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Final Work Plan: Phase I Investigation at Bladen, Nebraska

Environmental Science Division

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Final Work Plan: Phase I Investigation at Bladen, Nebraska

by
Applied Geosciences and Environmental Management Section
Environmental Science Division, Argonne National Laboratory

July 2014

United States Department of Agriculture

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Notation

AGEM	Applied Geosciences and Environmental Management
AMSL	above mean sea level
BGL	below ground level
BTEX	benzene, toluene, ethylbenzene, and xylene
ºC	degree(s) Celsius
CCC	Commodity Credit Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	CERCLA Information System
CLP	Contract Laboratory Program
cm	centimeter(s)
CPT	cone penetrometer
EPA	U.S. Environmental Protection Agency
ft	foot (feet)
gal	gallon(s)
GC-MS	gas chromatography-mass spectrometry
gpm	gallon(s) per minute
GSI	Geotechnical Services, Inc.
h	hour(s)
I.D.	inner diameter
IDW	investigation-derived waste
in.	inch(es)
L	liter(s)
LUST	leaking underground storage tank
MCL	maximum contaminant level
µg/L	microgram(s) per liter
mg/L	milligram(s) per liter
mi	mile(s)
mL	milliliter(s)
NAIP	National Agriculture Imagery Program
NDEQ	Nebraska Department of Environmental Quality
NDHHS	Nebraska Department of Health and Human Services
NRD	Natural Resources District
PRT	Post-Run Tubing
PVC	polyvinyl chloride
PWS	public water supply
QA/QC	quality assurance/quality control
TCLP	toxicity characteristic leaching procedure
TRPH	total recoverable petroleum hydrocarbon
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

VOC	volatile organic compound
WhAEM	Wellhead Analytic Element Model
WHP	Wellhead Protection (Program)
WHPA	wellhead protection area
yr	year(s)

Final Work Plan: Phase I Investigation at Bladen, Nebraska

1 Introduction

The village of Bladen is a town of population approximately 237 in the northwest part of Webster County, Nebraska (Figure 1.1), 30 mi southwest of Hastings and 140 mi southwest of Lincoln, Nebraska. In 2000, the fumigant-related compound carbon tetrachloride was detected in public water supply well PWS 68-1 (Figure 1.2), at a trace level. Low-level contamination, below the maximum contamination level (MCL) of 5.0 µg/L, has been detected intermittently in well PWS 68-1 since 2000, including in the last sample taken in July 2013. In 2006, the village installed a new well, PWS 2006-1, that remains free of contamination.

Prior to 1985, two grain facilities were in operation in Bladen. In 1950-1974, the Commodity Credit Corporation of the U.S. Department of Agriculture (CCC/USDA) operated a grain storage facility (currently owned by CHS, Inc.) south of the railroad right-of-way in Bladen. The other grain operation prior to 1985 was on the second parcel currently owned by CHS, Inc., on the railroad right-of-way (Figure 1.2). Until 1985, commercial grain fumigants containing carbon tetrachloride were in common use at public and private grain operation facilities across the state. Contaminated well PWS 68-1 is located about 700 ft northwest of the former CCC/USDA facility and adjacent to the northern edge of the CHS parcel on the railroad right-of-way.

In May 2012, the Remediation Section of the Nebraska Department of Environmental Quality (NDEQ) completed a pre-CERCLIS site screening assessment (NDEQ 2012). In this assessment, the NDEQ (1) suggested that the former CCC/USDA grain storage facility is a potential source of carbon tetrachloride contamination detected in well PWS 68-1; (2) recommended sampling of groundwater in three private wells in the vicinity of the village; and (3) indicated that the groundwater flow is to the north, likely with a westerly component toward the Little Blue River. In September 2012, the CCC/USDA sampled five private wells, including the three requested by the NDEQ, for carbon tetrachloride, chloroform, and methylene chloride. No contamination was identified in the private wells tested.

Because the carbon tetrachloride found in well PWS 68-1 might be linked to historical use of fumigants containing carbon tetrachloride at grain storage facilities, including its former facility in Bladen, the CCC/USDA is proposing an investigation to (1) delineate the source and

extent of the carbon tetrachloride contamination potentially associated with its former facility, (2) characterize pathways and controlling factors for contaminant migration in the subsurface, and (3) establish a basis for estimating potential health and environmental risks. The work will be performed in accordance with the Intergovernmental Agreement established between the NDEQ and the Farm Service Agency of the USDA.

The site investigation at Bladen will be implemented in phases, so that data collected and interpretations developed during each phase can be evaluated to determine if a subsequent phase of investigation is warranted and, if warranted, to provide effective guidance for the subsequent investigation activities. This *Work Plan* identifies the specific technical objectives and defines the scope of work proposed for the Phase I investigation by compiling and evaluating historical data. The proposed investigation activities will be performed on behalf of the CCC/USDA by the Environmental Science Division of Argonne National Laboratory. Argonne is a nonprofit, multidisciplinary research institute operated by UChicago Argonne, LLC, for the U.S. Department of Energy.

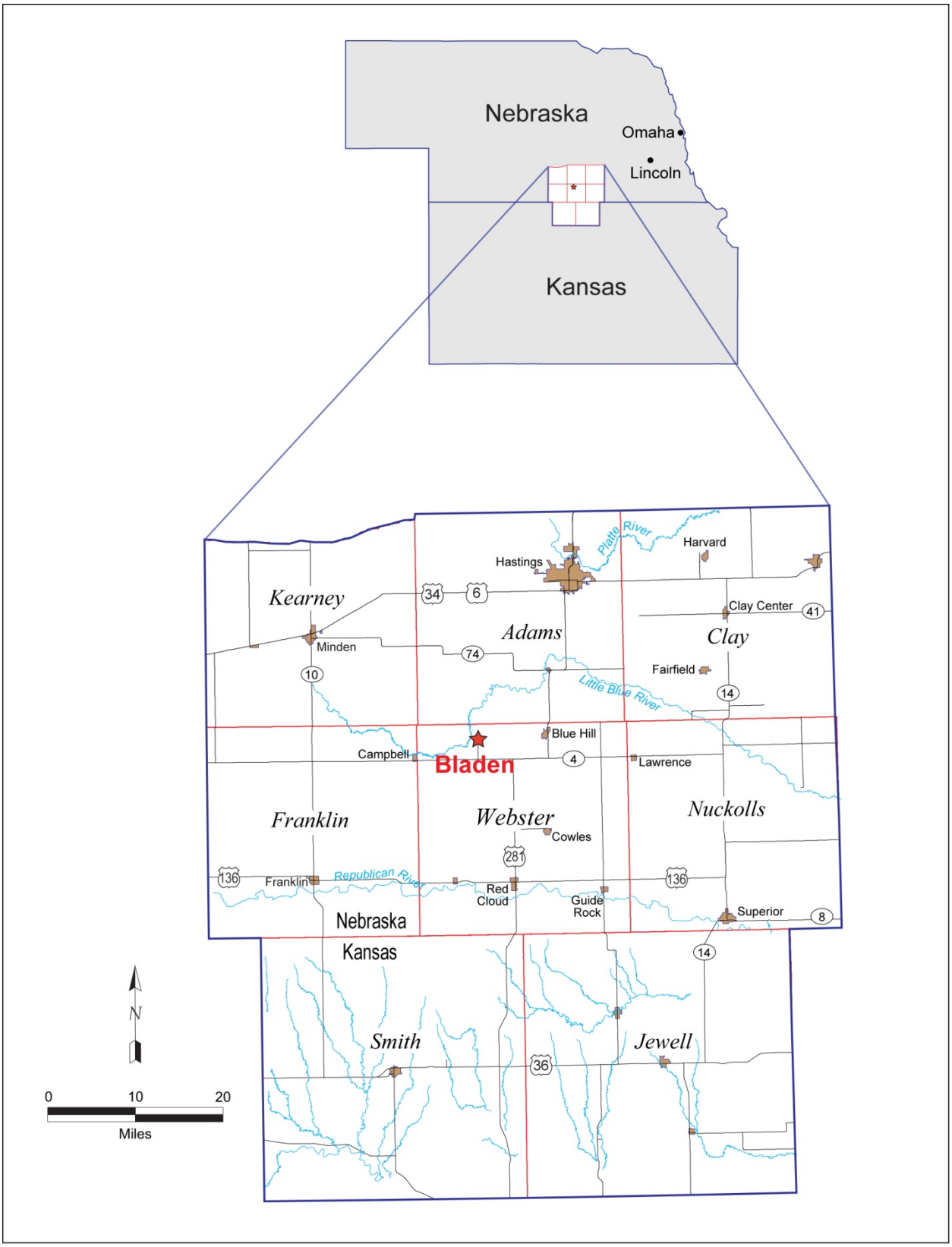


FIGURE 1.1 Location of Bladen, Nebraska.

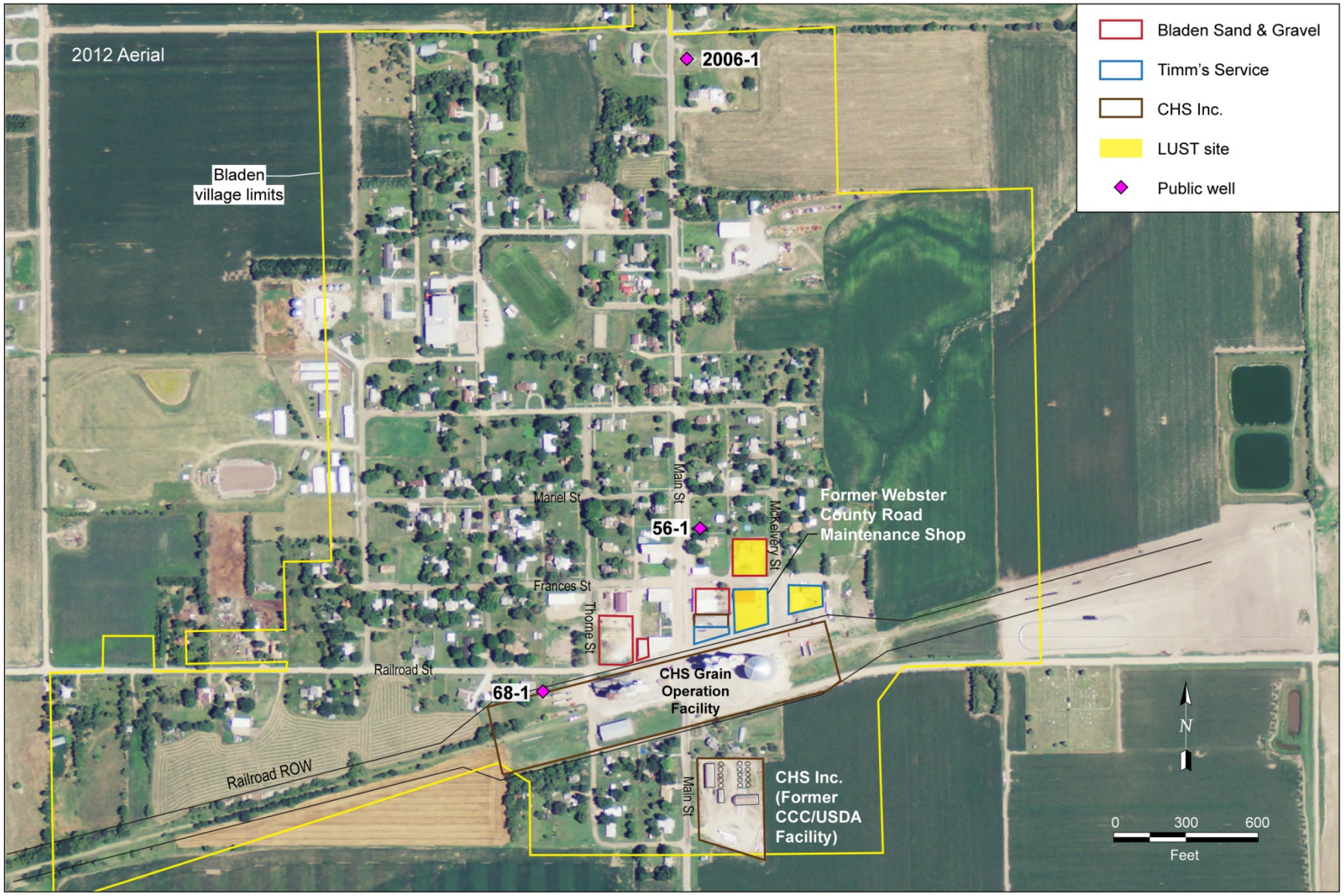


FIGURE 1.2 Locations of the former CCC/USDA facility, nearby agricultural business facilities, leaking underground storage tank sites, and public water supply wells. Source of photograph: NAIP (2012).

2 Background and Previous Studies

2.1 Site Background

2.1.1 Area Description

Bladen is a small village in northwestern Webster County, Nebraska, extending across the four corners at the intersection of Sections 7, 8, 17, and 18 of Township 4 North, Range 11 West. The village has several small businesses and local agricultural services, including CHS, Inc., Bladen Sand and Gravel, and Timm's Service (Figure 1.2). The village also hosts the Silver Lake Elementary School, a post office, the Webster County shop, churches, and a fire station.

The 2010 Census recorded 237 residents in 93 housing units in the village of Bladen. The village is served by a public water supply system that obtains its water from two wells (PWS 68-1 and PWS 2006-1) within the village limits (Figure 1.2). The wells are used on a alternating basis. All residences within the village limits are served by these wells.

The major agricultural service company CHS, Inc., has owned two grain operation facilities at Bladen since 2009. One is located on the railroad right-of-way, along the abandoned railroad branch still owned by the Burlington Northern Santa Fe Railroad. The other, located south of the railroad right-of-way, was leased to the CCC/USDA for use as a grain storage facility in 1950-1974 (Figure 1.2). CHS, Inc., is nationwide cooperative system. Its Bladen facilities provide grain storage, management, and wholesale services for the local farmers. Bladen Sand and Gravel operates and supports trucks that provide sands and gravels to many Nebraska counties. Timm's Service offers fuel supply to the local community.

2.1.2 Bladen Public Water Supply

The village of Bladen has had three public water supply wells (PWS 2006-1, PWS 68-1, and PWS 56-1). Well PWS 56-1, the oldest of these, was abandoned after PWS 68-1 was installed. Well PWS 2006-1 was installed in September 2006 and was placed in service in August 2007. Since then, the public water supply system at Bladen has been supported by wells PWS 68-1 and PWS 2006-1. The village maintenance superintendent indicated that the Bladen

public water supply system provides water to every household within the village limits, as well as a local school, for a total population of 311 (Pavalkan 2014).

Wells 2006-1 and 68-1 are approximately 2,700 ft apart. Well 68-1 is located at the northern edge of the CHS grain facility on the railroad right-of-way, and about 700 ft northwest of the former CCC/USDA facility. Well 2006-1 is more distant from both grain operation facilities: 2,400 ft from the CHS facility on the railroad right-of-way and 2,900 ft from the former CCC/USDA facility (Figure 1.2). Groundwater samples from wells PWS 68-1 and PWS 2006-1 have been tested for volatile organic compounds (VOCs) every 2-5 yr. Since a trace level of carbon tetrachloride (0.47 µg/L) was first detected at PWS 68-1 in 2000, carbon tetrachloride has been identified in five of nine sampling events, at low concentrations of 2.99-3.83 µg/L (below the MCL of 5.0 µg/L). Chloroform was detected only once in PWS 68-1, at the low concentration of 4.3 µg/L in 2005. Well PWS 2006-1 was tested for VOCs in 2009 and 2012. No carbon tetrachloride or chloroform was detected. The analytical results for carbon tetrachloride and chloroform in groundwater samples from both wells are in Table 2.1. In addition to VOCs testing, wells PWS 68-1 and PWS 2006-1 have also been sampled quarterly for nitrate. Slightly higher concentrations of nitrate have been found at well PWS 68-1 (8-10 mg/L) during July-August of the last 3 yr, coinciding with the peak of the irrigation season in the vicinity of the village. Corresponding elevated nitrate concentrations have not been detected in July-August during the last 3 yr at PWS 2006-1 (less than 5 mg/L; NDHHS 2014).

Wells PWS 68-1 and PWS 2006-1 have been operated alternately, with an approximate mixing ratio of 35% (PWS 68-1) to 65% (PWS 2006-1). Pumping records for the period of 2007-2013 (Pavalkan 2014) indicate a monthly pumping volume ranging from 1.04 million gallons (November 2013) to 5.98 million gallons (July 2012). Wells PWS 68-1 and PWS 2006-1 were both installed in an aquifer hosted by Quaternary sand and gravel, which unconformably overlies the Upper Cretaceous bedrock (Niobrara shale) and has a consistent thickness of 16-17 ft at depths of 152-169.5 ft below ground level (BGL). However, the PWS 2006-1 borehole is grouted from 127 ft BGL to 17 ft BGL with bentonite and from 17 ft BGL to the ground surface with concrete. In contrast, PWS 68-1 is sealed with clay only from 40 ft BGL to 20 ft BGL and with concrete from 20 ft BGL to the ground surface (Appendix A). The estimated pumping rates are approximately 550 gpm at PWS 68-1 and 450 gpm at PWS 2006-1 (Pavalkan 2014). The ungrouted interval of 40-169.5 ft BGL at PWS 68-1 might expose more of the stratigraphic sequence and thereby increase the pumping capacity of the well, but it could also make the well more vulnerable to contamination from the surface.

2.1.3 Wellhead Protection Area for the Public Water Supply Wells

The NDEQ Wellhead Protection (WHP) Program has developed a wellhead protection area (WHPA) for each public water supply system in Nebraska. The WHPA for Bladen wells PWS 68-1 and PWS 2006-1 was developed in November 2009. The assumptions and the well data used for development of the WHPA and the derived WHPA map are in Appendix B.

In development of the WHPA for the Bladen public water supply system, the NDEQ determined that the local groundwater flow is to the north-northwest, on the basis of water level data collected from 43 water wells in the surrounding area. In addition, the NDEQ estimated that the aquifer has an average thickness of 28 ft, with hydraulic conductivity of 168 ft/day and porosity of 0.2, on the basis of well logs and testing information for five water wells in the vicinity of Bladen (Appendix B). In the pumping scenario serving as the basis for the WHPA, the NDEQ assumed that the two public water supply wells withdraw groundwater at constant rates of 17 gpm and 34 gpm for 20 yr. The time-of-travel lines for water particles captured by the pumping wells were created by using the U.S. Environmental Protection Agency (EPA) Wellhead Analytic Element Model (WhAEM2000; EPA 2014a). The WHPA was drawn slightly larger than the 20-yr time-of-travel lines to allow for seasonal changes and some natural variability in the aquifer (Appendix B).

The WHPA and the 20-yr time-of-travel lines derived by the NDEQ suggest that (1) all of the former and current grain storage facilities are located within the WHPA and (2) the eastern portion of the CHS grain operation facility on the railroad right-of-way and the former CCC/USDA facility are not within the estimated time-of-travel lines captured by the pumping of well PWS 68-1. As indicated by the NDEQ WHP Program, however, the predicted WHPA is based on general, homogeneous assumptions and might not represent the actual capture zones of pumping wells under site-specific pumping configurations in a heterogeneous aquifer.

2.2 Previous Investigations

Several sampling events and investigations have been conducted for groundwater at Bladen. The main investigation activities are as follows:

- Soil and groundwater investigations for three leaking underground storage tank (LUST) sites identified in the 1990s.

- Private well sampling conducted by Woodward Clyde for the CCC/USDA in 1997.

- A pre-CERCLIS site screening assessment conducted by the NDEQ Remediation Section in 2012.

- Private well sampling conducted by Argonne for the CCC/USDA in June 2012.

The results of the previous investigations are discussed below.

2.2.1 Investigations of Leaking Underground Storage Tank Sites

During the 1990s, three LUST sites were identified at Bladen. The sites were operated by Bladen Sand and Gravel, Timm's Service, and the Webster County Roads Maintenance Shop (currently owned by Timm's Service). The locations of the sites are shown in Figure 1.2.

2.2.1.1 LUST Site at Bladen Sand and Gravel

The Bladen Sand and Gravel LUST site is one block east of Main Street and one block north of the railroad right-of-way (Figure 1.2). The site was used to store trucks and provide maintenance service for vehicles. In October 1991, a petroleum release was noticed, and one 10,000-gal underground diesel fuel tank and associated dispensers were removed. Petroleum contamination was identified in soil samples collected during the excavation. In 1993, the NDEQ requested that Bladen Sand and Gravel conduct a Step 6 Initial Site Assessment.

In June 1993, Geotechnical Services, Inc. (GSI), on behalf of Bladen Sand and Gravel, conducted a soil and groundwater investigation for the Step 6 Initial Site Assessment. A single borehole was drilled through the tank excavation area to a depth of 106 ft BGL. Soil samples were collected for every 5 ft from the ground surface to 50 ft BGL and every 10 ft from 50 ft to 106 ft BGL. The headspace of the soil samples was analyzed on-site with an organic vapor analyzer. No contamination was identified above the detection limit. Groundwater was encountered at a depth of 99 ft BGL, and a monitoring well was installed with 10-ft screen at the base of the borehole. Groundwater samples were collected after well construction and

development. Samples were sent to an analytical laboratory for analysis for petroleum compounds (total recoverable petroleum hydrocarbons [TRPH] and benzene, toluene, ethylbenzene, and xylene [BTEX]). No petroleum compounds were detected in the groundwater samples (GSI 1993). The expectation was to abandon the monitoring well after completion of the assessment report.

GSI (1993) reported that the lithology encountered during the drilling was mainly a loess unit (silty clay to silt), with some fine sand at the base of borehole where groundwater was encountered. No hydraulic testing was conducted for the groundwater-bearing zone.

2.2.1.2 LUST Site at Timm's Service

Timm's service station is on the southeast corner of the intersection of Frances Street and North McKelvey Street, just north of the railroad right-of-way (Figure 1.2). In 1997, petroleum contamination was identified beneath two 2,000-gal gasoline tanks, one 2,000-gal diesel fuel tank, and associated pipelines and dispensers at the station. The underground tanks and pipes were removed in November 1997, and a closure assessment report was filed (NDEQ 1998). On September 22, 1998, the NDEQ notified Timm's Service that a site investigation and cleanup (if necessary) might be required at a future date. In 2004, the NDEQ requested that Timm's Service conduct a Tier I investigation at the LUST site (GSI 2004b).

In December 2004, GSI, on behalf of Timm's Service, conducted soil sampling for the Tier I site investigation. One soil boring was advanced to 35 ft BGL, and soil samples were collected at 5-10 ft, 20-25 ft, and 30-35 ft BGL. No contamination was detected (GSI 2004b) upon laboratory analysis of the soil samples for petroleum compounds (BTEX and TRPH). The investigation was terminated, and no groundwater samples were collected.

2.2.1.3 LUST Site at Webster County Roads Maintenance Shop

The former Webster County Roads Maintenance Shop, operated by the Webster County Roads Department, was on the property currently owned by Timm's Service. The former shop was located on the southwest corner of the intersection of Frances Street and North McKelvey Street, north of the railroad right-of-way (Figure 1.2). The shop had two underground storage tanks, one for gasoline and the other for diesel fuel, to support the county's maintenance

operations. In October 1997, a suspected leak was reported, and two tanks were removed by Petroleum Equipment, Inc. Screening of the soil samples collected during excavation for petroleum compounds indicated contamination around the fuel diesel tank. On July 22, 1998, the NDEQ notified the Webster County Roads Department that a site investigation and cleanup (if necessary) might be required at a future date. In 2004, the NDEQ requested the Webster County Roads Maintenance Shop to conduct a Tier I investigation at the LUST site (GSI 2004a).

In August 2004, GSI, on behalf of the Webster County Roads Department, conducted soil sampling for the Tier I site investigation. Two soil borings were advanced to 20 ft and 35 ft BGL, and soil samples were collected every 5 ft. The soil samples were screened in the field with an organic vapor analyzer. Five selected samples were sent to an analytical laboratory for analysis of petroleum compounds (BTEX, TRPH, etc.). No contamination was detected in soil samples collected below 5 ft BGL (GSI 2004a). The investigation was terminated, and no groundwater samples were collected.

2.2.2 Woodward Clyde Private Well Sampling for the CCC/USDA in 1997

In October-November 1997, Woodward Clyde, on behalf of the CCC/USDA, conducted statewide groundwater sampling of private wells near former CCC/USDA facilities in Nebraska. Near Bladen, two private wells were identified at the Karr and Moriarty residences, 1,300-1,500 ft west of the western village limit (Figure 2.1). In groundwater samples from the wells analyzed for VOCs, neither carbon tetrachloride nor chloroform was found above the detection limits (Woodward Clyde 1997). The two wells were resampled by Argonne for the CCC/USDA in 2012, with the same results (Section 2.2.4). The results are in Table 2.2.

2.2.3 NDEQ Pre-CERCLIS Site Screening Assessment in 2012

In 2012, the NDEQ Remediation Section conducted a desktop pre-CERCLIS site screening assessment in response to the low-level contamination detected in well PWS 68-1 (NDEQ 2012). In this assessment, the NDEQ Remediation Section compiled available data and documents to identify any potential impacts to the existing public and private wells. The documents collected included information on the village public water supply wells, the state WHP Program, private wells, previous surveys, and the property the CCC/USDA formerly leased. The assessment identified three residences that might be using private wells as their

primary water sources. These three residences (Karr, Kaufman, and Niemeyer) are located outside the village limits but are within 1 mi of the village boundaries (Figure 2.1).

In its assessment, the NDEQ (2012) confirmed the location of the former CCC/USDA grain storage facility in the southern part of Bladen and collected information on groundwater flow from the state WHP Program. The NDEQ identified the former CCC/USDA facility as a potential source of contamination.

On the basis of findings of the assessment, the NDEQ requested sampling of the private wells at the Karr, Kaufman, and Niemeyer residences. The groundwater sampling for the private wells at these residences was performed in September 2012, as discussed below.

2.2.4 Argonne Private Well Sampling for the CCC/USDA in September 2012

In response to the NDEQ's recommendation in its Pre-CERCLIS site screening assessment, the CCC/USDA directed Argonne to conduct groundwater sampling for private wells in and near Bladen. In September of 2012, Argonne contacted the village and, within 1 mi of the former CCC/USDA facility, identified one livestock well (Kaufman) and four private residential wells (Karr, Kaufman, Moriarty, and Niemeyer) that are currently in use for water supply. The distance from the former CCC/USDA facility to the private wells ranges from 900 ft to 4,500 ft. The locations of these private wells are shown in Figure 2.1.

The groundwater samples collected from the five private wells in 2012 were analyzed for VOCs. No carbon tetrachloride or chloroform was found above the detection limits. The results are listed in Table 2.2 and illustrated in Figure 2.1.

2.3 Geologic and Hydrogeologic Setting

The village of Bladen lies in the High Plains section of the Great Plains province (http://tapestry.usgs.gov/physiogr/physio.html). The surface topography is typically characterized as relatively flat uplands and gently rolling hills with narrow channels of tributary valleys along the streams (Figure 2.2). The area surrounding the village of Bladen is drained mainly by a headwaters reach of the Little Blue River to the west and a tributary, Flat Creek, to the east. Both streams flow to the north and enter the main reach of the Little Blue River, which

is the principal stream in the region (Figure 2.2). The land surface elevations in the village of Bladen range from uplands at 1,980-1,990 ft above mean sea level (AMSL) to the headwaters and tributary creeks at 1,910-1,950 ft AMSL to the west and the east, respectively (Figure 2.3). The local relief is less than 100 ft.

The upland plain in the vicinity of Bladen consists of remnants of thick loess deposits partly dissected by the surface drainage system. Because the local drainage system does not cut through the loess plain into the underlying major aquifers, all the local creeks have intermittent flow and apparently receive no groundwater discharge. The perennial stream flow in the Little Blue River system starts in the middle part of Adams County, about 14 mi northeast of Bladen (Figure 1.1; Little Blue Natural Resources District [Little Blue NRD 2011]). At the origin of the perennial stream of the Little Blue River, the flow turns abruptly from northeasterly to southeasterly at a surface elevation below 1,810 ft AMSL, along a stream valley that is expected to dissect the entire loess plain to the major aquifers in the region.

2.3.1 Regional Geology and Hydrogeology

The subsurface geologic materials in Webster County consist mainly of the following, in ascending order: (1) Niobrara Formation of late Cretaceous age, including chalk, limestone, and shale; (2) Pierre Shale of late Cretaceous age, including clay shale, claystone, marl, shaly sandstone, and sandy shale; (3) Ogallala Group of Tertiary age, developed on the eroded surface of the Niobrara Formation or the Pierre Shale, with poorly sorted coarse rock debris; and (4) a thick layer of Pleistocene loess mantling the entire area, with alluvial deposits near the base of the paleovalleys overlying the bedrock.

The Niobrara Formation consists of argillaceous chalk, limestone, and shale. The chalk is medium gray to white, interbedded with thin layers of chalky shale, while the limestone is light gray to medium gray and yellowish gray, interbedded with medium gray chalky shale. Regionally, the thickness ranges up to 570 ft.

Overlying the Niobrara Formation, the Pierre Shale is predominately a fissile clay shale, medium to dark gray, brownish gray, and black in color. It can also locally contain thin beds of calcareous, silty shale or claystone, marl, shaly sandstone, and sandy shale. The maximum reported thickness of the Pierre Shale ranges up to 1,970 ft in the region.

The active mountain building to the west marks the end of Cretaceous time. Most of the deformation in the area occurred after the Pierre Shale was deposited but before deposition of the Ogallala Group. Periodic uplifting resulted in periods of erosion, deposition, and stability during the Tertiary. The Cretaceous rock currently dips gently to the northwest at about 11 ft/mi in Franklin and Webster Counties (Miller et al. 1964).

The Ogallala Group (Pliocene epoch) overlying the Pierre Shale typically forms major deposits (broad fans of rock debris) derived from the western mountains that encroached on the area during a fairly long period of erosion and valley formation across Nebraska. The Ogallala Group is composed of inter-fingered, fine- to coarse-grained, poorly sorted, arkosic, fluvial deposits of light gray, light olive-gray, and grayish green calcareous silt and sand. These deposits are locally poorly consolidated conglomerate, sandstone, and siltstone. South-central Nebraska is at the eastern edge of the Ogallala deposits, and erosion removed much of the Ogallala Group in the region at the close of Pliocene epoch (Miller et al. 1964). The remnants of the Ogallala Group are limited to isolated areas in Webster County.

Overlying the Ogallala Formation or Upper Cretaceous Pierre Shale are Pleistocene and recent deposits, consisting mainly of undifferentiated coarse-grained deposits (Red Cloud sand and gravel and Grand Island Formation) and the overlying loess that mantles most of the area. The Red Cloud and Grand Island deposits consist of alluvial coarse sand derived from the Rocky Mountains. Although Schultz et al. (1951) redefined the coarse fluvial deposits of Kansas age into the Red Cloud sand and gravel of early Kansas age and the Grand Island Formation of late Kansas age, the differentiation between the two units was difficult and was not adopted by the U.S. Geological Survey (USGS; Miller et al. 1964). The two coarse-grained units of Kansas age were combined as the Grand Island Formation by Miller et al. (1964).

Loess deposits in Nebraska can be further subdivided as the Loveland Formation and the Peorian Loess, correlating with glaciation stages (Johnson 1960). The Loveland Formation, of eolian origin and consisting of reddish brown calcareous silt with minor amounts of sand and clay, covers both the drainageways and the low divides. The overlying light brown to nearly white Peorian loess contains nodular calcareous concretions and mantles most of the area.

The Quaternary alluvial coarse-grained deposits (Grand Island Formation) constitute a major aquifer in Webster, Adams, Clay, and Nuckolls Counties. The aquifer is confined by the underlying Niobrara Formation chalk and shaly limestone or Pierre Shale and is overlain by a

thick loess mantle (Pleistocene). A recent hydrogeologic study (Little Blue NRD 2011) indicated that the thickness of the aquifer might vary from less than 10 ft in the upland plain and more than 250 ft along the major Little Blue River valley, about 10 mi northeast of Bladen. The Little Blue NRD (2011) compiled groundwater level data collected in 2010, suggesting that groundwater in the aquifer mainly flows from west to east and east-southeast along the Little Blue River Valley in the region. However, in the area surrounding Bladen, groundwater flows to the northwest, toward the Little Blue River valley.

2.3.2 Local Geology and Hydrogeology

Geologic and hydrogeologic information for the Bladen area was obtained from state test hole records and water well registration records. To illustrate the configuration of local geologic and hydrogeologic units, three geologic cross sections were constructed by using the geologic logs from test holes and lithologic descriptions of selected private water wells within 1 mi of well PWS 68-1. Locations of all test holes and wells used to construct the cross sections are shown in Figures 2.2 and 2.3. Individual logs are in Appendix C.

In the vicinity of Bladen, five test holes were identified. Three of these, 53-B-47, 23-B-81, and 25-B-49 (Figure 2.2), were selected to construct geologic cross section A-A' across Bladen and the surrounding area. Test hole 53-B-47, 7 mi northwest of Bladen, has a total depth of 240 ft and penetrates the Quaternary loess, the basal sand unit, and the Tertiary Ogallala Formation to the top of late Cretaceous Pierre Shale (Figure 2.4). Test hole 25-B-49, about 5 mi east of Bladen, penetrates the Quaternary loess and the Tertiary Ogallala Formation and reaches the top of the Niobrara Formation. Test hole 23-B-81 — the closest to Bladen, 2 mi to the northwest — was drilled to 200 ft BGL, penetrating Quaternary loess and a thick unit of sand and gravel to the top of Niobrara Formation.

On the basis of state water well registration records, 18 private water wells and 1 village test well were identified within 1 mi of well PWS 68-1. The private water wells include 15 irrigation wells, 2 domestic wells, and 1 livestock well. In addition, 1 test well owned by the village of Bladen was drilled for installation of PWS 2006-1. The locations of these wells are shown in Figure 2.2. The depths of these local-area wells are consistently in the range of 114-189 ft BGL, except that one irrigation well has no recorded well depth.

Cross section A-A' (Figure 2.4) extends for approximately 13 mi from west to east, connecting test holes, local private water wells, and Bladen well PWS 68-1 (Figure 2.2). Two shorter cross sections (B-B' and C-C') illustrate details of the local geology recovered in private water wells and well PWS 68-1 across the village of Bladen, along the north-south and west-east directions, respectively (Figures 2.3 and 2.5-2.6).

The interpretations presented in longer cross section A-A' (Figure 2.4) indicate four geologic units in descending order: (1) an undifferentiated Quaternary deposit including an eolian loess unit (silt and clay) and an underlying sand and gravel unit, with a total thickness of 99-178 ft; (2) the Tertiary Ogallala Group (silt, sand, and sandstone) occurring only at the west and east ends of the A-A' cross section, outside Bladen; (3) late Cretaceous Pierre Shale recovered at test hole 53-B-47; and (4) late Cretaceous Niobrara Formation chalk and shale. The two local geologic cross sections (B-B' and C-C') across the village of Bladen illustrate a simpler stratigraphic profile within 1 mi of well PWS 68-1: Quaternary loess and sand and gravel units directly overlying the late Cretaceous Niobrara Formation (Figures 2.5-2.6).

The local principal aquifer consists primarily of the sand and gravel unit in the lower section of the Quaternary deposit. This sand and gravel unit includes two layers: (1) a lower layer of sand and gravel overlying on the unconformable surface of the Niobrara bedrock and (2) an upper layer of sand in the loess unit. The lower layer of sand and gravel was present at the location of every local water well and was completely saturated, providing the source of groundwater for the wells. The thickness of the layer ranges from 9 ft to 38 ft (cross section C-C', Figure 2.6). The upper layer of sand extends along the north-south direction but is limited to the area surrounding the village of Bladen along the west-east direction. The upper layer might be partially saturated but is not the main source of groundwater for the water wells.

In developing the WHPA for the Bladen public water supply system, the NDEQ WHP Program collected water level data from 43 water wells in the vicinity of Bladen and determined a general groundwater flow direction to the north-northwest in the regional principal aquifer. More detailed measurements are needed to identify the groundwater flow patterns near the former CCC/USDA facility, with and without stress from pumping wells in the area.

2.4 Identification of Potential Contaminant Source Areas

Carbon tetrachloride contamination previously found in soil and groundwater in a number of rural communities in Nebraska has been determined to be related to grain storage operations at former CCC/USDA and commercial/private grain storage/operation facilities that were active prior to 1985. On the basis of results for public well sampling and previous investigations (Sections 2.1 and 2.2), carbon tetrachloride contamination has been identified in groundwater of the Quaternary aquifer at one location (well PWS 68-1) in Bladen. Low concentrations of carbon tetrachloride (0.47-3.83 µg/L) were detected in 6 of 10 sampling events (Table 2.1). To identify potential source areas for the groundwater contamination at well PWS 68-1, Argonne conducted a property document search, collected community information, and reviewed historical aerial photographs. This section presents the results of the combined analyses of all documentation available to the public.

Through a review of historical aerial photographs taken in 1956, 1963, 1969, and 2012 and local community information, two types of grain storage/operation facilities were identified at Bladen (Figure 2.7). These facilities are (1) the former CCC/USDA grain storage facility south of the railroad right-of-way, at the southeastern edge of Bladen, and (2) the private grain operation facility along the railroad right-of-way, north of the former CCC/USDA facility. Contaminated well PWS 68-1 is located at the northern boundary of the railroad right-of-way. Both of the grain facilities in operation before 1985 are currently owned by CHS, Inc., a farmer-owned cooperative with headquarters at Inver Grove Heights, Minnesota. The railroad has been abandoned. However, the property on which the tracks were laid and the right-of-way are still owned by the Burlington Northern Santa Fe Railroad.

The historical ownership of the former CCC/USDA grain storage property was determined on the basis of documents acquired from the Register of Deeds, Webster County, located in Red Cloud, Nebraska. The historical ownership and property records are summarized in Table 2.3, and the property records are reproduced in Appendix D.

Information on historical ownership of private grain operation facilities on the railroad right-of-way was obtained from a village centennial history publication (Bladen Opera House Centennial Book Committee 1986) and relevant records for properties near the railroad right-of-way.

2.4.1 Former CCC/USDA Grain Storage Facility and Subsequent Grain Operations

The former CCC/USDA facility was located east of Main Street at the southern edge of Bladen. On the basis of the property documents obtained from the Register of Deeds for Webster County, a three-acre parcel was initially leased by the CCC/USDA from R.C. Humes in April 1950, for 5 yr. The lease was renewed once for 5 yr and twice for 10 yr. During this time, the 9.2-acre property including the CCC leasehold was conveyed to Arthur and Stella Morey in 1957 and to Carl and Eva Hubert in May 1958. The lease was terminated before the end of the second 10-yr lease, and the property was released to the Huberts in August 1974 (Table 2.3). Historical aerial photographs show grain storage activities on the former CCC/USDA facility that are consistent with the lease term. The 1956, 1963, and 1969 aerial photographs show 2 steel Quonsets (40,110 bushels each), 1 storage building between the 2 Quonsets, and 15 circular Eaton aluminum bins (3,250 bushels each) on the former CCC/USDA facility (Figure 2.7). The total grain storage capacity was 128,970 bushels during the facility's peak time. Five bins were removed before 1993 (after 1974), and the rest were removed before 1999 (Figure 2.8). However, two Quonsets and one small storage building, as well as the concrete bases of four circular bins, still remain at the present time.

The Huberts' property that had been leased to the CCC/USDA in 1950-1974, with storage Quonsets and bins, was subsequently conveyed to the Farmers Coop in 1978 and to the Coop Grain and Supply Company, Roseland, Nebraska, in 1980. In 1995, the Agri Coop purchased the property; most of grain storage bins were removed in this time frame. In 2009, Agri Coop merged with the CHS Holdrege, Inc. (currently CHS, Inc.), which is a nationwide cooperative agribusiness company (Figure 2.9).

