Prepared for Dynegy Midwest Generation, LLC

Conservation Plan

Middle Fork Vermilion River at Dynegy Midwest Generation Vermilion Site

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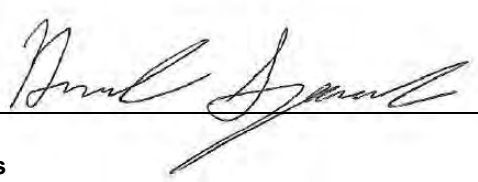
Prepared by 

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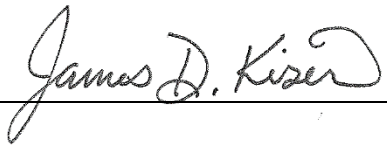
Reviewed by 

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Abbreviations

C	Celsius
Cm	Centimeter
ft	Feet
G	gram
HUC	Hydrologic Unit Code
IDNR	Illinois Department of Natural Resources
In	inch
INHD	Illinois Natural History Database
Km	Kilometer
M^2	Square meter
NTU	Nephelometric Turbidity Units
Oz	ounce
SCUBA	Self-Contained Breathing Apparatus
SWPPP	Stormwater Pollution Prevention Plan
TSS	Total Suspended Solids
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geographical Survey
yr	Year

1.0 DESCRIPTION OF IMPACTS

Dynegy Midwest Generation, LLC (DMG) is proposing to conduct bank stabilization activities along the Middle Fork Vermilion River (HUC 05120109) at the Vermilion Site in Oakwood, Illinois. The proposed action includes a combination of stone toe protection, embedded toe boulders, void-filled riprap, and live branch layering. These actions will stabilize a 1,900-foot (580 meter) long segment of the right descending streambank on the project site to mitigate erosion and lateral migration of the Middle Fork Vermilion River.

A mussel survey was conducted on September 16-17, 2018 by Stantec biologists as requested by Illinois Department of Natural Resources (IDNR). This survey was intended to assess the presence or probable absence of special status mussel species within the proposed bank stabilization area. A total of 33 live mussels from eight species were collected during 13.3 person-hours of SCUBA and snorkel searches (Stantec 2018, Appendix A). An additional 16 species were found as spent shells. Species of interest included six live *Lampsilis fasciola* (Wavyrayed Lampmussel) which is listed in Illinois by IDNR as endangered, along with spent shells of the federally endangered *Epioblasma rangiana* (Northern Riffleshell). Additionally, a single *Etheostoma camurum* (Bluebreast Darter), a fish listed in Illinois by IDNR as endangered, was sighted during the mussel survey.

The Illinois state endangered mussel species, *L. fasciola* is known to occur in the Middle Fork Vermilion River, and within the immediate vicinity of the project area (Stantec 2018 in Appendix A, Tiemann 2018). The Illinois state endangered fish *E. camurum* is known to occur within the riffle habitat at the upstream end of the project area, as well as throughout the Middle Fork Vermilion and Vermilion River basins (Tiemann 2008). Federal and Illinois endangered *E. rangiana* is known to the Middle Fork Vermilion River due to efforts to recolonize the river with translocated individuals after being extirpated from the state (Tiemann et al. 2017). As of December 2017, a total of 3,699 *E. rangiana* had been translocated by Illinois Natural History Survey into the Vermilion River basin (Tiemann et al. 2017).

Both IDNR threatened *Ammocrypta pellucida* (Eastern Sand Darter) and IDNR endangered *Hybopsis amblops* (Bigeye Chub) were not observed during the pre-construction mussel survey but are expected within the vicinity of the project area (Tiemann 2018, INHS 2018). Because these two species are expected within the project area they will be included in this Conservation Plan and subsequent Incidental Take Authorization.

1.A IDENTIFICATION OF AREA TO BE AFFECTED BY PROPOSED ACTION

The proposed project will take place on the right descending bank of the Middle Fork Vermilion River at approximately River Mile 8.1 (Figure 1, Appendix B). The Middle Fork Vermilion River at the project site has an approximate drainage area of 425 square miles (1,100 square kilometers). The project area (Table 1) is north (upstream) of Kickapoo State Recreation Area, west of Danville, Illinois, and can be found on the Danville NW, Illinois U.S. Geological Survey 7.5-minute series topographic map (Appendix B). The project area occurs within the Glaciated Wabash Lowlands, which is characterized by till plains with rugged ravines, floodplains, and terraces. This terrain and associated conditions create the gravel bottoms and riffles characteristic of portions of the Vermilion River system (USEPA 2005). The project site is accessed by traveling approximately 0.5 miles (0.8 km) northeast through the former Vermilion Power Station on

E 2150 North Road, Danville, Illinois. Site Photos can be seen in Appendix A. The Middle Fork Vermilion River is part of the Vermilion River drainage, which is a tributary to the Wabash River.

The project area consists of approximately 1,900 linear feet of the right descending bank of the Middle Fork Vermilion River that is currently eroding (Stantec 2017). Erosion rates were estimated between 1 and 3.6 feet per year (ft/yr, 0.3-1.1m/yr), averaging 2.3 ft/yr (0.7 m/yr) if no erosion controls are implemented. After the proposed construction is completed and with appropriate maintenance, further erosion of the streambank would not be anticipated (Stantec 2017). Sediment supply of the Middle Fork Vermilion River appears to be moderate to high with numerous channel bars observed within, upstream, and downstream of the project site. This sediment supply likely contributes to erosion rates during high flow events. Segments of the existing streambank contain vegetative communities with poor rooting depth and density.

As part of the project construction, the 1,900 linear feet (580m) of streambank will experience direct impacts as degraded and failed gabion baskets are removed, and approximately 2,130 cubic yards (1,628 cubic meters) of stone toe protection boulders and approximately 20,240 cubic yards (15,474 cubic meters) of void-filled riprap are placed below the ordinary high water mark of the river. Some construction activities will have to take place from within the river, extending to approximately the midpoint of the channel, impacting approximately 2.21 acres of streambed (Appendix B).

Table 1. Project Site Location

Site	Latitude	Longitude
Middle Fork Vermilion Downstream Project Extent	40.18244	-87.74229
Middle Fork Vermilion Upstream Project Extent	40.185294	-87.74483

1.B BIOLOGICAL DATA ON AFFECTED SPECIES

Lampsilis fasciola (Wavyrayed Lampmussel, Rafinesque 1820)

Lampsilis fasciola is listed by IDNR as endangered by the state of Illinois. It is identified as globally secure (G5) and imperiled (S2) in Illinois by NatureServe (2018). The shell of this species is medium sized, thin when young, ovular in shape, and somewhat sexually dimorphic (Watters et al. 2009). *Lampsilis fasciola* is given its name for its numerous, small, green wavy rays along the exterior of the yellow shell (Appendix A). This species is known for extreme polymorphism in its mantle lure displays, having at least four distinct lure variations, which assist in attracting potential fish host's used by its glochidia during a complicated life cycle (Zanatta et al. 2007).

Generally considered a high-water-quality species, *L. fasciola* is found in fast flowing streams in relatively shallow water (<3ft/1m) with sand to cobble substrates (Watters et al. 2009). *Lampsilis fasciola* is considered widespread throughout the Vermilion River drainage but is restricted to only that portion of Illinois (Tiemann 2018, INHS 2018, Cummings and

Mayer 1992). *Lampsilis fasciola* had been previously documented as recently as 2013 just 2.4km upstream of the proposed project area (INHS 2018). *Lampsilis fasciola* is Bradytictic, spawning in August and carrying glochidia until the following May-August (Zale & Neves 1982). It's also thought that *L. fasciola* may carry two broods, with gravid females found from August to October, and again May to August (Ortmann 1919, Watters & O'Dee 1996). It's known fish hosts include *Lepomis megalotis* (Longear sunfish), *Micropterus dolomieu* (Smallmouth Bass), and *M. salmoides* (Largemouth bass) (Watters et al. 2009). The reproductive cycle is similar to that of most mussels, requiring a fish host for it's parasitic glochidia larval stage. Individuals grow rapidly for the first 4-6 years of life, becoming fecund around year 3 (COSEWIC 2010). Large individuals (3.9in/100mm) may be 10-15 years old, and individuals greater than 20 years old are rare (Watters et al. 2009).

Epioblasma rangiana (Northern Riffleshell, Lea 1838)

Epioblasma rangiana is listed by USFWS as federally endangered and by IDNR as Illinois state endangered. It is listed on NatureServe as imperiled globally (G2) and is not ranked in Illinois (most likely due to extirpation prior to recent translocations) but is classified as endangered (S1) in five other states and Ontario, Canada as well as imperiled (S2) in Pennsylvania (2018). Previously extirpated from Illinois, this species has been translocated back to the Salt Fork and Middle Fork Vermilion Rivers by Illinois Natural History Survey, with multiple localities in both rivers (Tiemann 2014, Tiemann et al. 2015, Tiemann 2015, Tiemann et al. 2016, Tiemann et al. 2017). Shells are medium sized (approximately 2.75in/70 mm) and oval in shape, with males posteriorly pointed (Watters et al. 2009). Sexual dimorphism is present in this species, with females often having a prominent protrusion along the ventral to posterior margins, termed "marsupial swelling" (Watters et al. 2009). Shells are yellow, usually with green rays from umbo to margin (Appendix A).

This species is known to be bradytictic, with females found gravid from September to the following June (Ortmann 1919). Females use a bright white lure to draw in fish hosts, which become trapped between the closing valves of the mussel. The female then pumps the fish full of glochidia to ensure parasitism (Watters et al. 2009). Confirmed feasible host fish include *Cottus bairdi* (Mottled Sculpin) *E. camurum*, *E. caeruleum* (Rainbow Darter), and *E. zonale* (Banded Darter) (Watters et al. 2009). The reproductive cycle is similar to most mussel species, requiring a fish host for it's parasitic glochidia larval stage. This species is known to move to the substrate surface during brooding in winter and spring. Individuals grow quickly for the first three years and will live to 15 years (Watters et al. 2009).

Etheostoma camurum (Bluebreast Darter, Cope 1870)

Etheostoma camurum is listed as state endangered by IDNR. NatureServe lists it as globally apparently secure (G4) but is critically imperiled (S1) in New York and Alabama, and imperiled (S2) in Virginia and Ohio (recently de-listed). *Etheostoma camurum* is limited to the Vermilion River basin in Illinois, with populations documented in Kickapoo State Park (downstream of the project site) found in 2006, 2011, and 2016 (Trent Thomas, Personnel Communication November 11, 2018). Numerous localities throughout the Middle Fork Vermilion River basin were found for this species between 1960 and 2011 (INHS 2018). This species, as well as other *Nothonotus* subgenus darters are thought to be expanding in range, partially as result of improving water quality conditions under the Clean Water Act (Honick et al. 2017). Implementing additional targeted sampling techniques may reveal expanded ranges compared to historical sightings. This species is known to occur in moderate to large sized streams with consistently low turbidity (Trautman 1981). These fish prefer faster flowing and deep riffles with large cobble to boulder substrate (Trautman 1981, Tiemann 2008). No other streams in this species historic range in Illinois provide the correct habitat combination for *E. camurum* (Tiemann 2008).

Characterized by its white and black edged dorsal, anal, and caudal fins, this medium sized darter reaches ~3.9in/100mm and 0.25oz/7g maximum (Trautman 1981) and is not to be confused with *E. maculatum* (Spotted Darter) which has a more pointed snout and no fin margination or dusky vertical fins, as well as not found, outside of natural range, within Illinois. *Etheostoma camurum* is a benthic insectivore known to feed on midge larvae, and mayfly and stonefly nymphs (Tiemann 2008). *Etheostoma camurum* is known to spawn from late April to mid-June, utilizing the sand/gravel patches on the downstream side of large boulders in swift riffles (Mount 1959, Tiemann 2008).

Ammocrypta pellucida (Eastern Sand Darter, Putnum 1863)

Ammocrypta pellucida is listed by IDNR as a state threatened species. NatureServe lists it as globally apparently secure (G4) and critically impaired (S1) in Illinois (NatureServe 2018). *Ammocrypta pellucida* is limited to the Vermilion, Embarras and Little Wabash river systems in Illinois (IDNR 2018a). The Illinois Natural Heritage Database (INHD) includes one occurrence of *A. pellucida* within the Middle Fork Vermillion River basin (upstream of the project site), which was recorded during monitoring efforts conducted in 2016. However, the fish may be present in low abundances throughout the Middle Fork Vermilion River (Trent Thomas, IDNR personal communication on November 8, 2018; J. Tiemann Personal Communication on November 11, 2018; INHS 2018). This species prefers high quality streams and small rivers with sandy substrates and water depths of at least 60 cm. Major threats facing *A. pellucida* in Illinois include siltation, declining water quality, and impoundment construction (IDNR 2018a).

A. pellucida has an elongated body (up to 3.25in/82.5mm in length) and a single spine in the anal fin. It is characterized by 12-17 dark-green dorsal blotches and 10-19 horizontal dark-green blotches on along each side. This species, like other darters, conceals itself by burrowing into sandy substrates and darting out to capture prey. Their diet primarily consists of small crustaceans and insect larvae (IDNR 2018). Spawning generally occurs between June and mid-August when water temperatures are between 68.9°F (20.5°C) and 77.9F (25.5° C), however; the timing is variable among populations and little is known about spawning within the Vermillion River drainage (Facey 1998, Grandmaison et al. 2004). Ohio River basin *A. pellucida* are thought to spawn between June and July (Grandmaison et al. 2004).

