Wetland Delineation Report

Spring and Buffalo Creek Watersheds
Central Platte Natural Resources District
Custer and Dawson Counties, Nebraska

August 2022

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1.0 BACKGROUND AND INTRODUCTION

Central Platte Natural Resources District (District) have entered into an agreement to develop a watershed plan – environmental assessment (Watershed Plan-EA) for the Spring and Buffalo Creek Watersheds under the Natural Resource Conservation Service (NRCS) Watershed and Flood Prevention Operations program, hereafter referred to as the Project. The District aims to mitigate flood damages, protect land resources, conserve agricultural water, and enhance surface and groundwater contributions to the Platte River through the development of the Watershed Plan-EA.

The proposed lands are situated in a mixed rural, residential, commercial, and agricultural setting in south central Nebraska (see Appendix A, Figure 1—Project Location). The study area mainly consists of drainages and irrigation ditches between crop fields. The Project is comprised of three sites: Cozad, Lexington, and Overton. The study area is a total of 556 acres across the three sites. The sites are located in the following townships, ranges, and sections:

Cozad:

- Township 11 North, Range 23 West, Sections 31, 32;
- Township 11 North, Range 24 West, Section 36; and
- Township 10 North, Range 23 West, Sections 4, 5, 6, 7, 9, 16.

Lexington:

- Township 10 North, Range 22 West, Section 35, 36;
- Township 10 North, Range 21 West, Sections 31, 32, 33;
- Township 9 North, Range 22 West, Section 1, 6; and
- Township 9 North, Range 21 West, Sections 3, 4, 5, 6, 7, 8, 9, 10, 11, 13 and 14.

Overton:

- Township 9 North, Range 20 West, Sections 13, 24; and
- Township 9 North, Range 19 West, Sections 18, 19, 28, 29, and 30.

The purpose of this report is to document the type, size, and location of water resources, including wetlands and other waters of the US in the study area. Based on a desktop analysis and field survey conducted in November 2021 and May 2022, there are 27 wetland features, totaling 24.71 acres. Of the 27 wetlands: one wetland is scrub-shrub totaling 0.07 acres, 22 are emergent totaling 23.67 acres, two forested wetland PFOA totaling 0.35 acres and two are Wetland in Agricultural Settings (WIAS) totaling 0.62 acres. In addition to the wetlands, there are 10 stream channel features including two ephemeral stream channels totaling 0.90 acre (2,030 linear feet), seven intermittent streams totaling 6.07 acres (28,772 linear feet), and one perennial stream totaling 12.90 acres (30,184 linear feet). In total, the stream channel features account for 19.87 acres (60,986 linear feet). Six open water habitats were also identified, comprising 0.42 acres of the study area. See Appendix A, Figure 2 for the delineated boundaries of the on-site routine wetland delineation.

2.0 WETLAND DELINEATION METHODOLOGY

2.1 Standard (Non-Agricultural) Wetlands

HDR Engineering, Inc. (HDR) conducted an on-site routine wetland delineation in the study area on November 8-11, 2021 and May 19, 2022, in accordance with the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Great Plains Regional Supplement to the Corps of Engineers Wetland Delineation Manual* (USACE 2010). Representative wetland determination data forms were collected for each wetland. Hydrophytic vegetation, hydric soils, and wetland hydrology were verified for separate polygons in the field. Separate polygons of the same wetland were identified with a letter suffix (e.g., W-1A, W-1B)

According to the USACE Antecedent Precipitation Tool, normal conditions were present at the time of both delineations. The Drought Index (PDSI) in November 2021 was mild and in May 2022 it was severe, and the WebWIMP H20 Balance was during the wet season for both delineations. Results of the Antecedent Precipitation Tool can be found in Appendix B.

Prior to field delineations, a desktop analysis was conducted using USFWS National Wetlands Inventory (NWI) maps (USFWS 2021), the USGS National Hydrography Dataset (NHD) (USGS 2021), NRCS Web Soil Survey (NRCS 2022; Appendix A, Figure 3, and Appendix C), and USDA NRCS color aerial photographs (USDA 2021) to identify possible wetlands and water resources.

Wetland Determination Data Form locations and water resource boundaries were mapped in the field using sub-foot geographic positioning system (GPS) technology using an EOS™ Arrow 100 antennae and receiver, accompanied by ESRI™ Collector software. Wetlands and other water resources were classified according to the *Classification of Wetlands and Deepwater Habitats of the United States* (FGDC 2013). Vegetation for wetland and upland data forms were classified according to the *National Wetland Plant List* (USACE 2020). Streams were classified in the following categories:

- Ephemeral Stream: This feature carries only storm water in direct response to precipitation, with water flowing only during and shortly after large precipitation events. An ephemeral stream has a somewhat-defined channel, the aquatic bed is always above the water table, and storm water runoff is the primary source of water.
- Intermittent Stream: This feature has a well-defined channel that contains water for only part of the year, typically during winter and spring when the aquatic bed is below the water table. The flow may be heavily supplemented by storm water runoff.
- Perennial Stream: This feature has a well-defined channel that contains water year-round during a year of normal precipitation, with the aquatic bed located below the water table for most of the year. Groundwater is the primary source of water for a perennial stream, but it also carries storm water runoff.

In general, and according to Regulatory Guidance Letter 05-05, the ordinary high water mark (OHWM) of stream and open water features is delineated by two or more of the following physical characteristics:

- Natural line impressed on the bank;
- Shelving;
- Changes in the character of soil;
- Destruction of terrestrial vegetation;
- Presence of litter and debris;
- Wracking;
- Vegetation matted down, bent, or absent;
- Sediment sorting;
- Leaf litter disturbed or washed away;
- Scour;
- Deposition;
- Multiple observed flow events;
- Water staining; and
- Change in plant community (USACE 2005).

2.2 Wetlands in Agricultural Settings

In association with the desktop analysis and specific to the agricultural areas within the study area, wetland determinations were completed in accordance with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (USACE 2010) *and Hydrology Tools for Wetland Identification and Analysis* (NRCS 2015). Prior to field determinations, a desktop analysis was conducted using five years of National Agricultural Imagery Program (NAIP) color imagery (USDA 2021) to identify farmland that displayed wetland signatures (see Appendix F,G, and H). The five years of imagery analyzed for each site are as follows: Cozad: 2006, 2014, 2016, 2018 and 2020; Lexington: 2010, 2014, 2016, 2018 and 2020; and Overton: 2012, 2014, 2016, 2018 and 2020. All years presented normal conditions using the USACE Antecedent Precipitation Tool, excluding 2012 and 2018 for the Overton site; 2012 displayed drier than normal conditions and 2018 with wetter than normal conditions.

Areas that displayed wetland signatures in three or more of the five selected years of NAIP imagery were identified as potential WIAS and geospatially referenced using Geographic Information Systems (GIS).

Following the desktop analysis, HDR conducted ground-truthing surveys in November 2021 to document wetland indicators (i.e. hydrophytic vegetation, hydric soil, and wetland hydrology) to determine the presence or absence of potential WIAS.

A data form was completed at one of these locations to document the conditions observed at the more suspect WIAS where crops showed signs of stress and/or included emerging hydrophytic vegetation (e.g., inland saltgrass [*Distichlis spicata*]). Photos were taken at the remaining potential WIAS to document conditions, including areas with no signs of crop stress, as seen in the site photographs in Appendix E.

3.0 RESULTS

The results are presented in four sub-sections: standard wetlands, WIAS, streams, and open water habitat. The results are also provided in Appendix A, Figure 2—Wetlands and Aquatic Resources. The Wetland Determination Data Forms are provided in Appendix D, Site Photographs in Appendix E, and figures showing the analysis of WIAS in Appendix F, G, and H.

3.1 Wetlands

3.1.1 Standard Wetland Delineation

Results of the November 2021 and May 2022 wetland delineations are presented in

Table **1**. As mentioned in Section 1.0, 21 emergent wetlands, two Forested wetlands, and one scrub-shrub wetland were documented within the study area totaling 20.37 acres.

Table 1. Standard Wetland Delineation Results

Wetland ID	Figure 2 Page Number	Wetland / Upland Data Form	Wetland Classification (Cowardin / Nebraska Subclass)	Area (acres)
W-1	1, 2	DP-2 / DP-1	PEMA/C / Riverine Channel	0.47
W-2	3	N/A[b]	PEMA/C / Riverine Channel	0.36
W-3	3	N/A[b]	PEMA/C / Riverine Channel	0.05
W-4	3, 4	N/A[b]	PEMA/C / Riverine Channel	2.04
W-5	4, 5	DP-4 / DP-3	PEMA/C / Riverine Channel	1.10
W-6	7	DP-5 / DP-9[c]	PEMA/C / Riverine Channel	0.03
W-7	8, 11, 13, 14	DP -11 / DP-12	PEMA/C / Riverine Channel	1.60
W-8	14, 15	DP- 10 / DP-9[c]	PEMA/C / Riverine Channel	0.61
W-9	20, 21, 22	DP-5 / DP-9[c]	PEMA/C / Riverine Channel	1.07
W-10	20	DP-6 / DP-9[c]	PEMA/C / Riverine Channel	0.44
W-11	15, 16, 17, 18, 19, 20	DP-7 / DP-9[c]	PEMA/C / Riverine Channel	6.20
W-12	16	DP-8 / DP-9[c]	PEMA/C / Riverine Floodplain	0.04
W-13	23, 24	DP-14, DP-15 / DP-13, DP-16	PEMA/C / Riverine Channel	1.44
W-14	25, 26, 27	DP-26 / DP-25	PEMA/C / Riverine Channel	3.00
W-15	25	DP-17 / DP-19	PEMA/C / Riverine Channel	0.15
W-16	25, 26	DP-18 / DP-19	PEMA/C / Riverine Channel	0.47
W-17	26	DP-20 / DP-19	PSSA / Riverine Channel	0.07
W-19	28	DP-27, DP-28, DP-29 / DP-25	PEMA/C / Riverine Channel	1.23
ES-01	3	ES-01 / ES-02	PEMA/C / Riverine Channel	0.04
ES-05	23	ES-05 / ES-06	PEMA/C / Riverine Channel	0.06
ES-12	25	ES-12 / ES-13	PEMA/C / Riverine Channel	2.03
ES-15	26	ES-15 / ES-14	PFOA / Riverine Channel	0.15
ES-16	26	ES-16 / ES-14	PEMA/C / Riverine Channel	0.32

Wetland ID	Figure 2 Page Number	Wetland / Upland Data Form	Wetland Classification (Cowardin / Nebraska Subclass)	Area (acres)
ES-18	27, 28	ES-18 / ES-17	PEMA/C / Riverine Channel	0.92
ES-19	27, 28	ES-19 / ES-17	PFOA / Riverine Channel	0.20
			Total PEM:	**23.67**
			Total PSS:	**0.07**
			Total PFOA:	**0.35**
			Total:	**24.09**

Notes:

a. PEMA/C= Palustrine Emergent Wetland, Temporarily and Seasonally Flooded, PFOA = Palustrine Forested Temporarily Flooded, PSSA = Palustrine Scrub-Shrub Wetland, Temporarily Flooded (FGDC 2013)

b. Pedestrian access not granted by landowner; features were delineated by desktop based on USDA NAIP imagery and other field delineated features in the study area.

c. DP-9 is a representative upland data form for all noted W-wetlands in the table.

Wetland W-1 is a linear emergent wetland that begins in a drainage ditch west of intermittent stream S-1. The drainage ditch has steep slopes with berms built up on each side, separating it from the adjacent crop fields. The dominant vegetation is common reed (*Phragmites australis*). The wetland begins where there is no longer evidence of S-1's bed and bank, and there is a change to a hydrophytic plant community. W-1 has a surface hydrologic connection to streams S-1 and S-2 during high runoff and flow events. Surface water was present in portions of the wetland at the time of the delineation.

Wetlands W-3, W-4, W-5, W-10, W-13, W-19, and ES-12 are emergent wetlands dominated by reed canary grass (*Phalaris arundinacea*) found across all three sites in the study area. These wetlands are found within swales and/or drainage ditches between crop fields. They likely have anthropogenic disturbance/manipulation potential due to their close proximity to farming. Soils were found to be problematic at most of these wetlands due to potential salinity levels of the soils and/or anthropogenic influence. Documented salinity levels by the NRCS for each soil map unit within the study area can be found in Appendix C. Their primary source of hydrology is from a high water table during wet periods, as well as overland runoff and precipitation throughout the year.

Wetlands W-2, W-6, W-9, W-15, ES-05, are within man-made roadside ditches. These emergent wetlands were dominated by reed canary grass, narrowleaf cattails (*Typha angustifolia*), and Pennsylvania smart weed (*Persicaria pensylvanica*). These wetlands primarily receive hydrology from precipitation and overland runoff.

Wetlands W-7 and W-8 are emergent wetlands on stream terraces above the OHWM, abutting a perennial stream (Spring Creek) at the Lexington site. Dominant hydrophytic vegetation at W-7 consisted of common reed, and reed canary grass at W-8. These terraces likely formed due to erosion and sediment deposition within the floodplain during higher flow events. W-7 and W-8 have a direct hydrologic connection to Spring

Creek due to the height of flow within the stream dictating the water table of the wetland. High water levels in the stream raise the water table of the terrace wetlands and overland runoff from the adjacent fields also provide hydrology.

Emergent wetland W-11 is a narrow fringe wetland along the banks of intermittent stream S-9, also named Dawson County Drain Number 1. The wetland is dominated by reed canary grass and receives hydrology from the water level of the stream. Periods of increased flow and high water levels may temporarily flood this wetland. Evidence of laid over vegetation due to drainage patterns was present at the time of the delineation.

Wetland W-12 is an isolated manmade depression between two crop fields that runs under a transmission line at the Lexington site. This emergent wetland is adjacent to Dawson County Drain Number 1 but lacks surface connectivity. W-12 receives hydrology from overland runoff, and a high water table associated with its low-landscape position. Reed canary grass is the dominant vegetation with some catnip (*Nepeta cataria*) present.

W-14 is an emergent wetland within two swales among urban development at the Overton site. The northern portion of the wetland is located between Interstate Highway 30 and railroad tracks, while the southern portion is among crop fields and open waters OW-3 and OW-5. Its primary source of hydrology is from a high water table during wet periods, as well as overland runoff and precipitation throughout the year. Dominant vegetation alternates between narrow leaf cattail and reed canary grass. Surface soil cracks were present as a wetland hydrology indicator.

Wetland W-16 is a linear shaped emergent wetland within a swale at the Overton site. The dominant vegetation present was Nebraska sedge (*Carex nebrascensis*) and prairie cordgrass (*Spartina pectinata*). Saturation was present at the time of the delineation and the matrix was depleted in the soil profile. This wetland primarily receives hydrology from precipitation and overland runoff.

Wetland W-17 is a scrub shrub wetland in the central portion of the Overton site. This wetland was located within a swale near the water plant and dominated by coyote willow (*Salix exigua*) and prairie cordgrass. Emergent wetlands W-14 and W-16 are also within the swale, surrounding W-17 to the north and south. These wetlands share overland runoff and a high water table and are differentiated by their vegetation communities. Wetlands W-14, W-16, and W-17 are within a swale that drains to water sources connected to the Platte River downstream.

Wetland ES-01 is located on a stream terrace above the OHWM, abutting an intermittent stream at the Cozad site. Dominant hydrophytic vegetation at ES-01 consisted of reed canary grass. The banks are highly channelized, diverting water around the town during higher flow events.

Wetland ES-15 is a forested wetland following the narrow corridors of a drainage ditch at the Overton site. The area appears to be heavily manipulated by agriculture. The

primary sources of hydrology are from pivot irrigation and overland runoff due to precipitation. The dominant vegetation consisted of black willow (*Salix nigra*), eastern cottonwood (*Populus deltoides*), and reed canary grass.

Wetland ES-16 and ES-18 are narrow fringe emergent wetlands following a drainage ditch at the Overton site. Both areas are surrounded by agriculture on both sides with the primary sources of hydrology being from irrigation and overland runoff due to precipitation. These emergent wetlands were dominated by reed canary grass.

Wetland ES-19 is a forested wetland surrounding a depression inside the boundary of ES-18. The dominant vegetation consisted of black willow, eastern cottonwood, and reed canary grass.

3.1.2 Wetlands in Agricultural Settings

The desktop survey identified multiple potential WIAS consisting mainly of wetland signatures associated with saturation and a lack of vegetation on aerial imagery. Most of the WIAS within the study area identified during the desktop analysis did not display wetland indicators in the field. Many of the agricultural areas that displayed unique signatures in the aerial imagery analysis were field verified to be low-level areas at the edge of fields with a healthy stand of crops, no wetland hydrology, and no hydric soil indicators.

Two areas did exhibit wetland criteria, identified as wetland W-18 and ES-08 (see Appendix A**,** Figure 2 and Appendix D). Wetland W-18 was at the edge of a crop field that was tilled with sparse patches of corn (*Zea mays*) and inland saltgrass (*Distichlis spicata*). W-18 recently had crops harvested and exhibited hydric soil indicators in the soil profile. Cattle were grazing the harvested crop at the time of the delineation, and standing water was present within the cow prints at the wetland. The wetlands main source of hydrology is precipitation and a high water table associated with its low-landscape position. ES-08 occurred in an agricultural field consisting of corn. The wetland was composed of narrow-leaf cat-tail and bare ground, which was saturated at six inches.

Table 2. Wetlands in Agricultural Settings Delineation Results

Wetland ID	Figure 2 Page Number	Wetland / Upland Data Form	Wetland Classification (Cowardin / Nebraska Subclass)	Area (acres)
W-18	26	DP-22 / DP-21	WIAS / NA[a]	0.56
ES-08	23	ES-08	WIAS / NA[a]	0.06
			Total:	**0.62**

Notes:

a. N/A subclass designation was assigned as the area does not fit into any of the Nebraska Wetland Subclass definitions.

3.2 Streams

The study area contains three categories of streams: ephemeral, intermittent, and perennial. Two ephemeral, seven intermittent, and one perennial stream were identified within the study area. Additionally, some features identified as NHD linear stream features during the desktop assessment were found not to be streams. Some of these areas were small to relatively large, vegetated swales with no evidence of scouring or channel development. The summary of streams identified can be found in Table 3.

Table 3. Streams Identified Within the Study Area

Stream ID	Figure 2 Page Number	Name	Type	Stream Channel Length (feet)	Area (acres)
S-1	1, 2	N/A	Intermittent	464	0.12
S-2	1, 2	N/A	Intermittent	350	0.10
S-3	4	N/A	Ephemeral	438	0.03
S-4	5	Dawson County Canal	Ephemeral	1,592	0.87
S-5	6	N/A	Intermittent	595	0.21
S-6	8, 9, 10, 11, 12, 13, 14, 15	Spring Creek	Perennial	30,184	12.90
S-7	10	N/A	Intermittent	153	0.05
S-8	12	N/A	Intermittent	160	0.04
S-9	15, 16, 17, 18, 19, 20	Dawson County Drain Number 1	Intermittent	26,870	5.51
S-10	18	N/A	Intermittent	180	0.04
			Total:	**60,986**	**19.87**

Two ephemeral streams (S-3 and S-4) were identified at the Cozad site within the study area. Stream S-3 is a narrow channel associated with runoff from the road and adjacent fields. The OHWM width of S-3 averaged about 3 feet. S-4 is a large feature named the Dawson County Canal, with an average OHWM width of 40 feet. The stream bed consisted of sand, and portions of the bank were lined with concrete riprap; riparian vegetation included upland species. S-4 receives flow during the release of control structures at the Platte River. At the time of surveys, there was no water in either channel.