On the basis of the groundwater flow direction in the Quaternary aquifer, as determined by the NDEQ WHP Program and the Little Blue NRD (2011), the former CCC/USDA facility is not upgradient of well PWS 68-1 under the ambient groundwater flow condition. In addition, under the 20-yr pumping scenario defined by the WHP Program, groundwater at the former CCC/USDA facility would not be captured by well PWS 68-1. However, the former CCC/USDA facility is in the general wellhead protection area established by the WHP Program through consideration of the potential complexity of aquifer properties and variations of pumping scenarios in the area.

2.4.2 Private Grain Operation Facility along the Railroad Right-of-Way

The private grain operations have been located primarily on the railroad right-of-way. The grain operations on the property formerly leased by the CCC/USDA, south of the right-of-way, are discussed in Section 2.4.1. The private facilities on the right-of-way, expanded over decades, were operated by local farmers or coops, including McNeil, Bladen Grain Company, Coop Grain and Supply Company, Agri Coop, and CHS, Inc.

In 1956 aerial photograph (Figure 2.7) shows three elevators along the railroad right-of-way. These elevators were built or remolded in the early 1950s. An office building and a Quonset (40,110 bushels) added in the mid 1950s appear on 1963 and 1969 aerial photographs. The grain operation facility was owned by McNeil in the 1950s and 1960s, until 1970 (Bladen Opera House Centennial Book Committee 1986). The Bladen Grain Company managed the facility from 1970 to 1978 and then sold it to the Coop Grain and Supply Company. In 1982, the Coop Grain and Supply Company added six concrete silos on the east and two silos on the west, with a total added capacity of 400,000 bushels (Bladen Opera House Centennial Book Committee 1986). These new grain storage structures are shown on the 1993 and 1999 aerial photographs (Figure 2.8). In the mid 1980s, the facility on the right-of-way was operated in conjunction with the Roseland and Blue Hill Coops. In 1995, the grain operation facility was sold to Agri Coop, which merged with CHS, Inc., in 2009.

Well PWS 68-1 is located toward the western end of the northern boundary of the CHS grain operation facility on the railroad right-of-way (Figure 2.9). On the basis of groundwater flow direction, the entire western portion of the grain operation facility is upgradient of well PWS 68-1 under both ambient and pumping conditions.

2.5 Summary

As discussed above, all local background information, results of previous investigations, regional and local geologic data, and historical documents were compiled and evaluated in this site review. The main findings of the review are summarized as follows:

- Groundwater contamination associated with grain fumigation at Bladen has been identified at only one location: well PWS 68-1. Carbon tetrachloride has been detected intermittently at low concentrations of 0.47-3.83 µg/L (below

the MCL) since 2000. No carbon tetrachloride has been detected at well PWS 2006-1.

- Three LUST sites have been identified at Bladen. No VOCs analyses have been conducted for soil or groundwater at these sites.

- Carbon tetrachloride and chloroform have not been detected in any private water wells in the vicinity of Bladen, including two wells sampled by Woodward Clyde for the CCC/USDA in October-November 1997 and five wells tested by Argonne for the CCC/USDA in September 2012.

- The regional geologic sequence, in ascending order, consists of (1) Upper Cretaceous Niobrara Formation including chalk, shale, and limestone; (2) Upper Cretaceous Pierre Shale; (3) Tertiary Ogallala Group (alternating beds of silt, sand, and sandstone); and (4) a thick layer of Pleistocene loess mantling the entire area, with alluvial deposits near the bottom of the paleovalleys over the bedrock. The local geologic sequence within 1 mi of Bladen is expected to be simplified to Quaternary loess and sand and gravel units (99-178 ft) directly overlying the Upper Cretaceous Niobrara chalk, shale, and limestone.

- The local principal aquifer consists primarily of the sand and gravel unit in the lower section of Quaternary deposit, overlying the unconformable surface of the Niobrara bedrock. The aquifer extends laterally across the entire area and is vertically confined by the overlying loess unit and the underlying Niobrara chalky shale, which has a thickness of 9-38 ft. The NDEQ WHP Program suggests, on the basis of regional water well information, that the Quaternary aquifer exhibits a hydraulic conductivity of 168 ft/day and that groundwater flows north-northwest.

- Wells PWS 68-1 and PWS 2006-1 are operated alternately, with an approximate mixing ratio of 35% (PWS 68-1) to 65% (PWS 2006-1). Both wells were installed in the Quaternary aquifer and have similar screen intervals (16-17 ft) at depths of 152-169.5 ft BGL.

- The ungrouted interval of 40-153.5 ft at well PWS 68-1 might increase the pumping capacity of the well but could make the well more vulnerable to contamination from the local surface. The borehole of PWS 68-1 is sealed only from 40 ft BGL to the ground surface, while the borehole of PWS 2006-1 is grouted from 127 ft BGL to the ground surface. The estimated pumping rates are about 550 gpm at PWS 68-1 and 450 gpm at PWS 2006-1.

- Two types of grain storage facilities have been identified as potential source areas of the groundwater contamination associated with historical grain fumigation: (1) the former CCC/USDA facility south of the railroad right-of-way, located 700 ft southeast of well PWS 68-1, and (2) the private grain operation facility on the railroad right-of-way, whose western portion is immediately upgradient of well PWS 68-1. The main characteristics of two facilities are as follows:

  - The former CCC/USDA grain storage facility at the southern edge of the village operated 2 Quonsets and 15 bins with an estimated storage capacity of 128,970 bushels in 1950-1974. This facility is considered to lie within the general wellhead protection area defined by the NDEQ WHP Program, even though it is not hydraulically upgradient from the groundwater contamination in the Quaternary aquifer identified at well PWS 68-1 under either ambient or pumping conditions. Since 1974, the former CCC/USDA grain storage facility has been operated by Hubert, Farmers Coop, Coop Grain and Supply Company, Agri Coop, and CHS, Inc.

  - The private grain facility along the railroad right-of-way operated 3 elevators, 1 Quonset, and 8 silos with an estimate capacity of more than 500,000 bushels during its peak time. The west part of the facility is immediately upgradient of well PWS 68-1 under both ambient and pumping conditions, as defined by the NDEQ WHP Program. Since 1938, the facility has been owned and operated by farmers and coops including McNeil, Bladen Grain Company, Coop Grain and Supply Company, Agri Coop, and CHS, Inc.

TABLE 2.1 Analytical results for groundwater samples collected from the public water supply system at Bladen[a]

Location	Sampling Date and Time		Laboratory Sample	Concentration (µg/L) Carbon Tetrachloride	Chloroform
PWS 2006-1	7/30/2012	13:30	186423	ND[b] (0.5)	ND (0.5)
PWS 2006-1	9/14/2009		P36612-9	ND (0.5)	ND (0.5)
PWS 68-1	7/22/2013	10:35	246486	3.09	ND (0.5)
PWS 68-1	7/23/2012	13:10	184554	2.99	ND (0.5)
PWS 68-1	7/18/2011	14:00	118104	3.32	ND (0.5)
PWS 68-1	7/6/2010	14:35	31430	ND (0.5)	ND (0.5)
PWS 68-1	7/20/2009		P36764-3	3.83	ND (0.5)
PWS 68-1	7/28/2008		P34724-1	ND (0.5)	ND (0.5)
PWS 68-1	7/14/2008		P34394-9	3.7	ND (0.5)
PWS 68-1	8/8/2005		P28022-9	ND (0.5)	4.3
PWS 68-1	8/17/2002		P20930-13	ND (0.5)	ND (0.5)
PWS 68-1	2/29/2000		P9423-13	0.47	ND (0.4)
Point of Entry	1/7/1997		15791083	ND (0.4)	ND (0.1)
Point of Entry	8/17/1993		6887V	ND (0.4)	ND (0.1)
Point of Entry	4/1/1991		15190721	ND (0.4)	ND (0.1)
Point of Entry	7/25/1990		15090697	ND (0.4)	ND (0.1)
NG[c]	6/5/1985		1559221	ND (0.4)	ND (0.1)

[a] Source of data: NDHHS (2014).

[b] ND, not detected at the indicated method detection limit.

[c] Location not defined further in source table.

TABLE 2.2 Analytical results for groundwater samples collected from private wells in the vicinity of Bladen.

Location	Sample	Sample Date	Screen Interval (ft BGL)	Concentration (µg/L)			
				Carbon Tetrachloride	Chloroform	Methylene Chloride	Method Detection Limit
Private well sampling in November 1997 by Woodward Clyde							
KARR	BDDW01	11/26/97	–	ND[a]	ND	NA[b]	0.5
MORIARTY	BDDW02	11/26/97	–	ND	ND	NA	0.5
Private well sampling in September 2012 by Argonne							
KAUFMAN	BLKAUFMAN-W-34824	9/21/12	–	ND	ND	ND	1
KARR	BLKARR-W-34825	9/21/12	–	ND	ND	ND	1
MORIARTY	BLMORIARTY-W-34826	9/21/12	–	ND	ND	ND	1
KAUFMAN LIVESTOCK	BLKAUFMANLIVESTOCK-W-34827	9/21/12	–	ND	ND	ND	1
NIEMEYER	BLNIEMEYER-W-34828	9/21/12	–	ND	ND	ND	1
QC	BLQCTB-W-34829	9/21/12	–	ND	ND	ND	1

[a] ND, compound analyzed for but not detected at a level greater than or equal to the indicated method detection limit.

[b] NA, compound not analyzed for during sample analysis.

TABLE 2.3 Documented transactions and activities for the former CCC/USDA property (currently owned by CHS, Inc.) at Bladen, Nebraska.

Document Date	Lease Length	Grantor/Lessor	Grantee/Lessee	Description	Record
4/5/1950	4/5/1950–4/5/1955	R.C. Humes	CCC	Original lease for approximately 3 acres	Book N, pp. 255-256
7/20/1954	4/5/1955–4/5/1960	R.C. Humes	CCC	Lease extension for 5 yr	Book N, pp. 657-658
11/4/1957	NA	R.C. and Nora Humes	Arthur and Stella Morey	Warranty deed for 9.2 acres, including the CCC-leased property	Book 32, p. 210
5/28/1958	NA	Arthur and Stella Morey	Carl and Erva Hubert	Warranty deed for 9.2 acres, including the CCC-leased property	Book 32, p. 253
2/1/1960	4/5/1960–4/5/1970	Carl and Erva Hubert	CCC	Lease extension for 10 yr	Book P, pp. 566-567
3/3/1969	4/1/1969–3/31/1979	Carl and Erva Hubert	CCC	Lease extension for 10 yr	Book 65, pp. 824-825
8/13/1974	NA	Carl and Erva Hubert	CCC	Lease termination effective on 8/28/1974	Book 73, pp. 654-657
6/30/1978	NA	Carl and Erva Hubert	Farmers Coop	Warranty deed (?)	Book 78, p. 1114
7/21/1980	NA	Farmers Coop	Coop Grain and Supply Co., Roseland, Nebraska	Warranty deed	Book 80, p. 922
7/1/1995	NA	Coop Grain & Supply Co., Roseland, NE	Agri Coop	Warranty deed	Book 95, p. 943
7/8/2009	NA	Agri Coop	CHS Holdrege, Inc. (CHS, Inc.)	Merger	Book 09, p. 1531

FIGURE 2.1 Historical carbon tetrachloride concentrations in groundwater samples collected from private wells by Woodward Clyde for the CCC/USDA in November 1997 and by Argonne for the CCC/USDA in July 2012. Source of photograph: NAIP (2012).

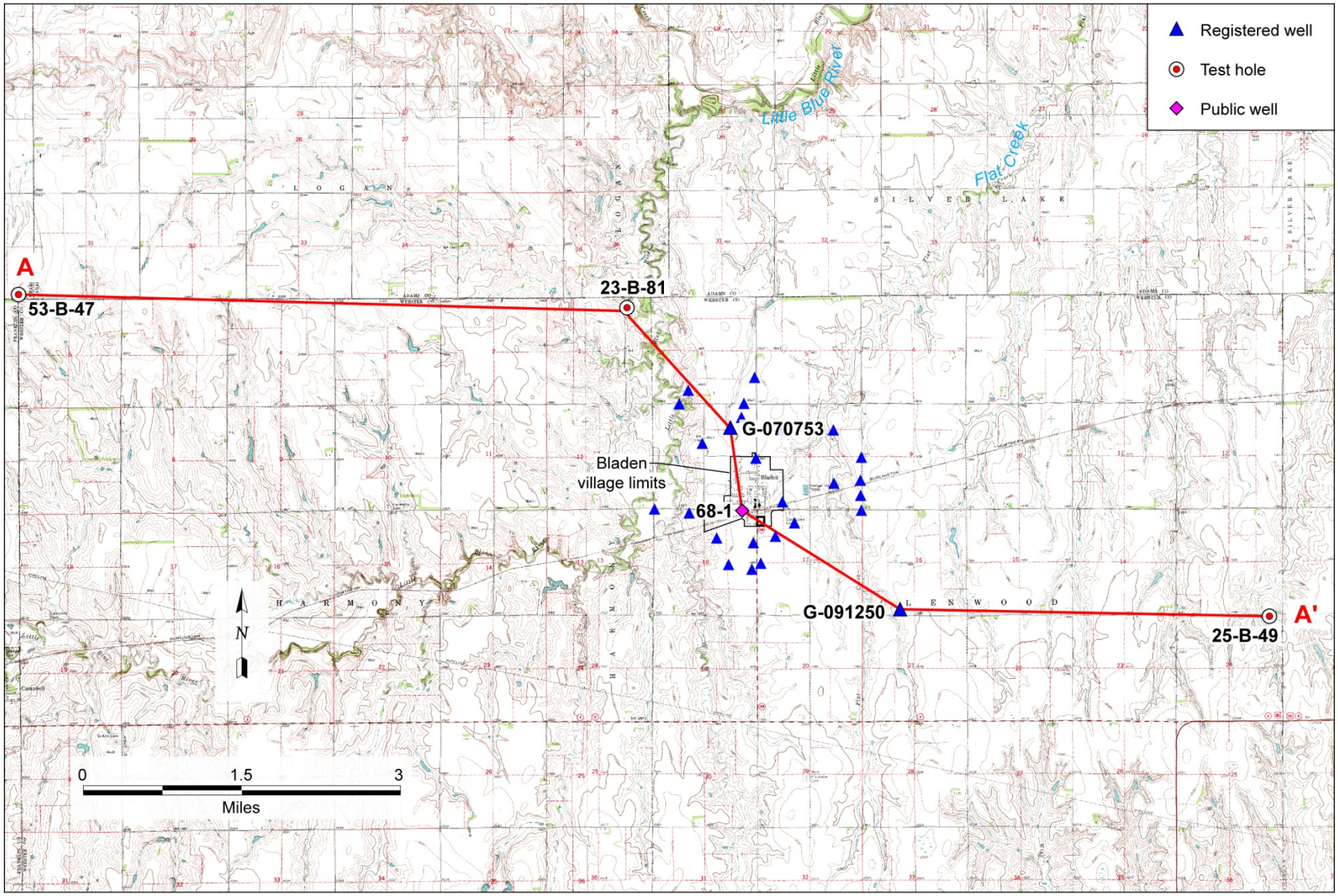


FIGURE 2.2 Locations of water wells within 1 mi of the former CCC/USDA facility that have been registered with the state and nearby state geologic test holes, with the location of geologic cross section A-A'. Source of topographic map: USGS (1997).

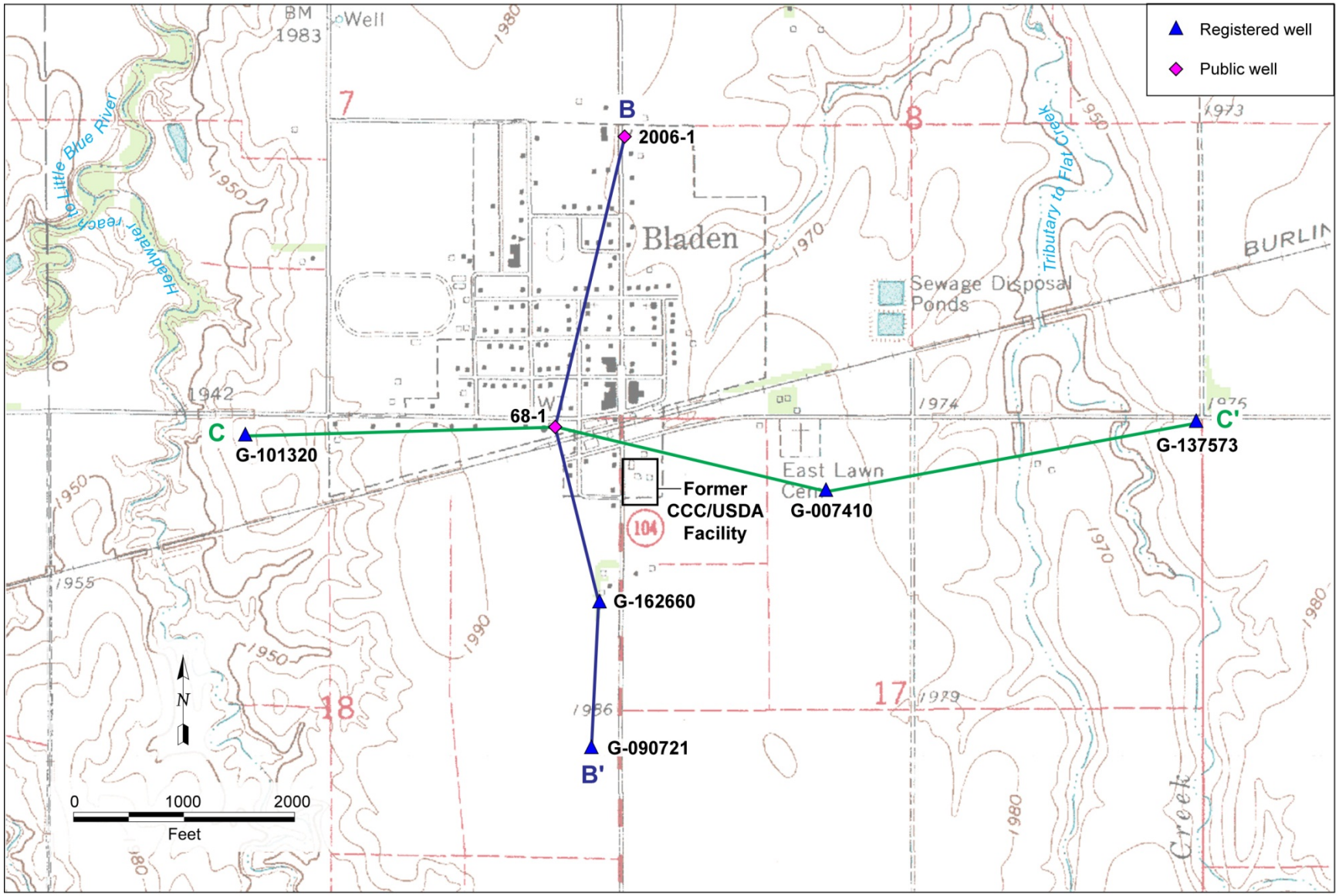


FIGURE 2.3 Locations of geologic cross sections B-B' and C-C' and the selected water wells used to construct the cross sections. Source of topographic map: USGS (1997).

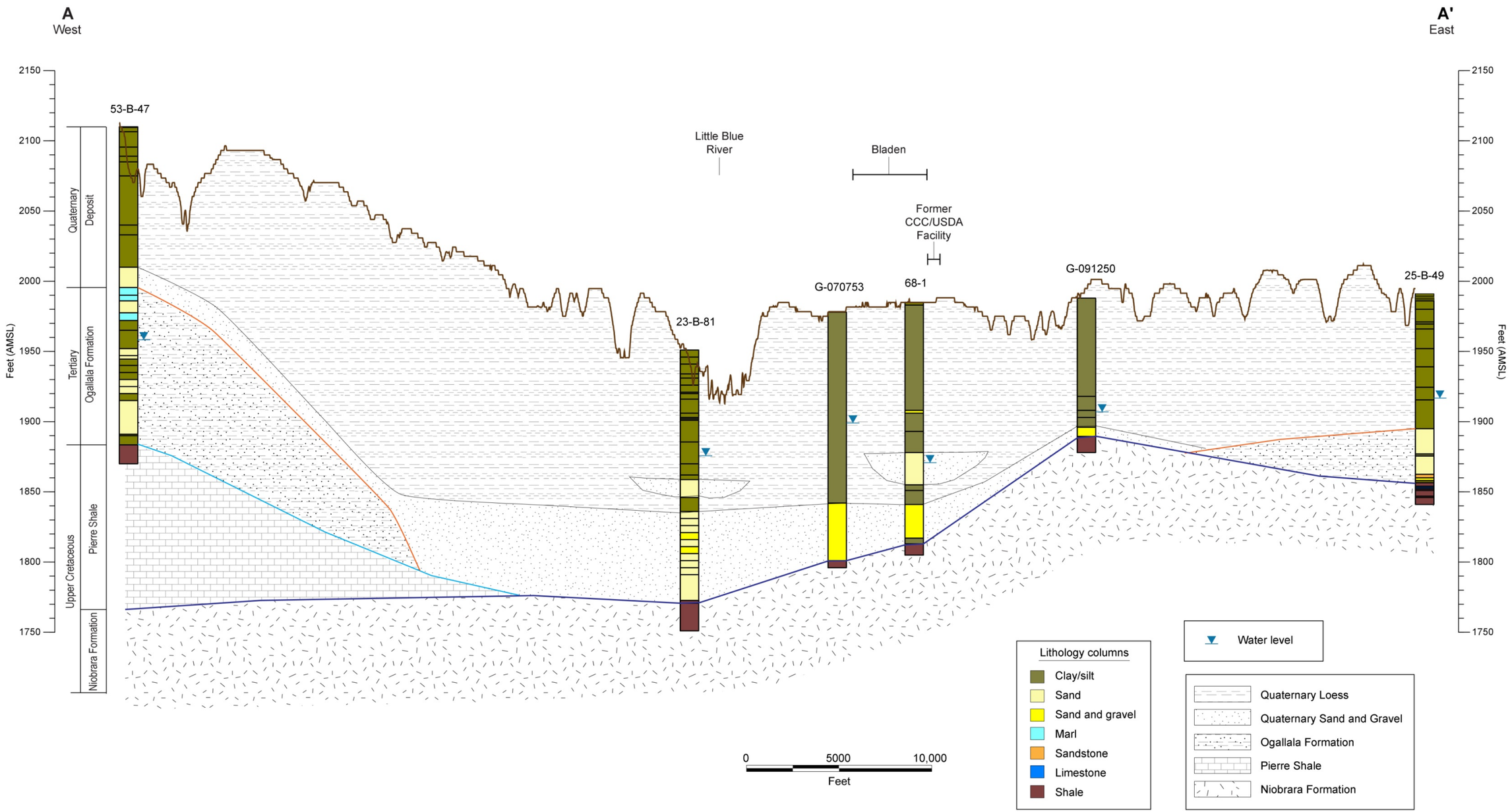


FIGURE 2.4 West-to-east hydrogeologic cross section A-A', illustrating regional stratigraphic relationships and water levels.

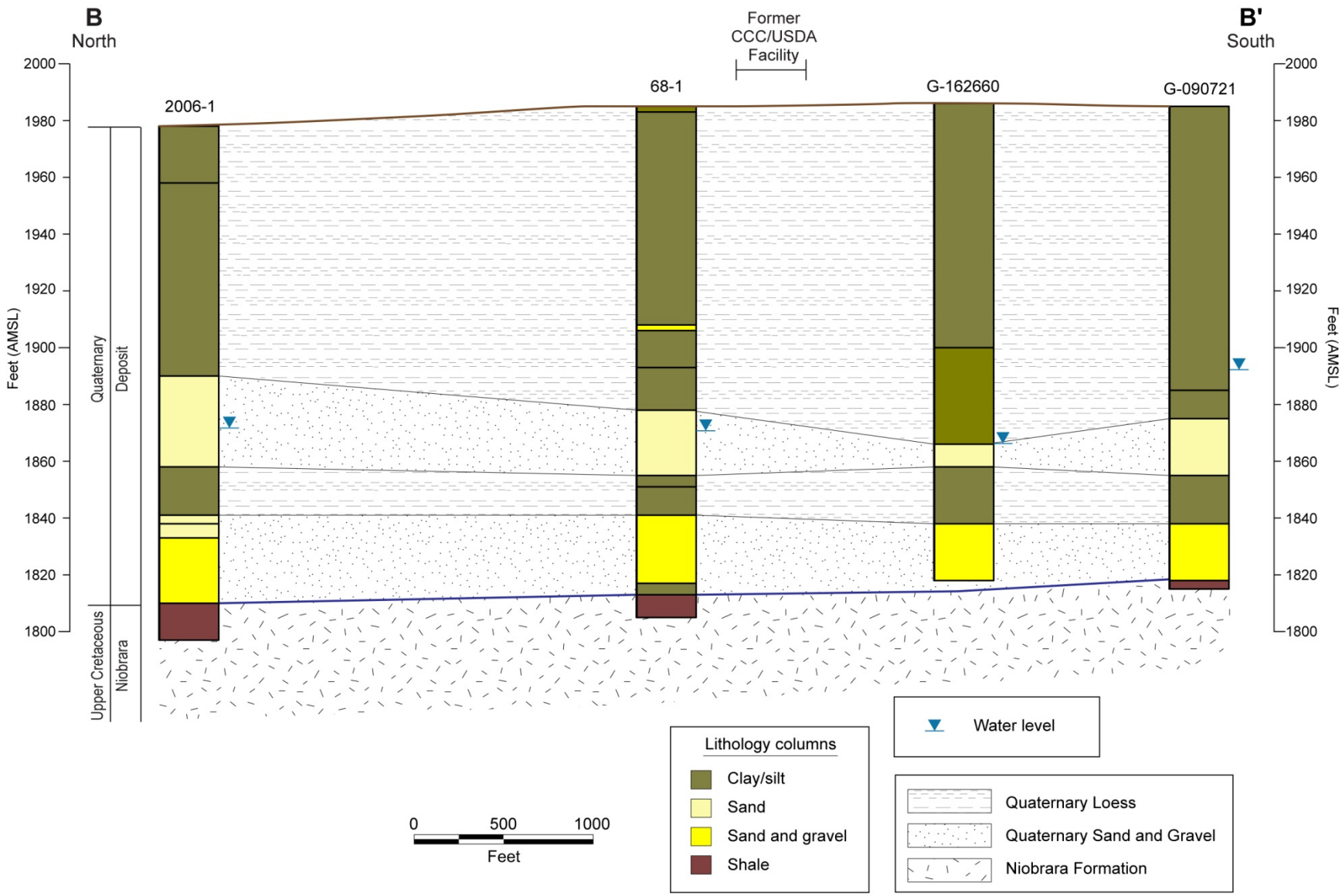


FIGURE 2.5 North-to-south geologic cross section B-B', illustrating local stratigraphic relationships and water levels at Bladen.

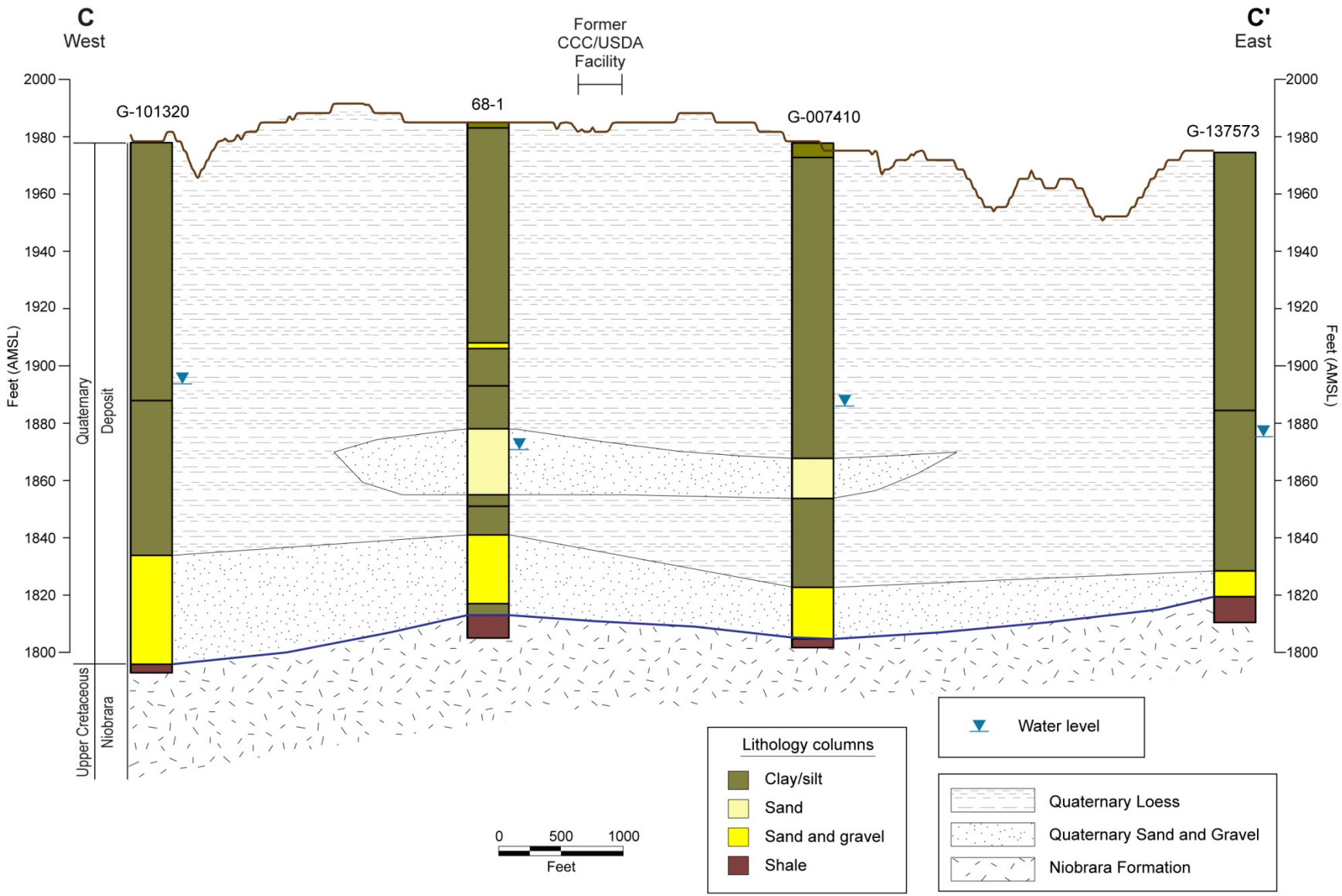


FIGURE 2.6 West-to-east geologic cross section C-C', illustrating local stratigraphic relationships and water levels at Bladen.

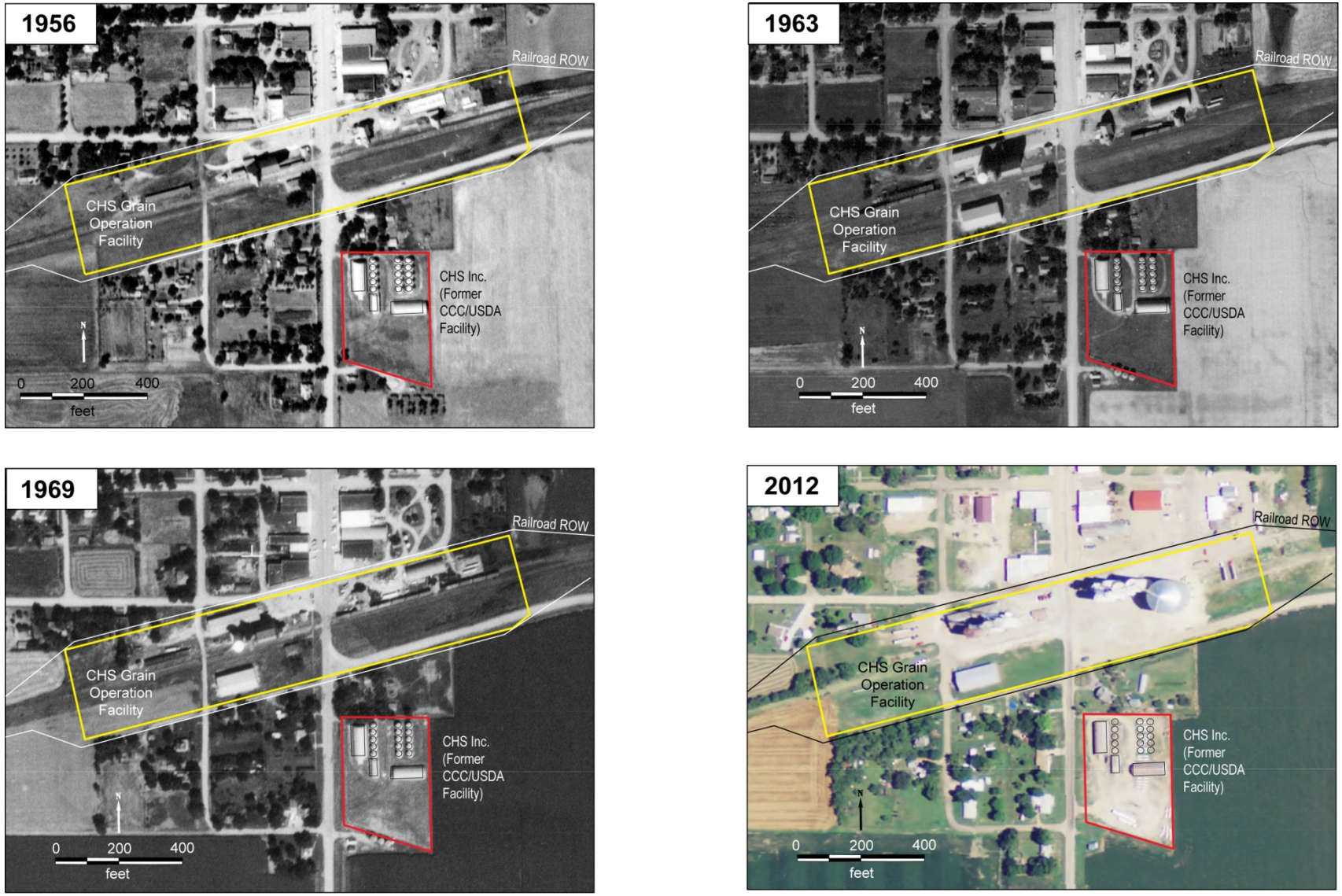
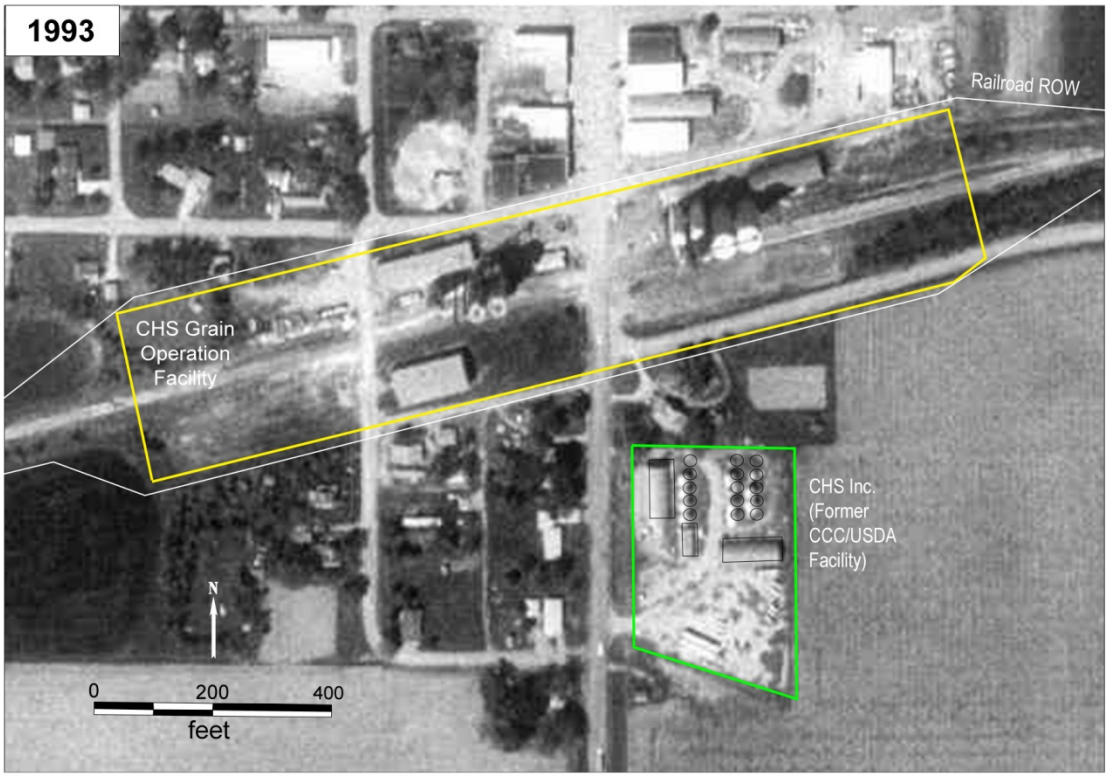


FIGURE 2.7 HIstorical and recent aerial photographs (1956, 1963, 1969, 2012), showing grain storage structures on the former CCC/USDA grain storage facility near the southern edge of Bladen and private grain operation facilities along the railroad right-of-way. Sources of photographs: USDA (1956, 1963, 1969); NAIP (2012).



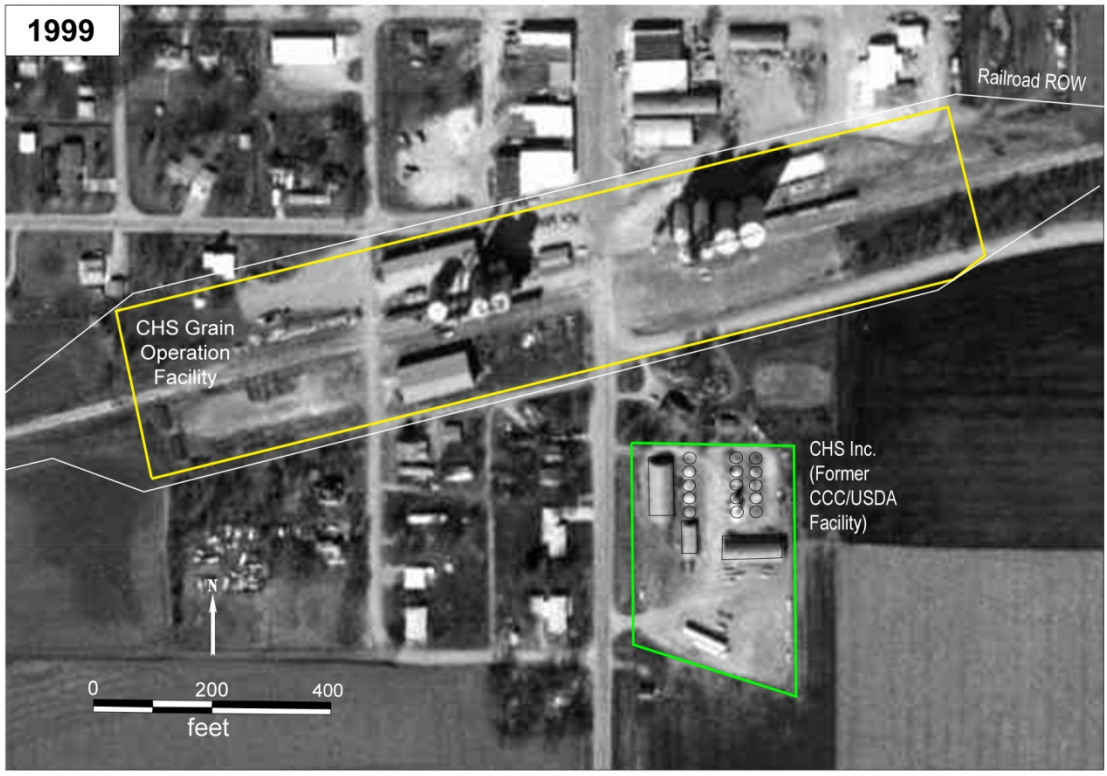


FIGURE 2.8 HIstorical aerial photographs (1993 and 1999), showing grain storage structures on the former CCC/USDA grain storage facility near the southern edge of Bladen and private grain operation facilities along the railroad right-of-way. Sources of photographs: DNR (1993, 1999).