Hybopsis amblops (Bigeye Chub, Rafinesque 1820)

Hybopsis amblops is listed by IDNR as an Illinois state threatened species and listed by NatureServe as globally secure (G5) and critically imperiled (S1) in Illinois (NatureServe 2018). *Hybopsis amblops* has been confirmed present in the Vermilion River, the Little Wabash, and other small tributaries to the Wabash River (IDNR 2014). The Illinois Natural Heritage Database includes 273 individuals found throughout (upstream and downstream of the project site) the Middle Fork Vermilion River system, which were documented during monitoring efforts conducted between 2006 and 2016 (INHD 2018; Trent Thomas, IDNR personal communication on November 8, 2018). This species prefers high quality streams with sandy, gravel or rocky substrates in pools with little to no current near riffles. *Hybopsis amblops* is highly intolerant to siltation and declining water quality (IDNR 2014).

Hybopsis amblops has a long and narrow, silvery body (up to 4in/102mm in length) with a blunt nose and large eyes. This species is characterized by a dark stripe that begins at the nose and extends along the sides to the base of the tail. Spawning occurs in late spring and extends through early summer, however; little is known about spawning habitat preference and behavior (IDNR 2014). *Hybopsis amblops* in the Flint River, Alabama were shown to spawn from March to June (Tarver 2015), however this could be explained by regional climatic differences.

1.C DESCRIPTION OF PROJECT ACTIVITIES

The project schedule has not been finalized, so these time periods are when tasks are expected to be executed. If changes to the schedule do occur, the actions and subsequent impacts should remain the same. This schedule is expected to commence following relocation activities in late May to Mid-June. The anticipated start date for instream impacts is July 1, 2019.

PRIOR TO MARCH 31, 2019

1.1.1 Initial Site Mowing/Clear and Grub

Contractors will mow or mulch brush and small diameter trees along the streambank to facilitate surveying, staking of construction limits, and installation of sediment control measures. Prior to topsoil removal, silt fences will be installed along the streambank edge. Trees will be removed during a period outside of bat roosting season (October 15 through March 31). Root wads from tree removal deemed suitable for restoration will be staged for later use. Direct impacts (i.e., mortality) to roosting bats will be avoided by implementing tree clearing activities outside of the bats' active season (October 15 through March 31).

JULY 2019 TO DECEMBER 2019

1.1.2 Proposed Access Road

Access roads will be constructed from the existing North Ash Pond road to the streambank (Appendix C, sheet 3). The proposed access road will follow the streambank along the entirety of the proposed project site. Access road construction will involve the excavation of existing substrate, and addition of 12 in (30.5 cm) thick aggregate as the road surface. Access roads will be wetted as necessary to control fugitive dust. Construction equipment will need access to the streambed, necessitating access via a streambank entry point(s). Equipment in the streambed will use vegetable oil based hydraulic fluid to prevent contamination of water in the vent of equipment failure.

1.1.3 Turbidity Curtain

During construction along the streambank, a turbidity curtain will be installed within the stream parallel to the streambank with a skirt depth of 10 ft (3 m) In instances of shallow water levels, the turbidity curtain will be positioned in pool areas downstream of the work area (Appendix C, sheets 5 & 6). Stream elevations are monitored during construction via nearby USGS gauges, with turbidity curtains being adjusted accordingly as flow conditions change.

1.1.4 Cofferdam

A cofferdam will be installed along the length of the project area in order to manage water levels during construction and enable working in dry conditions. A cofferdam will be used to dewater the right descending bank of the project area, with water diverted to the left descending bank. This will enable construction of stabilization features and streambank stabilization, in the dry, below the ordinary high water mark. The cofferdam will be installed at the construction limit in the center of the stream (Appendix C, sheets 3 & 4).

1.1.5 Excavation & Gabion Basket Removal

Proposed excavation on this project includes approximately 9,000 cubic yards (6,880 cubic meters) of existing bed and bank material below the ordinary high water mark. Excavation of the streambed will be conducted in 100 linear foot (30.5 m) segments to ensure backfilling within 24-48 hours from initial disturbance. Excavations are expected to reach between seven and ten feet deep (Appendix C, sheets 7-12). Sediment will be excavated and then disposed off-site. Existing gabion baskets are present in a portion of the proposed project area, in varying states of decay, and will be removed with an excavator.

1.1.6 Embedded Boulders & Stone Toe Protection

Embedded boulders will be placed on the upstream extent of the project area, requiring no excavation and transitioning into the area downstream of stone toe protection (Appendix C, sheet 15, detail 6). Stone toe protection will be installed in segments from the existing channel to the ordinary high-water mark, consisting of toe scour protection riprap, stone toe protection, void filled riprap, and topsoil (Appendix C, sheet 15, detail 2). Geotextile fabric is placed on subgrade, with aggregate and riprap placed with excavators. Root wads and live branch layers are placed along the new toe of bank and upslope.

DECEMBER 2019 TO FEBRUARY 2020

1.1.7 Winter Monitoring & Maintenance

Construction will be halted during winter months. However, monitoring and maintenance of installations such as silt fences and access roads will be conducted periodically.

MARCH TO MAY 2020

1.1.8 Overbank Soil Lift

Overbank soil lifts will be implemented above the ordinary high water mark, consisting of backfill, coir blanket, live branch layering, and topsoil (Appendix C, sheet 15, detail 1). Lifts will be installed in one-foot increments with permanent seed and mulch applied to the topsoil.

1.1.9 Plantings

Streambanks will be revegetated with a combination of seed mixtures, live branch layering, and live stake, bare root, and container plantings (Appendix C, sheets 13 & 14). Irrigation of plantings will take place as necessary until plants are established. Replanting will take place as needed until vegetative communities are established. Yearly monitoring will be quantified and reported at the end of each year and delivered to the U.S. Army Corps of Engineers (USACE) and Illinois Department of Natural Resources (IDNR) by a date agreed upon by the agencies. Performance measures will be reflected annually in the mitigation monitoring report for the previous year's vegetative monitoring event(s). The performance measures will be compared to the overall success criteria established within the *Planting and Maintenance Plan for the Middle Fork Vermilion River Erosion Mitigation and Riverbank Project* (Planting and Maintenance Plan) dated June 27, 2018 (Stantec 2018a).

Performance measures should demonstrate an overall positive trend in vegetation re-establishment, woody stem establishment, and native species cover percentage throughout the restoration area. As described in the Planting and Maintenance Plan, performance measures should show 80% survivability of planted trees and shrubs within the first three years of monitoring, and a minimum of 70% survivability of planted trees and shrubs through the remaining years of monitoring. In addition to tree and shrub survivability, native vegetation canopy should cover a minimum of 40% by year three of the five-year monitoring period. Overall native vegetation cover should continue on a positive trend throughout the five-year monitoring period, with no less than 5% cover and no areas of 100 square feet or larger being dominated by weedy or invasive species. Furthermore, native herbaceous vegetation should progress in a diverse manner throughout the monitoring period with no individual species making up greater than 50% of the overall herbaceous cover and the overall herbaceous plant diversity should be comprised of fifteen or more desirable species, as determined by the quantitative methods described in the Planting and Maintenance Plan.

If the established performance success criteria are not being met as described for native riparian vegetative re-establishment, then corrective actions may be warranted throughout each of the annual monitoring events to insure the established success criteria is met by the end of the five-year monitoring period.

1.1.10 Permitting Reviews

A Joint 404/401 permit application has been submitted to the U.S. Army Corps of Engineers and is currently under review. EcoCAT consultation coordination with IDNR can be seen in Appendix D.

1.D ANTICIPATED ADVERSE EFFECTS ON LISTED SPECIES

1.1.11 Direct Effects

1.1.11.1 Dewatering

The right descending bank of the stream is scheduled to be dewatered via a cofferdam structure. Any mussels not moved during the relocation effort will be stranded in the substrate as the water is pumped out of the construction area and redirected along the left descending bank of the stream. Freshwater mussels have developed behavioral adaptations to stage changes in streams such as drought conditions but have no defense against permanent stranding (Cooper 2011). Cooper (2011) found that quickly dewatering an impoundment was a contributing factor in the mortality of mussels due to stranding. An individual's ability to survive environmental stressors such as emersion depends on both physiological and behavioral characteristics of a given species (Gough et al. 2012). Mussels have behavioral mechanisms to deal with emersion: tracking, burrowing, and tracking then burrowing (Gough et al. 2012). Tracking is a behavioral response where mussels move on top of the substrate away from the from receding water levels in an attempt to avoid emersion. This response would be futile, as the cofferdam would prevent access to the wetted portion of the stream. Burrowing involves mussels burying themselves in the substrate to find thermal refuge and avoid desiccation. Burrowing would potentially leave mussels vulnerable to being crushed (1.1.9.2) or entrapped in the substrate (1.1.9.3) Tracking then burrowing is a combination of the two previous behavioral responses.

Fish are not expected to be extensively impacted by dewatering activities. *Etheostoma camurum* is not expected to inhabit the areas scheduled to be dewatered. *Ammocrypta pellucida* is not expected to inhabit the dewatered area in substantial quantity. *Hybopsis amblops* may inhabit the sandy bottom pools at the upstream end of the project area but will be removed from the dewatering area via backpack electrofishing prior to any pumping activities. Both *E. camurum* and *A. pellucida* are not expected to be within the construction area, but if present will be removed using electrofishing. Any fish missed during the electroshocking activity will be exposed to dewatered areas or pooled waters experiencing rising temperatures and concentrated total suspended solids (TSS), and subsequently expire. All fish and mussels located within the cofferdammed area after dewatering will be moved (by a permitted biologist) to the relocation area (mussels) or into the diverted river flow (fish).

1.1.11.2 Crushing of Mussels

Mussels could be crushed during construction activities, including the excavation/dredging phase, placement of stone in the stream channel, or during installation of the cofferdam. This could potentially occur in the portion of the stream channel scheduled to be excavated, as well as near the existing gabion baskets during their removal.

1.1.11.3 Entrapment of Mussels in Substrate

Some freshwater mussel species reside in the substrate for prolonged periods, seldom coming to the surface. The genus *Epioblasma* is one such cryptic group. Smith et al. (2001) found that 48 percent of *E. rangiana* were collected by excavation in a Pennsylvania river. The proportion of males (45 percent) at the surface was much lower than females (80 percent).

Thus, some mussels buried in the substrate may remain there even after the water is drawn off (Gough et al 2012). Gough et al. (2012) observed that two species *Uniomerus tetralasmus* (Pondhorn) and *Lampsilis straminea* (Rough Fatmucket) burrowed in response to a decrease in the water level of a stream. The mussels burrowed a few inches into the substrate, potentially to be protected from increased temperatures. At a depth of 1.0 inch (2.5 cm) in the substrate, temperatures decreased by as much as 10.3 ˚F (5.7 ˚C). Burrowing is likely a response of some species as an adaptation to surviving temporary drought conditions by accessing areas of thermal refuge in the substrate. Mussels that exhibit the behavioral response of burrowing have increased mortality when an impoundment is dewatered because they may remain buried when water levels permanently decline. In the case of this project, mussels not detected in relocation efforts (see Section 2A) may remain undetected after dewatering and perish. Overall totals are expected to be small when compared to totals present prior to relocation.

1.1.11.4 Short-term Water Quality Degradation

Instream activities are predicted to cause temporary increases in TSS downstream of the project area. Increased TSS can result in settling and deposition of solids in gravel or cobble streambeds, reducing the average sediment size (Bilotta & Brazier 2008). This could impact freshwater mussel populations downstream of the construction site, forcing individuals to unbury themselves from depositing sediments. The effect of increased TSS quantities has been infrequently studied, and with mixed results. Bucci et al. (2008) showed that high turbidity (20-75 NTU's) did not impair the valve gape (an indication of feeding activity) for *Lampsilis siliquoidea* (Fat Mucket). Meanwhile Aldridge et al. (1987) showed that exposure to suspended solids resulted in decreased metabolic rates in three species of mussel. Increased suspended sediments have been shown to decrease mussel larval (glochidia) attachment and metamorphosis rates (Beussink 2007).

Sediment deposition can inhibit egg incubation, respiration, and immune function in fish (Greig et al. 2005, Bilotta & Brazier 2008). Comprehensive studies on egg burial exist for salmonids and other highly managed fisheries but are lacking for species known to occur in the project area. Fish have been shown to exhibit a physiological stress response to increases in suspended solids (Au et al. 2004). The expected response in this system would be for fish to mobilize out of impacted areas to those more suitable (lower TSS). Further, there will be temporal avoidance for some life stages as construction is scheduled to avoid periods of reproduction and egg incubation. *Etheostoma camurum* should be finished with egg incubation by the end of June (Mount 1959, Tiemann 2008).

The cofferdam as well as terrestrial silt fences should eliminate most TSS increases during construction. Most increases in TSS will be a result of installation of the cofferdam and sediments pumped out of the dewatering area as suspended solids in the pumped water. Pumping will move water from the right descending bank directly over the temporary cofferdam into the left descending bank. As construction proceeds, additional pumping events to dewater the project area may need to take place as water pools behind the cofferdam. This will result in additional high TSS events downstream of the project area. Concentrations and duration of TSS increases are expected to be lower than those experienced during high flow/flood events. USGS gauge 03339000 Vermilion River Near Danville, IL shows frequent turbidity levels >100 NTU's during flood events. The cofferdam installation should not cause increases in turbidity (Portadam 2018) but increases may occur following installation due to flows being confined to one half the normal wetted width of the channel. The cofferdam will also cause changes in water quantity, temperature, and velocity, as normal flows will be restricted to half the normal wetted width. This will change the depth profile of the stream for the duration of construction, impacting temperatures and velocities. Fish will be expected to mobilize out of these habitats as they become potentially unsuitable.

