



Larimer County Analysis – Technical Memorandum No. 6 Wetlands Mitigation Plan

Prepared for:
Larimer County

Prepared by:
**Northern Integrated Supply Project
Water Activity Enterprise**

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Memorandum

Date: February 17, 2020
To: Christie Coleman, Northern Colorado Water Conservancy District
From: Karin McShea, Technical Group Manager Biological Resources – Pinyon Environmental, Inc.
Project: Northern Integrated Supply Project
Subject: Larimer County 1041 Permit: Wetland Mitigation Plan

Introduction

This memorandum (memo) presents the Wetland Mitigation Plan (Plan) developed for the Northern Integrated Supply Project's (NISP or the Project) use in the NISP Water Activity Enterprise's (WAE) 1041 Permit application. In accordance with Larimer County Land Use Code requirements, the purpose of this Plan is to document impacts to open waters and wetlands; identify strategies for avoiding, minimizing, mitigating, and enhancing open waters and wetlands; propose a plan to implement those strategies; and confirm that applicable requirements will be followed.

Furthermore, the purpose of this Plan is to document the Project's extensive coordination efforts and commitments to avoid, minimize, mitigate, and enhance open water and wetlands that would be impacted by the Project in unincorporated Larimer County, Colorado, in accordance with *Larimer County Land Use Code, 8.2.11 Wetlands Mitigation Plan Requirements* (Larimer County, 2019). NISP WAE is the permittee and the entity that will implement identified mitigation measures.

Project Overview

Northern Colorado Water Conservancy District (Northern Water), acting by and through the NISP WAE, has contracted Pinyon Environmental, Inc. (Pinyon) to provide environmental compliance services during the pre-construction phase of the Project. The Project will provide a new reliable water supply to Northern Colorado and consists of constructing the following in Larimer County:

- Glade Reservoir Complex, which includes Poudre Valley Canal and Munroe Canal improvements, and construction of the forebay area, the dam structure (including intake and release structures), a pump station, and recreation areas located adjacent to the new reservoir
- A realigned portion of U.S. Highway 287
- New pipeline conveyance systems, which include the Northern Tier, Poudre Intake, Glade Release, and County Line Alignments

The purpose of the Project is to meet a portion of the NISP Participants' (15 towns and water districts in Larimer, Weld, Morgan, and Boulder Counties) current and projected future water supply needs. The overall goal of the Project is to provide 40,000 acre-feet of new, annual water to the NISP Participants.

This Plan only covers work associated with Glade Reservoir, its appurtenant uses and recreation area, and NISP conveyance system in unincorporated Larimer County (Figure 1). Larimer County 1041 Permit requirements do not apply to Colorado Department of Transportation (CDOT) highway relocations. As a

result, the scope and effects of the realignment of U.S. Highway 287 will be evaluated per Larimer County requirements as a separate process.

8.2.1. – Purpose

The *Larimer County Land Use Code, 8.2 Standards for All Development – Wetland Areas* obligates developers to:

“...protect wetlands, their buffer areas and their water sources from encroachment that would adversely affect the wetlands' ability to maintain water quality, provide wildlife habitat, provide flood protection and maintain other critical environmental functions. When encroachment cannot be avoided, this section provides for mitigation of the impacts resulting from the encroachment.”

NISP WAE is required to obtain numerous federal and state permits, licenses, and approvals. The primary regulatory processes, as related to Larimer County Land Use Code, 8.2 Standards for All Development – Wetland Areas, include:

- *Clean Water Act Section 404 Permit*. Regulates the discharge of dredged or fill material into waters of the U.S. (WUS), including jurisdictional wetlands. This means the Project will take all appropriate and practicable steps to avoid, minimize, and mitigate adverse impacts to WUS.

8.2.2. – Applicability

Larimer County Land Use Code wetlands regulations apply to all applications for subdivisions, conservation developments, planned land divisions, rezonings, special reviews, special exceptions, and site plan reviews. This section also applies to any minor land division that will result in a new, vacant building site. NISP will comply with *Larimer County Land Use Code, Section 8.2.2. Applicability* requirements, as required.

8.2.3. – Other Regulations

In addition to those outlined above, the following regulations pertain to NISP.

- *National Environmental Policy Act (NEPA) Review*. A Final Environmental Impact Statement (FEIS) (dated July 2018) has been prepared by the U.S. Army Corps of Engineers (USACE) in accordance with NEPA and applicable NEPA implementation regulations (43 U.S.C. § 4321 *et. seq.*; 40 CFR 1500, as amended; 33 CFR 325) (USACE, 2018). This means that data were collected, effects were analyzed, and technical documents were produced regarding WUS, including open waters and wetlands.
- *2008 Mitigation Rule*. The Project is in the process of developing a Wetland and Open Water Mitigation Plan (January 20, 2020 Draft) in order to comply with the USACE 2008 Mitigation Rule (33 CFR Part 332) (USACE, 2008a; Pinyon, 2020). The Wetland and Open Water Mitigation Plan describes how the Project will mitigate for unavoidable permanent impacts to WUS.
- *Endangered Species Act (ESA)*. Section 7(a)(2) of the ESA requires that federal agencies consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that effects of actions that the federal agencies authorize, fund, or carry out are not likely to jeopardize the continued existence of listed species or adversely modify designated critical habitat. The USACE submitted a biological assessment to the USFWS for the NISP proposed action (alternative 2M) and has consulted with the USFWS under Section 7 (USACE, 2007). The USFWS issued a biological opinion on NISP on October 5, 2007 (USFWS, 2007). That opinion will be updated prior to issuance of a Record of Decision by the USACE.

- *Colorado Revised Statutes (C.R.S.) 37-60.122.2.* This state law requires the creation of a *Fish and Wildlife Mitigation and Enhancement Plan* by the applicant in coordination with the Colorado Parks and Wildlife Commission. This plan was approved in 2017 by the Colorado Parks and Wildlife Commission and the Colorado Water Conservation Board and represents the official state position on the mitigation actions required of the applicant.

8.2.4. – Wetland Mapping

As mentioned above, the Project will construct the Glade Reservoir and a new pipeline conveyance system in Larimer County. The pipeline conveyance system consists of four alignments: Northern Tier Alignment, Poudre Intake Alignment, County Line Alignment, and Glade Release Alignment (Figure 1).

In 2015, ERO Resources Corporation (ERO) delineated open waters and wetlands within the Glade Reservoir study area (Figure 2; ERO, 2016; Note: jurisdictional wetlands and open waters are shown for the Glade Reservoir area). Further open waters and wetland delineations were completed for the U.S. Highway 287 realignment area and Forebay area in 2018 (ERO, 2019). In 2018, AECOM conducted a delineation of wetlands and other aquatic resources at the proposed mitigation sites in the *Northern Integrated Supply Project Aquatic Resource Inventory Report for Mitigation Sites* (AECOM, 2018). In 2019, open water and wetland delineations were completed for the Poudre River Intake Diversion area and the conveyance pipelines (Figures 2-6; Pinyon, 2019). Wetlands in the study area were primarily palustrine emergent (PEM) wetlands with smaller areas of palustrine scrub-shrub (PSS) wetlands.

In unincorporated Larimer County, the Project is anticipated to result in a maximum of 31.344 acres of permanent impacts to wetlands and 0.982 acres of permanent impacts to open waters (USACE, 2018; Northern Water, 2019; Table 1). Permanent impacts would result from constructing Glade Reservoir and its associated infrastructure, constructing improvements at the Munroe Canal, and constructing an outfall for the Glade Release Pipeline. Temporary impacts will occur to wetlands and open waters as a result of construction activities associated with the installation of the Glade Reservoir and conveyance pipelines and associated structures. These construction activities include access for vehicles and construction equipment, vegetation clearing, removal and replacement of topsoil, and regrading and blending slopes back to pre-construction contours.

Table 1. Anticipated Impacts to Wetlands and Open Waters in Unincorporated Larimer County

Location	Permanent		Temporary	
	Wetlands (acres)	Open Waters (acres)	Wetlands (acres)	Open Waters (acres)
Glade Reservoir Complex*	31.300	0.923	2.361	1.214
NISP Conveyance – Northern Tier Alignment	0.000	0.000	2.729	0.998
NISP Conveyance – Poudre Intake Alignment	0.000	0.000	0.165	0.827
NISP Conveyance – County Line Alignment	0.000	0.000	2.803	0.467
NISP Conveyance – Glade Release Alignment	0.044	0.059	0.123	0.000
Total	31.344	0.982	8.181	3.506

*This table shows impacts to jurisdictional open waters and wetlands.

The majority of wetlands and associated buffers are located adjacent to roadways, man-made canals, agricultural crop field, and grazed pastures. As such, most of the buffer areas have previously been disturbed and impacted by human-related activities. In addition, impacts to wetland buffers along the Northern Tier, the Poudre Intake, and County Line Alignments of the conveyance system will be temporary in nature and will be restored on site. Temporarily disturbed areas will be regraded to match pre-construction conditions, will be returned to pre-construction land use, and will be seeded with a native seed mix. Plant species in the seed mix will be selected to best match the pre-construction conditions of the area.

Permanent impacts to wetland buffers will occur at the Glade Reservoir Complex and at the Glade Release Alignment. These permanent wetland buffer impacts will be mitigated by the creation and maintenance of riparian and upland buffers at the Owl Creek and Munroe Canal mitigation sites (Figures 7 and 8). Further information regarding wetland development and wetland buffer restoration is presented in section 8.2.11 below.

8.2.5. – Wetland Definition

All wetland areas mapped for NISP meet the USACE's definition of a wetland, "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory, 1987)." This definition is consistent with the criteria outlined in section 8.2.5. of the Land Use Code.

Wetland delineations at Glade Reservoir were completed by ERO and AECOM in accordance with the 1987 *USACE Wetland Delineation Manual* and the 2010 *Regional Supplement to the USACE Wetland Delineation Manual: Great Plains Region* (Environmental Laboratory, 1987; USACE, 2010).

Pinyon used a stepwise process to map potential wetlands and open waters along the pipeline conveyance systems: desktop analysis, field verification (windshield survey), and field delineations. The desktop analysis was followed by field verification of the wetlands and open waters that were visible from publicly accessible areas. The desktop analysis and field verifications likely overestimated potential wetland and open water areas. Field delineations were conducted at major river crossings (where the conveyances cross the Cache la Poudre, Big Thompson, and Little Thompson Rivers) and at the proposed Poudre River Intake structure; however, these areas are outside unincorporated Larimer County.

8.2.6. – Unmapped Wetlands

All wetlands and open waters within the proposed limits of disturbance were mapped based on conditions at the time of the delineations.

8.2.7. – Wetland Boundary Disputes

All wetland and open water areas were mapped by a qualified biologist in accordance with USACE delineation protocol, or methods approved by the USACE, as described above. Therefore, no wetland boundary disputes are anticipated.

8.2.8. – Wetland Development Standards

The NISP facilities are being designed to avoid and minimize impacts to open waters, wetlands, and wetland buffers to the extent feasible. Two of the most significant changes in the NISP/Glade Reservoir that avoid environmental effects are the movement of the proposed reservoir from an on-channel reservoir site to an off-channel reservoir site, and the elimination of a potential point-of-diversion that would have been upstream

of the North Fork confluence with the Poudre River. Additionally, wetland delineation information has been used to inform the design of the Poudre River intake structure so that the area of disturbance to jurisdictional waters can be minimized. Other avoidance measures, such as discarding pipeline alignments that followed waterways or wetlands, were incorporated into the design and final location of the conveyance alignments to the maximum extent possible.

Additionally, best management practices (BMPs), such as using equipment mats and implementing erosion control measures, will be used to further minimize impacts. BMPs will be incorporated throughout the Project to limit the indirect effects of sedimentation and erosion. Beyond the direct disturbance impacts, construction activities may temporarily change open water morphology and flow, which may in turn temporarily disturb open water and wetland functioning. Construction activities will be managed to reduce or eliminate soil compaction, increased runoff and sedimentation, nonpoint source pollution, and the introduction and spread of noxious weeds.

Unavoidable impacts to wetlands, open waters, and wetland buffers were minimized as much as practicable. Minimization measures for the conveyance system include reducing the width of impacts. Where the conveyance pipelines need to cross wetlands or open waters, or where work to install the conveyance pipelines would impact wetlands or open waters, the construction limits will be reduced from the anticipated impact width of 120 feet. At the majority of wetland and open water features for the conveyance pipelines, the reduced impact width will be 60 feet wide (30 feet on either side of center). However, at locations where wetland and open water features are over 500 feet in length along the conveyance pipeline, the reduced impact width will be 80 feet wide (40 feet on either side of center). At the Glade Reservoir Complex, construction limits at or near wetlands were reduced and non-disturbance areas were established, where possible, to avoid and then minimize impacts to wetlands and open waters. As Project designs progress, additional avoidance and minimization measures will be incorporated into engineering plan sets when possible to further limit impacts on waters, wetlands, and wetland buffers.

As would be expected for a project with the scope of NISP, not all impacts to wetlands can be avoided or minimized. Unavoidable permanent impacts remaining after implementation of avoidance and minimization measures will be offset as described in section 8.2.11 below.

8.2.9. – Protection of Wetland Water Sources

The NISP facilities are being designed to avoid and minimize impacts to wetlands and their water sources to the extent feasible. In addition, as designs progress, erosion control measures will be developed to help protect wetlands and their water sources.

8.2.10. – Wetland Mitigation Requirements

Wetlands mitigation is being developed for NISP as part of the Clean Water Act (CWA) Section 404 Permit wetlands mitigation requirements and as part of ESA Section 7 Consultation Preble's meadow jumping mouse (PMJM) (*Zapus hudsonius preblei*) mitigation area development. Wetlands mitigation plans associated with those requirements are summarized in the following sections as those plans relate to Larimer County Land Use Code wetlands regulations. These plans may be adjusted and further refined as a result of the federal agency reviews under ESA Section 7 and CWA Section 404.

Restoration of wetlands and their buffers has been developed in accordance with the requirements outlined in the Larimer County Land Use Code. Mitigation for wetlands and open waters at the Park Creek Station, Owl Creek, and Munroe Canal mitigation sites (described below) will adequately compensate for any impacts to wetlands, open waters, and wetland buffers located in unincorporated Larimer County. Further information regarding wetland development and wetland buffer restoration is presented in section 8.2.11 below.