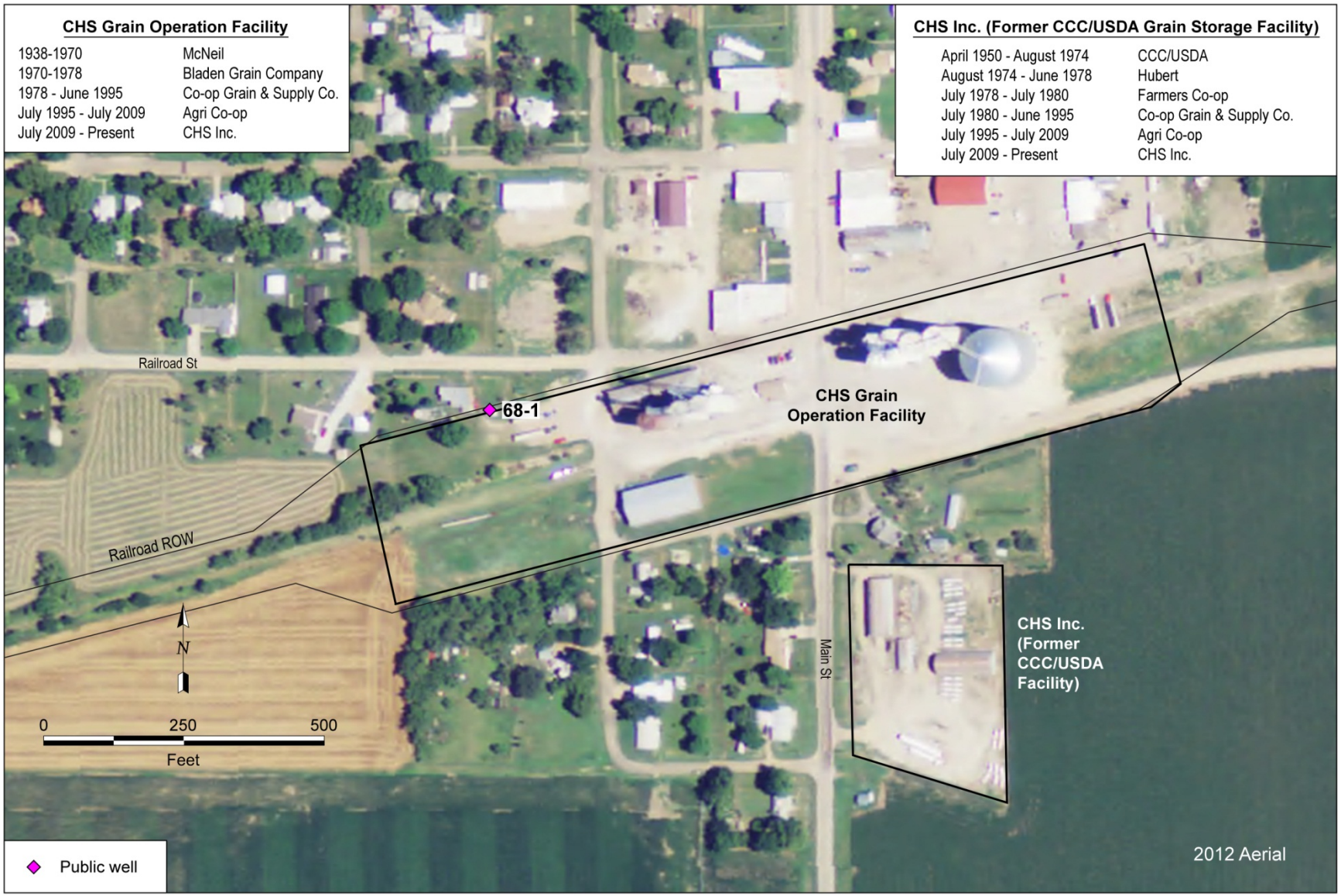


FIGURE 2.9 Locations and ownership of properties related to grain storage operations at Bladen, interpreted from property records, local community information, and aerial photographs. Source of photograph: NAIP (2012).

3 Proposed Technical Program for the Phase I Investigation

The investigative program outlined here focuses on the potential relationship of the past grain storage activities at the former CCC/USDA facility at Bladen to the carbon tetrachloride contamination found in well PWS 68-1, approximately 700 ft northwest of the former CCC/USDA facility. A phased approach is proposed to optimize the field investigation by incorporating new results from each previous phase, as well as input from the CCC/USDA and NDEQ project managers. The goal of the proposed program is to identify and characterize any subsurface contamination associated with the former CCC/USDA facility and its potential contributions to the groundwater contamination in well PWS 68-1, as well as to generate data for estimation of potential risks to human health and the environment. This section presents the technical objectives and tasks for the Phase I investigation.

3.1 Technical Objectives of the Phase I Investigation

The proposed technical objectives for the Phase I investigation are as follows:

- Determine the presence of a potential soil source of carbon tetrachloride and its daughter products in the vadose zone beneath the former CCC/USDA facility.

- Characterize the site-specific geology and hydrogeology at the former CCC/USDA facility.

- Delineate the distribution of carbon tetrachloride and its daughter products in groundwater at the former CCC/USDA facility.

- If contamination in groundwater is confirmed, obtain information on groundwater flow patterns that affect potential off-site contaminant migration from the former CCC/USDA facility.

3.2 Phase I Investigation Tasks

To address the technical objectives in Section 3.1, the investigative activities (four tasks) discussed below are recommended for the Phase I program. Tasks 1-2 will be undertaken on the former CCC/USDA property. Data collected in Tasks 1-2 will be evaluated to determine whether implementation of the subsequent tasks is necessary. If groundwater contamination in the Quaternary aquifer is confirmed beneath the former CCC/USDA facility, Tasks 3-4 will be performed along the property boundaries of the former facility to delineate the extent of groundwater contamination and assess the potential for off-site migration. The tasks discussed below are summarized in Table 3.1. Site-specific elements of the investigative approach and methods for implementing the proposed investigation program are discussed in Section 4.

3.2.1 Task 1: Determine the Presence of a Potential Soil Source of Carbon Tetrachloride and Its Daughter Products in the Vadose Zone beneath the Former CCC/USDA Facility

A complete review of all publicly available documents from previous investigations (Section 2) indicated that no investigation has been conducted on the former CCC/USDA facility. To identify possible evidence of a soil source in the vadose zone beneath the former CCC/USDA facility, we propose three activities: (1) initial sampling of shallow soils at locations surrounding grain storage structures; (2) soil gas sampling beneath the Quonsets on the former property; and (3) targeted sampling of deeper soils (above the saturated zone) and groundwater at the top of the saturated zone at locations selected on the basis of the findings for the shallow soils. Samples of shallow soils will be collected by using a cone penetrometer (CPT) or other direct-push technique, while samples of deeper soils will be collected with the CPT or with a sonic drilling rig if necessary. Sampling will be performed according to methods specified in Section 4.

3.2.1.1 Task 1a: Shallow Soil Sampling

The initial shallow soil sampling is designed to screen for residual fumigant-related contaminants in shallow soils as an indicator of possible historical surface release of fumigant, as well as potential contamination of underlying deeper soil and potential pathways for contaminant migration from shallow soil to groundwater. Previous Argonne work (Alvarado and Rose 2004) demonstrated that the analysis of shallow soils for carbon tetrachloride and its daughter products

(chloroform and methylene chloride) by a headspace method can serve as a screening tool to identify possible soil contamination in underlying deeper soils and groundwater. The headspace data are not used quantitatively but are examined for contaminant distribution patterns, in order to prioritize areas for follow-up sampling and analysis of deeper soils and underlying groundwater. The shallow soils will also be analyzed by a purge-and-trap method with analysis by gas-chromatography-mass spectrometry (GC-MS) to identify potential health risks associated with direct exposure to the shallow soils.

The initial locations for shallow soil sampling will target former grain storage structures and driveways at the former CCC/USDA facility. These locations are expected to have been the most vulnerable to potential releases of carbon tetrachloride during grain storage and handling of fumigant containers or related equipment. On the basis of the operational setting of the former CCC/USDA facility, as shown in the 1956, 1963, and 1969 aerial photos (Figure 2.7), 10 locations for shallow soil sampling are recommended. Of these locations, 6 are among/around the former grain bins (2 in each row), 2 (to the south) are at/near the front entrances of the Quonsets, and 2 lie along the former driveway between the grain storage structures (Figure 3.1). The former CCC/USDA facility is currently owned by CHS, Inc., and operated for CHS agricultural services. These sampling locations might be adjusted during field implementation to minimize the impact on the business operation at the facility and/or to meet CHS requests.

The following activities are recommended for the initial survey of shallow soils at the former CCC/USDA facility (Task 1a):

- Vertical soil profiling will be performed at all survey locations. For each profile, soil samples will be collected at intervals of about 4 ft, from the surface to 28 ft BGL (sampling depths of 2 ft, 6 ft, 10 ft, 14 ft, 18 ft, 22 ft, and 26 ft BGL), or at significant changes in the soil profile or recovery conditions.

- Analyses for VOCs with a headspace method will be conducted by the Applied Geosciences and Environmental Management (AGEM) Laboratory at Argonne on the second day for all shallow soil samples collected, to identify patterns of carbon tetrachloride, chloroform, and methylene chloride contamination in shallow soils and to determine sampling locations for deeper soils (Task 1c).

- Analyses for VOCs with a purge-and-trap method will be conducted subsequently for all shallow soil samples to provide a quantitative basis for evaluating risk due to soil contamination.

3.2.1.2 Task 1b: Soil Gas Sampling beneath Quonsets

Soil gas sampling will be conducted in the shallow subsurface within the footprint of the existing Quonset structures, if access inside the structures is permitted. Two soil gas sampling points are proposed — one for each Quonset, in a central portion of the structure if possible. The exact locations will be determined with the owner's permission and to minimize impacts on business at the CHS facility. The major activities for soil gas sampling (Task 1b) include the following:

- Soil gas samples will be collected by a Geoprobe unit through a small borehole with a Post-Run Tubing (PRT) system, from the depth interval at 185-200 cm (roughly 6-7 ft BGL) and stored in metal, certified-clean, 1-L gas canisters.

- Soil gas samples collected in the 1-L canisters will be shipped to TestAmerica Laboratories, Inc., South Burlington, Vermont, for VOCs analysis (including carbon tetrachloride, chloroform, and methylene chloride) with EPA Method TO-15.

The results of soil gas sampling will determine the presence of contamination in soil gas and provide a basis for assessing the potential for upward vapor intrusion of VOCs contaminants from soil gas to present and future structures on the former CCC/USDA property.

3.2.1.3 Task 1c: Targeted Soil Sampling for the Deeper Soils and Groundwater Sampling at the Top of the Saturated Zone

The contaminant distribution patterns in shallow soils at the former CCC/USDA facility will be evaluated to identify plausible pathways for contaminant migration to deeper soils and

groundwater. Up to three locations with evidence of plausible pathways will be selected for sampling of deeper soils.

The activities proposed for sampling of deeper soils at the former CCC/USDA facility (Task 1c) are as follows:

- Vertical soil profiling will be performed at all selected locations targeting deeper soils with either the CPT or the sonic drilling rig. For each profile, soil samples will be collected at intervals of 5-10 ft, from a depth of 30 ft BGL to the top of the saturated sand and gravel unit (Figures 2.5 and 2.6). The estimated depth of the saturated sand and gravel unit is approximately 100-120 ft BGL at the former CCC/USDA facility.

- All soil samples will be analyzed for carbon tetrachloride, chloroform, and methylene chloride with a purge-and-trap method.

- If the deep soil profiling is conducted with a CPT unit, CPT electronic logs will be collected and analyzed for general information on changes in lithology, to provide further guidance for confirmatory sampling at selected intervals. However, the depth of penetration could be a limiting factor in the use of the CPT for deeper soil sampling.

- Continuous cores will be collected and analyzed visually for lithologic evaluation and description. At selected intervals, soil property testing, grain size analysis, and other chemical analyses might be performed, as necessary, for the collected core samples.

- Groundwater samples will be collected for VOCs analysis from the top of the identified saturated sand and gravel unit at the base of deep soil boring.

The results of vertical soil profiling will provide a scientific basis for determining whether a soil source of carbon tetrachloride exists at the former CCC/USDA facility, as well as the potential for a soil-to-groundwater migration pathway.

3.2.2 Task 2: Characterize the Site-Specific Geology and Hydrogeology at the Former CCC/USDA Facility

As discussed in Section 2.3, local geologic units expected to be penetrated at the former CCC/USDA facility, from top to bottom, are as follows: (1) a Quaternary undifferentiated loess unit (silt and clay); (2) a Quaternary sand and gravel unit; and (3) Upper Cretaceous Niobrara chalk, shale, and limestone (Figures 2.5 and 2.6). The local principal aquifer is the saturated Quaternary sand and gravel unit, which unconformably overlies the Cretaceous Niobrara bedrock. The thickness of the saturated sand and gravel might vary from 9 ft to 38 ft from one location to the other. To gain a better understanding of the local aquifer and assist in groundwater sampling, one deep boring for lithologic confirmation will be conducted at one of the deeper soil sampling locations, penetrating the entire aquifer unit to the top of the Niobrara. The location of this deep boring will be based on the results of the investigations described in Section 3.2.1, to target possible pathways for soil contamination to groundwater in the aquifer. The sonic drilling rig will be used to penetrate the deep horizons.

The recommended activities associated with the deep boring at the former CCC/USDA facility (Task 2) are follows:

- Continuous core will be collected to a depth of approximately 180 ft BGL, at the top of Niobrara Formation bedrock. On the basis of the existing water well records in the vicinity of the former CCC/USDA facility, the stratigraphic units expected to be penetrated are (1) the Quaternary loess unit (about 110 ft thick) and (2) the sand and gravel unit with a clay layer (50-60 ft thick). The core collected will be analyzed visually, and the lithology will be described. At selected intervals, soil property testing, grain size analysis, and other chemical analyses might be performed, as necessary, for the collected core samples.

- The information on lithology, soil properties, and water content and recovery collected from this deep boring (to approximately 180 ft BGL) and other deeper soil sampling locations (up to 120 ft BGL; Section 3.2.1.3) will be evaluated to determine the hydrostratigraphic sequence, including the confining layer, aquifer, and relatively more permeable intervals within the aquifer. The interpreted hydrogeologic sequence and its properties will guide the collection of groundwater samples in the subsequent task (Section 3.2.3).

3.2.3 Task 3: Delineate the Distribution of Carbon Tetrachloride and Its Daughter Products in Groundwater at the Former CCC/USDA Facility

The results of groundwater sampling at selected deeper soil sampling points (Task 1c, Section 3.2.1.3) and the deep boring location for lithologic identification (Task 2, Section 3.2.2) will be evaluated to determine the presence of carbon tetrachloride and its daughter products in groundwater at the former CCC/USDA facility. If groundwater contamination associated with fumigants is confirmed, a subsequent task will be performed to delineate the extent of contamination in groundwater. Additional groundwater sampling will target the Quaternary aquifer at the four locations shown in Figure 3.2. One sampling point in the southern part of the former facility is located upgradient from the grain storage structures, on the basis of estimated groundwater flow in the aquifer, and the other three sampling points are possibly downgradient locations along the edge of the former facility. These locations might be adjusted slightly, depending on the actual locations of groundwater sampling at three deep-soil sampling points (Task 1c).

The proposed activities for delineation of contamination in groundwater at the former CCC/USDA facility (Task 3) are as follows:

- Deep coring at four sampling points will be conducted through the entire section of aquifer to the top of Niobrara Formation chalk and shale at the approximate depth of 180 ft. Observations of lithology, grain size, thickness, and water recovery will be recorded for use in determining the characteristics of the aquifer and guiding the groundwater sampling.

- Groundwater samples will be collected from 1-2 intervals in the aquifer at each sampling location, identified by considering the aquifer thickness and the sampling results obtained in Tasks 1c and 2. Each sampling interval will be in a range of 5-10 ft.

- All groundwater samples will be analyzed for VOCs to identify the presence and concentrations of carbon tetrachloride, chloroform, and methylene chloride. The analytical results will be evaluated to determine the lateral distribution of contamination in the aquifer.

3.2.4 Task 4: Obtain Information on the Groundwater Flow Patterns That Affect Potential Off-Site Contaminant Migration from the Former CCC/USDA Facility

The water level data collected by the NDEQ WHP Program suggest that, under ambient conditions, groundwater in the principal aquifer generally flows toward the north-northeast in the regional area that encompasses the village of Bladen. However, the pumping at well PWS 68-1 and surrounding irrigation wells might alter the groundwater flow pattern locally. Information on the site-specific groundwater flow patterns and their variations in response to the local pumping events is critical for determining the potential for off-site contaminant migration beneath the former CCC/USDA facility. Therefore, if the presence of groundwater contamination is identified beneath the former CCC/USDA facility (Sections 3.2.1 and 3.2.2), a preliminary groundwater monitoring network will be established during the Phase I investigation.

The proposed activities for determining groundwater flow patterns (Task 4) are as follows:

- Monitoring wells will be installed with a drilling rig at the deep boring location (described in Task 2, Section 3.2.2) and four groundwater sampling points (Task 3, Section 3.2.3; Figure 3.2). The well depth is expected to be approximately 180 ft BGL. The screen interval will be selected on the basis of contaminant data obtained in Tasks 1c, 2, and 3. All wells will be completed in accordance with Nebraska regulations, Title 178 NAC 12.

- Groundwater levels will be measured in all wells at least 24 h after well completion (and after the wells have stabilized). The locations of all monitoring wells will be determined by a professional, licensed surveyor, in relation to state coordinates. The surveyor will determine the elevation of the top of each well and the designated reference point in each well for water level measurement.

- Groundwater level fluctuations will be monitored continuously over a period of 6-12 months. Automatic water level sensors and data loggers will be installed in all monitoring wells to identify the effects on the flow pattern of pumping at the public water supply and local irrigation wells and seasonal variations in the groundwater system.

- Results of the investigation for soil and groundwater contamination at the former CCC/USDA facility generated from Tasks 1-3, together with the groundwater flow patterns and variations in response to pumping at the public water supply and local irrigation wells and seasonal variations identified in Task 4, will be compiled to determine the configuration of the contaminant plume and the primary direction(s) of groundwater flow and contaminant migration under the site-specific conditions in the vicinity of the former CCC/USDA facility.

TABLE 3.1 Summary of Phase I investigation tasks.

Task	Objective	Medium	Depth (ft BGL)	Number of Locations	Equipment		Section	Figure
					CPT	Sonic Rig		
1a	Shallow soil sampling	Soil profiles	2, 6, 10, 14, 18, 22, 26	10	x	-	3.2.1.1	3.1
1b	Soil gas sampling	Soil gas	6-7	2	Geoprobe	-	3.2.1.2	3.1
1c	Deeper soil sampling	Soil profiles[a]	30 to < 120 (to top of saturated sand and gravel unit)	≤ 3	x	-	3.2.1.3	3.1[b]
1c	GW sampling	Groundwater	100-120 (top of saturated sand and gravel unit)	≤ 3	x	-	3.2.1.3	3.1[b]
2	Site-specific hydrostratigraphy	Soil cores and groundwater[c]	180 (to Niobrara bedrock)	1	-	x	3.2.2	3.1[d]
3	Delineate extent of groundwater contamination	Soil cores and groundwater[c]	100-180 (saturated sand and gravel unit)	4	-	x	3.2.3	3.2
4	Monitoring well installation[d]	Groundwater	180	~ 5	-	x	3.2.4	-

[a] Deep soil samples will be collected at 5-ft to 10-ft intervals.

[b] Locations of deep soil and groundwater sampling (Task 1c) will be selected on the basis of results for 10 shallow soil sampling locations.

[c] Continuous coring, analysis of soil cores, and collection of groundwater samples from 1-2 intervals in aquifer (saturated sand and gravel unit).

[d] Location will be selected from 1 of 3 deep soil sampling locations on basis of the results of Task 1c.

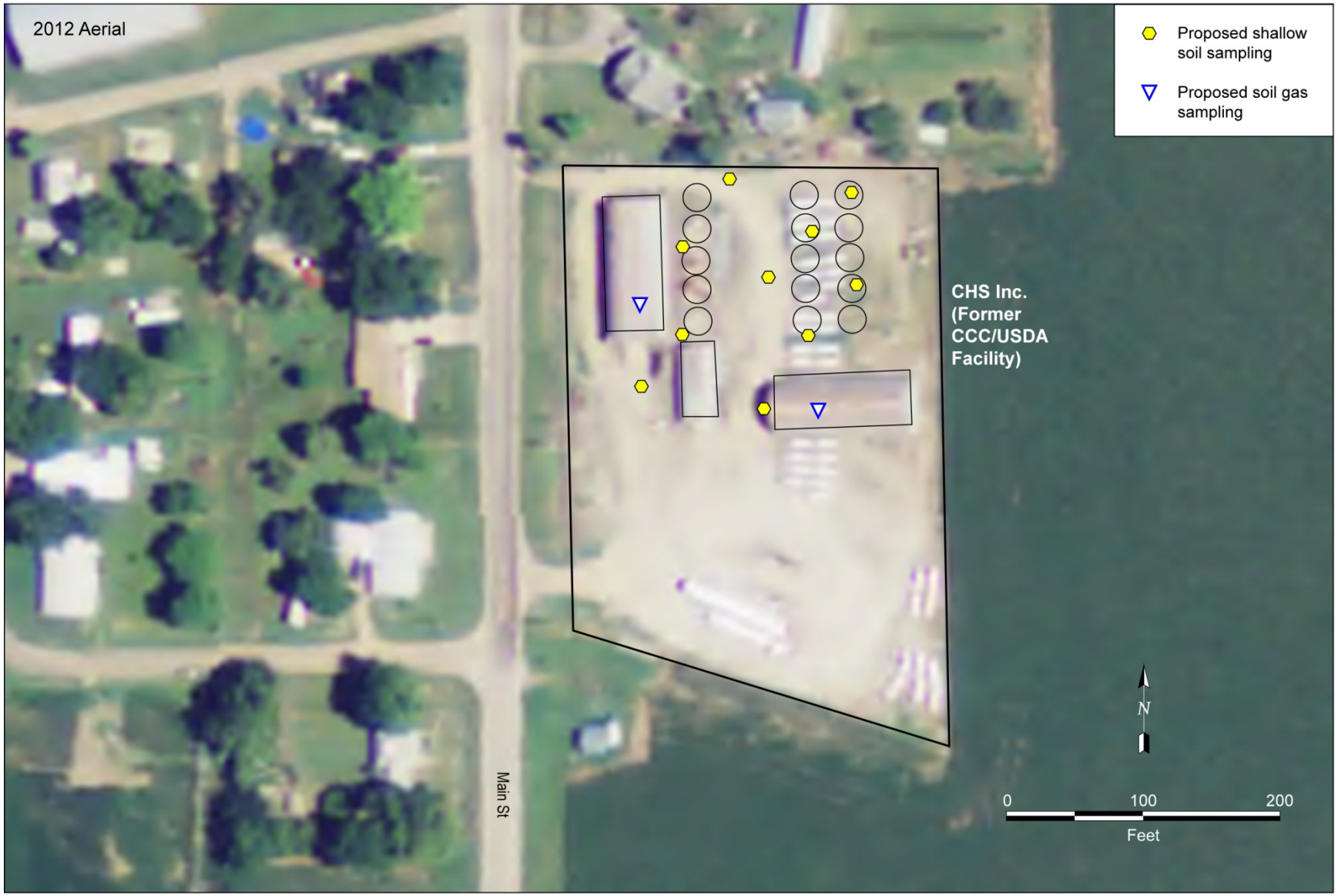


FIGURE 3.1 Proposed shallow soil sampling locations on the former CCC/USDA property (currently CHS property). Source of photograph: NAIP (2012).

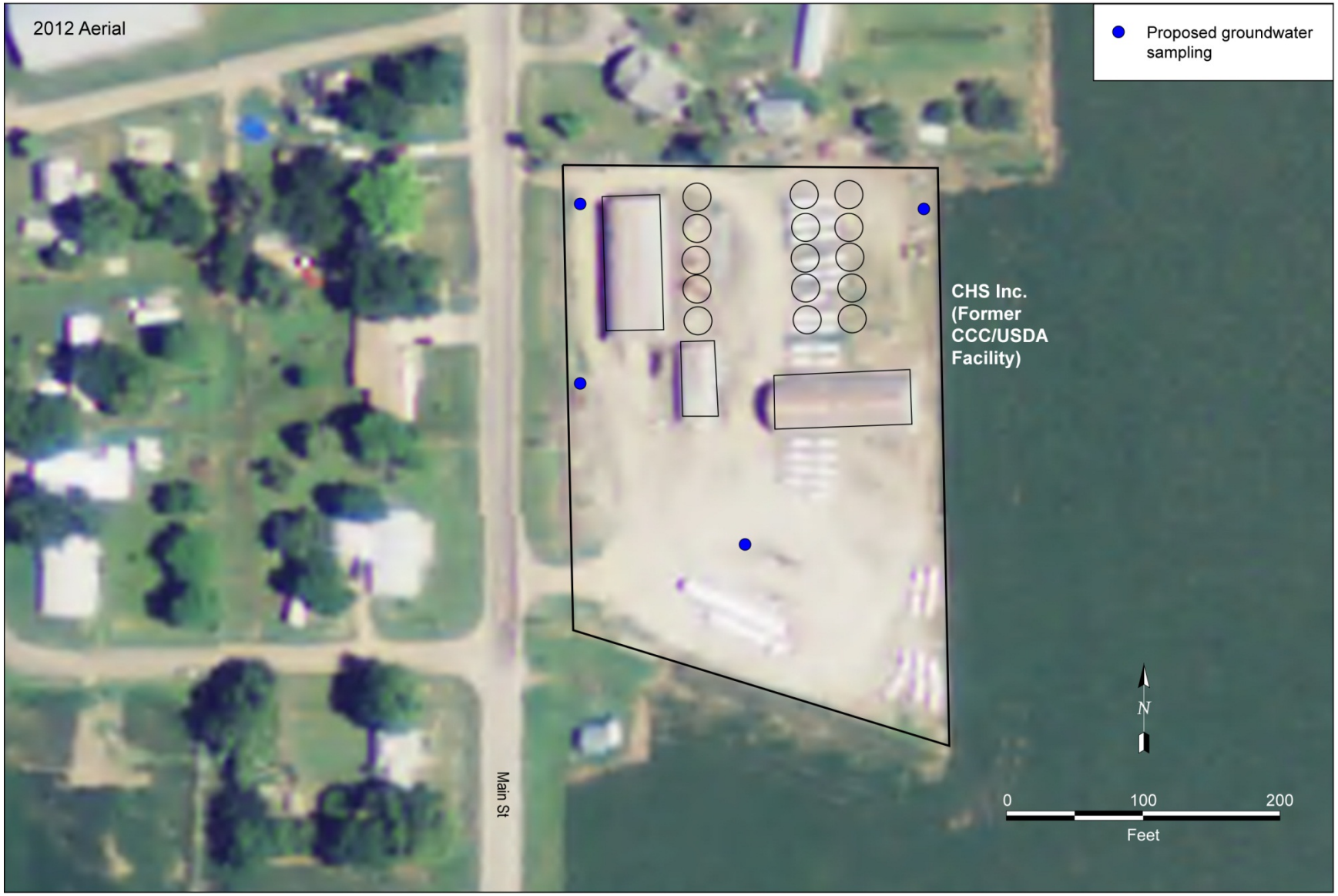


FIGURE 3.2 Proposed groundwater sampling locations on the former CCC/USDA property (currently CHS property). Source of photograph: NAIP (2012).

4 Investigation Methods

The site-specific investigative technologies, field procedures, and analytical methods to address the technical objectives discussed in Section 3 are discussed below. Argonne will implement the proposed tasks in accord with established standard operating procedures, relevant state regulations, quality assurance-quality control (QA/QC) measures, and general health and safety policies.

4.1 Methods for Shallow Soil Sampling and Analysis

Shallow soil sampling (Section 3.2.1.1) will be performed by using the Argonne 22-ton, track-mounted CPT crawler. At each investigation location, a 4-ft-long core barrel with a 1.125-in.-I.D. disposable liner (Geoprobe dual-tube coring system) will be advanced with the CPT unit to collect samples of shallow soils at anticipated depths of 2 ft, 6 ft, 10 ft, 14 ft, 18 ft, 22 ft, and 26 ft BGL.

The soil samples recovered from the core barrel will be placed immediately in jars, then sealed, placed in coolers with dry ice at -78.5ºC for overnight shipment to the AGEM Laboratory for rapid-turnaround analysis. The premise of using dry ice is that VOCs are volatile at room temperature, but their volatility decreases as the temperature decreases. For example, the vapor pressure of carbon tetrachloride decreases by four orders of magnitude when the temperature changes from 15.8°C to -79.4°C (CRC 1999-2000). In previous work evaluating the recoveries of soil samples collected and stored on dry ice, we demonstrated that storage with dry ice is a better option than traditional procedures (Alvarado and Rose 2004).

The shallow soil samples will be analyzed first by a headspace method with a gas chromatograph and electron capture detector (modified EPA Method 5021). The headspace method (Alvarado and Rose 2004) provides an improved, rapid analytical process that is sensitive to low concentrations. The results from the headspace analysis can be used qualitatively to facilitate initial screening to guide subsequent field activities. At a later time, all soil samples will be further subjected to purge-and-trap sample preparation with analysis by GC-MS (EPA Methods 5030B and 8260B) for VOCs. The results of the purge-and-trap analysis will be used as a quantitative base for risk assessment.

4.2 Methods for Soil Gas Sampling and Analysis

Sub-slab soil gas samples will be collected from the Quonsets on the former CCC/USDA facility by using a Geoprobe 5400M unit, equipped with a 2-in. cement bit, to drill a 2-in. hole through the cement floor. A PRT soil gas sampling system will be installed on the Geoprobe 5400M, with an expandable point holder attached to the lead rod of the Geoprobe rod string, and the rod will be advanced to 7 ft (215 cm) BGL. A 0.25-in. poly tubing fitted with a left-hand-threaded adapter will be lowered into the rod string and threaded onto the expandable PRT tip. A second open-end 0.25-in. poly tubing will be lowered into the rod string to the top of the expandable point, to fill the rods with carbon dioxide gas, plus 100% excess. A 100-mL syringe will be attached to the poly tubing connected to the expandable point holder, and a volume of gas equal to the volume of the poly tubing will be extracted and discharged to the atmosphere. Then a second sample will be extracted and discharged into a landfill gas analyzer to check for carbon dioxide gas (as a leak detector). If no carbon dioxide gas is detected, the Geoprobe rods will be retracted back to 6 ft (185 cm) BGL to expose the PRT tip to the soil for vapor collection. A soil gas sample will be then withdrawn through the tubing into a metal, certified-clean, 1-L gas canister. After sampling is complete, the rods will be removed. The borehole remaining in the soil will be plugged with bentonite chips, hydrated with sufficient clean, fresh water to allow the bentonite to expand and form a tight seal, and the hole in the cement floor will be sealed with cement.

All soil gas samples collected in gas canisters will be shipped immediately to TestAmerica Laboratories, Inc., South Burlington, Vermont, for VOCs analysis with EPA Method TO-15.

4.3 Methods for Deeper Soil Sampling and Analysis

Deeper soil sampling (Section 3.2.1.3) will be performed by using the Argonne 22-ton, track-mounted CPT crawler, if possible, to achieve the target depth at the top of the saturated sand and gravel unit (100-120 ft BGL). At each investigation location, soil samples will be collected at depth intervals of 4-8 ft from 30 ft BGL to the depth of groundwater in the sand and gravel unit. The CPT sampling method is described in Section 4.1.

If drilling is necessary to reach the saturated sand and gravel unit at 100-120 ft BGL, a sonic drilling rig will be employed. To collect soil samples or soil cores with the sonic rig, an

inner drill string with core barrel will be advanced 5 ft or 10 ft at a time, followed by advancement of an outer sonic casing. The inner barrel will then be pulled, and the soil core will be extracted for sampling or lithologic evaluation. Samples of deeper soils will be collected every 5-10 ft from the cores recovered with the sonic drilling rig.

The soil samples recovered from the core barrel will be placed immediately in jars, then sealed, preserved on dry ice in the field, and shipped to the AGEM Laboratory for purge-and-trap sample preparation with analysis by GC-MS (EPA Methods 5030B and 8260B). As discussed in Section 4.1, preservation of soil samples with dry ice will improve the recovery of VOCs compared to traditional procedures using sample additives.

At selected locations and depth intervals, soil samples will be also collected from cores for soil property testing (e.g., moisture content, porosity, bulk density), grain size analysis, and other chemical analysis (total organic carbon, etc.).

4.4 Methods for Deep Boring and Logging

The deep subsurface borings discussed in Section 3.2.1.3 (Task 1c), Section 3.2.2 (Task 2), and Section 3.2.3 (Task 3) will obtain the key data for characterizing the site-specific geologic and hydrogeologic sequences, as an aid in guiding groundwater sampling and to provide a better understanding of the site-specific conceptual model. The borings will be implemented by using the CPT and/or a sonic drilling rig.

Initially, at each proposed deep soil sampling location to the depth of 100-120 ft BGL (Task 1c), the electronic CPT cone might be used to acquire continuous geomechanical measurements of tip pressure, sleeve friction, conductivity (if possible), and tip-versus-sleeve ratio. The resulting logs will document sensor responses to the vertical sequence of sediments penetrated, for possible correlation with the site-specific lithologies and stratigraphy, as well as the presence of water (if possible). The findings will be verified in corresponding cores recovered later with the CPT through a 4-ft-long soil coring barrel fitted into the push rod.

If the CPT cannot reach the desired depth (100-120 ft BGL) to the top of the saturated sand and gravel unit for the deeper soil sampling points (Figure 3.1), boring will be conducted with a sonic drilling rig. The 4-in.-diameter cores will be recovered by using a 6-in.-diameter

inner core barrel at depth increments of approximately 10 ft. The drilling will take place within an 8-in.-diameter overriding casing, which will be advanced as the coring progresses to prevent potential cross-contamination of the deeper soil intervals by any contamination that might be present at shallow depths.

For the deep boring to a proposed depth of approximately 180 ft BGL near the grain storage structures at the former CCC/USDA facility and the four additional borings to similar depth (180 ft BGL) along the edge of the former CCC/USDA facility and the upgradient location (Figure 3.2), the sonic drilling rig is expected to be required for penetration. Cores will be collected as discussed above.

At each boring location, cores recovered with either the CPT or the sonic drilling rig will be examined to evaluate lithology, characteristics of the aquifer unit, and water content and water recovery conditions. The results of this evaluation will be documented in a boring log for each boring location. Information on the vertical distribution of various properties, as identified by analyzing the continuous cores, will be evaluated to determine the site-specific stratigraphic and hydrogeologic sequences in the context of the local hydrogeologic setting.

4.5 Methods for Groundwater Sampling and Analysis

As discussed in Sections 3.2.1.3, 3.2.2, and 3.2.3, groundwater samples will be collected from the bases of the vertical soil profiles (Task 1c) at the deeper soil sampling points (top of the saturated sand and gravel unit), as well as from the permeable intervals in the aquifer at one deep boring near the grain storage structures at the former CCC/USDA facility (Task 2) and the four deep borings along the edge and in the southern part of the former facility (Task 3; Figure 3.2).

4.5.1 Groundwater Sampling with the Cone Penetrometer

At each CPT deeper soil sampling point (Section 3.2.1.3), the CPT rods will be used to push a sacrificial tip and 0.5-in.-I.D. polyvinyl chloride (PVC) filter screen and riser to the desired maximum sampling depth. The rods will then be partially withdrawn to the desired upper sampling depth, to expose the screen to the formation waters. Water samples will be collected from the PVC casing by using a bailer, without purging, for preservation and analysis as described in Section 4.5.4.

4.5.2 Groundwater Sampling with the Drilling Rig

At deep borings implemented with the sonic drilling rig (Sections 3.2.2 and 3.2.3), relatively thick permeable units will be the target intervals for groundwater sampling. Once the desired sampling interval is confirmed in the recovered core, as discussed in Section 4.3, groundwater will be collected with a bailer from the portion of the borehole that is exposed to the formation, between the bottom of the overriding (outer) casing and the bottom of the borehole. If necessary, a packer-and-riser technique in which a pair of packers is placed in the borehole on steel piping (a work string) will be employed for discrete groundwater sampling within the aquifer. With this technique, a straddle packer assembly is lowered into the borehole to the desired depth. The pair of packers is then inflated, so that groundwater samples can be collected in the interval between the two packers. Once the groundwater sampling is completed, the packers are deflated and moved to the next zone of interest, then re-inflated for the next sampling.

Water samples will be preserved and analyzed as described in Section 4.5.4.

4.5.3 Decontamination

Decontamination of the CPT and drilling rigs, tools, and equipment will be performed as needed, by using a hot-water pressure washer, to ensure the integrity of the media sampled for laboratory analysis at each sampling point.

4.5.4 Sample Preservation and Analysis

Groundwater samples collected with the CPT and the drilling rig will be preserved on ice at 4ºC and shipped overnight to the AGEM Laboratory for rapid-turnaround (24-h) analysis. Water samples will be analyzed by the purge-and-trap method with a GC-MS system (EPA Method 5030B and 8260B). To ensure reproducibility, a minimum of 10% of the water samples will be selected for verification analysis by a second laboratory (TestAmerica Laboratories, South Burlington, Vermont) with the EPA's Contract Laboratory Program (CLP) methods. An index to the EPA methods is online (http://www.epa.gov/epahome/index/).

In addition, groundwater samples selected for inorganic geochemical and/or isotope analysis will be preserved on ice at 4ºC and shipped overnight to TestAmerica Laboratories (South Burlington, Vermont) and the University of Miami (Miami, Florida) for analysis.

4.6 Methods for Installing Monitoring Wells and Abandoning Boreholes

Monitoring wells will be installed with a sonic drilling rig. The wells will consist of 2-in. PVC casing installed in 6.25-in.-diameter boreholes. Screens for monitoring wells will be 0.010-in. mill slot PVC, at the appropriate length for the depth. The filter pack will extend from 1 ft below the screen to 2 ft above the screened interval. A 2-ft to 5-ft bentonite pellet seal will be installed above the filter pack. The remainder of the hole will be sealed with a high-solids bentonite grout slurry by using a tremie pipe, from the top of the bentonite seal to within 3 ft of the ground surface. The surface will be completed with a 12-in. flush-mount well cover, cemented in place. The top of the casing will be fitted with a 2-in. locking J-plug.

All wells will be constructed in accordance with Nebraska guidelines (Title 178 NAC 12). Any variances required will be obtained from the appropriate agency prior to installation. All investigation-derived waste (IDW) will be managed as described in Section 4.7. After installation, each well will be pumped and developed for a minimum of 2 h, or as determined by the attendant drilling engineer to be necessary.

All CPT investigation boreholes and all drilled boreholes that are not selected for completion as monitoring wells will be abandoned according to Nebraska requirements (Title 178 NAC 12).

4.7 Methods for Water Level Monitoring

Groundwater levels will be monitored continuously in all monitoring wells or in a subset of selected monitoring wells, as well as in one or both of the public water supply wells (subject to access), by using programmable downhole pressure sensors and data loggers (Instrumentation Northwest PT2X^{TM} devices). The data logger at each location will be programmed initially to record one measurement every 30 min. The data from the loggers will be downloaded after approximately 1 month of operation, and the resulting hydrographs will be examined for possible evidence of pumping effects at the public water supply wells and/or nearby private wells, as well

as other short-term variations in the local groundwater levels. On the basis of these results, monitoring will either continue at the original measurement frequency, or the loggers will be reprogrammed to a recording interval suitable for extended monitoring. The monitoring period will be extended to 6-12 months to document possible variations in responses to pumping at well PWS 68-1 and the surrounding irrigation wells, as well as short-term, seasonal, or other potential changes in groundwater levels.

Groundwater levels will also be measured manually in all monitoring wells at each data logger downloading event, to confirm that the sensors and loggers are performing appropriately.