Seven intermittent streams were identified within the study area, S-1, S-2, S-5, S-7, S-8, S-9, and S-10. These streams consisted of man-made irrigation ditches and/or channelized natural streams across the study area. These streams had moderate to relatively slow-moving water in their channels due to the wet season and normal conditions during the field investigation. At other times, these streams may experience increased high flow during precipitation events or a dry streambed during drought conditions. Streams S-1, S-2, and S-5 are irrigation ditches located between crop fields at the Cozad site. S-7 and S-8 are unnamed agricultural ditches that drain into Spring Creek. S-9 is named the Dawson County Drain Number 1 and drains into

Spring Creek in the southeast portion of the Lexington site. A defined bed and bank develop at the road crossing south of wetland W-10B, with flow emptying into Spring Creek to the east.

One perennial stream, S-6, was identified within the study area in the northern portion of the Lexington site. Stream S-6 is named Spring Creek and flows in a southeast direction into the Platte River. Flow was moderate to fast with severe erosion on its banks. Portions with severe erosion and steep banks lacked hydrophytic vegetation, with bankfull heights reaching up to 10 feet. Gently sloping banks and stream terraces of S-6 are vegetated with emergent wetland species such as reed canary grass and common reed. Emergent wetlands on the stream terraces were common near the southeast portion of the stream. The OHWM was identified by a break in slope and an area void of vegetation (i.e., defined bed and bank) with the water level at the time of the delineation below the OHWM.

3.3 Open Water Habitat

Six open water features were identified during field investigations and comprise 0.42 acres of the study area. Table 3 summarizes all open water habitat found within the study area, including size (acres) and Federal Geographic Data Committee (FGDC) classification.

Table 4. Open Water Habitat Identified Within the Study Area

Sample ID	Figure 2 Page Number	Area (acres)	Type[1]
OW-1	4	0.13	PUB
OW-2	7	0.001	PUB
OW-3	26	0.03	PUB
OW-4	26	0.04	PUB
OW-5	26	0.20	PUB
OW-6	27	0.02	PUB
	Total:	**0.42**	**-**

[1] PUB = Palustrine Unconsolidated Bottom (FGDC 2013)

Open water OW-1 is a constructed pond within the study area at the Cozad site. This feature is within a forested area with a wetland swale (W-5) adjacent to the west and crop field to the east. OW-1 receives hydrology from precipitation and a highwater table.

Open waters OW-2, OW-4, and OW-6 are ponded areas associated with their low-lying position in the landscape. OW-2 and OW-6 are associated with the ends of agricultural ditches where ponding occurs next to the road. These open waters were void of vegetation and displayed surface soil cracks from recent inundation. OW-4 is a depressional pond next to a crop field. The edges of the pond were dominated by upland vegetation.

Open waters OW-3 and OW-5 are man-made holding ponds. They do not appear to drain outside their delineated boundaries.

4.0 DISCUSSION

Of all aquatic resources identified during the delineation, one wetland (W-12) and two open water habitats (OW-3 and OW-5) have been identified as potentially non-jurisdictional based on the definition of waters of the U.S. and regulatory guidance in place at the time of this report. These features lack a hydrologic connection to a relatively permanent water and/or a traditional navigable water, and would therefore be considered isolated, without a significant nexus to a downstream traditional navigable water (68 Fed. Reg. 1991-1995 [January 15, 2003]; USACE and EPA 2008). All other aquatic features within this report are potentially jurisdictional waters of the U.S.

This delineation and proposed jurisdictional determination of waters of the U.S. within the study area is based on the best professional judgement of HDR. However, it does not constitute an Approved Jurisdictional Determination, which can only be officially rendered by the United States Army Corps of Engineers Regulatory Branch through the formal review process.

5.0 REFERENCES

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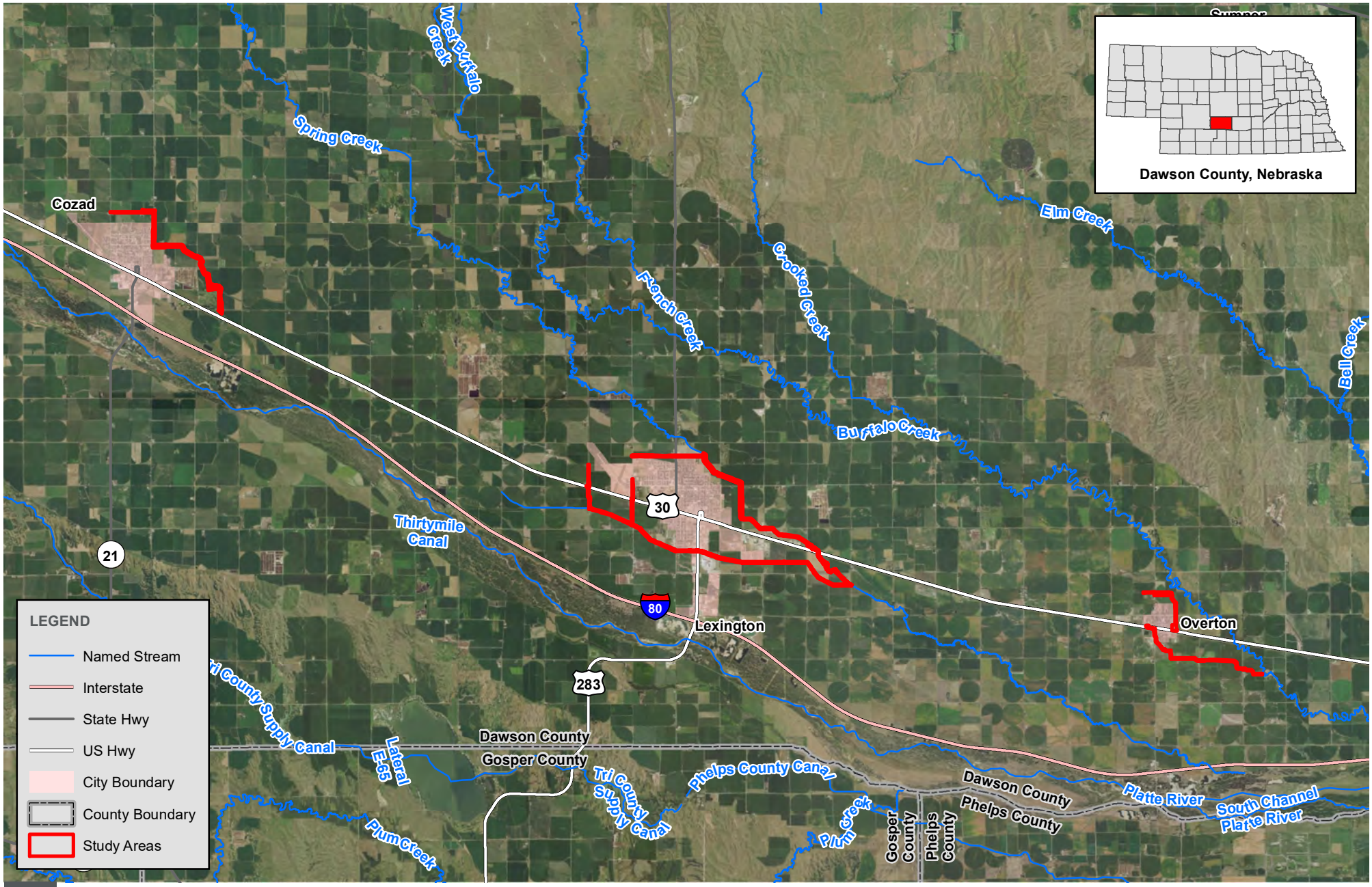
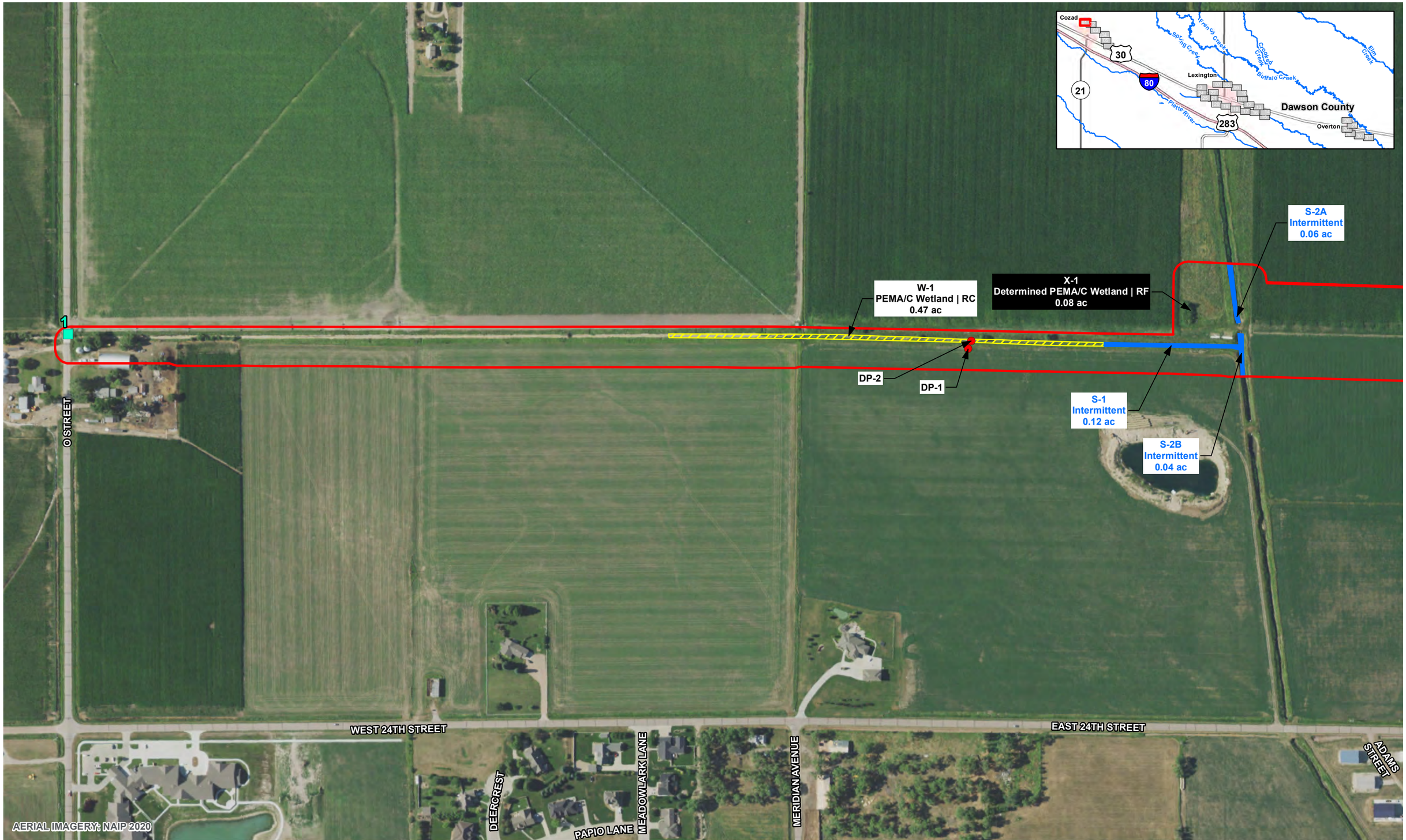
Appendix A.
FIGURES



PROJECT LOCATIONS

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 1



0 Feet 300

Nebraska Subclasses
NA = Not Applicable
RC = Riverine Channel
RF = Riverine Floodplain

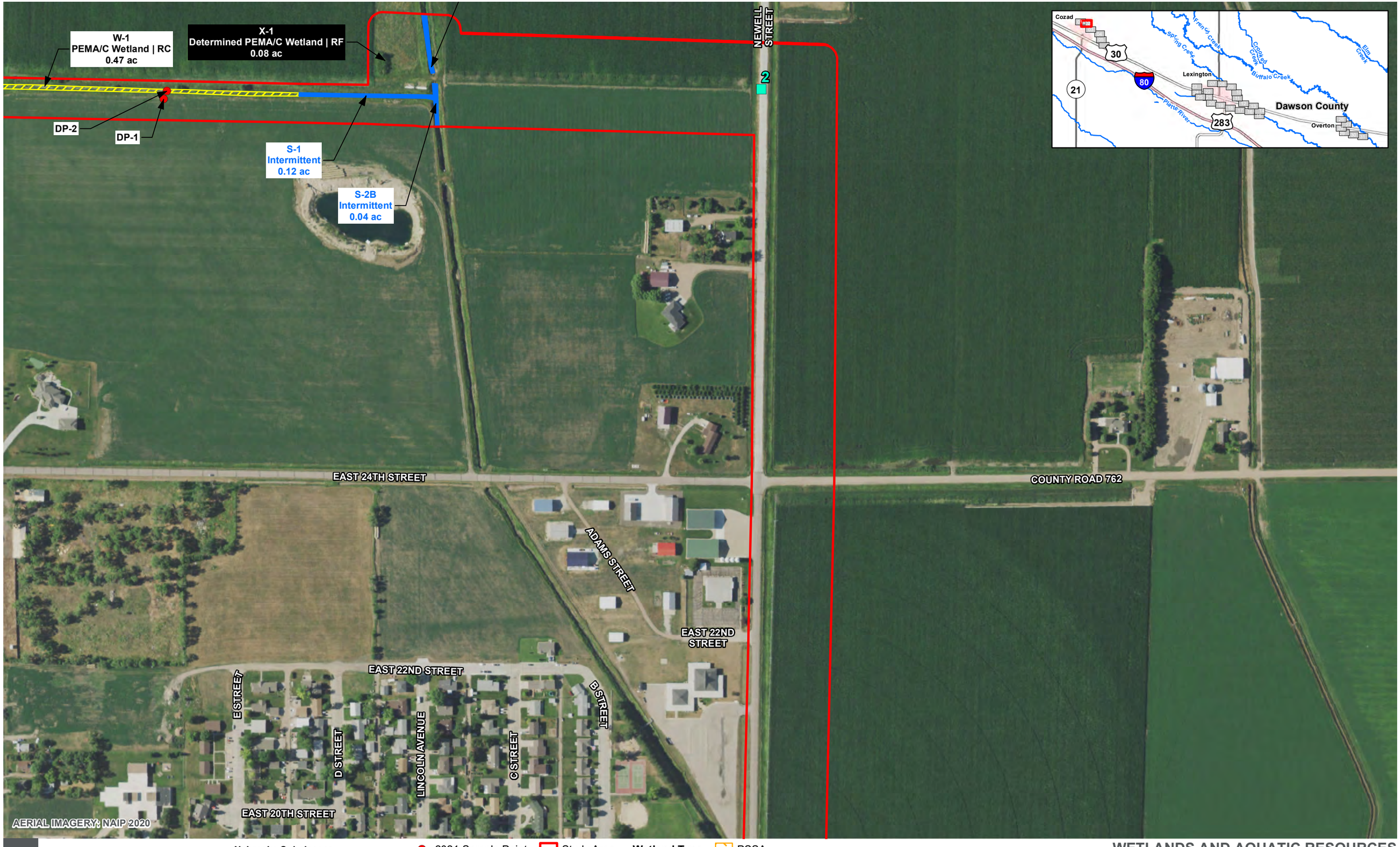
- 2021 Sample Point
- 2022 Sample Point
- 2022 Photo Point
- Study Area
- Open Water
- Stream

Wetland Type
- PEMA/C
- PFOA
- PSSA
- WIAS
- Determined PEMAC

WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 1 OF 31



HDR

0 Feet 300

Nebraska Subclasses
NA = Not Applicable
RC = Riverine Channel
RF = Riverine Floodplain

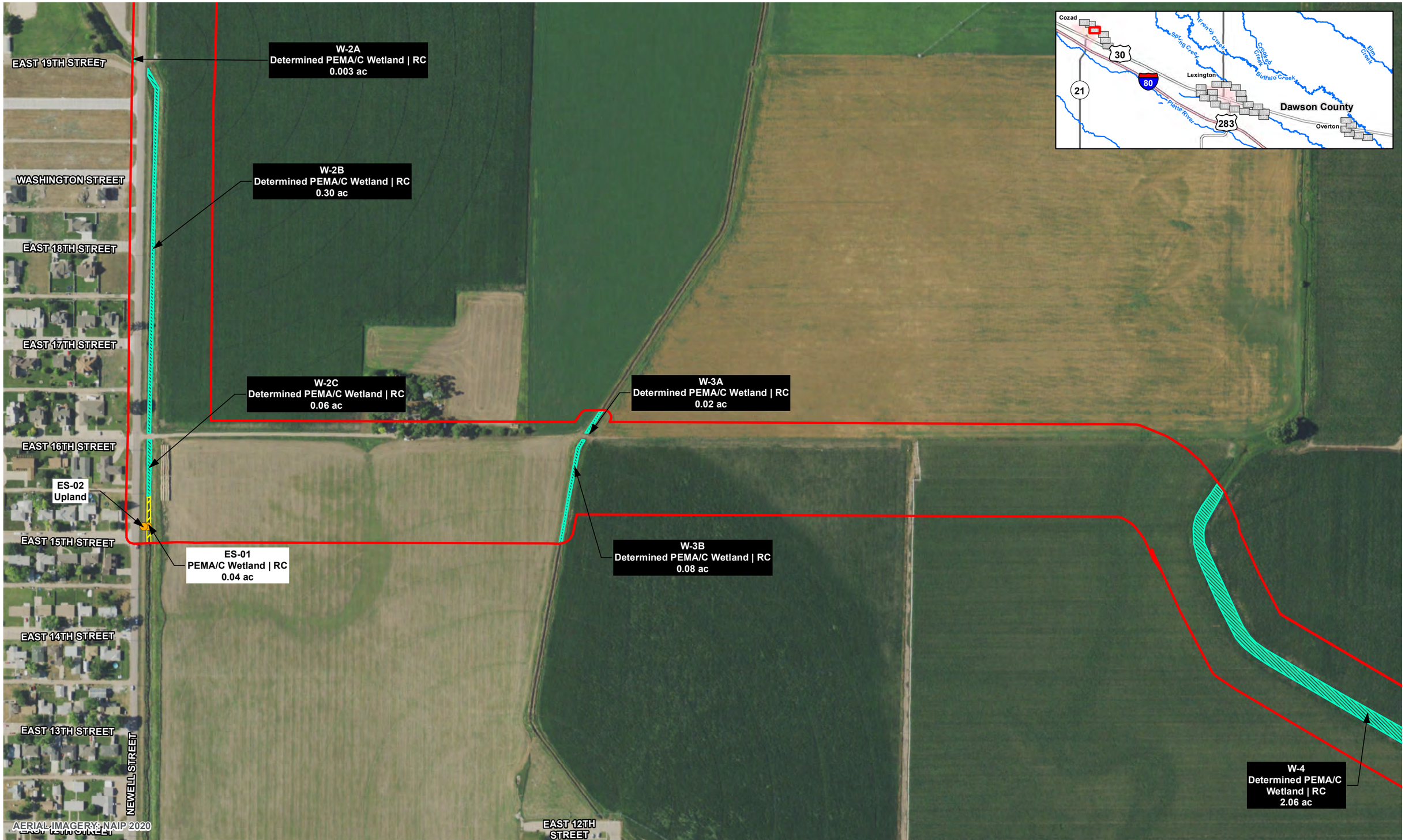
- 2021 Sample Point
- 2022 Sample Point
- 2022 Photo Point
- Study Area
- Open Water
- Stream