8.2.1.1. – Wetland Mitigation Plan Requirements

1. A description of the ownership, location, type, size and classification of the wetland and its buffer area

NISP WAE will offset permanent Project impacts by constructing a compensatory mitigation area for wetlands and open waters, along Owl Creek in Larimer County (Figure 7). In addition, another compensatory mitigation area will be constructed for PMJM (Munroe Canal) and will create new wetlands in the vicinity of Munroe Canal in Larimer County (Figure 8). The Project will also offset permanent Project impacts to wetlands by developing a wetlands mitigation plan in association with a proposed wetlands mitigation bank along Park Creek in Larimer County (Figure 9).

At the Owl Creek mitigation site, wetlands will be created in areas along Owl Creek below the proposed Glade Reservoir dam to replace the functions of wildlife habitat, flood attenuation, short- and long-term water storage, nutrient/toxicant removal, sediment retention/shoreline stabilization, and production export/food chain support that would be lost with implementation of the proposed Project (Figure 7). Because the replacement wetlands will be the same type and provide the same functions as the impacted wetlands, the mitigation actions will qualify as “in-kind” mitigation. The mitigation area will result in a net increase in aquatic function and services and will improve ecological functions in the mitigation areas. The location of the mitigation area has been carefully selected to provide the greatest opportunities for successfully creating wetland and open water mitigation in terms of acreage and potential ecological lift for wetlands and open waters. Ecological lift is defined herein to mean a net improvement in habitat quality. NISP WAE is committed to the long-term success of the compensatory mitigation areas, and therefore sites were selected that were deemed as having high potential for success. At the Munroe Canal mitigation site, additional wetland and upland mitigation areas have been designed and planned as a part of the Project’s PMJM habitat mitigation requirements. These areas are located north of the proposed forebay and south of the Munroe Canal as shown in Figure 8. By creating wetlands at the Munroe Canal mitigation site, many of the same functions and net increases described above will be replaced in this area as well.

PEM and PSS wetlands will be created at the Owl Creek and Munroe mitigation sites. Additionally, habitat lift credit (which includes Plains Cottonwood – Riparian Forest and Upland Grass, Forb, and Shrub) for non-wetland buffer zones will be created. This mitigation Plan summarizes portions of the wetlands and PMJM mitigation plans developed as part of the Project's federal permitting efforts.

None of the affected open waters within the Glade Reservoir area provide permanent aquatic habitat; i.e., no fish-bearing streams would be directly impacted by any of the Project infrastructure. However, impacts to open waters (e.g., portions of Owl Creek and its tributary drainages) will be mitigated through the development of Glade Reservoir. Many functions, including support of characteristic fish/aquatic habitat, flood attenuation, short- and long-term water storage, nutrient/toxicant removal, and sediment retention, would be greater for the new aquatic resource created by Glade Reservoir than for the impacted open water. The reservoir would also provide support of characteristic wildlife habitat for species dependent on open water.

Mitigation Work Plan

For the Owl Creek and Munroe Canal mitigation sites, two wetland Mitigation Zones were developed to fulfill wetland mitigation requirements, while an upland Mitigation Zone was developed to meet PMJM habitat mitigation requirements and will also mitigate permanent impacts to wetland buffers.

- **PEM Wetlands** – This wetland zone will be created by using cut and fill grading in upland slopes to establish topographic shelves which can be excavated for wetland development. The two wetland zones adjacent to Owl Creek will receive indirect flows from the dam toe drains to support wetland vegetation

(Figure 7). Toe drains will provide water to Owl Creek with mitigation areas receiving water through connections with Owl Creek. Wetland vegetation in these areas will be planted and seeded using a combination of native wetland plugs/container plants and native wetland seeds.

- **PSS Wetlands – Riparian** – This zone will be planted with riparian shrubs and trees and is designed to provide dense shrub cover for wildlife, including PMJM, as well as buffer zones to protect created wetlands. These areas will be located either on the fringes of wetland zones or on slightly elevated areas within wetland zones. Additional plant materials, including native grass, forb, and shrub seeding will also be included in these areas to supplement planted materials. This zone is included as new wetlands as most of the plant materials, either through planting or seeding, will be rated as Facultative or wetter. Hydrology and soil composition are expected to exhibit hydric conditions and function as wetlands in the future.
- **Upland** – Disturbed land surfaces adjacent to created wetlands and riparian zones will be seeded with native grass, forb, and shrub seed. Seeding in these areas will establish upland buffer zones and increase the potential lift in ecological function. Upland container shrubs will also be planted in this zone in designated areas. Upland plants will provide an increase in diversity, density, and vertical structure for wildlife and increase the buffering capacity of adjacent land throughout the wetland mitigation zones.

All planting and seeding mixes include native shrubs to provide increased density of cover throughout the zones.

The area selected for the Park Creek Station mitigation site currently includes various restoration strategies based on the potential for functional lift of existing resources to increase the overall wetland function of the area. The current concept includes six different strategies: PEM re-establishment, PEM rehabilitation, PSS re-establishment, PSS establishment, an excluded from bank area, and a 50-foot buffer area (Figure 9).

- **PEM Re-establishment** – Strategies in this area include minor grading to connect adjacent wetland areas and includes non-native species control and planting/seeding of wetland species.
- **PEM Rehabilitation** – Activities will consist of vegetation management to reduce non-native species and add additional native wetland species to increase diversity of the existing wetlands on site.
- **PSS Re-establishment** – Activities will include excavating soil adjacent to Park Creek to lower the elevation of that area down to get closer to groundwater, and then planting/seeding this area with riparian shrub species to re-establish a riparian buffer along the creek. In addition to the area-specific restoration strategies, the entire bank site will be fenced off to exclude cattle which are currently grazing throughout the site. Cattle may be used in a controlled manner to assist with vegetation management in the future but will not be allowed to roam the site freely as they do now.
- **PSS Establishment** – Activities include non-native species control and planting/seeding the fringes of existing wetland areas. This will take advantage of these wetted areas to establish riparian shrub vegetation to act as a buffer between the wetlands and upland areas similar to historic conditions.
- **Excluded from Bank and 50-foot Buffer Areas** – These areas will receive weed control and be seeded with a native upland (shrub/grassland) plant palette to serve as a buffer between the restoration site and surrounding areas.

These sites (Park Creek Station, Owl Creek, and Munroe) in combination will provide wetlands mitigation in the same Poudre River drainage basin on a one-to-one basis by area with equivalent or better biologic and hydrologic functions.

The mitigation boundaries as described may change if the dam or forebay infrastructure or PMJM mitigation area is modified from what is shown. However, the types and amounts of mitigation areas will remain the same. Any changes in impacts or subsequent updates to the mitigation of wetlands for the NISP will be forwarded to Larimer County, if needed.

2. An evaluation of the altered wetland's hydrologic and biologic functions

As part of the 2015 delineations, ERO also completed assessments to score the functions of existing wetlands in the Glade Reservoir study area using the Functional Assessment of Colorado Wetlands (FACWet) method (Johnson et al., 2013). A complete description of methodology can be found in ERO's Wetland and Other Waters Delineation Report and Addendum to the 2016 Wetland and Other Waters Delineation Report (ERO, 2016; ERO, 2019).

Wetlands in the study area were PEM wetlands that have FacWet scores ranging from Functioning Impaired condition (composite score of 0.6-0.7) to Reference Standard condition (composite score of 0.9-1.0). In the Glade Reservoir area, wetlands would either be lost by inundation or by the placement of fill for the dam and other facilities. Functions provided by these wetlands that would be lost are: support of characteristic wildlife habitat, shoreline stabilization, and production export/food chain support. Many functions, including support of characteristic fish/aquatic habitat, flood attenuation, short- and long-term water storage, nutrient/toxicant removal, and sediment retention, would be greater for the new aquatic resource created by the reservoir than for the impacted wetlands. The reservoir would also provide support of characteristic wildlife habitat for species dependent on open water.

Wetlands along the NISP conveyance system were not assessed for function as part of the 2019 NISP Conveyance system wetland mapping. However, as impacts to wetlands will be temporary and will be restored in place, wetlands along the NISP conveyance system are expected to provide the same function in the future as they do currently.

3. The estimated cost of the proposed mitigation, its probability of success and a financial guarantee for completion

NISP WAE assumes financial responsibility for all of its compensatory mitigation under Section 404 of the CWA related to the Project. NISP WAE will be financially responsible for the construction, maintenance, monitoring, and any necessary remedial actions/adaptive management associated with the mitigation area during the construction and monitoring period. NISP WAE is a permanent entity with access to adequate funds to cover mitigation monitoring and any necessary remedial actions. The NISP WAE's budget will include routine maintenance to cover compensatory mitigation monitoring and maintenance to ensure that adequate funding is available for these purposes. Northern Water's past performance under other USACE permits demonstrates its commitment to assure that projects approved by the USACE, including compensatory mitigation, will be fully implemented and maintained by NISP WAE. No federal funds will be applied to the work credited for compensatory mitigation.

4. An evaluation of the suitability of the proposed mitigation site for establishing the restored or created wetland

Wetlands mitigation sites associated with CWA Section 404 wetlands mitigation and ESA Section 7 Consultation PMJM mitigation have and will be evaluated for suitability through those federal permitting processes and associated mitigation requirements, including approvals for mitigation designs, required protections for mitigation sites, and monitoring requirements. This Plan summarizes portions of those plans applicable to Larimer County's Land Use Code and meets those same standards.

5. An evaluation of the hydrology of the site proposed for restoration or creation of a wetland and a clear statement of the project's hydrologic and ecological goals

The Owl Creek and Munroe Canal mitigation areas contain large areas of irrigated cropland and low-quality uplands that will be immediately adjacent to the proposed dam's forebay. There is high potential for habitat lift in these areas through establishment of wetlands due to the low quality of the existing habitat. The sites were selected for the potential to create new wetland habitat on lands that are owned or will be purchased by NISP WAE. The location of the sites adjacent to the proposed Glade Reservoir dam means that NISP WAE can use water from the reservoir's toe drains to supply water and establish wetlands in these areas, using this continuous water supply to allow for successful establishment of wetland vegetation.

The Park Creek Station Mitigation Site is being developed in coordination with a wetlands mitigation bank to meet USACE standards related to the adequacy of water supply and demonstration of ecological benefits.

6. A maintenance program that includes weed control; litter and debris removal; erosion control; watering, repair of water-control structures; maintenance of vegetation and wildlife habitat; and cleaning of culverts. The maintenance program must be included in the use plan for residual land and/or common area described in Section 8.14.6 (of the Land Use Code)

Once construction is completed, NISP WAE will be responsible for ongoing monitoring and maintenance. Annual monitoring will identify areas in need of maintenance and will guide adaptive management of the mitigation areas as described in section 8 below, ultimately increasing effectiveness and permanence of the mitigation area. Maintenance will be considered when a potential condition is identified that could lead to catastrophic failure, significant deviations from the Project objectives are identified, or situations are present that prevent achievement of performance standards. Any maintenance activities will be reviewed by NISP WAE to ensure consistency with federal mitigation plans as summarized in this report. Potential areas for maintenance, including weed control, litter and debris removal, erosion control, repair of structures, maintenance of vegetation and wildlife habitat, and cleaning of culverts, will be identified through annual monitoring; a proposed maintenance plan will be developed and reviewed; and the maintenance plan will be implemented by NISP WAE.

7. A description of the water source and evidence of ownership of water rights approved by the state engineer

A description of water sources and associated water rights for proposed mitigation sites is provided in section 5 above.

8. A description of the critical elements and potential problems that may influence the success of the mitigation effort

Adaptive management will be used to ensure that mitigation areas are developed and maintained properly during the critical establishment period (1 to 3 years after establishment). This will provide for the adaptation of management strategies and implementation of corrective actions for mitigation efforts based on current knowledge and continued monitoring and allow land managers to adjust management practices as needed to best suit a site and reach desired outcomes. For example, wetland creation projects can be vulnerable to plant mortality and establishment of noxious weeds. Therefore, adaptive management, in conjunction with the monitoring program, is to be used as a tool to evaluate the restoration achieved by the mitigation project. This will determine necessary corrective measures that must be implemented during the early stages of establishment to ensure the desired goals and success criteria are met.

9. A timetable for construction and monitoring

Glade Reservoir construction is anticipated to start in 2023 and last for approximately 5 years. It is anticipated that water will start to be stored in Glade Reservoir in 2028. The Owl Creek and Munroe Canal Mitigation Areas will be constructed during or after construction of the Glade Reservoir. Construction of the Park Creek Mitigation Site is anticipated to occur before construction of Glade Reservoir starts.

10. A three-year, post-construction monitoring program. The monitoring program must be included in the use plan for residual land and/or common area described in Section 8.14.6 (of the Land Use Code)

The purpose of monitoring is to ensure the mitigation area is meeting performance standards and to identify any concerns associated with the site and make appropriate recommendations. NISP WAE shall be responsible for monitoring the mitigation sites.

Prior to construction activities at the mitigation areas, NISP WAE will assess conditions at the mitigation sites to establish baseline conditions. NISP WAE will assess as-built conditions of the mitigation areas following their construction. An annual monitoring report will be submitted to the USACE before December 31 of each year for a minimum of 5 years, until performance standards have been met and monitoring requirements have been fulfilled. NISP WAE will monitor the mitigation areas with one field survey to be completed during the growing season beginning the year as-built construction conditions are reported. Each of the annual monitoring reports will include a summary of the previous year's monitoring in order to compare results from previous years. The report will identify any concerns associated with the sites and make appropriate recommendations. In addition, a Baseline Report and an As-Built Conditions Report will each be submitted to the USACE prior to the first annual monitoring report.

11. A demonstration of fiscal, administrative and technical competence to successfully execute the plan

A demonstration of fiscal, administrative and technical competence to execute the plan is provided in section 3 above.

Conclusions

The efforts summarized in this Plan have been designed to mitigate impacts to open waters and wetlands, for the construction of the Glade Reservoir Complex and associated conveyance system for NISP. Those efforts have been designed to satisfy either the requirements of Section 404 of the Clean Water Act under the provisions administered by the USACE or the Project's ESA Section 7 consultation. These efforts also satisfy the requirements set forth in the *Larimer County Land Use Code, 8.2 Standards for All Development – Wetland Areas* (Larimer County, 2019).