1.1.11.5 Handling Stress

Short term impacts of relocation will be experienced by fish and mussels as they are removed from the river for the length of the construction area. Improper handling and exposure of mussels has been shown to cause mortality and/or abortion of glochidia in gravid females (Waller et al. 1995) but can easily be avoided with proper handling protocols such as avoiding extreme temperatures, dehydration or drying out, and overcrowding of animals (Dunn et al. 1999).

1.1.12 Indirect Effects

1.1.12.1 Reduced Sediment Load From Bank Erosion (Beneficial Long-term)

Sedimentation of downstream areas should be reduced as erosion of the right descending bank is stopped. Currently erosion rates are on average, 2.3 feet (0.7 m) per year, which is contributing to the sedimentation of the stream. This area of the Middle Fork Vermilion River is noticeably sedimented due to eroding banks, both within the project area and upstream. This streambank stabilization will not eliminate high TSS concentrations downstream, but will incrementally reduce overall sediment loads, a benefit to mussel and fish species downstream. Respiration and egg incubation for fish species should be improved following lowered TSS concentrations.

1.1.12.2 Riparian Vegetation Community (Beneficial)

As a result of live branch layering and planting along the streambank, there will be an increase in allochthonous material entering the waterway (compared to existing gabion baskets). This material serves as the base to aquatic food webs and should result in an increase in biotic production within the project area and downstream. Overhanging vegetation will also provide thermal refuge to aquatic communities during summer.

1.1.12.3 Structural Habitat Complexity (Beneficial)

Streambank stabilization activities should result in increased structural habitat complexity through the addition of multiple size classes of riprap and fill, along with vegetative plantings and root wads below the ordinary high-water mark. This type of habitat heterogeneity will provide suitable habitat (Trautman 1981) for mussel host fishes such as *M. dolomieu* and *L. megalotis*, both hosts for *L. fasciola,* and seen during the September 2017 mussel survey.

1.1.12.4 Relocation Mortality

Freshwater mussels may experience mortality associated with relocation from within the project site. When following proper handling and transport protocols along with discretionary selection of suitable relocation habitats has shown to result in survival of 85-100 percent of recovered mussels (Cope et al. 2003). During relocation, protocols agreed upon by IDNR/USFWS and Stantec will be implemented to ensure that mortality during relocation is minimal. A relocation proposal is presented in Appendix E.

Fish may experience mortality during electrofishing activities designed to remove them from the dewater area. Backpack electrofishers can be adjusted to proper voltage according to site conductivity conditions to limit mortality. Mortality may also be avoided by using aerators, changing water frequently in holding buckets, or using a livewell.

1.1.12.5 Temporal Impacts

Project activities shouldn't impact the *E. camurum* population in the upstream riffles as construction equipment will avoid that area. Downstream riffles may be impacted by increased TSS caused by instream construction work. Increased turbidity and sediment deposition of cobble/boulder habitat could negatively impact *E. camurum* spawning (Late April to Mid-June) (Mount 1959), as they require clear water and specific gravel/sand compositions behind large riffle rocks (Trautman 1981, Tiemann 2007). Construction schedules should avoid the majority *E. camurum* spawning season, as impacts are anticipated to begin on July 1, with latest known spawning taking place on June 22nd and incubation periods for eggs being seven to ten days (Mount 1959, Tiemann 2008).

Relocation of *L. fasciola* may impact the early spawning season, as they're known to brood from April to August, and relocations are scheduled for Late May or June (flow dependent). Instream work resulting in increased TSS will also impact downstream individuals outside of the proposed work area. *Lampsilis fasciola* require host fish to encyst their glochidia on fish for the parasitic portion of their life cycle. Part of this process involves a visual component of host fishes seeing the modified mantle lure on adult females, inducing attempted predation by fish of the adult mussel and subsequent encystment of glochidia. Increased TSS could reduce efficacy of the female's mantle lure and overall mussel recruitment. Survival would most likely not be impacted because sediment deposition rates would not exceed the vertical migration abilities of individual mussels.

Similar adverse impacts exist for *E. rangiana* as they're known to brood into June, which would potentially overlap with relocation dates (Ortmann 1919). *Epioblasma rangiana* are also visually dependent upon fish to host their glochidia. Increased TSS and turbidity could result in decreased recruitment due to lower propensity to obtain fish hosts. Survival would most likely not be impacted because sediment deposition rates would not exceed the vertical migration abilities of individual mussels.

A. pellucida is present within the Vermilion River, however; in low abundances. Project activities are likely to impact *A. pellucida* populations downstream of the project site as they may be impacted by increased TSS as a result of planned instream construction work. Additionally, increased turbidity and sediment deposition of cobble/boulder substrates may also negatively affect *A. pellucida* as they are highly intolerant of reduced water quality and prefer sandy substrates for spawning (Grandmaison et al. 2004). The sandy run habitat suitable for *A. pellucida* should eventually return to the mid-channel of the stream in the project area, resulting in a long-term beneficial impact. Grandmaison et al. (2004) state that Ohio River basin *A. pellucida* spawn from June to July, suggesting that construction will impact the spawning period for this fish.

Project activities are unlikely to impact the *H. amblops* populations in the upstream riffles as this area will be avoided during construction. Downstream riffles may be impacted by increased TSS resulting from instream construction work. Increased turbidity and sediment deposition of cobble/boulder habitat may negatively impact *H. amblops,* especially during spawning (late spring through early summer), as they are highly intolerant to siltation and reduced water quality (IDNR 2004). The pool habitat at the upstream end of the project area (immediately downstream of the riffle where *E. camurum* was observed) should return and be the same quality as prior to construction, with minimal siltation.

2.0 MINIMIZATION AND MITIGATION

2.A PLANS TO MINIMIZE IMPACTED AREA

In an effort to minimize the impact on threatened and endangered mussels, a relocation effort will take place to move mussels from within the river for the length of the project area to an upstream location of equal or greater habitat quality that will be absent of impacts (Appendix E). The relocation effort will take place under the supervision of a permitted malacologist according to IDNR/USFWS approved methodologies. To minimize the effects of the proposed action on threatened and endangered species, Stantec/DMG will monitor for contractors performing construction and will limit impacts to those defined in the project area. Construction activities are not anticipated to begin until July 1 to avoid the most sensitive reproduction period for fish and mussels. Instream construction efforts will be restricted to construction limits as shown in Appendix C. These construction limits will ensure that the *E. camurum* habitat in the riffle upstream of the construction area is unimpacted. Additionally, Best Management Practices (BMPs) including a turbidity curtain isolating instream construction and silt curtains along the streambank will be in place to reduce downstream impacts. Construction impacts are expected to cover an area of habitat to approximately the midpoint of the river channel, or 2.21 acres of habitat. Freshwater mussels will be moved prior to construction impacts and following construction, habitats should be suitable for recolonization. Construction impacts to fish should also be temporary, as finished construction should result in a stable streambank suitable for recolonization.

2.1.1 Lampsilis fasciola

Estimated take of *L. fasciola* was determined based on the September 2017 survey of the project area, historical records for the Wabash River drainage, and comparable quantitative surveys involving healthy *L. fasciola* populations. Historical records provided basin-wide context for the health of *L. fasciola*¸ but often lacked quantitative data needed to calculate probable densities in the project area (Cummings et al. 1998, Szafoni et al. 2000). The September 2017 quantitative survey efforts examined approximately 9,500 ft^2 (880 m^2) of habitat, yielding one *L. fasciola* from this portion of the survey. Extrapolating to a full wetted width relocation indicates an estimated take of 11 individuals. Qualitative surveys showed that in suitable habitat, denser populations could be present. This type of habitat was not seen within the transect areas near and downstream of the construction area. Most *L. fasciola* observed during the qualitative portion of the survey were from the gravel/cobble dominated substrate in normal run habitat upstream of the impact area.

Stodola et al. (2013) found 41 individuals at 11 sites throughout the Vermilion River Basin during extensive basin-wide inventory surveys. Szafoni et al. found a total of 18 *L. fasciola* at three of eight surveyed sites throughout the North Fork Vermilion River, indicating low overall densities (2000). A total of eight individuals were collected by Suloway et al. In the entire Vermilion River drainage, with none found in the Middle Fork Vermilion River (1981). *Lampsilis fasciola* was not originally discovered in the Middle Fork Vermilion River by Baker (1922) in mollusk surveys of Vermilion River, they were later reported in the 1950's but noticeably absent through surveys in the 1970's and 1980's (Suloway et al. 1981). Historic data supports a low expected take of *L. fasciola* in the proposed project area.

In a survey of the Stillwater River in West Milton, Ohio, Stantec personnel found 26 live *L. fasciola* during a dam drawdown that resulted in mussel beds being exposed as water levels receded (Stantec 2015). Seventeen and nine individuals were found respectively in two cells of approximately 107,640 ft^2 (10,000 m^2) in area, representing densities of 0.0009 -0.0017 individuals per square meter. These sites were found to have highly abundant and diverse mussel beds, indicating healthy communities. This presumed healthy population density range mimicked in the proposed project area would estimate between nine to 17 individuals for a wetted width relocation.

Based on the preceding information we conservatively estimate take of *L. fasciola* to be between 10 and 20 individuals.

2.1.2 Epioblasma rangiana

Estimated take of *E. rangiana* is based off translocation data from Illinois Natural History Survey (Tiemann et al. 2015, Tiemann et al. 2016, and Stodola et al. 2017). The Middle Fork Vermilion River was the destination for 1,076 *E. rangiana* translocated from Pennsylvania between 2013 and 2016. These individuals were all placed upstream of the proposed project site, and as indicated by the two spent valves found during the September 2017 mussel survey, could inhabit (live or dead) the project area due to being washed out of their translocation site. Average estimated overall survival of *E. rangiana* in the Middle Fork Vermilion River was 4% in 2016, with estimated annual survival at 30% (Stodola et al. 2017), indicating that high numbers of individuals could have been transported downstream to within the proposed project site. Despite large numbers of relocated *E. rangiana,* at multiple sites upstream, the habitat within the project action area is not ideal for long-term survival under current conditions due to lack of stable substrate. However, we conservatively estimate *E. rangiana* take of between 1 and 5 animals.

2.1.3 *Etheostoma camurum*

The previous survey of the project area did not include fish sampling, therefore estimated take of *E. camurum* is based on historical densities in the Middle Fork Vermilion River. Tiemann's quantitative samples yielded densities of 0.000 to 0.071 individuals per square meter (mean: 0.025, SD: 0.0282) in the Middle Fork Vermilion River (2008). The riffle area where an anecdotal observation of *E. camurum* took place is approximately 3,000 ft^2 (280 m^2). Based on Tiemann's data this would result in take of seven individuals on average, and a maximum of 20. The pool habitats slated for construction are unlikely to contain large numbers of *E. camurum*. Due to the avoidance of the identified *E. camurum* habitat, we estimate take to be between one and seven individuals.

2.1.4 *Ammocrypta pellucida*

Quantified data for *A. pellucida* is sparse, with only one record for the Middle Fork Vermilion River. However, they are still thought to be throughout the system, albeit sporadically and in low quantities. Due to these factors, we estimate take to be between one and five individuals.

2.1.5 *Hybopsis amblops*

Illinois Department of Natural Resources biologists have sampled extensive populations of *H. amblops*, both upstream and downstream of the project area. Catch ranged from zero individuals in 2006 and 2011 at the Middle Fork River Forest Preserve (upstream of project site), to 71 individuals at Kickapoo State Park (downstream of project site) and 156 individuals at Kennekuk County Park (upstream of project site) both in 2016 (Trent Thomas personal communication on November 8, 2018). Due to the inclusion of suitable habitat for *H. amblops* within the project area, there is a reasonable chance of sampling a large population of this species. Due to these factors, we estimate take to be between 50 and 150 individuals.

2.B PLANS FOR MANAGEMENT OF AREA

The proposed action will allow for the continued use of the impacted area, and hopefully long-term improvements, as by design the stabilization activities will be self-maintaining. Once construction is complete and the vegetation has established as desired there will be no need for additional management. This project will stop erosion of the bank and its lateral migration. The stabilization activities should have a net benefit to the project area and downstream through reductions in TSS loads. Riparian vegetation will be a more native representation of plant species compared to existing populations, providing allochthonous material to instream biotic communities. The addition of certain design aspects (root wads, live branch layering, soil lifts, etc.) creates habitat heterogeneity that is currently lacking. These habitat structures will improve the cover for known fish hosts of *L. fasciola* which include *L. megalotis*, *M. dolomieu*, and *M. salmoides*, thus possibly increasing recruitment of this state endangered mussel. Indirectly, they will help reduce TSS and improve downstream riffle areas and overall water quality for the remaining listed species.

