chain/hook, 30 ft	1	EA	Fairbanks	Emerald Alaska
Ladder, step, 8-ft	1	EA	Fairbanks	Emerald Alaska
2010 Ford F550 flatbed truck	1	EA	Fairbanks	Emerald Alaska
2009 Ford F350 (crew cab)	1	EA	Fairbanks	Emerald Alaska
2010 Peterbilt box truck	1	EA	Fairbanks	Emerald Alaska
2008 Kenworth vacuum truck	1	EA	Fairbanks	Emerald Alaska
1991 Peterbilt vacuum truck	1	EA	Fairbanks	Emerald Alaska
1989 Kenworth package truck	1	EA	Fairbanks	Emerald Alaska

Table 2-2 Chena River Spill Response Resources

Description	Quantity	Unit	Location	Source
2005 Peterbilt tractor	1	EA	Fairbanks	Emerald Alaska
2000 Ford F350 (crew cab)	1	EA	Fairbanks	Emerald Alaska
Trailer mount pump: Blackmer 2" diesel	1	EA	Fairbanks	Emerald Alaska
Trailer mount pump: Yanmar 3" diesel	1	EA	Fairbanks	Emerald Alaska
Trailer mount pump: Yanmar 4" diesel	1	EA	Fairbanks	Emerald Alaska
Trailer mount pump: Godwin 4" diesel	1	EA	Fairbanks	Emerald Alaska
Hydraulic pump: Corkon 3"	1	EA	Fairbanks	Emerald Alaska
Hydraulic pump: 2" centrifugal	1	EA	Fairbanks	Emerald Alaska
Hydraulic pump: 3" sump pump	1	EA	Fairbanks	Emerald Alaska
Diaphragm pump: 1"	2	EA	Fairbanks	Emerald Alaska
Diaphragm pump: 2"	1	EA	Fairbanks	Emerald Alaska
Diaphragm pump: 3"	2	EA	Fairbanks	Emerald Alaska
Portable snow melting self-contained unit for contaminated snow	1	EA	Fairbanks	Emerald Alaska
Stationary snow melting self-contained unit for contaminated snow	1	EA	Fairbanks	Emerald Alaska
Dredging equipment for lagoons and surface waters	1	EA	Fairbanks	Emerald Alaska
40' connex with hoses, pumps, fast tank, skimmers, hardware, etc.	1	EA	Fairbanks	Alaska Railroad
40' connex with consumables, i.e., PPE, absorbent pads, rolls, booms, etc.	1	EA	Fairbanks	Alaska Railroad
40-gal or 55-gal drums		EA	Fairbanks	Alaska Railroad
Boom, 6" float 4" skirt "reclaimed" 30'-50'	30	EA	Fairbanks	Arctic Fire & Safety
Drum, poly, 55-gal OT	50	EA	Fairbanks	Arctic Fire & Safety
Drum, steel, 85-gal OT	35	EA	Fairbanks	Arctic Fire & Safety
Bag, 4M 33 X 40 oil/print 100	30	EA	Fairbanks	Arctic Fire & Safety
Drum, steel, 110-gal OT	100	EA	Fairbanks	Arctic Fire & Safety
Drum, steel, 30-gal OT	35	EA	Fairbanks	Arctic Fire & Safety
Drum, steel, 55-gal OH	60	EA	Fairbanks	Arctic Fire & Safety
Drum, poly 65-gal w/o wheel	10	EA	Fairbanks	Arctic Fire & Safety
Universal pad 16 X 20 M 100	144	EA	Fairbanks	Arctic Fire & Safety
Oil only pads Dimpl 100-ct	144	EA	Fairbanks	Arctic Fire & Safety
Oil only boom 5 x 10'	80	EA	Fairbanks	Arctic Fire & Safety
Oil only boom 8 x 10'	200	EA	Fairbanks	Arctic Fire & Safety
Oil only sock 3 x 8'	90	EA	Fairbanks	Arctic Fire & Safety
Oil only sock 3 x 4'	180	EA	Fairbanks	Arctic Fire & Safety
Oil only pads 100/bg	144	EA	Fairbanks	Arctic Fire & Safety
Oil only boom 5 x 20'	200	EA	Fairbanks	Arctic Fire & Safety
Drum, poly 95-gal w/o wheel	12	EA	Fairbanks	Arctic Fire & Safety

2.4 GRS Locations

In June 2013, the EPA, START, and the ADEC conducted a reconnaissance survey of the Chena River. The three-person team conducted the survey by boat, from the confluence of the Chena and Tanana Rivers, east through Fairbanks, just east of the Fort Wainwright boat launch. This survey identified access points for the Chena River (see Figure 2-1). Table 2-3 provides a list of the ten identified river access sites.

Table 2-3: Chena River Access Locations

River Access Sites and Boat Launches
Chena Pump Road/Tanana Wayside and Boat Launch. Located at Mile 4.6 Chena Pump Road.
Pike's Waterfront Lodge. Boat launch accessed from parking lot between Pike's Waterfront Lodge and Pike's Landing restaurant, 1850 Hoselton Road.
Chena Small Tracts Road and Pike's Landing Road (Alaska Department of Natural Resources). Chena Small Tracts Road (north bank) or Pikes Landing Road (south bank) terminate at the Chena River with river access.
Alaska Division of Forestry (Alaska Department of Natural Resources). Located at 3700 Airport Way. No boat launch. Site also has a helicopter landing pad.
Chena River State Recreation Area/Chena River Wayside. Located at 221 University Ave. This park has a boat launch frequently used to launch kayaks and canoes and other non-motorized uses as well as motor boats.
Boatel Landing. Located at 3368 Riverside Drive. Boat launch.
Pioneer Park Recreational Landing (Paddler's Cove). Located at 1101 Peger Road. This landing is primarily for the canoe and kayak rental operated by Alaska Outdoor Rentals and Guides at Pioneer Park.
Kiwanis Park/South of Philips Field Road. The Kiwanis Park is located at Second Avenue and Wilber Street, near the Carlson Community Center. The river access on south of Philips Field Road is located two blocks east of Peger Road. No boat launch.
Graehl Park. Located at Front Street and Fortymile Street. Boat launch.
Fort Wainwright Boat Landing. Located off of Glass Drive on Fort Wainwright, near the Gaffney Road gate. Boat Launch.

Eleven GRS locations have been identified and are described in Table 2-4. These areas are generally associated with a river access site for shoreside recovery, with additional shoreline locations identified as potentially needing protective measures to prevent oil from entering sensitive areas or becoming entrained on-shore. The GRS locations are shown in Figures 2-2 through 2-7.