4.8 Methods for Handling and Disposal of Investigation-Derived Waste

The approach to handling and disposal of soil and water IDW will be as follows:

- Soil cores collected during sampling will be retained in core boxes for lithologic description and research. The cores will be transported to and stored at an Argonne facility for further reference.

- Soil IDW from drilling activities will be stored on-site in 55-gal drums or a roll-off container. A representative sample will be collected and analyzed for VOCs by the AGEM Laboratory and by the toxicity characteristic leaching procedure (TCLP) by TestAmerica Laboratories, Inc., South Burlington, Vermont.

- A Solid Waste Disposal Authorization will be obtained from the NDEQ for disposal of soil on-site or in a permitted landfill. If analytical data indicate that the soils cannot be placed in a permitted landfill, alternative disposal methods will be proposed to the NDEQ for review.

- Water IDW will be stored on-site in 55-gal drums or polyurethane containers. All containers will be covered and stored on the site prior to disposal. The wastewater will be analyzed for VOCs by the AGEM Laboratory.

- If analytical results for the wastewater indicate concentrations of carbon tetrachloride, chloroform, and methylene chloride below the MCLs, then the water will be discharged on-site, away from known sensitive receptors. If the analytical results indicate concentrations above the MCLs, then the water will be disposed of at a wastewater treatment facility approved by the NDEQ.

4.9 Quality Assurance/Quality Control for Sampling and Analysis

Quality in sampling and analysis will be assured through documentation of activities, performance and system audits, and periodic evaluations of QC procedures. The project QA/QC requirements will be satisfied through periodic and final reviews covering all aspects of sampling, field measurements, chemical analyses, data collection, data reporting, instrument calibrations, routine maintenance of analytical equipment, and standardization procedures in analyses. In addition, technical review of the results will ensure that the stated objectives of the project are met.

Conditions significantly adverse to quality, their causes, and corrective actions taken will be documented and reported to the technical project manager, the QA/QC coordinator, and the AGEM program manager. Examples of such conditions are deficiencies in the use of procedures or instructions, failure to implement corrective actions in response to nonconformances with quality standards, and unexpected loss of or damage to documentation. Corrective action will be implemented in a timely manner, and the field team will be informed of the issue. Actions taken to correct problems or deficiencies during sampling in the field or during laboratory analyses will be documented and described in the QA portion of the sampling and analysis report.

4.9.1 Field Quality Assurance/Quality Control for Sampling and Analysis

4.9.1.1 Sample Collection

The following two major criteria must be met in sampling:

1. The samples must be a genuine representation of the conditions prevalent at the site.

2. Adequate numbers of samples must be available for meaningful characterization or monitoring of the site, in the judgment of the technical project manager and the AGEM program manager and with the concurrence of the sponsoring and regulatory agencies.

In some cases, it might not be possible to collect samples from an intended location because of access constraints. In such cases, alternate or additional samples will be collected, as appropriate, from accessible areas, if this can be accomplished without compromising the original objectives of the work.

All samples will be recorded in a field document dedicated to the specific site under investigation. Records will be as complete as possible, with the goal of supporting resolution of any issues that might arise in the future.

4.9.1.2 Calibration Procedures for Field Analytical Instruments

The technical project manager, in conjunction with team members, will ensure that instruments used for field measurements are properly calibrated, reliable, and in good working order. Standards will be protected from extreme weather conditions and discarded on the expiration date, so that outdated standards cannot be used inadvertently.

The typical field measurements derived from water samples are temperature, pH, and electrical conductivity. Calibration information will be documented in a dedicated record for each instrument. The record will include the instrument's name and model or serial number, the date of calibration and calibration method, and the signature of the person performing the calibration. The record will also contain dated, signed entries for all actual field measurements.

4.9.1.3 Field Blanks, Field Rinsates, Field Replicates, and Trip Blanks

The QC samples collected as part of the field sampling activity will include field blanks, field rinsates, field replicates, and trip blanks. Field blanks and field rinsates are samples of waters used for and after decontamination of field equipment, respectively. Field replicates provide a measure of consistency in both sampling and analytical methodologies. Trip blanks will be included in shipments of samples for VOCs analyses to demonstrate that cross-

contamination of samples has not occurred during shipment. The nature and frequency of these types of samples will be as follows:

- *Field Blanks*
  A field blank is a sample of the water used in the field for decontamination. This water is obtained from an uncontaminated source in the field or is transported to the field expressly for decontamination and other sampling activities. Blanks of other materials that might affect sample integrity will also be collected as necessary. Analysis of field blanks for VOCs will verify that contamination has not been introduced into the samples from outside sources. One field blank will be prepared during each sampling event when water is used.

- *Rinsates*
  Some equipment (e.g., sampling bailers) is used repeatedly in sampling activities. This equipment must be decontaminated after each use to avoid cross-contamination of samples. A rinsate sample consists of water rinsed over a piece of sampling equipment after it has been cleaned and decontaminated. Rinsate samples will be collected with a frequency of 1 sample per 20 pieces of equipment cleaned, with a minimum of 1 sample per cleaning session. All rinsate samples will be analyzed for VOCs.

- *Trip Blanks*
  Trip blanks (soil or water) may be prepared at the AGEM Laboratory or in another suitable uncontaminated area and transported to the field site. Trip blanks may also be prepared with appropriate care at the field site. A blank sample will be shipped to the laboratory in each container of field samples for VOCs analyses. Trip blanks will be analyzed only for VOCs. Any indication of contamination will be reported to the field team immediately, so that action can be taken to identify the source of contamination and rectify the problem.

- *Field Replicates/Split Samples*
  Field replicates of soil, water, and vegetation samples are used to verify consistency in the sampling methodology and the reproducibility of the analytical results. The required frequency is 1 replicate for every 10 samples

collected, but replicates will be collected more frequently if the particular situation warrants. All field replicates collected will be analyzed.

4.9.2 Laboratory Quality Assurance/Quality Control for Sampling and Analysis

4.9.2.1 Laboratory Duplicates

In addition to sample replicates prepared in the field, the analytical laboratory will select some samples at random for duplicate analyses. This procedure will allow for quantitation of the precision of the laboratory analysis.

4.9.2.2 Volatile Organic Analysis

Samples collected for VOCs analyses will be shipped to the AGEM Laboratory or to an EPA-certified CLP laboratory for immediate analysis. Analysis of the samples will be prioritized in consultation with the technical project manager, so that the results can be used to optimize decision making in the field. Water samples will be analyzed by using modifications of EPA Methods 5030B and 8260B (purge-and-trap method on a GC-MS system) or a modification of EPA Method 524.2 (for drinking water). Soil samples will be analyzed by using a modification of EPA Methods 5030B and 8260B (Level V). The shallow subsurface soil samples will be analyzed with a modification of EPA Method 5021 (headspace analysis on a GC with electron capture detection). Soil gas samples will be analyzed by an EPA-certified CLP laboratory using EPA Method TO-15.

In reviewing the analytical results, QA/QC procedures will be verified in the following laboratory-related areas:

- Chain-of-custody records for samples
- Storage of samples and sample extracts
- Holding times before analyses

- Calibration and maintenance of analytical instruments
- Performance standards for instruments (reproducibility, internal and external standards, spike recoveries, etc.)
- Field records

The verification will involve thorough evaluation of laboratory practices and procedures, audits of field records, and review of data packages (both original and reduced forms of data) by the project QA/QC coordinator. The results of this evaluation, in keeping with EPA guidelines (EPA 2008), will be presented in the QA/QC portion of the sampling and analysis report.

At least 10% of all water and soil samples collected in a given sampling event (or a minimum of 1 sample if fewer than 10 are collected) will be shipped to an EPA-certified CLP laboratory for a second analysis to verify the results obtained by the AGEM Laboratory. Samples may be sent directly to the CLP laboratory from the field, or they may be selected for verification analysis on the basis of the AGEM Laboratory's results. When possible, the samples selected in the AGEM Laboratory will have a wide range of carbon tetrachloride values (from below the detection limit to high concentrations) to allow comparison of the analytical methods over the range of concentrations found. Water samples will be analyzed by the reference laboratory according to the CLP procedure SOW SOM01.2-trace (EPA 2014b), with a quantitation limit of 5 µg/L. Soil samples will be analyzed by EPA Method 8260B, as referenced in the EPA's SW-846 (EPA 1998), with a quantitation limit of 10 µg/kg. Each sample subjected to verification analysis by the reference laboratory will be accompanied by complete CLP documentation.

4.9.2.3 Other Analyses

Selected samples may be subjected to other analyses (unrelated to site contamination) to aid in development of the site hydrogeologic model. Groundwater samples may be selected for inorganic or tritium analysis to aid in characterization of groundwater geochemistry. Soil samples may be selected for analysis of physical parameters such as particle size, bulk density, or percent moisture. These analyses will be conducted by certified laboratories with accepted procedures. The analytical methodologies used and results of a review of QC procedures for these analyses will be presented in the sampling and analysis report as appropriate or requested.

4.9.3 Quality Assurance Records

Records that document quality will be assembled and maintained. Records will be legible, identifiable, and retrievable and will be protected against damage, deterioration, or loss. Such QA records pertain to all activities related to sampling and analysis. The QA records include soil boring logs, well completion logs, other field records, sample labels, and chain-of-custody records. These records will be retained for a minimum of 10 yr after the program ends.

4.9.3.1 Field Notes Related to Sample Collection

All field notes relating to the collection of samples will be placed in the permanent project records. Notes will provide information on the sampling conditions and sample handling and collection methods. The sample identification number, the date and time of sampling, the place of collection (with a simple hand-drawn location map), the weather conditions at the time of sampling, and any measurements made by field monitoring equipment will be the minimal data recorded. Each entry will be signed by the sampler.

4.9.3.2 Sample Labels

A uniquely numbered sample label will be affixed to each sample container to identify the sample; the date, time, and location of sampling; and the analysis to be performed.

4.9.3.3 Chain-of-Custody Records for Samples

A uniquely numbered chain-of-custody record will be maintained to track the possession of each sample throughout its history, from the time of collection to the time of delivery to the analytical laboratory. The chain-of-custody record is discussed in *Master Work Plan* (Argonne 2002). One copy of a chain-of-custody record will accompany each sample container. The second copy will be retained by the technical project manager until completion of the investigation, when it will be placed in the permanent project record.

4.9.4 Analytical Data Reduction, Validation, and Reporting

4.9.4.1 Analytical Data Reduction

All sampling logbooks and related records (for both sample collection and sample analysis) completed during individual tasks will be submitted to the QA/QC coordinator for storage with the project files. The analytical results, with all pertinent information about sample locations and sampling conditions, will be entered into a computer file for integration with results from other activities and for presentation in the final report.

4.9.4.2 Analytical Data Validation

If minimal QC requirements are not met by the analytical laboratory, all data from the associated batch of samples will be thoroughly scrutinized. If no analytical problems are found, the data and out-of-control parameter(s) will be discussed in the QA/QC section of the site-specific report. If problems with the analytical data are found, the samples associated with the batch will be reanalyzed, and the data from the reanalysis will be reported. If holding times defined in the procedure for the reanalysis are exceeded, both sets of data will be reported.

In the final report, all sample data will be presented, along with detection limits and concentrations found.

4.9.4.3 Analytical Data Reporting

For all analyses, the laboratory report will show, at a minimum, traceability to the sample analyzed. The report will contain the following information:

- Project identification
- Field sample number
- Laboratory sample number

- Sample matrix description
- Date of sample collection
- Date of sample receipt at the laboratory
- Analytical method description
- Individual parameter results
- Date of analysis (extraction, first runs, and subsequent runs)
- Quantitation limits achieved
- Dilution of concentration factors
- Corresponding QC report (to include method blanks, blanks/spikes, and continuing calibrations)
- Raw chromatogram data
- Chain-of-custody forms
- Case narrative (where appropriate)

4.10 Field Investigation Schedule

The proposed Phase I investigation will be conducted in one or more field sessions, as required to accomplish the program objectives. The proposed activities are summarized in Table 3.1.

The first field session will include the following tasks with a CPT unit and a small Geoprobe: (1) initial sampling of shallow soils at 10 locations (Task 1a; Section 3.2.1.1); (2) soil

gas sampling beneath two Quonsets (Task 1b; Section 3.2.1.2); and (3) deeper soil sampling at selected locations (up to 3 locations) to the depth of the top of saturated sand and gravel unit, as well as groundwater sampling from the saturated unit (< 120 ft), if the CPT can reach the desired depth (Task 1c; Section 3.2.1.3) (Figure 3.1). The results of the first field session will be analyzed to identify the target deep boring location for characterizing the site-specific geology and aquifer system and confirming the four additional groundwater sampling locations (Figure 3.2) that will be implemented in the subsequent field session(s).

The second and third (if necessary) sessions will consist of the following tasks with a sonic drilling rig:

- Coring and groundwater sampling at one deep boring in the northern part of the former CCC/USDA facility (selected on the basis of results obtained in the deeper soil sampling (Task 2; Section 3.2.2).

- Coring and groundwater sampling at four additional deep borings along the edge and in the southern part of the former CCC/USDA facility (Task 3; Section 3.2.3; Figures 3.2).

- Installation of monitoring wells at five deep boring locations, with appropriate depths and screen intervals (Task 4; Section 3.2.4).

Field work will be conducted in cycles of approximately 10 days on and 4 days off, subject to the specific requirements of the activities being performed and the approval of the CCC/USDA and NDEQ project managers for subsequent sessions.

5 Community Relations Plan

This community relations plan identifies issues of community concern regarding the proposed field investigation and outlines community relations activities to be conducted during the Phase I investigation at Bladen.

Community concern is likely to increase when the field work begins and Argonne's presence becomes apparent. Effective community relations will require close contact with residents, both within and outside the village limits. Information will be made available, as appropriate, in the local area to ensure that interested residents are adequately informed.

Argonne will develop a fact sheet that describes the investigation and will provide copies to the village office and to interested residents at and near the investigation area. The fact sheet will provide the names and contact information for the NDEQ and CCC/USDA officials and Argonne staff members involved in the investigation.

This community relations plan is divided into sections including site description, community background, community relations objectives, timing of community relations activities, and contact list of key officials.

5.1 Site Description

Section 2 of this report contains a complete description of the site and its history.

5.2 Community Background

The incorporated village of Bladen is governed by a village board chairman and a village board. In addition to public works and other village responsibilities, the chairman and board have authority to provide and maintain the municipal water supply system. The board employs a full-time village maintenance superintendent who is charged with maintaining the water system. The village operates an office that is staffed by the village clerk.

Residents within the limits of the village of Bladen receive their drinking water from the village public water supply system, which is currently supported by two wells, PWS 68-1 (35%)

and PWS 2006-1 (65%). The village recently received a grant and loan from the USDA's Rural Development Program for upgrades to Bladen's public water supply infrastructure. Upgrades will include new water mains, complete renovation of the existing water tower, installation of meters, and mechanical improvements to the two existing public wells.

5.2.1 History of Community Involvement Associated with Well Contamination

Well PWS 68-1 is tested annually, with the last sampling event on July 22, 2013. Carbon tetrachloride was detected in 6 of the 10 sampling events at low concentrations (0.47-3.83 µg/L). Slightly elevated nitrate concentrations of 8-10 mg/L have also been found in groundwater from PWS 68-1 in every sampling event during July-August of the last 3 yr. Well PWS 68-1 provides an average 35% of the water for the village public water supply system. No carbon tetrachloride or elevated nitrate has been found in well PWS 2006-1. However, the lifting pressure from well PWS 2006-1 is limited, and a large amount of power is required to lift water into the water tower near well PWS 68-1.

5.2.2 Key Community Concerns

Once the proposed Phase I investigation begins and the presence of Argonne staff and contractors becomes apparent, nearby residents are likely to become curious. This community relations plan is being developed in anticipation of the potential for greater community interest. Community concerns will be gauged during and after the site investigation and addressed appropriately, as needed.

5.3 Community Relations Objectives

The Bladen community relations plan has the following major objectives:

1. Explain the CCC/USDA's investigation plans and provide general information about the hazardous waste program.

2. Present the proposed Phase I investigation plan and activities to village officials and the current property owner and local manager of the CHS facility

(the former CCC/USDA facility) and request permission to conduct the proposed activities. Anticipated activities include direct-push boring with the CPT and some drilling.

3. Inform village officials, the current property owner of the former CCC/USDA facility, and other interested residents of the investigation's findings and developments.

4. Respond to residents' inquiries about site activities and the presence of health and environmental hazards.

5. Ensure that the public has appropriate access to technical information and contact individuals for involvement in site-related decisions.

6. Provide appropriate documentation and contact information to enable interested residents to learn about the site.

5.4 Timing of Community Relations Activities

This section describes the activities needed to meet the community relations objectives identified in Section 5.3. Many of these activities need to take place before the field work begins. Listed below are milestones and planned activities.

5.4.1 Activities before Field Work Begins

The CCC/USDA and Argonne will conduct the following community relations activities, to the extent practicable, before field work begins:

1. A point of contact will be designated for Argonne. The individual will be Argonne's liaison with village officials, the property owner and local manager of the former CCC/USDA facility (currently the CHS facility), and interested residents.

2. Prior to the Phase I investigation, Argonne will assist the CCC/USDA in obtaining an access agreement with CHS, Inc., for the proposed investigation activities.

3. Upon obtaining approval from the CCC/USDA, Argonne will make further contact with the local CHS manager and village officials to explain the proposed activities and schedules.

4. Argonne will make arrangements to present and discuss the Phase I investigation plan to the village board and will request the board's approval for drilling and associated activities in support of the site investigation within 1,000 ft of the well PWS 68-1.

5. Argonne will arrange for discussions (by telephone and in person) with interested residents and any other affected parties, as appropriate, to address their concerns and information needs.

6. Upon completion and approval of this site-specific *Work Plan*, Argonne will provide a copy of the document to the village for public viewing by interested parties.

5.4.2 Activities during Field Work

The CCC/USDA and Argonne will provide for the conduct of the following community relations activities, to the extent practicable, during field work:

1. Meetings with interested residents and other parties when needed.

2. Preparation and distribution of fact sheets or letters to inform the community of the investigation's progress, significant milestones, or changes in plans.

3. Continued telephone contact with interested residents and with state and local officials.

4. Arrangements for site visits by interested parties, within allowable safety limitations.

5.4.3 Activities upon Completion of Field Work Activities

The CCC/USDA and Argonne will conduct the following community relations activities, to the extent practicable, upon completion of the field work:

1. If requested, arrange for a meeting with village officials and interested residents, as appropriate, to present and discuss the investigation's findings, results, and recommendations, as well as any future activities at the site.

2. Prepare and distribute printed information outlining the investigation's results and any future activities at the site, as appropriate.

3. Provide a copy of the final report that documents results of the investigation to the village for public viewing by interested parties.

5.5 Contact List of Key Officials

The contact list for use during Phase I work is below. The list includes key federal, state, local officials, and Argonne contacts.

Local Officials

Village of Bladen Office
211 North Main Street
Bladen, NE 68928
bladenclerk@gtmc.net
Village Clerk/Treasurer: Debbie Thayer
402-756-1369 (office)
402-469-9083 (cell)

Bladen Village Board
Roger Fassler, Chairman
Meleah Armes, Member
Mike Kile, Member
Arlo Thayer, Member
Tara Vance, Member

Village Maintenance Superintendent
Keith Pavalkan
402-469-5782 (cell)

CHS Agri Service Center Contacts

Bladen Service Center Manager
Andy Klein
206 South Main Street
Bladen, NE 68928
402-765-1331
Andrew.klein@chsinc.com

Lincoln Area Safety Director
Allen Mintzmyer
310 Logan Street
Holdrege, NE 68949
308-998-8626
Allen.mintzmyer@chsinc.com

Federal Agency Officials

Steve Gilmore
Conservation and Environmental Protection Division
Farm Service Agency
Commodity Credit Corporation
U.S. Department of Agriculture
Room 4725, Stop 0513, South Agriculture Building
1400 Independence Avenue, SW
Washington, DC 20250-0513
202-720-5104
Steve.Gilmore@usda.gov

State Agency Officials

Mike Felix
Supervisor of Remediation Section
Waste Management Division
Nebraska Department of Environmental Quality
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Lincoln, NE 68509-8922
402-471-2938
402-471-2909 (fax)
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402-471-3377
402-471-2909 (fax)
wade.gregson@nebraska.gov

Argonne Contacts

Lorraine M. LaFreniere, Ph.D.
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Environmental Science Division
9700 South Cass Avenue
Argonne, IL 60439-4843
630-252-7969
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James Hansen
Community Relations Representative
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Argonne National Laboratory
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Washington, DC 20024
202-488-2453
hansenj@anl.gov

Eugene Yan, Ph.D.
Bladen Project Manager
Environmental Science Division
9700 South Cass Avenue
Argonne, IL 60439-4843
630-252-6322
eyan@anl.gov

6 Health and Safety

The general health and safety plan for use during the work at Bladen is in Section 3 of the *Master Work Plan* (Argonne 2002). That document addresses all anticipated safety issues for the activities at the Bladen site. Specific emergency information for use at the site is in Table 6.1.

The village of Bladen has emergency 911 service. All emergency calls, including police, fire, and ambulance calls, will be directed for an appropriate response from this number. The local major medical services are provided by Mary Lanning Healthcare in Hastings, Nebraska, approximately 33 mi north of Bladen. The travel time for driving is about 40 minutes. Driving directions to the hospital and a map showing the route are in Figure 6.1. Additional emergency information is in Table 6.1.

TABLE 6.1 Emergency information for the investigation at Bladen, Nebraska.[a]

Resource	Telephone Number	Name
All Emergencies	911	Ambulance, fire, police (Be prepared to give your location.)
Hospital	402-463-4521	Mary Lanning Healthcare[b] 715 North Street, Hasting, NE 68901
Fire Protection (nonemergency)	402-756-1420	Bladen Volunteer Fire Department 221 Thorne Street, Bladen, NE 68928
Sheriff (nonemergency)	402-746-2722	Webster County Sheriff 641 North Cedar Street, Red Cloud, NE 68970
Industrial Hygiene	630-252-3310	Argonne-Industrial Hygiene
Safety	630-988-9706	EVS Division[c] Field Safety Coordinator (Monte Brandner)
Management	630-252-4878	EVS Division[c] Environmental, Safety, and Health Coordinator (Bill Gasper)
	630-252-7969	AGEM Program Manager (Lorraine LaFreniere)
	630-252-1275 630-408-7114	AGEM Field Project Manager (David Surgnier)
	630-252-6322	AGEM Technical Project Manager (Eugene Yan)
Security	630-252-5737 630-252-5731	Argonne-Operations Security (workdays) (after hours and weekends)
Poison Control	800-222-1222	Nebraska Regional Poison Center
Utilities Survey	800-331-5666	Diggers Hotline of Nebraska, Omaha, NE http://www.ne1call.com/

[a] Post this table in the field operations base.

[b] The route from Bladen to the Mary Lanning Healthcare is shown in Figure 6.1.

[c] Environmental Science Division at Argonne.

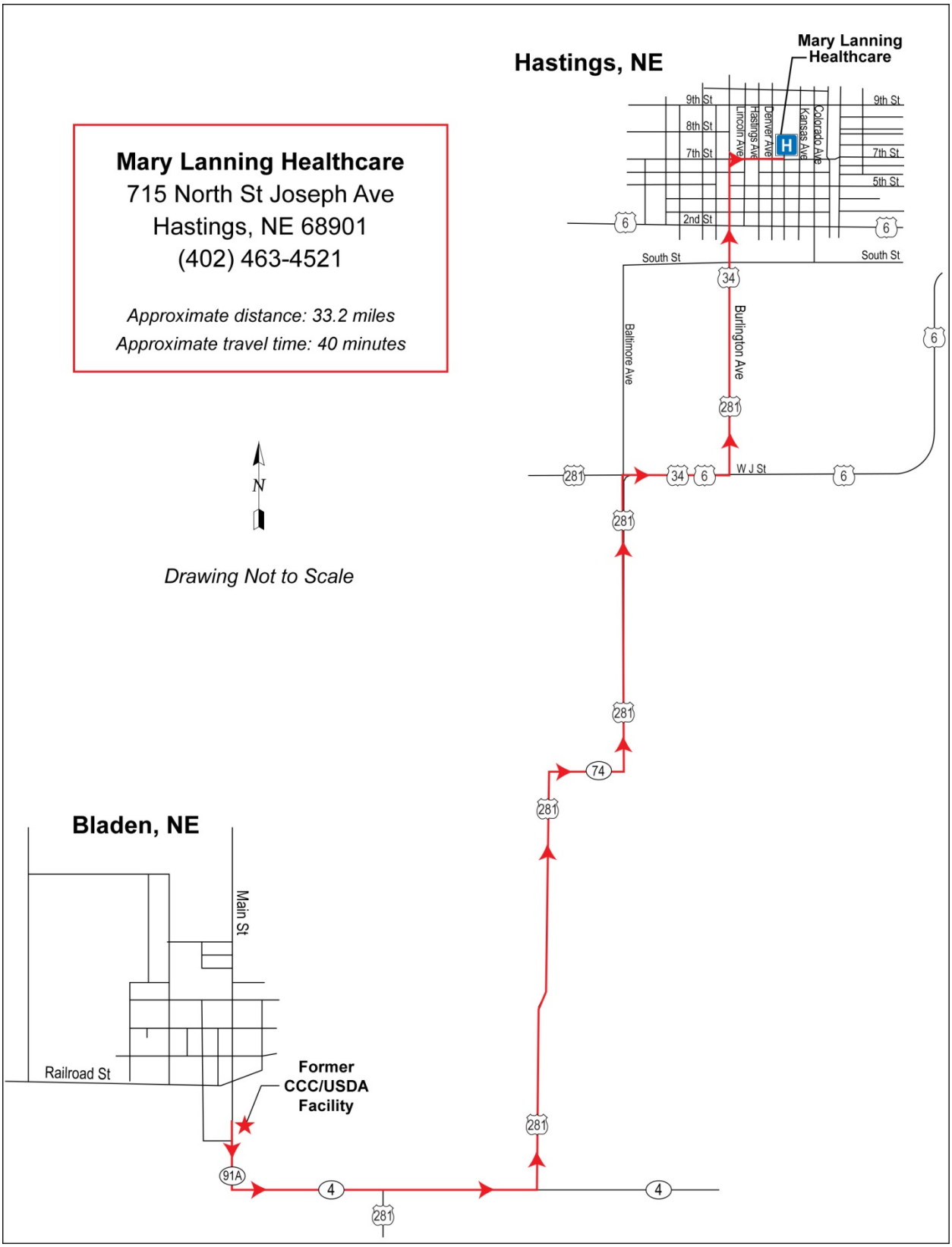

FIGURE 6.1 Emergency route from the Bladen site to the Hastings Hospital (Mary Lanning Healthcare).

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USDA, 1963, aerial photograph of Bladen, Nebraska, BNR-3DD-278, U.S. Department of Agriculture, Washington, D.C., September 29.

USDA, 1969, aerial photograph of Bladen, Nebraska, BNR-1KK-78, U.S. Department of Agriculture, Washington, D.C., August 4.

USGS, 1997, *Digital Raster Graphics (DRG) 1:24000 Quads of Bladen, Nebraska, Projection: UTM Zone 14 NAD27* (created from USGS 1981 7.5-minute topography maps), U.S. Geological Survey, Reston, Virginia.

Woodward Clyde, 1997, private well sampling records, documented for the Commodity Credit Corporation, U.S. Department of Agriculture, Washington, D.C., by Woodward Clyde, Omaha, Nebraska, November.

Appendix A:

Information on Public Water Supply Wells

Bladen, Nebr 68928
Nov. 12, 1968

Department of Water Resources
P.O. Box 94607
Lincoln, Nebr 68509

Dear Sirs:

In regard to the original Well # G-28430 the Mayor Harold Crowe asked me to inform you that the well has been properly plugged or capped, as provided in Section 46-602

Yours respectfully
Miss Hazel Toap clerk
Village of Bladen
Bladen, Nebr 68928

G-28430

November 7, 1968 G-28430

Mrs. Hazel Toap
Village Clerk
Bladen, Nebraska 68928

Dear Mrs. Toap:

You will please find enclosed photocopy of Replacement Well Registration No. G-28430 covering a well located in the NE¼ NE¼ of Section 18, Township 4 North, Range 11 West of the 6th P.M., Webster County, Nebraska and owned by the Village of Bladen. This replacement well will be identified upon our records by the same number as the well which it replaced, No. G-28430.

Under the provisions of Section 46-602 all abandoned wells should be properly plugged or capped. You should, if you have not already done so, properly plug or cap the abandoned well and give written notice of such action to this department.

Very truly yours,

DEPARTMENT OF WATER RESOURCES

TP

(Mrs.) Thelma Pangle, Clerk

G-28430

December 22, 1967

Ms. Hazel Toap
Village Clerk
Bladon, Nebraska 68928

Dear Ms. Toap:

You will please find enclosed photocopy of Municipal Well Registration No. G-28430 covering a well owned by the Village of Bladen. This registration was filed upon our records on the 14th day of December, 1967. Also enclosed is Receipt No. 24976 in the amount of $7.50 covering the registration fee.

We should like to suggest that this photocopy be placed in permanent files for the reason it is the official record of this registration.

Very truly yours,

DEPARTMENT OF WATER RESOURCES

Thelma Pangle, Clerk

TP: vc
Enclosure

24430

December 11, 1967

Village Clerk
Bladen, Nebraska

Dear Sir:

We wish to acknowledge your municipal well registration papers covering one well owned by the Village of Bladen and located in Section 8, Township 4 North, Range 11 West of the 6th P.M., Webster County, Nebraska.

You enclosed one page and stated on same that the Village of Bladen has two wells and included a plat showing the location of this well as well as what information was available covering the well.

If there are two wells in Bladen it will be necessary that you complete the enclosed forms and return them to this office, together with fee of $7.50 to cover the second well. The forms should be completed as accurately as possible giving what information you have on this well. It is also noted that you did not include a driller's certificate with the registration covering the No. 1 well. If the driller is available he should complete the driller's certificate form and send it to this office as soon as possible.

Very truly yours,

DEPARTMENT OF WATER RESOURCES

TP

(Mrs.) Thelma Paggle, Clerk

Revised April 1967
MGI - 1

11-7-68
9:30

1

Registration No. G-28430 County of Webster Date Filed Nov. 7, 1968

REPLACEMENT WELL Orig. filed Dec. 14, 1967

STATE OF NEBRASKA

MUNICIPAL OR INDUSTRIAL WELL REGISTRATION

I, x Hazel Toap (Name of person signing registration) of Bladen (Postoffice Address)

County of Webster, State of Nebraska, do hereby certify:

1st. That the name of the owner of the municipal (or) industrial well registered herein is Village of Bladen whose postoffice address is Bladen, Nebr 68925

2nd. That the well is located on the NE ¼ Quarter of the N.E. ¼ Quarter of Section 18, Township 2 N 4, Range 11 of the Sixth P. M., Webster County, and it is 1304.14 feet from the N line and 1½ blocks feet from the East line of said tract, as accurately shown on the plat on page 2 hereof. Replaces Well #1 registered last year

3rd. That the well was installed for the following purpose or purposes: Water for Village of Bladen

4th. That the capacity of said well under normal operating conditions is 500 gallons per minute.

5th. That the depth of the well is 168 feet, measured from the surface of the ground.

6th. That the inside diameter of the casing is 18 inches.

7th. That the static water level in the well is 44 feet below ground surface.

8th. That the depth to water under normal pumping condition is 138 (Pumping level) feet below ground surface.

9th. That the diameter of the pump column is 6 5/8 inches. That the diameter of the 7 (Give Number of Bowls) bowl or bowls is 10 inches.

10th. That the type and size of impeller is as follows:

Semi Open 10CH

11th. That the well was completed on or about the 8 day of October, 1968

12th. That attached hereto are three copies of the log of the well certified to by the driller of the well.

13th. That the well was drilled by Shuck Drilling Co. whose address is Edgar, Nebr.

14th. That the relation which the subscriber to this affidavit bears to said registrant is that of Village of Bladen (Owner or Agent) and that he is authorized to make this affidavit in behalf of the interest affected.

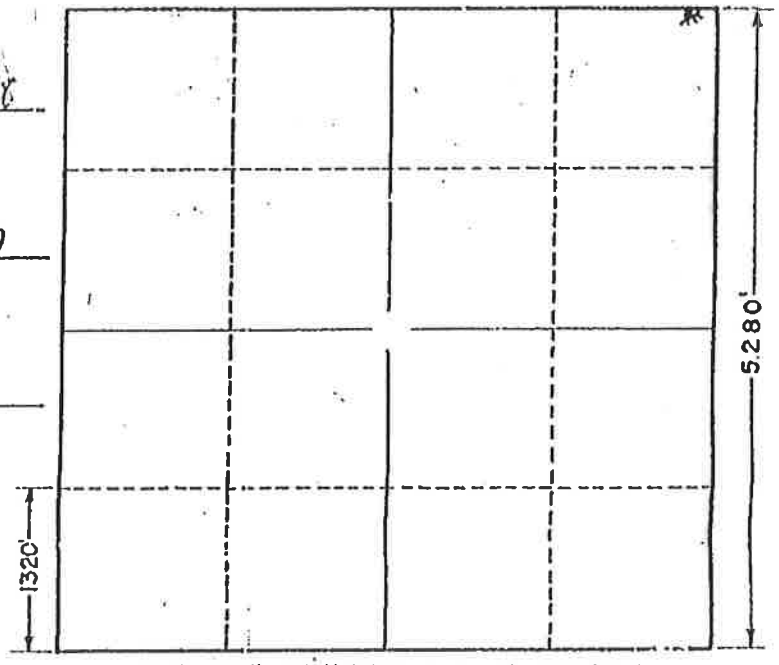
Hazel Fox Clerk

This drawing represents one Section

Section No. 18

Township 4 N

Range 11



Each small subdivision is a 40 acre tract.

State of Nebraska

Department of Water Resources

This instrument was filed for record at 8:30 o'clock A.M. on the 7th day of Nov., 1968

REPLACEMENT WELL Orig. filed Dec. 14, 1967

Director of Water Resources

Revised April 1, 1966
Dr. 87-1

1

Registration No. G-27430 County of Webster Date Filed Nov. 7, 1968

STATE OF NEBRASKA
CERTIFICATE OF WELL DRILLER

I, Shuck Drilling Co. (Name of Driller) of Edgar (Postoffice Address)

County of Clay State of Nebr., do hereby certify that:

1. I am the driller of a well located on the X Quarter, Section No.

Township North, Range, owned by

whose postoffice address is State of

That the drilling was begun on the day of, 19 and completed on

the day of, 19

3. That the well is cased and screened in the following manner: 0-153.5 18" ID Plain (Give kind of casing, lengths and position of plain and

Concrete 153.5-169.5 16" ID Sorelin Concrete screen casing, weight of metallic casing, etc.)

4. That the diameter of drilled hole is 36 inches.

5. That Reverse Rotary type of drilling machinery was used.

6. That the drilled hole ~~is not~~ sealed, as follows: 0-20 Concrete 20-40 Yellow Clay

7. That the following is an accurate log of the depth, thickness and character of the different strata penetrated, and the location of water-bearing strata:

DEPTH IN FEET FROM	TO	MATERIAL DRILLED
0	2	Top Soil
2	77	Clay
77	79	Sand & Gravel
79	92	Clay
92	107	Sandy Clay
107	130	Fine Sand
130	134	Clay Some Fine Sand
134	144	Clay
144	168	Sand & Gravel
168	172	Clay
172	180	Blue Shale

Date Signed 10-9-68

Wendell Shuck
Driller

VILLAGE OF BLADEN

BLADEN, NEBRASKA

The Village has a second well but allthe information available is as follows :

N.W. Quarter of N.W. Quator Section 18 Township 4 Range 11

Depth 168 ft.
146 ft 10 inches to top of screen.

21 foot 2 inch screen

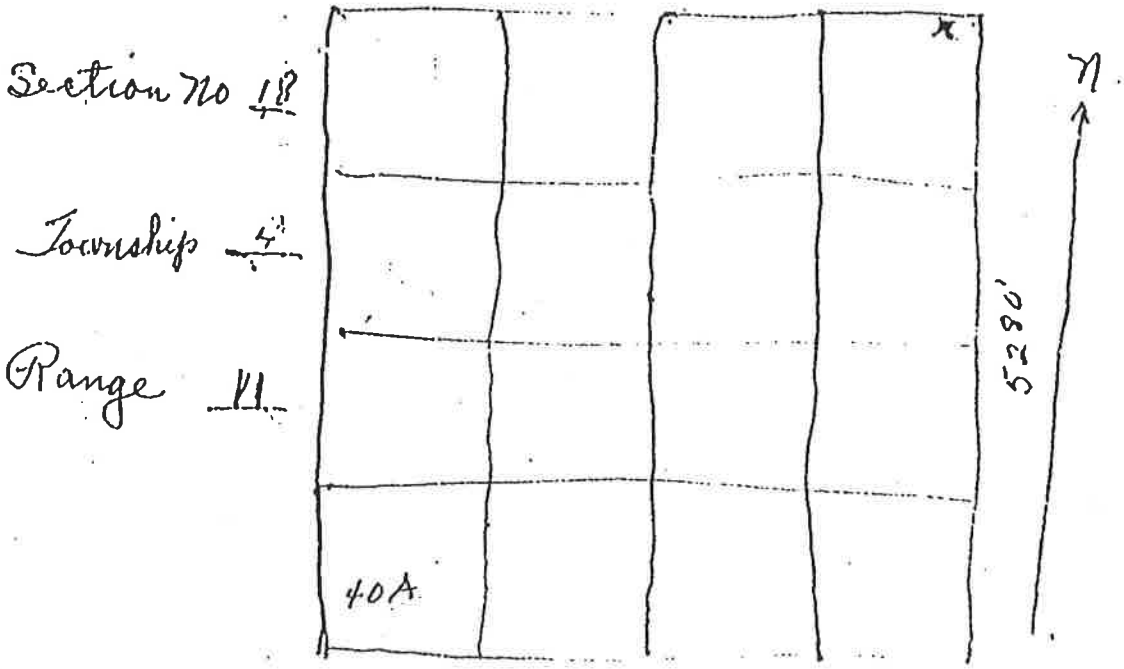
85 feet water in well.

83 feet to water

12 to 15 bowls.

450 gallons per minute.

Taken from Town board meeting minutes dated October 1930



Revised April 1947
M&I - 1

12-14-67
8:30
7.55

1

Registration No. G-28430 County of Webster Date Filed December 14, 1967

STATE OF NEBRASKA

MUNICIPAL OR INDUSTRIAL WELL REGISTRATION

I, Village Bladen (Name of person signing registration) of Bladen (Postoffice Address)

County of Webster State of Nebraska, do hereby certify:

1st. That the name of the owner of the municipal (or) industrial well registered herein is Village of Bladen whose postoffice address is Bladen

2nd. That the well is located on the N. E. Quarter of the N. E. Quarter of Section 17, Township 4 N., Range 11 of the Sixth P. M., Webster County, and it is 1320 feet from the North line and 1320 feet from the East line of said tract, as accurately shown on the plat on page 2 hereof.

3rd. That the well was installed for the following purpose or purposes: City water

4th. That the capacity of said well under normal operating conditions is 450 gallons per minute.

5th. That the depth of the well is 168 feet, measured from the surface of the ground.

6th. That the inside diameter of the casing is Not given inches.

7th. That the static water level in the well is 85 feet below ground surface.

8th. That the depth to water under normal pumping condition is 85 (Pumping Level) feet below ground surface.

9th. That the diameter of the pump column is inches. That the diameter of the 12 & 15 (Give Number of bowls) bowl or bowls is Not given inches.

10th. That the type and size of impeller is as follows:

Not given in records of town board meeting

11th. That the well was completed on or about the day of October, 1930.

Revised April 1967
M&I - 2

1

12th. That attached hereto are three copies of the log of the well certified to by the driller of the well.

13th. That the well was drilled by driller unknown whose address is also unknown.