Figures

- Figure 1. Project Location
- Figure 2. Glade Reservoir Complex Wetland Resources
- Figure 3. NISP Conveyance – Northern Tier Alignment Wetland Resources
- Figure 4. NISP Conveyance – Poudre Intake Alignment Wetland Resources
- Figure 5. NISP Conveyance – County Line Alignment Wetland Resources
- Figure 6. NISP Conveyance – Glade Release Alignment Wetland Resources
- Figure 7. Owl Creek Wetland Mitigation Site
- Figure 8. Munroe Canal PMJM Mitigation Site
- Figure 9. Park Creek Station Mitigation Site

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<http://www.nwo.usace.army.mil/Missions/Regulatory-Program/Colorado/EIS-NISP/>. Accessed December 2019.

USFWS, 2007. Letter to Chandler Peter, United States Army Corps of Engineers from Susan C. Linner, Colorado Field Supervisor, United States Fish and Wildlife Service, subject Northern Integrated Supply Project (NISP) – Glade/Gaileton Alternative (Project) (Corps File No. 200380509). October 5, 2007.

Figure 1. Project Location

Glade Reservoir
170,000 acre-feet

U.S. Highway 287
Realignment

Wellington

Poudre Valley Canal



Galeton Reservoir
45,600 acre-feet

Horsetooth Reservoir

Fort Collins

NISP Delivery Pipeline

Ault

Galeton Pipeline

Larimer & Weld Canal

Severance

Eaton

Windsor

New Cache Canal

Cache la Poudre River

Loveland

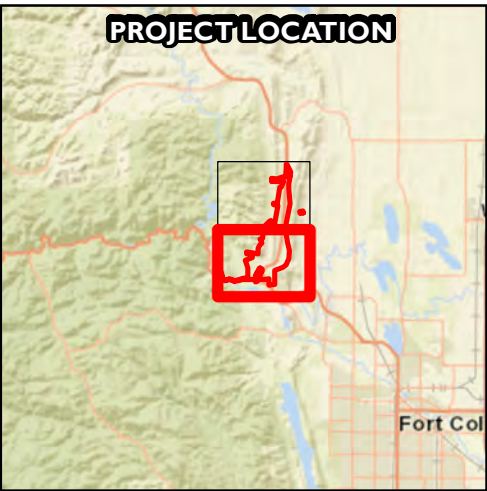
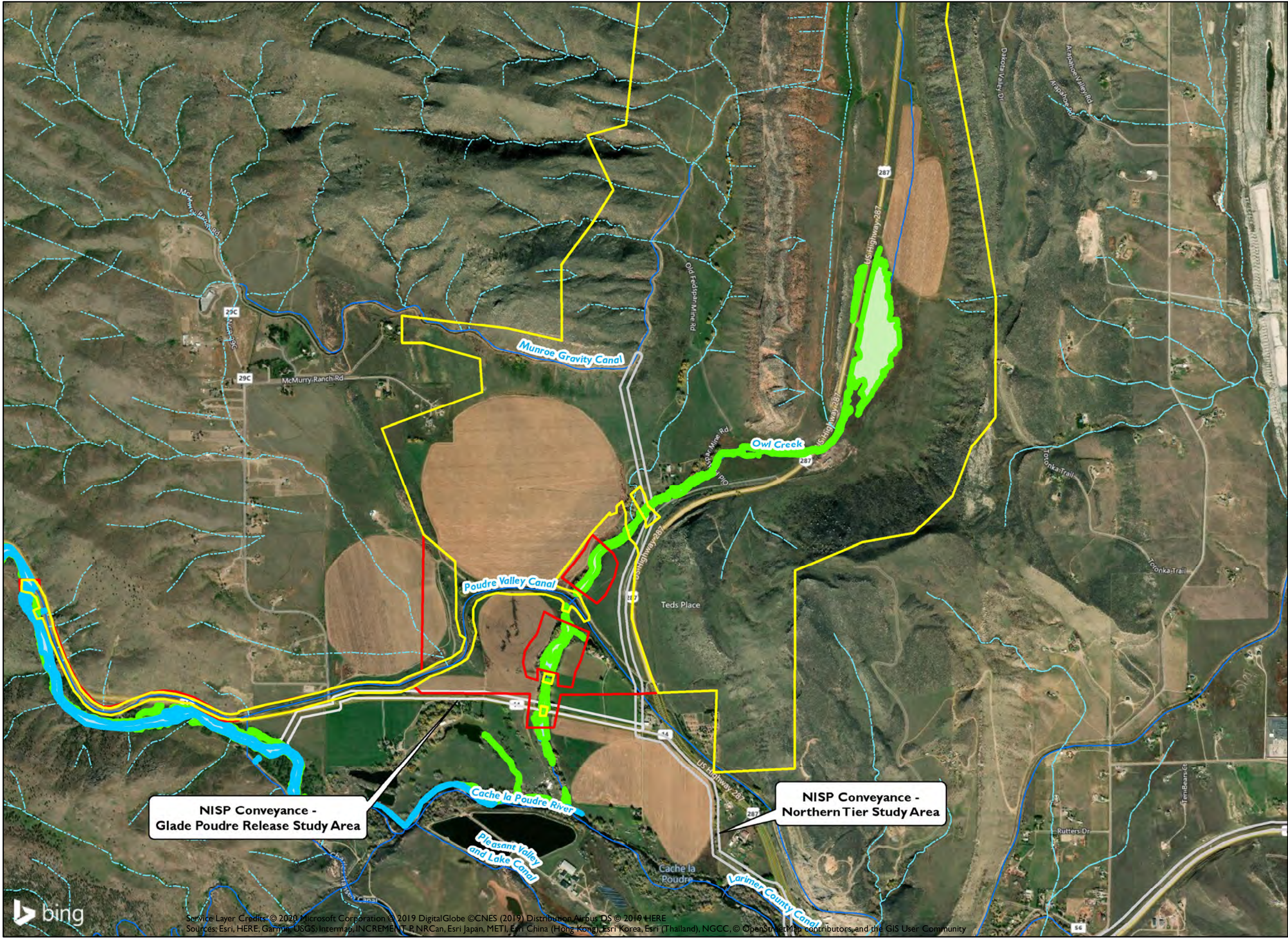
Greeley

Big Thompson River

South Platte River



Figure 2. Glade Reservoir Complex Wetland Resources



Legend

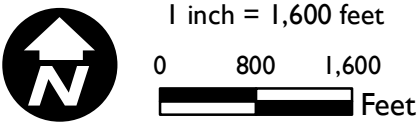
- Glade Reservoir Permanent Impact Area
- Glade Reservoir Temporary Impact Area
- Open Waters
- Wetland
- Major Stream/Ditch
- Minor Stream/Ditch

Note
NISP = Northern Integrated Supply Project
Wetland and Open Water boundaries have been exaggerated for visual purposes.

*All non-hatched areas are Unincorporated Larimer County

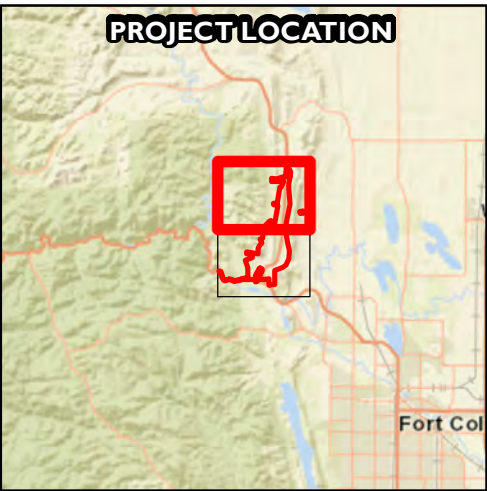
Wetlands Data Sources: ERO 2019 and 2016; AECOM 2018; Pinyon 2019

Jurisdictional wetlands are shown in the Glade Reservoir Area.



Pinyon Environmental, Inc.

GLADE RESERVOIR COMPLEX
WETLAND RESOURCES
Northern Integrated Supply Project
Larimer and Weld Counties, Colorado



Legend

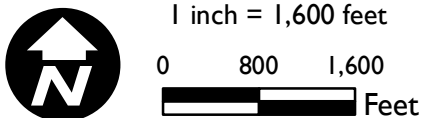
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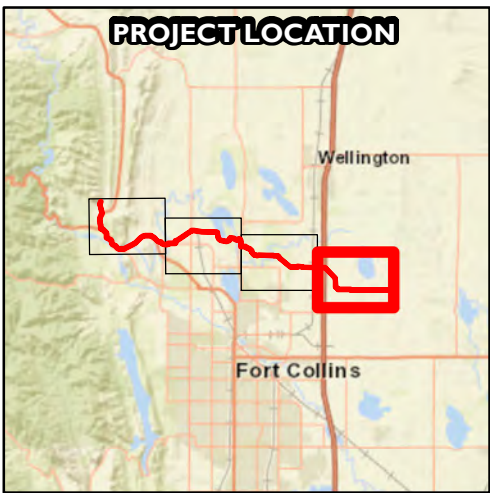
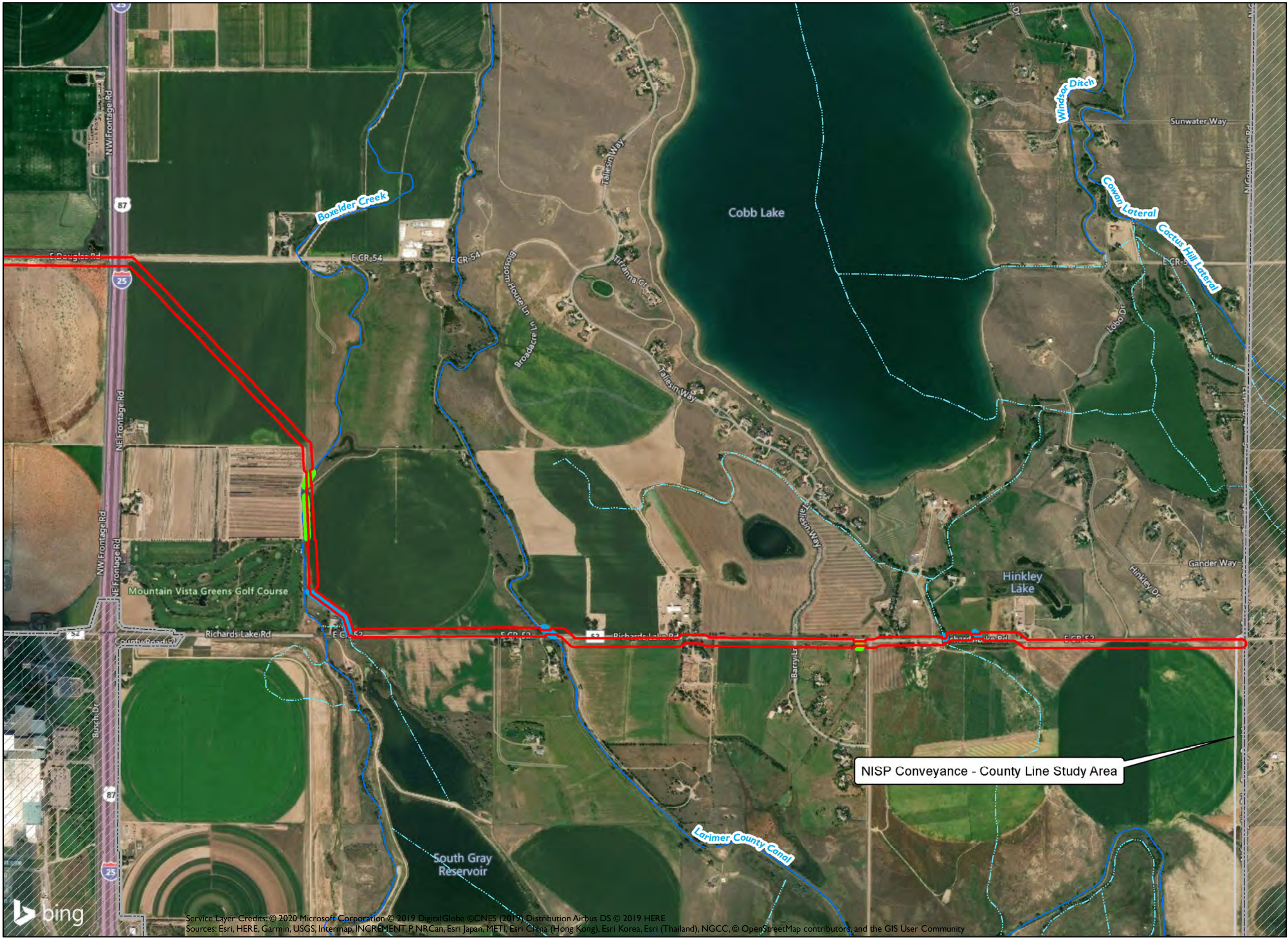
Wetlands Data Sources: ERO 2019 and 2016;
AECOM 2018; Pinyon 2019

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**GLADE RESERVOIR COMPLEX
WETLAND RESOURCES**
Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

Figure 3. NISP Conveyance – Northern Tier Alignment Wetland Resources



Legend

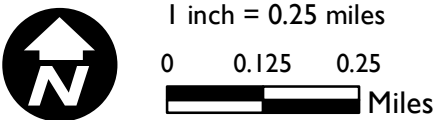
- NISP Conveyance – Northern Tier Temporary Impact Area
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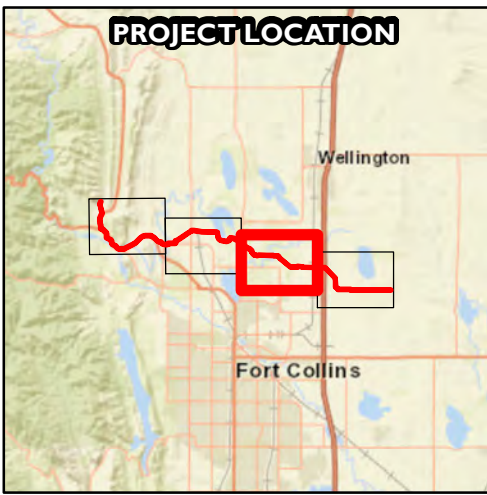
*All non-hatched areas are Unincorporated Larimer County

Wetlands Data Sources: ERO 2019 and 2016; AECOM 2018; Pinyon 2019

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NISP CONVEYANCE - NORTHERN TIER ALIGNMENT WETLAND RESOURCES
Northern Integrated Supply Project
Larimer and Weld Counties, Colorado



Legend

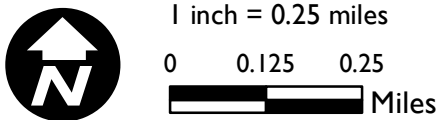
- NISP Conveyance – Northern Tier Temporary Impact Area
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Pinyon Environmental, Inc.