Table 2-4: Chena River GRS

GRS	Location and Description
CR1	**Chena River Confluence with Tanana River** • Deflection boom at east and west ends to prevent oil on Tanana River from entering Chena River • Deflection boom at Tanana Wayside and Boat Launch to prevent oil from contaminating shore at boat launch and public use area.
CR2	**Chena Pump House and Cripple Creek** • Deflection boom at the original and re-routed outlets of Cripple Creek • Deflection boom along shore at Chena Pump House (U.S. National Register of

Table 2-4: Chena River GRS

GRS	Location and Description
	Historic Places) • Deflection boom to prevent contamination of the Riverboat Discovery dock.
CR3	**Chena Small Tracts Road and Pike's Landing Road Boat Launches** • Diversion boom to direct oil toward oil collection area near boat launch/ice road access for shoreside recovery. • Deflection boom at entries into Riverboat Cove to prevent oil from entering protected water of cove.
CR4	**Division of Forestry (DOF)** • Diversion boom to direct oil toward oil collection area near shore at DOF facility for shoreside recovery. • Deflection boom at channel inlet/outlet of small slough located on north bank, across from DOF.
CR5	**Chena River State Recreation Site** • Diversion boom to direct oil toward oil collection area near boat launch access for shoreside recovery. • Diversion boom to direct oil toward oil collection area near shore below picnic area for shoreside recovery. • Deflection boom at inlet/outlet of Noyes Slough located on north bank, across from boat launch.
CR6	**Pioneer Park** • Diversion boom to direct oil toward oil collection area near Peger Road Bridge for shoreside recovery. • Deflection boom at entries into Paddler's Cove to prevent oil from entering protected water of cove.
CR7	**Kiwanis Park** • Diversion boom to direct oil toward oil collection area near shore upstream of the river bend around Kiwanis Park and Carlson Community Center for shoreside recovery. • Deflection boom along north bank, across for Kiwanis Park, to prevent oiling of sandy beaches on river bend.
CR8	**Aurora Energy Power Plant** • Deflection boom to protect water intake for power plant.
CR9	**Graehl Park and Noyes Slough** • Diversion boom to direct oil toward oil collection area near Graehl Park boat launch for shoreside recovery. • Diversion boom to direct oil toward oil collection area near shore upstream of the Noyes Slough inlet/outlet for shoreside recovery. • Deflection boom along north bank to protect mid-channel islands and bars.
CR10	**Fort Wainwright Boat Launch** • Diversion boom to direct oil toward oil collection area near Glass Park using the split in the channel created by an island to create a collection area for shoreside recovery accessed from Glass Park. • Deflection boom at inlet/outlet of pond on north bank located off of Fegre Road, Fort Wainwright. • Deflection boom at channel inlet/outlet of small slough and pond located on north

Table 2-4: Chena River GRS

GRS	Location and Description
	bank, near Hamilton Acres Park. • Deflection boom to protect shoreline of island splitting river into two channels upstream of boat landing. • Deflection boom to protect Fort Wainwright boat landing and dock.
CR11	**Fort Wainwright Trainor Gate Road and railroad bridge crossing** • Diversion boom to direct oil toward oil collection areas on south channel using split in river channel created by an oxbow island. Potential collection areas possible on north and south bank of southern channel. • Deflection boom on north bank upstream of the oxbow island to direct oil away from northern channel and into southern channel. • Deflection boom along upstream banks of the oxbow island to prevent oiling of shore. • Deflection boom to protect shoreline of island in southern channel.

During a spill response, some locations shown in the GRS figures may be identified for either protection from contamination by oil or used for recovery of oil. These include the Riverboat Cove (Riverboat Discovery and Tanana Chief docking facilities) and Paddler's Cove (Pioneer Park Recreational Landing). At either site, oil could be deflected away from entering the protected waters or diverted into the cove area to facilitate recovery, depending on the response needs and property owner and other stakeholder concerns. Additionally, river access sites generally have been identified as potential shoreside recovery areas with diversion boom used to direct oil to the access site. However, it may be appropriate to use a deflection boom to direct free oil away from a boat launch to minimize the spread of contamination as vessels and other equipment enter and exit the river.

2.5 Recovery Tactics

The following spill recovery tactics descriptions from the *Alaska Spill Tactics for Alaska Responders (STAR) Field Guide* (April 2006) are summarized below. Page references from the STAR guide are noted in brackets. Although not specified in the STAR guide, it is assumed that sufficient containment boom will be available when using these tactics.

Both deflection boom and diversion boom are tactics utilizing the same type of boom. The specific type of boom will be determined by the river conditions and available equipment. (Exclusion boom and containment boom are two other commonly used tactics but they are not appropriate for the fast water condition of the Chena River and are not recommended here.)

In the event of a response utilizing all of the tactics identified in Figures 2-2 through 2-9, over 10,000 feet of boom would be required. Depending on river conditions and water levels, additional diversion boom may be required to protect shorelines or mid-channel islands from oil.

2.6 Deflection Boom

[STAR Field Guide B-123]

The purpose of deflection boom is to prevent oil from entering protected waters or coming onshore at protected locations.

In locations where the current is 0.5 to 3.0 knots, the boom is placed at an optimum angle to the oil trajectory, using the movement of the current to carry oil along the boom and then releasing it into the current again with a new trajectory. The angle is chosen to prevent oil from entraining beneath the bottom of the boom skirt; however, there is no oil recovery associated with this tactic.

Examples of this tactic are shown in Figure 2-4 where the deflection boom is used to prevent oil from entering "Riverboat Cove," where the Riverboat Discovery and Tanana Chief are docked. It is also used to keep oil from entraining on mid-channel islands and bars.

2.7 Diversion Boom

[STAR Field Guide B-77]

Boom is placed at an optimum angle to the oil trajectory, using the current to carry oil along the boom to a recovery location. The boom held in place by anchors, vessels, or a boom control device such as a trolley or boom vane.

2.7.1 Single Boom – This is a basic technique to divert oil from a current to a recovery site along the shoreline, where there is minimal current (an eddy, quiet water, or collection beach), and a suitable recovery system can be deployed. The boom is anchored at the site and deployed at an optimum angle to the current and secured/anchored to divert the oil to the recovery site. The offshore end of the boom can be secured with an anchor in the water or, on a far shore, with a boom control device or with a vessel.

2.7.2 Cascade Boom – Multiple booms are deployed in a cascade configuration when a single boom cannot be used due to fast current or when openings in the boom are needed for vessel traffic or access. Shorter sections of the boom in a cascade system are easier to handle in fast water, increasing safety and efficiency. This system requires additional equipment to set and maintain than a single boom.

2.7.3 Chevron Boom, Staggered or Open – Chevron boom configurations may be used in fast water. Two booms are deployed from separate anchors midstream and attached to each bank, with one anchor point upstream or downstream of the other. This system allows for boat traffic to pass.

2.8 Shoreside Recovery

[STAR Field Guide B-99]

A shoreside recovery system is set up to recover oil from water that has been diverted to a recovery site accessible from shore. It is usually used in conjunction with a diversion boom. The system generally consists of a skimming system, oil storage system, and appropriate site access vehicles and vessels.

2.9 Fast Water Free-Oil Recovery

[STAR Field Guide B-57]

Fast water free-oil recovery is an on-water strategy deployed to recover oil without bringing the oil to or near shore. These systems comprise vessels with oil booms for containment and concentration, skimming systems for recovery of oil, and primary storage devices for temporary storage. Vessels, booms, and skimmers should be able to be deployed and operated in waves up to 2 feet and winds up to 15 knots.

This tactic is not shown in any of the GRS figures. It is highly dependent on available vessels and associated equipment (such as Boom Vanes™ and Current Busters™), skilled vessel operators, and conditions on the river. In most cases this tactic is deployed in either open water or very large rivers, unlike the Chena River.

References and Resources

Alaska Department of Environmental Conservation, 2013, Underground Storage Tank Database Website. Available at: http://dec.alaska.gov/spar/ipp/ust/search/default.htm. Accessed on April 9, 2013.

Alaska Department of Natural Resources, Division of Parks & Outdoor Recreation. n.d. *River Guide for Chena River State Recreation Area. http://dnr.alaska.gov/parks/units/chena/river.htm* Accessed October 23, 2013.

Alaska Railroad Corporation. May 2012. Alaska Railroad Freight Services.https://www.alaskarailroad.com/Portals/6/pdf/pr/2012_05_16_Freight_FS_PR.pdf. Accessed on June 13, 2013.