14th. That the relation which the subscriber to this affidavit bears to said registrant is that of Village Clerk (Owner or Agent) and that he is authorized to make this affidavit in behalf of the interest affected.

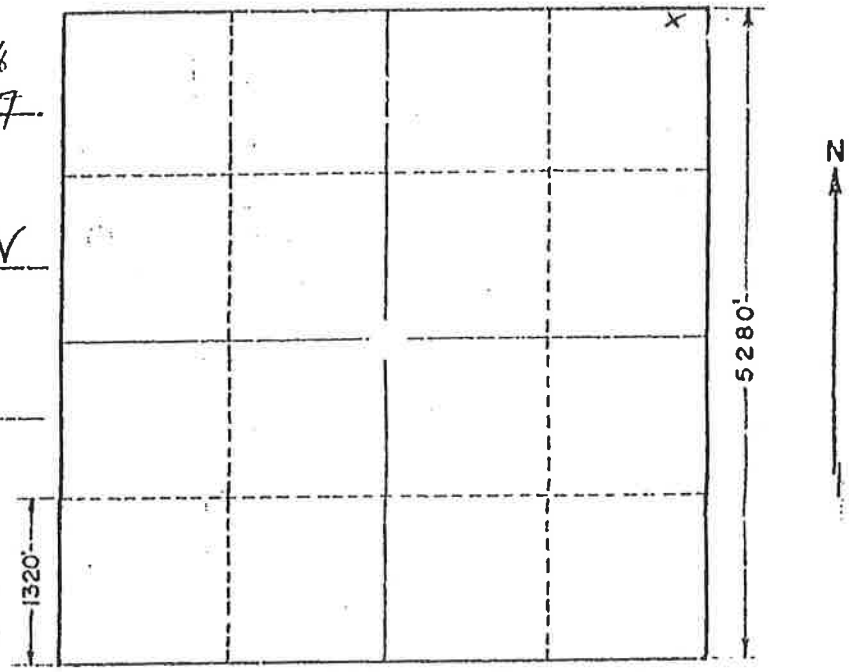
Hazel Jones

This drawing represents one Section

Section No. 17 18

Township 4 N

Range 11



Each small subdivision is a 40 acre tract.

State of Nebraska

Department of Water Resources

This instrument was filed for record at 8:30 o'clock A.M. on the 14th day of December, 19 67

Dan S. Lucas Jr.
Director of Water Resources

Revised April 1, 1966
Ltr. 67-3

1

Registration No. G-28430 County of Webster Date Filed December 14, 1967

Unknown

STATE OF NEBRASKA
CERTIFICATE OF WELL DRILLER

I, ... of .....
(Name of Driller) (Postoffice Address)

County of ..... State of ....., do hereby certify that:

1. I am the driller of a well located on the ..... Quarter, Section No. .....

Township ..... North, Range ....., owned by .....

whose postoffice address is ..... State of .....

2. That the drilling was begun on the ..... day of ....., 19....., and completed on

the ..... day of ....., 19.....

3. That the well is cased and screened in the following manner: .....
(Give kind of casing, lengths and position of plain and

.....
screen casing, weight of metallic casing, etc.)

4. That the diameter of drilled hole is ..... inches.

5. That ..... type of drilling machinery was used.

6. That the drilled hole is/is not sealed, as follows: .....

.....

7. That the following is an accurate log of the depth, thickness and character of the different strata penetrated, and the location of water-bearing strata:

DEPTH IN FEET FROM	TO	MATERIAL DRILLED

Date Signed ....
Driller

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES
WATER WELL REGISTRATION

Fee Paid	$110.00	DNR Cash Fund	$18.50
HHSS Fee	$70.00	HHSS-DNR Cash Fun	$0.00
Get Billing	17055		

FOR DEPARTMENT USE ONLY

NOL ID	117024949819855	NOL Status	Accepted	Well Status	A	Registration Code	G-143662
Owner ID	2792	NOL Date	02/07/2007	Call Up Code		Registration Date	02/07/2007
Seq Num	179456			Call Up Date			

Add

02072007 - 179456 -WWRF

1a Owner's Name

b Company Name: Village of Bladen

c Correspondent Name: Attention Name

Address: PO Box 37

City: Bladen State: NE Zip Code: 68928 - Phone: 402 - 756-1369

2a HHSS Contractor Lic ID: 16593903 Contractor's Name: Loren C.Taylor

Contractor's License No: 3919403 Contractor's Email Address: sargentdrilling@alltel.net

b Drilling Firm Name: Charles Sargent Irrigation Inc - Geneva

Address: P.O. Box 367

City: Geneva State: NE Zip Code: 68361 Phone: 402 - 759-3902

Drilling Firms Email Address: sargentdrilling@alltel.net

3a Well Location: NWSW of Section: 8 Township: 4 North, Range: 11 W (E/W), Webster County

b Natural Resource District: Little Blue

c The well is 2549 feet from the S (N/S) section line and 69 feet from the W (E/W) section line

GPS: or Latitude: 40 19' 41.00" Longitude: -098 35' 40.20"

d Street address or block, lot and subdivision, if applicable: Block No: Lot:

e Location of water use, if applicable (give legal descriptions): NWSW S8 T4 R11W

f If for irrigation, the land to be irrigated is Acres

g Well Reference letter(s), if applicable

4 Permits

Permits	Permits Number	Date	Permits	Permits Number	Date
Management Area Permit	LBMA-1160	09/18/2006	Transfer Out-Of-State		
Surface Water			Well Spacing		
Geothermal			Conduct Water		
Industrial			Municipal		
Industrial Transfer Notice			Other		

5 Purpose of Well: Public Water Supplier with Spacing Prot Other:

Notes:

6 Wells in a Series

a Is this well a part of a series? ☐

b If one or more of the wells in the series is currently registered, give the well registration number

c How many wells in the series are you registering at this time?

7 Replacement and abandoned well information Replacement Number

a Is this well a replacement well? ☐

b Registration number of original well

If not registered, date original well was constructed

c Original well last operated

e Location of water use of original well

e Original well pump column size: inches.

d Replacement well is feet from original well.

Please Select One:

f. ☐

Use: ☐

if nonconsumptive, State use:

8 Pump Information

a Is pump installed at this time? ☑

Is pump installed by well owner in section 1? ☐ Is pump installed by contractor in section 2? ☑

Else installed by pump installer.

b HHSS Installer's License ID. 431529

Pump Installer's License No. 39454 Pump Installer's Name Nathan R Jacobson

Pump Installer's Email Address sargentdrilling@alltel.net

Pump Installer's Firm Name Charles Sargent Irrigation, Inc

Pump Installer's Firm Address PO Box 367

City: Geneva State NE Zip Code 68361-0000 Phone 402 - 759-3902

Pump Installer's Firm Email Address

c Pumping Rate 450 gallons per minute M measured or estimated

d Drop pipe diameter 6 inches e Length of drop pipe 140. feet.

f Pumping equipment installed 01 / 11 / 2007 g Pump Brand SPC

h This well will be used to pump less than 50 gpm ☐

9 Well Construction Information

a Total well depth 181. feet. b Static Water Level 106. feet.

c Pumping Water Level 130. feet. d Well construction began: 09 / 27 / 2006

e Well construction completed: 09 / 27 / 2006 f Bore hole diameter in inches. Top 32. Bottom 32.

g Casing and Screen Joints Welded Other

10 Well Construction (Casing and Screen)

Fr Depth	To Depth	Case Scrn	In Diam	Out Diam	Thickness	Scrn Slot Size	Material	Trade name	NOLID
0	152	casing	15.25	16	.375		Steel	Livingston	117024949819
152	169	screen	15.25	16	.375	.090	Steel	Johnson Ag	117024949819
169	181	casing	15.25	16	.375		Steel	Sump	117024949819

11 Well Construction (Grout and Gravel)

NOL ID	From Depth	To Depth	GroutGravel	Material
117024949819855	0	17	grout	Concrete
117024949819855	17	127	grout	Bentonite
117024949819855	127	175	gravel	Gravel
117024949819855	175	181	grout	Coated Bentonite

12 Geolog Material Logged

NOL ID	From Depth	To Depth	Description
117024949819855	0	20	Topsoil and clay
117024949819855	20	88	Clay
117024949819855	88	120	Medium to coarse sand with clay layers
117024949819855	120	137	Clay with medium to coarse sand
117024949819855	137	140	Medium to coarse sand with trace of fine gravel
117024949819855	140	145	Medium to coarse sand
117024949819855	145	168	Coarse sand with fine to medium gravel
117024949819855	168	181	Ocher and shale

APPLICATION FOR A PERMIT TO CONSTRUCT A WATER WELL IN THE LITTLE BLUE NATURAL RESOURCES DISTRICT

DWR & NRD Use Only
Permit No: LBMA-1160
Reg. No. G-143667

SEP 13 2006

1. NAME: Village of Bladen (2792)
ADDRESS: PO Box 37
Bladen, NE 68928
Phone No. (402) 756 - 1369

2. PURPOSE OF WELL: (check one)

09272006-179456-PERF
Department of Natural Resources (2)

____ Irrigation	____ Industrial	____ Dewatering (over 90 days)	____ Aquaculture
____ Domestic	____ Geothermal	____ Groundwater Source Heat Pump	____ Ground Heat Exchanger
____ Livestock	____ Recovery		X Public Water Supply
____ Monitoring	____ Other (Specify) ____		

Spacing protected

3. IDENTIFY THE LOCATION OF THE WELL:

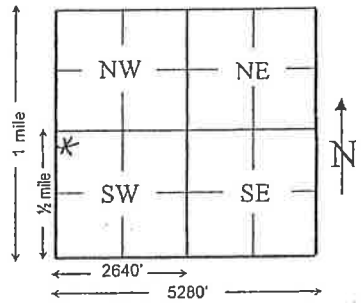
Webster County, Section (by quarter) 8

Township 4 North Range 11 East or West

Well is 2690 feet from the North/South Section Line or Latitude ____ North
and 50 feet from the East/West Section Line or Longitude ____ West

The box at the right represents one square mile, (section). Indicate with an "X", the proposed location of the well, please highlight the proposed water-use area. **If water is to be used outside the above-written legal description. give legal description of water-use area below.**

Section (by quarter) ____ Township ____ North, Range ____ East/West



4. IRRIGATION WELLS:

How many acres will be irrigated? ____ Will flow meter be used on the well? ____
Type of irrigation system? ____ Center Pivot ____ Gravity ____ Other (specify) ____
Will system be ____ Electric ____ Fuel Powered?
Will the well be used in a system with other wells? ____ Yes ____ No? If yes, how Many? ____
Will fertilizer, chemicals or animal waste be applied through the system ____ Yes ____ No?

c/s # 28291

5. REPLACEMENT AND ABANDONMENT WELL INFORMATION:

Is this a replacement well? ____ Yes X No
Registration Number of well to be replaced: ____
Well to be replaced was last operated on ____
Replacement well is ____ feet from original well.
Completion of original well decommission on ____ (must be within 180 days)
Replacement well must water the same tract of land as the decommissioned well.

municipal well
spacing protected

6. SPECIFICATIONS OF WELL AND PUMP:

Date when construction will begin: 10-01-2006
Pump column diameter: 6" inches. Total well depth: 180' feet.
Estimated pumping capacity: 500 gallons per minute. Well casing diameter 16" inches.

Please attach test hole log, if available. Name of Well Driller: Sargent Drilling

7. I certify that I am familiar with the information contained in this application and its restrictions, rules and land regulations; and that to the best of my knowledge and belief, such information is true, complete and accurate.

This form must be completed in full and be accompanied by a non-refundable $50.00 filing fee payable to the Little Blue Natural Resources District.

9-8-06
Date

Roger Fassler Vallery Chairman
Signature of Applicant

9/18/06
Date Approved

NRD Representative

RECEIVED
SEP 27 2006

SEE OTHER SIDE FOR IMPORTANT PERMIT RESTRICTIONS, RULES AND REGULATIONS!!!!!

G-143662

This form must be completed in full and be accompanied by a non-refundable $50.00 filing fee payable to the Little Blue Natural Resources District. Forward this application and filing fee to:

Little Blue Natural Resources District
PO Box 100
Davenport, NE 68335
(402) 364-2145

Please take the time and fill out the information correctly. An incomplete or defective application will be returned by the District, with 60 days being allowed for resubmission. All permits shall be issued by the District with conditions attached or denied not later than 30 days after receipt of a complete and properly prepared application.

PERMIT RESTRICTIONS

1. Well permits are required **prior** to construction or a late fee of $250.00 will be assessed.
2. Permits are not required for test holes, temporary dewatering wells (less than 90 days), or wells designed to pump 50 gallons per minute or less.
3. Construction of the water well authorized by this permit must be completed not later than one year after the issuance date of this permit. If a stay on water well permits or a moratorium on well construction is issued prior to that one year date of expiration, the permit shall expire immediately upon the date of issuance of that stay or moratorium, unless construction of the well has been commenced prior to the issuance of that stay or moratorium.
4. Irrigation wells authorized by this permit may not be constructed closer than 1000 feet to any existing well having a capacity of 50 gallons per minute or more. This applies to all irrigation wells, even if registered to the same owner. Other permitted wells with spacing protection will be regulated by state statutes.
5. According to State law §46-637, water wells may not be drilled within 50 feet of a streambank without first getting a surface water right for that stream from the Department of Natural Resources.
6. Replacement wells **do** need a permit from the Little Blue NRD. A replacement well is one which replaces an abandoned water well that has been operated within the last three years, and is constructed to water the same tract of land as the abandoned water well. If the well is being replaced, it must be properly abandoned within according to state guidelines. A copy of these guidelines is available from the Little Blue NRD.

All new or replacement water wells constructed in the district are required to be sampled for nitrates upon completion.

A. Municipalities which develop a new public water well shall submit a copy of that well's initial water quality test results to the district within 30 days of receipt of such results from the Department of Health and Human Services.

B. The sample for all non-municipal wells shall be collected by the owner, operator or farm manager no sooner than 30 days, nor later than 60 days after activation of the well.

8. The Little Blue NRD requires that all new non-domestic water wells designed to pump 50 gallons per minute or more be constructed with 80 inches of free space in the pump discharge or piping configuration to accommodate a flow measurement device if required in the future.
9. Any person who commences or causes construction of such a well for which the required permit has not been obtained, or who knowingly furnishes false information regarding such permit, shall be guilty of Class IV misdemeanor, {§46-602.01}.
10. This permit **does not** register the well with the Department of Natural Resources. All wells are required to be registered with the State Department of Natural Resources within 30 days after the well is completed.

If possible, mark the well site in the field with a flag.

Comments/Restrictions

_____

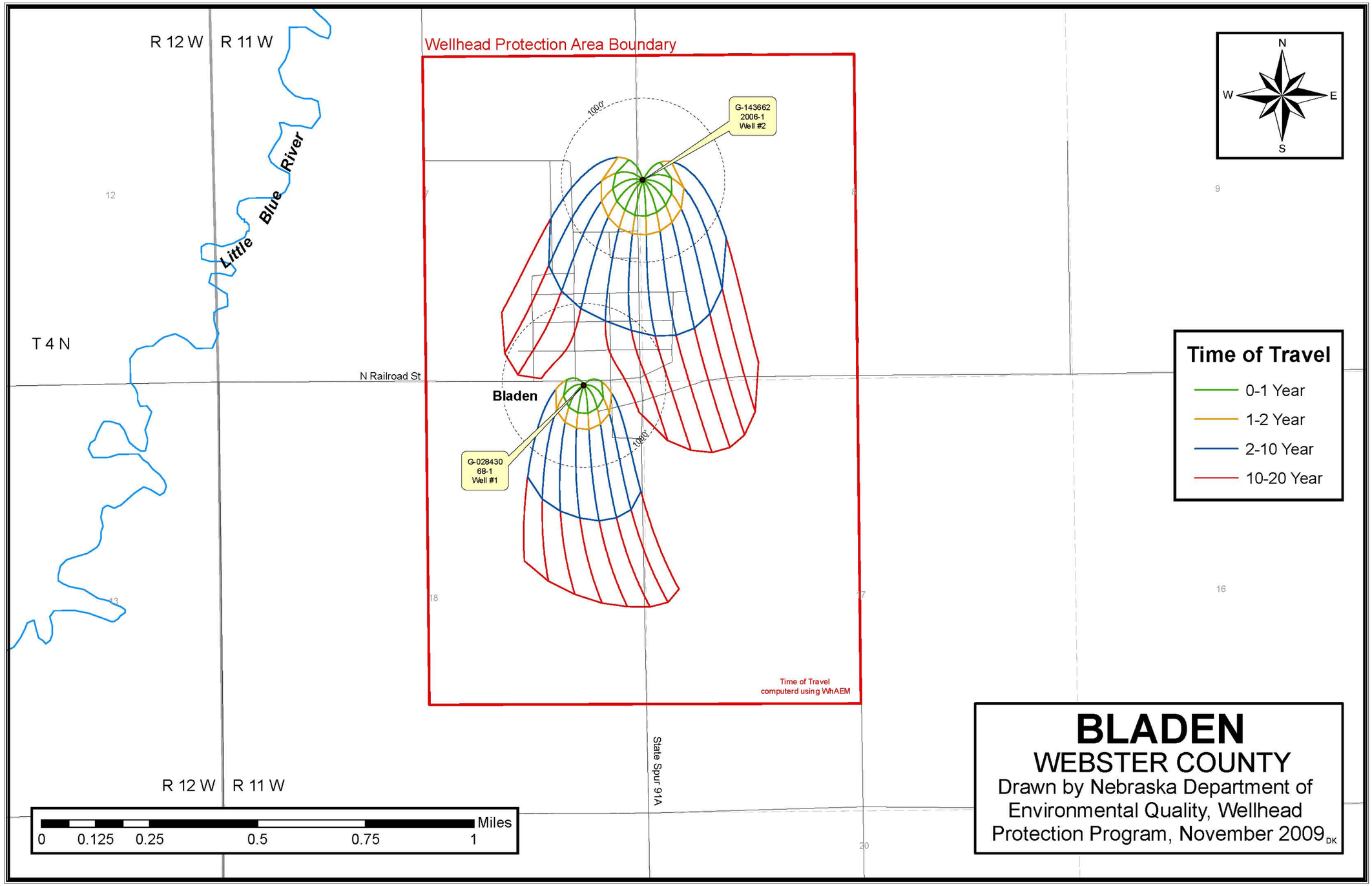
_____

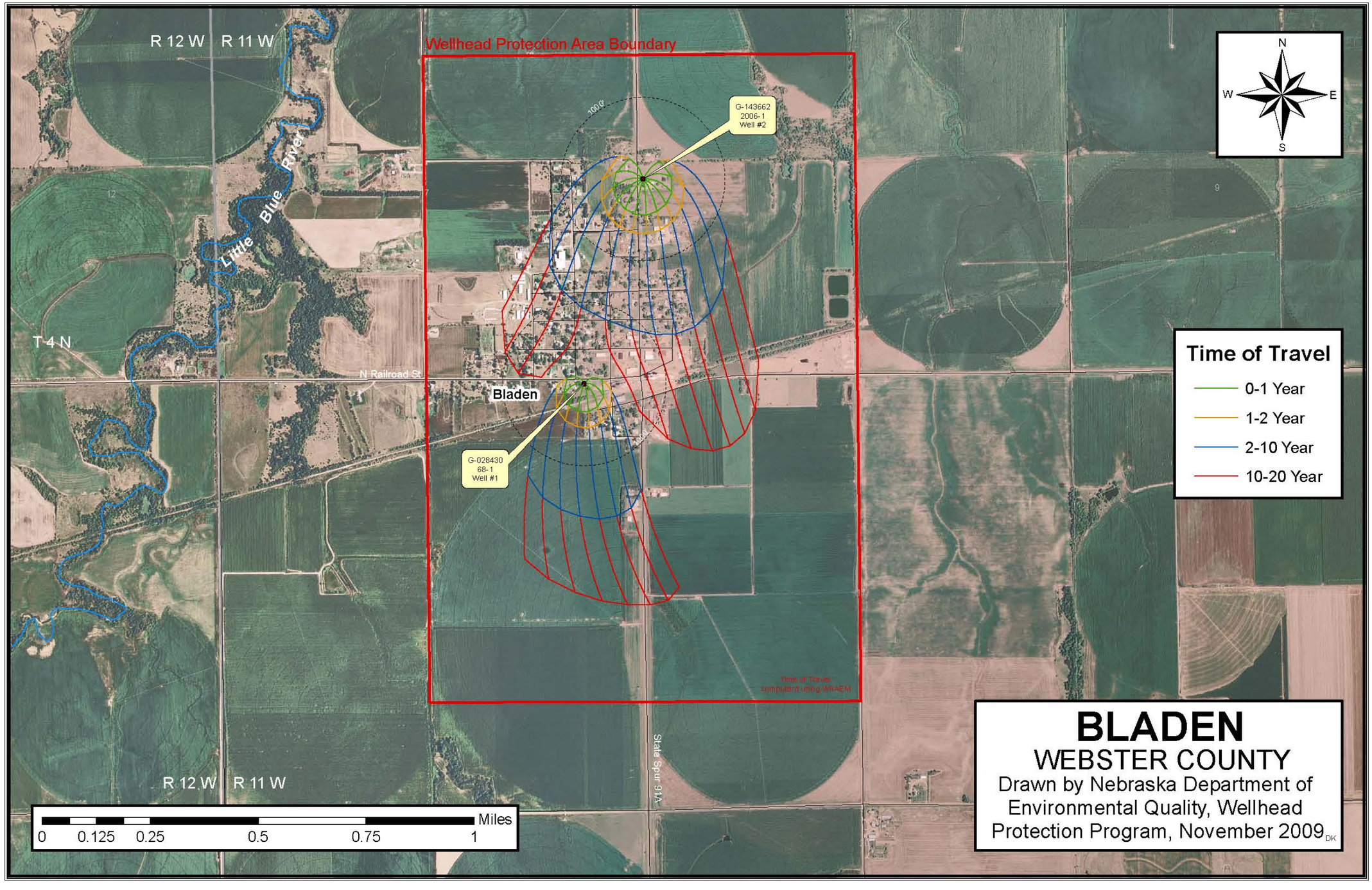
_____

Revised 07/06

Appendix B:

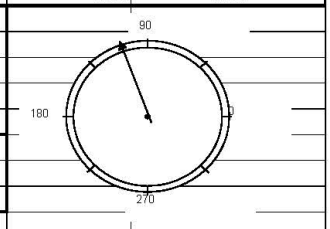
Nebraska Wellhead Protection Area Map for the Bladen Public Water Supply System and Data Used to Construct the Map


R 12 W
R 11 W
Wellhead Protection Area Boundary
Little Blue River
T 4 N
N Railroad St
Bladen
G-143662
2006-1
Well #2
G-028430
68-1
Well #1
1000'
Time of Travel
computerd using WhAEM
State Spur 91A
N
W
E
S
Time of Travel
0-1 Year
1-2 Year
2-10 Year
10-20 Year
Miles
0
0.125
0.25
0.5
0.75
1
BLADEN
WEBSTER COUNTY
Drawn by Nebraska Department of Environmental Quality, Wellhead Protection Program, November 2009
DK


R 12 W
R 11 W
Wellhead Protection Area Boundary
N
W
E
S
G-143662
2006-1
Well #2
100.0'
Little Blue River
T 4 N
N Railroad St
Bladen
G-028430
68-1
Well #1
Time of Travel
0-1 Year
1-2 Year
2-10 Year
10-20 Year
Time of Travel
computed using WhAEM
State Spur 91A
R 12 W
R 11 W
Miles
0
0.125
0.25
0.5
0.75
1
BLADEN
WEBSTER COUNTY
Drawn by Nebraska Department of
Environmental Quality, Wellhead
Protection Program, November 2009
DK

WhAEM Data Sheet

System Name:	**Village of Bladen**				
Base Maps:					
Hydrography (HY)	dnrsteams				
Roads (RD)	rds181-83				
Railroads (RR)	rail181-83				
Element		**Well**	**Well**	**Well**	**Well**
Wells	**Name**	Well #1	Well #2		
	Pump Rate (ft^3/day)	3242	6489		
	Radius (ft)	1	1		
	Starting Elevation (ft)	1817	1817		
	# of Pathlines	8	12		
Line Sink (river/lake)	Name	Head change	**Units**		
	Little Blue River	1800-1650	feet		
	Platte River	2145-1820	feet		
	Republican River	1850-1560	feet		
			feet		
			feet		
Head-Specified Wells					
Wells	**Head**		**Well**	**Head**	
USGS 401459098325801	1825	feet	USGS401928098292502	1912	feet
USGS 401819098385101	1903	feet	USGS402248098273801	2016	feet
USGS 401905098432101	1937	feet	USGS402238098244301	1996	feet
USGS 401928098292501	1915	feet	USGS402224098290901	1828	feet
G-137284	1870	feet	G-128304	1991	feet
G-132192	1869	feet	G-136039	1997	feet
G-033729	1880	feet	G-128302	1820	feet
G-122286	1875	feet	G-126655	1885	feet
G-122287	1866	feet	G-029486	1832	feet
G-137573	1878	feet	G-112780	1851	feet
G-122243	1905	feet	G-126876	1829	feet
G-134710	1867	feet	G-122600	1822	feet
G-145511	1878	feet	G-041562	2013	feet
G-140359	1882	feet	G-092910	1927	feet
G-129581	1894	feet	G-017957 (LBNRD)	1827	feet
Unl 23-B-81	1875	feet	G-030035 (LBNRD)	1941	feet
G-091250	1902	feet	G-034223 (LBNRD)	1906	feet
G-135806	1887	feet	G-007049 (LBNRD)	1914	feet
G-150286	1895	feet	G-030745 (LBNRD)	1913	feet
G-110447	1899	feet	G-023420 (LBNRD)	2001	feet
USGS401916098252101	1915	feet	G-033392 (LBNRD)	1997	feet
			G-047380 (LBNRD)	1819	feet
Model	Base Elevation	1817	feet		
Aquifer	Thickness (saturated)	28	feet		
	Hydraulic Conductivity	168	ft/day		
	Porosity	0.2			
	Iterations	4			
Tracing	Maximum Travel Time	7305, 3652, 730, 365	days		
	Compute Particle Paths	X			
	Use Default Step Size	X			



Appendix C:

Geologic Logs and Well Information for Private and Public Water Wells and State Test Holes Used in Construction of Geologic Cross Sections A-A', B-B', and C-C'

Geologic Logs and Well Information Used in Construction of Geologic Cross Section A-A'

UNIVERSITY OF NEBRASKA–LINCOLN
School of Natural Resources (http://snr.unl.edu)

Test Hole Data

Download tables of:

BACK to Test Hole Selection (nebraskatesthole.asp)

General Character Lithology Stratigraphy

- General Character (javascript:void(null);)
- Lithology (javascript:void(null);)
- Stratigraphy (javascript:void(null);)

General Character

LogID	53-B-47	**Log Type**	CMP	**Year Drill**	1947	**Twn Shp**	5
TwnShp Dir	N	**Rng**	13	**Rng Dir**	W	**Sec**	36
Sub Sec	DDCD	**FtNS**	13	**FtEW**	-700	**Lng**	-98.7265068876
Lat	40.3509481091	**Datum**	NAD27	**Cnty**	Kearney	**NRD**	Tri-Basin
Quad	Campbell	**100K Map**	Red Cloud	**250K Map**	Grand Island	**FldLog Elev**	2107
ScrFld Elev	i	**DEM**	2109.554	**Fin Elev**	2110	**ScrFin Elev**	DEM
DTW	152.2 ft (9-8-47).No e-log available.	**TD**	240	**G Logs**	False	**E Logs**	False
D Logs	False	**Hdr Notes**	None				

Lithology

LogID	LithUnit	Descrpt	DepFm	DepTo	Notes
53-B-47	Soil	silt, slightly clayey, medium brown gray	0	0.5	None
53-B-47	Silt	moderately clayey, buff gray	0.5	3.5	None
53-B-47	Silt	slightly clayey, light buff gray, slight tan tint below 12.5 ft, contains a few limy nodules	3.5	14.5	None
53-B-47	Silt	soil-like, very slightly clayey to slightly sandy, dark reddish brown, texture of sand is very fine to fine	14.5	21	None
53-B-47	Silt	moderately sandy, brownish tan	21	25	None
53-B-47	Silt	slightly clayey to slightly sandy, light brownish tan with gray tint	25	35	None
53-B-47	Silt	moderately sandy, light brownish tan to tannish gray, texture of sand is very fine with a trace of fine, contains a very calcareous zone from 67 to 69 ft	35	70	None
53-B-47	Silt	sandy, light brownish tan, texture of sand is very fine to medium with a trace of coarse	70	77	None
53-B-47	Silt	moderately to very sandy, brownish tan, texture of sand is very fine to medium, moderately calcareous from 77 to 85 ft, contains limy concretions from 77 to 80 ft and from 95 to 100 ft	77	100	None
53-B-47	Sand	silty, light tan to buff gray, very fine to coarse texture	100	114.5	None
53-B-47	Marl	moderately sandy, white, texture of sand is very fine to medium	114.5	120	None
53-B-47	Marl	light gray, contains volcanic ash	120	124	None
53-B-47	Sand	silty, marly, in part siliceous, light gray, very fine to medium texture	124	132.5	None
53-B-47	Marl	sandy, white, texture of sand is very fine to medium sand	132.5	138	None
53-B-47	Silt	sandy, moderately calcareous, olive gray, texture of sand is very fine to medium, slightly calcareous and in part indurated and more sandy below 140 ft	138	145	None
53-B-47	Silt	sandy, to silty sand, very slightly calcareous, very light olive gray, texture of sand grades from very fine to medium, slightly consolidated, grading more sandy and coarser with depth	145	158	None
53-B-47	Sand	slightly silty, light buff gray, very fine to coarse texture	158	163	None
53-B-47	Sand	silty, marly, light gray, very fine to medium from texture	163	165.5	None

LogID	LithUnit	Descrpt	DepFm	DepTo	Notes
53-B-47	Clay	silty to slightly sandy, reddish tan and greenish gray, contains rounded limy fragments	165.5	170	None
53-B-47	Silt	slightly clayey to very sandy, in part marly, light olive gray	170	175	None
53-B-47	Clay	silty to very sandy, tannish gray, texture of sand is fine to coarse, in part contains reworked material	175	180	None
53-B-47	Sand	silty, very light brownish gray, fine to coarse texture, contains fossil seeds and reworked limy fragments	180	185	None
53-B-47	Sand	slightly silty, very light brownish gray, texture grades from very fine to very coarse, contains some reworked limy material	185	190	None
53-B-47	Silt	moderately sandy, and sand, interbedded, brownish gray, texture of sand is very fine to very coarse with a trace of fine to medium gravel, contains some calcareous spots	190	195	None
53-B-47	Sand	light brownish gray with pink and a trace of light green grains, texture grades from very fine to very coarse with a trace of fine gravel	195	219	None
53-B-47	Silt	very sandy to slightly clayey, yellowish brown, contains a few rounded limy and limonitic granules	219	220	None
53-B-47	Silt	clayey to slightly sandy, yellowish brown, modmoderately sandy to gravelly below 224.5 ft	220	226.5	None
53-B-47	Clay shale	black, contains occasional thin ironstone layers	226.5	240	None

LogID	LithUnit	Descrpt	DepFm	DepTo	Notes

Stratigraphy

LogID	Sys	Ser	Grp	Frm	Mem	DepFm	DepTo
53-B-47	Quaternary					0	114.5
53-B-47	Tertiary	Miocene	Ogallala			114.5	219
53-B-47	Cretaceous	Upper Cretaceous	Montana	Pierre		219	240

UNIVERSITY OF NEBRASKA–LINCOLN
School of Natural Resources (http://snr.unl.edu)

Test Hole Data

Download tables of: BACK to Test Hole Selection (nebraskatesthole.asp)

General Character | Lithology | Stratigraphy | Download available G-Logs

- General Character (javascript:void(null);)
- Lithology (javascript:void(null);)
- Stratigraphy (javascript:void(null);)

General Character

LogID	23-B-81	**Log Type**	CMP	**Year Drill**	1981	**Twn Shp**	4
TwnShp Dir	N	**Rng**	12	**Rng Dir**	W	**Sec**	1
Sub Sec	ABAD	**FtNS**	-551	**FtEW**	-1328	**Lng**	-98.6175565394
Lat	40.3488352235	**Datum**	NAD27	**Cnty**	Webster	**NRD**	Little Blue
Quad	Bladen	**100K Map**	Red Cloud	**250K Map**	Grand Island	**FldLog Elev**	1955
ScrFld Elev	u	**DEM**	1943.322	**Fin Elev**	1951	**ScrFin Elev**	MAP
DTW	75.8 ft. 06/08/81	**TD**	200	**G Logs**	True	**E Logs**	True
D Logs	False	**Hdr Notes**	None				

Lithology

LogID	LithUnit	Descrpt	DepFm	DepTo	Notes
23-B-81	Road fill	no detailed description recorded	0	5	None
23-B-81	Silt	slightly calcareous, very pale brown	5	10	None
23-B-81	Silt	very pale brown	10	17	None
23-B-81	Silt	slightly clayey, slightly sandy, moderately calcareous, pale brown, sand is very fine to fine	17	20	None
23-B-81	Silt	slightly sandy, moderately calcareous, light yellowish brown, sand is very fine	20	25	None
23-B-81	Silt	slightly sandy, moderately calcareous, pale brown, sand is very fine to fine	25	30	None
23-B-81	Silt	slightly sandy, moderately calcareous, light yellowish brown, sand is very fine	30	31	None
23-B-81	Silt	slightly clayey, slightly calcareous, light yellowish brown	31	35	None
23-B-81	Silt	slightly clayey, light yellowish brown	35	45	None
23-B-81	Silt	light yellowish brown	45	48	None
23-B-81	Silt	moderately sandy, light yellowish brown, sand is very fine to fine	48	49	None
23-B-81	Silt	light yellowish brown	49	50	None
23-B-81	Silt	slightly sandy, light yellowish brown, sand is very fine, slightly calcareous below 51.0 ft, very pale brown below 55.0 ft	50	65.5	None
23-B-81	Silt	light gray, very pale brown below 73.0 ft	65.5	81	None
23-B-81	Silt	slightly clayey, light brownish gray	81	89	None
23-B-81	Silt	moderately sandy, slightly clayey, light brownish gray, sand is very fine, slightly sandy below 90.0 ft	89	92.3	None
23-B-81	Sand	very fine to medium, some coarse sand	92.3	105	None
23-B-81	Silt	moderately sandy, light gray, sand is very fine to coarse	105	115	None
23-B-81	Sand	slightly gravelly, very fine sand to fine gravel	115	120	None
23-B-81	Sand	moderately gravelly, fine sand to fine gravel	120	125	None
23-B-81	Sand	very fine to medium	125	130	None
23-B-81	Gravel	very sandy, medium sand to medium gravel	130	135	None
23-B-81	Sand	very gravelly, medium sand to fine gravel, some medium gravel	135	140	None

LogID	LithUnit	Descrpt	DepFm	DepTo	Notes
23-B-81	Gravel	very sandy, medium sand to medium gravel	140	145	None
23-B-81	Sand	moderately gravelly, fine sand to fine gravel	145	150	None
23-B-81	Sand	slightly gravelly, fine sand to fine gravel	150	155	None
23-B-81	Sand	fine to very coarse, some very fine gravel	155	160	None
23-B-81	Sand	slightly gravelly, fine sand to fine gravel, some medium gravel	160	178.3	None
23-B-81	Chalk	pale yellow, shaly	178.3	180.3	None
23-B-81	Shale	gray, very calcareous, dark gray below 187.0 ft	180.3	200	None

LogID	LithUnit	Descrpt	DepFm	DepTo	Notes

Stratigraphy

LogID	Sys	Ser	Grp	Frm	Mem	DepFm	DepTo
23-B-81	Quaternary					0	178.3
23-B-81	Cretaceous	Upper Cretaceous	Colorado	Niobrara		178.3	200

Revised November 1987
DWR Form 602

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WELL REGISTRATION

A ground water well will be registered when the following are completed and received together by the Department:

1. Well Registration Form (DWR Form 602)
2. Certificate of Well Driller (DWR Form 603)
3. A $20.00 fee (payable to the Director of Water Resources) except when registering:
   a) a replacement well. A replacement well shall mean a well which replaces a registered abandoned well that was last operated in the past five years and is within six hundred feet of said abandoned well; or,
   b) well(s) permitted under the Municipal and Rural Domestic Transfers Permit Act.
4. The most recent United States Department of Agriculture aerial photograph(s), available at the county Agricultural Stabilization and Conservation Service, marked to show the following:
   a) The location of the well to be registered.
   b) The location of wells owned by you in the same section. Each well should be labeled to show the use of water and the registration number. Abandoned wells should be shown also.
   c) If the well is for irrigation, the land to be irrigated should be shown by a crosshatch pattern and the number of acres irrigated from the well should be indicated.

For Department Use Only

Registration Number: G-70753
Registration Date: 6/6/88
Receipt Number: 68700
NRD: 05 - Little Blue

(1) Name of well owner Betty Mae Karr Telephone Number (402) 756-2020
(16984) Address P.O. Box 187
City Baladen State Nebraska Zip Code 68928

2. Name of well driller Patterson Well Drilling Inc Telephone Number (402) 462-5601
Address 143 North Maple Ave. Contractor's License Number 39160
City Hastings State Nebraska Zip Code 68901

3. Ground Water Control or Management Area Permit Number NA Little Blue NRD

4. Ground water withdrawn from this well will be for (Indicate one)
XX Irrigation ___ Municipal use ___ Industrial use ___ Other _____ (Indicate use)

5. Replacement and abandoned well information:
   A. Is this well a replacement well? ___ Yes XX No
   B. Give the registration number of the abandoned well: _____
   C. The replacement well is _____ feet from the abandoned well.
   D. The abandoned well was last operated _____, 19___.

6. Well and pump information:
   A. Pumping rate under normal conditions: 800 gallons a minute.
   B. Total well depth: 182 feet.
   C. Pump column: Diameter: 8 5/8 inches. Length: 150 feet.
   (D) Will chemicals or fertilizer be injected into the distribution system? ___ Yes ✓ No
   (E) The well was completed: 5-23-8, 1958.

7. A. Well location: N.E. ¼ of the N.E. ¼ of Section 7, Township 4 North, Range 11 West, Webster County. 1230S 1215W
   (B) The well is 1230 feet from the North/South section line and 1215 feet from the East/West section line.
   C. If for irrigation, the land to be irrigated is 120 acres in the following legal description: N.E. ¼ 7-4-11 Webster county

X I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

June 3, 1988 — Date
Betty Mae Karr — Well Owner's Signature

Forward to:

State of Nebraska
Department of Water Resources
301 Centennial Mall South
P.O. Box 94676
Lincoln, Nebraska 68509-4676
(402) 471-2363

Revised 1985
DWR Form 601

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
CERTIFICATE OF WELL DRILLER

1. Name and address of well driller: Patterson Well Drilling Inc.
143 North Maple Ave.
Hastings, Nebraska
Zip Code 68901 Telephone (402) 462-5601

For Department Use Only

Registration Number: G-70753
Registration Date: 6/6/88
Receipt Number: 68700
NRD: 05 - Little Blue

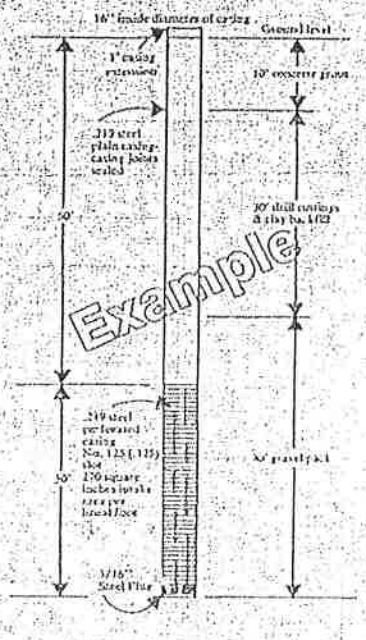
(2) Name and address of well owner:
Betty Mae Karr
Box 187
Bladen, Nebr.
Zip Code 68928 Telephone (402) 756-1010

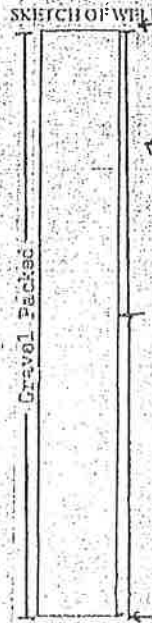
3. Permit Number: NA
(If applicable)

(4) Well location: N.E. 1/4 of the N.E. 1/4 of Section 7, Township 4 North, Range 11 ~~West~~/West, Webster County.
The well is 1230 feet from the North (North/South) section line and 1215 feet from the East (East/West) section line.