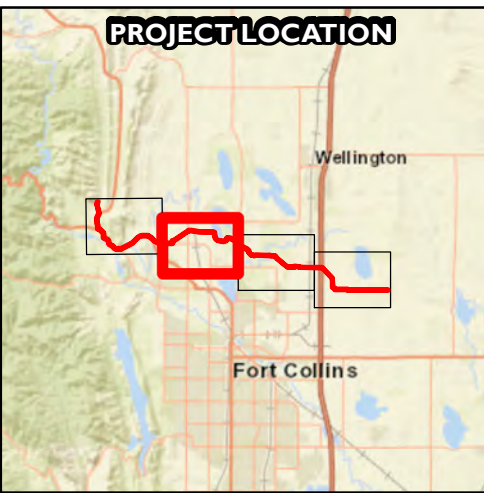
NISP CONVEYANCE - NORTHERN TIER ALIGNMENT WETLAND RESOURCES

Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

Drawn By: MJS	Figure 3; Page 2 of 4
Reviewed By: KKM	Date: 2/5/2020

Site Location: Larimer County, Colorado

Pinyon Project Number: I1881402



Legend

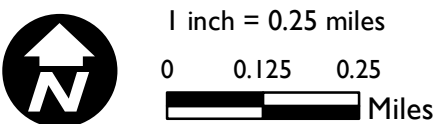
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NISP CONVEYANCE - NORTHERN TIER ALIGNMENT WETLAND RESOURCES

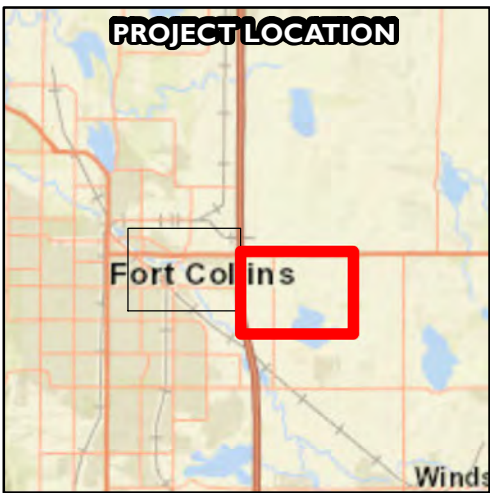
Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

Drawn By: MJS	Figure 3; Page 3 of 4
Reviewed By: KKM	Date: 2/5/2020

Site Location: Larimer County, Colorado

Pinyon Project Number: I1881402

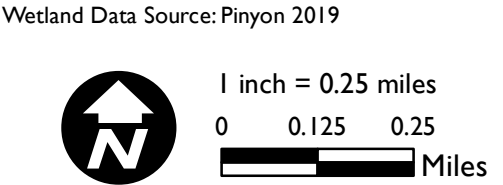
Figure 4. NISP Conveyance – Poudre Intake Alignment Wetland Resources



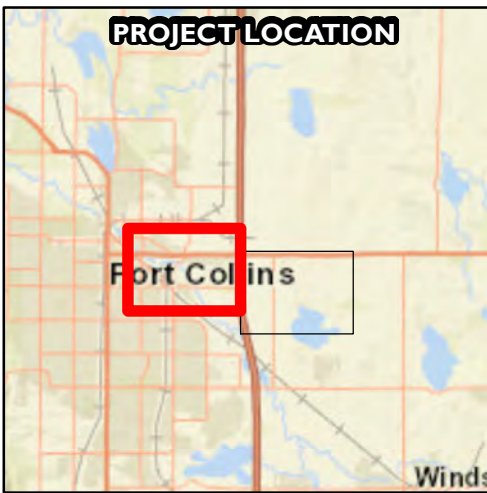
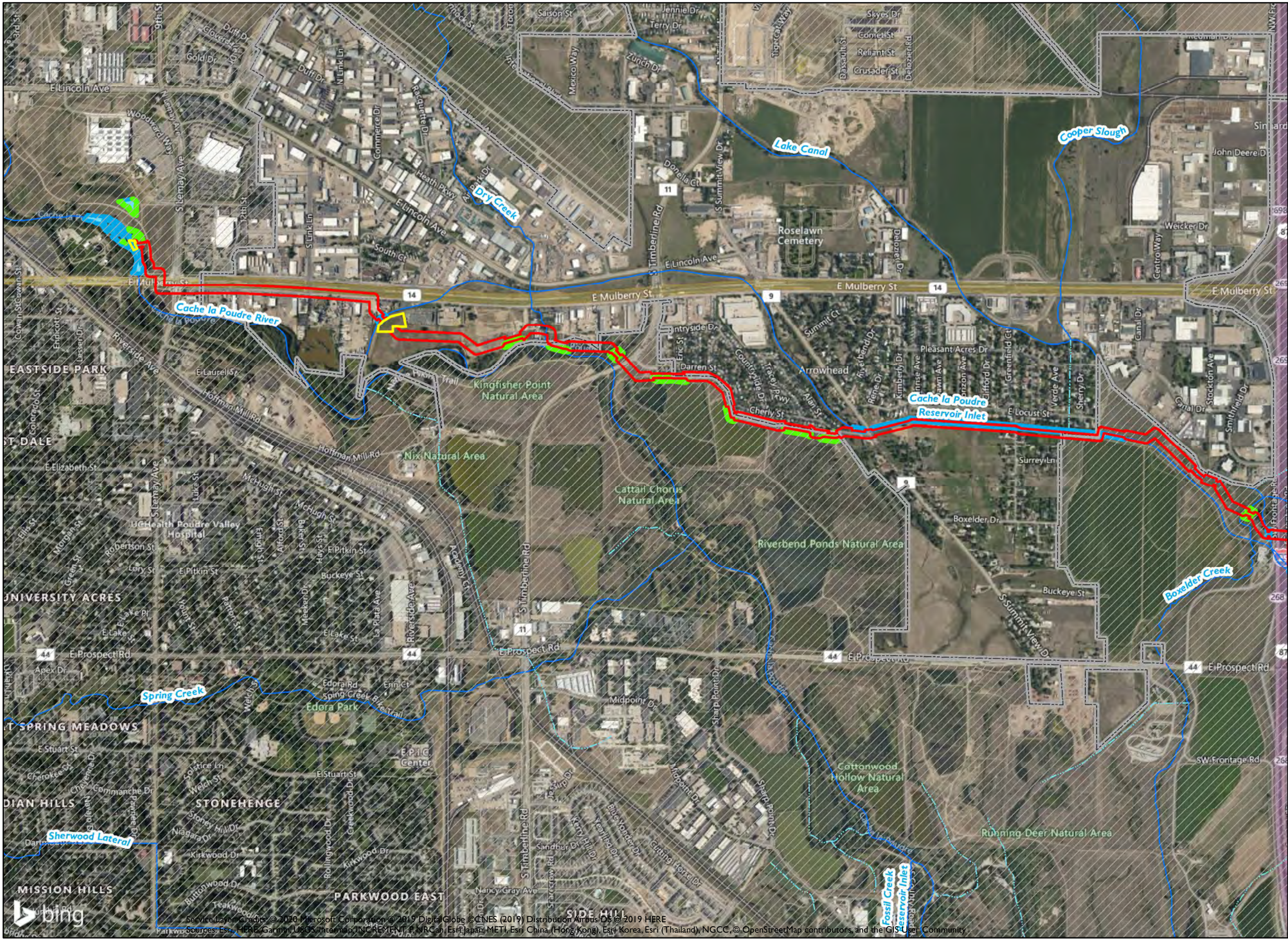
Legend

- NISP Conveyance – Poudre Intake Permanent Impact Area
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NISP CONVEYANCE - POUDRE INTAKE ALIGNMENT WETLAND RESOURCES
Northern Integrated Supply Project
Larimer and Weld Counties, Colorado



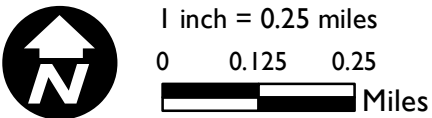
Legend

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Wetland Data Source: Pinyon 2019



Pinyon
Environmental, Inc.

NISP CONVEYANCE - POUDRE INTAKE ALIGNMENT WETLAND RESOURCES

Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

Site Location: Larimer County, Colorado

Pinyon Project Number: I1881402

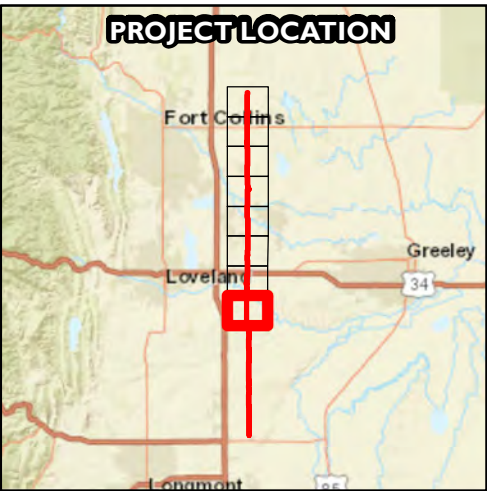
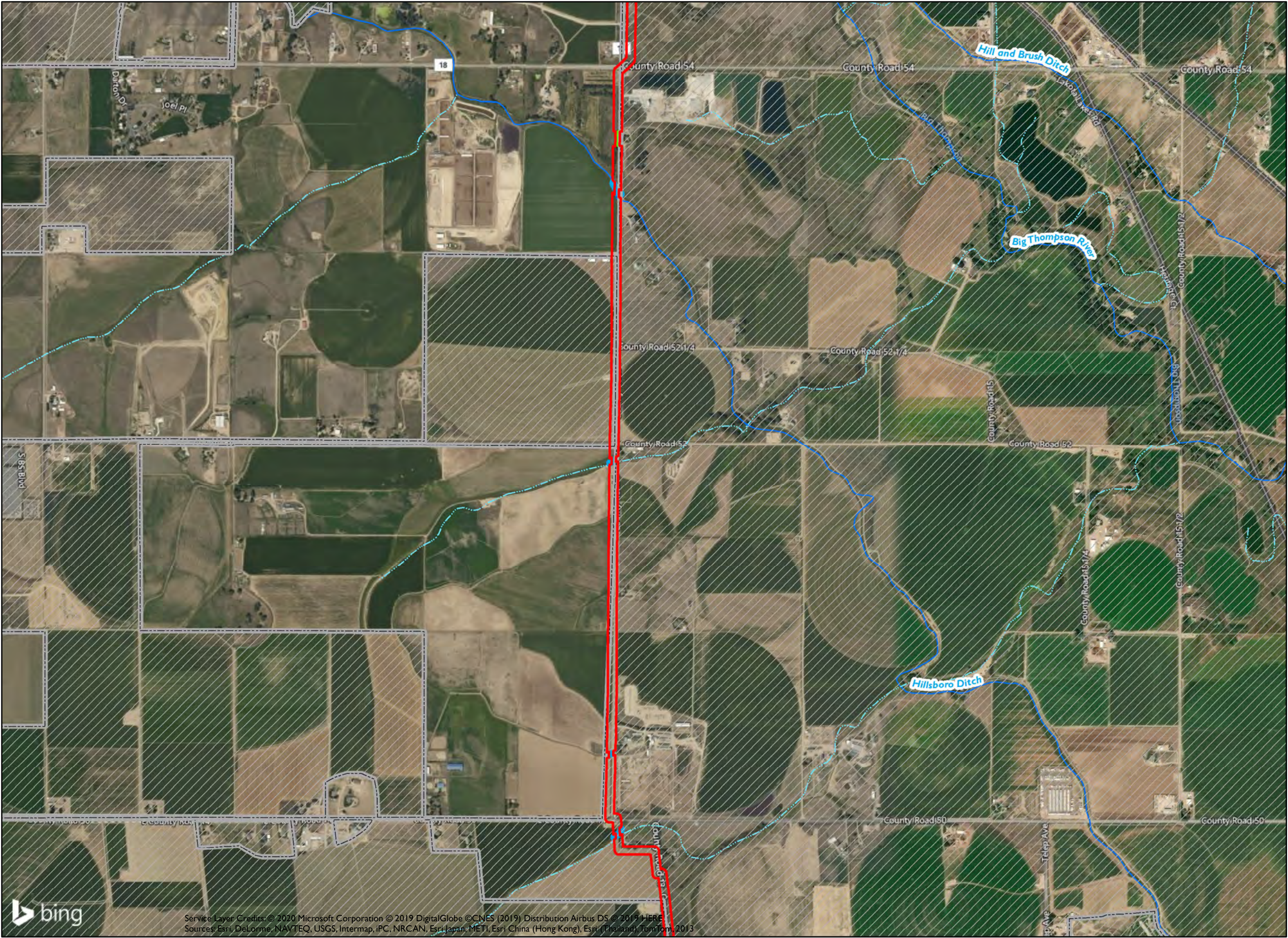
Drawn By: MJS

Figure 4; Page 2 of 2

Reviewed By: KKM

Date: 1/23/2020

Figure 5. NISP Conveyance – County Line Alignment Wetland Resources



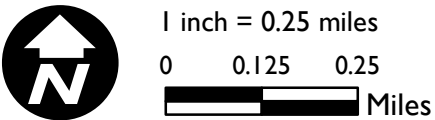
Legend

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Wetland Data Source: Pinyon 2019