2.C MEASURES TO BE IMPLEMENTED TO AVOID, MINIMIZE, AND MITIGATE EFFECTS OF PROPOSED ACTION

2.1.6 Avoidance Measures

Avoidance of threatened and endangered species habitat has been implemented where possible. The riffle habitat known to contain *E. camurum* has been restricted from construction limits to avoid disturbances. Timing of work (Mussel relocation in May/June, Construction June-December) will attempt to avoid *E. camurum* spawning periods as they potentially inhabit downstream riffles. The brooding period for *E. rangiana* and the first brooding period for *L. fasciola* would be fully avoided by a June relocation.

2.1.7 Minimization Measures

Dewatering the construction area will result in minimization of impacts to both mussels and fish, as they can more easily be removed from the area prior to impacts, and sustained construction activities won't impact organism's post-relocation. The project will minimize take resulting in death by relocating mussels prior to construction activities as well as following dewatering of the construction area. Fish will also be taken without death via backpack electroshocking.

2.1.8 Mitigation Measures

DMG shall provide funding in the amount of $63,923 to the Illinois Wildlife Preservation Fund earmarked for bringing conservation benefit to the species potentially impacted. This funding shall be provided within 90 days of execution of this agreement. Mitigation payments are nonrefundable, including events of revocation or termination. This mitigation value was based on IDNR's best current understanding of the species life history needs and impact analysis relevant to the project site's proposed conceptual design elements available at the time of review.

2.D PLANS FOR MONITORING AREA

As mentioned, a freshwater mussel relocation will occur prior to commencement of construction activities. All native mussels will be relocated upstream to an area of equal or greater habitat. Listed species of mussels will be tagged with passive integrated transponders (PIT) to facilitate monitoring post-relocation. Listed fish species will be tagged with visible implant elastomers (VIE) to allow for survivability estimates during post-relocation monitoring, provided that counts do not exceed 50 individuals. Tagging fish with VIE's has been shown to have high retention rates and little to no impact on survival or growth (Olsen & Vollestad 2001, Goldsmith et al. 2003, Weston & Johnson 2008). However, recapture rates would be highly dependent on the number of individuals tagged. If less than 5 fish of any species are caught during any depletion pass during electroshocking, they will not be tagged. The relocation site as well as the proposed construction site will be re-surveyed for survival and recolonization rates at the 1-year and 3-year points after completion of construction (Fall 2020 and Fall 2022). Fish are expected to colonize the construction area quickly, but mussels may require longer than the proposed monitoring period. Summary reports of the relocation and two monitoring events will be provided to IDNR according to permit guidelines. Construction activities resulting in the stabilized streambank will be monitored post-construction to ensure efficacy of the proposed project.

2.E ADAPTIVE MANAGEMENT PRACTICES

The mussel relocation prior to commencement of construction will include adaptive practices to ensure that flow levels are suitable for proper surveying methodologies. Relocation is tentatively scheduled for late May - early June to allow for flexibility to flow conditions, as suitable conditions would include low turbidity and flow. Conditions during the September 2017 survey were ideal (~100 cubic feet per second flow, 17-19 NTUs turbidity), and similar conditions will trigger the relocation survey.

The relocation site for mussels being moved out of the construction area will be the previously surveyed area just upstream of the project site (Appendix A). If during the relocation survey this site is deemed unsuitable at any point, a new site will be located, *deemed appropriate by IDNR*, and utilized.

A turbidity curtain will be installed midchannel to isolate instream work from influencing areas of the stream downstream. This turbidity curtain will be monitored and adjusted during construction according to flow conditions and specific work locations. Changing flow conditions will trigger adjustment of the turbidity curtain as necessary to keep construction activities from impacting lower reaches of the stream.

Erosion control measures will be implemented minimize sediment runoff during construction. These measures will be monitored and adjusted as needed, details in the Stormwater Pollution Prevention Plan (Stantec 2018b). Geomorphological and vegetative monitoring will also take place to ensure stabilization progresses according to plan.

In the event that any listed mussels other than *E. rangiana* or *L. fasciola* are taken during the relocation survey, IDNR will be notified before work continues. Additionally, if federally listed mussels are found, USFWS will be notified before work continues.

2.F VERIFICATION OF FUNDING

Verification of funding is provided in Appendix F.

3.0 DESCRIPTION OF ALTERNATIVES

Alternative actions were previously examined as part of the design phase for this project (Stantec 2018c). Five unique design alternatives (including a no-action alternative) were considered for stabilization of the streambank.

Alternative 1: No Action

- Description: No Action.
- Impacts:
  - Erosion would continue to occur along the streambank (at an estimated average rate of 2.3 feet per year), resulting in sedimentation downstream of the Project site, eventual failure of gabion

baskets, and a reduced width between the Middle Fork Vermilion River and the adjacent embankments. For this reason, this alternative is not preferred.

Alternative 2: Stone Toe with Live Branch Layering (preferred alternative)

- Description: Install riprap scour protection at the toe of slope (keyed into channel bottom) up to the bankfull elevation and install soil lifts wrapped in coir fabric with live branches and other native vegetation above the riprap.

- Impacts:
  - Reduces risk of future toe erosion and associated downstream sedimentation.
  - This treatment is suitable for high stream velocities with erodible soils and has proven to be successful in other similar project settings.
  - Enhances riparian zone functions and provides natural aesthetics once vegetation is established. Proposed native vegetation will be consistent with surrounding area along this section of stream. Vegetation establishment in the live branch layering will typically take up to two growing seasons. Use of containerized trees and shrubs in addition to live stakes and whips can provide more rapid revegetation of the streambank, which once fully established will aid in the erosion mitigation. Once the vegetation establishes, it requires little maintenance.
  - Requires work in the channel during construction.

Alternative 3: Buried Riprap Trench

- Description:
  - Install buried riprap in an excavated trench within the streambank, offset a specified distance from the top of the exposed bank. The toe trench is built such that the base is below the predicted scour depth and extends to a height of the current bankfull flow.

- Impacts:
  - The buried riprap does not provide immediate bank protection or stability; rather, it is intended to become active once the bank has eroded to the location of the riprap. At that time, the rock from the riprap trench acts as a resisting force to erosion of the stream and provides a stable base for the above bank. Sediment between the trench location and existing streambank would therefore be allowed to erode further, resulting in conveyance downstream.
  - Areas with a narrow bench between the Middle Fork Vermilion River and existing embankments are not suitable for this treatment without excavating the embankment.
  - This method would require less disturbance to the stream channel than Alternative 2 (Stone Toe with Live Branch Layering); however, it is only suitable if the stability of adjacent embankments will not be jeopardized during installation.
  - Riparian vegetation will need to be cleared for this work, removing the natural bank stabilization of riparian vegetation. Once the stream bank has eroded to the buried riprap, the banks above

the rock toe will be bare, but the rock toe will provide stabilization. Vegetation will then need to be re-established on exposed streambank above the riprap toe.

Alternative 4: Sheet Pile Wall

- Description:
  - Driving interlocking steel sheet piling along the bank, separating the bank from the stream to prevent exposure of the bank to stream flows.
- Impacts:
  - Provides bank protection to flows with stages below the top of the sheet pile wall. The sheet pile wall becomes an impermeable barrier between the stream and bank and eliminates erosive forces along the bank soil.
  - Once in place, the sheet pile wall offers low maintenance and high flow protection.
  - Placement by precision mechanical means can lead to high construction costs.
  - Installation requires the removal of riparian vegetation.
  - Sheet pile wall has an unnatural look and is inconsistent with the surrounding area along the Middle Fork Vermilion River.

Alternative 5: River Relocation

- Description:
  - Relocating the stream involves constructing a new channel to the east of the current channel, pulling the stream away from the property.

- Impacts:
  - The newly constructed channel would provide the benefits of a healthy system ranging from riparian vegetation, bank stabilization, access to the floodplain, and proper pattern and grade control.
  - This is a costly method due to the large amount of design and construction required to develop a new hydrologically stable channel.
  - This alternative would disrupt a significant amount of existing vegetation and require extensive earthwork. With the stream being a National Scenic River, it is unlikely that the necessary permits to perform this work would be attainable.

4.0 DATA INDICATING PROPOSED ACTION WILL NOT REDUCE SURVIVAL OF LISTED SPECIES

Relocation activities should have little to no mortality due to proper handling and site selection procedures (Cope et al. 2003). This should eliminate most, if not all, mortality of mussels within the project area, therefore not reducing survival of the species locally or within the state of Illinois.

Lampsilis fasciola is considered widespread throughout the Vermilion River system but restricted to that basin within Illinois (J. Tiemann, Personal Communication, November 11, 2018, INHS 2018, Cummings and Mayer 1992). Illinois Natural History Survey's database contains 14 records for *L. fasciola* in the Middle Fork Vermilion River, with two

records as recent as 2013, despite the few active searches for this particular species. This species is considered globally stable, yet the restriction to the Vermilion River basin in Illinois makes them rare within the state. Five live individuals were found during the September 2017 survey upstream of the proposed construction area. Habitat upstream of the project area was more suitable for *L. fasciola* and yielded four individuals during qualitative surveying. Due to being widespread throughout the Vermilion River basin, and numerous in suitable habitat (upstream of the project area), the data indicate that incidental take during this project will not reduce survival of this listed species.

Epioblasma rangiana was extirpated from the state of Illinois until recent translocation efforts brought individuals from Pennsylvania to the Middle and Salt Forks of the Vermilion River (Tiemann et al. 2017). There have been no reports of recruitment among the 1,076 translocated *E. rangiana* upstream of the project site. Yearly survival has been estimated at 30% (Stodola et al. 2017). It is highly unlikely that the project site contains a significant population of live *E. rangiana* that would impact overall species survival.

A single *Etheostoma camurum* was sighted in the riffle habitat just upstream of the proposed construction area during the September 2017 survey. Recent recordings in the Middle Fork Vermilion River by IDNR include four individuals found in 2006, 21 in 2011, and four in 2016 at BPK-07, in Kickapoo State Park, downstream of the proposed project site. Tiemann (2008) collected specimens throughout the Vermilion River drainage, and most abundantly within the Middle Fork Vermilion River. Because the construction impacts are not within the preferred habitat of *E. camurum* incidental take is highly unlikely. Therefore, the possibility of the proposed action reducing overall survival of the species is also unexpected.

Based on information from IDNR, a single *A. pellucida* is documented near the project area, however personal communication suggest that this species is widespread, but sporadic (J. Tiemann personal communication on November 11,2018; INHS 2018). This project should result in a long-term benefit to the species, as decreasing sediment loads has been shown to allow re-expansion to historic norms (Tessler et al. 2012). The small overall impact area of this project along with the long-term benefits to the restoration area and downstream suggest that *A. pellucida* survival will not be threatened.

Numerous *H. amblops* have been recorded throughout the Middle Fork Vermilion River (INHS 2018), suggesting that populations are widespread and abundant. Samples totaling 71 individuals at BPK-07, in Kickapoo State Park and 156 individuals at BPK-17 Kennekuk County Park in 2016 show healthy populations exist throughout the region. Relocating any extant populations within the project area will most likely not result in a decline of this species in the Middle Fork Vermilion River.

5.0 IMPLEMENTING AGREEMENT

The implementing agreement can be seen in Appendix F.

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APPENDIX A

Freshwater Mussel Survey on the Middle Fork Vermilion River at the Illinois Power Company Vermilion Station (River Mile 8.1)

Stantec

Prepared for Vistra Energy

Draft Freshwater Mussel Survey on the Middle Fork Vermillion River at the Illinois Power Company Vermillion Station (River Mile 8.1)

October 24, 2018

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Sign-off Sheet

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Cody Fleece

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Executive Summary

Vistra Energy contracted with Stantec Consulting Services, Inc (Stantec) to conduct a freshwater mussel survey on The Middle Fork Vermilion River in Vermilion County, Illinois. The primary objective of this project was to determine presence or probable absence of special status mussel species within an area proposed for river restoration activities.

The proposed project involves river restoration along approximately 650 meters of the west bank of the Middle Fork Vermilion River. A combination of stone toe protection, embedded toe boulders, void-filled riprap, and live branch layering is being proposed to stabilize a segment of the riverbank on the project site. Existing gabion baskets along the river edge within the central portion of the project will be removed.

The mussel survey was performed on September 16 and 17, 2018. Total search effort was approximately 13.3 person-hours. During this effort 33 live mussels were collected, measured, aged, and sexed. Total live species richness was eight, with an additional 16 species represented by spent shells. All mussels were replaced back into the substrate in the approximate area they were found. The most abundant live species were *Lampsilis cardium* (Plain Pocketbook; n=11), *Lampsilis siloquoidea* (Fatmucket; n=9), and *Lampsilis fasciola* (Wavyrayed Lampmussel; n=6). Special status species found during the survey include live and shell specimens of *L. fasciola* (Illinois Endangered) and shells of *Epioblasma rangiana* (Northern riffleshell, Illinois and Federal Endangered). Field personnel also collected shells for the following Illinois listed species: *Villosa lienosa* (Little Spectaclecase, n=1), *Alasmidonta viridis* (Slippershell, n=1), *Ptychobranchus fasciolaris* (Kidneyshell, n=1), and *Cyclonaias tuberculata* (Purple Wartyback, n=1).