Wetland Type
- PEMA/C
- PFOA
- PSSA
- WIAS
- Determined PEMAC

WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 2 OF 31



0 Feet 300

Nebraska Subclasses
NA = Not Applicable
RC = Riverine Channel
RF = Riverine Floodplain

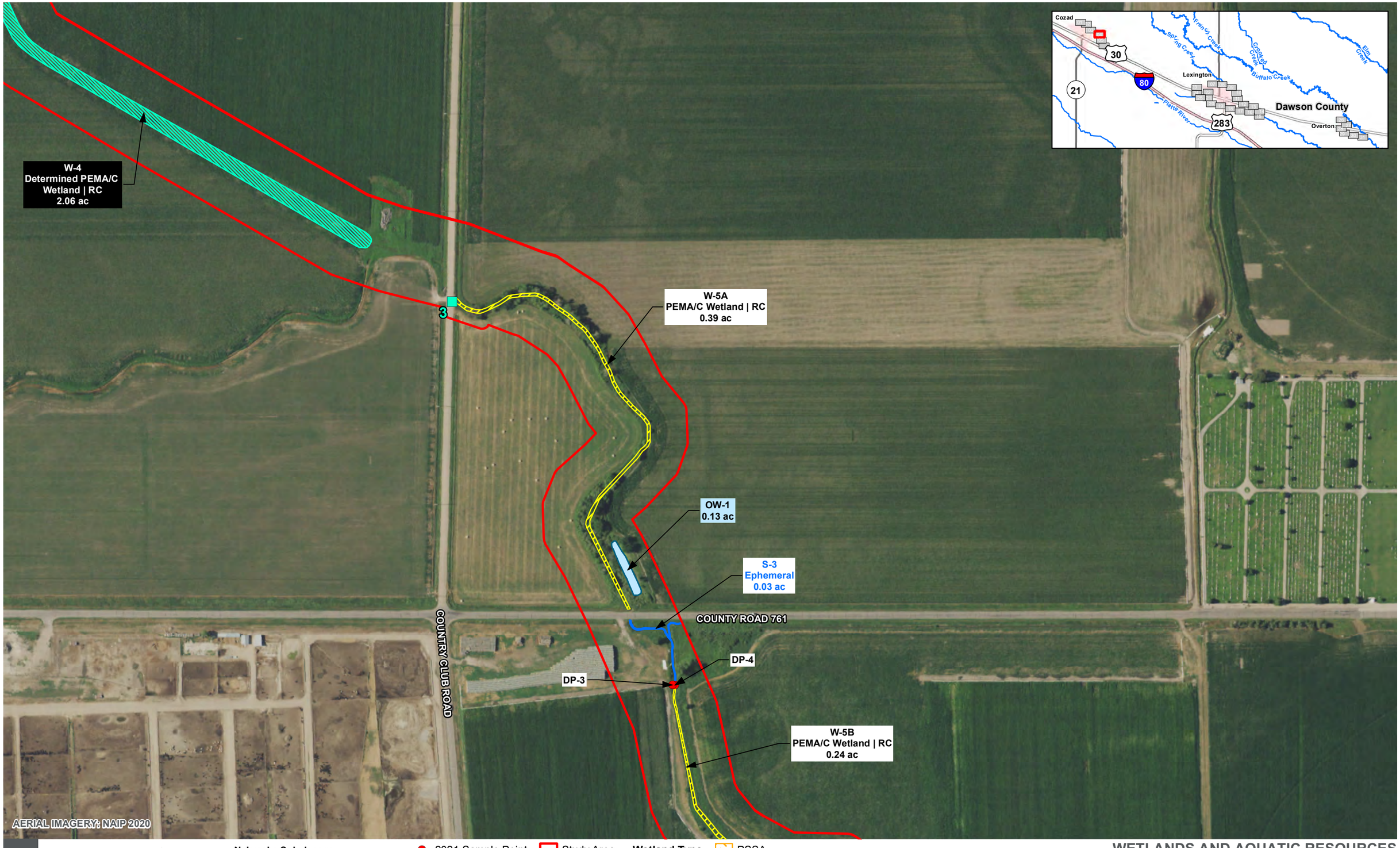
- 2021 Sample Point
- 2022 Sample Point
- 2022 Photo Point
- Study Area
- Open Water
- Stream

Wetland Type
- PEMA/C
- PFOA
- PSSA
- WIAS
- Determined PEMAC

WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 3 OF 31



0 Feet 300

Nebraska Subclasses
NA = Not Applicable
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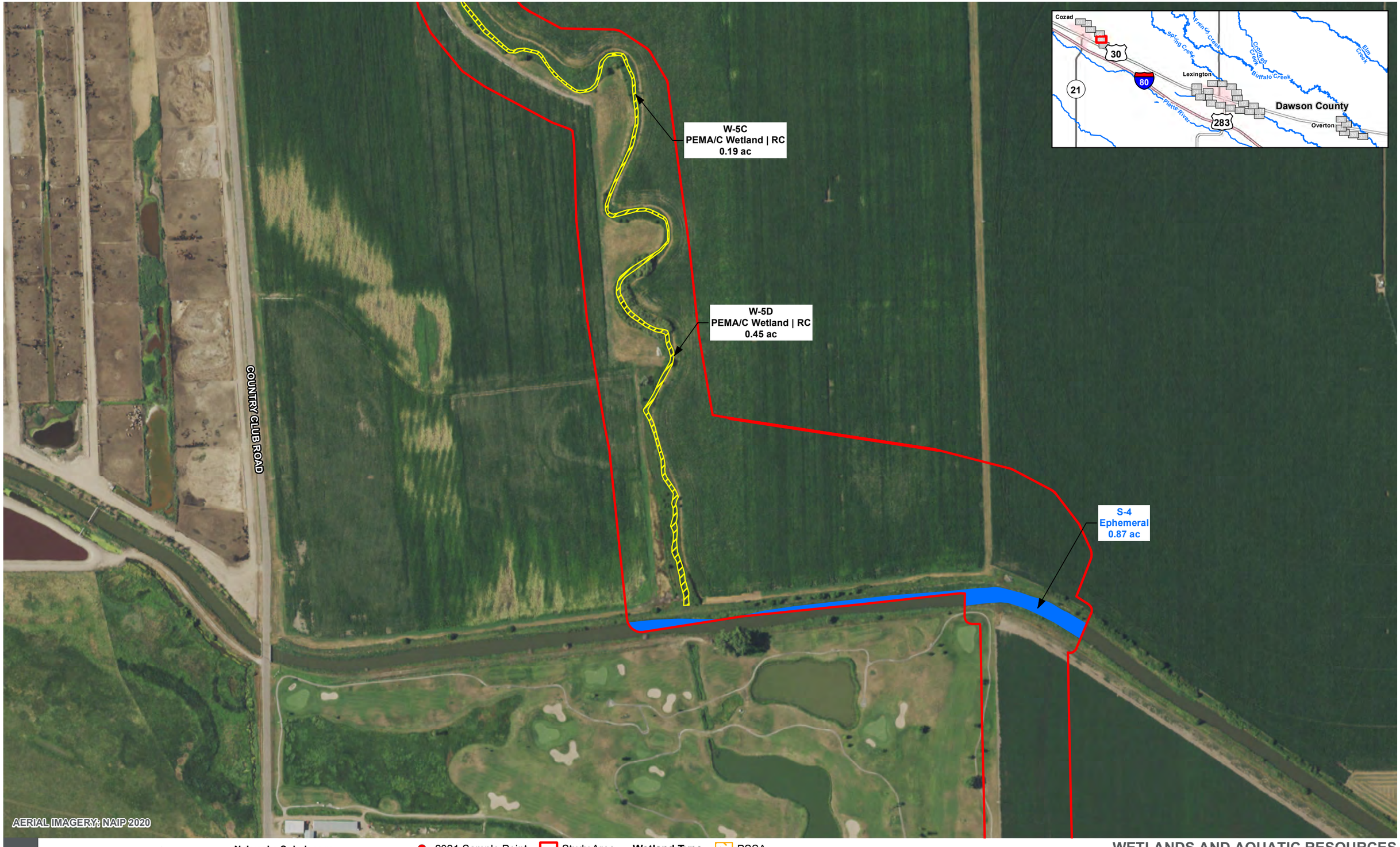
2021 Sample Point
2022 Sample Point
2022 Photo Point
Study Area
Open Water
Stream

Wetland Type
PEMA/C
PFOA
PSSA
WIAS
Determined PEMAC

WETLANDS AND AQUATIC RESOURCES
SPRING / BUFFALO CREEK WATERSHED STUDY
FIGURE 2 PAGE 4 OF 31



0 Feet 300

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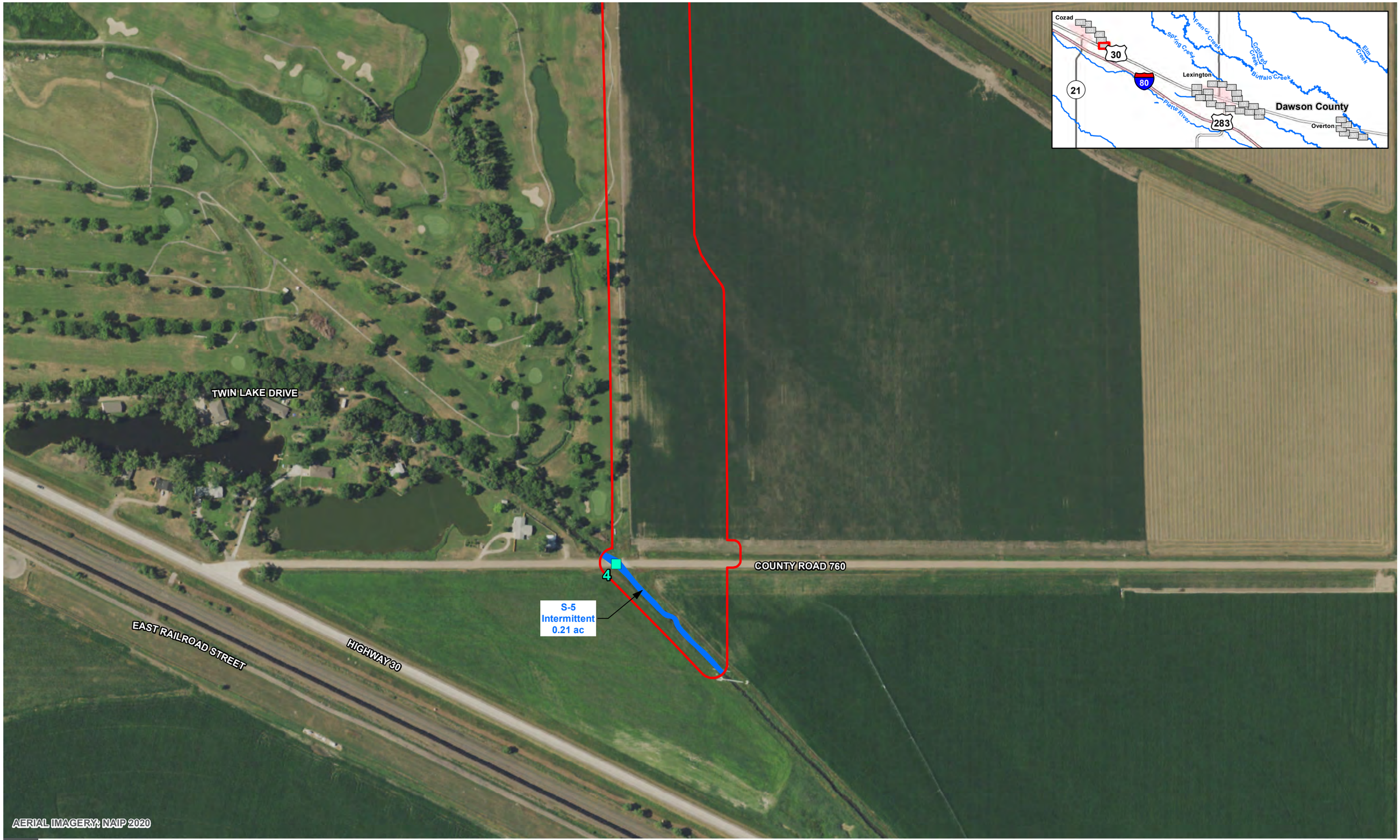
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 5 OF 31



0 Feet 300

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2021 Sample Point
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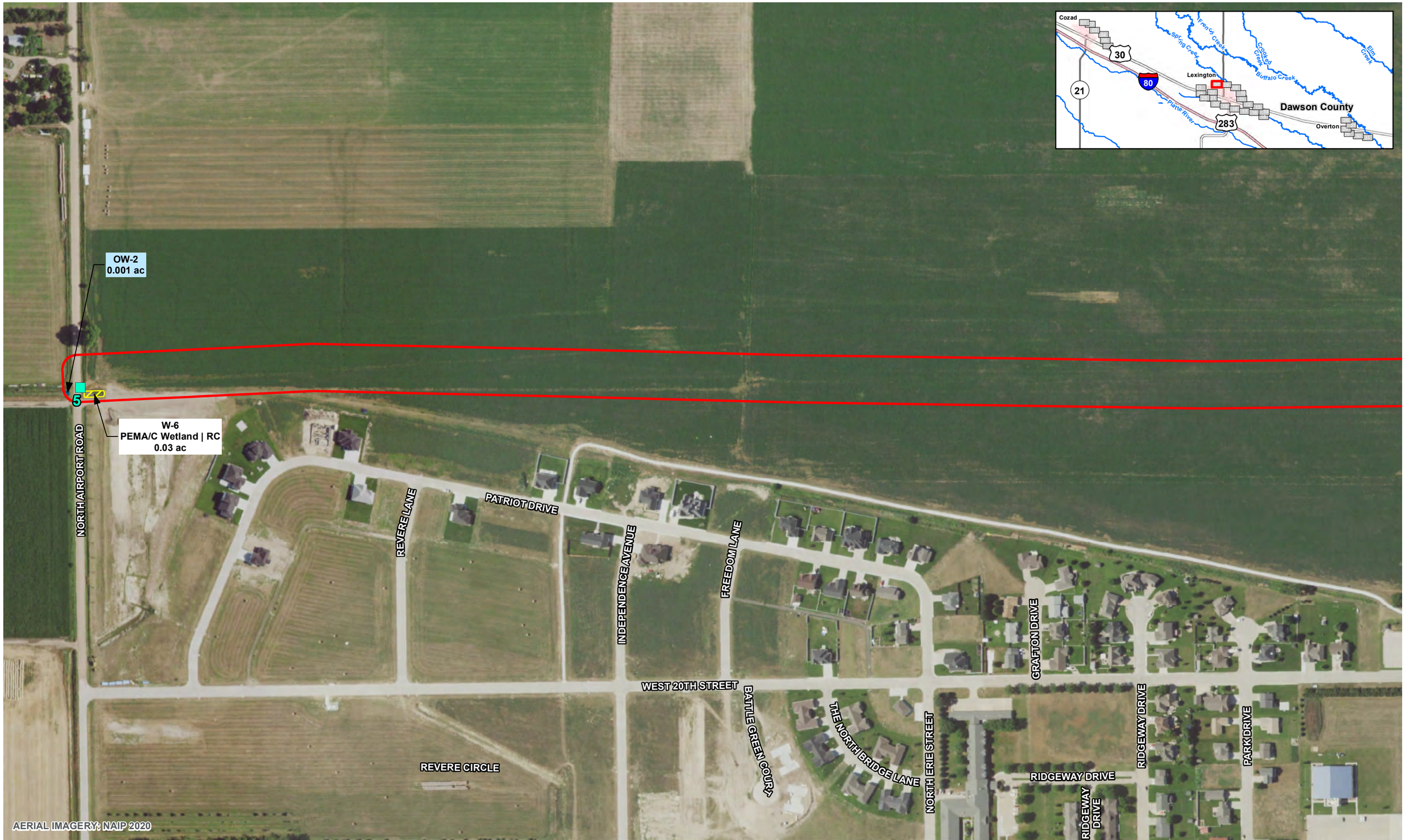
PSSA
WIAS
Determined PEMAC

WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 6 OF 31



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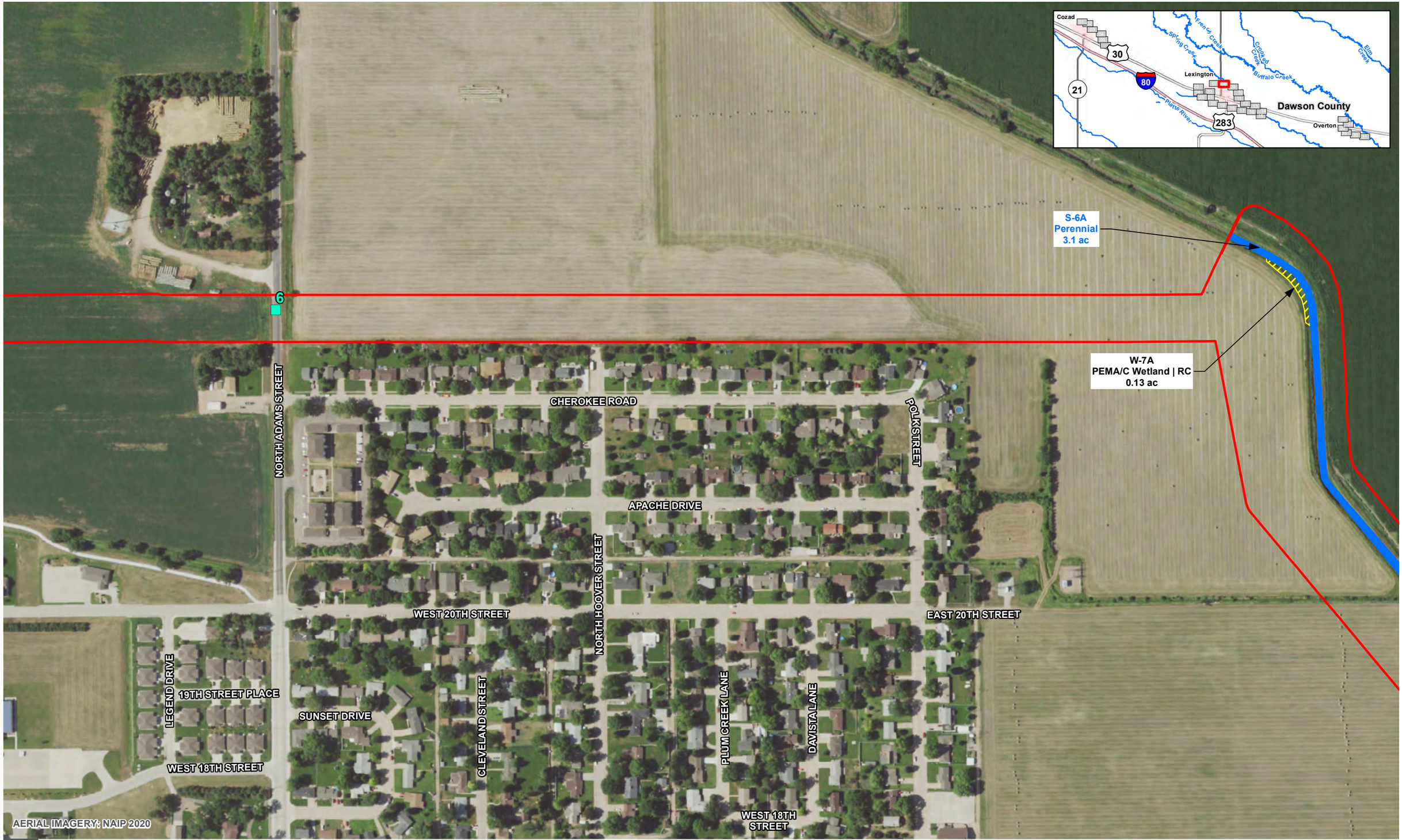
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 7 OF 31