5. Well and pumping information: (If a timed pump test was conducted, submit complete pumping and drawdown data on separate sheet of paper.)
A. Construction began: 3-14, 1988.
(B) Construction completed: 5-23, 1988.
C. Drilled hole diameter: 28 inches.
D. Static water level: 79 feet.
E. Pumping level expected under normal operating conditions: 115 feet.

6. Indicate on the SKETCH OF WELL the location of the plain casing and screen segments. Give the lengths of the segments in feet. Also, identify the size, weight, type and inside diameter of segments; where the hole is sealed and backfilled and the type of seal(s) and backfill used.





DRILLING LOG

DEPTH IN FEET FROM	TO	MATERIAL DRILLED	DEPTH IN FEET FROM	TO	MATERIAL DRILLED
0	136	Top soil, silts, & clays			
136	177	Sand & gravel			
177	179	Ocher			
179	182	Shale			

Patterson Well Drilling Inc.
Well Driller's Signature By Bill Laugert

5-23-85
Date

Revised April 1961
MAI - 1

PWS 68-1

11-7-68
9:30

1

Registration No. G-28430 County of Webster Date Filed Nov. 7, 1968

REPLACEMENT WELL Orig. filed Dec. 14, 1967

STATE OF NEBRASKA

MUNICIPAL OR INDUSTRIAL WELL REGISTRATION

I, Hazel Loop (Name of person signing registration) of Bladen (Postoffice Address)

County of Webster State of Nebraska, do hereby certify:

1st. That the name of the owner of the municipal (or) industrial well registered herein is Village of Bladen whose postoffice address is Bladen, Nebr. 68925

2nd. That the well is located on the NE ¼ Quarter of the N.E. ¼ Quarter of Section 18, Township 1N 4, Range 11 of the Sixth P. M., Webster County, and it is 1324.14 feet from the N line and 1½ blocks feet from the East line of said tract, as accurately shown on the plat on page 2 hereof. Replaces Well #1 registered last year

3rd. That the well was installed for the following purpose or purposes: Water for Village of Bladen

4th. That the capacity of said well under normal operating conditions is 500 gallons per minute.

5th. That the depth of the well is 169 feet, measured from the surface of the ground.

6th. That the inside diameter of the casing is 18 inches.

7th. That the static water level in the well is 111 feet below ground surface.

8th. That the depth to water under normal pumping condition is 138 (Pumping level) feet below ground surface.

9th. That the diameter of the pump column is 6 5/8 inches. That the diameter of the 7 (Give Number of Bowls) bowl or bowls is 10 inches.

10th. That the type and size of impeller is as follows:

Semi Open 10CH

11th. That the well was completed on or about the 8 day of October, 1968

12th. That attached hereto are three copies of the log of the well certified to by the driller of the well.

13th. That the well was drilled by Shuck Drilling Co. whose address is Edgar, Nebr.

14th. That the relation which the subscriber to this affidavit bears to said registrant is that of Village of Bladen (Owner or Agent) and that he is authorized to make this affidavit in behalf of the interest affected.

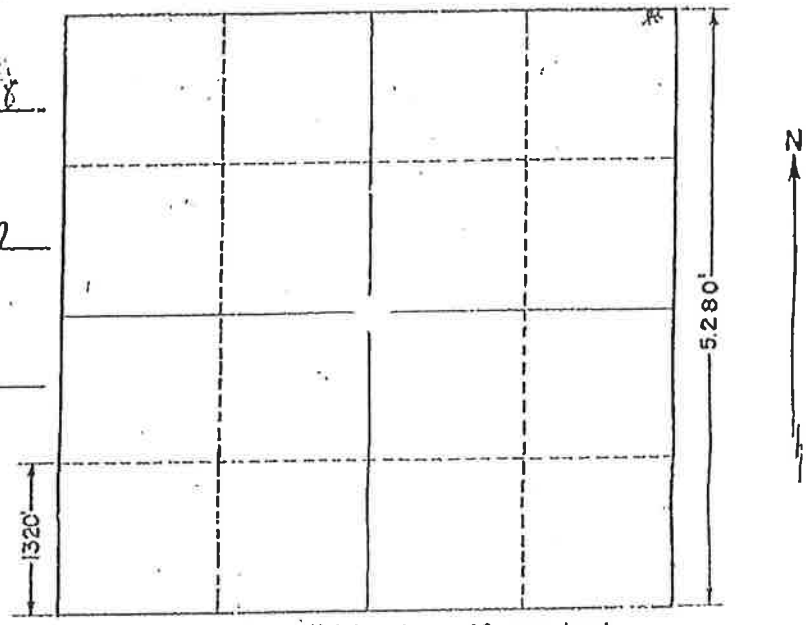
Hazel Fox Clerk

This drawing represents one Section

Section No. 18

Township 4 N

Range 11



Each small subdivision is a 40 acre tract.

State of Nebraska

Department of Water Resources

This instrument was filed for record at 8:30 o'clock A.M. on the 7th day of Nov., 1968

REPLACEMENT WELL Orig. filed Dec. 14, 1967

Director of Water Resources

Revised April 1, 1966
Dr. 87-3

1

Registration No. G-27430 County of Webster Date Filed Nov. 7, 1968

STATE OF NEBRASKA
CERTIFICATE OF WELL DRILLER

I, Shuck Drilling Co. (Name of Driller) of Edgar (Postoffice Address)

County of Clay State of Nebr., do hereby certify that:

1. I am the driller of a well located on the X Quarter, Section No.

Township North, Range, owned by

whose postoffice address is State of

2. That the drilling was begun on the day of, 19 and completed on

the day of, 19

3. That the well is cased and screened in the following manner: 0-151.5 16" ID Plain (Give kind of casing, lengths and position of plain and perforated casing, weight of metallic casing, etc.)

Concrete 151.5-169.5 16" ID Sorelin Concrete

4. That the diameter of drilled hole is 36 inches.

5. That Reverse Rotary type of drilling machinery was used.

6. That the drilled hole [illegible] not sealed, as follows: 0-20 Concrete 20-41 Yellow Clay

7. That the following is an accurate log of the depth, thickness and character of the different strata penetrated, and the location of water-bearing strata:

DEPTH IN FEET FROM	TO	MATERIAL DRILLED
0	2	Top Soil
2	77	Clay
77	79	Sand & Gravel
79	92	Clay
92	107	Sandy Clay
107	130	Fine Sand
130	134	Clay Some Fine Sand
134	144	Clay
144	168	Sand & Gravel
168	172	Clay
172	180	Blue Shale

Date Signed 10-9-68

Wendell Shuck
Driller

VILLAGE OF BLADEN

BLADEN, NEBRASKA

The Village has a second well but allthe information availablis as follows :

N.W. Quarter of N.W. Quator Section 18 Township4 Range 11

Depth 168 ft.
146 ft 10 inches to top of screen.

21 foot 2 inch screen

85 feet water in well.

83 feet to water

12 to 15 boils.

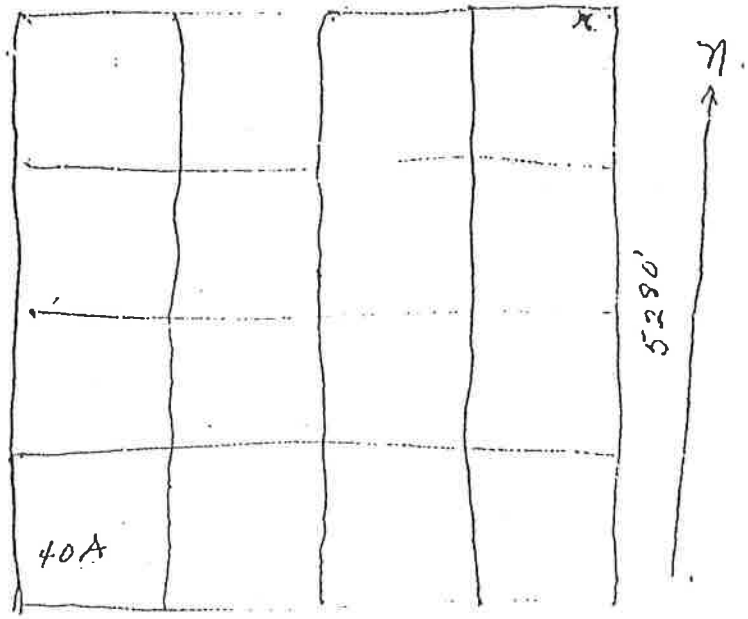
450 gallons per minute.

Taken from Town board meeting minutes dated October 1930

Section No 18

Township 4

Range 11



Revised April 1967
M&I - 1

12-14-67
3:30
7,55

1

Registration No. G-28430 County of Webster Date Filed December 14, 1967

STATE OF NEBRASKA

MUNICIPAL OR INDUSTRIAL WELL REGISTRATION

I, Village Bladen (Name of person signing registration) of Bladen (Postoffice Address)

County of Webster State of Nebraska, do hereby certify:

1st. That the name of the owner of the municipal (or) industrial well registered herein is Village of Bladen whose postoffice address is Bladen

2nd. That the well is located on the N. E. Quarter of the N. E. Quarter of Section 17, Township 4 N., Range 11 of the Sixth P. M., Webster County, and it is 1320 feet from the North line and 1½ blocks from the East line of said tract, as accurately shown on the plat on page 2 hereof.

3rd. That the well was installed for the following purpose or purposes: city water

4th. That the capacity of said well under normal operating conditions is 450 gallons per minute.

5th. That the depth of the well is 168 feet, measured from the surface of the ground.

6th. That the inside diameter of the casing is Not given inches.

7th. That the static water level in the well is 85 feet below ground surface.

8th. That the depth to water under normal pumping condition is 83 (Pumping Level) feet below ground surface.

9th. That the diameter of the pump column is inches. That the diameter of the 12 to 15 (Give Number of bowls) bowl or bowls is Not given inches.

10th. That the type and size of impeller is as follows: Not given in records of town board meeting

11th. That the well was completed on or about the day of October, 1930.

Revised April 1967
M&I - 2

1

12th. That attached hereto are three copies of the log of the well certified to by the driller of the well.

13th. That the well was drilled by driller unknown whose address is also unknown

14th. That the relation which the subscriber to this affidavit bears to said registrant is that of Village Clerk (Owner or Agent) and that he is authorized to make this affidavit in behalf of the interest affected.

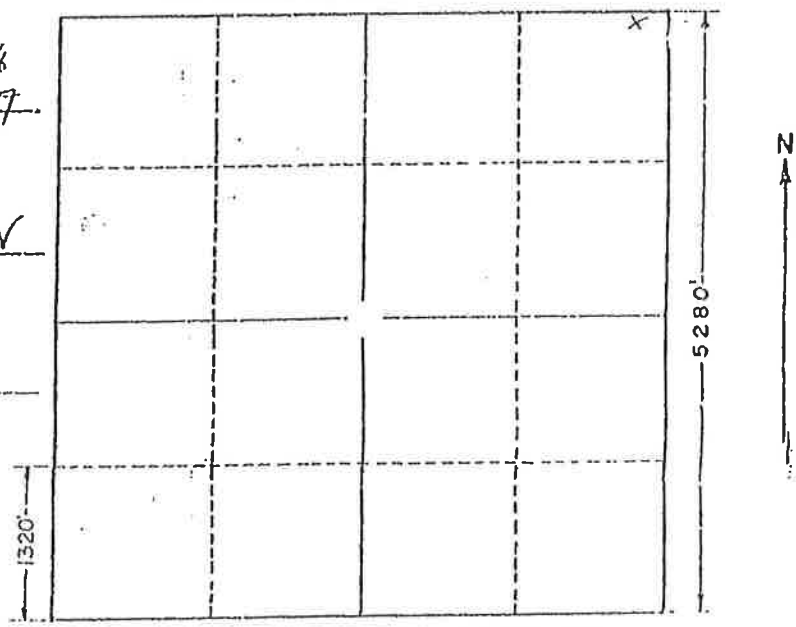
Hazel Jones

This drawing represents one Section

Section No. 17 18

Township 4 N

Range 11



Each small subdivision is a 40 acre tract.

State of Nebraska

Department of Water Resources

This instrument was filed for record at 8:30 o'clock A.M. on the 14th day of December, 19 67

Director of Water Resources

Revised April 1, 1966
Ltr. 67-9

1

Registration No. G-28430 County of Webster Date Filed December 14, 1967

Unknown

STATE OF NEBRASKA
CERTIFICATE OF WELL DRILLER

I, ... (Name of Driller) of ..... (Postoffice Address)

County of ..... State of ....., do hereby certify that:

1. I am the driller of a well located on the ..... Quarter, Section No. .....

Township ..... North, Range ....., owned by .....

whose postoffice address is ..... State of .....

2. That the drilling was begun on the ..... day of ....., 19....., and completed on

the ..... day of ....., 19.....

3. That the well is cased and screened in the following manner: ..... (Give kind of casing, lengths and position of plain and

..... screen casing, weight of metallic casing, etc.)

4. That the diameter of drilled hole is ..... inches.

5. That ..... type of drilling machinery was used.

6. That the drilled hole is/is not sealed, as follows: .....

.....

7. That the following is an accurate log of the depth, thickness and character of the different strata penetrated, and the location of water-bearing strata:

DEPTH IN FEET FROM	TO	MATERIAL DRILLED

Date Signed ....
Driller

October 1995
DWR Form 145

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date 4-28-97 Sequence No. 104682 Registration No. G-91250
Owner Code No. 44511 Receipt No. 90570 05-Little Blue NRD

1. Well Owner David K. Berns Telephone Number (402) 756-1018
Address RR1 Box 40
City Bladen, Ne State NE Zip Code 68928 + 9707

2. Drilling Firm MARYHN WELL DRilling Telephone Number (402) 746-3373
Address RR1 Box 27 Contractor's License No. 39131
City Red Cloud State NE Zip Code 68970 + 9506

3. Permit Number(s) NA

4. Purpose of well (indicate one): ___Dewatering (over 90 days) X Domestic ___Geothermal ___Ground Heat Exchanger ___Ground Water Source Heat Pump ___Industrial ___Injection ___Irrigation ___Livestock ___Monitoring ___Observation ___Public Water Supply (with spacing (46-638)) ___Public Water Supply (without spacing) ___Recovery ___Aquaculture ___Other _____
(indicate use)

5. Replacement and abandoned well information.
A. Is this well a replacement well? ___Yes X No
B. Registration number of abandoned well: _____
C. Replacement well is _____ feet from abandoned well.
D. Abandoned well last operated _____, 19___
E. Original well pump column size: _____ inches.
F. Completion of original well abandonment on _____, 19___
G. Location of water use of abandoned well: _____

6. A. Well location: SE ¼ of the SW ¼ of Section 16, Township 4 North, Range 11 East/(West) Webster County.
B. The well is 1165 feet from the (North or (South)) section line and 1990 feet from the (East or (West)) section line.
(Circle one) (Circle one)
C. Street address or block, lot and subdivision, if applicable: _____
D. Location of water use, if applicable (give legal descriptions): _____
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: _____

7. Pump Information.
Is pump installed at this time? ___Yes X No
If yes, complete items A through F.
If no, complete items A and D with estimated information for those wells in which pump will be installed.
A. Actual pumping rate, if applicable: 12 gallons per minute. Measured ☐ or Estimated ☒
B. Pump column diameter: _____ inches.
C. Length of pump column: _____ feet.
D. Pumping equipment installed: July, 19 97
E. Brand/Type: _____
F. Pump installed by: Contractor ☐ Owner ☐ Pump Installer ☐ License No. _____

PRINT OR TYPE

8. Well Construction Information.

A. Total well depth: 110 feet. B. Static water level: 81' 4" 6" feet. C. Pumping water level: _____ feet.

☐ Estimated or ☐ Measured

D. Well Construction began: 3-27, 1997 E. Well Construction completed: 3-27, 1997

F. Bore hole diameter: 9 3/4 - 20' inches. 7 3/4 - 110

G. Plain Casing: Diameter 4 ID 4.500 OD inches. Type of material: PVC

Wall thickness: .173 inch(es). Joints--Welded/Glued/Threaded/Other: _____

Length(s) and placement(s) depth from 0 ft. to 90 ft. from 100 ft. to 110 ft.

H. Screen: 4 ID 4.500 OD in.; Type of material Slotted Pvc Casing

Screen openings (slot size): 0016 Trade name: _____

Length(s) and placement(s) depth from 90 ft. to 100 ft. from _____ ft. to _____ ft. Guides at 90 ft.

I. Gravel pack interval(s) from 17 ft. to 110 ft. from _____ ft. to _____ ft. Grade size: 3/8 Smaller

J. Grouted/Sealed from 5 ft. to 17 ft., with 3/4 Hole Plug (type)

from _____ ft. to _____ ft., with _____ (type)

K. Drilling method: Rotary L. Drilling fluid: Natural

M. Well development technique (total time and method): air & bailed

N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? ___ Yes X No

If yes, what will be used: _____

9. Geologic Materials Logged

DEPTH IN FEET FROM	TO	DESCRIPTION	DEPTH IN FEET FROM	TO	DESCRIPTION
0	70	Top Soil & Clay's			
70	80	Sandy Clay			
80	85	Clay White			
85	92	Clay White, Sandy			
92	98 1/2	Sand & Gravel			
98 1/2	110	Shales			

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Leon Martin — Water Well Contractor's Signature — 3-27-97 Date

David K Berry — Water Well Owner's Signature — 4-23-97 Date

Lithology

LogID	LithUnit	Descrpt	DepFm	DepTo	Notes
25-B-49	Soil	silt, dark brown gray	0	1.5	None
25-B-49	Silt	slightly clayey, medium brown gray	1.5	2	None
25-B-49	Silt	moderately clayey, slightly calcareous, light brown gray	2	3	None
25-B-49	Soil	silt, slightly clayey, medium brown gray	3	3.5	None
25-B-49	Silt	moderately clayey, slightly calcareous, buff gray, contains a few limy nodules	3.5	4	None
25-B-49	Silt	slightly clayey, slightly to moderately calcareous, very light buff gray, contains a few limonitic nodules and limy nodules	4	5	None
25-B-49	Silt	slightly calcareous, very light gray, contains many limonitic nodules below 7.0 ft	5	11	None
25-B-49	Silt	slightly clayey, very light gray with a brown tint	11	20	None
25-B-49	Soil	silt, moderately clayey, medium brown gray	20	21.5	None
25-B-49	Silt	slightly clayey to sandy, light tan gray, contains very fine sand	21.5	25	None
25-B-49	Silt	moderately clayey to slightly sandy, light tan gray, contains very fine sand, contains a few limonitic flecks from 27.0 to 30.0 ft, reddish tan below 30.0 ft, in part granular and grading very sandy with depth below 35.0 ft	25	39	None
25-B-49	Silt	sandy, reddish tan, contains very fine sand, slightly calcareous from 43.0 to 45.0 ft, slightly consolidated	39	52	None
25-B-49	Silt	sandy, slightly calcareous, buff gray, contains very fine sand, moderately to very calcareous with several nodular limy zones below 54.0 ft	52	66.5	None
25-B-49	Silt	sandy, moderately to very calcareous, buff gray, contains very fine to some fine sand, granular and slightly consolidated, contains a trace of medium to coarse sand below 70.0 ft	66.5	75.5	None
25-B-49	Silt	slightly clayey to sandy, moderately to very calcareous, light brown, contains very fine sand, contains large limy nodules, moderately clayey below 90.0 ft	75.5	96	None
25-B-49	Sand	very silty, very calcareous, texture grades from very fine to medium sand, partially cemented with lime, in part clayey below 105.0 ft	96	114	None
25-B-49	Clay	silty, slightly calcareous, light greenish gray	114	115.5	None
25-B-49	Sand	silty, very calcareous, texture grades from very fine to medium sand, calcareous cemented, contains thin hard limy zones from 120.0 to 120.1 ft and from 123.0 to 123.5 ft, contains a few rootlets	115.5	128.5	None
25-B-49	Sandstone	silty, slightly calcareous, light gray, texture grades from very fine to fine sand	128.5	131	None
25-B-49	Sand and gravel	silty, texture grades from very fine sand to fine gravel, contains many rounded chalk granules	131	133	None
25-B-49	Silt	clayey to sandy, embedded sand and gravel	133	134.5	None
25-B-49	Chalk	silty, white, (possibly reworked)	134.5	137	None
25-B-49	Limestone	chalky, yellow, contains a thin siliceous layer from 137.0 to 137.1 ft	137	138	None
25-B-49	Limestone	siliceous, yellow	138	139	None
25-B-49	Chalk	shaly, light yellow and white	139	140	None
25-B-49	Shale	chalky, silty, orange from 140.0 to 141.5 ft light yellow to brown gray 141.5 to 144.0 ft	140	144	None
25-B-49	Shale	chalky, light brown gray, some white specks	144	145	None
25-B-49	Shale	chalky, medium brown gray, grades darker with depth below 146.0 ft	145	150	None

Stratigraphy

LogID	Sys	Ser	Grp	Frm	Mem	DepFm	DepTo
25-B-49	Quaternary					0	96
25-B-49	Tertiary	Miocene	Ogallala			96	134.5
25-B-49	Cretaceous	Upper Cretaceous	Colorado	Niobrara		134.5	150

Geologic Logs and Well Information Used in Construction of Geologic Cross Section B-B'

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES
WATER WELL REGISTRATION

Fee Paid	$110.00	DNR Cash Fund	$18.50
HHSS Fee	$70.00	HHSS-DNR Cash Fun	$0.00
Get Billing	17055		

FOR DEPARTMENT USE ONLY

NOL ID	117024949819855	NOL Status	Accepted	Well Status	A	Registration Code	G-143662	Add
Owner ID	2792	NOL Date	02/07/2007	Call Up Code		Registration Date	02/07/2007
Seq Num	179456			Call Up Date		PWS 2006-1	

02072007 - 179456 -WWRF

1a Owner's Name

b Company Name: Village of Bladen

c Correspondent Name: Attention Name

Address: PO Box 37

City: Bladen State: NE Zip Code: 68928 - Phone: 402 - 756-1369

2a HHSS Contractor Lic ID: 16593903 Contractor's Name: Loren C.Taylor

Contractor's License No: 3919403 Contractor's Email Address: sargentdrilling@alltel.net

b Drilling Firm Name: Charles Sargent Irrigation Inc - Geneva

Address: P.O. Box 367

City: Geneva State: NE Zip Code: 68361 Phone: 402 - 759-3902

Drilling Firms Email Address: sargentdrilling@alltel.net

3a Well Location: NWSW of Section: 8 Township: 4 North, Range: 11 W (E/W), Webster County

b Natural Resource District: Little Blue

c The well is 2549 feet from the S (N/S) section line and 69 feet from the W (E/W) section line

GPS: or Latitude: 40 19' 41.00" Longitude: -098 35' 40.20"

d Street address or block, lot and subdivision, if applicable: Block No Lot

e Location of water use, if applicable (give legal descriptions): NWSW S8 T4 R11W

f If for irrigation, the land to be irrigated is Acres

g Well Reference letter(s), if applicable

4 Permits

	Permits Number	Date		Permits Number	Date
Management Area Permit	LBMA-1160	09/18/2006	Transfer Out-Of-State		
Surface Water			Well Spacing		
Geothermal			Conduct Water		
Industrial			Municipal		
Industrial Transfer Notice			Other		

5 Purpose of Well: Public Water Supplier with Spacing Prot Other

Notes

6 Wells in a Series

a Is this well a part of a series? ☐

b If one or more of the wells in the series is currently registered, give the well registration number

c How many wells in the series are you registering at this time?

7 Replacement and abandoned well information Replacement Number

02072007 - 179456 -WWRF

a Is this well a replacement well? ☐

e Original well pump column size: inches.

b Registration number of original well

If not registered, date original well was constructed

c Original well last operated

d Replacement well is feet from original well.

e Location of water use of original well

Please Select One:

f. ☐

Use: ☐

if nonconsumptive, State use:

8 Pump Information

a Is pump installed at this time? ☑

Is pump installed by well owner in section 1? ☐

Is pump installed by contractor in section 2? ☑

Else installed by pump installer.

b HHSS Installer's License ID. 431529

Pump Installer's License No. 39454 Pump Installer's Name Nathan R Jacobson

Pump Installer's Email Address sargentdrilling@alltel.net

Pump Installer's Firm Name Charles Sargent Irrigation, Inc

Pump Installer's Firm Address PO Box 367

City: Geneva State NE Zip Code 68361-0000 Phone 402 - 759-3902

Pump Installer's Firm Email Address

c Pumping Rate 450 gallons per minute M measured or estimated

d Drop pipe diameter 6 inches

e Length of drop pipe 140. feet.

f Pumping equipment installed 01 / 11 / 2007

g Pump Brand SPC

h This well will be used to pump less than 50 gpm ☐

9 Well Construction Information

a Total well depth 181. feet.

b Static Water Level 106. feet.

c Pumping Water Level 130. feet.

d Well construction began: 09 / 27 / 2006

e Well construction completed: 09 / 27 / 2006

f Bore hole diameter in inches. Top 32. Bottom 32.

g Casing and Screen Joints Welded Other

10 Well Construction (Casing and Screen)

Fr Depth	To Depth	Case Scrn	In Diam	Out Diam	Thickness	Scrn Slot Size	Material	Trade name	NOLID
0	152	casing	15.25	16	.375		Steel	Livingston	117024949819
152	169	screen	15.25	16	.375	.090	Steel	Johnson Ag	117024949819
169	181	casing	15.25	16	.375		Steel	Sump	117024949819

11 Well Construction (Grout and Gravel)

NOL ID	From Depth	To Depth	GroutGravel	Material
117024949819855	0	17	grout	Concrete
117024949819855	17	127	grout	Bentonite
117024949819855	127	175	gravel	Gravel
117024949819855	175	181	grout	Coated Bentonite

12 Geolog Material Logged

NOL ID	From Depth	To Depth	Description
117024949819855	0	20	Topsoil and clay
117024949819855	20	88	Clay
117024949819855	88	120	Medium to coarse sand with clay layers
117024949819855	120	137	Clay with medium to coarse sand
117024949819855	137	140	Medium to coarse sand with trace of fine gravel
117024949819855	140	145	Medium to coarse sand
117024949819855	145	168	Coarse sand with fine to medium gravel
117024949819855	168	181	Ocher and shale

Revised April 1941
MAI - 1

PWS 68-1

11-7-68
9:30

1

Registration No. G-28430 County of Webster Date Filed Nov. 7, 1968

REPLACEMENT WELL Orig. filed Dec. 14, 1967

STATE OF NEBRASKA

MUNICIPAL OR INDUSTRIAL WELL REGISTRATION

I, x Hazel Toap (Name of person signing registration) of Bladen (Postoffice Address)

County of Webster, State of Nebraska, do hereby certify:

1st. That the name of the owner of the municipal (or) industrial well registered herein is Village of Bladen whose postoffice address is Bladen, Nebr 68925

2nd. That the well is located on the NE ¼ Quarter of the N.E. ¼ Quarter of Section 18, Township 2 N 4, Range 11 of the Sixth P. M., Webster County, and it is 1324.14 feet from the N line and 1½ blocks feet from the East line of said tract, as accurately shown on the plat on page 2 hereof. Replaces Well #1 registered last year

3rd. That the well was installed for the following purpose or purposes: Water for Village of Bladen

4th. That the capacity of said well under normal operating conditions is 500 gallons per minute.

5th. That the depth of the well is 169 feet, measured from the surface of the ground.

6th. That the inside diameter of the casing is 18 inches.

7th. That the static water level in the well is 114 feet below ground surface.

8th. That the depth to water under normal pumping condition is 138 (Pumping Level) feet below ground surface.

9th. That the diameter of the pump column is 6 5/8 inches. That the diameter of the 7 (Give Number of Bowls) bowl or bowls is 10 inches.

10th. That the type and size of impeller is as follows:

Semi Open 10CM

11th. That the well was completed on or about the 8 day of October, 1968

12th. That attached hereto are three copies of the log of the well certified to by the driller of the well.

13th. That the well was drilled by Shuck Drilling Co. whose address is Edgar, Nebr.

14th. That the relation which the subscriber to this affidavit bears to said registrant is that of Village of Bladen (Owner or Agent) and that he is authorized to make this affidavit in behalf of the interest affected.

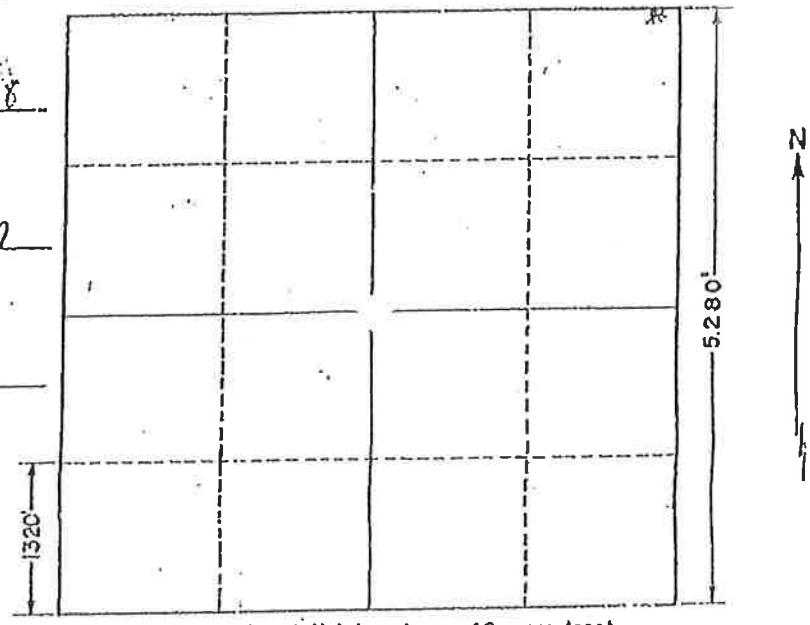
Hazel Tarp Clerk

This drawing represents one Section

Section No. 18

Township 4 N

Range 11



Each small subdivision is a 40 acre tract.

State of Nebraska

Department of Water Resources

This instrument was filed for record at 8:30 o'clock A.M. on the 7th day of Nov., 1968

REPLACEMENT WELL Orig. filed Dec. 14, 1967

Director of Water Resources

Revised April 1, 1966
Form 17-3

1

Registration No. G-27430 County of Webster Date Filed Nov. 7, 1968

STATE OF NEBRASKA
CERTIFICATE OF WELL DRILLER

I, Shuck Drilling Co. (Name of Driller) of Edgar (Postoffice Address)

County of Clay State of Nebr., do hereby certify that:

1. I am the driller of a well located on the ..... Quarter, Section No. .....

Township ..... North, Range ....., owned by .....

whose postoffice address is ..... State of .....

2. That the drilling was begun on the ..... day of ....., 19..... and completed on

the ..... day of ....., 19.....

3. That the well is cased and screened in the following manner: 0-151.5 16" ID Plain (Give kind of casing, lengths and position of slots and screen casing, weight of metallic casing, etc.)

Conoxato 151.5-169.5 16" ID Sorelin Concrete

4. That the diameter of drilled hole is 36 inches.

5. That Reverse Rotary type of drilling machinery was used.

6. That the drilled hole [ ] is not sealed, as follows: 0-20 Concrete 20-40 Yellow Clay

7. That the following is an accurate log of the depth, thickness and character of the different strata penetrated, and the location of water-bearing strata:

DEPTH IN FEET FROM	TO	MATERIAL DRILLED
0	2	Top Soil
2	77	Clay
77	79	Sand & Gravel
79	92	Clay
92	107	Sandy Clay
107	130	Fine Sand
130	134	Clay Some Fine Sand
134	144	Clay
144	168	Sand & Gravel
168	172	Clay
172	180	Blue Shale

Date Signed 10-9-68

Wendell Kuck
Driller

VILLAGE OF BLADEN

BLADEN, NEBRASKA

The Village has a second well but allthe information availablis as follows :

N.W. Quarter of N.W. Quator Section 18 Township 4 Range 11

Depth 168 ft.
146 ft 10 inches to top of screen.

21 feet 2 inch screen

85 feet water in well.

83 feet to water

12 to 15 boils

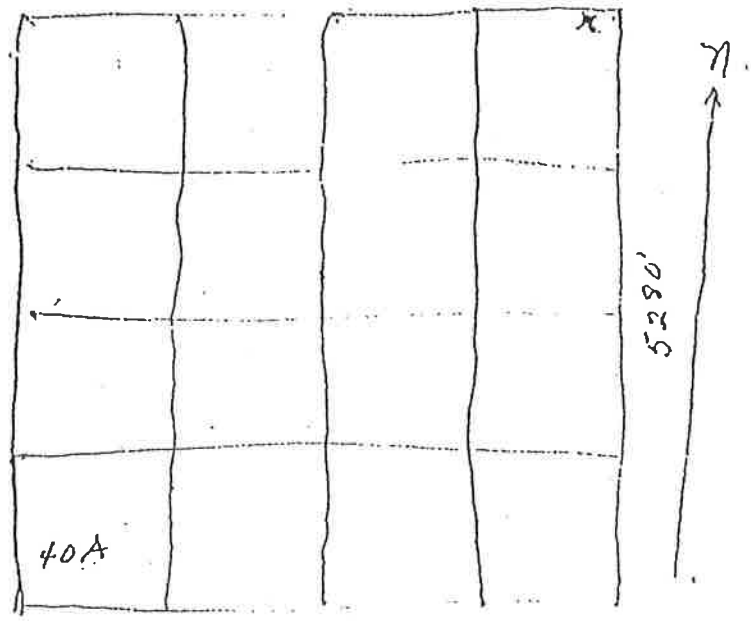
450 gallons per minute.

Taken from Town board meeting minutes dated October 1930

Section No 18

Township 4

Range 11



Revised April 1947
M&I - 1

12-14-67
3:30
7,55
1

Registration No. G-28430 County of Webster Date Filed December 14, 1967

STATE OF NEBRASKA

MUNICIPAL OR INDUSTRIAL WELL REGISTRATION

I, Village Bladen (Name of person signing registration) of Bladen (Postoffice Address)

County of Webster State of Nebraska, do hereby certify:

1st. That the name of the owner of the municipal (or) industrial well registered herein is Village of Bladen whose postoffice address is Bladen

2nd. That the well is located on the N. E. Quarter of the N. E. Quarter of Section 17, Township 4 N., Range 11 North of the Sixth P. M., Webster County, and it is 1214 feet from the North line and 1½ block feet from the East line of said tract, as accurately shown on the plat on page 2 hereof.

3rd. That the well was installed for the following purpose or purposes: city water

4th. That the capacity of said well under normal operating conditions is 450 gallons per minute.

5th. That the depth of the well is 168 feet, measured from the surface of the ground.

6th. That the inside diameter of the casing is Not given inches.

7th. That the static water level in the well is 85 feet below ground surface.

8th. That the depth to water under normal pumping condition is 85 (Pumping Level) feet below ground surface.

9th. That the diameter of the pump column is inches. That the diameter of the 12 to 15 (Give Number of bowls) bowl or bowls is Not given inches.

10th. That the type and size of impeller is as follows:

Not given in records of town board meeting

11th. That the well was completed on or about the day of October, 1930.

Revised April 1967
M&I - 2

12th. That attached hereto are three copies of the log of the well certified to by the driller of the well.

13th. That the well was drilled by driller unknown whose address is also unknown.

14th. That the relation which the subscriber to this affidavit bears to said registrant is that of Village Clerk (Owner or Agent) and that he is authorized to make this affidavit in behalf of the interest affected.

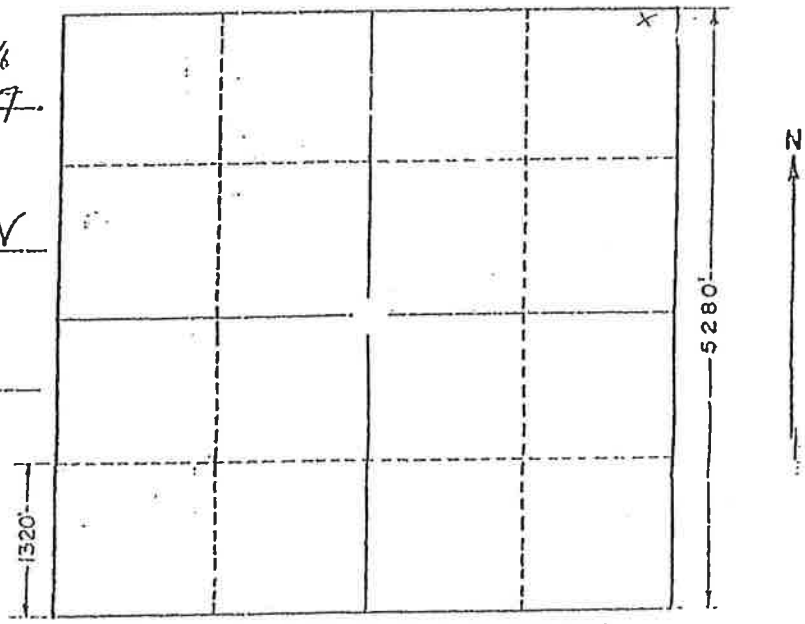
Hazel Jones

This drawing represents one Section

Section No. 17 (18)

Township 4 N

Range 11



Each small subdivision is a 40 acre tract.

State of Nebraska

Department of Water Resources

This instrument was filed for record at 8:30 o'clock A.M. on the 14th day of December, 19 67

Director of Water Resources

Revised April 1, 1966
Form 67-1

1

Registration No. G-28430 County of Webster Date Filed December 14, 1967

Unknown

STATE OF NEBRASKA
CERTIFICATE OF WELL DRILLER

I, ... of .....
(Name of Driller) (Postoffice Address)

County of ..... State of ....., do hereby certify that:

1. I am the driller of a well located on the ..... Quarter, Section No. .....

Township ..... North, Range ....., owned by .....

whose postoffice address is ..... State of .....

2. That the drilling was begun on the ..... day of ....., 19....., and completed on

the ..... day of ....., 19.....

3. That the well is cased and screened in the following manner: .....
(Give kind of casing, lengths and position of plain and

.....
screen casing, weight of metallic casing, etc.)

4. That the diameter of drilled hole is ..... inches.

5. That ..... type of drilling machinery was used.

6. That the drilled hole is/is not sealed, as follows: .....

.....

7. That the following is an accurate log of the depth, thickness and character of the different strata penetrated, and the location of water-bearing strata:

DEPTH IN FEET FROM	TO	MATERIAL DRILLED

Date Signed ....
Driller

Well Registration or Area Permit

Fee Paid: $70.00 HHSS Fee: $30.00
DNR Cash Fund: $18.50 WWDF: 21.50
Billing ID: 34372

Source:	Nebraska On Line	Import Status:	Accepted	Use:	Domestic	Owner ID:	120229
Import ID:	13365274581818	Status:	Inactive Well (Well is not Pumping)	Decommission Date:	.	Registration Number:	G-162660
Well ID:	217017	NRD:	Little Blue			Registration Date:	5/9/2012
Last Change User:	hmcpherson	Call Up Code:	.	Call Up Date:	.	Last Change Date:	5/9/2012

Owner:

	ContactID	Type	SeqNum	Begin Date	End Date	Name
Display	120229	Owner	1	5/9/2012		Kamm, Frank & L Faith

Contractor:

Certificate ID	First Name	Last Name
19216	Robert J	Metz

Drilling Firm:

EmployerID	Employer
159433	Bauer Well Drilling

A. Well Location: SE1/4NE1/4 of Section 18
Township 4 North, Range 11 (West E/W), Webster County
B. Natural Resource District: Little Blue

	Latitude	Longitude	
Well GPS Coordinates:	40° 18' 59.60"	-098° 35' 42.40"	GPS Required
Lat/Long DD	40.31656	-98.59511	

C. The well is: 1640 feet from the Section line and 108 feet from the E section line.
D. Street address or block, lot and subdivision: Addr/Sub Div . Block No . Lot .
E. Location of water use, if applicable (give legal description): Same as above
G. Well reference letter(s) if applicable: .