Abbreviations

°C	Degrees Celsius
CPUE	Catch per unit effort
cm	Centimeters
ft	Feet
hr	Hour
IDNR	Illinois Department of Natural Resources
INHS	Illinois Natural History Survey
In	Inch
m	Meter
m^2	Square Meter
mm	Millimeters
mg/L	Milligram per Liter
µS	Microsiemens
NTU	Nephelometric Turbidity Unit
SCUBA	Self-contained Underwater Breathing Apparatus
USFWS	U. S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 INTRODUCTION

1.1 PROPOSED PROJECT

Vistra Energy seeks to conduct bank stabilization activities along the Middle Fork Vermilion River (HUC 05120109), which is listed as a nationally-designated scenic river near Oakwood, Illinois for 17.1 miles, including the project area. This project consists of stabilizing approximately 650m of the right descending riverbank. The design includes the utilization of stone toe protection (a combination of 24" boulders and void-filled riprap) and live branch layering. The proposed planting plan will include a variety of native species that once established will give this project a consistent appearance with the native landscape. The mussel survey area consisted of 26 transects spread evenly throughout 1,050m of streambank, running from the western bank to the midpoint of the river (Appendix A). This survey also consisted of three 2-hour qualitative timed searches of suitable habitat areas.

1.2 PROJECT SETTING

The Middle Fork Vermilion River at the project site has an approximate drainage area of 425 square miles (Table 1). The survey area is located north of Kickapoo State Recreation Area on the Middle Fork Vermilion River, west of Danville, Illinois and can be found on the Danville NW, Illinois U.S. Geological Survey (USGS) 7.5-minute series topographic map. The project area sits within the Glaciated Wabash Lowlands, which is characterized by till plains with rugged ravines, floodplains, and terraces. This terrain and associated conditions create the gravel bottoms and riffles associated with the Vermilion River system (USEPA 2018).

Table 1. Survey Site Location

Site	Latitude	Longitude
Middle Fork Vermilion Downstream Survey Extent	40.18113	-87.73941
Middle Fork Vermilion Upstream Survey Extent	40.18627	-87.74273

1.3 LISTED FRESHWATER MUSSEL DISTRIBUTION

Streams within Vermilion County, Illinois are host to at least three federally endangered, along with eight state endangered and four state threatened mussel species (Table 2). Some of these species were extirpated or became extremely rare, leading to Illinois Natural History Survey (INHS) translocating 686 *Epioblasma rangiana* (Northern Riffleshell) and 730 *Pleurobema clava*

(Clubshell) between 2013-2014 from Pennsylvania to four sites on the Middle Fork Vermilion River, all of which are upstream of the project area (Stodola et al. 2017). An additional 680 *P. clava* and 500 *E. rangiana* were translocated INHS in 2016, for a total of 1,420 *P. clava* and 1,186 *E. rangiana* translocated into habitat upstream of the project area (Tieman et al. 2016). High flow events have been shown to displace these translocated populations and transport them downstream (Stodola et al. 2017). No critical habitat has been designated for *E. rangiana* or *P. clava*. *Quadrula cylindrica* (Rabbitsfoot) critical habitat consists of 28.5km of habitat on the North Fork Vermilion River and Middle Branch North Fork Vermilion River.

While monitoring of these populations has taken place, no specific surveying within the project area has been completed. Surveys conducted in 2013 (prior to any translocations) examined sites upstream and downstream of the project area, finding shells of *Lampsilis fasciola* (Wavyrayed Lampmussel) in both directions (Stodola et al. 2013). *Pleurobema clava* has historic localities upstream of the project site, but has been considered extirpated from the Middle Fork Vermilion for 40 years. *Epioblasma rangiana* has not been observed naturally in the Middle Fork Vermilion in over 70 years and before translocations the species was considered extirpated (Cummings et al. 1998). In 2013 relict shells of *Q. cylindrica* were found in the Middle Fork Vermilion upstream of the project area, as well as live individuals at three sites in the North Fork Vermilion River (Stodola et al. 2013).

Table 2. Listing status of freshwater mussel species with historic records in Vermilion County, Illinois (Illinois Natural Heritage Database, 2018)

Scientific name	Common Name	State Status	Federal Status
Alasmidonta viridis	Slippershell	Threatened	-
Cycolonaias tuberculata	Purple Wartyback	Threatened	-
Epioblasma rangiana	Northern Riffleshell	Endangered	Endangered
Lampsilis fasciola	Wavyrayed Lampmussel	Endangered	-
Ligumia recta	Black Sandshell	Threatened	-
Pleurobema clava	Clubshell	Endangered	Endangered
Ptychobranchus fasciolaris	Kidneyshell	Endangered	-
Quadrula cylindrica	Rabbitsfoot	Endangered	Endangered
Simpsonaias ambigua	Salamander Mussel	Endangered	-
Toxolasma lividus	Purple Lilliput	Endangered	-
Villosa iris	Rainbow	Endangered	-
Villosa lienosa	Little Spectaclecase	Threatened	-

2.0 METHODS

2.1 FIELD SURVEYS

The mussel survey was performed on September 16 and 17, 2018. Total search effort consisted of 13.3 person-hours of surveying. The survey area was composed of 1,050m of river, with surveys occurring along 26 transects spread evenly throughout the river reach. Each transect extended from the edge of the water on the west bank to the midpoint of the river. Surveying consisted of one minute per meter of transect length, with surveyors examining approximately one meter upstream and downstream of the transect. Each transect was separated into, at most, 10m long segments. Data was reported for each individual segment. In addition to transects, three 2-hour qualitative surveys in optimal habitat were conducted following transect surveys. These methods were approved by USFWS and IDNR (Appendix B).

Mussels were collected by visual and tactile searches, including moving cobble and woody debris, hand sweeping away silt, sand, and/or small detritus, and disturbing/probing the upper five centimeters (two inches) of substrate. SCUBA was used for areas with depths greater than 0.5m, and snorkeling was done in area's with depths <0.5m. All live mussels were placed in mesh bags and brought to shore for identification and data collection. Species identification and processing was completed by a federal and state permitted (Appendix C) malacologist. Following processing, mussels were returned to the approximate locations of capture. Spent shells were collected during incidental surveying by support staff and in between transect surveys. No live animals were retained during field surveys.

Water samples were taken prior to field surveys each day. Conductivity, pH, and water temperature were taken with a Hanna HI98130 handheld unit. Dissolved oxygen readings were taken with a Yellow Springs Instruments (YSI) 500A handheld unit. Turbidity was measured using a Hach turbidimeter.

2.2 ANALYTICAL METHODS

Assemblage composition was assessed using simple metrics such as relative abundance, catch per unit effort (CPUE), and species richness. Population structure was assessed by plotting individual lengths and growth ring counts for evidence of reproduction and recruitment.

3.0 RESULTS

3.1 SITE CONDITIONS

Flow conditions in the Middle Fork Vermilion River were suitable for surveying September 16-17, 2018 (Figure 1). Turbidity was relatively low throughout the survey period, with visibility >1 meter for

the entirety of the survey. Average water depth was approximately 1 meter (3ft), with the maximum being ~2 meters (6ft). All measured water quality parameters stayed relatively constant throughout the survey period (Table 3).

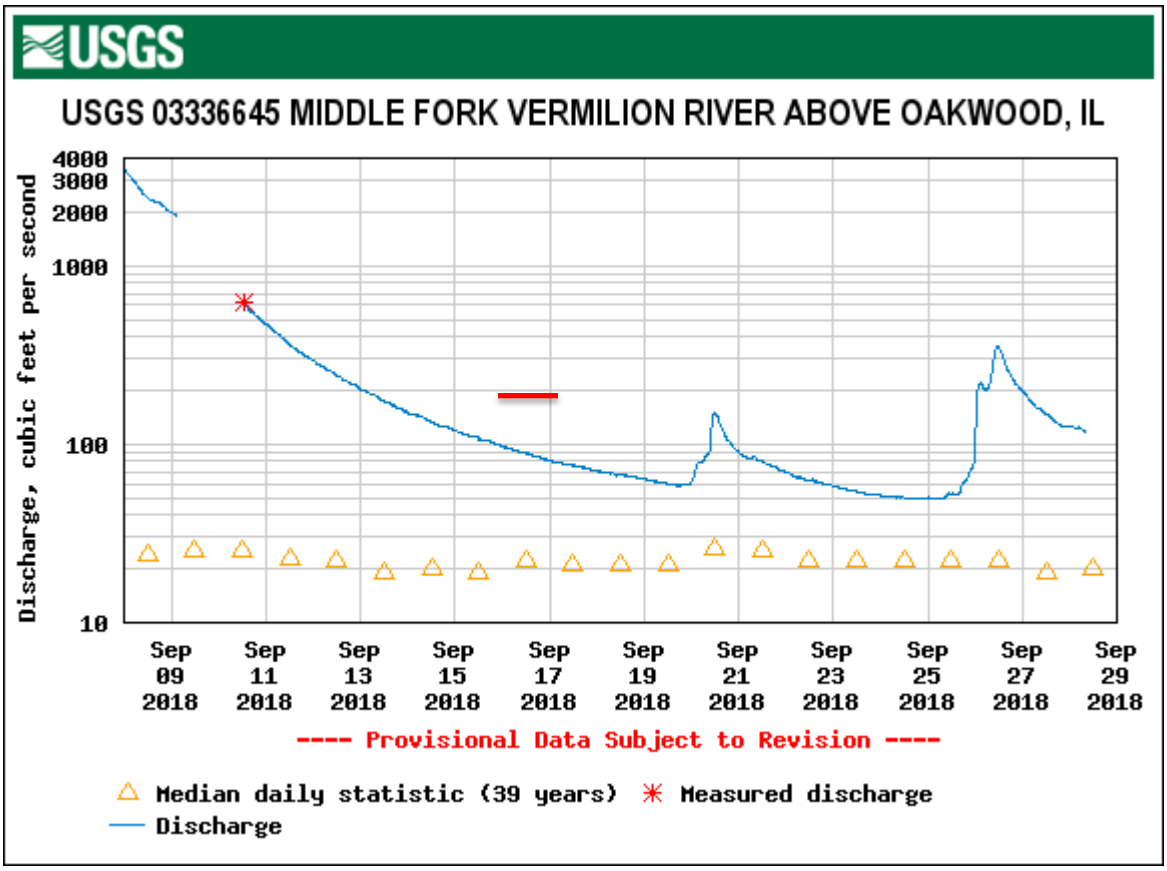

Figure 1. Discharge on the Middle Fork Vermilion River at USGS Gauge 03336645 Above Oakwood, Illinois During the Freshwater Mussel Survey on September 16-17, 2018

Table 3. Water Quality Parameters for the Middle Fork Vermilion River During the Freshwater Mussel Survey on September 16-17, 2018

Date	Water Temperature (°C)[1]	% Oxygen Saturation	Dissolved Oxygen (mg/L)[2]	Turbidity (NTU)[3]	Specific Conductivity (µS)[4]	pH
9/16/2018	22.4	89.7	7.89	19	674	8.75
9/17/2018	22.9	87.5	7.57	17	685	8.45

[1]Degrees Celsius
[2]Milligrams per liter
[3]Nephelometric turbidity units
[4]Microsiemens

The project area contained multiple distinct habitat types (Site photos in Appendix D). Transects 1-9 were generally similar, being on the depositional bank of a point bar, displaying approximately 40 percent coarse gravel, 40 percent small gravel, and 20 percent sand. The exposed point bar held high concentrations of uneroded sand.

Transects 10-19 were along the eroding west bank, exhibiting similar characteristics. Multiple seeps were located within this section of riverbank in addition to gabion baskets in varying states of disrepair (Appendix C). Substrate consisted of riprap, cobble, and hardpan near the edge of the bank, with sporadic flow refuges full of small gravel and sand. Towards the midpoint of the river there was more sand/small gravel mixtures as the dominant substrate. The area along this bank was the deepest portion of the river, with depths of approximately 2m.

The area between transects 20-21 was a cobble riffle system, with a steep slope and larger cobble and boulders.

Transects 22-26 were similar to transects 1-9, again exhibiting characteristics of a depositional bar, with loose sand and small gravel comprising the majority of substrate, with some sporadic boulders and cobbles. Qualitative surveys upstream of transect 26 were in deeper habitat (approximately 1-2m deep) with larger substrate, approximately 40 percent cobble, 40 percent gravel, and 20 percent sand/silt.

Also of note was the sighting of *Etheostoma camurum* (Bluebreast Darter) within the riffle area of transect 22. This fish is a state endangered species in Illinois, and occupies fast flowing, clear riffles like those seen in transect 22, upstream of transect 26, and approximately 200m downstream of transect 1.

Additional fish seen within the project site during SCUBA and snorkel surveys include: *Etheostoma caeruleum* (Rainbow Darter), *Etheostoma flabellare* (Fantail Darter), *Micropterus dolomieu* (Smallmouth Bass), *Nocomis biguttatus* (Hornyhead Chub), *Lepomis megalotis* (Longear sunfish), and *Etheostoma sciera* (Dusky Darter). Photos can be seen in Appendix C.

3.2 MUSSEL DISTRIBUTION AND ABUNDANCE

3.2.1 Species composition

A total of 33 live mussels were collected from the salvage areas, comprising 8 species (Table 4). All eight species were found after 11 search hours, with no additional species being found during the final 2.3 search hours (Figure 2). The most abundant live species were *Lampsilis cardium* (Plain Pocketbook; n=11), *Lampsilis siloquoidea* (Fatmucket; n=9), and *L. fasciola* (n=6). Other species collected during the mussel relocation included *Anodontoides ferrusacianus* (Cylindrical Papershell; n=3), *Fusconaia flava* (Wabash Pigtoe; n=1), *Lasmigona costata* (Flutedshell; n=1), *Pyganodon grandis* (Giant Floater; n=1), *Cyclonaias pustulosa* (Wartyback; n=1).