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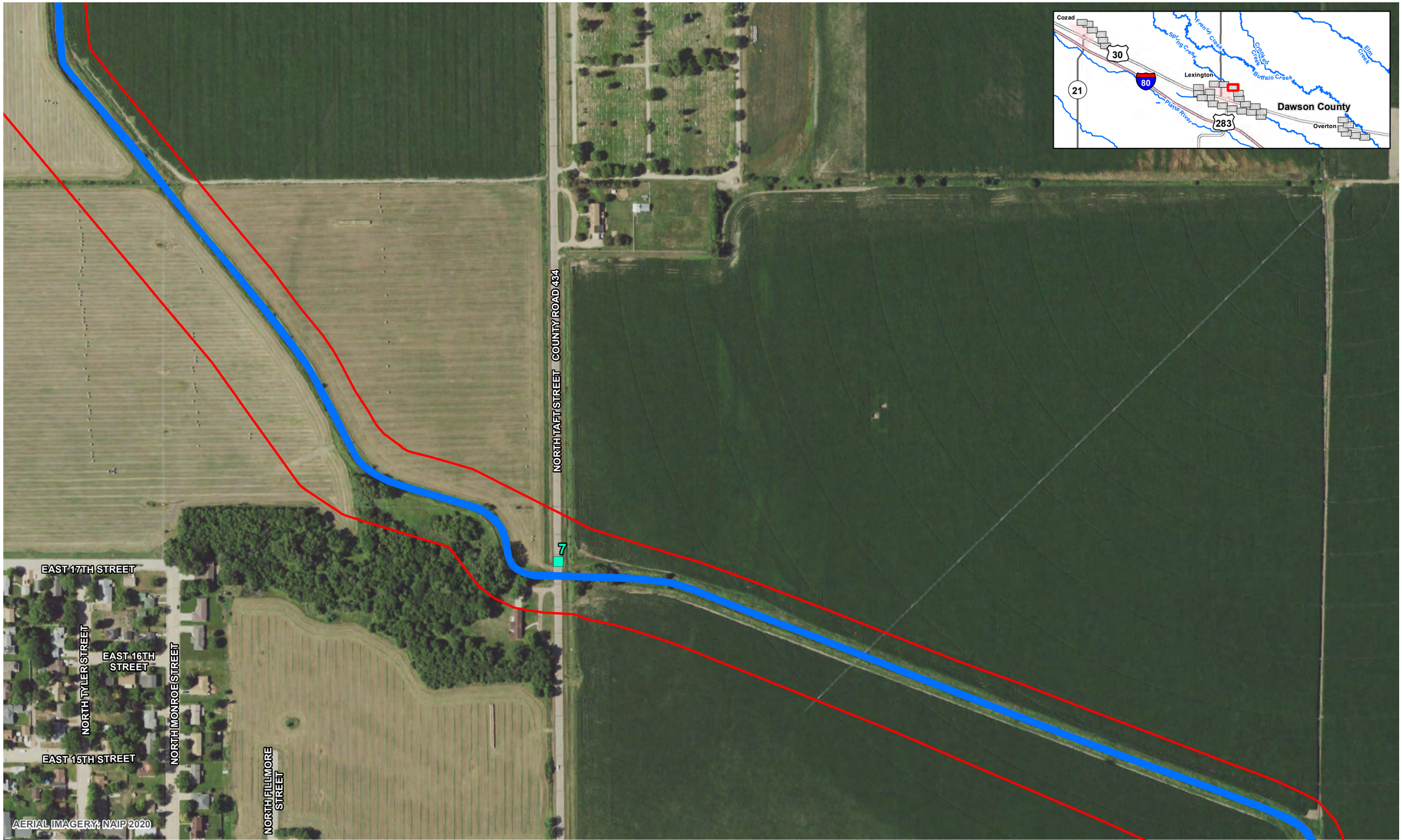
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 8 OF 31



HDR

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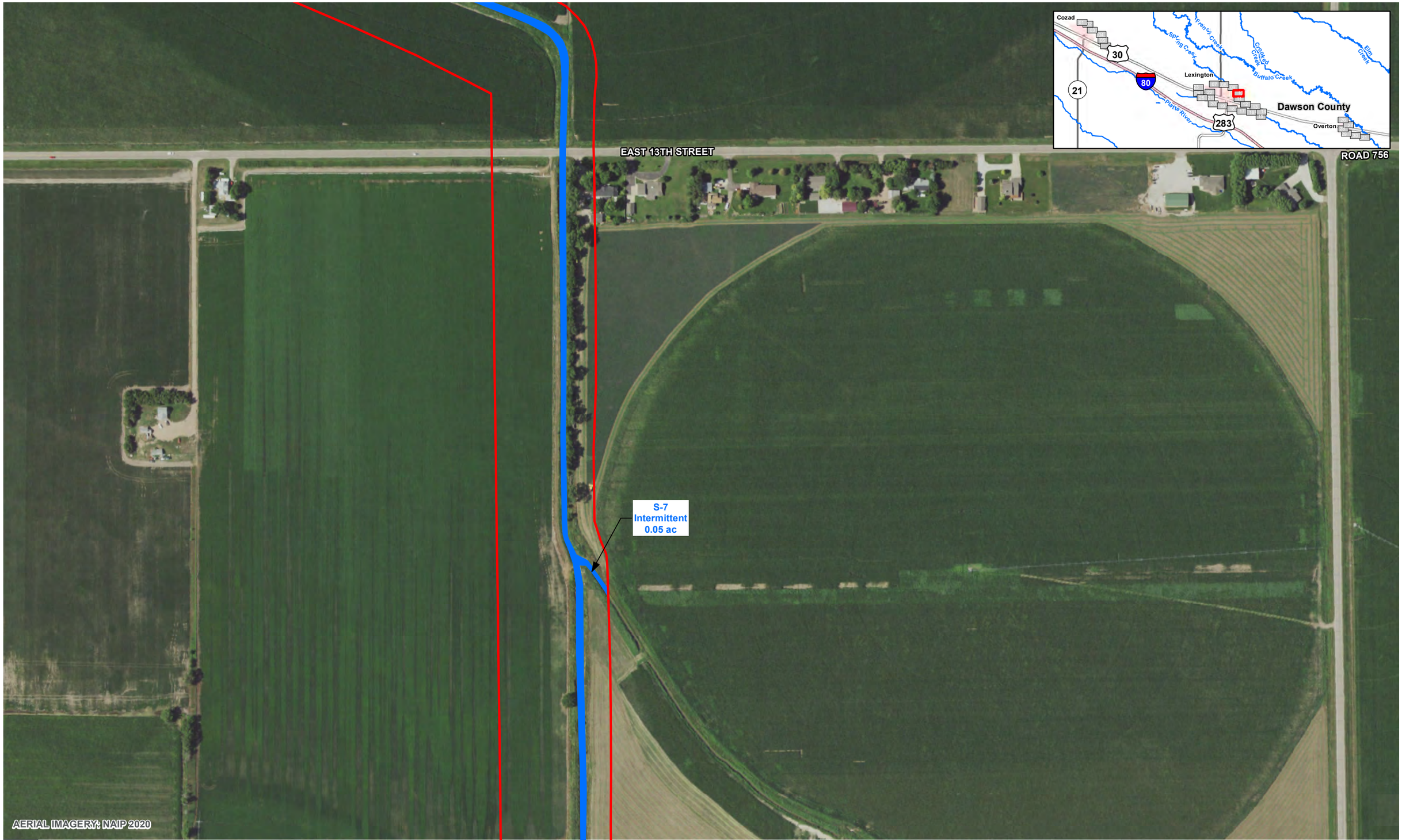
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 9 OF 31

PATH: Z:\PROJECTS\CENTRAL_PLATTE_NRD\10231475_SPRINGBUFFALO_CRK_WTRSHD\MAP_DOCS\WORKING_MXD\WETLAND_DELINEATION\2022\FIG_2_WETLANDS_AQUATICRESOURCES.MXD - USER: EMSCHMIT - DATE: 7/8/2022



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WETLANDS AND AQUATIC RESOURCES
SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 10 OF 31

0 Feet 300

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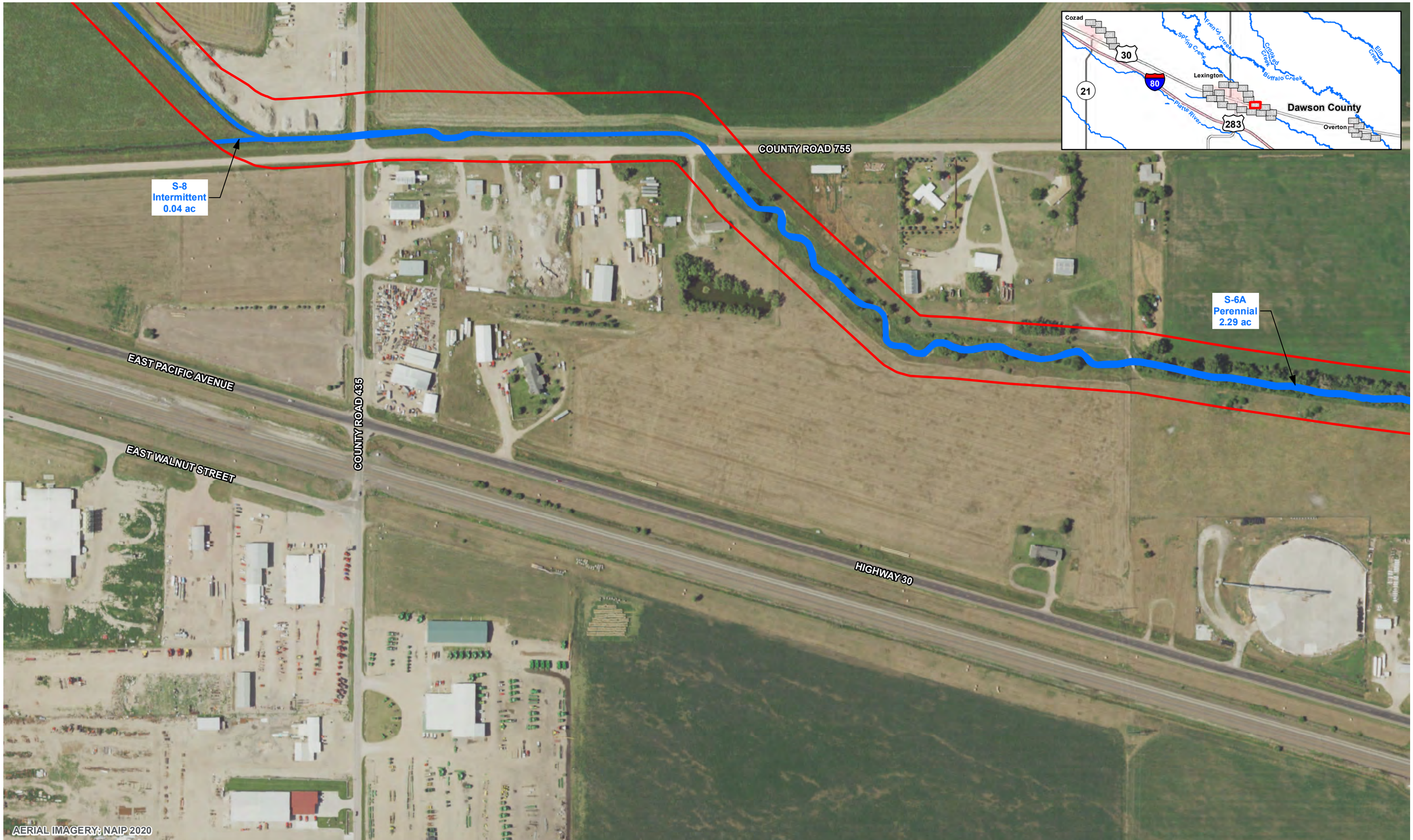
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 11 OF 31



HDR

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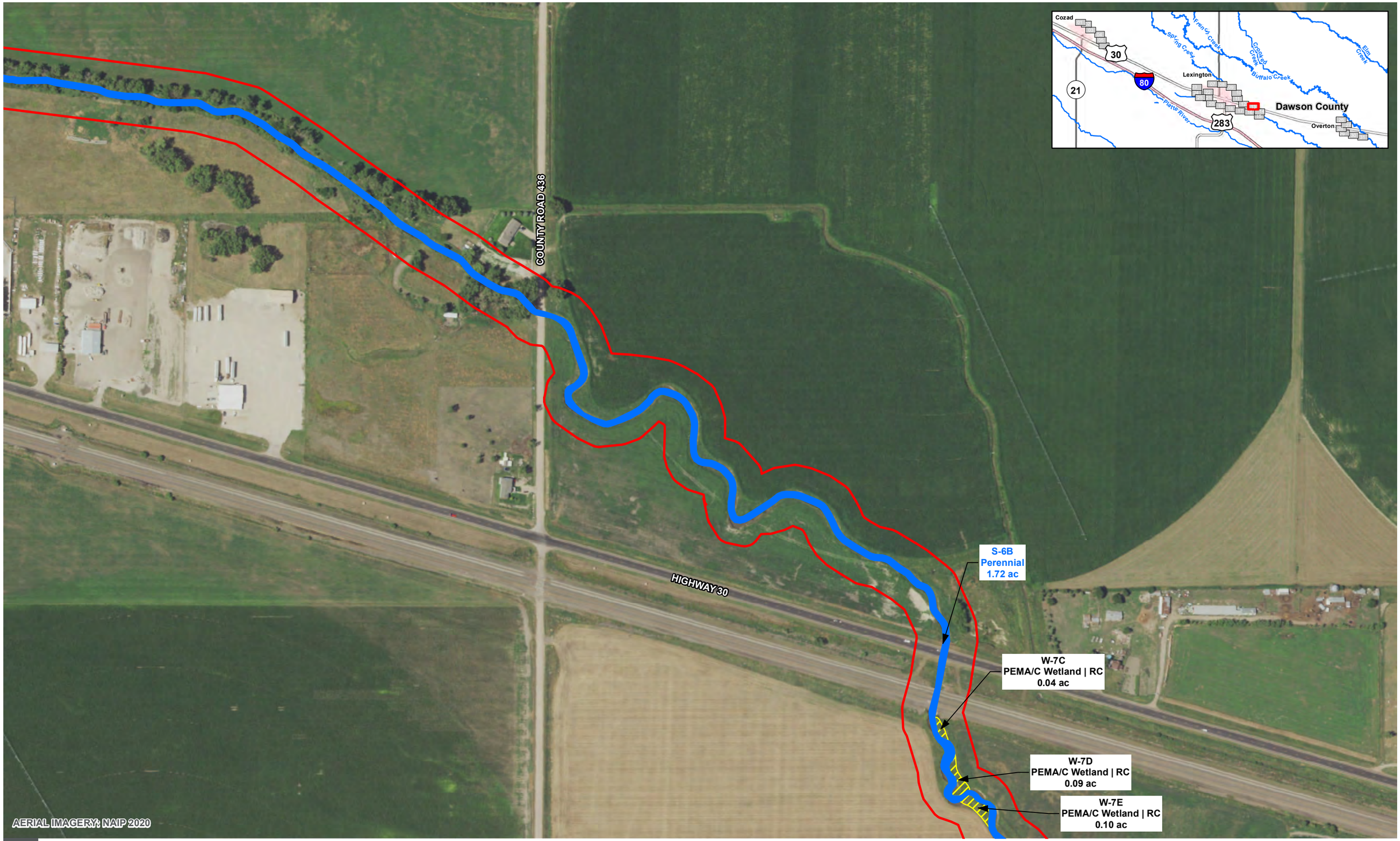
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 12 OF 31



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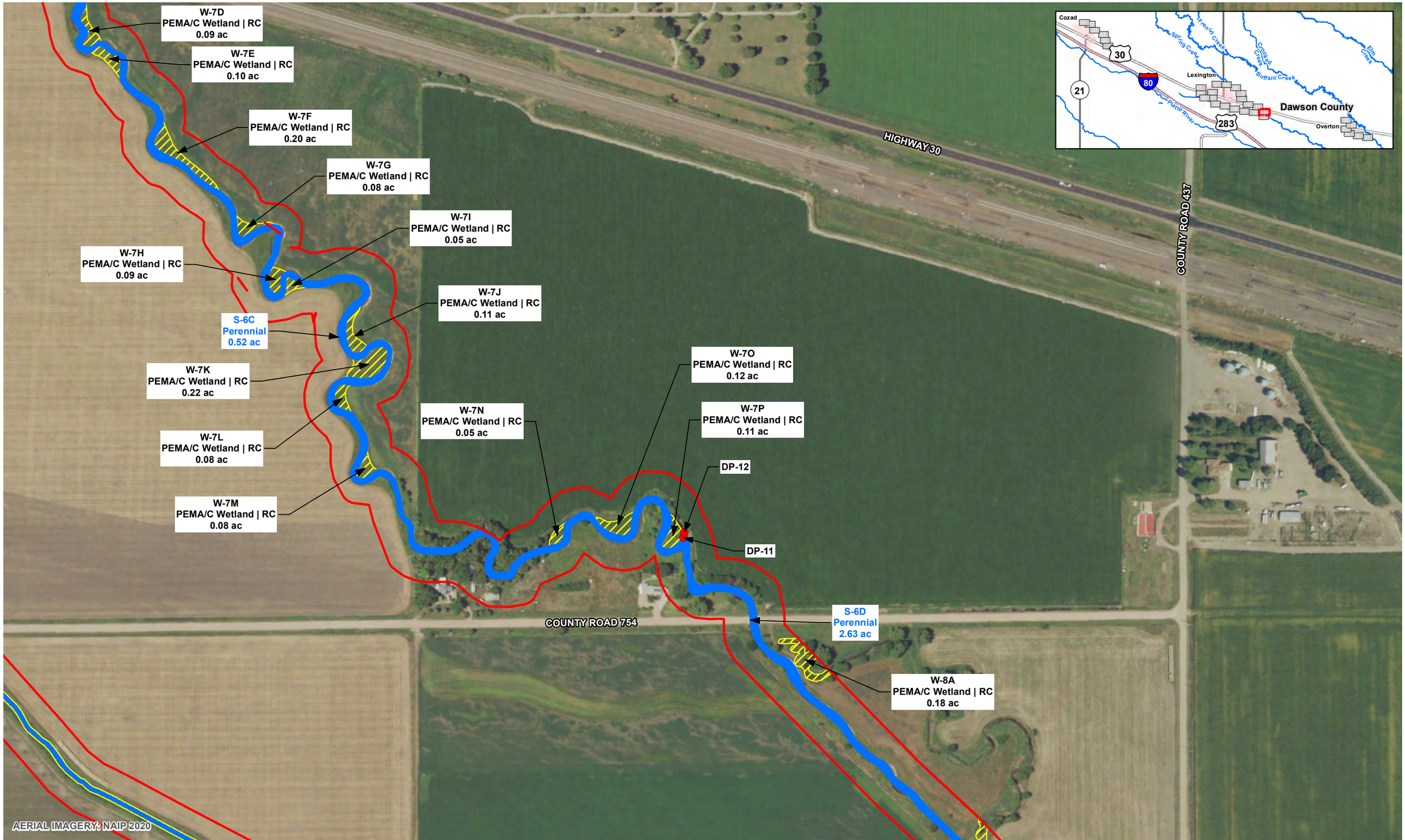
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 13 OF 31