Alaska Spill Tactics for Alaska Responders (STAR) Field Guide (April 2006): http:// dec.alaska.gov/spar/perp/star/docs.htm. Accessed on October 22, 2013.

Alaska Statewide Hazmat Work Group.February 14, 2011. Statewide Hazmat Detection Equipment Assets.

Alyeska Pipeline Service Company (APSC). 2013 Pipeline Operations. http://www.alyeska-pipe.com/TAPS/PipelineOperations/LowFlowOperations. Accessed June 13, 2013.

_____. 2011. *Trans Alaska Pipeline System Pipeline Oil Discharge Prevention and Contingency Plan.*

Brase, A. L. J. 2009. *Sport Fishery Management Plan for Chinook salmon in the Chena and Salcha Rivers.* Alaska Department of Fish and Game, Fishery Management Report No. 09-11, Anchorage.

Brase, A. L. J. and B. Baker. 2014. *Fishery Management Report for Recreational Fisheries in the Tanana River Management Area, 2012.* Alaska Department of Fish and Game, Fishery Management Report No. 14-14, Anchorage.

_____. 2012. *Fishery Management Report for Recreational Fisheries in the Tanana River Management Area, 2010.* Alaska Department of Fish and Game, Fishery Management Report No. 12-32.

Chena Hot Springs Resort. 2013. History of Chena Hot Springs.: http://www.chenahotsprings.com/history/. Accessed April 22, 2014.

Ecology and Environment, Inc., September 2012. 2011 Tier Two Compilation/CAMEO Database.

_____. 2013. Facility Response Plan Database [computer files].

Fairbanks North Star Borough. April 2013. Fairbanks North Star Borough GIS Data, FNSBGIS.gdb [computer files].

_____. July 2012. Pictometry imagery [computer files].

_____. Fairbanks Store Water Management Program Storm Drain Map. http://co.fairbanks.ak.us/PWorks/StormWaterManagementProgram/stormdrainmap.htm. Accessed March 6, 2013.

_____. Fairbanks Store Water Management Program, Stormwater 101. http://co.fairbanks.ak.us/PWorks/StormWaterManagementProgram/stormwater101.htm. Accessed March 6, 2013

Tetra Tech. 2011. Watershed Characterization for the Chena River Watershed, Alaska.http://dec.alaska.gov/water/wnpspc/protection_restoration/ChenaRiverWQ/docs/ChenaRiver_Watershed_Characterization_11-11.pdf. Accessed on March 5, 2013.

United States Army Corps of Engineers (USACE). 1997. *Chena River Watershed Study Reconnaissance Report,* as summarized in the *Watershed Characterization for the Chena River Watershed, Alaska*.

United States Environmental Protection Agency. 2013. *Water: Nonpoint Source Success Stories. Alaska: Chena River, Cleaning Up Contaminated Sites Improves Water Quality* http://water.epa.gov/polwaste/nps/success319/ak_chena.cfm. Accessed October 25, 2013.

United States Fish and Wildlife Service. 2013. Juvenile Chinook salmon (Oncorhynchus tshawytscha) in the Chena River corridor through Fairbanks, AK: using citizen scientists to build community stewardship. RM #32-12 http://www.fws.gov/alaska/fisheries/fieldoffice/fairbanks/subsistence/pdf/reports/rm_32_2012.pdf Accessed May 7, 2014.

This page intentionally left blank

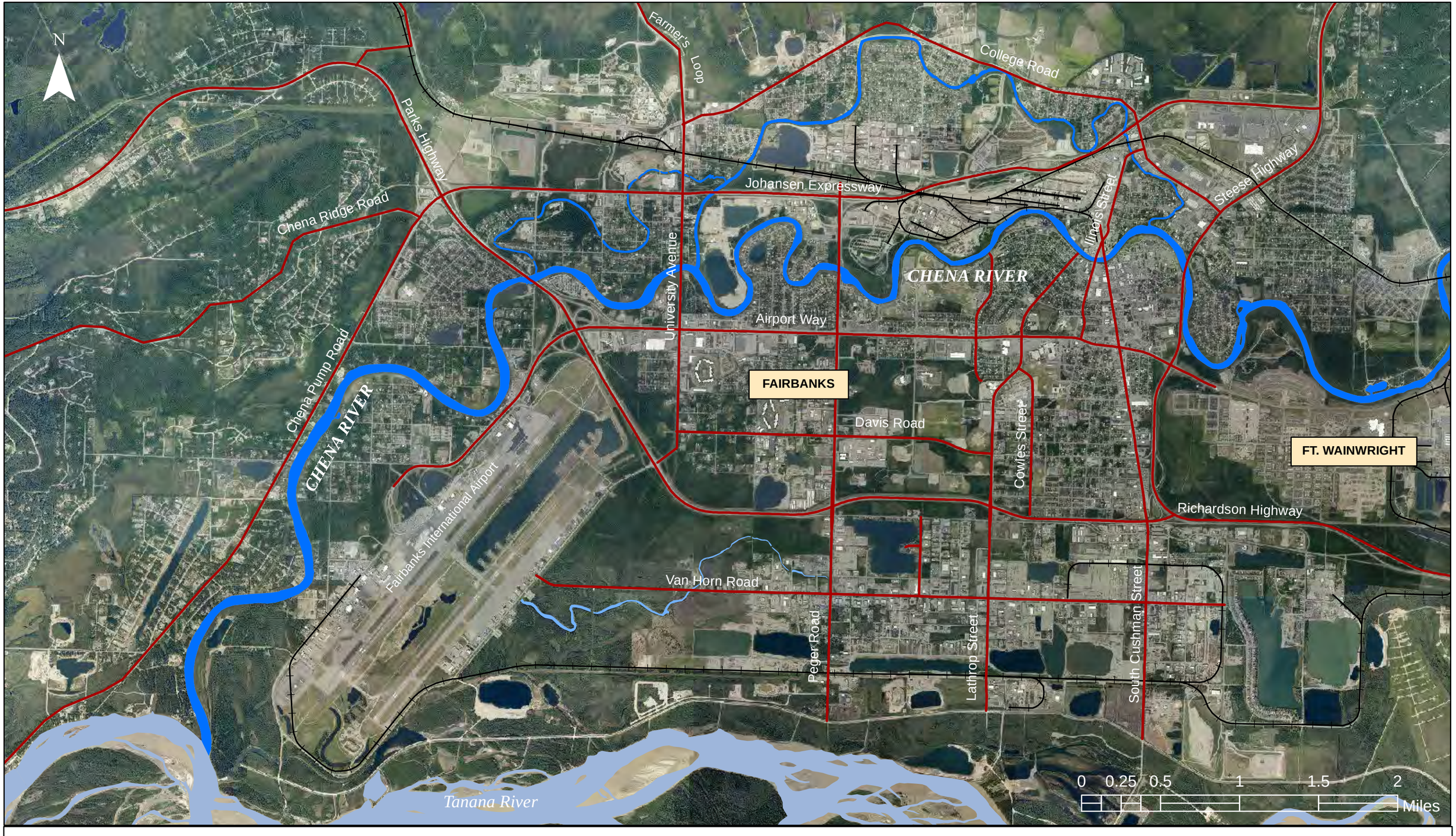
Chena River Vulnerability Assessment

Figure 1-1a Base Map with Aerial Photo

Source: Fairbanks North Star Borough GIS; Pictometry imagery dated 2012.
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Legend