Species represented solely by spent shell specimen included *Alasmidonta marginata* (Elktoe), *Amblema plicata* (Threeridge), *Alasmidonta viridis* (Slippershell), *Cyclonaias tuberculata* (Purple Wartyback), *Eurynia dilatata* (Spike), *E. rangiana*, *Lasmigona complanata* (White Heelsplitter), *Obovaria subrotunda* (Round Hickorynut), *Potamilus alatus* (Pink Heelsplitter), *Ptychobranchus fasciolaris* (Kidneyshell), *Pleurobema sintoxia* (Round Pigtoe), *Quadrula quadrula* (Mapleleaf), *Strophitus undulatus* (Creeper), *Tritogonia verrucosa* (Pistolgrip), *Villosa iris* (Rainbow), *Villosa lienosa* (Little Spectaclecase) (Table 4). Spent shell specimens of note include the two *E. rangiana*, a Federally Endangered species, numerous *L. fasciola* (State Endangered), a single *P. fasciolaris* (State Endangered) and single shells of *A. viridis, C. tuberculata,* and *V. lienosa* (All State Threatened).

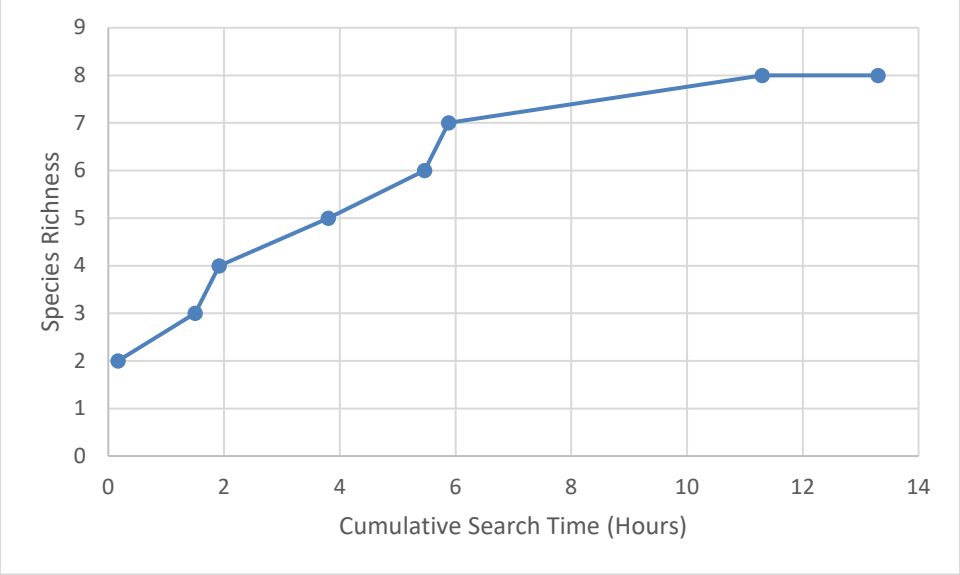

Figure 2. Cumulative Species Richness as a Function of Search Time on the Middle Fork Vermilion River, Vermilion County, Illinois

Table 4. Live and Spent Shell Totals for Freshwater Mussel Survey on Middle Fork Vermilion River, Vermilion County, Illinois

Common Name	Scientific Name	Live	Fresh Dead	Weathered	Subfossil	Total
Cylindrical Papershell	A. ferussacianus	3	-	2	-	5
Elktoe	A. marginata	-	-	-	3	3
Threeridge	A. plicata	-	-	-	6	6
Slippershell	A. viridis	-	-	-	1	1
Wartyback	C. pustulosa	1	-	-	2	3
Purple Wartyback	C. tuberculata	-	-	1	-	1
Spike	E. dilatata	-	-	-	1	1
Northern Riffleshell	E. rangiana	-	-	1	-	1
Wabash Pigtoe	F. flava	1	-	8	3	12
Plain Pocketbook	L. cardium	11	-	8	40	59
White Heelsplitter	L. complanata	-	-	-	1	1
Flutedshell	L. costata	1	-	-	7	8
Wavy-Rayed Lampmussel	L. fasciola	6	-	3	3	12
Fatmucket	L. siloquoidea	9	-	6	30	45
Round Hickorynut	O. subrotunda	-	-	-	1	1
Pink Heelsplitter	P. alatus	-	-	-	1	1
Kidneyshell	P. fasciolaris	-	-	-	1	1
Giant Floater	P. grandis	1	-	1	1	3
Round Pigtoe	P. sintoxia	-	-	-	1	1
Mapleleaf	Q. quadrula	-	-	-	1	1
Creeper	S. undulatus	-	-	1	3	4
Pistolgrip	T. verrucosa	-	-	-	1	1
Rainbow	V. iris	-	-	1	-	1
Little Spectaclecase	V. lienosa	-	-	-	1	1
Grand Total		**33**	**0**	**32**	**108**	**173**

*Condition as defined by ODNR and USFWS 2016

3.2.1.1 Relative Abundance and CPUE

The survey area was searched for a total of 13.3 person-hours. Live mussels or shells were found in 23 of 42 transect segments during 7.23 hours of searching. Eleven live mussels were found in 7 of 42 segments. CPUE during transect searches was 1.52 live mussels per person-hour, resulting in a species richness of seven. Live mussels were collected in each of three 2-hour qualitative searches

totaling 6.06 person-hours of surveying. CPUE for the qualitative was 3.63 mussels per hour. The three *Lampsiline* species comprised 79 percent of the total live mussel catch. In addition, *L. cardium* spent shells were extremely abundant (40 counted) along the exposed riverbanks. JThe State Endangered *L. fasciola* represented 18 percent of live mussels.

Four live mussels were found in transects 1-9, with two being in deep gravel that formed in the thalweg of transect 1. The other two live mussels were found in the gravel bar area along transects 5 and 7 respectively. Five mussels were found in transects 10-19, mainly within small flow refuges created by spilled gabion basket rip rap and boulders. Only two mussels were found in transects 20-26, both also within abnormal flow refuges uncharacteristic of the majority habitat.

3.2.1.2 Age Distribution, Reproduction, and Recruitment

A gravid female *L. fasciola* was seen displaying a lure along with exposed gravid marsupial pouches, indicating local reproduction (Appendix E). A gravid female *L. siloquoidea* was also sighted, releasing glochidia upon removal from the substrate. Despite low overall abundances, length and age (growth lines) distributions show multiple age classes for *A. ferussacianus*, *L. cardium*, *L. fasciola*, and *L. siloquoidea*, indicating local recruitment (Figure 3 & 4).

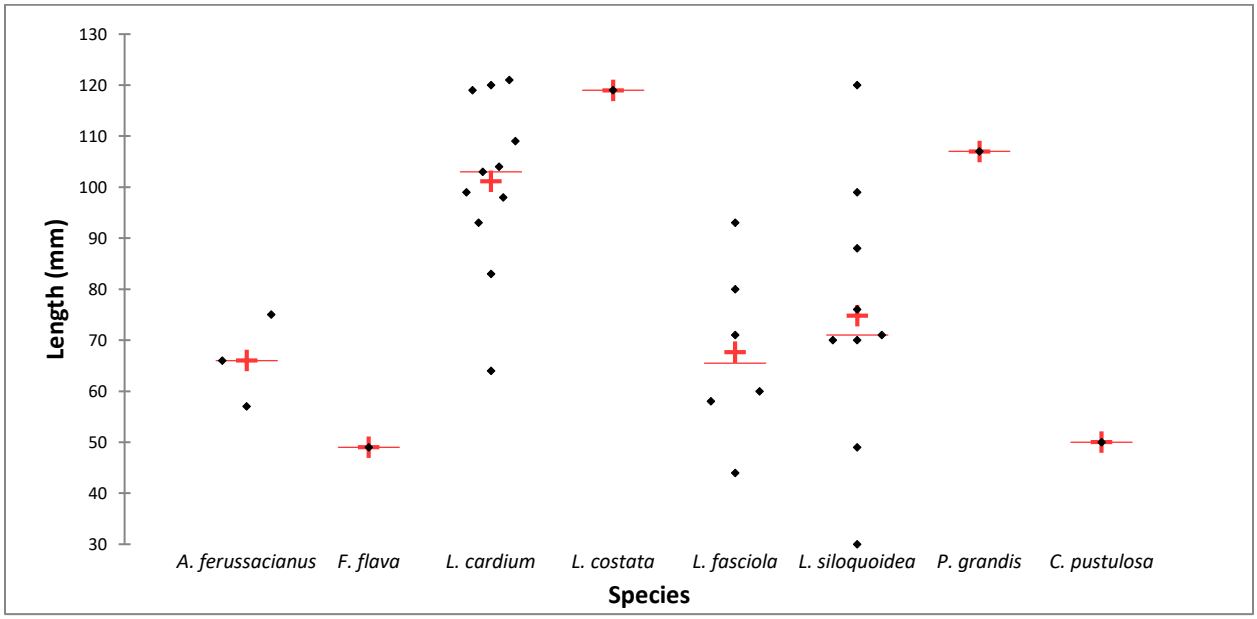

Figure 3. Length Scattergram for Live Mussels Found during Middle Fork Vermilion River Mussel Survey, Vermilion County, Illinois

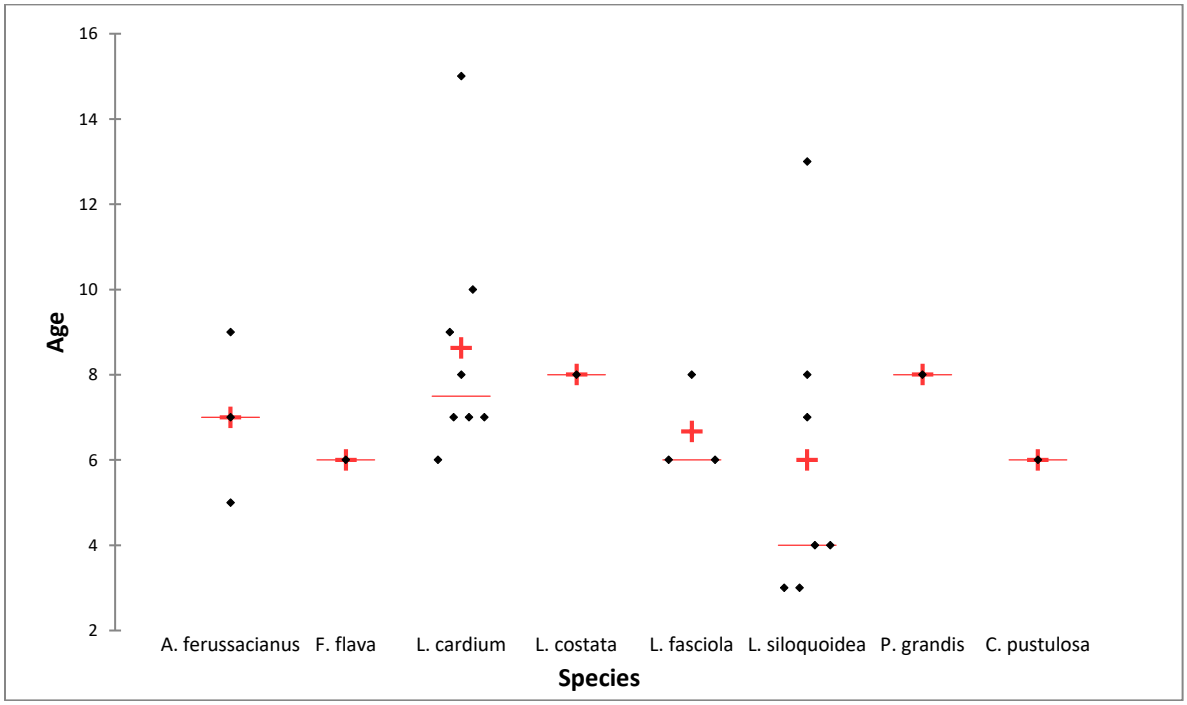

Figure 4. Age Scattergram Based on Growth Rings for Live Mussels Found during Middle Fork Vermilion River Mussel Survey, Vermilion County, Illinois

4.0 SUMMARY OF FINDINGS

The mussel survey was performed on September 16 and 17, 2018. Total search effort was approximately 13.3 person-hours. During this effort 33 live mussels were collected, measured, aged, and sexed. Total live species richness was eight. An additional 16 species were represented by spent shells. The most abundant live species were *L. cardium* (n=11), *L. siloquoidea* (n=9), and *L. fasciola* (n=6). Special status species found during the survey include live and shell specimens of *L. fasciola* (Illinois Endangered), shells of *E. rangiana* (Illinois and Federal Endangered), one shell of *V. lienosa* (Illinois Threatened), one shell of *A. viridis* (Illinois Threatened), one shell of *P. fasciolaris* (Illinois Endangered), and shells of *C. tuberculata* (Illinois Threatened).

5.0 DISCUSSION

Relatively low CPUE's were obtained during transect surveying (1.52/hr vs. 3.63/hr) compared to habitat targeted qualitative surveys. The sporadic nature of suitable mussel habitat in the shifting riverbed led to the higher CPUE's in the habitat targeted qualitative surveys. Despite low overall abundances, the Illinois Endangered *L. fasciola* represented a large portion of the local community (Table 4). Multiple age classes as well as evidence of active reproduction indicate a healthy population of *L. fasciola* in the area.