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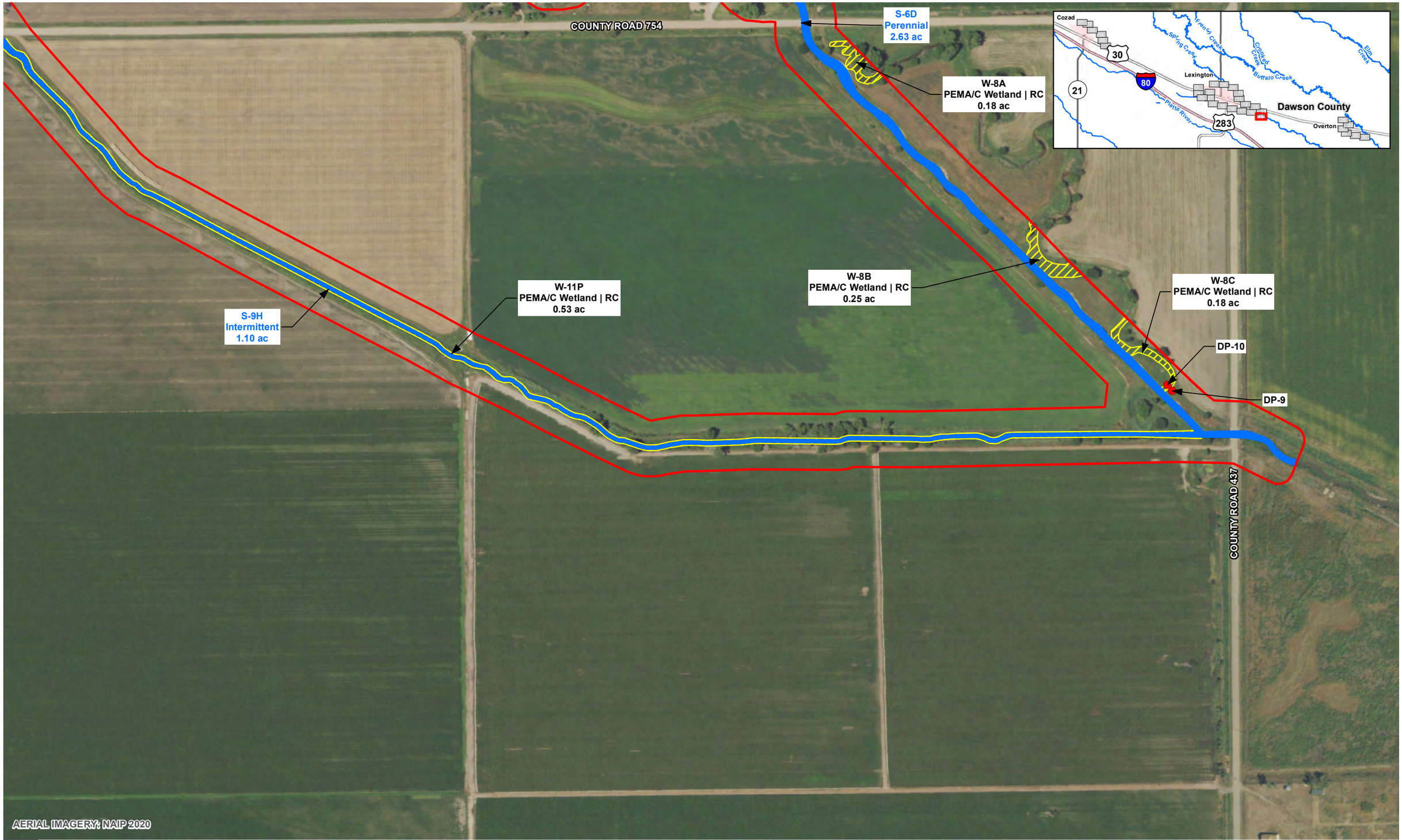
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 14 OF 31



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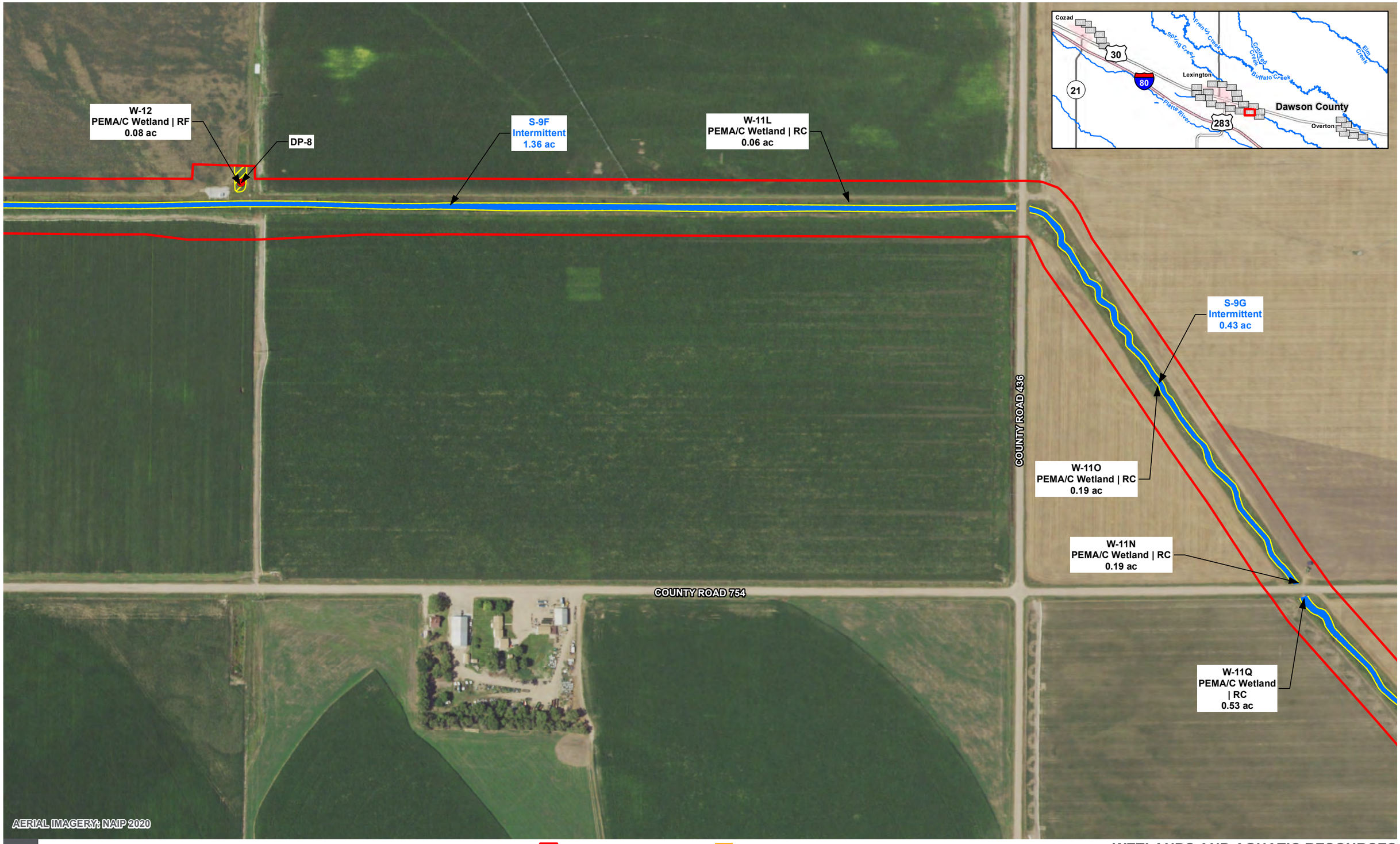
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 15 OF 31



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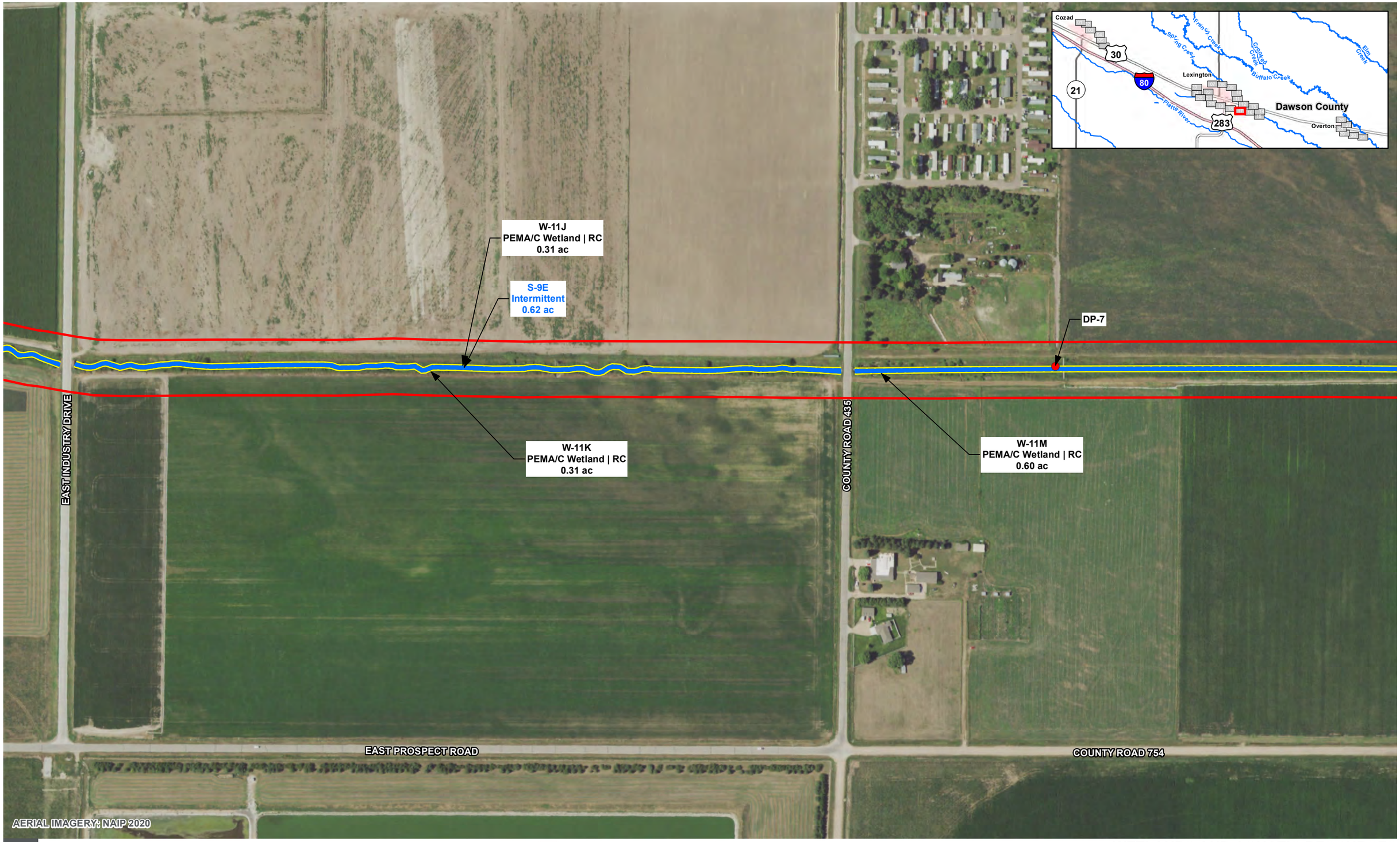
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 16 OF 31



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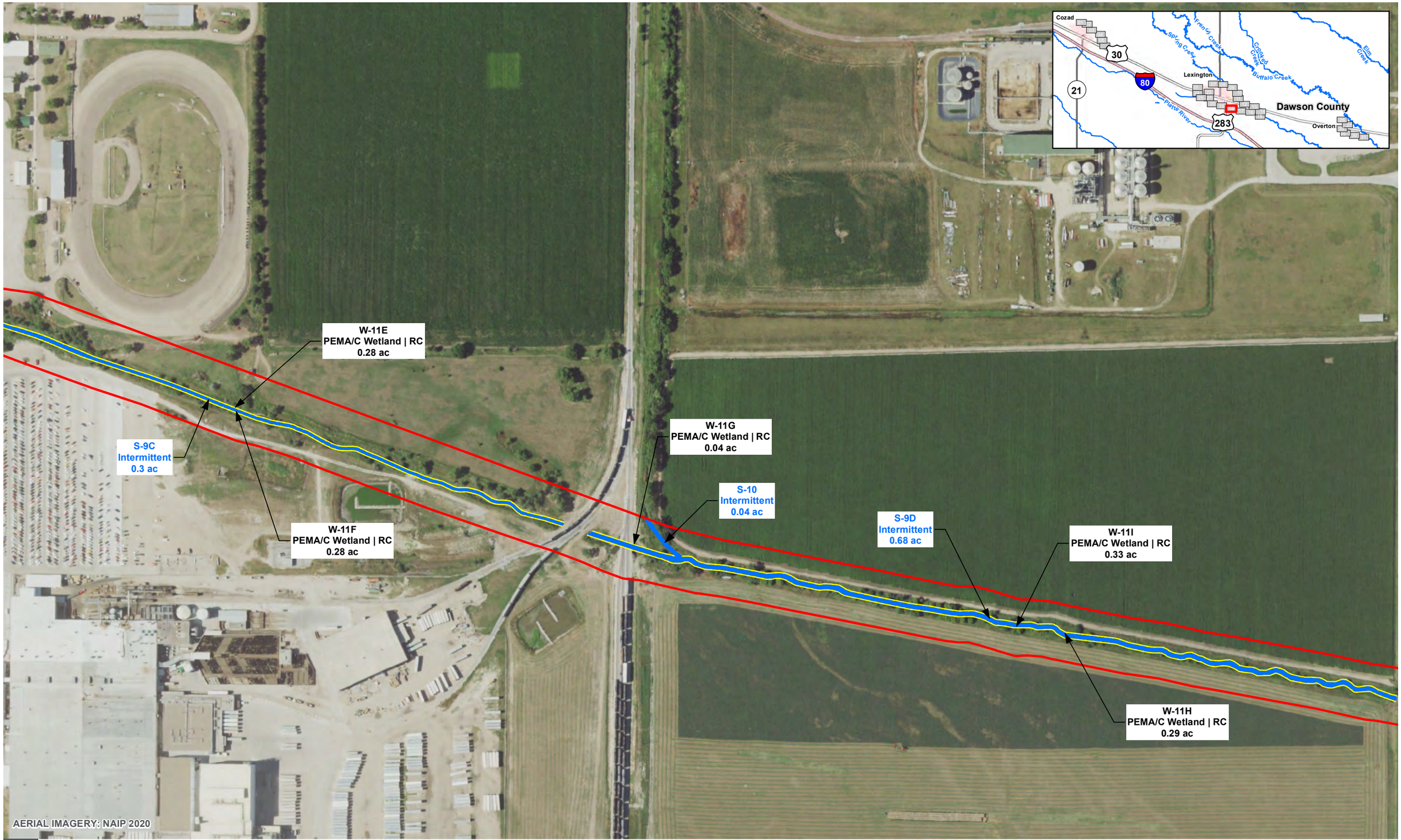
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 17 OF 31



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PSSA
WIAS
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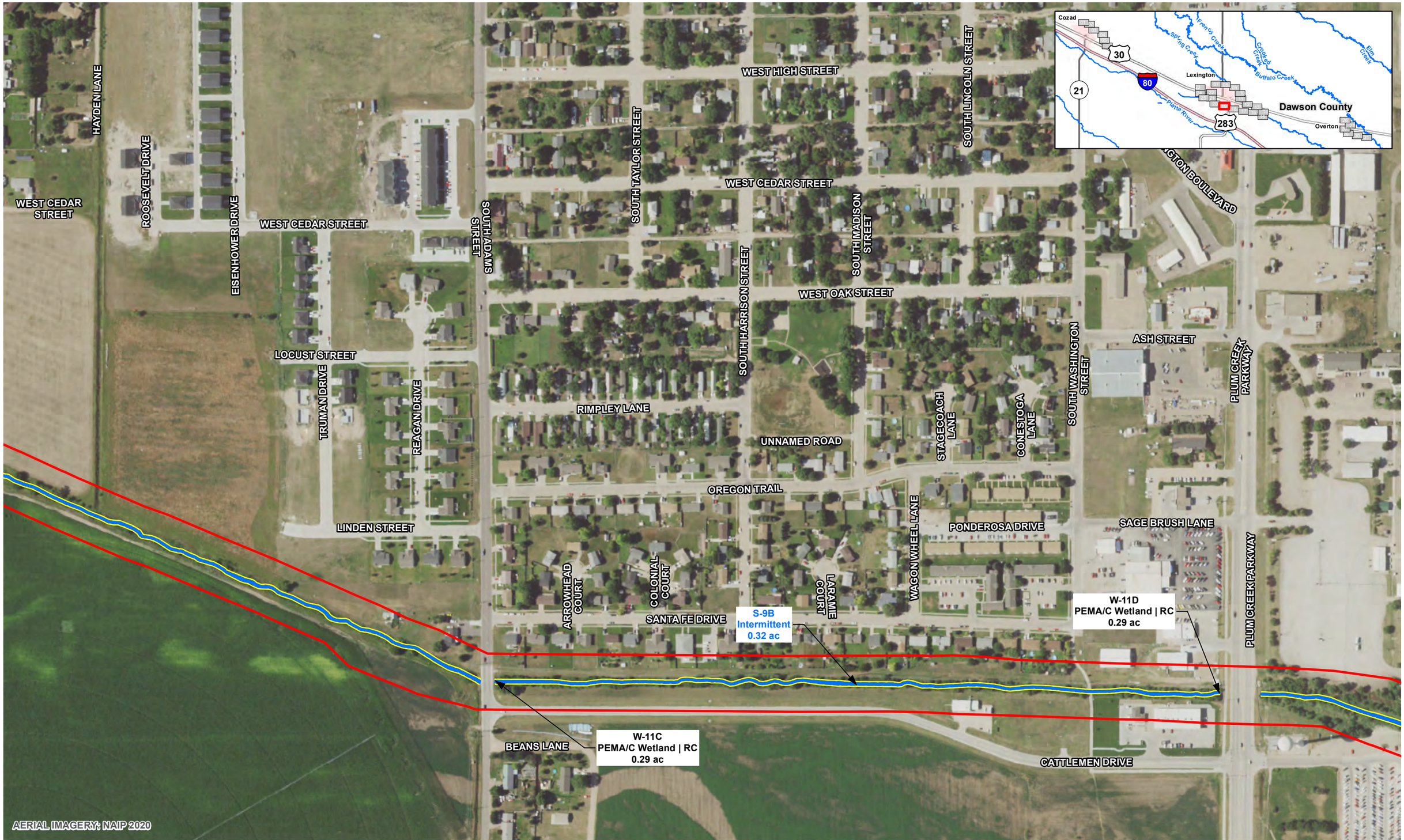
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 18 OF 31