- Chena River
- Other Rivers and Lakes
- Major Roads
- Railroad
- Pipeline



Chena River Vulnerability Assessment

Figure 1-1b Base Map with Aerial Photo: Chena River fromTanana River to Fort Wainwright

Source: Fairbanks North Star Borough GIS; Pictometry imagery dated 2012.
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Legend

- Chena River
- Other Rivers and Lakes
- Major Roads
- Railroad

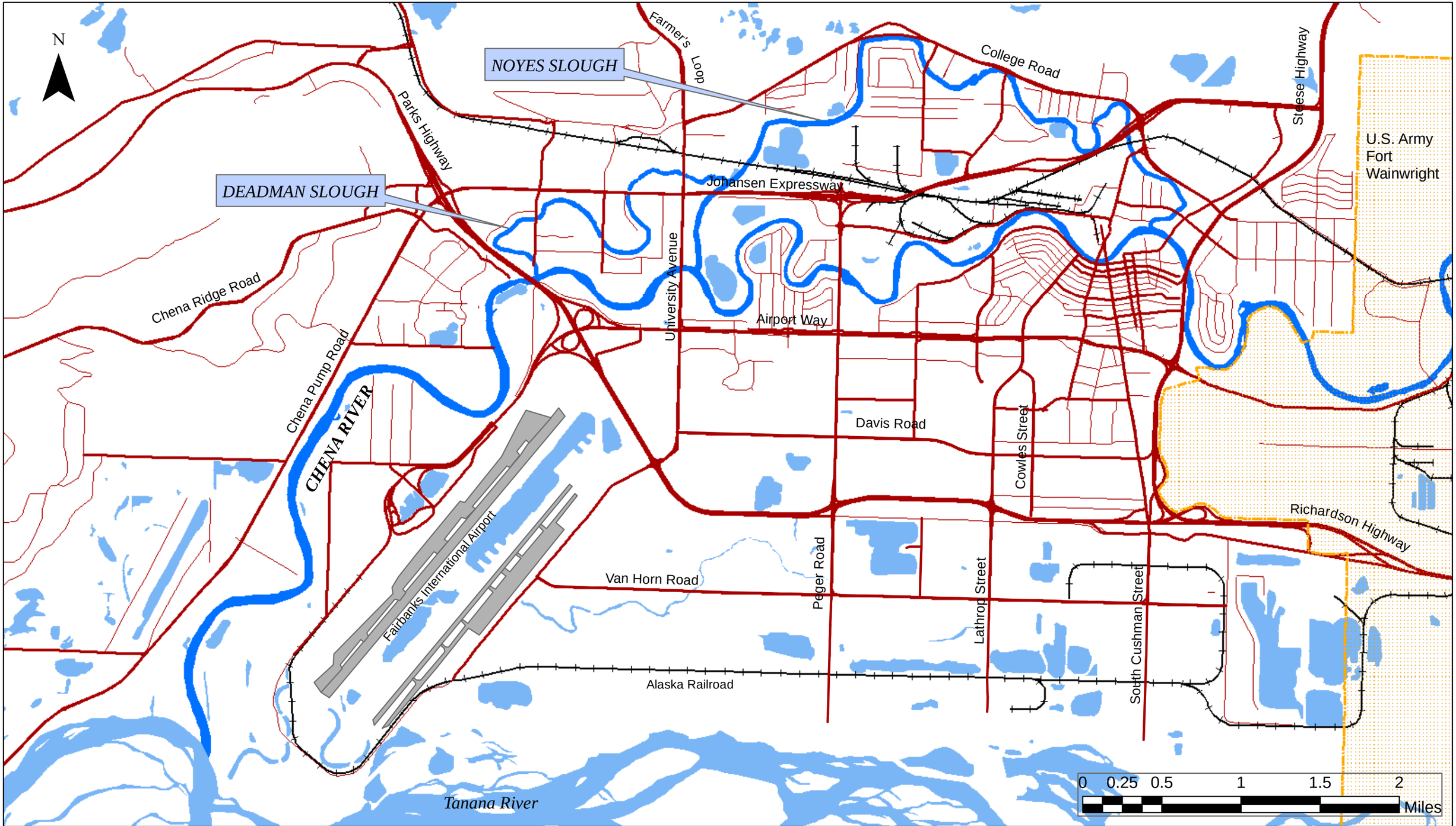
Chena River Vulnerability Assessment

Figure 1-1c Base Map with Aerial Photo: Steese Highway to Trans Alaska Pipeline

Source: Fairbanks North Star Borough GIS; Pictometry imagery dated 2012.
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Legend

- Chena River
- Other Rivers and Lakes
- Major Roads
- Railroad



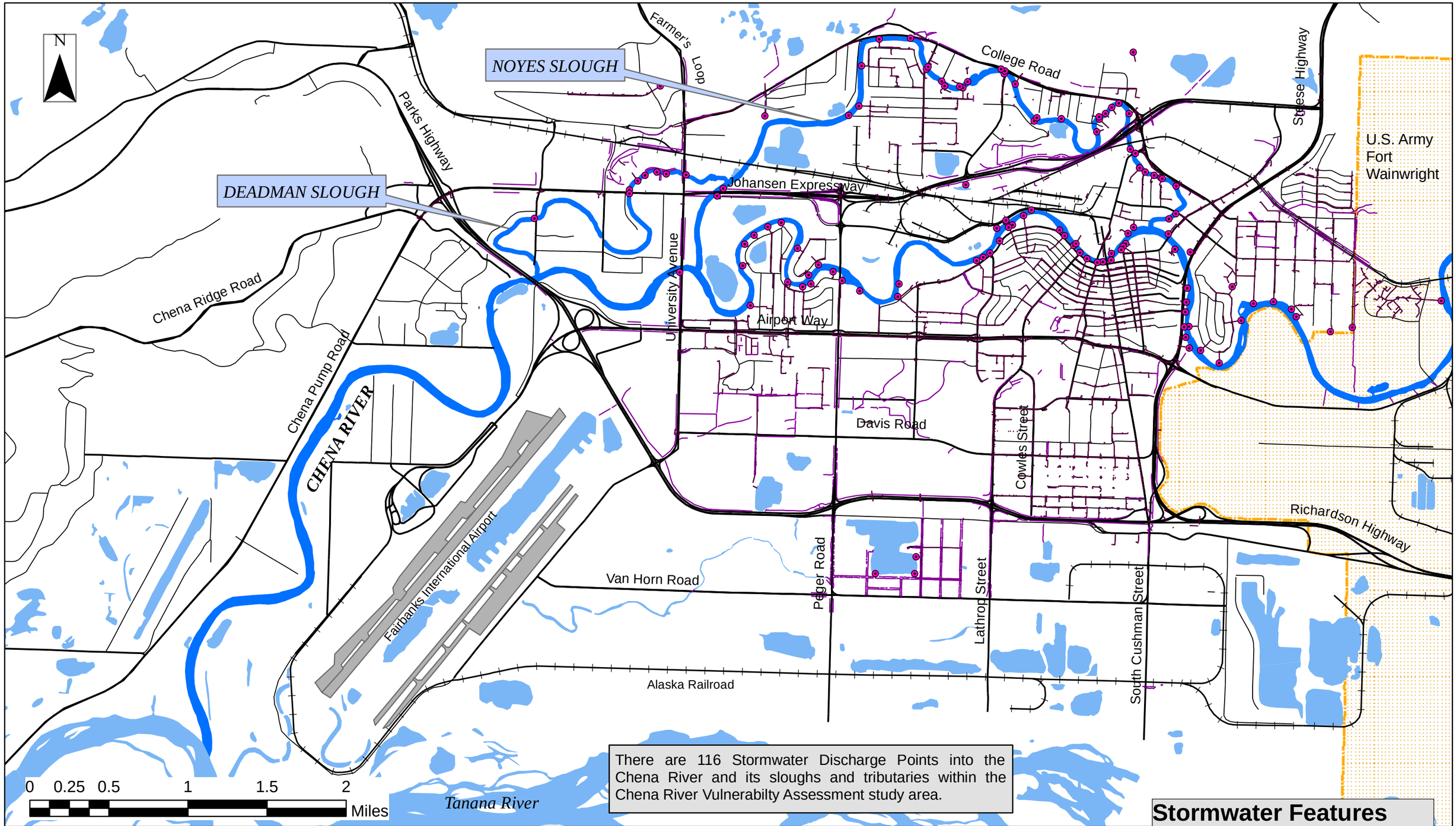
Chena River Vulnerability Assessment

Figure 1-2 Base Map with Road Network, Fairbanks Area

Source: Fairbanks North Star Borough GIS
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Legend