The live species richness of eight compared to the total species richness (shells and live) of 24 indicates that areas not searched during this survey can hold more diverse assemblages, or that communities upstream are much more diverse. On the other hand, the greater abundance of subfossil (n=108) to weathered (n=32) shells may indicate that stressors (geomorphic instability, water quality, etc) may have impacted local fauna. Some species of mussel are more susceptible to stressors than others and many of the live species found are more tolerant of water quality and substrate changes.

The two individual shells of *E. rangiana* indicate movement from areas of prior translocation by INHS (Tiemann et al. 2017). The presence of these shells does not necessarily indicate live populations within the project area, as shells could have drifted downstream post-mortality. *E. rangiana* has been shown to have lower survivorship following translocation relative to other endangered species (*Pleurobema clava*) (Stodola et al. 2017). The tagged individual (#1383, Appendix D) was translocated from Pennsylvania by INHS in 2014 approximately 4km upstream of where it was located during this survey (Tiemann 2018). Due to flooding in the Middle Fork Vermilion River, numerous live and dead *E. rangiana* have been found downstream of the original translocation sites (Stodola et al. 2017). The untagged *E. rangiana* shell is not believed to be an Illinois native, but instead a Pennsylvania transplant that has lost its shell (Tiemann 2018). The wear on the shell and age indicate that it is not a recruit from translocated individuals.

Fish provide an important link in the freshwater mussel life cycle as an obligate host to the parasitic larval glochidia stage. *E. camurum*, and *E. caerulum* are both reported as hosts for *E. rangiana* glochidia (Watters 1996, O'Dee & Watters 2000, McNichols 2007). *M. dolomieu* and *L. megalotis* were reported as host fish for *L. fasciola* (Zale & Neves 1982, Watters 2009). No known fish hosts for *P. clava* were observed, but it should be noted that fish were only inventoried based on incidental observation. These other fish observations indicate that conditions are favorable for the parasitic stage of both *E. rangiana* and *L. fasciola* glochidia.

The occurrence of live *L. fasciola* requires the acquisition of an Illinois Incidental Take Permit prior to any further impacts to the mussel community within the project area. This process involves the creation and public dissemination of a Conservation Plan relative to the impacts expected on state listed species. The sighting of state endangered *E. camurum* will require a similar Incidental Take Permit and Conservation Plan. The collection of shell specimens of *E. rangiana* was reported to USFWS (as required by Stantec's Federal Recovery Permit) and may require a separate incidental take authorization from USFWS under Section 7 of the Endangered Species Act.

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Appendix A AGENCY CORRESPONDENCE

From:	Grider, Nathan
To:	Fleece, Cody; Symonds, Daniel; McClelland, Michael; Stephenson, Dan
Cc:	Hoy, Matthew; Peyton, Scott; Sridhar, Paul; phil.morris@vistraenergy.com; Matthew_Mangan@fws.gov; kristen_lundh@fws.gov; Metzke, Brian; Thomas, Trent; Rawe, Adam; Kath, Joe; Rogers, Nancy S; Victor.Modeer@vistraenergy.com; Hayes, Bradley; Yockey, Louis; Cattoor, Wes; Heavisides, Tom
Subject:	RE: Middle Fork Vermilion River Freshwater Mussel Survey Study Plan - Vistra Energy River Stabilization Project
Date:	Friday, August 31, 2018 4:27:02 PM
Attachments:	sp_07162018_v5.pdf

Hi Cody,

IDNR concurs with the proposed survey as indicated in the attached revised plan for the Vistra Energy river stabilization project. We look forward to the results of the survey at your earliest convenience. My understanding is you already have a general scientific collectors permit from IDNR for this work and your T&E permit has been applied for and is in process, if not executed already.

IDNR, Fisheries: Please execute a salvage authorization for Stantec to relocate all non-listed freshwater mussels from the project impact area to upstream suitable habitat areas beyond the 100 meter buffer area. If state or federally-listed mussels are found, they will be placed back as close as possible to where they were found and IDNR, Consultation and USFWS will discuss any need for ITA with Stantec after the final survey results are received.

Please let us know if you have any questions or concerns as the survey effort commences.

Thank you!
Nathan Grider
Assistant Manager, Consultation Services
Office of Realty & Capital Planning
Illinois Dept. of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271
nathan.grider@illinois.gov
Phone: (217) 557-0483
Cell: (217) 836-7545

From: Fleece, Cody <Cody.Fleece@stantec.com>
Sent: Friday, August 31, 2018 10:59 AM
To: Grider, Nathan <Nathan.Grider@Illinois.gov>; Symonds, Daniel <Daniel.Symonds@stantec.com>
Cc: Hoy, Matthew <Matthew.Hoy@stantec.com>; Peyton, Scott <Scott.Peyton@stantec.com>; Sridhar, Paul <Paul.Sridhar@stantec.com>; phil.morris@vistraenergy.com; Matthew_Mangan@fws.gov; kristen_lundh@fws.gov; Metzke, Brian <Brian.Metzke@Illinois.gov>; McClelland, Michael <Michael.McClelland@illinois.gov>; Thomas, Trent <Trent.Thomas@Illinois.gov>; Rawe, Adam <Adam.Rawe@illinois.gov>; Stephenson, Dan <Dan.Stephenson@Illinois.gov>; Kath, Joe <Joe.Kath@Illinois.gov>; Rogers, Nancy S <Nancy.S.Rogers@Illinois.gov>; Victor.Modeer@vistraenergy.com; Hayes, Bradley

<Bradley.Hayes@illinois.gov>
Subject: [External] RE: Middle Fork Vermilion River Freshwater Mussel Survey Study Plan

Nathan

Please see our revised study plan.

Let me know if you have questions, comments, or concerns.

Thanks for your time and attention

Cody
513-262-3994

From: Grider, Nathan <Nathan.Grider@Illinois.gov>
Sent: Wednesday, August 29, 2018 3:52 PM
To: Fleece, Cody <Cody.Fleece@stantec.com>; Symonds, Daniel <Daniel.Symonds@stantec.com>
Cc: Hoy, Matthew <Matthew.Hoy@stantec.com>; Peyton, Scott <Scott.Peyton@stantec.com>; Sridhar, Paul <Paul.Sridhar@stantec.com>; phil.morris@vistraenergy.com; Matthew_Mangan@fws.gov; kristen_lundh@fws.gov; Metzke, Brian <Brian.Metzke@Illinois.gov>; McClelland, Michael <Michael.McClelland@illinois.gov>; Thomas, Trent <Trent.Thomas@Illinois.gov>; Rawe, Adam <Adam.Rawe@illinois.gov>; Stephenson, Dan <Dan.Stephenson@Illinois.gov>; Kath, Joe <Joe.Kath@Illinois.gov>; Rogers, Nancy S <Nancy.S.Rogers@Illinois.gov>; Victor.Modeer@vistraenergy.com; Hayes, Bradley <Bradley.Hayes@illinois.gov>
Subject: RE: Middle Fork Vermilion River Freshwater Mussel Survey Study Plan

Hi Cody,

I discussed the proposed change with our staff and we think the current proposal with our suggested modifications per the email below on 8/24/18 will provide the best coverage of the area and ability to detect rare species. Thus, we do not concur with switching away from the transect method to qualitative timed searches.

Please let me know if you have further questions or concerns.

Thank you!
Nathan Grider
Assistant Manager, Consultation Services
Office of Realty & Capital Planning
Illinois Dept. of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271
nathan.grider@illinois.gov
Phone: (217) 557-0483
Cell: (217) 836-7545

From: Fleece, Cody [mailto:Cody.Fleece@stantec.com]
Sent: Wednesday, August 29, 2018 6:25 AM
To: Grider, Nathan <Nathan.Grider@Illinois.gov>; Symonds, Daniel <Daniel.Symonds@stantec.com>
Cc: Hoy, Matthew <Matthew.Hoy@stantec.com>; Peyton, Scott <Scott.Peyton@stantec.com>; Sridhar, Paul <Paul.Sridhar@stantec.com>; phil.morris@vistraenergy.com; Matthew_Mangan@fws.gov; kristen_lundh@fws.gov; Metzke, Brian <Brian.Metzke@Illinois.gov>; McClelland, Michael <Michael.McClelland@illinois.gov>; Thomas, Trent <Trent.Thomas@Illinois.gov>; Rawe, Adam <Adam.Rawe@illinois.gov>; Stephenson, Dan <Dan.Stephenson@Illinois.gov>; Kath, Joe <Joe.Kath@Illinois.gov>; Rogers, Nancy S <Nancy.S.Rogers@Illinois.gov>; Victor.Modeer@vistraenergy.com
Subject: [External] RE: Middle Fork Vermilion River Freshwater Mussel Survey Study Plan

Nathan

Thanks for taking time to discuss our proposed study plan. I am writing to propose modifications to the sample design you proposed below. As we discussed on the phone, I think we might be more productive if we switched away from the transect method to qualitative sampling (e.g., timed searches) given the relative small size of the stream. Instead we propose to divide the stream into 100 meter reaches for a total of seven in the direct disturbance area. One reach will be placed upstream of the project reach and two will be placed downstream. Two hour timed searches will be conducted in each reach. If state or federally listed taxa are detected we will conduct quantitative sampling in the highest quality habitats. A minimum of twenty quadrats will be excavated in each search area where special status taxa are detected.

If these changes are acceptable to you we will revise the study plan and submit it for your approval.

Thanks for your time and attention.

Cody

From: Grider, Nathan <Nathan.Grider@Illinois.gov>
Sent: Monday, August 27, 2018 10:16 AM
To: Fleece, Cody <Cody.Fleece@stantec.com>; Symonds, Daniel <Daniel.Symonds@stantec.com>
Cc: Hoy, Matthew <Matthew.Hoy@stantec.com>; Peyton, Scott <Scott.Peyton@stantec.com>; Sridhar, Paul <Paul.Sridhar@stantec.com>; victor.modder@vistraenergy.com; phil.morris@vistraenergy.com; Matthew_Mangan@fws.gov; kristen_lundh@fws.gov; Metzke, Brian <Brian.Metzke@Illinois.gov>; McClelland, Michael <Michael.McClelland@illinois.gov>; Thomas, Trent <Trent.Thomas@Illinois.gov>; Rawe, Adam <Adam.Rawe@illinois.gov>; Stephenson, Dan <Dan.Stephenson@Illinois.gov>; Kath, Joe <Joe.Kath@Illinois.gov>; Rogers, Nancy S <Nancy.S.Rogers@Illinois.gov>
Subject: RE: Middle Fork Vermilion River Freshwater Mussel Survey Study Plan

Hi Cody,

We are proposing the qualitative effort in addition to the transects and quantitative effort. Let me know if you have further questions or need further clarification.

Thanks
Nathan Grider
Assistant Manager, Consultation Services
Office of Realty & Capital Planning
Illinois Dept. of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271
nathan.grider@illinois.gov
Phone: (217) 557-0483
Cell: (217) 836-7545

From: Fleece, Cody [mailto:Cody.Fleece@stantec.com]
Sent: Friday, August 24, 2018 7:31 PM
To: Grider, Nathan <Nathan.Grider@Illinois.gov>; Symonds, Daniel <Daniel.Symonds@stantec.com>
Cc: Hoy, Matthew <Matthew.Hoy@stantec.com>; Peyton, Scott <Scott.Peyton@stantec.com>; Sridhar, Paul <Paul.Sridhar@stantec.com>; victor.modder@vistraenergy.com; phil.morris@vistraenergy.com; Matthew_Mangan@fws.gov; kristen_lundh@fws.gov; Metzke, Brian <Brian.Metzke@Illinois.gov>; McClelland, Michael <Michael.McClelland@illinois.gov>; Thomas, Trent <Trent.Thomas@Illinois.gov>; Rawe, Adam <Adam.Rawe@illinois.gov>; Stephenson, Dan <Dan.Stephenson@Illinois.gov>; Kath, Joe <Joe.Kath@Illinois.gov>; Rogers, Nancy S <Nancy.S.Rogers@Illinois.gov>
Subject: [External] RE: Middle Fork Vermilion River Freshwater Mussel Survey Study Plan

Nathan

Thanks for your feedback. Most of the requested modifications will be easily incorporated.

One quick question – we proposed to conduct quantitative sampling if a density trigger was exceeded. You proposed qualitative sampling in your prior message. Was qualitative sampling proposed as "in addition to" or "in lieu" of quantitative sampling?

Thank you!

Cody

From: Grider, Nathan <Nathan.Grider@Illinois.gov>
Sent: Friday, August 24, 2018 4:59 PM
To: Symonds, Daniel <Daniel.Symonds@stantec.com>
Cc: Fleece, Cody <Cody.Fleece@stantec.com>; Hoy, Matthew <Matthew.Hoy@stantec.com>; Peyton, Scott <Scott.Peyton@stantec.com>; Sridhar, Paul <Paul.Sridhar@stantec.com>; victor.modder@vistraenergy.com; phil.morris@vistraenergy.com; Matthew_Mangan@fws.gov; kristen_lundh@fws.gov; Metzke, Brian <Brian.Metzke@Illinois.gov>; McClelland, Michael <Michael.McClelland@illinois.gov>; Thomas, Trent <Trent.Thomas@Illinois.gov>; Rawe, Adam <Adam.Rawe@illinois.gov>; Stephenson, Dan <Dan.Stephenson@Illinois.gov>; Kath, Joe

<Joe.Kath@Illinois.gov>; Rogers, Nancy S <Nancy.S.Rogers@Illinois.gov>
Subject: RE: Middle Fork Vermilion River Freshwater Mussel Survey Study Plan

Hello Mr. Symonds,

Thank you for providing the survey proposal for our review. We have gathered and condensed comments internally and provide them below:

1. You will need a valid Scientific Collector permit and permit to 'potentially' handle T&E species issued by IDNR. Perhaps you already have one and I missed it in the proposal? If not, you can apply for them here: https://www.dnr.illinois.gov/conservation/NaturalHeritage/Pages/ResearchPermits.aspx

2. We will need to issue a salvage authorization from Fisheries for the non-listed relocation to upstream habitats. We will get that going once we have final concurrence from you on our comments.