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Nebraska Subclasses
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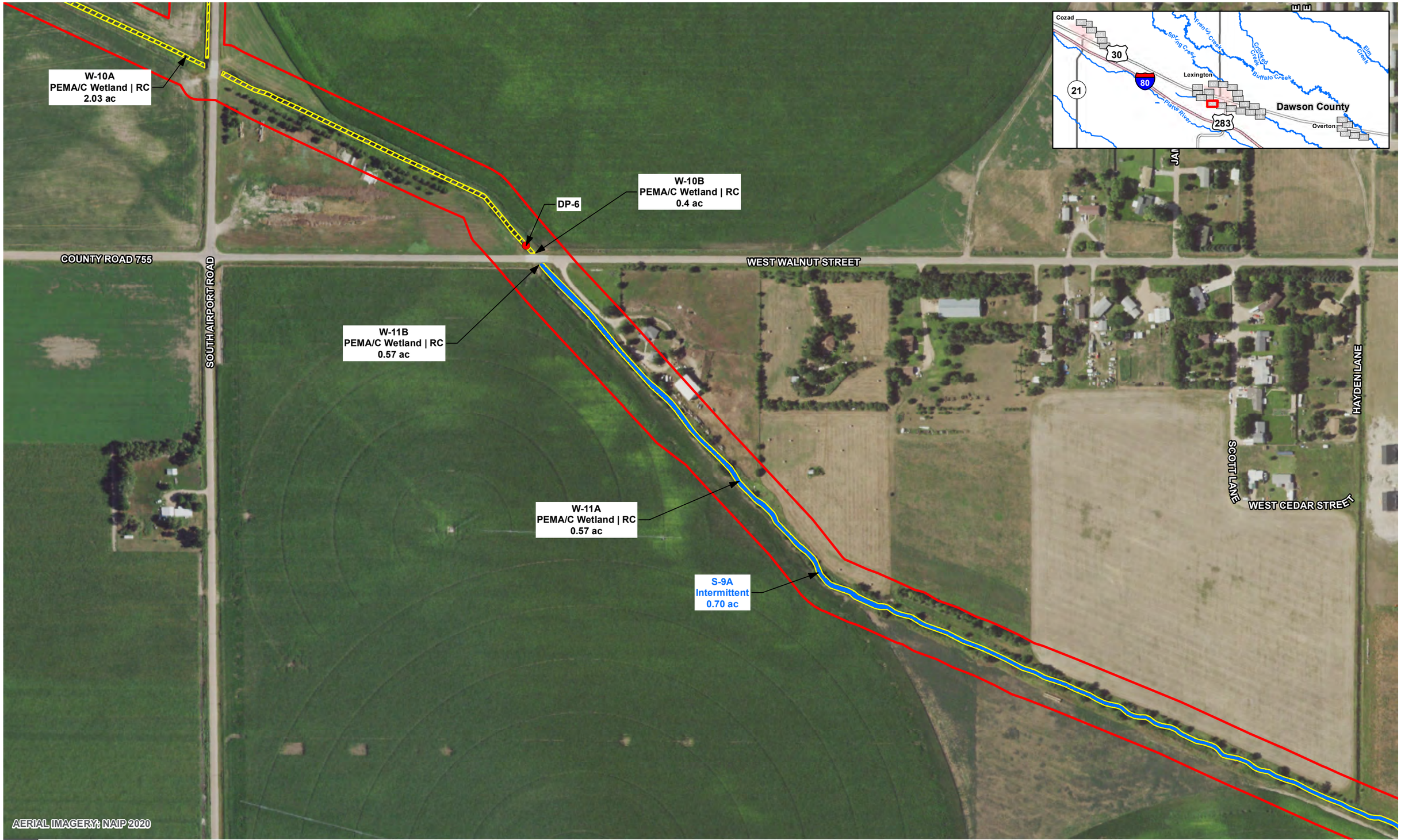
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 19 OF 31



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Nebraska Subclasses
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Open Water
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PEMA/C
PFOA
PSSA
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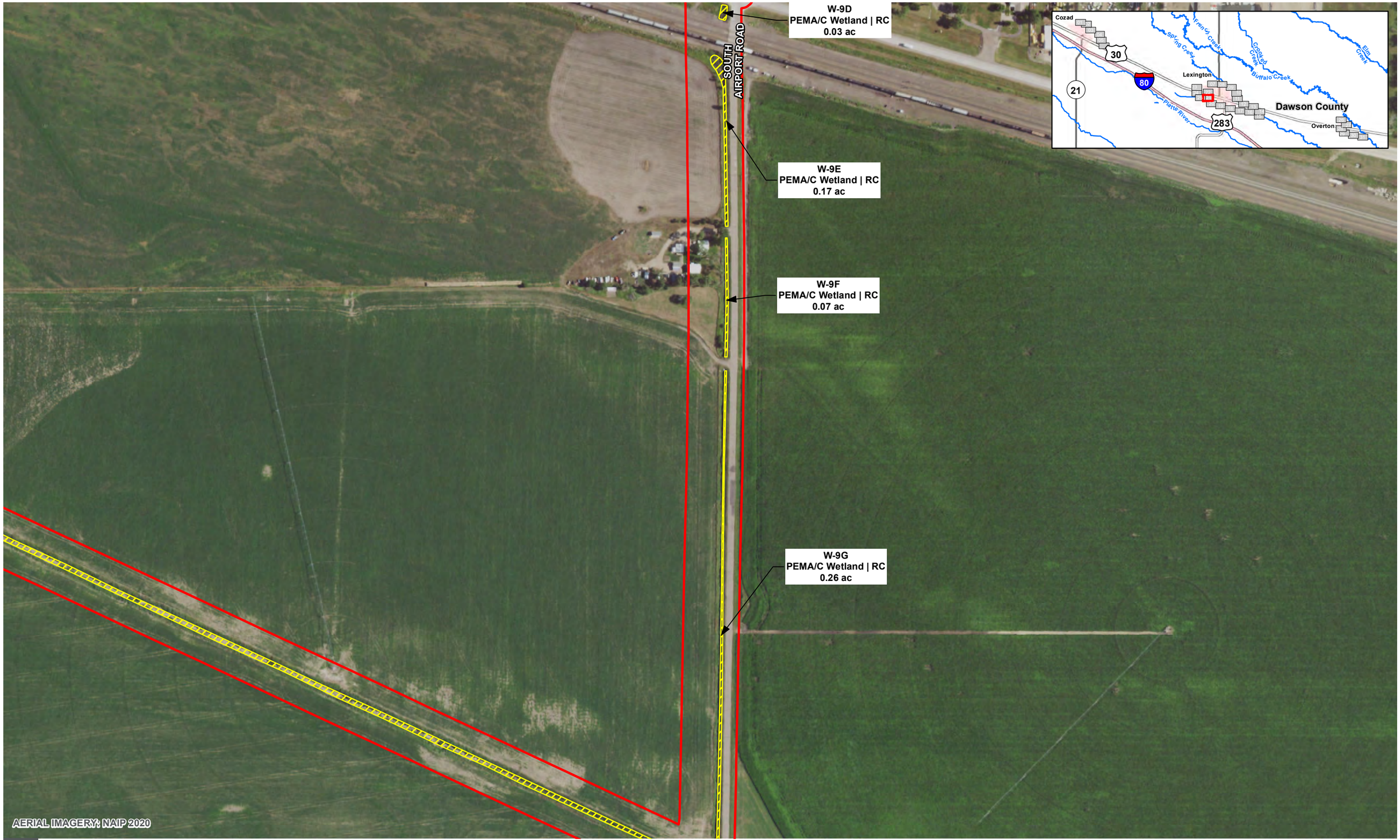
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 20 OF 31

PATH: Z:\PROJECTS\CENTRAL_PLATTE_NRD\10231475_SPRINGBUFFALO_CRK_WTRSHD\MAP_DOCS\WORKING_MXD\WETLAND_DELINEATION\2022\FIG_2_WETLANDS_AQUATICRESOURCES.MXD - USER: EMSCHMIT - DATE: 7/8/2022



Nebraska Subclasses
NA = Not Applicable
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0 Feet 300

2021 Sample Point
2022 Sample Point
2022 Photo Point

Study Area
Open Water
Stream

Wetland Type
PEMA/C
PFOA
PSSA
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WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

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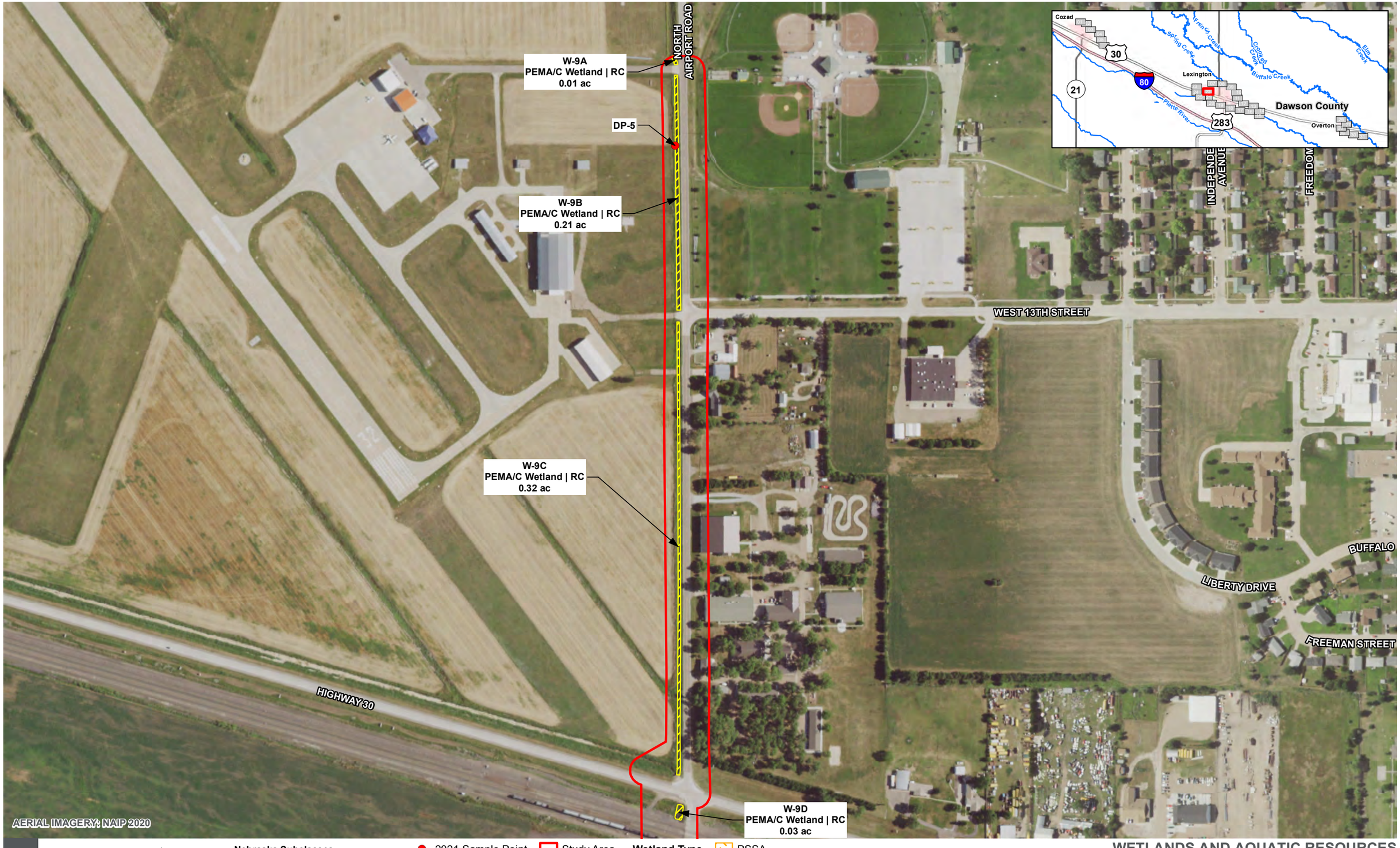

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WETLANDS AND AQUATIC RESOURCES
SPRING / BUFFALO CREEK WATERSHED STUDY
FIGURE 2 PAGE 22 OF 31

0 Feet 300

Nebraska Subclasses
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2021 Sample Point
2022 Sample Point
2022 Photo Point
Study Area
Open Water
Stream

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PSSA
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WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 23 OF 31

0 Feet 300

Nebraska Subclasses
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WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 24 OF 31

PATH: Z:\PROJECTS\CENTRAL_PLATTE_NRD\10231475_SPRINGBUFFALO_CRK_WTRSHD\MAP_DOCS\WORKING_MXD\WETLAND_DELINEATION\2022\FIG_2_WETLANDS_AQUATICRESOURCES.MXD - USER: EMSCHMIT - DATE: 7/8/2022

0 Feet 300

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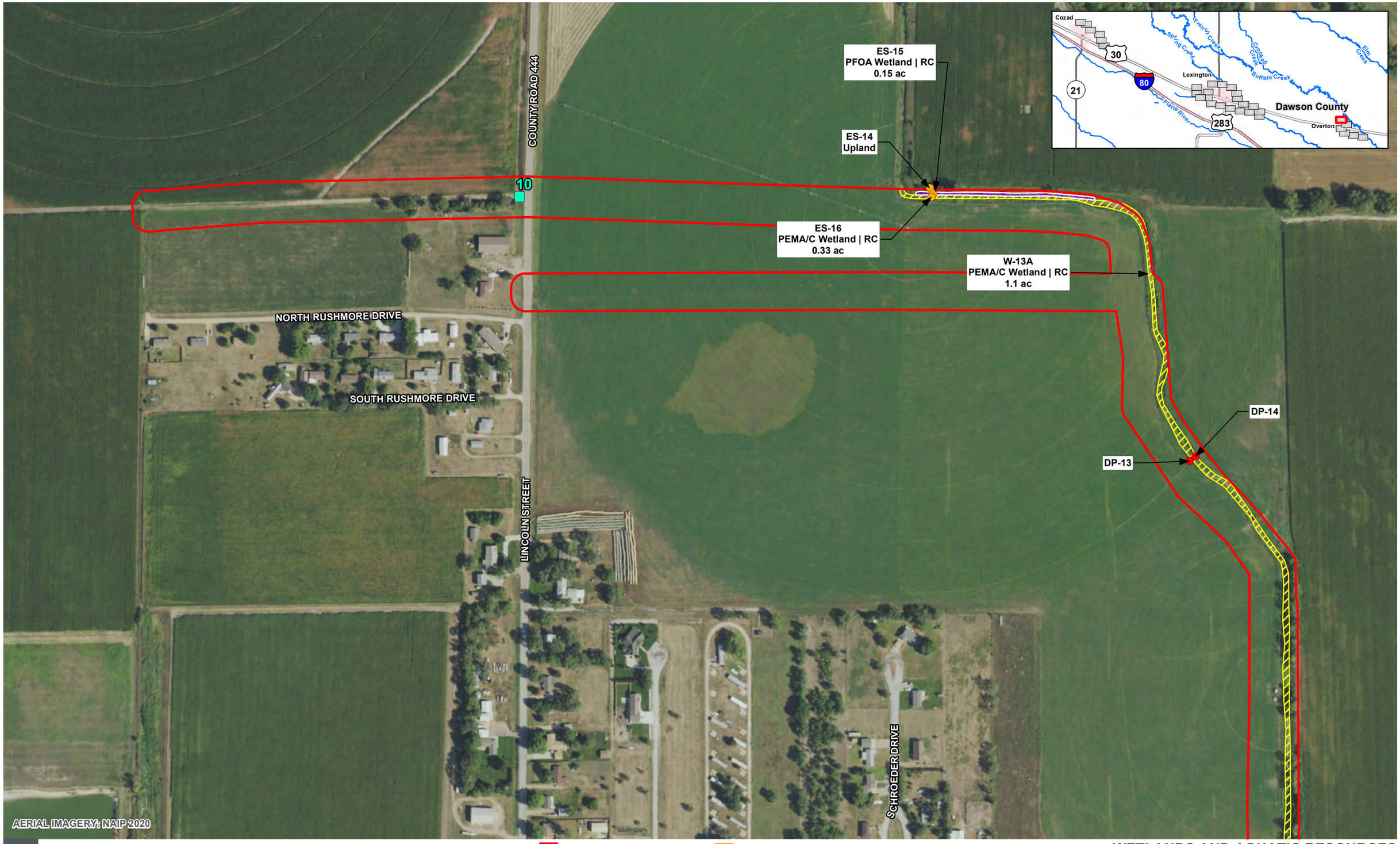
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 25 OF 31



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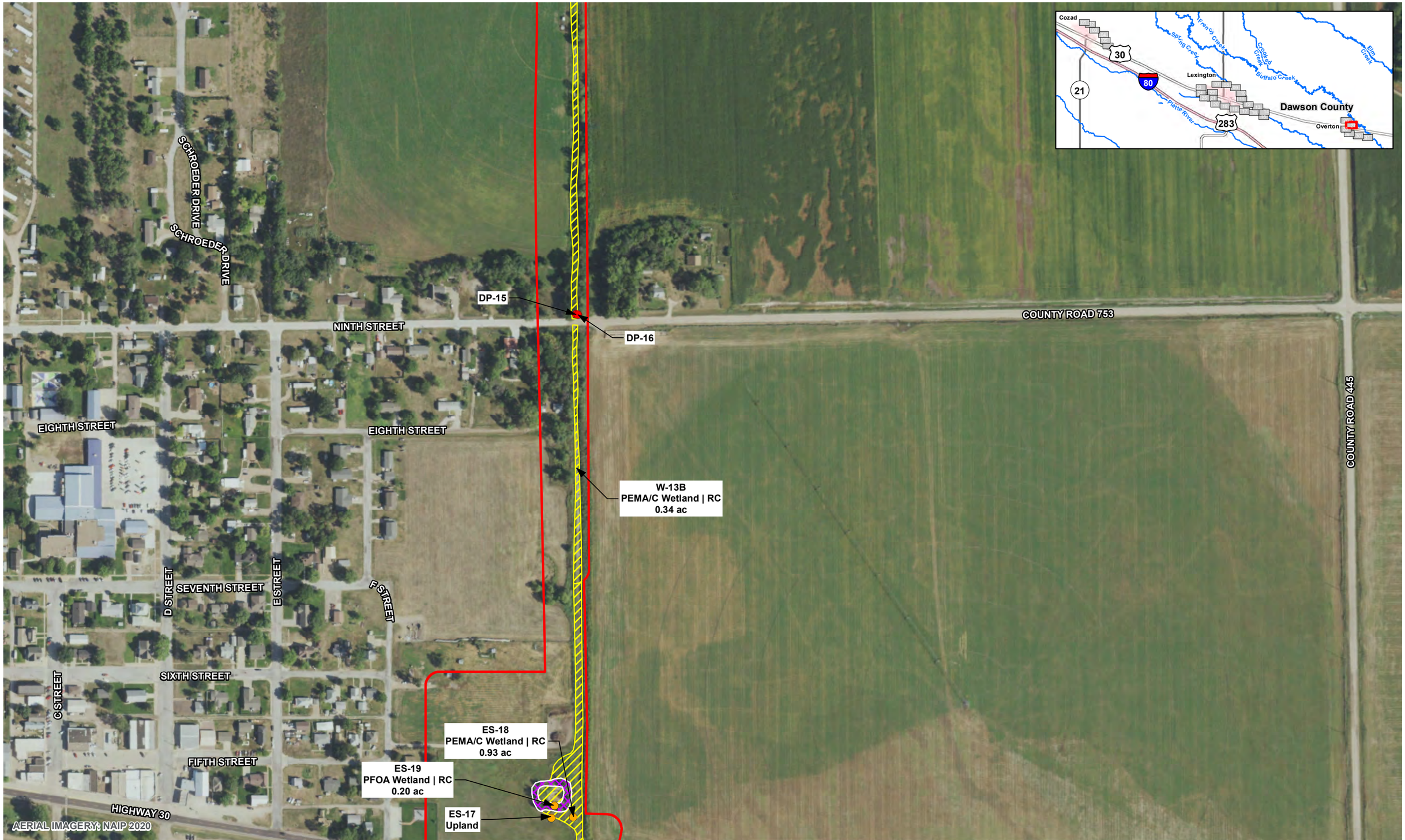
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 26 OF 31