Well In A Series

Well Part of a Series with Site Plan: No

Series	# of Wells	Reg Total	# Wells	Acres	Acres Cert	NRD Appr	StartDate	EndDate	Comment	Series Reg Num (External Source)	Code	Description	Wells in the Series: WellID	RegCD	StartDate	EndDate
15783					No	No	5/8/2012				PRO	Single Project	217017	G-162660	5/8/2012	

Permits

	Aprvd Date(s)		Aprvd Date(s)
Area Permit	. . .	SWater App Code	. . .
GeoPermit	. . .	Industrial	. . .
MWF	. . .	Transfer	. . .
WSP	. . .	Swater Conduct Code	. . .
HHSS	.	Other	. .
HHSS PWS ID	.	ITN	. .
NDEQ	.		

5. Purpose of Well Domestic
Other Use .
Notes .

7. Replacement well information.

Well Considered a replacement by NRD(WellID, RegCD) .

A. Is this well a Replacement well? No Repl No . NRD Approval Date . Well Replacement Reg CD .

B. Registration number of abandoned well: .

Check Well

If not registered, date abandoned well was constructed .

C. Abandoned well last operated .

D. Replacement well is .feet from abandoned well.

E. Original well pump column size: .inches.

F. [ ] Original water well decommissioned .
[ ] I hereby certify that the original water well will be decommissioned within 180 days after such construction of the replacement water well.
[ ] I hereby certify that the original water well will be modified and equipped to pump 50 gallons per minute or less within 180 days after such construction of the replacement water well.
[ ] Livestock
[ ] Monitoring
[ ] Observation

[ ] Nonconsumptive or de minimus use approved by the applicable natural resources district. .

[ ] Decommission/Modification certification form is submitted by landowner (Must be submitted before registering well)

G. Location of water use of original well: .

Decommission Information

Decommission Date: . By

. Pump Information.

A. Is Pump installed at this time? No

Pump present but Well Inactive: No

Free Flowing Well: No

Well active, no pump installed: No

B. License No.

CertificateID	FirstName	LastName	Employer
1	Owner drilled well &/or installed pump		Owner drilled well &/or installed pump

C. Pumping Rate . gallons per minute.

D. Pumping water level . feet.

E. Drop pipe diameter . inches.

F. Length of pipe . in feet.

G. Pump equipment installed: .

H. Pump Brand/Type .

I. This well wll be used to pump less than 50 gpm? Yes

. Well Construction Information

A. Total well depth: 168 feet.

B. Static water level . feet.

C. Well Construction began: 5/8/2012

D. Well Construction Completed: 5/8/2012

E. Bore hole diameter in inches. Top 11 Bottom 11

F. Casing and Screen Joints are: Glued

Other Joints description: .

H. Total Estimate Capacity of Well .gallons per minute.

I. Pumping water level at capacity: . feet.

0. Well Construction (Casing & Screen) - c, d, e & f measurements should be in inches to three decimal places

ecord Count = 2

WellID	FromDepth*	ToDepth*	Case/Screen	InsideDiam	OutsideDiam	CaseThickness	ScrnSlotSize	Material ScreenTname
17017	0	158	casing	4.072	4.5	0.214	0	PVC 200 Certainteed
17017	158	168	screen	4.072	4.5	0.214	0.03	PVC 200 Certainteed

are in Feet, all else is in inches

1. Grout and Gravel Pack

ecord Count = 4

WellID	FromDepth	ToDepth	Grout/Gravel	Material Description[1]	Quantity Gravel[2]	Volume & Type Grout[3]
17017	0	86	grout	Bentonite chips		3 sacks
17017	86	128	gravel	Gravel pit	2 yards	
17017	128	148	grout	Bentonite chips		4 sacks
17017	148	168	gravel	Gravel pit	2 yards	

are in Feet, all else is in inches

Description of gravel pack, i.e. engineered gravel pack, or gravel pit description (1/4 down) or brand name (best sand) natural ormation, drilling cuttings, soil backfill

Quantity #cubic yards, #Tons, #Sacks - (for drilling cuttings and soil backfill estimate quantity) Calculation assistance available n web

Volume & Type: #gallons of a slurry, #Barrels of a slurry, #sacks used in the slurry, #Bags of non-slurry bentonite (chip-pellet-ranular)

2. Well Geologic Materials Logged

WellID	FromDepth*	ToDepth*	Type	Hardness	Color	Other/Drilling Action
17017	0	86	Clay	Dense/Stiff	Brown	
17017	86	120	Sand with Clay/Silt	Soft	Gray	
17017	120	128	Sand fine-med	Loose	Gray	
17017	128	148	Clay	Dense/Stiff	Gray	
17017	148	168	Gravel	Loose	Red	

are in Feet.

October 1995
DWR Form 113

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date 2-24-97 Sequence No. 1026660 Registration No. G90721
Owner Code No. 14848 Receipt No. 89938 05 - Little Blue NRD

1. Well Owner Frank Kamm MD Telephone Number ( ) (402) 756 3190
   Address C/O BOB KARR
   City BLUE HILL State NE Zip Code 68930

2. Drilling Firm Shuck Drilling Company, Inc. Telephone Number ( ) (402) 224-4615
   Address Route 1, Box 20 Contractor's License No. 39196
   City Edgar State NE Zip Code 68935

3. Permit Number(s) LBMA-0012

4. Purpose of well (indicate one): ___Dewatering (over 90 days) ___Domestic ___Geothermal ___Ground Heat Exchanger
   ___Ground Water Source Heat Pump ___Industrial ___Injection X Irrigation ___Livestock ___Monitoring
   ___Observation ___Public Water Supply (with spacing (46 630)) ___Public Water Supply (without spacing) ___Recovery ___Aquaculture
   ___Other ___ (Indicate use)

5. Replacement and abandoned well information.
   A. Is this well a replacement well? ___Yes X No B. Registration number of abandoned well: ___
   C. Replacement well is ___ feet from abandoned well. D. Abandoned well last operated ___, 19___
   E. Original well pump column size: ___ inches. F. Completion of original well abandonment on ___, 19___
   G. Location of water use of abandoned well: ___

6. A. Well location: NE 1/4 - SE 1/4 ¼ of the ___ ¼ of Section 18, Township 4 North, Range 11W East/West, Webster County.
   B. The well is 2300 N feet from the (~~North or~~ South) section line and 180 W feet from the (East ~~or West~~) section line.
   (Circle one) (Circle one)
   C. Street address or block, lot and subdivision, if applicable: ___
   D. Location of water use, if applicable (give legal descriptions): ___
   E. If for irrigation, the land to be irrigated is ___ acres.
   F. Well reference letter(s), if applicable: ___

7. Pump Information.
   Is pump installed at this time? ___Yes X No
   If yes, complete items A through F.
   If no, complete items A and D with estimated information for those wells in which pump will be installed.
   A. Actual pumping rate, if applicable: 600 gallons per minute. Measured ☑ or Estimated ☐
   B. Pump column diameter: 8 inches. C. Length of pump column 160 feet.
   D. Pumping equipment installed: ___, 19___. E. Brand/Type: L&H Turbine
   F. Pump installed by: Contractor ☐ Owner ☐ Pump Installer ☐ License No. ___

8. Well Construction Information.

A. Total well depth: 170 feet. B. Static water level: 93 feet. C. Pumping water level: 120 feet.
☐ Estimated or ☒ Measured

D. Well Construction began: 1/3/97, 19__. E. Well Construction completed: 1/3/97, 19__.

F. Bore hole diameter: 26" inch(es).

G. Plain Casing: Diameter 15" ID 16" OD inches. Type of material: PVC

Wall thickness: .500" inches. Joints--Welded/Glued/Threaded/Other: Glued

Length(s) and placement(s) depth from 0 ft. to 130 ft. from ____ ft. to ____ ft.

H. Screen: 15" ID 16" OD in.; Type of material PVC

Screen openings (slot size): .085" double slot Trade name: Certainteed Guides at 145, 160 ft.

Length(s) and placement(s) depth from 130 ft. to 170 ft. from ____ ft. to ____ ft.

I. Gravel pack interval(s) from 10 ft. to 170 ft. from ____ ft. to ____ ft. Grade size: ____

J. Grouted/Sealed from 0 ft. to 10 ft., with Clay and Bentonite (type)

from ____ ft. to ____ ft., with ____ (type)

K. Drilling method: Reverse Rotary L. Drilling fluid: Water

M. Well development technique (total time and method): Surging and pumping with turbine pump - 2 hours

XN. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? ____ Yes X No
If yes, what will be used: ____

9. Geologic Materials Logged.

DEPTH IN FEET FROM	TO	DESCRIPTION
		See Page 2

DEPTH IN FEET FROM	TO	DESCRIPTION
		TEST PUMP DATA
		SWL 93
		300 GPM 103
		500 GPM 117
		800 GPM 126
		1000 GPM: 140
		1200 GPM: 155
		1500 GPM: 0
	0	0
	0	0

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Jim J. Rush 1-30-97 Frank Kanner 2-21-97
Signature Date

6-90721

Fig 1[illegible]
DWR Form [illegible]

GEOLOGIC MATERIALS LOGGED

DEPTH IN FEET FROM	TO	DESCRIPTION
0	100	TS & clay
100	110	Sandy clay
110	130	FS
130	147	Sandy clay
147	167	S&G M
167	170	Ochre & shale

DEPTH IN FEET FROM	TO	DESCRIPTION

[illegible] 1-20-91

Geologic Logs and Well Information Used in Construction of Geologic Cross Section C-C'

October 1995
DWR Form 145

STATE OF NEBRASKA
DEPARTMENT OF WATER RESOURCES
WATER WELL REGISTRATION

FOR DEPARTMENT USE ONLY

Registration Date 7-20-1999 Sequence No. 119321 Registration No. G-101320
Owner Code No. 53707 Receipt No. 102255 Little Blue NRD

1. Well Owner David M. Kaufman Telephone Number (402) 756-1360
Address Rt 1 Box 96
City Bladen State NE Zip Code 68928 +

2. Drilling Firm MARUHN Well Drilling Telephone Number (402) 746 3373
Address RR1 Box 27 Contractor's License No. 39131
City Red Cloud State NE Zip Code 68970 + 9506

✓ 3. Permit Number(s) N/A

4. Purpose of well (indicate one): ___Dewatering (over 90 days) X Domestic ___Geothermal ___Ground Heat Exchanger ___Ground Water Source Heat Pump ___Industrial ___Injection ___Irrigation ___Livestock ___Monitoring ___Observation ___Public Water Supply (with spacing (46-638)) ___Public Water Supply (without spacing) ___Recovery ___Aquaculture ___Other _____ (indicate use)

✓ 5. Replacement and abandoned well information.
A. Is this well a replacement well? ___Yes X No B. Registration number of abandoned well: _____
C. Replacement well is _____ feet from abandoned well. D. Abandoned well last operated _____, 19____
E. Original well pump column size: _____ inches. F. Completion of original well abandonment on _____, 19____
G. Location of water use of abandoned well: _____

✓ 6. A. Well location: NE ¼ of the NW ¼ of Section 18, Township 4 North, Range 11 East/(West) WEBSTER County.
✓ B. The well is 180 feet from the (North) or South) section line and 1878 feet from the (East or (West)) section line. (Circle one) (Circle one)
C. Street address or block, lot and subdivision, if applicable: Rt 1 Box 96
D. Location of water use, if applicable (give legal descriptions): _____
E. If for irrigation, the land to be irrigated is _____ acres.
F. Well reference letter(s), if applicable: _____

7. Pump Information.
Is pump installed at this time? X Yes ___No
If yes, complete items A through F.
If no, complete items A and D with estimated information for those wells in which pump will be installed.
A. Actual pumping rate, if applicable: 20 gallons per minute. Measured ☒ or Estimated ☐
B. Pump column diameter: 1¼ inches. C. Length of pump column: 20 feet.
D. Pumping equipment installed: 6-30, 1999. E. Brand/Type: Grundfos Sub
F. Pump installed by: Contractor ☒ Owner ☐ Pump Installer ☐ License No. 39131

printed on recycled paper

G-101320

8. Well Construction Information.

A. Total well depth: 180 feet. B. Static water level: 84' 5" feet. C. Pumping water level: 85 feet.
☑ Estimated or ☐ Measured

D. Well Construction began: 6-21, 1999. E. Well Construction completed: 6 21, 1999.

F. Bore hole diameter: 9½, 0-19 inches. 7¾" 19-180

G. Plain Casing: Diameter 4 ID 4.500 OD inches. Type of material: PVC

Wall thickness: .173 inch(es). Joints--Welded/Glued/Threaded/Other:

Length(s) and placement(s) depth from 0.5 P.Tless ft. to 5-160 ft. from ft. to ft.

H. Screen: 4 ID 4.500 OD in.; Type of material Slotted PVC casing

Screen openings (slot size): 0020 Trade name: Eagle Pacific

Length(s) and placement(s) depth from 160 ft. to 180 ft. from ft. to ft. Guides at 160 ft.

I. Gravel pack interval(s) from 19 ft. to 180 ft. from ft. to ft. Grade size: 3/8 Sieved

J. Grouted/Sealed from 5 ft. to 19 ft., with 3/8 Hole Plug (type)

from ft. to ft., with (type)

K. Drilling method: Rotary L. Drilling fluid: Natural

M. Well development technique (total time and method): air

N. Will chemicals, fertilizer or antifreeze be injected or utilized in the system? ___Yes ✓ No
If yes, what will be used:

9. Geologic Materials Logged

DEPTH IN FEET FROM	TO	DESCRIPTION	DEPTH IN FEET FROM	TO	DESCRIPTION
0	90	top soil & clays			
90	144	Sandy Clay			
144	182	Sand & Gravel			
182	183	Ochre			
183	185	Shale			

(Additional sheets may be submitted)

10. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Leroy Marsh — Water Well Contractor's Signature — 6-21-99 Date

David Kaufman — Water Well Owner's Signature — 7-17-99 Date

Revised April 1961
MAI - 1

PWS 68-1

11-7-68
9:30

1

Registration No. G-28430 County of Webster Date Filed Nov. 7, 1968

REPLACEMENT WELL Orig. filed Dec. 14, 1967

STATE OF NEBRASKA

MUNICIPAL OR INDUSTRIAL WELL REGISTRATION

I, x Hazel Toap (Name of person signing registration) of Bladen (Postoffice Address)

County of Webster, State of Nebraska, do hereby certify:

1st. That the name of the owner of the municipal (or) industrial well registered herein is Village of Bladen whose postoffice address is Bladen, Nebr. 68928

2nd. That the well is located on the NE ¼ Quarter of the N.E. ¼ Quarter of Section 18, Township 2 N. 4, Range 11 of the Sixth P. M., Webster County, and it is 1324.14 feet from the N line and 1½ blocks feet from the East line of said tract, as accurately shown on the plat on page 2 hereof. Replaces Well #1 registered last year

3rd. That the well was installed for the following purpose or purposes: Water for Village of Bladen

4th. That the capacity of said well under normal operating conditions is 500 gallons per minute.

5th. That the depth of the well is 169 feet, measured from the surface of the ground.

6th. That the inside diameter of the casing is 18 inches.

7th. That the static water level in the well is 114 feet below ground surface.

8th. That the depth to water under normal pumping condition is 138 (Pumping Level) feet below ground surface.

9th. That the diameter of the pump column is 6 5/8 inches. That the diameter of the 7 (Give Number of Bowls) bowl or bowls is 10 inches.

10th. That the type and size of impeller is as follows:

Semi Open 10CM

11th. That the well was completed on or about the 8 day of October, 1968

12th. That attached hereto are three copies of the log of the well certified to by the driller of the well.

13th. That the well was drilled by Shuck Drilling Co. whose address is Edgar, Nebr.

14th. That the relation which the subscriber to this affidavit bears to said registrant is that of Village of Bladen (Owner or Agent) and that he is authorized to make this affidavit in behalf of the interest affected.

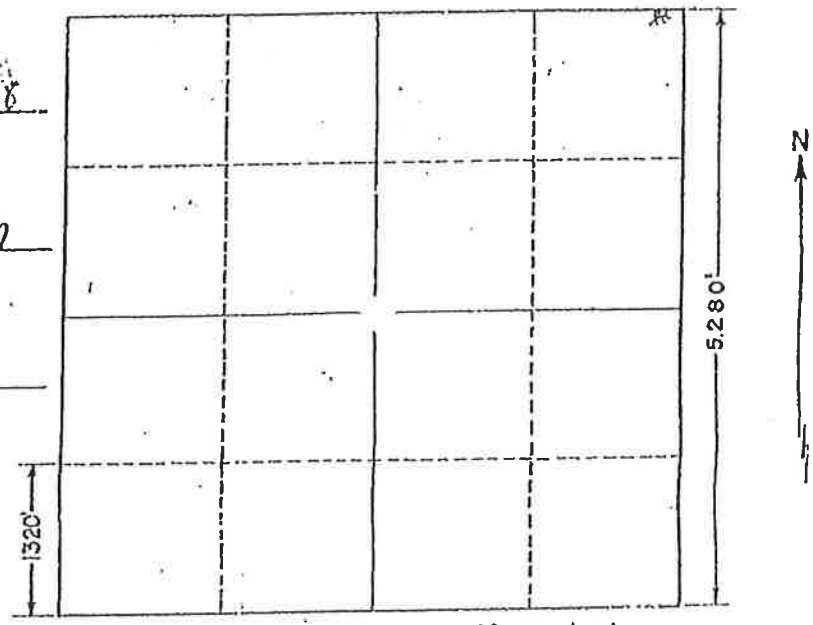
Hazel Zoap Clerk

This drawing represents one Section

Section No. 18

Township 4 N

Range 11



Each small subdivision is a 40 acre tract.

State of Nebraska

Department of Water Resources

This instrument was filed for record at 8:30 o'clock A.M. on the 7th day of Nov., 1968

REPLACEMENT WELL Orig. filed Dec. 14, 1967

Director of Water Resources

Revised April 1, 1966
Dr. 87-3

1

Registration No. G-27430 County of Webster Date Filed Nov. 7, 1968

STATE OF NEBRASKA
CERTIFICATE OF WELL DRILLER

I, Shuck Drilling Co. (Name of Driller) of Edgar (Postoffice Address)

County of Clay State of Nebr., do hereby certify that:

1. I am the driller of a well located on the ..... Quarter, Section No. .....

Township ..... North, Range ....., owned by .....

whose postoffice address is ..... State of .....

2. That the drilling was begun on the ..... day of ....., 19..... and completed on

the ..... day of ....., 19.....

3. That the well is cased and screened in the following manner: 0-151.5 18" ID Plain (Give kind of casing, lengths and position of slots and screen casing, weight of metallic casing, etc.)

Conorete 151.5-169.5 16" ID Sorelin Conorete

4. That the diameter of drilled hole is 36 inches.

5. That Reverse Rotary type of drilling machinery was used.

6. That the drilled hole (~~is not~~) sealed, as follows: 0-20 Concrete 20-41 Yellow Clay

7. That the following is an accurate log of the depth, thickness and character of the different strata penetrated, and the location of water-bearing strata:

DEPTH IN FEET FROM	TO	MATERIAL DRILLED
0	2	Top Soil
2	77	Clay
77	79	Sand & Gravel
79	92	Clay
92	107	Sandy Clay
107	130	Fine Sand
130	134	Clay Some Fine Sand
134	144	Clay
144	168	Sand & Gravel
168	172	Clay
172	180	Blue Shale

Date Signed 10-9-68

Wendell Shuck
Driller

VILLAGE OF BLADEN

BLADEN, NEBRASKA

The Village has a second well but allthe information available is as follows :

N.W. Quarter of N.W. Quator Section 18 Township4 Range 11

Depth 168 ft.
146 ft 10 inches to top of screen.

21 foot 2 inch screen

85 feet water in well.

83 feet to water

12 to 15 boils.

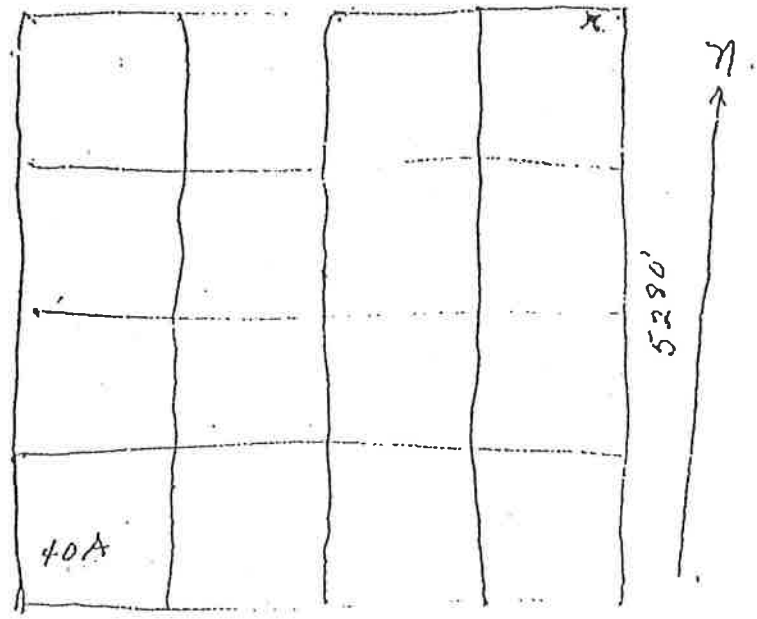
450 gallons per minute.

Taken from Town board meeting minutes dated October 1930

Section No 18

Township 4

Range 11



Revised April 1947
M&I - 1

12-14-67
3:30
7:55
1

Registration No. G-28430 County of Webster Date Filed December 14, 1967

STATE OF NEBRASKA

MUNICIPAL OR INDUSTRIAL WELL REGISTRATION

I, Village Bladen (Name of person signing registration) of Bladen (Postoffice Address)

County of Webster State of Nebraska, do hereby certify:

1st. That the name of the owner of the municipal (or) industrial well registered herein is Village of Bladen whose postoffice address is Bladen

2nd. That the well is located on the N. E. Quarter of the N. E. Quarter of Section 17, Township 4 N., Range 11 of the Sixth P. M., Webster County, and it is 1320 feet from the North line and 1320 feet from the East line of said tract, as accurately shown on the plat on page 2 hereof.

3rd. That the well was installed for the following purpose or purposes:

City water

4th. That the capacity of said well under normal operating conditions is 450 gallons per minute.

5th. That the depth of the well is 168 feet, measured from the surface of the ground.

6th. That the inside diameter of the casing is Not given inches.

7th. That the static water level in the well is 85 feet below ground surface.

8th. That the depth to water under normal pumping condition is 85 (Pumping Level) feet below ground surface.

9th. That the diameter of the pump column is inches. That the diameter of the 12 to 15 (Give Number of bowls) bowl or bowls is Not given inches.

10th. That the type and size of impeller is as follows:

Not given in records of Town board meeting

11th. That the well was completed on or about the day of October, 1930.

Revised April 1967
M&I - 2

12th. That attached hereto are three copies of the log of the well certified to by the driller of the well.

13th. That the well was drilled by driller unknown whose address is also unknown.

14th. That the relation which the subscriber to this affidavit bears to said registrant is that of Village Clerk (Owner or Agent) and that he is authorized to make this affidavit in behalf of the interest affected.

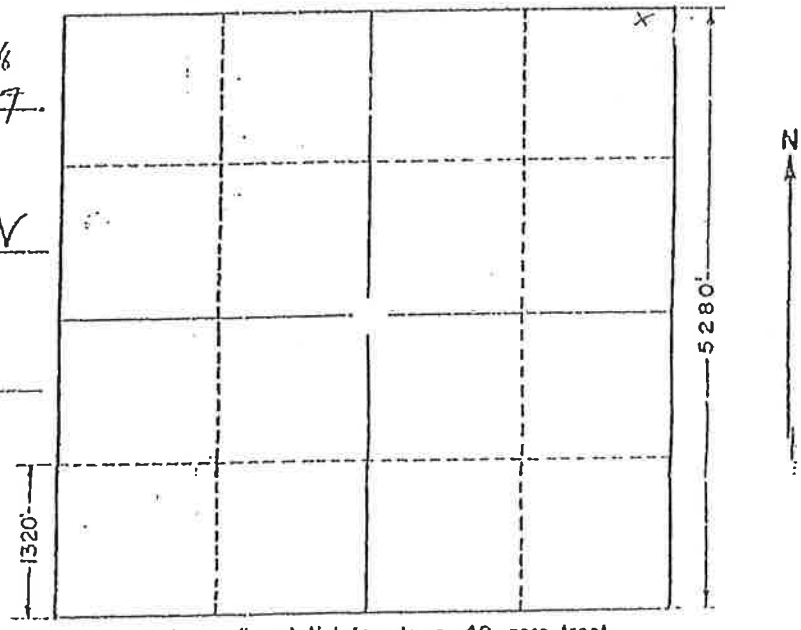
Hazel Jones

This drawing represents one Section

Section No. 17 18

Township 4 N

Range 11



Each small subdivision is a 40 acre tract.

State of Nebraska

Department of Water Resources

This instrument was filed for record at 8:30 o'clock A.M. on the 14th day of December, 19 67

Director of Water Resources

Revised April 1, 1966
Form 67-1

1

Registration No. G-28430 County of Webster Date Filed December 14, 1967

Unknown

STATE OF NEBRASKA
CERTIFICATE OF WELL DRILLER

I, ... (Name of Driller) of ..... (Postoffice Address)

County of ..... State of ....., do hereby certify that:

1. I am the driller of a well located on the ..... Quarter, Section No. .....

Township ..... North, Range ....., owned by .....

whose postoffice address is ..... State of .....

2. That the drilling was begun on the ..... day of ....., 19....., and completed on

the ..... day of ....., 19.....

3. That the well is cased and screened in the following manner: ..... (Give kind of casing, lengths and position of plain and

..... screen casing, weight of metallic casing, etc.)

4. That the diameter of drilled hole is ..... inches.

5. That ..... type of drilling machinery was used.

6. That the drilled hole is/is not sealed, as follows: .....

.....

7. That the following is an accurate log of the depth, thickness and character of the different strata penetrated, and the location of water-bearing strata:

DEPTH IN FEET FROM	TO	MATERIAL DRILLED

Date Signed ....
Driller

Return to Search Page

Nebraska Department of Natural Resources
Database Through: 5/12/2014
Processed: 5/13/2014 1:36:12 PM

Registration Number G-007410, Well ID 11752

Geo Logs

FromDepth	ToDepth	Description	Color	Density	Composition
0	5	TOPSOIL			Other
5	110	CLAY			Other
110	124	SAND			Other
124	155	CLAY			Other
155	173	GRAVEL			Other
173	176	SHALE			Other

Casing and Screen

Grount and Gravel

STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES
WATER WELL REGISTRATION

Fee Paid	$110.00	DNR Cash Fund	$18.50
HHSS Fee	$70.00	HHSS-DNR Cash Fun	$0.00
Get Billing	13016		

FOR DEPARTMENT USE ONLY

NOL ID	113237099111997	NOL Status	Accepted	Well Status	A	Registration Code	G-137573
Owner ID	67979	NOL Date	11/23/2005	Call Up Code		Registration Date	11/23/2005
Seq Num	171524			Call Up Date			

Add

11232005 - 171524 -WWRF

1a Owner's Name

b Company Name: DAVID K. BERNS REVOKABLE TRUST

c Correspondent Name: Attention Name: DAVID BERS

Address: 912 RD X

City: BLADEN State: NE Zip Code: 68928 - Phone: 402 - 756-1018

2a HHSS Contractor Lic ID: 413312 Contractor's Name: Mitch A Watson

Contractor's License No: 39446 Contractor's Email Address: drillerwatson@hotmail.com

b Drilling Firm Name: Watson Well Drilling

Address: Route 1 Box 27

City: Red Cloud State: NE Zip Code: 68970 Phone: 402 - 746-3373

Drilling Firms Email Address: drillerwatson@hotmail.com

3a Well Location: NWNW of Section: 16 Township: 4 North, Range: 11 W (E/W), Webster County

b Natural Resource District: Little Blue

c The well is 40 feet from the N (N/S) section line and 40 feet from the W (E/W) section line

GPS: or Latitude: Longitude:

d Street address or block, lot and subdivision, if applicable: Block No Lot

e Location of water use, if applicable (give legal descriptions): NWNW S16 T4 R11W

f If for irrigation, the land to be irrigated is 175 Acres

g Well Reference letter(s), if applicable

4 Permits

Permits	Permits Number	Date	Permits	Permits Number	Date
Management Area Permit	LBMA-1063	09/29/2005	Transfer Out-Of-State		
Surface Water			Well Spacing		
Geothermal			Conduct Water		
Industrial			Municipal		
Industrial Transfer Notice			Other		

5 Purpose of Well: Irrigation Other:

Notes:

6 Wells in a Series

a Is this well a part of a series? ☑

b If one or more of the wells in the series is currently registered, give the well registration number: G-128020

c How many wells in the series are you registering at this time? 1

7 Replacement and abandoned well information Replacement Number

a Is this well a replacement well? ☐

b Registration number of abandoned well

If not registered, date abandoned well was constructed

c Replacement well is feet from abandoned well.

d Abandoned well last operated

e Original well pump column size: inches. f Completion of original well abandonment on

g Location of water use of abandoned well

8 Pump Information

a Is pump installed at this time? ☑

Is pump installed by well owner in section 1? ☐ Is pump installed by contractor in section 2? ☑

Else installed by pump installer.

b HHSS Installer's License ID. 413312

Pump Installer's License No. 39446 Pump Installer's Name Mitch A Watson

Pump Installer's Email Address drillerwatson@hotmail.com

Pump Installer's Firm Name Watson Well Drilling

Pump Installer's Firm Address Route 1 Box 27

City: Red Cloud State NE Zip Code 68970-0000 Phone 402 - 746-3373

Pump Installer's Firm Email Address

c Pumping Rate 225 gallons per minute E measured or estimated

d Drop pipe diameter 3. inches e Length of drop pipe 152. feet.

f Pumping equipment installed 10 / 24 / 2005 g Pump Brand BERKELEY

h This well will be used to pump less than 50 gpm ☐

9 Well Construction Information

a Total well depth 164. feet. b Static Water Level 98. feet.

c Pumping Water Level 146. feet. d Well construction began: 10 / 13 / 2005

e Well construction completed: 10 / 13 / 2005 f Bore hole diameter in inches. Top 11. Bottom 9.

g Casing and Screen Joints Glued Other

10 Well Construction (Casing and Screen)

Fr Depth	To Depth	Case Scrn	In Diam	Out Diam	Thickness	Scrn Slot Size	Material	Trade name	NOLID
0	145	casing	6.065	6.625	.280		PVC	PW	113237099111
145	155	screen	6.065	6.625	.280	.030	PVC	JAYCO	113237099111
155	164	casing	6.065	6.625	.280		PVC	PW	113237099111

11 Well Construction (Grout and Gravel)

NOL ID	From Depth	To Depth	GroutGravel	Material
113237099111997	0	15	grout	3/8 BENTONITE CHUNKS
113237099111997	15	164	gravel	3/8 & SMALLER

12 Geolog Material Logged

NOL ID	From Depth	To Depth	Description
113237099111997	0	90	TOPSOIL & CLAY
113237099111997	90	146	SANDY CLAY
113237099111997	146	155	MEDIUM SAND & GRAVEL
113237099111997	155	156	OCHRE
113237099111997	156	164	GRAY SHALE

Appendix D:

Property Records for the Former CCC/USDA Facility

R. C. HUMES
TO
COMMODITY CREDIT CORPORATION.

Filed for record April 20, 1950 at 2:35 P.M.
G. F. Doering., County clerk & recorder gfd

Bin Site #48-09I-4 --- BLADEN.

LEASE WITH OPTION TO PURCHASE.

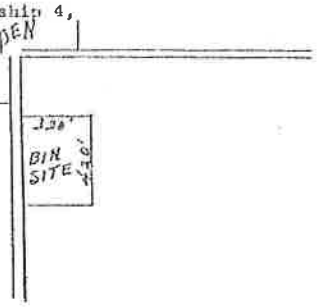
THIS LEASE, made and entered into this 5th day of April, 1950, by and between R. C. Humes of Bladen, Nebr, Lessor, and Commodity Credit Corporation, Lessee.

WITNESSETH THAT:

I. The Lessor leases to the Lessee, and the Lessee hereby leases from the Lessor, upon the terms and conditions hereinafter stated, the following described real estate (hereinafter called "property") situated in the County of Webster and State of Nebraska, consisting of - - - - - square feet of space in Block - - - -, Lot - - - - Subdivision - - - - - Town or West 320 feet of County Surveyor's Lot #5, Approx 3 A. of the

NW¼ of the - - - - - of I/4 of Section I7, Township 4, Range II,

to permit the placing thereon of C.C.C. owned granaries and facilities. This space is located as indicated herein:



2. The term of the lease shall be for a period of five years, commencing the 5th day of April, 1950, and ending the 5th day of April, 1955, with the right of the Lessee to terminate said lease, and liability for any further rent, on the first day of any month of any year, by giving thirty days' previous notice in writing to the Lessor.

3. As rent for said property, the Lessee shall pay the Lessor Fifty & no/100 Dollars ($50.00) per year, such rent to be payable October I of each year.

4. The Lessor warrants that he is the owner of the property, has the right to give the Lessee possession under this lease, and will, so long as this lease remains in effect, warrant and defend the Lessee's possession against any and all persons whomsoever.

5. The Lessee shall have the right to construct or erect storage structures or facilities on said property and, at the expiration of said lease or any renewal or extension thereof or at any time this lease is in effect, may remove said storage structures or facilities or any part thereof, whether or not such structures or facilities have become legally a fixture. It is, therefore, hereby agreed that the Lessee shall have the right of ingress and egress at any time to the space herein leased.

6. The Lessee shall not assign this lease nor sublet said property or any part thereof without the written consent of the Lessor.

7. The Lessor hereby reserves unto itself, and/or its lessees, the right to operate, maintain and renew such pipe lines, electric transmission lines, telephone lines, telegraph lines, signal lines and other facilities of like character as may exist upon, under or over the leased premises as of the date of this lease, it being agreed that this lease is subject and subordinate to any and all rights granted by the Lessor for any such existing lines and facilities.

It is further agreed that upon the expiration of this lease, or in case the Lessee shall in any manner fail to comply with the terms and conditions hereof, the Lessee shall, forthwith, cease to use or remain upon said premises and shall remove all the improvements placed thereon by the Lessee and restore said premises to substantially their former state.

If the Lessee fails to surrender to the Lessor the leased premises, upon any termination or expiration of this lease, all the liabilities and obligations of the Lessee hereunder shall continue in effect until the leased premises are surrendered, and no termination or expiration hereof shall release the Lessee from any liability or obligation hereunder which theretofore or thereafter may accrue.

It is further agreed that this lease shall be binding upon the Lessee and assigns of the Lessee, and shall inure to the benefit of the Lessor, its successors and assigns.

No member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this agreement or to any benefit to arise therefrom. Nothing, however, herein contained shall be construed to extend to any incorporated company, if the agreement be for the general benefit of such corporation or company.

8. The Lessor grants and gives the Lessee the option, at any time while this lease is in effect, to purchase said property from the Lessor, his heirs, executors, administrators, and assigns, for the sum of Four Hundred & no/100 Dollars ($400.00). In the event the Lessee shall exercise this option to purchase said property, the Lessor agrees to execute a good and sufficient warranty deed conveying fee simple title to said property free and clear of all taxes, liens, or encumbrances except for the following and no others: - - - - - - - - - - - - - -

IN TESTIMONY WHEREOF, the parties have executed this instrument in duplicate this day and year first above written.

/s/ JOHN D. HARVEY., Witness.

/s/ R. C. HUMES., Lessor.
By- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -
(Title)

/s/ JOHN D. HARVEY., Witness

COMMODITY CREDIT CORPORATION, LESSEE
By /s/ RAY D. JOHNSON.
Contracting Officer,
Chairman Webster County PMA Committee.

State of Nebraska)
: ss
County of Webster)

the date last aforesaid.
My Commission expires on the 15th day of Sept. 1952.

:WEBSTER COUNTY, NEBRASKA: /s/ HARRY L. ROBINSON., Notary Public.
:NOTARIAL SEAL:

FRED O. SCHMIDT, Lessor
TO
COMMODITY CREDIT CORPORATION, Lessee

Filed for record April 20th, at 2:40 P.M., 1950
G. F. Doering, County Clerk & Recorder JJ

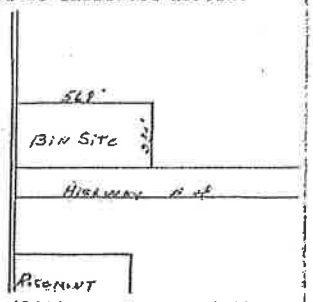
Bin Site # 48-091-5 - - - Rosemont

LEASE WITH OPTION TO PURCHASE

THIS LEASE, made and entered into this 5th day of April, 1950, by and between Fred O. Schmidt, of Blue Hill, Nebr., Lessor, and Commodity Credit Corporation, Lessee.

WITNESSETH THAT:

1. The Lessor leases to the Lessee, and the Lessee hereby leases from the Lessor, upon the terms and conditions hereinafter stated, the following described real estate (hereinafter called "property") situated in the County of Webster and State of Nebraska, consisting of - - - square feet of space in Block - - -, Lot - - - Subdivision - - - Town or - - - - - -; or the Approx. 3 acres of the SW¼ of the SW¼ of 1/4 of Section 20 Township 4 Range 9, to permit the placing thereon of C.C.C. owned granaries and facilites. This space is located as indicated herein:



2. The term of the lease shall be for a period of five years, commencing the 5th day of April, 1950, and ending the 5th day of April, 1955, with the right of the Lessee to terminate said lease, and liability for any further rent, on the first day of any month of any year, by giving thirty days' previous notice in writing to the lessor.

3. As rent for said property, the Lessee shall pay the Lessor, Fifty and no/100 - - Dollars ($50.00) per year, such rent to be payable October 1 of each year.

4. The Lessor warrants that he is the owner of the property, has the right to give the Lessee possession under this lease, and will, so long as this lease remains in effect, warrant and defend the Lessee's possession against any and all persons whomsoever.

5. The Lessee shall have the right to construct or erect storage structures or facilities on said property and, at the expiration of said lease or any renewal or extension thereof or at any time this lease is in effect, may remove said storage structures or facilities or any part thereof, whether or not such structures or facilities have become legally a fixture. It is, therefore hereby agreed that the Lessee shall have the right of ingress and egress at any time to the space herein leased.

6. The Lesee shall not assign this lease nor sublet said property or any part thereof without the written consent of the Lessor.

7. The Lessor hereby reserves unto itself, and/or its lessees, the right to operate, maintain and renew such pipe lines, electric transmission lines, telephone lines, telegraph lines, signal lines and other facilities of like character as may exist upon, under or over the leased premises as of the date of this lease, it being agreed that this lease is subject and subordinate to any and all rights granted by the Lessor for any such existing lines and facilities.

It is further agreed that upon the expiration of this lease, or in case the Lessee shall in any manner fail to comply with the terms and conditions hereof, the lessee shall, forthwith, cease to use or remain upon said premises and shall remove all the improvements placed thereon by the Lessee and restore said premises to substanatially their former state.

If the Lessee fails to surrender to the Lessor the leased premises, upon any termination or expiration of this lease, all the liabilities and obligations of the Lessee hereunder shall continue in effect until the leased premises are surrendered, and no termination or expiration hereof shall release the Lessee from any liability or obligation hereunder which theretofore or thereafter may accrue.

It is further agreed that this lease shall be binding upon the Lessee and assigns of the Lessee, and shall inure to the benefit of the Lessor, its successors and assigns.