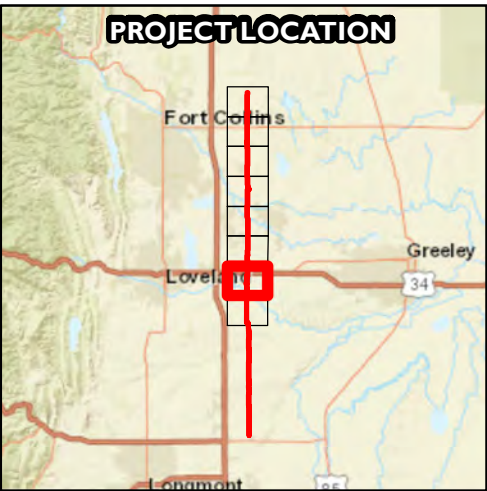
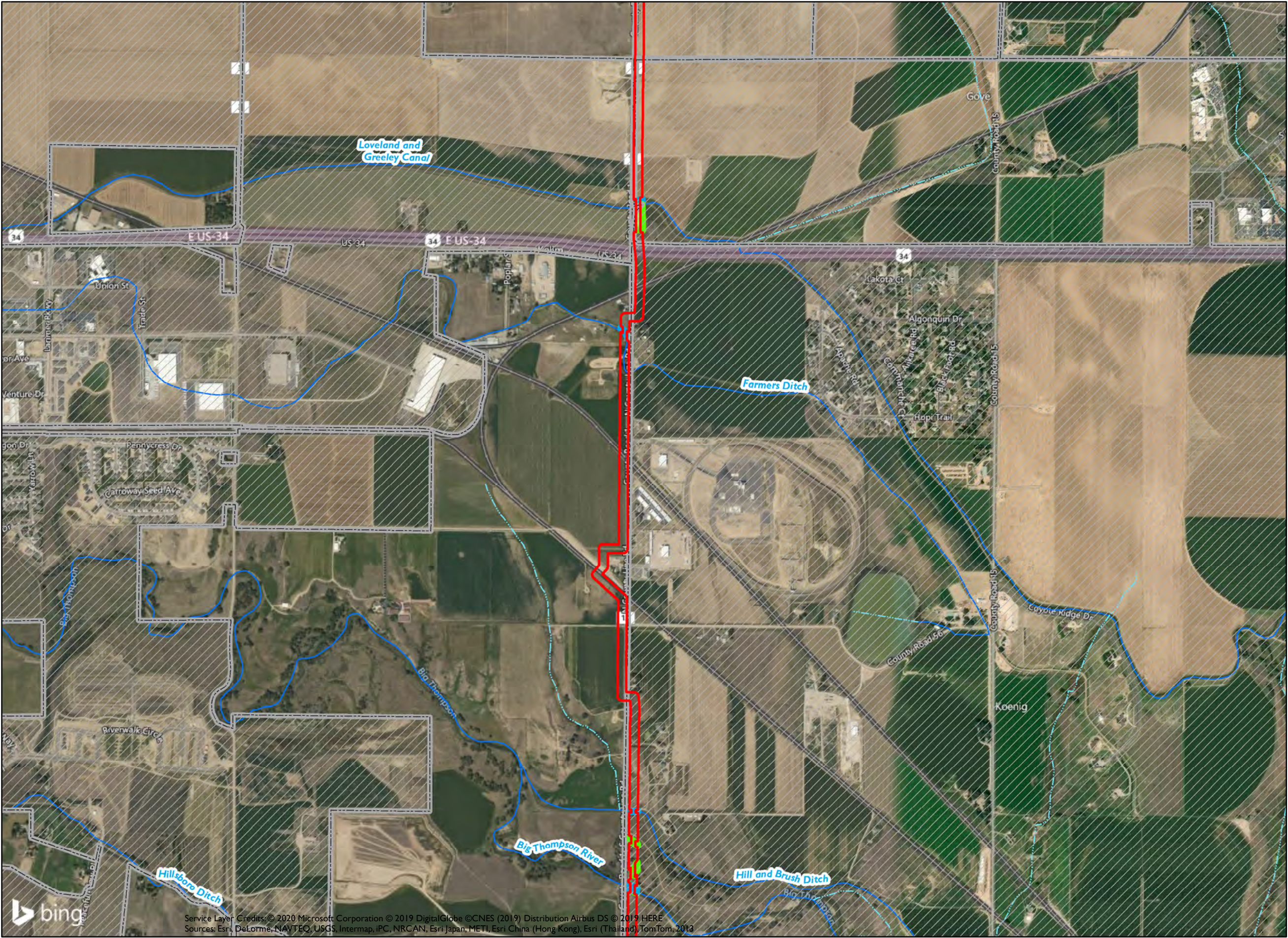
NISP CONVEYANCE - COUNTY LINE ALIGNMENT WETLAND RESOURCES

Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

Site Location: Larimer and Weld Counties, Colorado

Pinyon Project Number: I1881402

Drawn By: MJS	Figure 5; Page 1 of 8
Reviewed By: KKM	Date: 1/31/2020



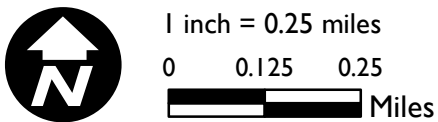
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Wetland Data Source: Pinyon 2019



Pinyon
Environmental, Inc.

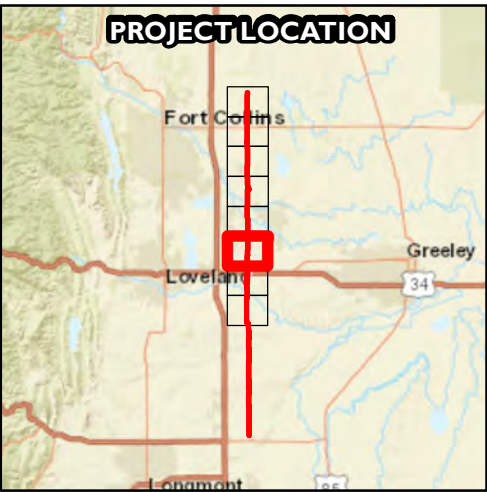
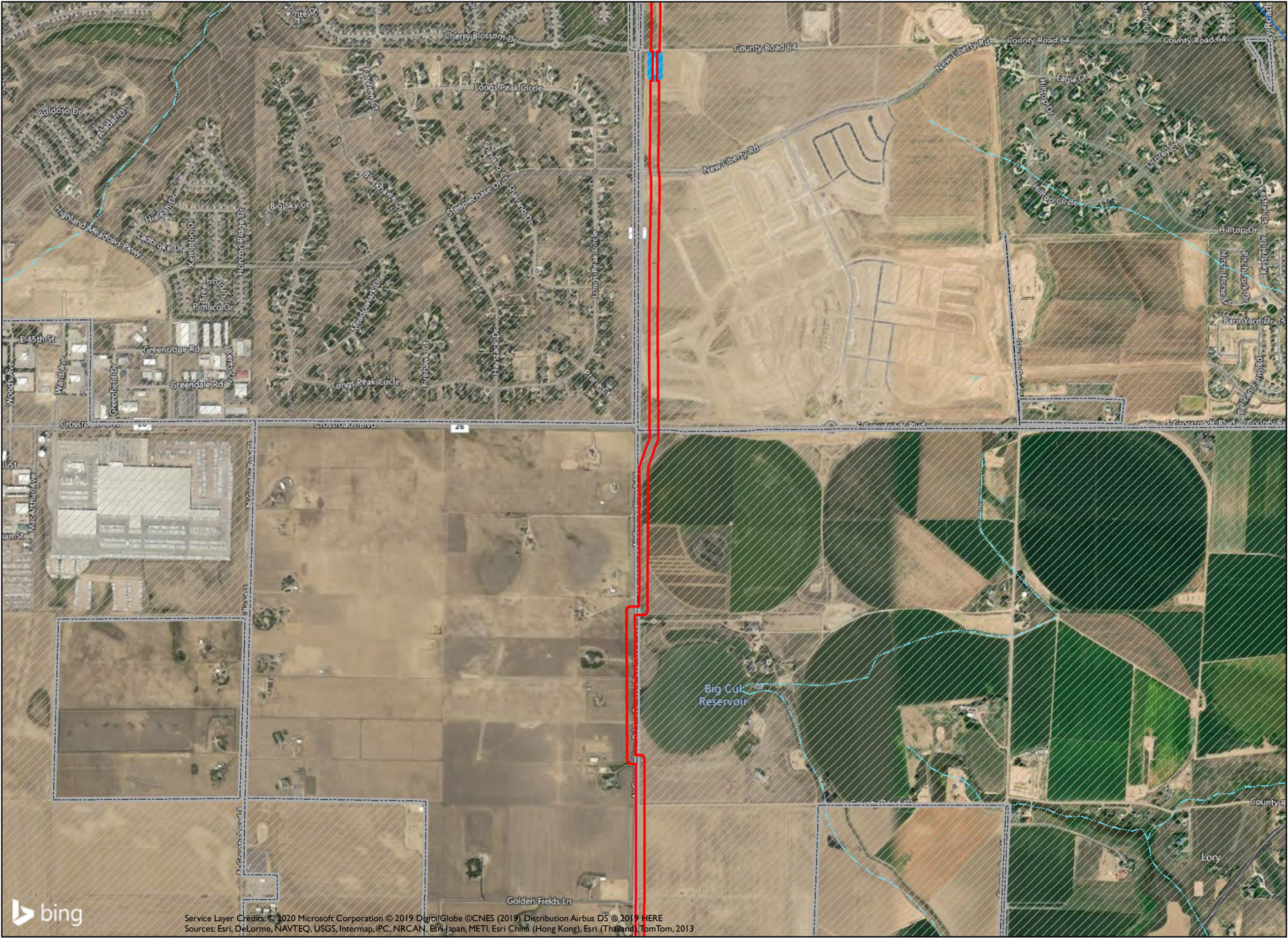
NISP CONVEYANCE - COUNTY LINE ALIGNMENT WETLAND RESOURCES

Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

Site Location: Larimer and Weld Counties, Colorado

Pinyon Project Number: I1881402

Drawn By: MJS	Figure 5; Page 2 of 8
Reviewed By: KKM	Date: 1/31/2020



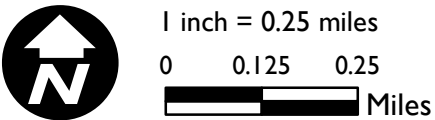
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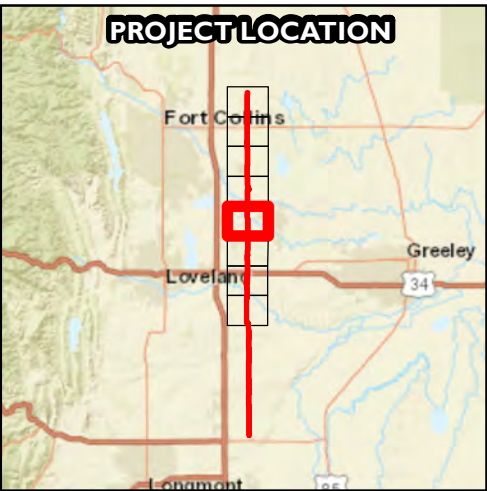
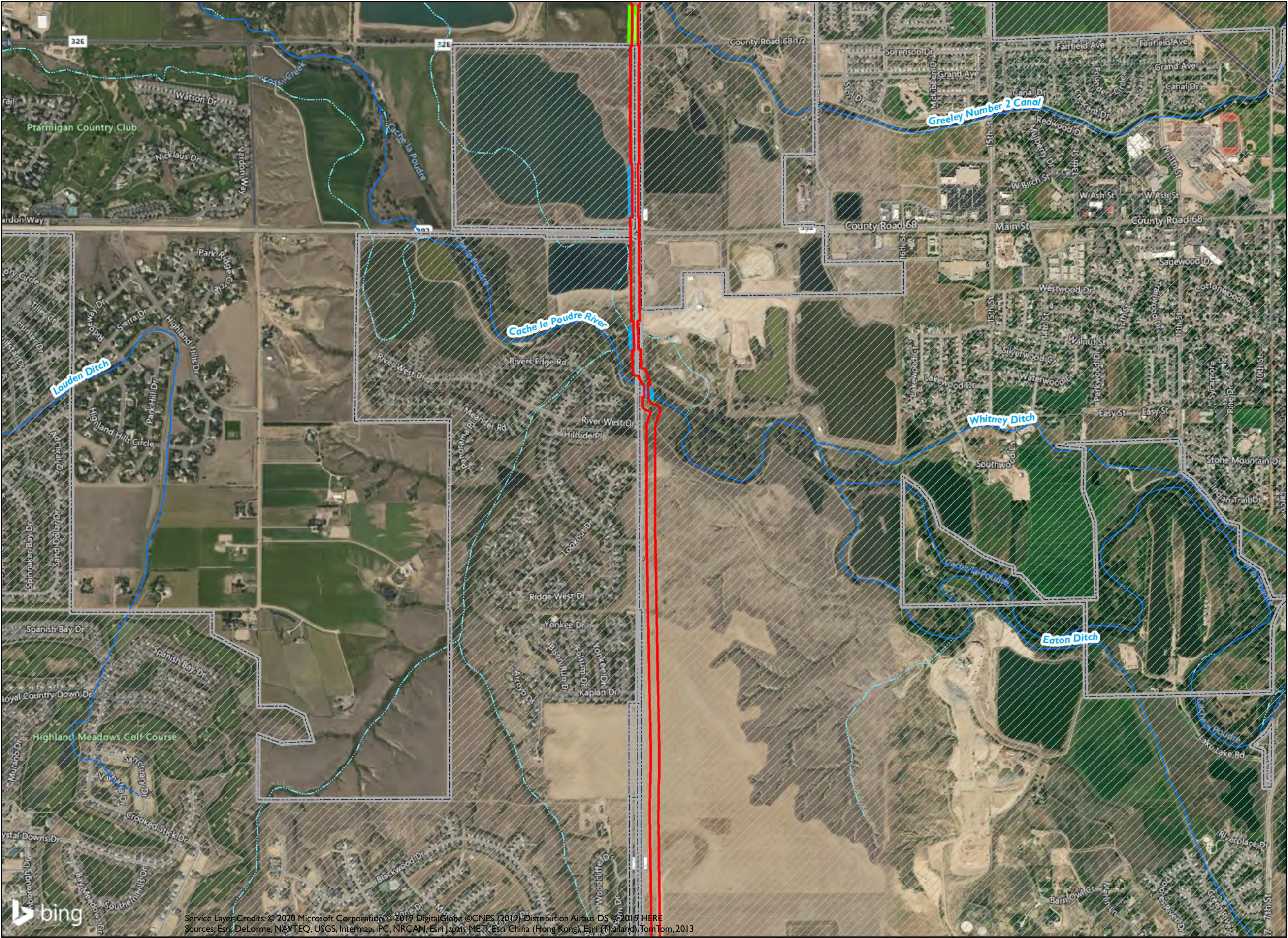
NISP CONVEYANCE - COUNTY LINE ALIGNMENT WETLAND RESOURCES

Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

Site Location: Larimer and Weld Counties, Colorado

Pinyon Project Number: I1881402

Drawn By: MJS	Figure 5; Page 3 of 8
Reviewed By: KKM	Date: 1/31/2020



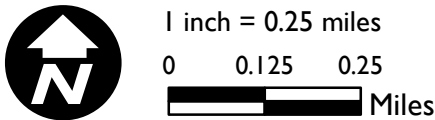
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NISP CONVEYANCE - COUNTY LINE ALIGNMENT WETLAND RESOURCES

Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

Site Location: Larimer and Weld Counties, Colorado

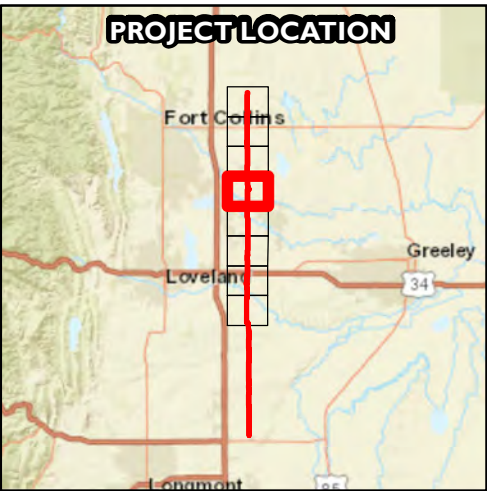
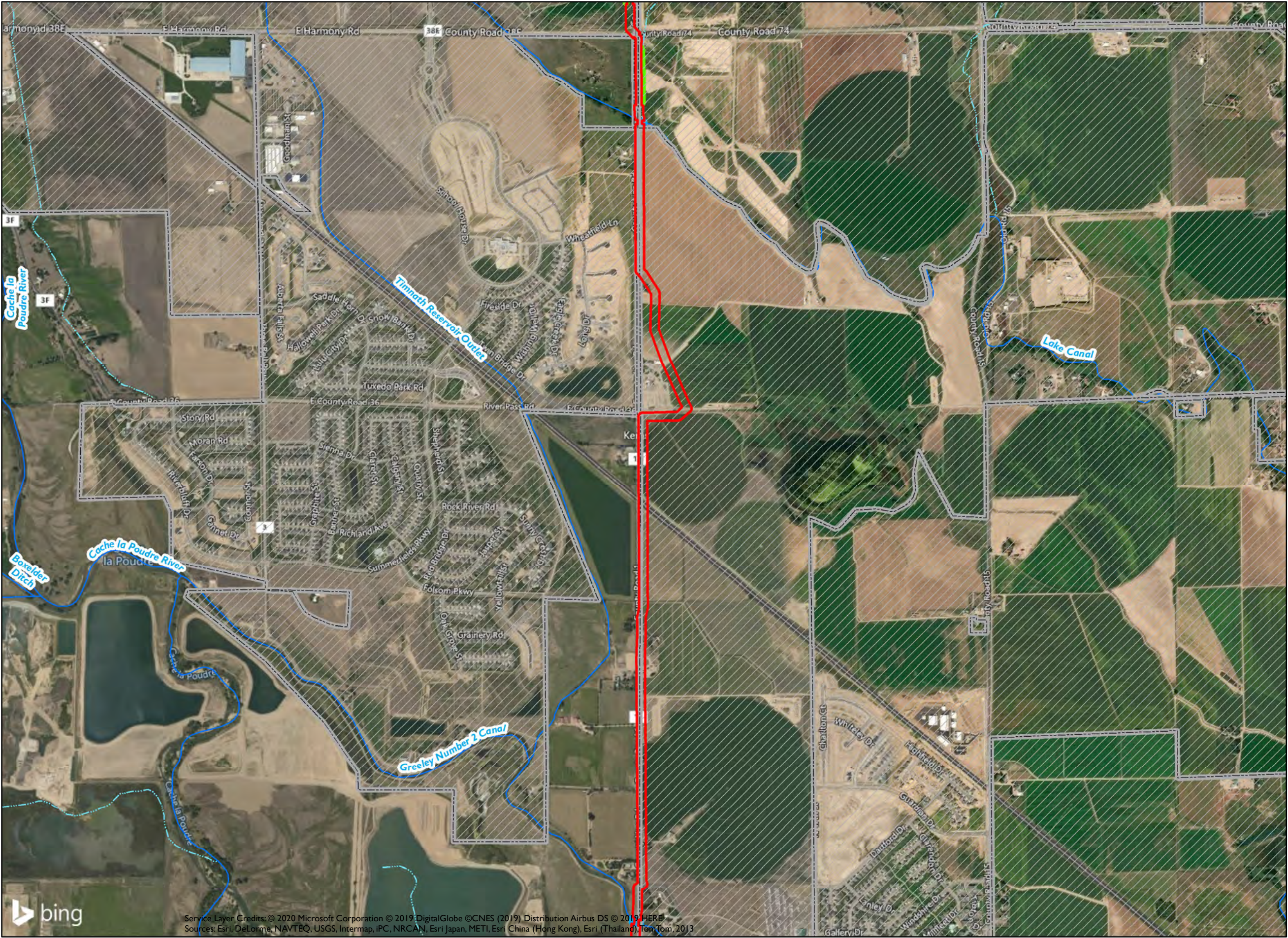
Pinyon Project Number: I1881402

Drawn By: MJS

Figure 5; Page 4 of 8

Reviewed By: KKM

Date: 1/31/2020



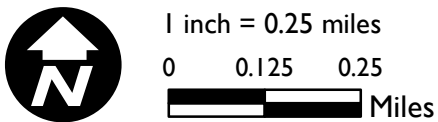
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Pinyon Environmental, Inc.

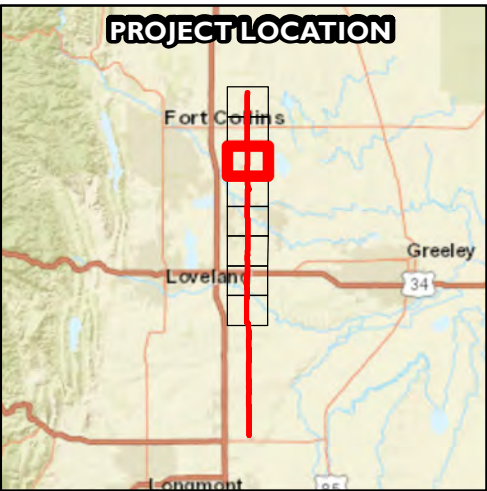
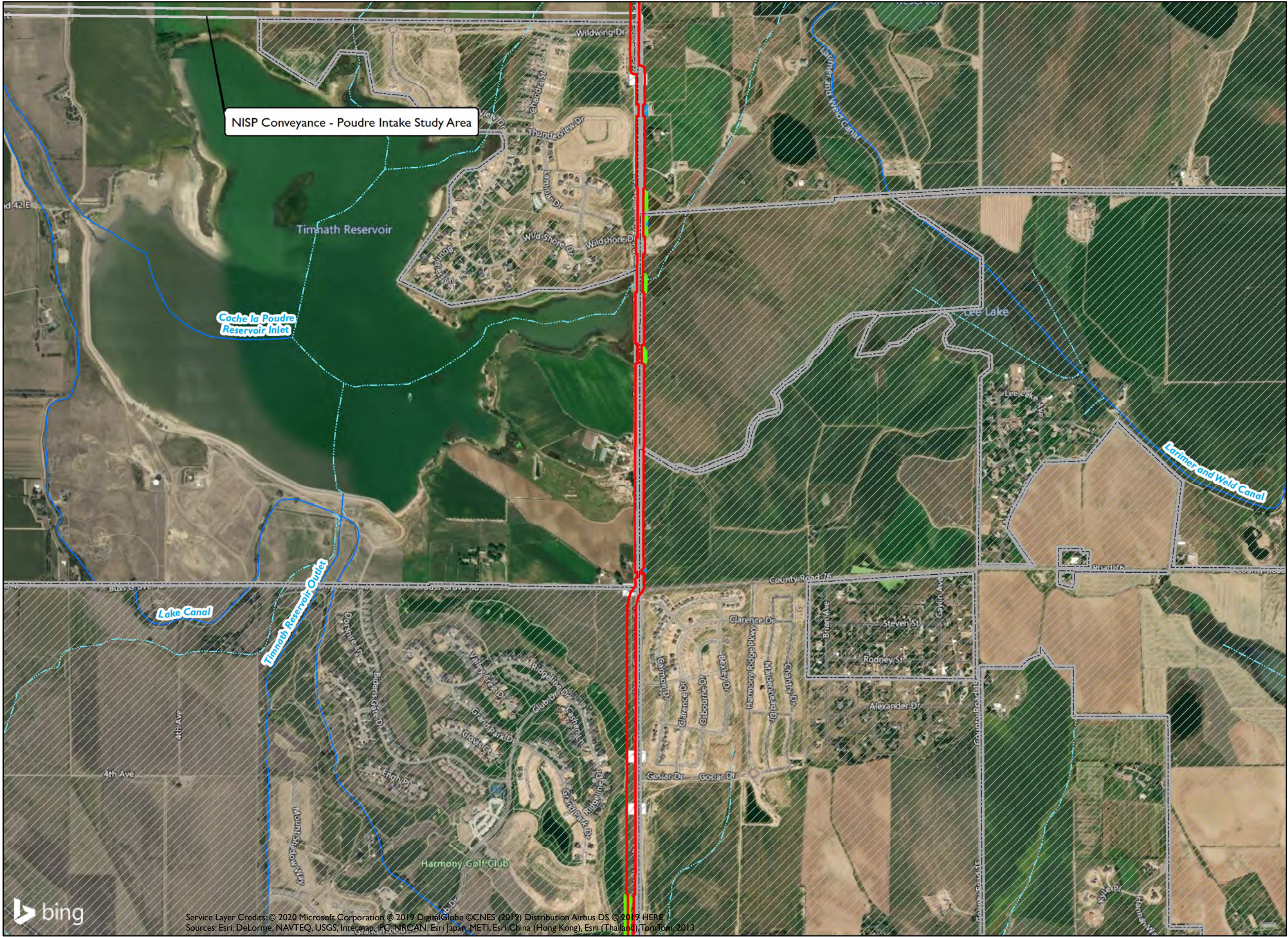
NISP CONVEYANCE - COUNTY LINE ALIGNMENT WETLAND RESOURCES

Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

Site Location: Larimer and Weld Counties, Colorado

Pinyon Project Number: I1881402

Drawn By: MJS	Figure 5; Page 5 of 8
Reviewed By: KKM	Date: 1/31/2020



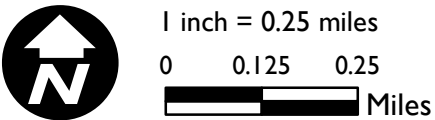
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Pinyon Environmental, Inc.

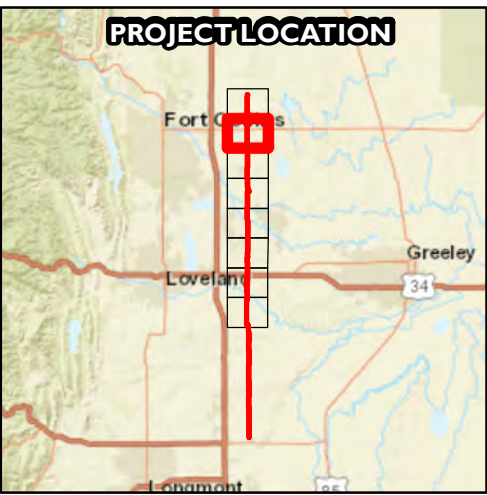
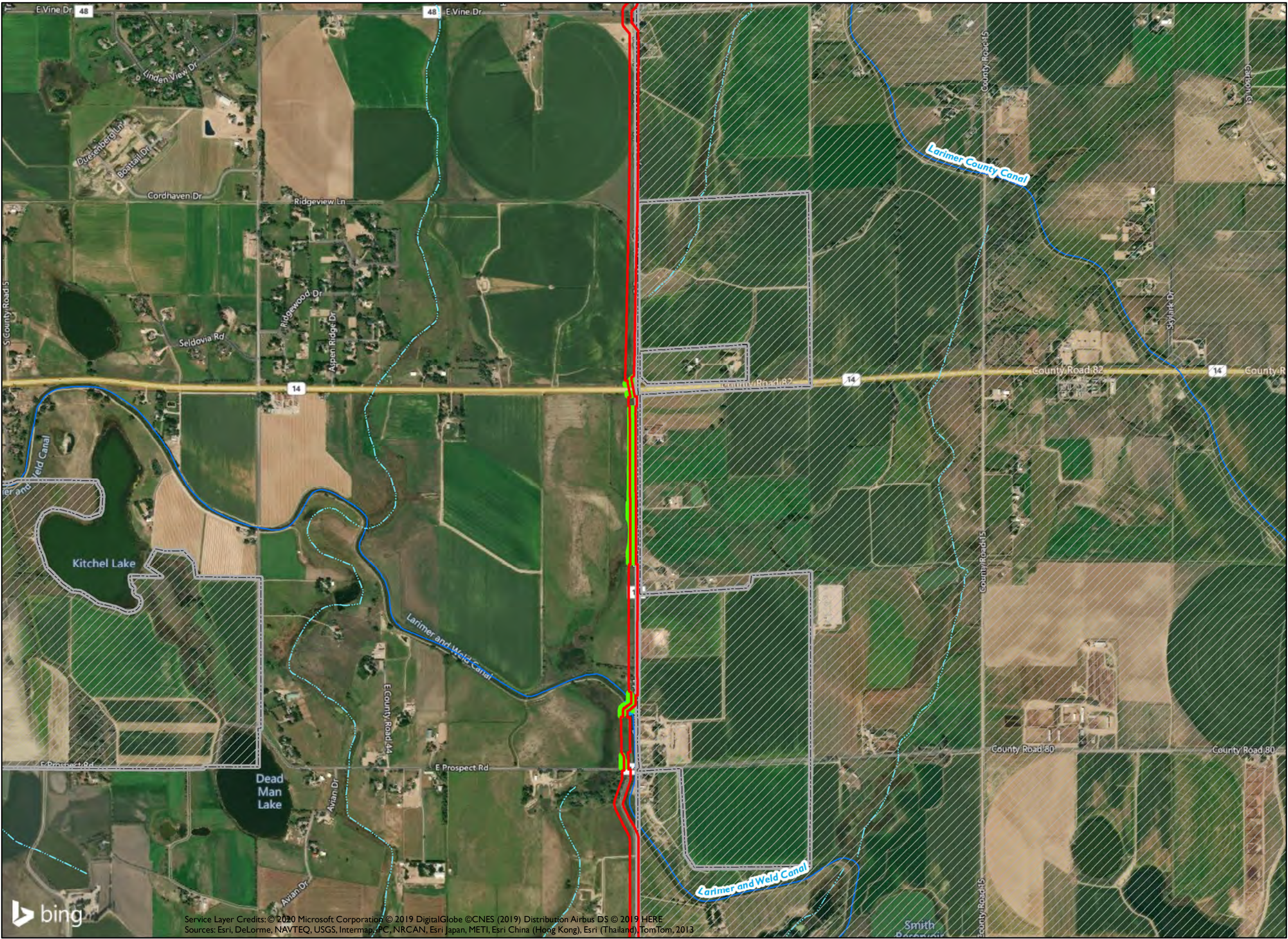
NISP CONVEYANCE - COUNTY LINE ALIGNMENT WETLAND RESOURCES

Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

Drawn By: MJS	Figure 5; Page 6 of 8
Reviewed By: KKM	Date: 1/31/2020

Site Location: Larimer and Weld Counties, Colorado

Pinyon Project Number: I1881402



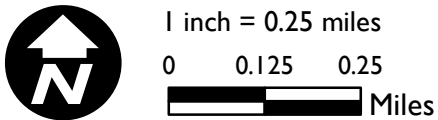
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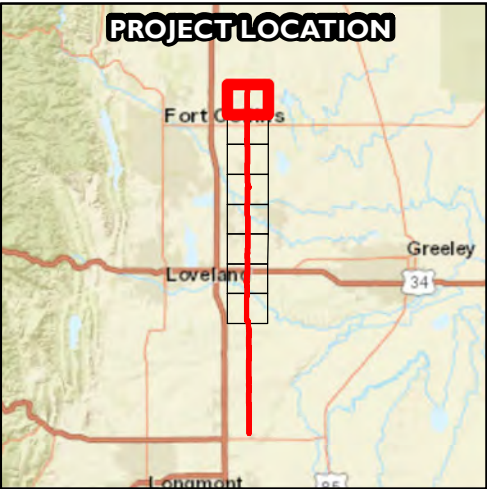
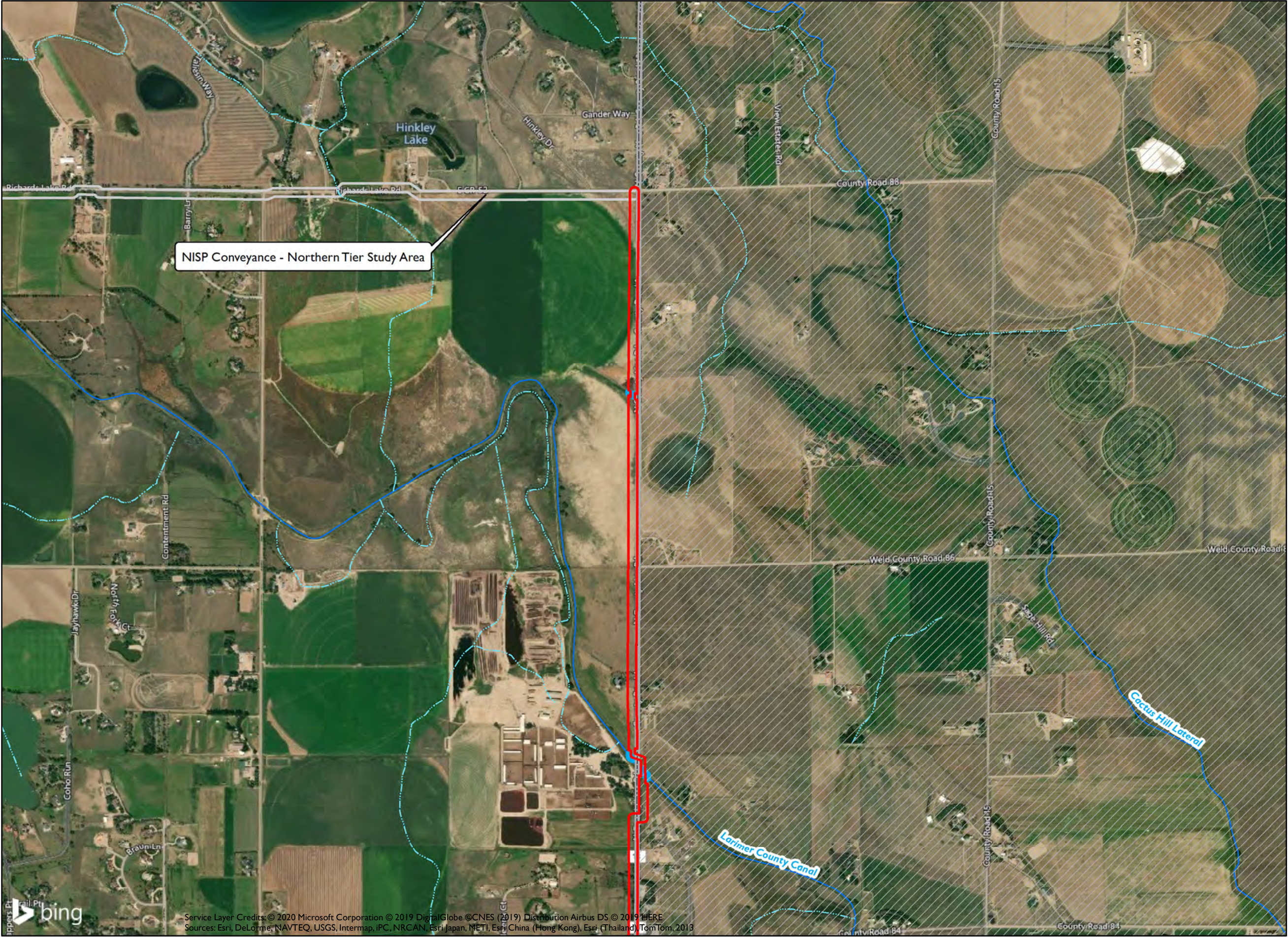
Pinyon
Environmental, Inc.

**NISP CONVEYANCE - COUNTY LINE
ALIGNMENT WETLAND RESOURCES**
*Northern Integrated Supply Project
Larimer and Weld Counties, Colorado*

Site Location: Larimer and Weld Counties, Colorado

Pinyon Project Number: I1881402

Drawn By: MJS	Figure 5; Page 7 of 8
Reviewed By: KKM	Date: 1/31/2020



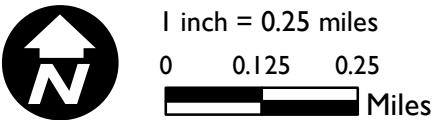
Legend

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NISP CONVEYANCE - COUNTY LINE ALIGNMENT WETLAND RESOURCES

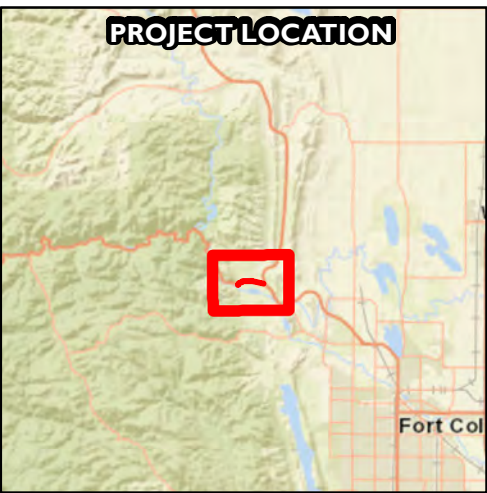
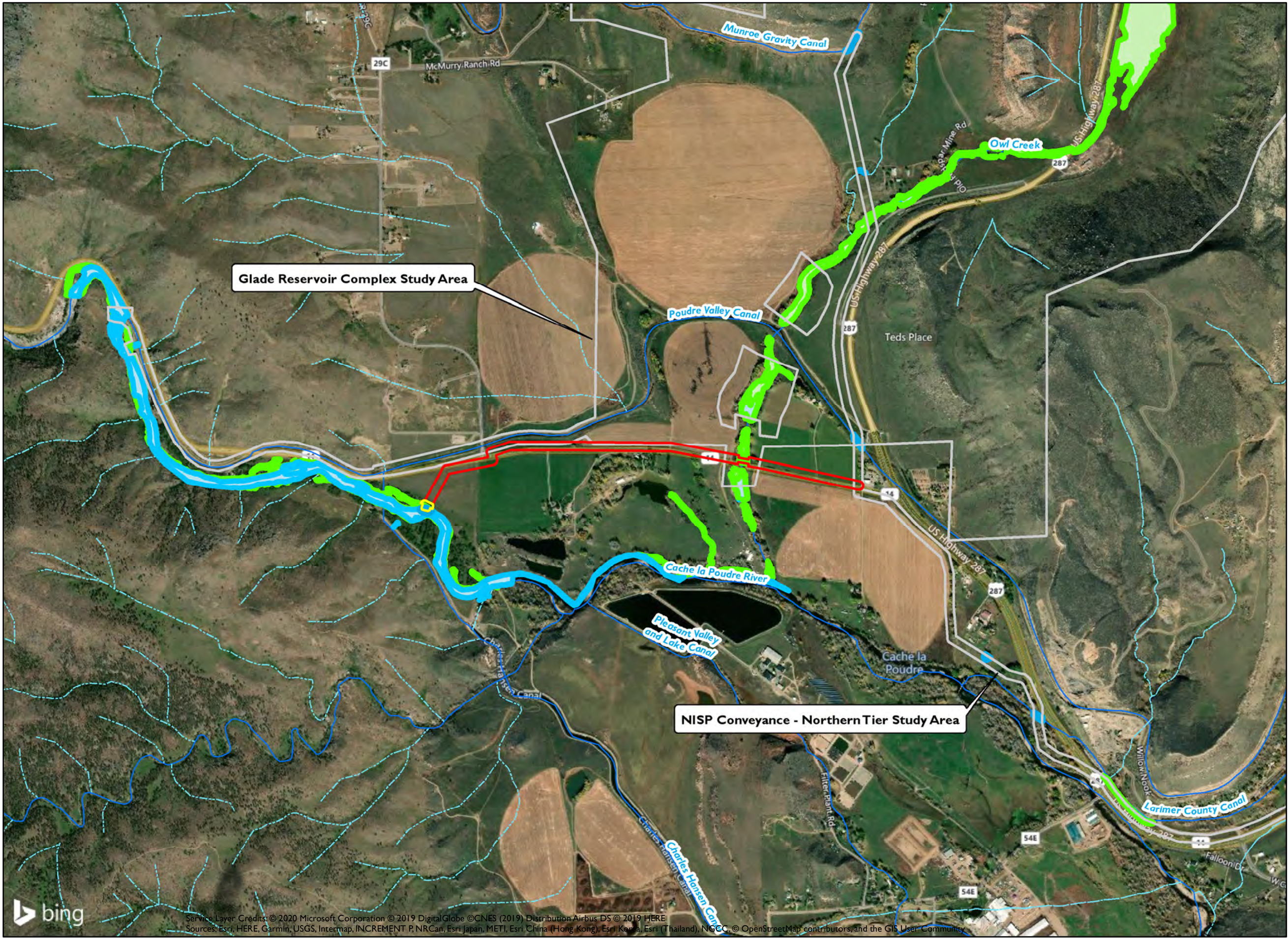
Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

Site Location: Larimer and Weld Counties, Colorado

Pinyon Project Number: I1881402

Drawn By: MJS	Figure 5; Page 8 of 8
Reviewed By: KKM	Date: 1/31/2020

Figure 6. NISP Conveyance – Glade Release Alignment Wetland Resources



Legend

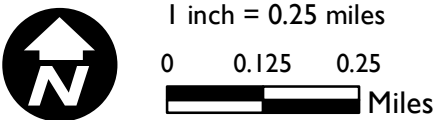
- NISP Conveyance - Glade Release Temporary Impact Area
- NISP Conveyance - Glade Release Permanent Impact Area
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- Major Stream/Ditch
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Wetlands Data Sources: ERO 2019 and 2016; AECOM 2018; Pinyon 2019

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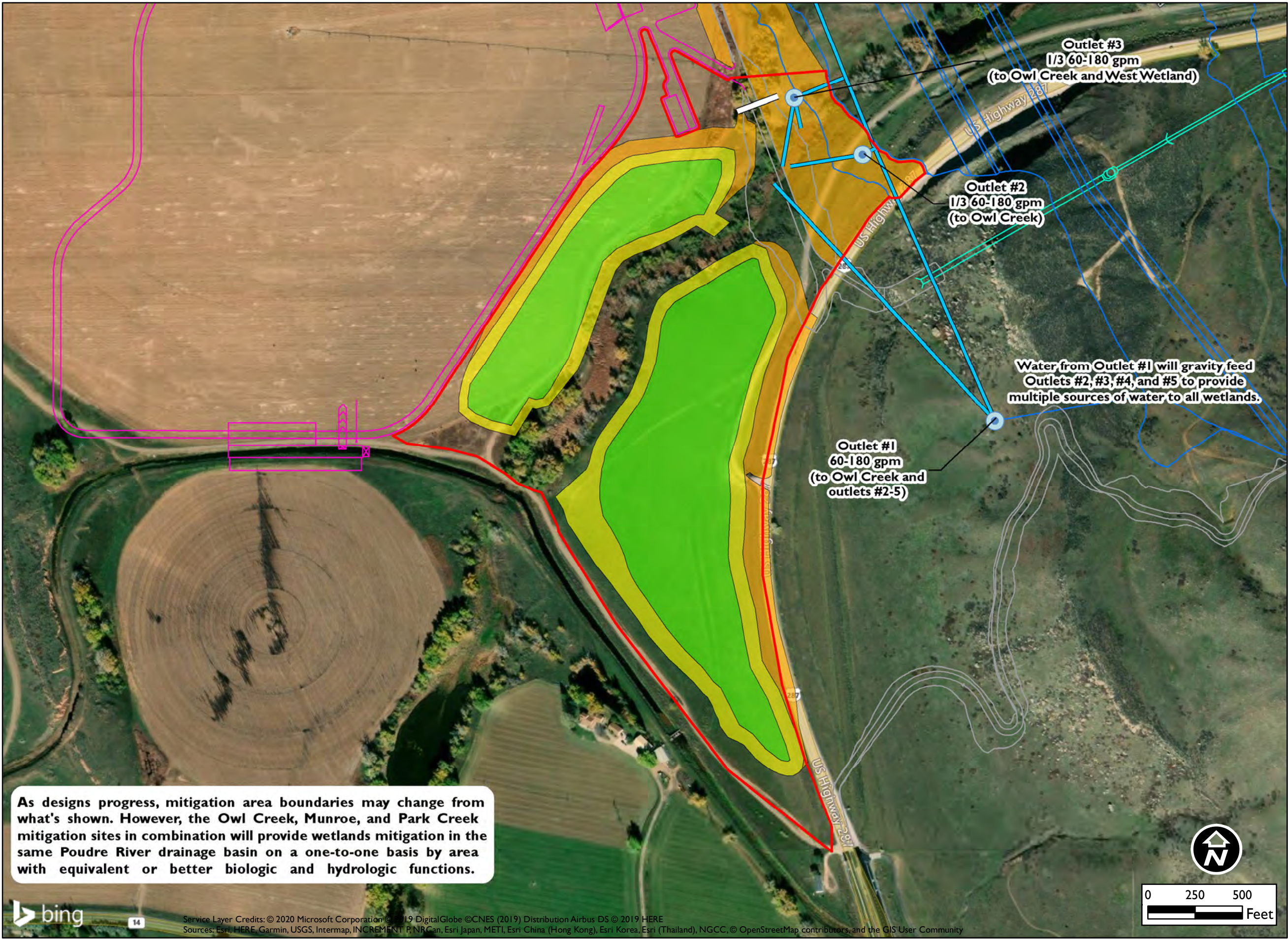