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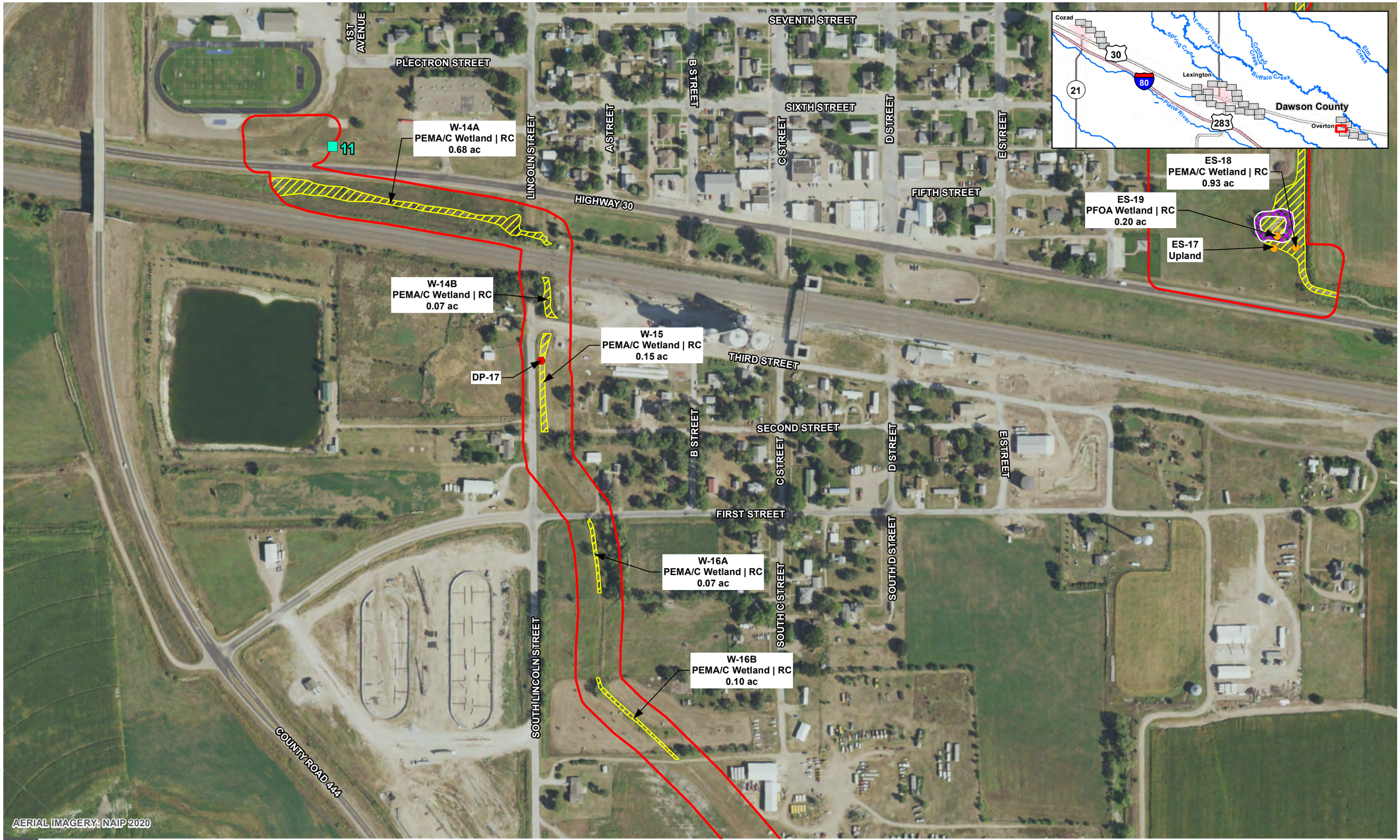
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 27 OF 31



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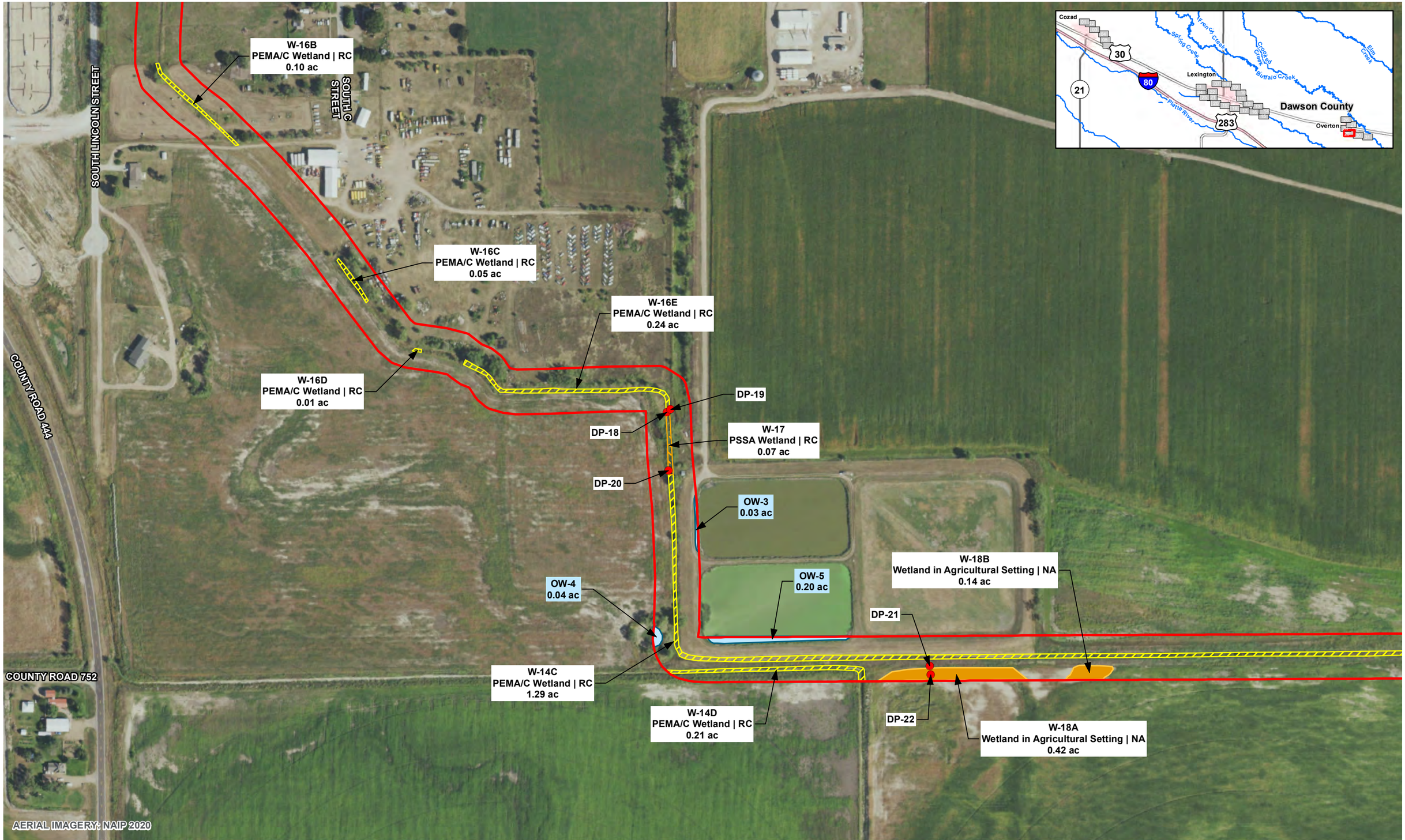
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 28 OF 31



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WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 29 OF 31

0 Feet 300

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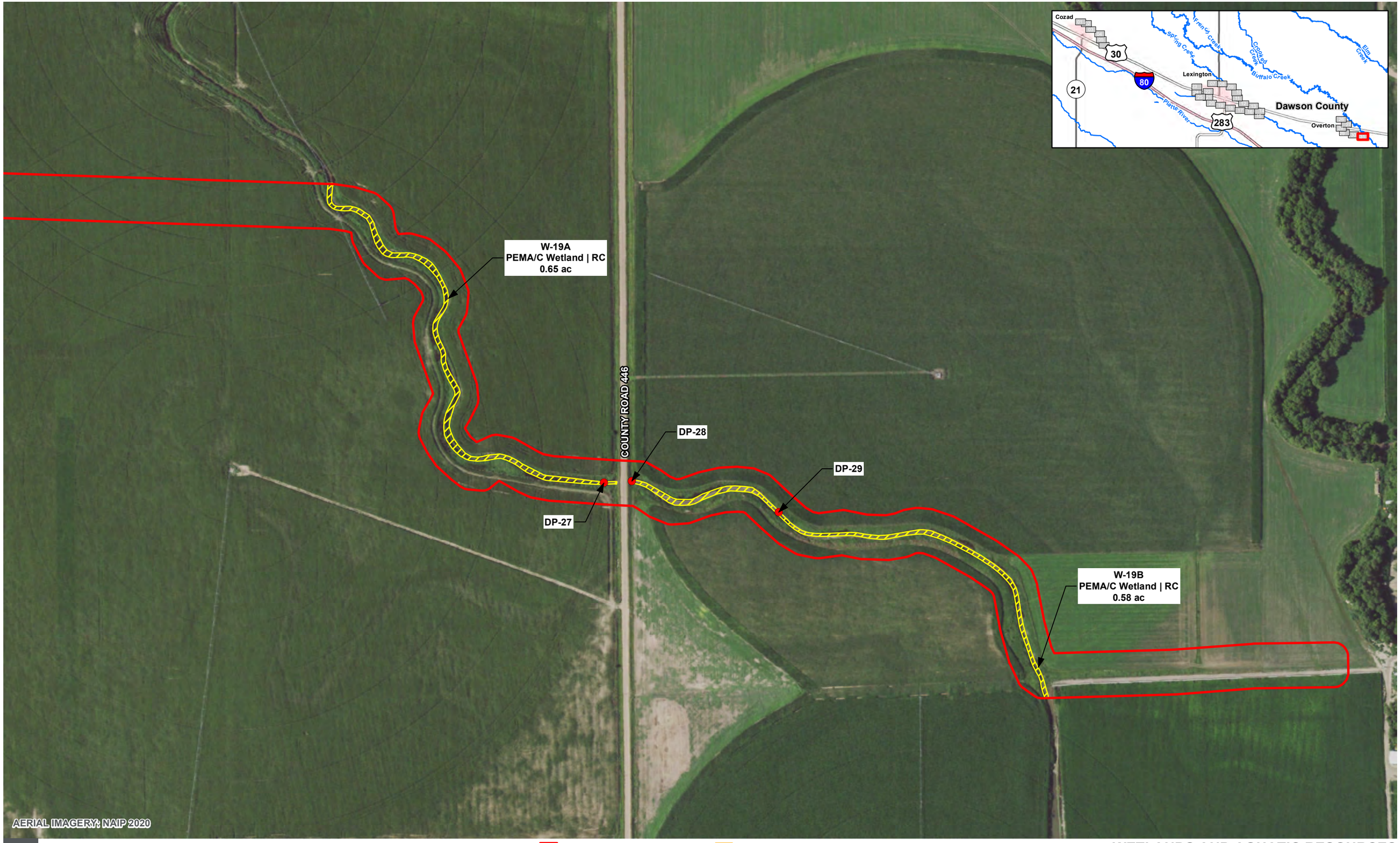
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 30 OF 31



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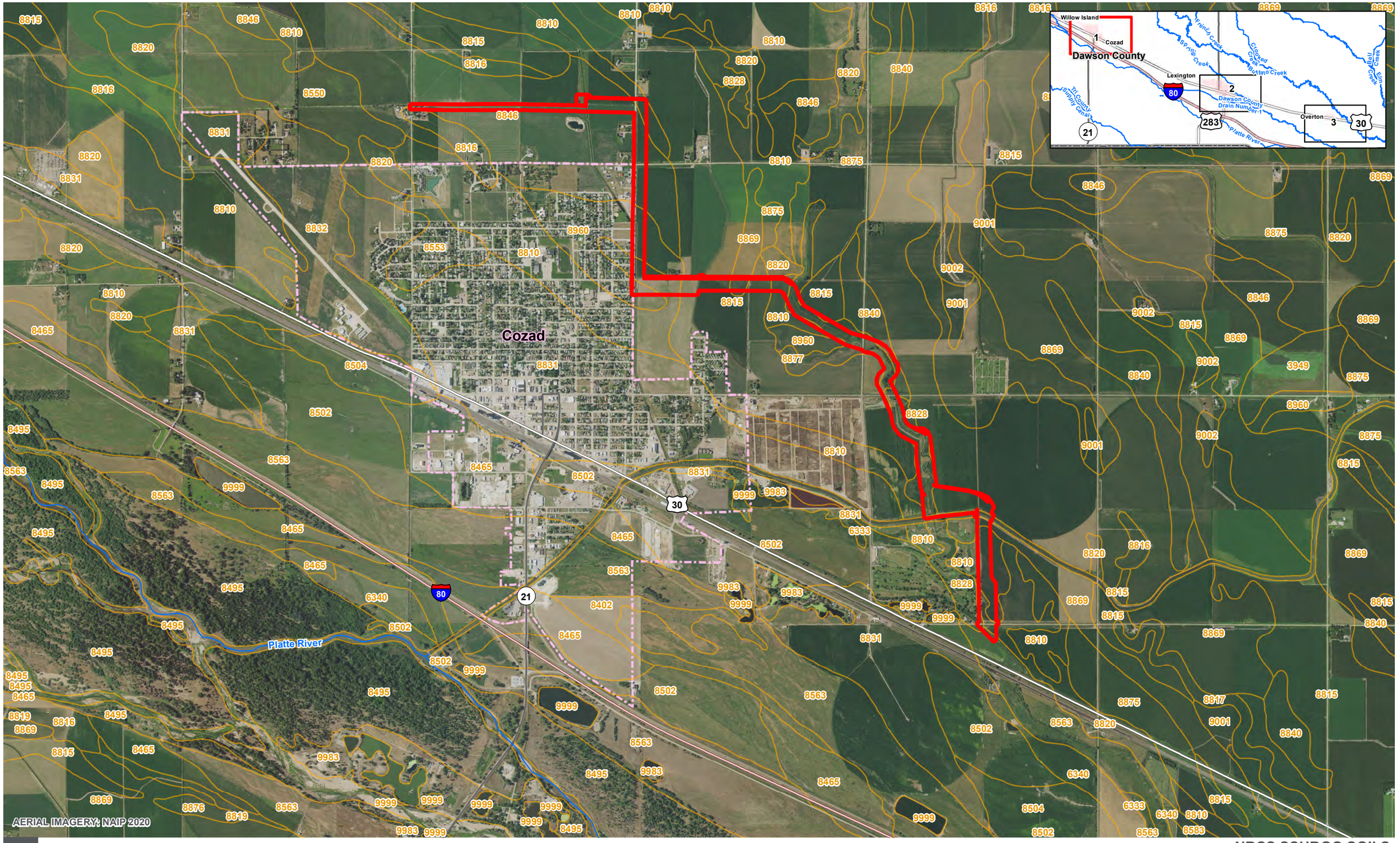
WETLANDS AND AQUATIC RESOURCES

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 2 PAGE 31 OF 31



HDR

0 Feet 2,000

City Boundary

SSURGO Soils - NRCS

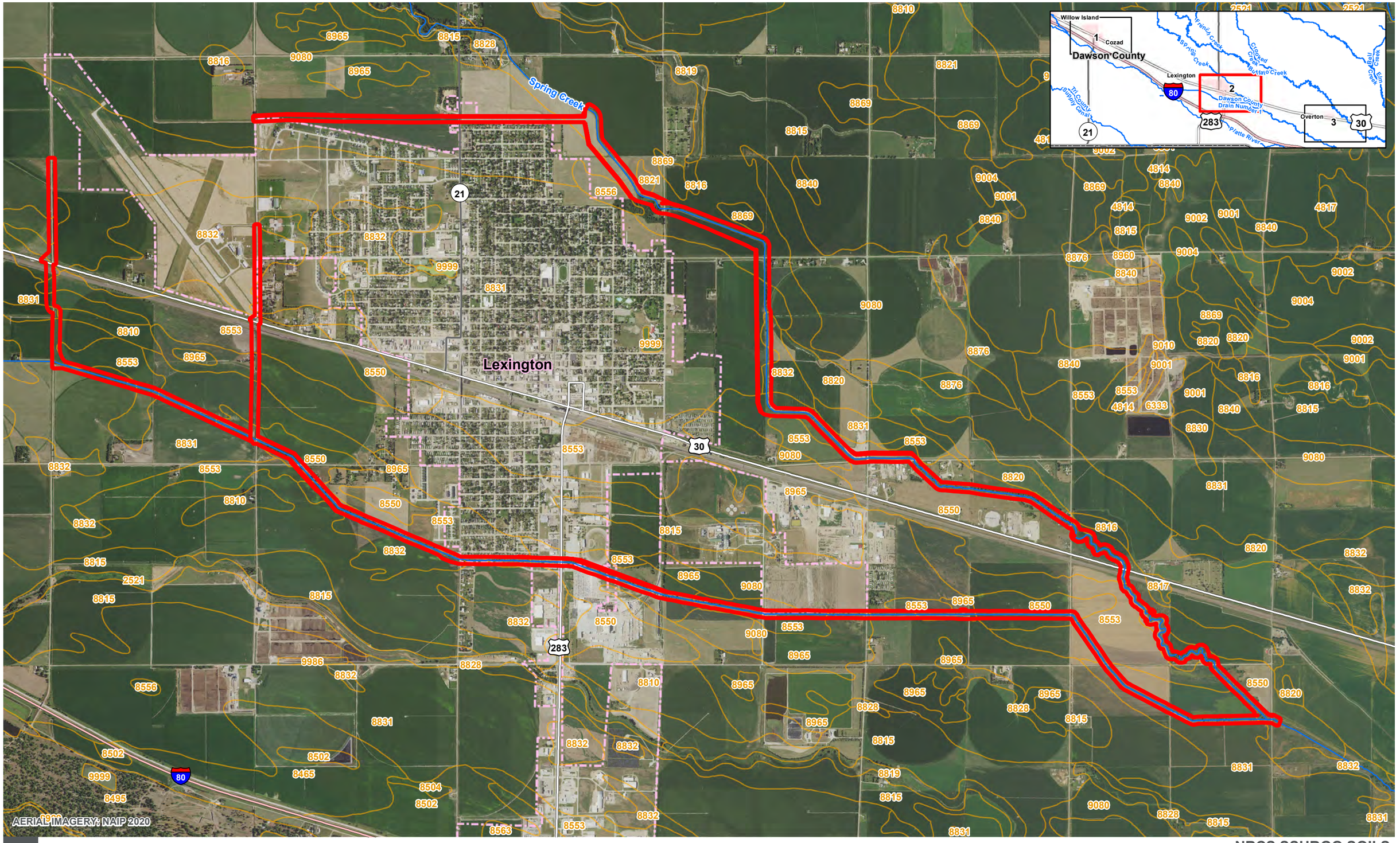
Study Areas

NRCS SSURGO SOILS

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 3 PAGE 1 OF 3

PATH: Z:\PROJECTS\CENTRAL_PLATTE_NRD\10231475_SPRINGBUFFALO_CRK_WTRSHD\MAP_DOCS\WORKING_MXD\WETLAND_DELINEATION\2022\FIG_3_WETLANDS_NRCS_SOILS_MAP.MXD - USER: EMSCHMIT - DATE: 7/8/2022