No member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this agreement or to any benefit to arise therefrom. Nothing, however, herein contained shall be construed to extend to any incorporated company, if the agreement be for the general benefit of such corporation or company.

8. The Lessor grants and gives the Lessee the option, at any time while this lease is in effect, to purchase said property from the Lessor, his heirs, executors, administrators, and assigns, for the sum of Four Hundred and no/100 - - Dollars ($400.00). In the event the Lessee shall exercise this option to purchase said property, the Lessor agrees to execute a good and sufficient warranty deed conveying fee simple title to said property free and clear of all taxes, liens, /encumbrances except for the following and no others: -

IN TESTIMONY WHEREOF, the parties have executed this instrument in duplicate this day and year first above written.

/s/ JOHN D. HARVEY.
Witness.

/s/ JOHN D. HARVEY.
Witness.

/s/ FRED O. SCHMIDT, Lessor.
By: - - - - - - - - - - - -

- - - - - - - - - - - -
(Title)

COMMODITY CREDIT CORPORATION, Lessee
By: /s/ RAY D. JOHNSON.
Contracting Officer,
Chairman Webster County PMA Committee

STATE OF NEBRASKA)
:ss.
COUNTY OF WEBSTER)

On this 5 day of April, 1950, before me a Notary Public in and for said county personally came the above named Fred O. Schmidt, who is personally known to me to be the identical person whose name is affixed to the above instrument as Lessor and he acknowledged said instrument to be his voluntary act and deed. Witness my hand and notarial seal, the date last aforesaid.
My commission expires on the 15 day of April, 1952.

:WEBSTER COUNTY, NEBRASKA:
:NOTARIAL SEAL:

/s/ WILLIAM KORT, Notary Public.

N-657

appurtenances thereto and related facilities, on, over and across the following described lands, situate in Webster County, State of Nebraska, to wit:

A tract of land lying in the N½NW¼ of Section 33, Township 2 North, Range 12 West of the Sixth Principal Meridian, containing 20.21 acres, more or less, lying within the closed course more particularly described as follows:

Beginning at Point A, which point bears S 00°14'30" W a distance of 318.1 feet from the northwest corner of Section 33 and proceeding

thence N 84°55'00" E	757.0	feet to point B;
thence S 56°58'00" E	620.0	feet to point C;
thence S 33°02'00" W	150.0	feet to point D;
thence S 56°58'00" E	156.0	feet to point E;
thence S 84°43'00" E	907.1	feet to point F;
thence N 67°02'00" E	463.0	feet to point G;
thence S 00°42'00" W	240.2	feet to point H;
thence S 67°02'00" W	629.1	feet to point I;
thence N 84°43'00" W	445.1	feet to point J;
thence N 56°58'00" W	600.0	feet to point K;
thence S 33°02'00" W	142.3	feet to point L;
thence N 56°58'00" W	670.0	feet to point M;
thence S 65°42'00" W	534.0	feet to point N;
thence N 00°14'30" E	475.9	feet to point of beginning.

Approved as to Engineering Data: /s/ R. S. L. Date 6-7-54.

($2.75 revenue stamps affixed)

2. The grant of easement herein contained shall include the right of the United States, its agents, contractors, or assignees, to enter upon said premises to survey, clear and remove objects interfering with the use of said lands for the purposes hereinabove mentioned. Vendor reserves the right to cultivate, use and occupy said premises for any purpose consistent with the rights and privileges above granted, and which will not interfere with or obstruct the construction, operation and maintenance of the proposed Franklin Canal and related facilities. In case of permanent abandonment of said right-of-way, the title and interest herein granted shall end, cease and determine.

3. Vendor is to be paid damages for all crops growing upon the lands herein described if destroyed by Government construction forces during the construction of the proposed facilities. The amount of damages is to be determined by a Bureau appraisal board by an appraisal made on or about the date destruction occurs. Said amount shall not exceed $80.00 an acre.

4. The grant of easement herein contained is subject to any coal or mineral rights reserved to or outstanding in third parties as of the date of this contract, and to any existing rights-of-way in favor of the public or third parties for roads, railroads, telephone lines, transmission lines, ditches, conduits, or pipe lines. on, over, or across said lands.

5. As a complete consideration for the above grant of easement and as full payment for any damage to the lands of the Vendor resulting from the use of said lands by the United States as provided in this contract, the United States agrees to pay the Vendor the sum of Two Thousand One Hundred Thirty-three and 40/100 Dollars ($2,133.40), except as specifically provided in Article 3 hereof.

6. If the Secretary of the Interior determines that the title should be acquired by the United States by judicial procedure, either to procure a safe title or to obtain title more quickly or for any other reason, then the award to be made for the interest acquired in said lands in said proceedings shall be the same amount as the purchase price herein provided.

7. No Member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this restriction shall not be construed to extend to this contract if made with a corporation or company for its general benefit.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be exexuted the day and year first above written.

THE UNITED STATES OF AMERICA
By /s/ H. E. ROBINSON.
/t/ H. E. Robinson.
Title Projects Manager.
/s/ IDA RICHARDSON.
/t/ Ida Richardson.

CERTIFICATE OF ACKNOWLEDGMENT

STATE OF NEBRASKA)
: ss.
COUNTY OF LANCASTER)

I, E. Chet Swearengen, a Notary Public in and for said county in the State aforesaid, do hereby certify that Ida Richardson, a widow who is personally known to me to be the person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that she signed, sealed, and delivered said instrument of writing as her free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and official seal this 29th day of June, 1954.

:LANCASTER COUNTY, NEBRASKA:
:NOTARIAL SEAL:

/s/ E. CHET SWEARENGEN., Signature.
Notary Public. Title
My commission expires Aug. 4, 1957.

R. C. HUMES, Lessor
to
COMMODITY CREDIT CPN.Lessee.

Filed for record July 21st, 1954 at 4:25 P. M.
G. F. Doering, County Clerk & Recorder. EB

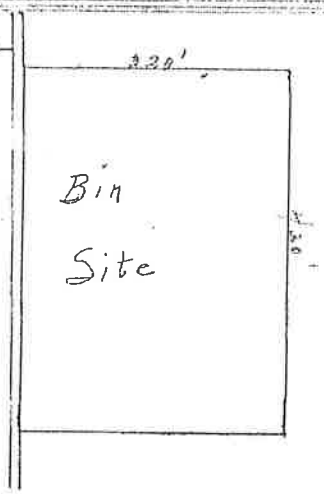
CL Form-58
(4-2-54)

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURE STABILIZATION AND CONSERVATION
COMMODITY CREDIT CORPORATION
LEASE OF PROPERTY

THIS LEASE, made and entered into this 20 day of July, 1954 by and between R. C. Humes of Bladen, Nebr., Lessor, and Commodity Credit Corporation, Lessee.

WITNESSETH THAT:

I. The Lessor leases to the Lessee, and the Lessee hereby leases from the Lessor, upon the terms and conditions hereinafter stated, the following described real estate (hereinafter called "property") situated in the County of Webster and State of Nebraska:



West 320 feet of County Surveyor's
Lot # 5 NW¼ Sec. I7 Town 4, Range II
containing 3 acres, more or less.

2. The term of the lease shall be for a period of 5 years, commencing the 5 day of April, I955, and ending the 5 day of April, I960, with the right of the Lessee, during such term or any extension thereof, to terminate said lease, and liability for any further rent, on the I day of any month of any year, by giving 30 days' previous notice in writing to the Lessor.

3. As rent for said property, the Lessee shall pay the Lessor Fifty and No/I00 Dollars ($50.00) per year, such rent to be payable in advance, but to be apportionable in the event the lease is terminated as provided in paragraph 2 hereof:

4. The Lessor warrants that he is the owner of the property, has the right to give the Lessee possession under this lease, and will, so long as this lease remains in effect, warrant and defend the Lessee's possession against any and all persons whomsoever.

5. The Lessee shall have the right, during this lease, to erect storage structures or facilities, make alterations, install scales, fences, or signs, in or upon the premises hereby leased and, at the expiration of said lease or any renewal or extension thereof or at any time this lease is in effect, may remove said storage structures, facilities, scales, fences or signs or any part thereof, whether or not such structures, facilities, scales, fences or signs have become legally a fixture.

6. The Lessee shall not assign this lease without the written consent of the Lessor. The Lessee, may, however, sublet the structures on the premises leased hereunder, or any one or more of them for the term of the lease or any part thereof upon such terms and conditions as Lessee may wish to so sublet.

7. The Lessee, if required by the Lessor, shall, upon the expiration of this lease, or renewal thereof, restore the premises to the same condition as that existing at the time of entering upon the same under this lease, reasonable and ordinary wear and tear and damages by the elements or by circumstances over which the Lessee has no control excepted: Provided, however, that if the Lessor requires such restoration, the Lessor shall give written notice thereof to the Lessee 30 days before the termination of the lease.

8. The Lessor grants and gives the Lessee the option as a consideration of this lease and for the further consideration of one dollar, the receipt of which is hereby acknowledged, to renew said lease for a period of 5 years from the Lessor, his heirs, executors, administrators, and assigns, for the sum of Fifty & No/I00 Dollars ($50.00) per year.

9. As a consideration of this lease and for the further consideration of one dollar, the receipt of which is hereby acknowledged, the Lessor grants and gives the Lessee the option, at any time while this lease is in effect, to purchase said property from the Lessor, his heirs, executors, administrators, and assigns, for the sum of Four Hundred Dollars ($400.00). In the event the Lessee shall exercise this option to purchase said property, the Lessor agrees to furnish at his own expense an abstract of title, certificate of title, or other evidence of title satisfactory to CCC and to execute a good and sufficient warranty deed conveying fee simple title to said property free and clear of all taxes, liens, or encumberances except for the following, and no others.

I0. In the event any increased tax assessment is made against the Lessor or the property by virtue of the erection of storage structures and facilities thereon by the Lessee, the Lessor agrees to cooperate fully in any contest of such increased assessment which the Lessee feels should be made. The Lessee agrees that the rental hereunder shall be adjusted upward by the amount of any such increased tax assessment which the Lessor and Lessee mutually agree to be proper or which is determined to be legally valid in court proceedings.

II. No member of or Delegate to Congress or Resident Commissioner, shall be admitted to any share or part of this lease or purchase or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this lease or purchase if made with a corporation for its general benefit.

I2. The Lessor warrants that he has not employed any person to solicit or secure this lease upon any agreement for a commission, percentage, brokerage, or contingent fee and that no such consideration or payment has been or will be made. Breach of this warranty shall give CCC the right to annul the lease, or, in its discretion, to deduct from the rental or purchase price the amount of such commission, percentage, brokerage, or contingent fees. This warranty shall not apply to commissions payable by the Lessor if the lease is secured or made through a bona-fide agent maintained by the Lessor for the purpose of leasing or selling his property.

(Seal) /s/ R. C. HUMES., Lessor.
(Seal) /s/ O. L. LINGREN.,
Notary Public.
Commission expires Aug.I7,I954.
:WEBSTER COUNTY, NEBRASKA:
:NOTARY PUBLIC SEAL:

COMMODITY CREDIT CORPORATION, LESSEE.
By /s/ JOHN D. HARVEY., Chairman,
Webster County, ASC Committee.

ESTATE OF ALBERT U. KALEY,DEC'D
TO
HOWARD B. KALEY.

Filed for record July 24th, I954 at I0:40 A. M.
G. F. Doering, County Clerk & Recorder. EB

FINAL DECREE
IN THE COUNTY COURT OF WEBSTER COUNTY, NEBRASKA.
IN THE MATTER OF THE ESTATE OF Albert U. Kaley, DECEASED.

At a session of the County Court held on the 24th day of July, I954, there being present, Harry M. Barrows, County Judge of said county, and Howard B. Kaley, Adm. and Howard S. Foe, his attorney,

This day having been assigned by order of this court, for hearing on the petition and final report of the above named legal representative of said estate, praying, among other things, for the examination and allowance of the final report of such representative heretofore filed, and for final settlement of said account and report, and for a discharge of said representative.

THE COURT FINDS: that legal notice of the filing of said final report and petition for final

DEED RECORD

No. 135 [illegible]

Huffman (Title in Survivor)—No. 163½—415 Printed Words

FROM

R. C. & NORA HUMES, husb & wf

TO

ARTHUR B. & STELLA MAY MOREY, husb & wf

STATE OF NEBRASKA } ss. WEBSTER } Entered in Numerical Index and filed for record in the Register of Deeds of said County the 4th day of November 1957 at 10 o'clock and 00 minutes A.M., and recorded in Book 32 page 210 of Deeds

By G. F. Doering., Register of Deeds
eb Deputy.

WARRANTY DEED—VESTING ENTIRE TITLE IN SURVIVOR.

KNOW ALL MEN BY THESE PRESENTS, That We, R. C. Humes and Nora Humes, husband and wife, each in his & her own right,

in consideration of - - - One & 00/100 - - - - - - - - *DOLLARS*

in hand paid, do hereby grant, bargain, sell, convey and confirm unto Arthur B. Morey and Stella May Morey, husband and wife

as JOINT TENANTS, and not as tenants in common; the following described real estate, situated in the County of Webster and State of Nebraska, to-wit:

All that portion of County Surveyor's Lot Number Five (5), of the Northwest Quarter (NW¼) of Section Seventeen (17), Township Four (4) North, Range Eleven (11) West of the 6th P. M., Webster County, Nebraska, consisting of New Territory annexed to the Village of Bladen, Nebraska and containing Seven (7) Acres more or less. Also all that portion of County Surveyor's Lot Number Five (5) of the Northwest Quarter (NW¼) of Section Seventeen (17), Township Four (4) North, Range Eleven (11) West lying outside of the New Territory annexed to the Village of Bladen, Webster County, Nebraska, containing 2.2 acres, more or less, also Lots Two (2), and Three (3) in the Northwest Quarter (NW¼) of Section Seventeen (17), Township Four (4) North, Range Eleven (11) West of the 6th P. M., Webster County, Nebraska.

($1.65 revenue stamps affixed)

together with all the tenements, hereditaments and appurtenances to the same belonging, and all the estate, title, dower, right of homestead, claim or demand whatsoever of the said grantors, of, in or to the same, or any part thereof; subject to -

IT BEING THE INTENTION OF ALL PARTIES HERETO, THAT IN THE EVENT OF THE DEATH OF EITHER OF SAID GRANTEES, THE ENTIRE FEE SIMPLE TITLE TO THE REAL ESTATE DESCRIBED HEREIN SHALL VEST IN THE SURVIVING GRANTEE.

TO HAVE AND TO HOLD the above described premises, with the appurtenances, unto the said grantees as JOINT TENANTS, and not as tenants in common, and to their assigns, or to the heirs and assigns of the survivor of them, forever, and they *the grantors named herein for* them *and* their *heirs, executors, and administrators, do covenant with the grantees named herein and with their assigns and with the heirs and assigns of the survivor of them, that* they are *lawfully seized of said premises; that they are free from incumbrance except as stated herein; and that* they *the said grantors have good right and lawful authority to sell the same, and that* they *will and* their *heirs executors and administrators shall warrant and defend the same unto the grantees named herein and unto their assigns and unto the heirs and assigns of the survivor of them, forever, against the lawful claims of all persons whomsoever, excluding the exceptions named herein.*

IN WITNESS WHEREOF We *have hereunto set* our *hand* s *this* 16th *day of* May *, A. D.* 1957.

In presence of

/s/ O. L. LINDGREN.

/s/ R. C. HUMES.
/s/ NORA HUMES.

STATE OF NEBRASKA
County of WEBSTER } ss.

On this 16th *day of* May *A. D.* 1957, - - - - - *before me, a Notary Public in and for said County, personally came the above named* R. C. Humes and Nora Humes, Husband and Wife,

who are *personally known to me to be the identical persons whose name* s are *affixed to the above instrument as grantor* s *, and* they *acknowledged said instrument to be* their *voluntary act and deed.*

WITNESS my hand and Notarial Seal the date last aforesaid.

/s/ O. L. LINDGREN., *Notary Public*

My commission expires on the 23rd *day of* August *A. D.* 1960.

:WEBSTER COUNTY, NEBRASKA:
:NOTARIAL SEAL:

BK 30 PG 253

WARRANTY DEED (To Joint Tenancy Certificate Title in Survivor)

FROM	STATE OF NEBRASKA, } ss.	
ARTHUR B. MOREY & WIFE	WEBSTER County, and filed for Record in the County Clerk's Office of said County, the 28 day of May 19 58, at 2:30 o'clock P. M., and recorded in Book 32 of Deeds, Page 253.	Entered on Numerical Index
To		
CARL H. & ERVA M. HUBERT	By G. F. Doering., Register of Deeds. eb Deputy.	

KNOW ALL MEN BY THESE PRESENTS, That We, Arthur B. Morey and Estella May Morey, husband & wife (Also known as Stella May Morey) each in his or her own right and as the spouse of the *in consideration of* Three thousand - ($3,000.00) - *DOLLARS,*

in hand paid, do hereby grant, bargain, sell, convey and confirm unto Carl H. Hubert and Erva M. Hubert, husband and wife

as JOINT TENANTS, and not as tenants in common; the following described real estate, situated in the County of Webster *and State of Nebraska, to-wit:*

All that portion of County Surveyor's Lot 5 of the NW¼ of Section 17, Twp. 4 N, Range 11W of the 6th P. M., Webster County, Nebraska consisting of New Territory annexed to the Village of Bladen, Nebraska containing 7 acres more or less. Also that portion of County Surveyor's Lot 5 of the NW¼ of 17-4-11 lying outside of the New Territory annexed to the Village of Bladen, Webster County, Nebraska containing 2.2 acres, more or less, also Lots 2 and 3 in NW¼ of Section 17, Two. 4 N, Range 11 West of the 6th P. M., Webster County, Nebraska.

All of Lot 6, in the NW¼ of Section 17, Two. 4 N, Range 11 West of the 6th P. M., Webster County, Nebraska.

($3.30 revenue stamps affixed)

together with all the tenements, hereditaments, and appurtenances to the same belonging, and all the estate, title, dower, right of homestead, claim or demand whatsoever of the said grantor s , of, in or to the same, or any part thereof; subject to - - - - - - - - - - - - - - -

IT BEING THE INTENTION OF ALL PARTIES HERETO, THAT IN THE EVENT OF THE DEATH OF EITHER OF SAID GRANTEES, THE ENTIRE FEE SIMPLE TITLE TO THE REAL ESTATE DESCRIBED HEREIN SHALL VEST IN THE SURVIVING GRANTEE.

TO HAVE AND TO HOLD the above described premises, with the appurtenances, unto the said grantees as JOINT TENANTS, and not as tenants in common, and to their assigns, or to the heirs and assigns of the survivor of them, forever, and that *the grantors named herein for* themselves *and* their *heirs, executors, and administrators, do covenant with the grantees named herein and with their assigns and with the heirs and assigns of the survivor of them, that* they are *lawfully seized of said premises; that they are free from incumbrance except as stated herein, and that* they *the said grantors have good right and lawful authority to sell the same, and that* they *will and* their *heirs, executors and administrators shall warrant and defend the same unto the grantees named herein and unto their assigns and unto the heirs and assigns of the survivor of them, forever, against the lawful claims of all persons whomsoever, excluding the exceptions named herein.*

IN WITNESS WHEREOF We *have hereunto set* our *hands this* 28th *day of* May, 1958.

EXECUTED

In Presence of

/s/ ROBERT J. MEYER. /s/ ARTHUR B. MOREY.
/s/ ROBERT J. MEYER. /s/ ESTELLA MAY MOREY.

STATE OF NEBRASKA, } ss. WEBSTER *County*

On this 28th *day of* May, 19 58, *before me, the undersigned, a Notary Public, duly commissioned and qualified for said county, personally came* Arthur B. Morey and Estella May Morey, (Also known as Stella May Morey), husband and wife *to me known to be the identical person or persons whose name is or names are subscribed to the foregoing instrument, and acknowledged the execution thereof to be, his, her or their voluntary act and deed.*

Witness my hand and Notarial Seal the day and year last above written.

WEBSTER COUNTY, NEBRASKA: NOTARIAL SEAL: /s/ ROBERT J. MEYER., *Notary Public*

My commission expires the 14th *day of* Sept. , 19 62.

STATE OF NEBRASKA, } ss. *County*

On this day of , 19 , before me, the undersigned, a Notary Public, duly commissioned and qualified for said county, personally came

to me known to be the identical person or persons whose name is or names are subscribed to the foregoing instrument, and acknowledged the execution thereof to be, his, her or their voluntary act and deed.

Witness my hand and Notarial Seal the day and year last above written.

Notary Public.

My commission expires the day of , 19

3. Parties of the first part hereby agree to hold harmless the party of the second part for any damage that may result to the before mentioned land of the parties of the first part as a result of the erection of said dam.

Said agreement will be binding on the grantees, heirs or assigns of the parties of the first part and the party of the second part.

Signatures for Easement.

/s/ CLYDE M. WOLFE.,
/t/ Clyde M. Wolfe, Party of the 1st Part.
/s/ LOUISE ELEANOR WOLFE.,
/t/ Louise Eleanor Wolfe, Party of the 1st Part.
/s/ FRANK L. PETERSON.,
/t/ Frank L. Peterson, Party of the 2nd Part.

STATE OF COLORADO)
:ss.
COUNTY OF ARAPAHOE)

SUBSCRIBED in my presence and sworn to before me this 2nd day of February, 1960.

:ARAPAHOE COUNTY, COLORADO:
:NOTARY PUBLIC SEAL:

/s/ BETTY BROWN., Notary Public.
My Commission expires Feb. 27, 1962.

THE STATE OF ARIZONA)
:ss.
COUNTY OF YUMA)

The foregoing instrument was acknowledged before me by Clyde M. Wolfe and Louise Eleanor Wolfe this 8th day of January, 1960.

:YUMA COUNTY, ARIZONA:
:NOTARY PUBLIC SEAL:

/s/ MARY M. OUTLAW., Notary Public.
My Commission expires July 10, 1963.

***

MYRTLE CATHER
TO
JOHN WORLEY

Filed for record February 9, 1960 at 10:45 A. M.
G. F. Doering., County Clerk & Recorder. eb

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that I, Myrtle E. Cather, of Bladen, Webster County, Nebraska, do hereby appoint John Worley of Bladen, Webster County, Nebraska, my attorney, for me and in my name to ask, demand, sue for, collect, recover and receive all sums of money, debts, dues, accounts, legacies, bequests, interests, dividends, annuities, and demands whatsoever as are now or shall hereafter become due, owing, payable or belonging to me, and have, use and take all lawful ways and means in my name or otherwise, for the recovery thereof, by attachments, arrests, distress or otherwise, and to compromise and agree for the same, and acquittances or other sufficient discharges for the same, for me, and in my name to make, seal and deliver; to bargain, contract, agree for, buy, sell, mortgage, hypothecate, and in any and every way and manner deal in and with goods and merchandise, choses in action, and other property in possession or in action, and to release mortgages on lands or chattels, and to make, do and transact all and every kind of business of what nature and kind soever. Also, to bargain, contract, agree for, purchase, receive, and take lands, tenements, hereditaments and accept the seizin and possession of all lands and all deeds and other assurances, and to lease, let demise, bargain, sell, release, convey, mortgage and hypothecate lands, tenements and hereditaments, upon such terms and conditions, and under such covenants, as he shall think fit and also for me and in my name and as my act and deed to sign, seal, execute, and deliver and acknowledge such deeds, leases, and assignment of leases, covenants, indentures, agreements, mortgages, hypothecations, bottomries, charter parties, bills of lading, bills, bonds, notes, receipts, evidencesbf debt, releases, and satisfaction of mortgages, judgments and other debts and such other instruments in writing of whatever kind or nature as may be necessary or proper in the premises. Giving and granting unto John Worley, said attorney and his substitute or substitutes, full power and authority to do and perform all and every act and thing whatsoever requisite and necessary to be done in and about the premises, as fully to all intents and purposes as I might or could do if personally present, I hereby ratifying and confirming all that John Worley, said attorney, or his substitute or substitutes, shall lawfully do or cause to be done by virtue of these presents.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 11th day of July, 1958.

/s/ MYRTLE CATHER.

STATE OF NEBRASKA)
:
COUNTY OF ADAMS)

On this 11th day of July, 1958, Myrtle E. Cather personally appeared before me and acknowledged that she executed the foregoing power of attorney as her voluntary act and deed.

:STATE OF NEBRASKA :
:GENERAL NOTARY SEAL:

/s/ DON BROCK., Notary Public.
My commission expires August 25, 1958.

***

CARL H. HUBERT
TO
COMM CREDIT CPN.

Filed for record February 9th, 1960 at 4:00 P.M.
G. F. Doering., County Clerk & Recorder., eb

CCC GRAIN FORM-19
(9-2-58)

U. S. DEPARTMENT OF AGRICULTURE
COMMODITY STABILIZATION SERVICE
COMMODITY CREDIT CORPORATION.
LEASE OF PROPERTY

THIS LEASE, made entered into this 1st day of February, 1960, by and between Carl H. Hubert of Bladen, Nebraska, Lessor, and Commodity Credit Corporation, Lessee.

WITNESSETH THAT:

1. The Lessor leases to the Lessee, and the Lessee hereby leases from the Lessor, upon the terms and conditions hereinafter stated, the following described real estate (hereinafter called "property") situated in the County of Webster and State of Nebraska.

West 320 feet of County Surveyor's Lot #5, NW¼ 17-4-11
containing 3 acres, more or less.

2. The terms of the lease shall be for a period of 10 years, commencing the 5th day of April, 1960, and ending the 5th day of April, 1970, with the right of the Lessee, during such term or any extension thereof, to terminate said lease, and liability for any further rent, on the 1st day of Any Month of any year, by giving 30 days' previous notice in writing to the Lessor.

3. As rent for said property, the Lessee shall pay the Lessor Ninety Dollars ($90.00) - - per year, such rent to be payable in advance, but to be apportionable in the event the lease is terminated as provided in paragraph 2 hereof.

4. The Lessor warrants that he is the owner of the property, has the right to give the Lessee possession under this lease, and will, so long as this lease remains in effect, warrant and defend the Lessee's possession against any and all persons whomsoever.

5. The Lessee shall have the right, during this lease, to erect storage structures or facilities, make alterations, install scales, fences, or signs, in or upon the premises hereby leased and, at the expiration of said lease or any renewal or extension thereof or at any time this lease is in effect, may remove said storage structures, facilities, scales, fences or signs or any part thereof, whether or not such structures, facilities, scales, fences or signs have become legally a fixture.

6. The Lessee shall not assign this lease without the written consent of the Lessor. The Lessee, may, however, sublet the structures on the premises leased hereunder, or any one or more of them for the term of the lease or any part thereof upon such terms and conditions as Lessee may wish to so sublet.

7. The Lessee, if required by the Lessor, shall, upon the expiration of this lease, restore the premises to the same condition as that existing at the time of entering upon the same under this lease, reasonable and ordinary wear and tear and damages by the elements or by circumstances over which the Lessee has no control excepted: Provided, however, That if the Lessor requires such restoration, the Lessor shall give written notice thereof to the Lessee 30 days before the termination of the Lease.

8. The Lessor grants and gives the Lessee the option as a consideration of this lease and for the further consideration of one dollar, the receipt of which is hereby acknowledged, to renew said lease for a period of 5 years from the Lessor, his heirs, executors, administrators, and assigns, for the sum of Ninety Dollars ($90.00) per year.

9. As a consideration of this lease and for the further consideration of one dollar, the receipt of which is hereby acknowledged, the Lessor grants and gives the Lessee the option, at any time while this lease is in effect, to purchase said property from the Lessor, his heirs, executors, administrators, and assigns, for the sum of Appraisal Method - Dollars ($- - -). In the event the Lessee shall exercise this option to purchase said property, the Lessor agrees to furnish at his own expense an abstract of title, certificate of title, or other evidence of title satisfactory to CCC and to execute a good and sufficient warranty deed conveying fee simple title to said property free and clear of all taxes, liens, or encumbrances except for the following, and no others. The sum to be determined by three persons, one to be selected by the lessor, one to be selected by the lessee, and the third person to be selected by the first two.

10. In the event any increased tax assessment is made against the Lessor or the property by virtue of the erection of storage structures and facilities thereon by the Lessee, the Lessor agrees to cooperate fully in any contest of such increased assessment which the Lessee feels should be made. The Lessee agrees that the rental hereunder shall be adjusted upward by the amount of any such increased tax assessment which the Lessor and Lessee mutually agree to be proper or which is determined to be legally valid in court proceedings.

11. No Member of or Delegate to Congress or Resident Commissioner, shall be admitted to any share or part of this lease or purchase or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this lease or purchase if made with a corporation for its general benefit.

12. The Lessor warrants that he has not employed any person to solicit or secure this lease upon any agreement for a commission, percentage, brokerage, or contigent fee and that no such consideration or payment has been or will be made. Breach of this warranty shall give CCC the right to annul the lease, or, in its discretion, to deduct from the rental or purchase price the amount of such commission, percentage, brokerage, or contigent fees. This warranty shall not apply to commissions payable by the Lessor if the lease is secured or made through a bona-fide agent maintained by the Lessor for the purpose of leasing or selling his property.

(Seal) /s/ CARL H. HUBERT, LESSOR
(Seal) /s/ ERVA M. HUBERT, LESSOR

COMMODITY CREDIT CORPORATION, LESSEE
By /s/ RALPH PORTENIER., Chairman,
Webster ASC County Committee.

STATE OF NEBRASKA)
: Subscribed to by me this 3rd day of Febr., 1960.
COUNTY OF WEBSTER)
:WEBSTER COUNTY, NEBRASKA:
:NOTARIAL SEAL:

/s/ ROBERT J. MEYER., Notary Public.
My Com. Exp. 9/14/62.

B. W. BUSS
TO
COMM CREDIT CPN

Filed for record February 9th, 1960 at 4:05 P. M.
G. F. Doering., County Clerk & Recorder., eb

EXTENSION OF LEASE

"THIS EXTENSION OF LEASE made and entered into this 1st day of February, 1960, by and between B. W. Buss, hereinafter called lessor, and Commodity Credit Corporation, hereinafter called Lessee.

WITNESSETH

WHEREAS, the parties hereto have heretofore entered into a certain lease dated 30th August, 1954, wherein the Lessor leased to the Lessee the following described property:

Tract 1 in SE¼ 4-4-10

for a term ending October 1, 1960, and
WHEREAS, it is desired by the parties hereto to extend the said lease for an additional term under the same terms and conditions:
NOW, THEREFORE, it is mutually understood and agreed by and between the parties hereto as follows:

(1) The said lease is hereby extended for an additional term beginning October 1, 1960, and ending October 1, 1970,

(2) Lessors grant and give to the Lessee the option of further renewal of the lease for an additional period of five (5) years ending October 1, 1975, under the same terms and conditions of the lease as extended herein provided the Lessee gives the Lessors written notice to renew at least thirty (30) days prior to the time the lease, as extended,

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FORM CCC GRAIN-15
(12-9-63)

U. S. DEPARTMENT OF AGRICULTURE
Agricultural Stabilization and Conservation Service
Commodity Credit Corporation

LEASE OF PROPERTY

THIS LEASE, made and entered into this 3rd day of March, 19 69, by and between Carl H. Hubert and Erva M. Hubert of Bladen, Nebraska (hereinafter called the "Lessor") and Commodity Credit Corporation, (hereinafter called the "Lessee").

WITNESSETH THAT:

1. The Lessor leases to the Lessee, and the Lessee hereby leases from the Lessor, upon the terms and conditions hereinafter stated, the following described real estate (hereinafter called "property") situated in the County of Webster and State of Nebraska

(Enter here a complete legal description of the site)

West 320 Feet of County Surveyor's Lot #5, NW¼ 17-4-11

containing 3 acres, more or less.

2. The term of the lease shall be for a period of 10 years, commencing the 1st day of April 19 69, and ending the 31st day of March, 19 79, with the right of the Lessee, at any time during each term or any extension thereof, to terminate said lease, and liability for any further rent, by giving 30 days' previous notice in writing to the Lessor.

3. As rent for said property, the Lessee shall pay the Lessor One Hundred Thirty-Five Dollars ($ 135.00) per year, each rent to be payable in advance, but to be apportionable in the event the lease is terminated as provided in paragraph 2 hereof.

4. The Lessor warrants that he is the owner of the property, has the right to give the Lessee possession under this lease, and will, so long as this lease remains in effect, warrant and defend the Lessee's possession against any and all persons whomsoever.

5. The Lessee shall have the right, during this lease, to erect storage structures or facilities, make alterations, install scales, fences, or signs, in or upon the premises hereby leased and, at the expiration of said lease or any renewal or extension thereof or at any time this lease is in effect, may remove said storage structures, facilities, scales, fences or signs or any part thereof, whether or not such structures, facilities, scales, fences or signs have become legally a fixture.

6. The Lessee shall not assign this lease without the written consent of the Lessor. The Lessee, may, however, sublet the structures on the premises leased hereunder, or any one or more of them for the term of the lease or any part thereof upon such terms and conditions as Lessee may wish to so sublet.

7. The Lessee, if required by the Lessor, shall upon the expiration of this lease, restore the premises to the same condition as that existing at the time of first entering upon the same under this lease or under any prior lease from the Lessor to the Lessee which has been continuous, reasonable and ordinary wear and tear and damages by the elements or by circumstances over which the Lessee has no control excepted: Provided, however, That if the Lessor requires such restoration, the Lessor shall give written notice thereof to the Lessee 30 days before the termination of the lease.

8. The Lessor grants and gives the Lessee the option as a consideration of this lease and for the further consideration of one dollar, the receipt of which is hereby acknowledged, to renew said lease for a period of 10 years from the Lessor, his heirs, executors, administrators, and assigns, for the sum of One Hundred Thirty-Five Dollars ($ 135.00) per year.

9. As a consideration of this lease and for the further consideration of one dollar, the receipt of which is hereby acknowledged, the Lessor grants and gives the Lessee the option, at any time while this lease is in effect, to purchase said property from the Lessor, his heirs, executors, administrators, and assigns, for the sum of Appraisal Method Dollars ($). In the event the Lessee shall exercise this option to purchase said property, the Lessor agrees to furnish at his own expense an abstract of title, certificate of title, or other evidence of title satisfactory to CCC and to execute a good and sufficient warranty deed conveying fee simple title to said property free and clear of all taxes, liens, or encumbrances except for the following, and no others. The sum to be determined by three persons, one to be selected by the lessor, one to be selected by the lessee and the third person to be selected by the first two.

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FORM CCC GRAIN 15 (REVERSE)

10. In the event any increased tax assessment is made against the Lessor or the property by virtue of the erection of storage structures and facilities thereon by the Lessee, the Lessor agrees to cooperate fully in any contest of such increased assessment which the Lessee feels should be made. The Lessee agrees that the rental hereunder shall be adjusted upward by the amount of any such increased tax assessment which the Lessor and Lessee mutually agree to be proper or which is determined to be legally valid in court proceedings.

11. No member of or Delegate to Congress or Resident Commissioner, shall be admitted to any share or part of this lease or purchase or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this lease or purchase if made with a corporation for its general benefit.

12. The Lessor warrants that he has not employed any person to solicit or secure this lease upon any agreement for a commission, percentage, brokerage, or contingent fee and that no such consideration or payment has been or will be made. Breach of this warranty shall give CCC the right to annul the lease, or, in its discretion, to deduct from the rental or purchase price the amount of such commission, percentage, brokerage, or contingent fees. This warranty shall not apply to commissions payable by the Lessor if the lease is secured or made through a bona-fide agent maintained by the Lessor for the purpose of leasing or selling his property.

(Seal) Carl H. Hubert, LESSOR

(Seal) Erva M. Hubert, LESSOR

_____, WITNESS

COMMODITY CREDIT CORPORATION, LESSEE

By Robert L. Postmier

Chairman, Webster ASC County Committee

Contracting Officer

State of Nebraska

County of Webster

On this 20th day of March 1969, before me a Notary Public in and for said county personally came the above-named Carl H. Hubert and Erva M. Hubert who is personally known to me to be the identical person(s) whose name(s) are affixed to the above instrument as Lessor and they acknowledged said instrument to be their voluntary act and deed. Witness my hand and notarial seal, the date last aforesaid.

My Commission expires on the 29th day of June, 1969.

Robert L. Rehm Notary Public

INDEXED
COMPARED
ASSESSOR
CARDED

Chg #325 and Return to- Commodity Credit Corp. Red Cloud NB.

State of Nebraska } ss.
Webster County

Entered on the numerical index and filed for record in the clerk's office of said County this 20 day of March A.D., 1969 at 3 o'clock and 35 minutes P.M. Recorded in Book 65 of ___ on Page 824

Mabel Douglas County Clerk

_____ Deputy

Page 654

1-BI-Nebr. Form 10

AGREEMENT FOR TERMINATION OF, SURRENDER OF, AND RELEASE OF LEASE

This agreement by and between Carl H. Hubert and Erva M. Hubert, hereinafter called "Lessor", and Commodity Credit Corporation, hereinafter called "CCC", is made with respect to a lease (hereinafter called "the lease") heretofore entered into between Lessor and CCC, whereby Lessor leased to CCC real estate situated in the County of Webster, Nebraska, described as follows:

West 320 Feet of County Surveyor's Lot #5, NW¼ 17-4-11

the lease being recorded in the office of the Register of Deeds in and for the County of Webster, Nebraska, on Page 824, in Book 65, of the Microfilmed Records.

NOW, THEREFORE, Lessor and CCC do hereby agree as follows:

(1) That the lease shall be and same is hereby cancelled and terminated effective the 28th day of August, 19 74.

(2) That Lessor hereby waives and releases CCC from any further obligation to restore the premises to the same condition as that existing at the time that CCC first entered upon the premises under the lease or under any prior lease.

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(3) That Lessor shall retain all rent previously paid by CCC, and that Lessor hereby releases CCC of all further obligation to make rent payments.

(4) This termination is executed on behalf of CCC pursuant to delegation of authority published in the Federal Register (26 F.R. 3900).

COMMODITY CREDIT CORPORATION

Carl H. Hubert

Ewa M. Hubert
Lessor

By [signature]
State Executive Director
Nebraska State ASCS Office

ACKNOWLEDGMENT

STATE OF NEBRASKA }
COUNTY OF Lancaster } SS.

On this 15th day of August, 1974, before me, the undersigned Notary Public in and for the County and State aforesaid, personally appeared [signature], State Executive Director, Agricultural Stabilization and Conservation Service, United States Department of Agriculture, who is personally known to me and personally known to be such State Executive Director, and the same person who executed the within and foregoing instrument, and he duly acknowledged the execution of the same for and on behalf of and as the free act and deed of Commodity Credit Corporation.

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IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year above written.

PATRICIA K. ANDERSON
GENERAL NOTARY
State of Nebraska
My Commission Expires
August 8, 1976

Patricia K. Anderson
Notary Public

My commission expires _____

ACKNOWLEDGEMENT

STATE OF NEBRASKA }
COUNTY OF Webster } SS.

BE IT REMEMBERED, that on this 9th day of August, A. D., 1974, before me, the undersigned, a Notary Public in and for the County and State aforesaid, came Carl H. Hubert and Erva M. Hubert who are personally known to me to be the same person described in, and who executed the within and foregoing agreement, and duly acknowledged the execution of the same to be their voluntary act and deed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed my official seal, on the day and year last above written.

ROBERT E. BOHNER
GENERAL NOTARY
State of Nebraska
My Commission Expires
June 29, 1977

x Robert E. Bohner
Notary Public

My commission expires June 29, 1977

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State of Nebraska)
County of Webster) ss.

Entered on the numerical index and filed for record in the Clerk's office of said County this 19th day of August A.D., 19 74, at 11:00 o'clock A.M. Recorded in Book 92, on Page 457

Betty Behrens County Clerk

Cy Deputy

Ind. ✓ Comp. ✓ Assessor Carded

12.25 - Chg & return to ASCS office Red Cloud

Environmental Science Division
Argonne National Laboratory
9700 South Cass Avenue, Bldg. 203
Argonne, IL 60439-4843
www.anl.gov

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