NISP CONVEYANCE - GLADE RELEASE ALIGNMENT WETLAND RESOURCES
Northern Integrated Supply Project
Larimer and Weld Counties, Colorado

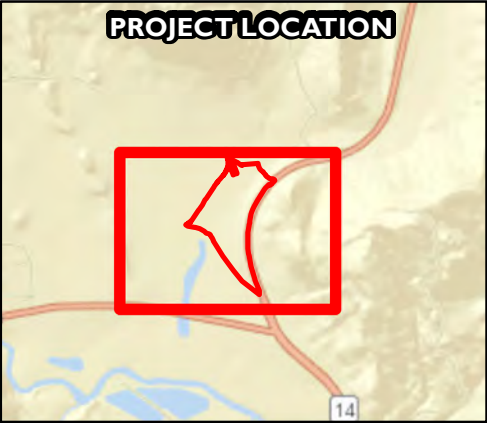
Site Location: Larimer County, Colorado
Pinyon Project Number: I1881402

Drawn By: MJS	Figure 6
Reviewed By: KKM	Date: 2/5/2020

Figure 7. Owl Creek Wetland Mitigation Site



As designs progress, mitigation area boundaries may change from what's shown. However, the Owl Creek, Munroe, and Park Creek mitigation sites in combination will provide wetlands mitigation in the same Poudre River drainage basin on a one-to-one basis by area with equivalent or better biologic and hydrologic functions.



Legend

- Wetland Mitigation Area
- Proposed Toe Drain Outlet
- Proposed Pipe Connections
- PMJM Crossing
- Access Road (4/25/18)
- Embankment (11/9/17)
- Forebay (4/25/18)
- LLOW (1/16/18)
- Spillway (4/24/18)

- Mitigation Type
- PEM Wetlands
 - PSS Wetlands - Riparian
 - Upland

Pinyon
Environmental, Inc.

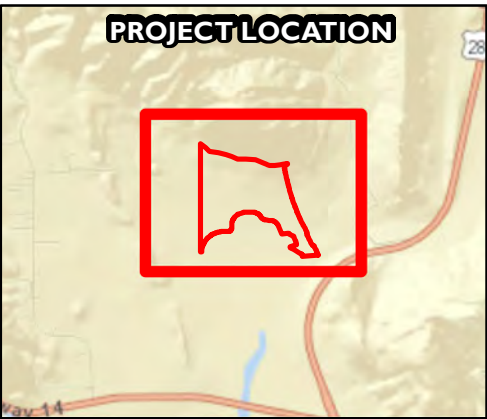
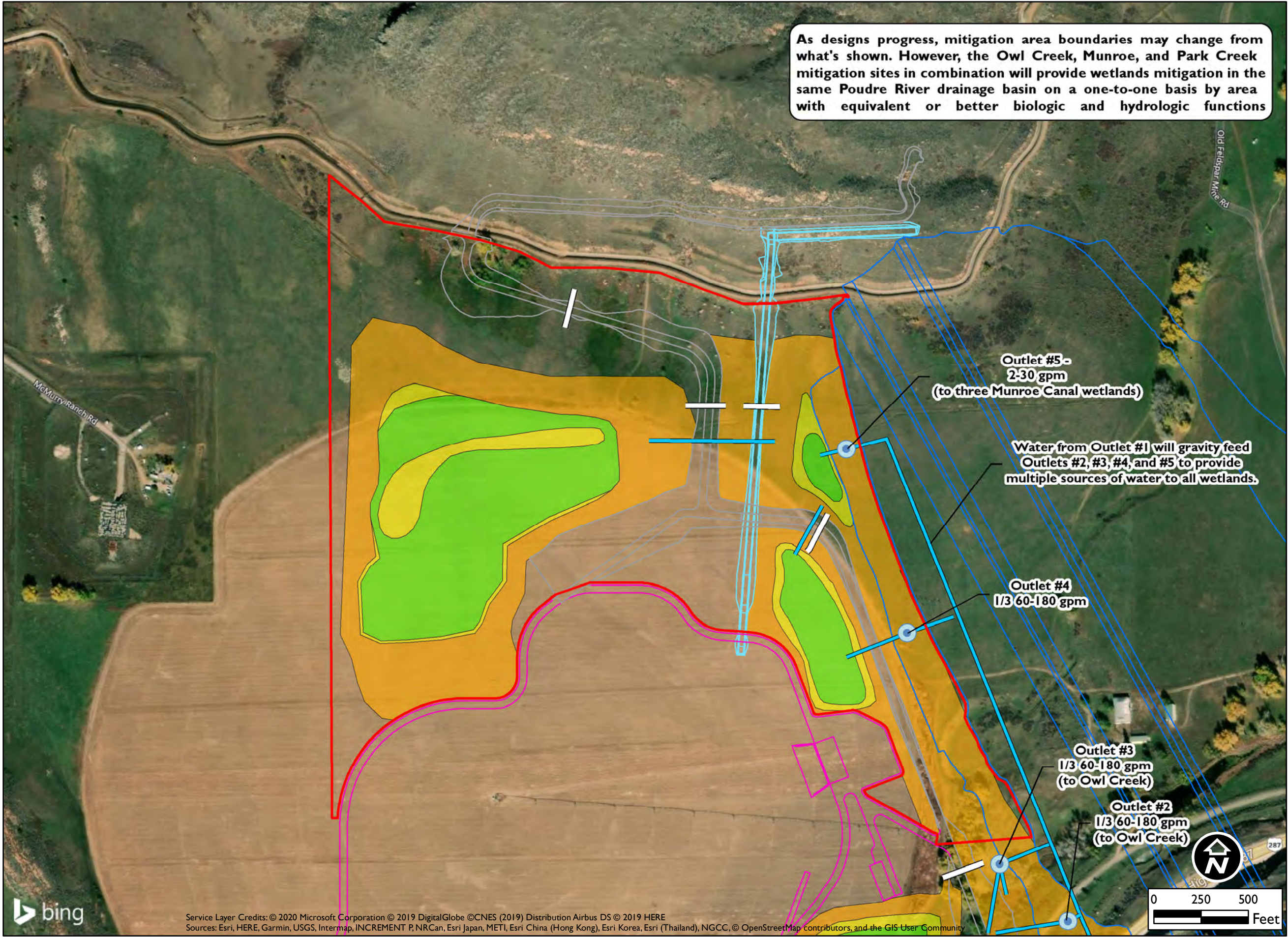
OWL CREEK WETLAND MITIGATION
Northern Integrated Supply Project
Northern Colorado Water Conservancy District
Larimer County, Colorado

Site Location: Larimer County, Colorado
Pinyon Project Number: I/18-814-02

Drawn By: MJS
Reviewed By: CCS

Figure 7
Date: 2/5/2020

Figure 8. Munroe Canal PMJM Mitigation Site



Legend

- PMJM Mitigation Area Boundary
- Proposed Toe Drain Outlet
- Propsed Pipe Connections
- PMJM Crossing
- Access Road (4/25/18)
- Embankment (11/9/17)
- Forebay (4/25/18)
- LLOW (1/16/18)
- Spillway (4/24/18)

- Mitigation Type
- PEM Wetlands
 - PSS Wetlands - Riparian
 - Upland



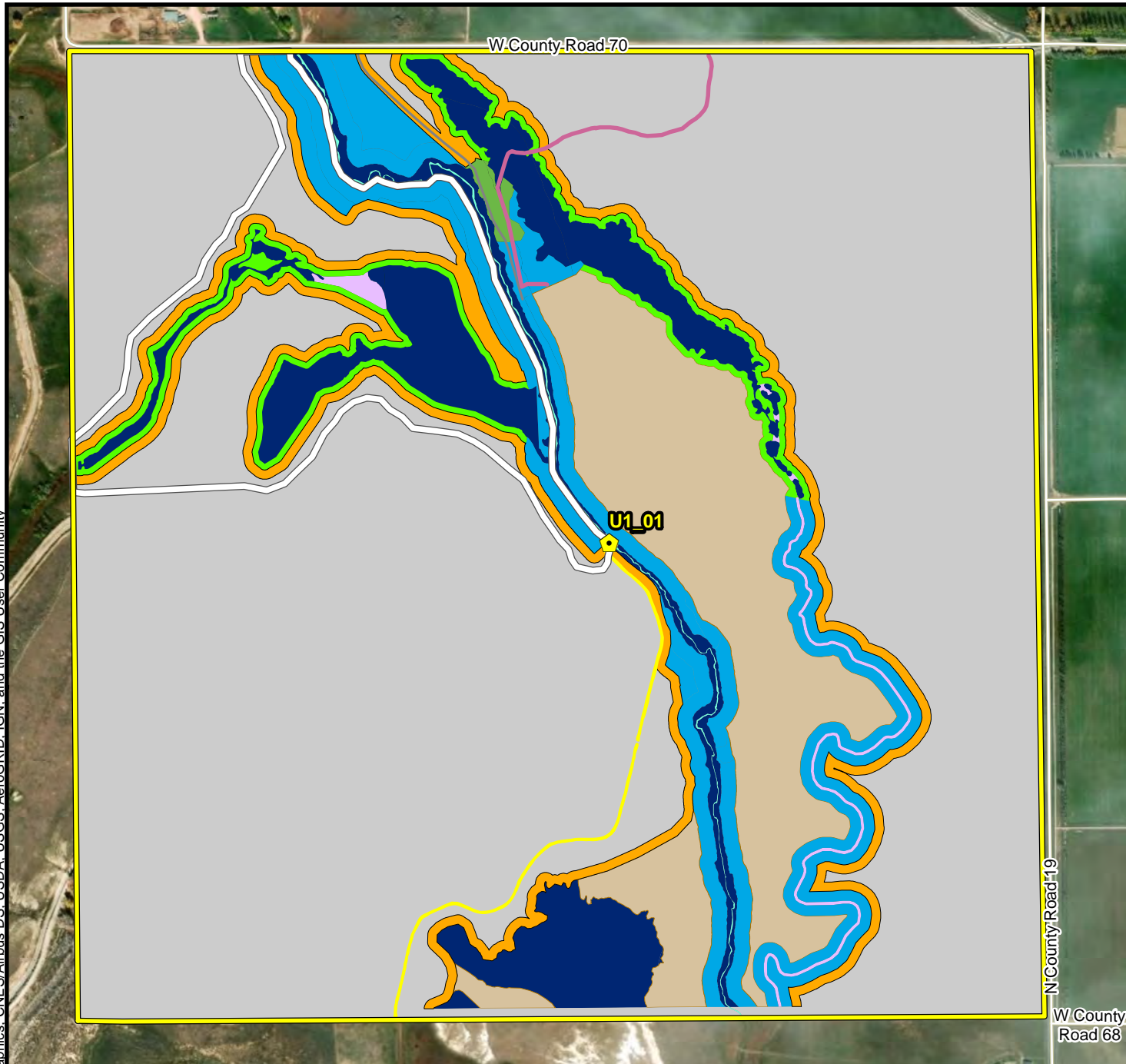
MUNROE CANAL PMJM MITIGATION
Northern Integrated Supply Project
Northern Colorado Water Conservancy District
Larimer County, Colorado

Site Location: Larimer County, Colorado
Pinyon Project Number: I/18-814-02

Drawn By: MJS	Figure 8
Reviewed By: CCS	Date: 1/29/2020

Figure 9. Park Creek Station Mitigation Site

Path: Z:\Resources\Local\Clients\KCM\EN\Scout\CleanEn\103828_Sweetland\Wind\ArcGIS\Geospatial\DataFiles\ArcDocs\PUC_App\NISP PRM Location_01\282020_GB.mxd gwback 1/29/2020
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Mitigation Strategies

- PEM Re-Establishment
- PEM Rehabilitation
- PSS Enhancement
- PSS Establishment
- PSS Re-Establishment
- Infill Buffer
- Excluded from Bank

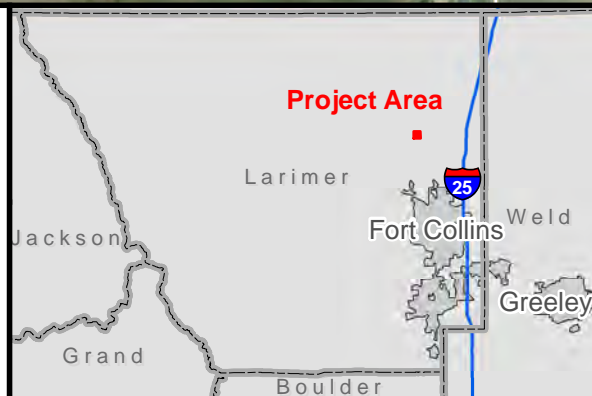
As designs progress, mitigation area boundaries may change from what's shown. However, the Owl Creek, Munroe, and Park Creek mitigation sites in combination will provide wetlands mitigation in the same Poudre River drainage basin on a one-to-one basis by area with equivalent or better biologic and hydrologic functions.

- Canal
- Property Boundary
- Diversion Structure
- Park Creek
- 50ft Buffer
- Proposed NISP PRM Boundary
- Onsite Ditch
- Access Road
- Local Street



800 400 0 800

Scale in Feet



Attachment 1
 NISP PRM Location within
 Park Creek Station
 Mitigation Bank
 Larimer County, Colorado