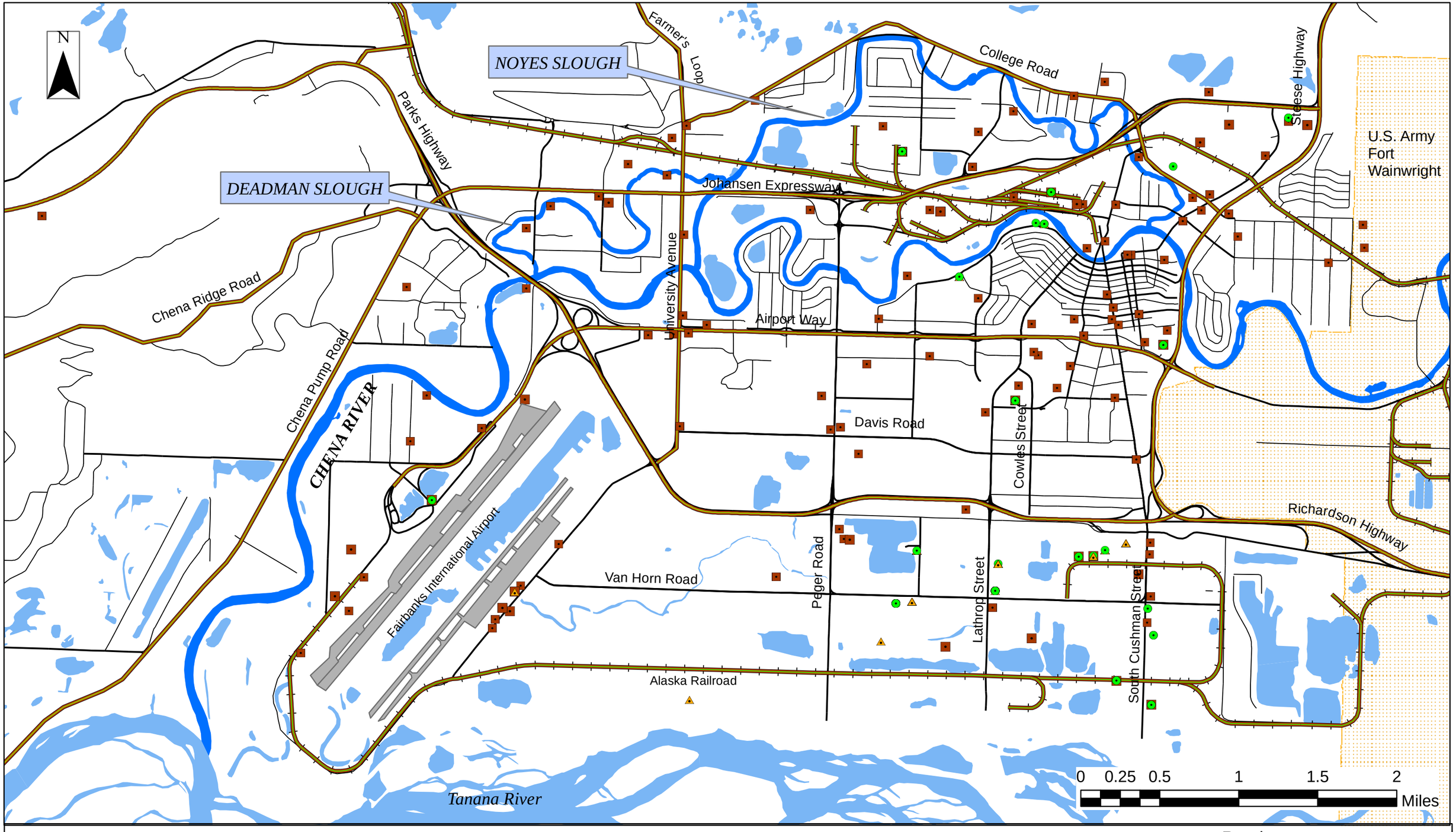
- Chena River
- Other Rivers and Lakes
- Major Roads
- Railroad



Chena River Vulnerability Assessment

Figure 1-3 Stormwater Drainage & Discharge Features

Source: Fairbanks North Star Borough GIS
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014