HDR

0 Feet 2,000

City Boundary

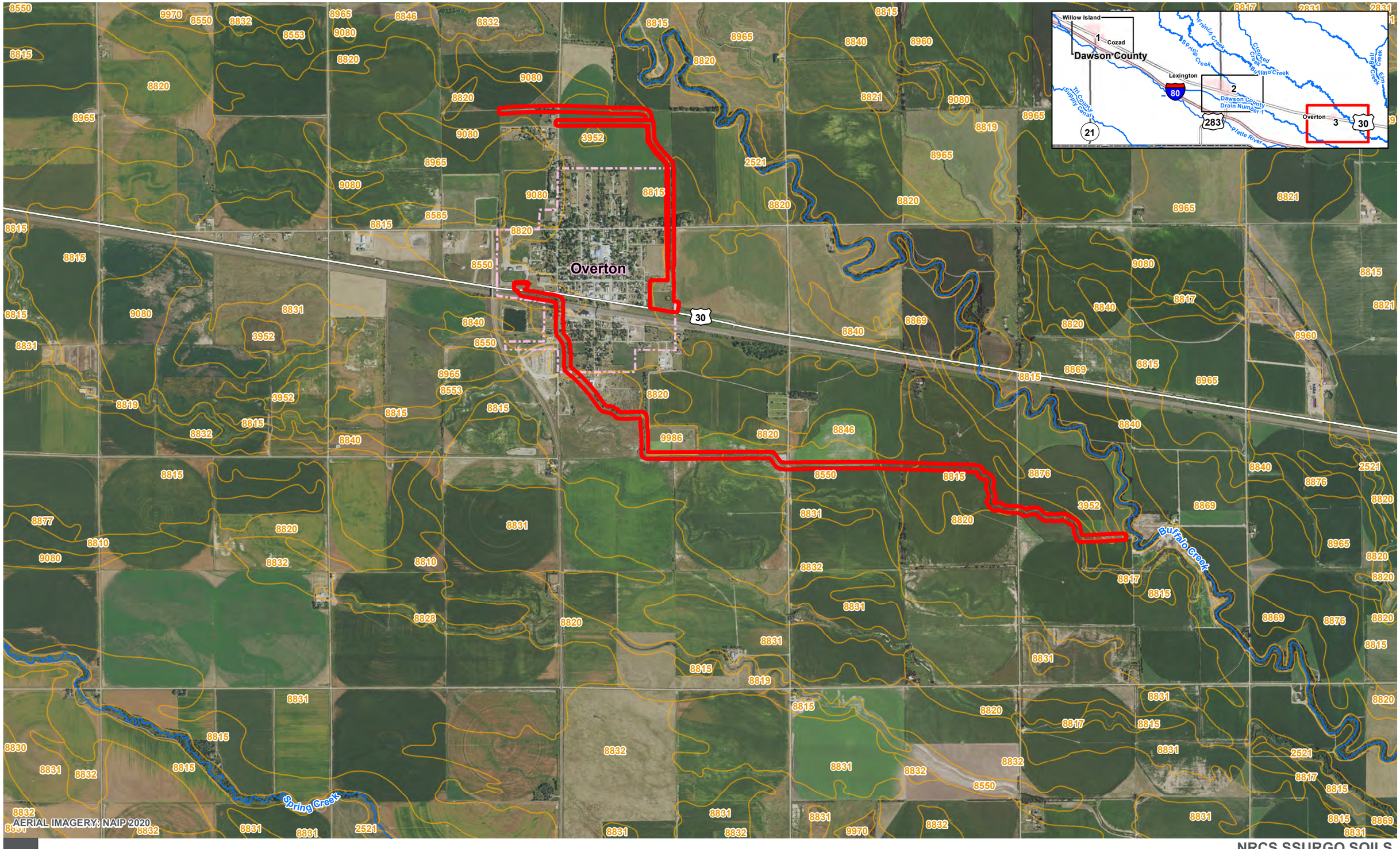
SSURGO Soils - NRCS

Study Areas

NRCS SSURGO SOILS

SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 3 PAGE 2 OF 3



0 Feet 2,000

City Boundary

SSURGO Soils - NRCS

Study Areas

NRCS SSURGO SOILS

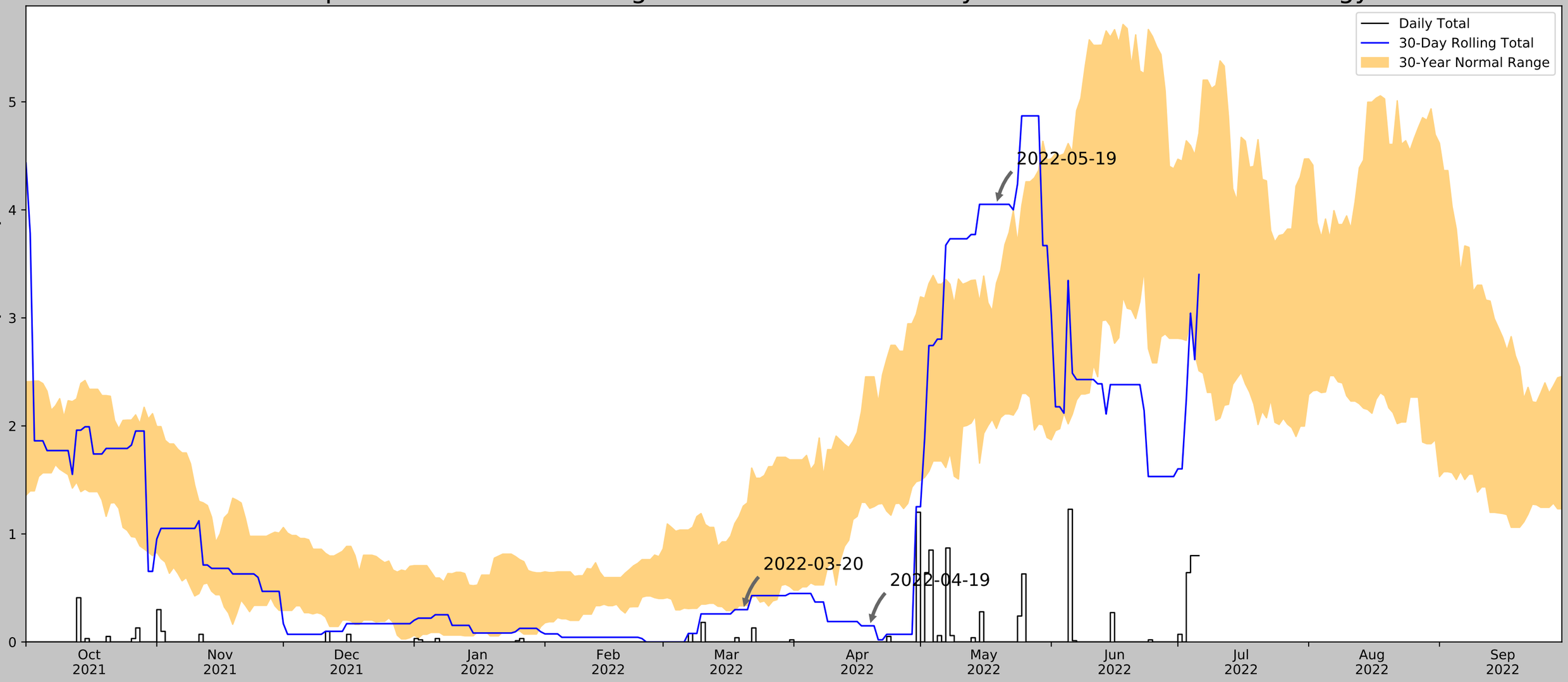
SPRING / BUFFALO CREEK WATERSHED STUDY

FIGURE 3 PAGE 3 OF 3

PATH: Z:\PROJECTS\CENTRAL_PLATTE_NRD\10231475_SPRINGBUFFALO_CRK_WTRSHD\MAP_DOCS\WORKING_MXD\WETLAND_DELINEATION\2022\FIG_3_WETLANDS_NRCS_SOILS_MAP.MXD - USER: EMSCHMIT - DATE: 7/8/2022

Appendix B.
ANTECEDENT PRECIPITATION TOOL

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	40.74316, -99.53129
Observation Date	2022-05-19
Elevation (ft)	2310.59
Drought Index (PDSI)	Severe drought
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-05-19	1.976772	3.321654	4.051181	Wet	3	3	9
2022-04-19	1.237402	2.454724	0.149606	Dry	1	2	2
2022-03-20	0.333858	1.257874	0.299213	Dry	1	1	1
Result							Normal Conditions - 12

Figure and tables made by the **Antecedent Precipitation Tool** Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days (Normal)	Days (Antecedent)
CANADAY STEAM PLT	40.6944, -99.7008	2361.877	9.495	51.287	4.76	10370	81
OVERTON 2.2 SE	40.7135, -99.5213	2319.882	2.115	9.292	0.971	24	0
OVERTON 3 W	40.7456, -99.59	2330.053	3.078	19.463	1.445	485	0
ELM CREEK 4.8 WNW	40.7471, -99.4578	2329.068	3.857	18.478	1.807	77	0
LEXINGTON 7 ESE	40.75, -99.6167	2342.848	4.496	32.258	2.168	0	5
LEXINGTON 1.1 E	40.78, -99.72	2395.013	10.199	84.423	5.45	342	4
LEXINGTON 0.4 ESE	40.777, -99.7346	2391.076	10.894	80.486	5.779	1	0
MILLER	40.9283, -99.3886	2310.039	14.808	0.551	6.672	51	0
HOLDREGE	40.4517, -99.3803	2319.882	21.64	9.292	9.939	3	0

Appendix C.
CUSTOM SOIL RESOURCE REPORT

Please contact Melissa Baier (melissa.baier@usda.gov) for custom soil resource report for Dawson County, Nebraska.

Appendix D. WETLAND DETERMINATION DATA FORMS

Please contact Melissa Baier (melissa.baier@usda.gov) for Wetland Determination Data Forms.

Appendix E.
SITE PHOTOGRAPHS

Photo 1 (W-1). Emergent wetland W-1, photo taken from berm built up on side of the channel. Note dominant vegetation of common reed being shown.

Photo 2 (W-5). Southern portion of wetland W-5 shown with narrowleaf cattails growing within the ditch.

Photo 3 (W-5). The northern end of W-5 is dominated by reed canary grass with patches of sparse vegetation, indicating periods of inundation.

Photo 4 (W-7). Stream terrace wetland, W-7, along Spring Creek. Note the wetland is above the water level, but below the upland fields surrounding.

Photo 5 (W-8). Emergent wetland W-8 dominated by reed canary grass. This wetland is also hydrologically connected to Spring Creek.

Photo 6 (W-9). Cattails and Pennsylvania smartweed growing within the narrow drainage ditch of wetland W-9.

Photo 7 (W-10). Emergent wetland W-10 within a channel with sloping sides. Note, S-9 begins further downslope with the start of scouring and a defined bed and bank.

Photo 8 (W-13). Portion of wetland W-13 where common reed is the dominant vegetation. Wetland is located within a swale between crop fields.

Photo 9 (W-13). Flow debris present on pivot bridge at W-13 indicating high flow events.

Photo 10 (W-13). The southern extent of W-13 where reed canary grass dominates near the bridge and road.

Photo 11 (W-14). Emergent wetland W-14 is within a swale along alternate Interstate Highway 30 at the Overton site.

Photo 12 (W-14). North of alternate Interstate Highway 30 where no wetland exists on other side of highway from wetland W-14.

Photo 13 (W-15). Emergent wetland within a roadside ditch that recieves hydrology from precipitation and runoff from the adjacent road.

Photo 14 (W-16). Northern end of emergent wetland W-16. Hydrophytic vegetation consists of Nebraska sedge and prairie cordgrass.

Photo 15 (W-18). W-18 is a WIAS with saturation and surface water present. Note that the field is tilled.

Photo 16 (W-18). Overview of WIAS W-18 with signs of distressed crop and lack of vegetation.

Photo 17. Photo of a potential WIAS mapped from desktop at the Overton site to the southeast. Feature did not present any wetland indicators in the field. Crop is growing well in the area.

Photo 18 (W-19). Overview of emergent wetland W-19. Wetland is within a ditch between two cropfields with corn planted up to the edge of the ditch.

Photo 19. Example of upland vegetation growing in a ditch within the southern extent of the Overton site.

Photo 20. Vegetated swale in the southwest portion of the Overton site that lacked wetland indicators.

Photo 21 (S-1 and S-2). Location where stream S-1 and S-2 converge near culvert. Streams are surrounded by agricultural fields on both sides.

Photo 22 (S-2) . Stream S-2 facing south. Note the height of banks due to the berms built on the sides of the stream.

Photo 23 (S-3). Ephemeral stream S-3, located adjacent to road. Vegetation growing within stream bed.

Photo 24 (S-4) . View of S-4 from berm, showing golfcourse to the south of the stream and an agricultural field to the north.

Photo 25 (S-4). Stream S-4 is an ephemeral stream where the bed is comprised of sand. Note concrete rip rap on the left bank.

Photo 26 (S-5) . Intermittent stream S-5 facing upstream to the northwest.

Photo 27 (S-6). Photo showing heavy erosion on the banks of stream S-6 (Spring Creek).

Photo 28 (S-6) . Stream with undercut banks and common reed growing on stream terrace.

Photo 29 (S-6 and S-7). Headgate where streams S-6 and S-7 converge.

Photo 30 (S-9; W-11) . Example of stream conditions at S-9 in the southern portion of the Lexington site. Moderate flow and water level present in this section of S-9. Note W-11 abutting S-9.

Photo 31 (S-9). In the northern extent of stream S-9. Note these portions without surface water.

Photo 32 (W-10). Looking southeast at wetland W-10 before a bed and bank forms (i.e., S-9) south of the concrete box culvert.

Photo 33 (S-9). Flow debris present in trees in the northern portion of S-9, indicating high flow events occur.

Photo 34 (S-10). Photo depicting steep banks of stream S-10 and canopy cover over stream.

Photo 35 (OW-1). Open water OW-1 at the Cozad site within a forested area.

Photo 36 (OW-2). OW-2 is a ponded area at the end of an agricultural ditch. Algal mat crust was present during field investigation.

Photo 37 (OW-4). OW-4 is a natural ponded area situated at the end of a drainage swale in the crop field and a high water table due to low landscape position.

Photo 38 (OW-5) . Open water OW-5 is an artificial pond located at the Overton site.

Photo 39 (OW-6). Open water OW-6 is a ponded area at the end of an agricrultural ditch. Surface soil cracks indicate periods of inundation.

Photo 40. Empty basin located next to OW-5 at the Overton site. This artificial pond may no longer be in use.

Photo 41. Example of a row crop field in the northwest portion of the Overton site. This crop was abundant throughout the study area.

Photo 1 (Photo Point 1) Intermittent waterway located north of west 24th Street and east of O Street. Orientation east.

Photo 2 (Photo Point 2) Agriculture field located east of Newell Street and north of Road 762. Orientation west.

Photo 3 (ES-01) Emergent wetland fringe along the banks of an intermittent waterway located north of East 15th Street and east of Newell Street. Orientation north.

Photo 4 (ES-02) Upland outpoint located upgradient to the emergent wetland north of East 15th Street and east of Newell Street. Orientation south.

Photo 5 (Photo Point 3) Agriculture field located west of Country Club Road and north of County Road 761. Orientation east.

Photo 6 (Photo Point 4) Intermittent waterway intersecting County Road 760 and east of US-30. Orientation south.

Photo 7 (Photo Point 5) Agriculture field located east of North Airport Road and north of West 20th Street. Orientation east.

Photo 8 (Photo Point 6) Agriculture area located west of North Adams Street and north of West 20th Street. Orientation West.

Photo 9 (Photo Point 7) Agriculture field located west of North Taft Street and north of East 13th Street. Orientation west.

Photo 10 (ES-03) Upland area located in a roadside ditch west of Road 431 and south of Road 757. Orientation south.

Photo 11 (ES-04) Upland area located in a roadside ditch west of Road 431 and south of Road 757. Orientation south.

Photo 12 (ES-05) Emergent wetland fringe located in a roadside ditch west of Road 431 and south of Road 757. Orientation north.

Photo 13 (ES-06) Upland outpoint located in a roadside ditch upgradient to the emergent wetland west of Road 431 and south of Road 757. Orientation south.

Photo 14 (ES-07) Upland outpoint located in a roadside ditch upgradient to the emergent wetland east of Road 431 and south of Road 757. Orientation east.

Photo 15 (ES-08) Wetland in an agriculture setting west of Road 431 and south of Road 757. Orientation west.

Photo 16 (ES-09) Upland area located in a roadside ditch north of US-30 and west of Road 431. Orientation south.

Photo 17 (ES-10) Upland area located in a roadside ditch north of US-30 and east of Road 431. Orientation north.

Photo 18 (Photo Point 8) Upland area located in a roadside ditch north of US-30 and east of Road 431. Orientation north.

Photo 19 (Photo Point 9) Upland area located in a roadside ditch north of US-30 and east of Road 431. Orientation north.

Photo 20 (ES-11) Upland area located in a roadside ditch east of Road 431 and south of US-30. Orientation south.

Photo 21 (ES-12) Emergent wetland fringe located in an irrigation drainage located east of Road 431 and south of US-30. Orientation east.

Photo 22 (ES-13) Upland outpoint located upgradient to the emergent wetland east of Road 431 and south of US-30. Orientation east.

Photo 23 (Photo Point 10) Access road in an agriculture field west of County Road 444 and north of North Rushmore Drive. Orientation west.

Photo 24 (ES-14) Upland outpoint located upgradient to the emergent wetland east of Country Road 444 and north of North Rushmore Drive. Orientation east.

Photo 25 (ES-15) Forested wetland fringe along the banks of an intermittent waterway located east of Country Road 444 and north of North Rushmore Drive. Orientation east.

Photo 26 (ES-16) Emergent wetland fringe along the banks of an intermittent waterway located east of Country Road 444 and north of North Rushmore Drive. Orientation east.

Photo 27 (Photo Point 11) Emergent wetland fringe along the banks of an intermittent waterway located south of Road 754 and east of Lincoln Street. Orientation east.

Photo 28 (ES-17) Upland outpoint located upgradient to the emergent wetland north of US-30 and east of F Street. Orientation southwest.

Photo 29 (ES-18) Emergent wetland fringe along the banks of an intermittent waterway located north of US-30 and east of F Street. Orientation north.

Photo 30 (ES-19) Forested wetland located north of US-30 and east of F Street. Orientation north.