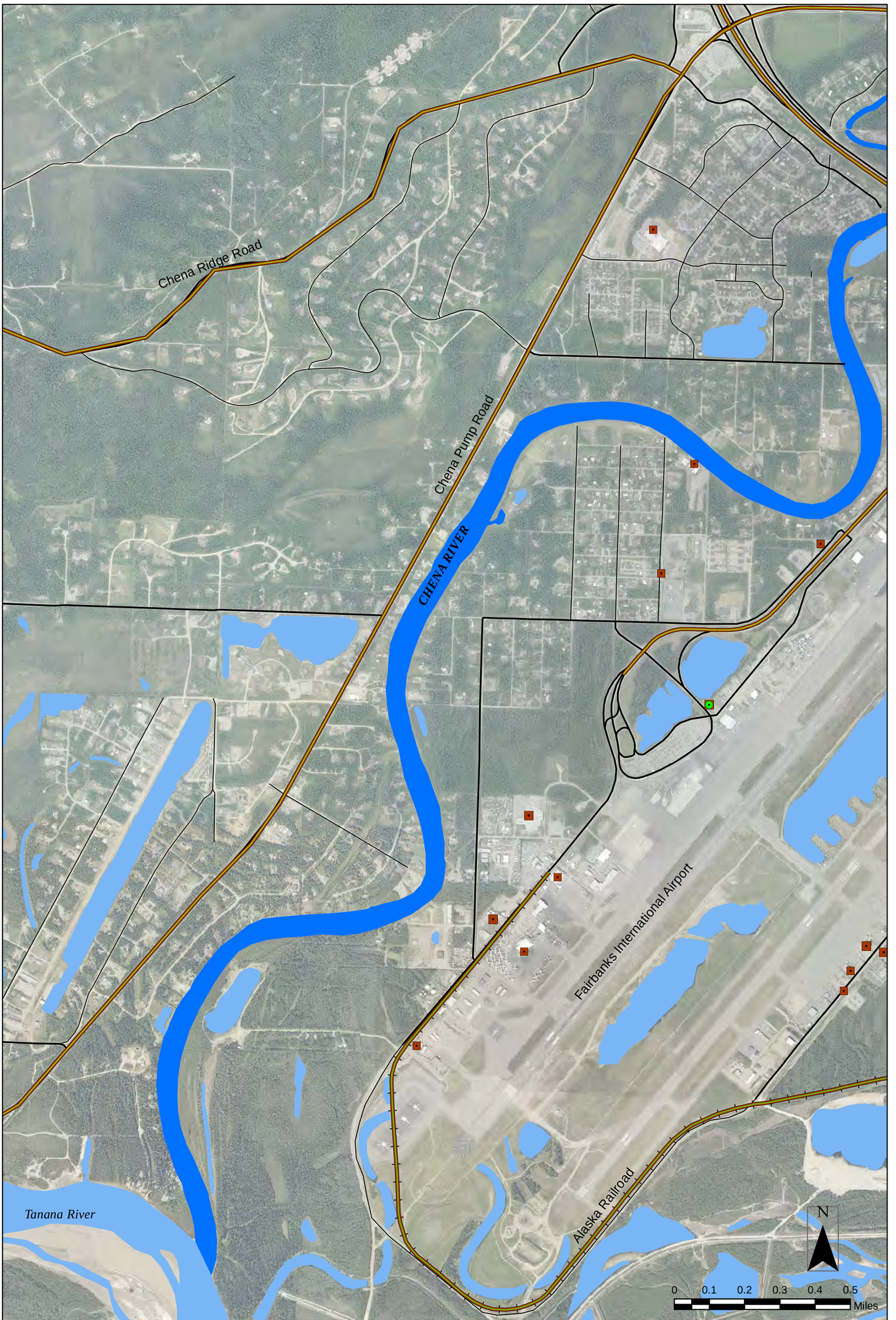
Chena River Vulnerability Assessment

Figure 1-4 Hazardous Material Storage Facilites

Source: ADEC UST Database, 2011 Tier Two data; Fairbanks North Star Borough GIS
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Legend

- Hazardous material transportation corridor
- Hazardous Material Storage Facilities
  - Compressed Gases
  - Chemical
  - Petroleum Product
- Roads
- Railroad
- Chena River
- Other Rivers and Lakes



Chena River Vulnerability Assessment

Figure 1-5 Chena River: Parks Highway to Confluence

Sources: ADEC UST Database; 2011 Tier Two data; Fairbanks North Star Borough GIS
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Legend

- Hazardous Material Transportation Corridor
- Hazardous Material Storage Facilities
  - Compressed Gases
  - Chemical
  - Petroleum Product
- Roads
- Railroad
- Chena River
- Other Rivers and Lakes

N

Alaska Railroad

Johansen Expressway

Parks Highway

Deadman Slough

Noyes Slough

Airport Way

Peger Road

University Avenue

CHENA RIVER

Fairbanks International Airport

0 0.1 0.2 0.3 0.4

Miles

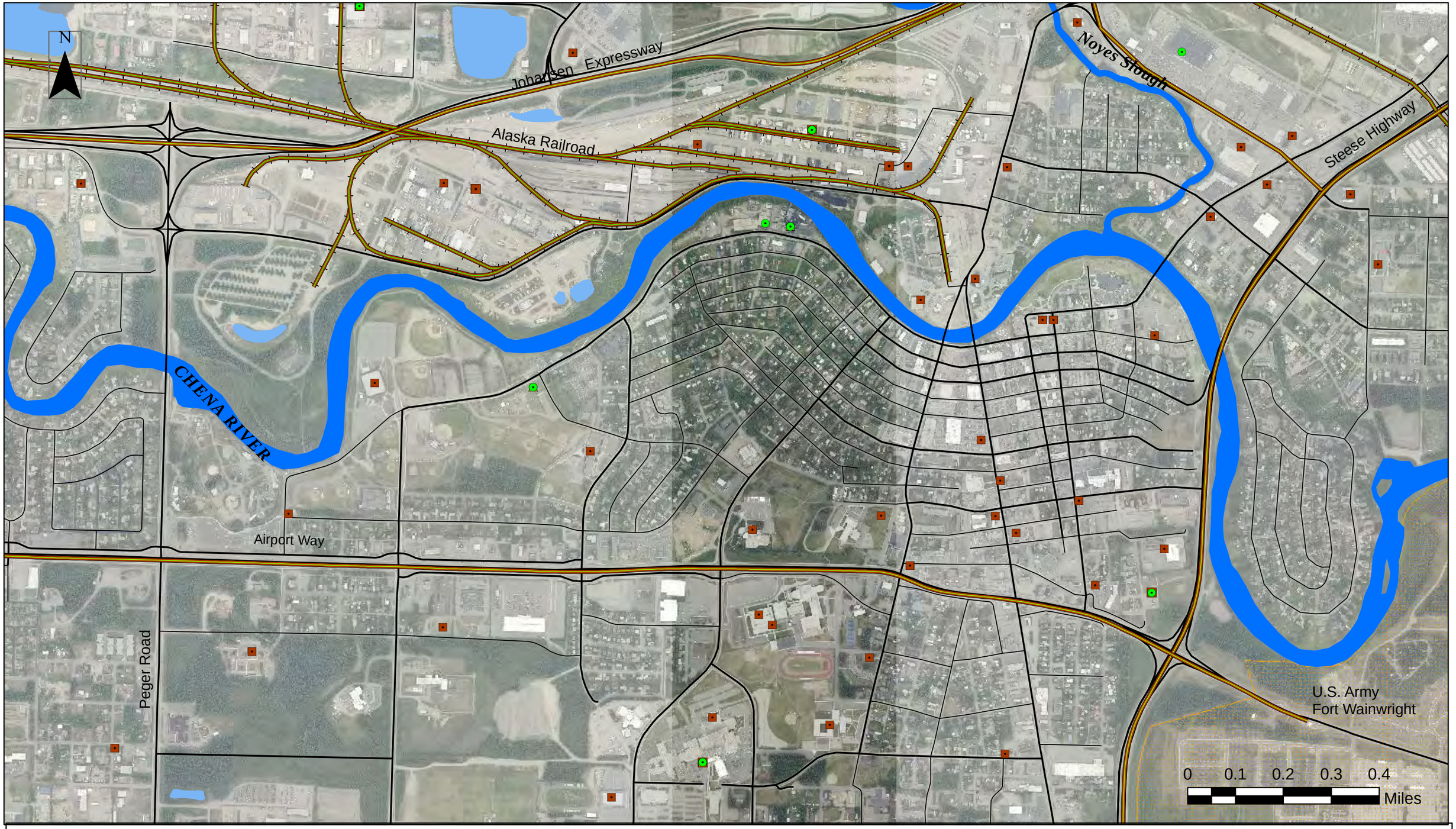
Chena River Vulnerability Assessment

Figure 1-6 Chena River: Peger Road to Parks Highway

Sources: ADEC UST Database; 2011 Tier Two data; Fairbanks North Star Borough GIS
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Legend

- Hazardous Material Transportation Corridor
- Hazardous Material Storage Facilities
  - Compressed Gases
  - Chemical
  - Petroleum Product
- Roads
- Railroad
- Chena River
- Other Rivers and Lakes



Chena River Vulnerability Assessment

Figure 1-7 Chena River: Steese Highway to Peger Road

Sources: ADEC UST Database; 2011 Tier Two data; Fairbanks North Star Borough GIS
Figure prepared by Ecology and Environment, Inc. Anchorage, Alaska. May 16, 2014

Legend

- Hazardous Material Transportation Corridor
- Hazardous Material Storage Facilities
  - Compressed Gases
  - Chemical
  - Petroleum Product
- Roads
- Railroad
- Chena River
- Other Rivers and Lakes

N

0 0.1 0.2 0.3 0.4
Miles

College Road

Noyes Slough

Alaska Railroad

Johansen Expressway

CHENA RIVER

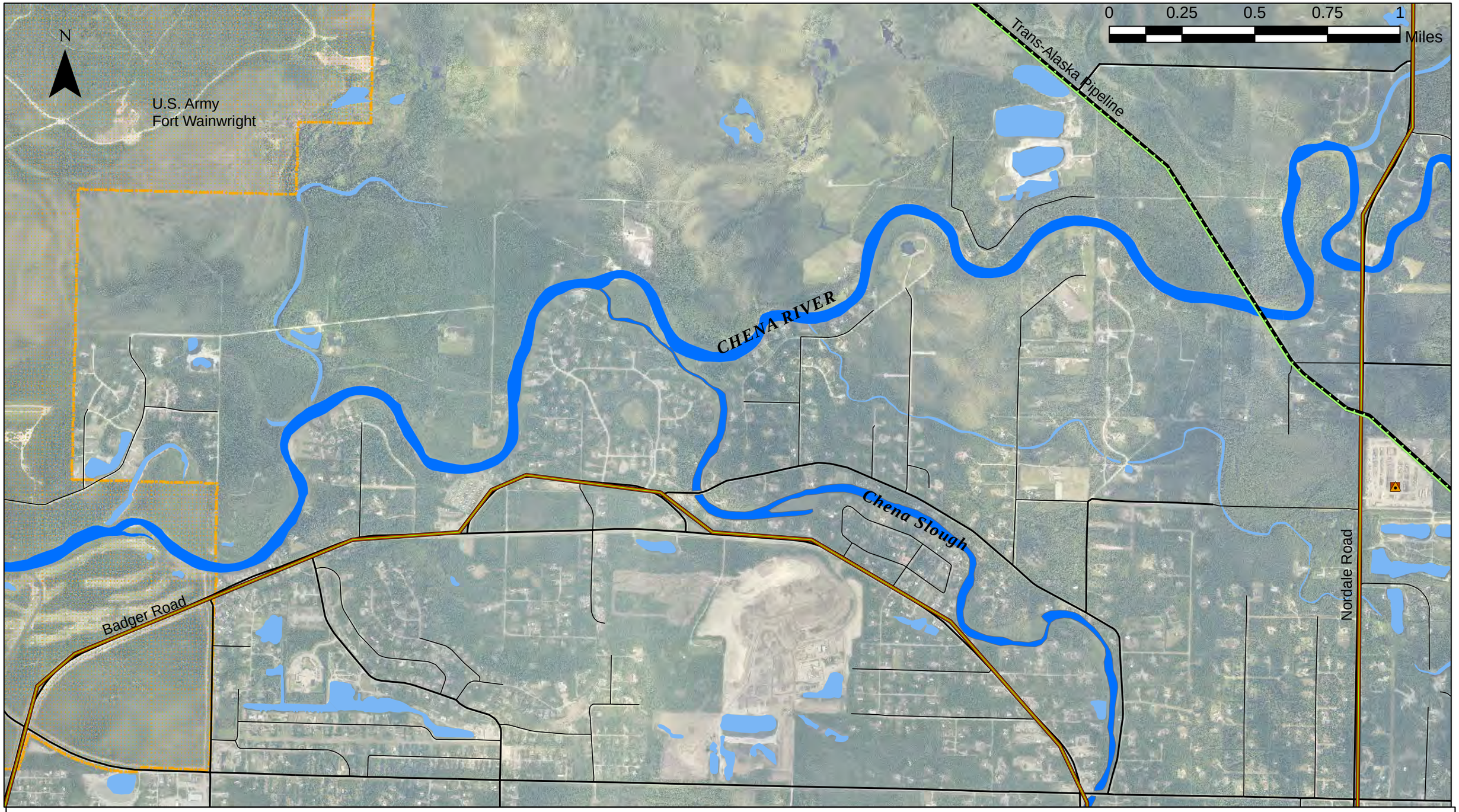
Chena River Vulnerability Assessment

Figure 1-8 Chena River, Noyes Slough

Sources: ADEC UST Database; 2011 Tier Two data; Fairbanks North Star Borough GIS
Figure prepared by Ecology and Environment, Inc. Anchorage, Alaska. May 16, 2014

Legend

- Hazardous Material Transportation Corridor
- Hazardous Material Storage Facilities
  - Compressed Gases
  - Chemical
  - Petroleum Product
- Roads
- Railroad
- Chena River
- Other Rivers and Lakes



Chena River Vulnerability Assessment

Figure 1-9 Chena River: Trans-Alaska Pipleline to Fort Wainwright

Note: Hazmat storage data not publicly available for Fort Wainwright therefore the area is not shown.

Sources: ADEC UST Database; 2011 Tier Two data; Fairbanks North Star Borough GIS
Figure prepared by Ecology and Environment, Inc. Anchorage, Alaska. May 16, 2014

Legend

- Hazardous Material Transportation Corridor
- Hazardous Material Storage Facilities
  - Compressed Gases
  - Chemical
  - Petroleum Product
- Trans-Alaska Pipeline
- Roads
- Chena River
- Other Rivers and Lakes

River Access Sites

1 Tanana Wayside & Boat Launch (Chena Pump Road Landing)
2 Pike's Waterfront Lodge
3 Chena Small Tracts Road/Pikes Landing Road
4 Department of Natural Resouces, Division of Forestry
5 Chena River State Recreation Site (Chena Park Landing)
6 Boatel Landing
7 Pioneer Park Recreational Landing
8 South of Phillips Field Road (Kiwanis Park)
9 Graehl Recreation Park
10 Fort Wainwright Landing

Johansen Expressway
University Avenue
Peger Road
Airport Way
Illinois Street
Steese Highway
Chena Pump Road
CHENA RIVER
Davis Road
Cowles Street
Richardson Highway
Fairbanks International Airport
Van Horn Raod
Peger Road
Lathrop Street
South Cushman Street
TANANA RIVER
N
0 0.25 0.5 0.75 1 Miles

Chena River Geographic Response Strategies

Figure 2-1 Chena River Access Sites, Fairbanks, Alaska

Source: Fairbanks North Star Borough GIS; Pictometry imagery dated 2012.
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Legend

Chena River
Other Rivers and Lakes
River Access Sites
Major Roads
Railroad

Chena River Geographic Response Strategies

Figure 2-2 CR1 -Chena River Confluence withTanana River

Source: Fairbanks North Star Borough GIS; Pictometry imagery dated 2012.
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Strategy: Deflection boom at Chena River confluence to prevent oil on Tanana River from entering the Chena River at times of low flow on Chena. Deflection boom also at the Tanana Wayside and Boat Launch. Note: Depending on relative rive volume and velocity, the water north of Byers Island can be predominately Chena River or Tanana River. The Chena River-Tanana River confluence mixing zone can be to the east, north or west of Byers Island.
Boom required: 1000 feet Tanana Wayside, 1200 feet Confluence.

Chena River Geographic Response Strategies

Figure 2-3 CR2 - Cripple Creek and Chena Pump House

Source: Fairbanks North Star Borough GIS; Pictometry imagery dated 2012.
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Strategy: Deflection boom at outlets for Cripple Creek (original course and re-routed course) and at the Chena Pump House. Deflection boom also at the Riverboat Discovery dock.
Note: The Chena Pump House is on the U.S. Register of Historic Places.
Boom required: 1350 feet.

Chena River Geographic Response Strategies

Figure 2-4 CR3 - Chena Small Tracts Road/Pike's Landing Road River Access and CR4 - Department of Natural Resources, Division of Forestry

Source: Fairbanks North Star Borough GIS; Pictometry imagery dated 2012.
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Strategy: Oil Collection areas at the Department of Forestry and at the landings at Chena Small Tracts Road and Pike's Landing Road. Open/staggered chevron at Chena Small Tracts/ Pike's Landing to allow for boat passage. Deflection boom at inlet and outlet small slough across for Department of Forestry and at Riverboat Cove near Parks Highway crossing.
Boom required: 2100 feet.
Alternate Strategy: Divert oil into Riverboat Cove. Use cove at oil collection and recovery site.

Chena River Geographic Response Strategies

Figure 2-5 CR5 - Chena River State Recreation Site

Source: Fairbanks North Star Borough GIS; Pictometry imagery dated 2012.
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Strategy: Collect oil via diversion boom at Chena River State Recreation Site.
Two collection and recovery areas: Near boat launch and picnic area.
Deflection boom deployed at Noyes Slough.
Boom required: 700 feet.

LEGEND

DF — Deflection Boom symbol

DV — Diversion Boom symbol

SR — Shoreside Recovery symbol

Deflection Boom (Location in River)

Diversion Boom (Location in River)

Boat Launch/ River Access

N

Phillips Field Road

Peger Road

CHENA RIVER

Kiwanis Park

Carlson Community Center

Second Avenue

Paddler's Cove (Canoe & Kayak Rental)

Pioneer Park

0 250 500 750 1,000 Feet

Alternate Pioneer Park, Paddler's Cove Strategy

Chena River Geographic Response Strategies

Figure 2-6 CR6 - Pioneer Park and CR7 - Kiwanis Park

Source: Fairbanks North Star Borough GIS; Pictometry imagery dated 2012.
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK. May 16, 2014

Strategy: Collect and recover oil at Kiwanis Park and at Peger Road Bridge near Pioneer Park. Use deflection boom to keep oil off sandy shoreline across river from Kiwanis Park and out of Kayak launch cove at Pioneer Park.
Boom required: 1550 feet
Alternate Strategy: Divert oil into Paddler's Cove and utilize site for oil collection and recovery.

Chena River Geographic Response Strategies

Figure 2-7 CR8 - Aurora Energy Power Plant and CR9 - Graehl Park and Noyes Slough

Source: Fairbanks North Star Borough GIS; Pictometry imagery dated 2012.
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

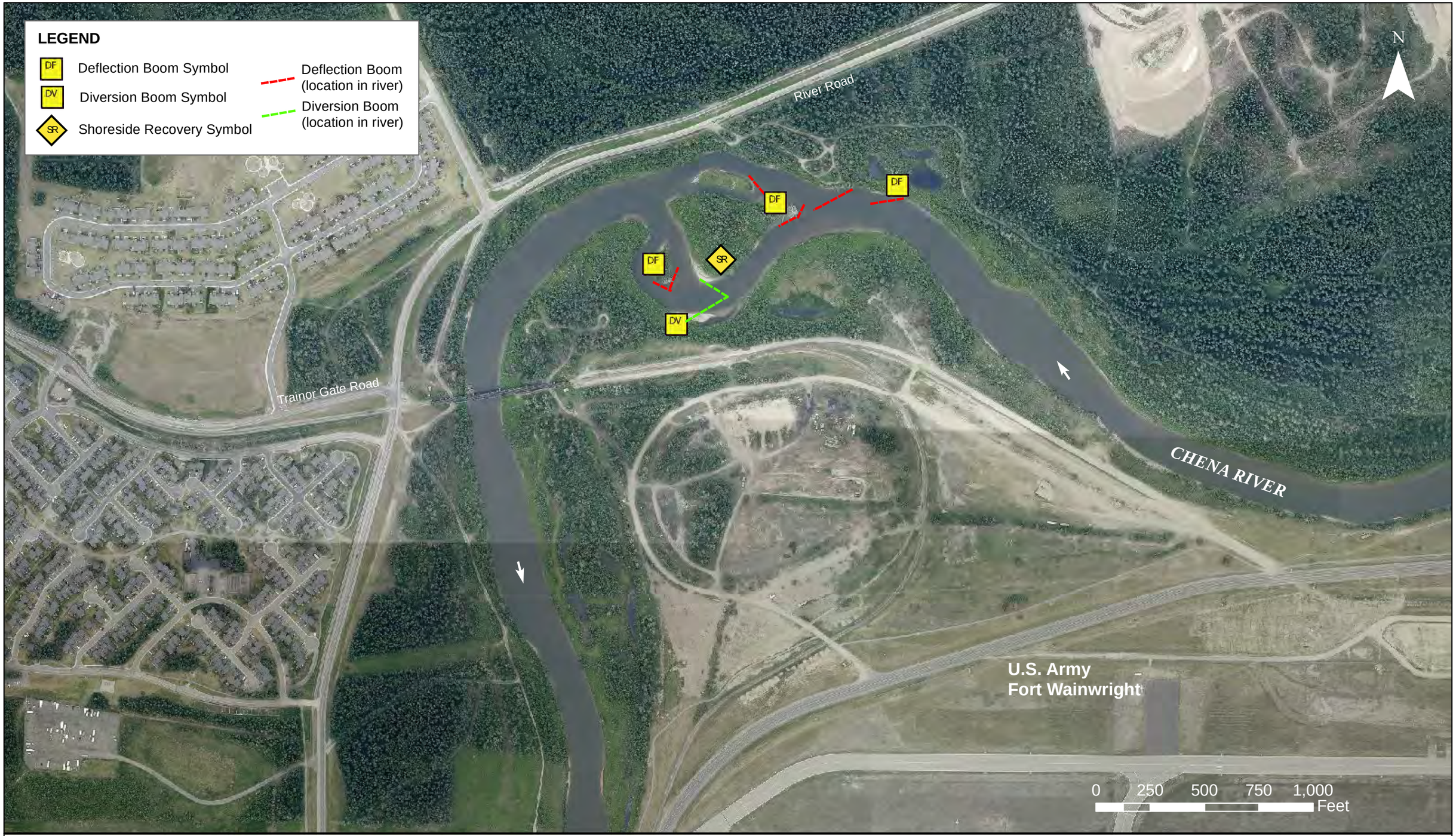
Strategy: Deploy deflection boom to prevent oil from entering water intake for Aurora Energy Power Plant. Divert oil for collection and recovery at Graehl Park and Noyes Slough. Establish collection area to maintain access to Grael Park boat lauch area. Deploy deflection boom to prevent oil from entering Noyes Slough and off of islands/sand bars across from Griffin Park.
Boom required: 1750 feet.

Chena River Geographic Response Strategies

Figure 2-8 CR10 - Fort Wainwright Boat Launch and Bentley Island Slough Area

Source: Fairbanks North Star Borough GIS; Pictometry imagery dated 2012.
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Strategy: Deflect oil from coves and connected water bodies. Deflect oil from islands and boat launch dock. Divert oil to collection and recovery area on east side of island upstream of boat launch.
Boom required: 1350 feet



Chena River Geographic Response Strategies

Figure 2-9 CR11 - Fort Wainwright Trainor Gate Road and railroad bridge crossing

Source: Fairbanks North Star Borough GIS; Pictometry imagery dated 2012.
Figure Prepared by Ecology and Environment, Inc. Anchorage, AK May 16, 2014

Strategy: Deflect oil into southern channel around island. Deflect oil off of island. Collect oil at via Diversion Boom in closed chevron formation; place skimmers at the north and south bank of southern channel. Boom required: 1350 feet