3. You mention reporting the species, gender, and length measurement of each mussel. In addition we request age (number of growth rings) and transect or quadrat location where they were found to help interpret richness and abundance in the area.

4. We request the transect lengths be reduced to the midpoint of the river, but doubled in number to 26 to improve detection and focus in the impact area (essentially the same person effort). After the transects, a qualitative survey should commence (excluding the transects already surveyed). Qualitative survey effort should be broken into 2 person/hour periods. After each 2 hour period mussels would be processed. If new species are found during the 2 hour survey period, the survey effort would continue for another 2 hour period until no new species are found.

5. The upstream buffer area can be reduced to 100 meters to focus effort and save time, but the downstream buffer of 300 should remain the same to help fully consider downstream impacts from the streambank work.

6. In reporting, we also request the "raw data" in a clean table format as an attachment with information in #3 above included and any other relevant information collected.

Let us know if you have any questions or concerns with these requested changes. We will wait for your response to finalize the salvage authorization with Fisheries and verify the IDNR permit needs. The project should conclude before October 15, or before water temperatures drop below 59°F.

Thank you
Nathan Grider
Assistant Manager, Consultation Services
Office of Realty & Capital Planning
Illinois Dept. of Natural Resources

One Natural Resources Way
Springfield, IL 62702-1271
nathan.grider@illinois.gov
Phone: (217) 557-0483
Cell: (217) 836-7545

From: Symonds, Daniel [mailto:Daniel.Symonds@stantec.com]
Sent: Monday, August 6, 2018 3:46 PM
To: Grider, Nathan <Nathan.Grider@Illinois.gov>
Cc: Fleece, Cody <Cody.Fleece@stantec.com>; Hoy, Matthew <Matthew.Hoy@stantec.com>; Peyton, Scott <Scott.Peyton@stantec.com>; Sridhar, Paul <Paul.Sridhar@stantec.com>; victor.modder@vistraenergy.com; phil.morris@vistraenergy.com; Matthew_Mangan@fws.gov; kristen_lundh@fws.gov
Subject: [External] Middle Fork Vermilion River Freshwater Mussel Survey Study Plan

Dear Mr. Grider,

Attached for your approval is our study plan for a mussel survey on the Middle Fork Vermilion River. Let us know if you have any questions.

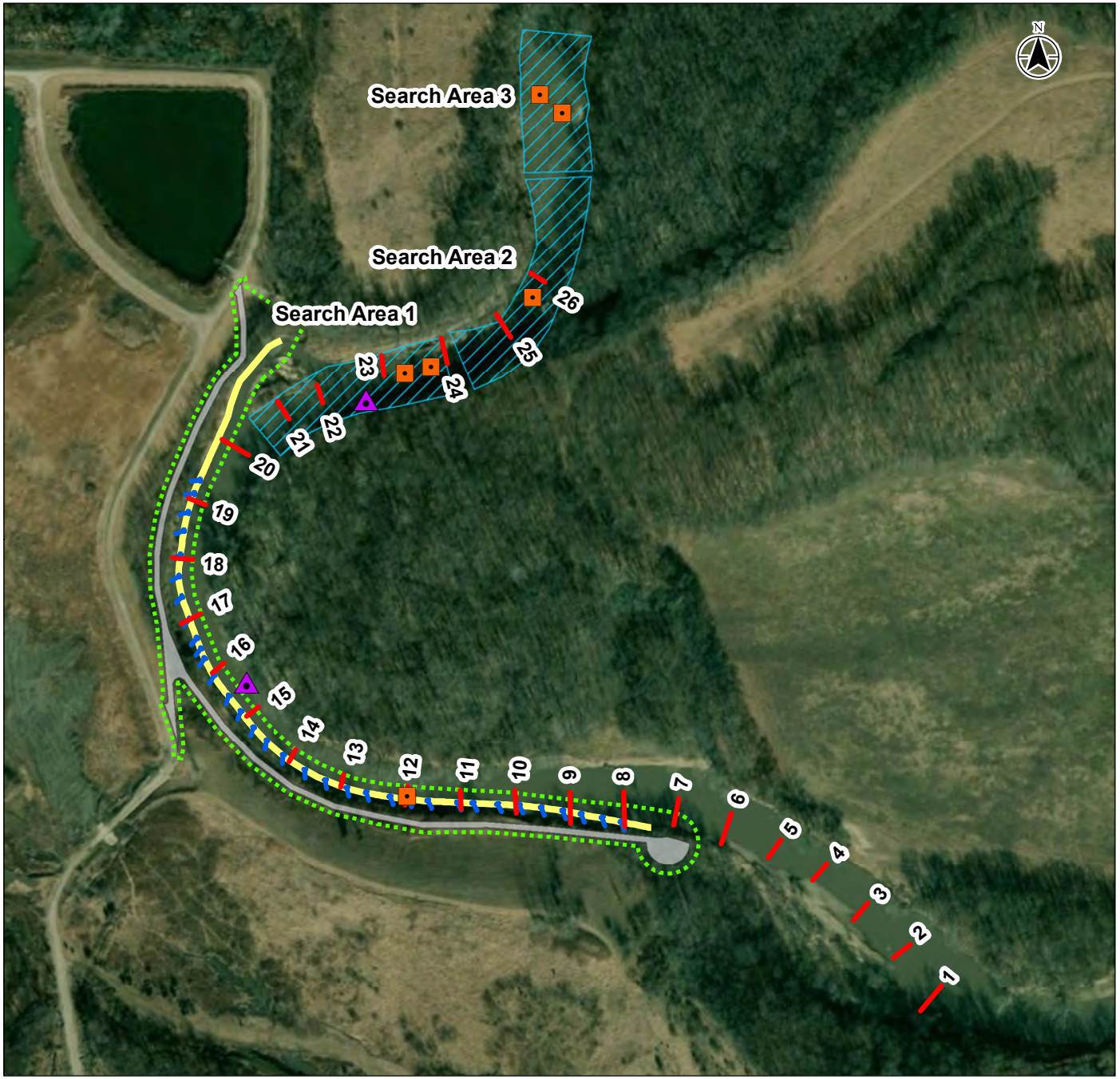
Thank you,
Dan Symonds

Daniel Symonds
Aquatic Ecologist

Direct: 614 643-4363
Daniel.Symonds@stantec.com

Stantec
1500 Lake Shore Drive Suite 100
Columbus OH 43204-3800 US

Appendix B FIGURES



Stantec

VISTRA ENERGY

Legend

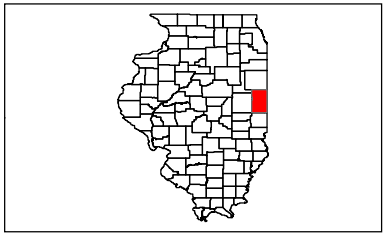
- *Lampsilis fasciola*
- *E. torulosa rangiana*
- Transects
- Root Wad
- Stone Toe Protection
- Limits of Construction
- Access Road
- Search Area

0 275 550 Feet

1:5,500 (At original document size of 8.5x11)

Notes

1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
2. Base Imagery: ESRI Map Services.



Project Location
Oakwood, IL
Vermilion Co.

123456789
Prepared by EKD on 2018-09-28
Technical Review by WCF on 2018-09-30
Independent Review by DS on 2018-10-01

Client/Project
Vistra Energy
Middle Fork Vermilion River
Erosion Mitigation and Riverbank Stabilization

Figure No.
1

Title
Freshwater Mussel Survey

Appendix C SITE PHOTOGRAPHS

Photo 1. Transect #1 looking downstream outside of project area.

Photo 2. Transect 1 looking upstream towards transects 2-4.

Photo 3. Transect 6 looking downstream.

Photo 4. Transect 6 looking upstream.

Photo 5. Transect 9 west bank.

Photo 6. Riverbank at Transect 10.

Photo 7. Transect 11 looking downstream.

Photo 8. Transect 11 looking upstream at west bank.

Photo 9. Transect 12 looking upstream.

Photo 10. Transect 12 on right descending (west) bank.

Photo 11. Transect 13 looking upstream. Tagged *E. rangiana* shell was found near sandbar on right hand side of photo.

Photo 12. Transect 15, right descending (west) bank.

Photo 13. Transect 16 looking upstream.

Photo 14. Transect 20 looking downstream.

Photo 15. Transect 20 looking upstream.

Photo 16. Transect 21 looking upstream.

Photo 17. *Percina sciera* (Dusky Darter)

Photo 18. *Nocomis biguttatus* (Hornyhead Chub)

Photo 19. *Etheostoma caeruluem* (Rainbow Darter)

Photo 20. *Etheostoma flabellare*(Fantail Darter)

Photo 21. *Micropterus dolomieu* (Smallmouth Bass)

Appendix D SPECIMEN PHOTOGRAPHS

Photo 1. *Anodontoides ferussacianus* (Cylindrical Papershell)

Photo 2. *Lasmigona costata* (Flutedshell)

Photo 3. *Lampsilis siloquoidea* (Fatmucket)

Photo 4. *Fusconaia flava* (Wabash Pigtoe)

Photo 5. *Lampsilis fasciola* (Wavyrayed Lampmussel)

Photo 6. *Pyganodon grandis* (Giant Floater)

Photo 7. *Lampsilis cardium* (Plain Pocketbook)

Photo 8. *Cyclonaias pustulosa* (Wartyback)

Photo 9. *Epioblasma rangiana* (Northern Riffleshell) shell

Photo 10. *Epioblasma rangiana* (Northern Riffleshell) shell

Photo 11. *Epioblasma rangiana* (Northern Riffleshell) shell

Photo 12. *Epioblasma rangiana* (Northern Riffleshell) shell

Photo 13. *Cyclonaias tuberculata* (Purple Wartyback) shell

Photo 14. *Lampsilis fasciola* marsiupia and lure

Appendix E ILLINOIS AND FEDERAL COLLECTING PERMITS

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Authorization is hereby granted, under Section 5/3.22, Chapter 520, Section 5/20-100, Chapter 515 and Section 68/40-5, Chapter 510 of the Illinois compliled Statues to:

Last Name: **Fleece** First Name: **Cody** Permit Number: **NH18.6234**

Issued: **8/8/2018** **Expires: 12/31/2018**

Business Name: Stantec Consulting Services, Inc.

Street Address: 11687 Lebanon Road

City: Cincinnati State: OH Zip Code: 45241

for strictly scientific, educational or zoological purposes, to take the Illinois fauna identified below subject to the following provisions:

As this is a new permit, the applicant appears to meet the minimum requirements and there are no known issues with previous permits or the applicant, I would recommend approving with the following provisions:
Applicant and all individuals listed may legally capture, handle, collect data and/or obtain biological samples, by scientifically accepted and approved methods, for projects and species listed below [as listed on the accompanying Illinois Department of Natural Resources (IDNR) scientific permit application/project proposal (on file in Springfield, IL) strictly for scientific, educational and/or zoological purposes]. Permitted activities include: may conduct survey for non-listed mussel species by hand, handling for identification and data collection. All individuals will be released unharmed at or near the original site of capture immediately upon completion of data collection. Possession of a valid scientific collection permit does not grant access for permitted activities as other permits may be required. A federal permit is required for all projects involving federally regulated species, including migratory birds. If species listed as endangered and threatened under Illinois Administrative Code Title 17: Chapter 1, Part 1010 (https://www.dnr.illinois.gov/ESPB/Pages/default.aspx) are incidentally captured and handled during the permitted activity, the occurrence needs to be documented (preferably with photographs of diagnostic characteristics and geographic location) and reported via email to Tara Kieninger at: tara.kieninger@illinois.gov within (1) week. The specimen cannot be removed and should be released on site immediately. Intentional capture, handling and/or collection of endangered or threatened species require prior approval and possession of an Endangered or Threatened Species Permit. Any permitted activities conducted on State-owned properties require prior approval and possession of an IDNR Research / Site Permit. Any permitted activities conducted on sites Dedicated or Registered through the Illinois Nature Preserves Commission require prior approval and possession of an INPC Research Permit. Applicants must utilize appropriate decontamination procedures to prevent the spread of disease between individuals and sites and every effort should be made to prevent the spread of exotic or invasive plants/plant propagules.
Authorization: Vermillion county
Individuals working under direction of applicant include: Daniel Symonds, Dillon McNulty, Kari Soltau

Special disinfection guidelines for aquatic environments (minimum requirements):
Upon completion and prior to initiation of work at a new site, all equipment and personal gear used should be rinsed with water to remove mud and debris and then a 3% solution of household bleach should be applied by either dipping (for one minute) or spraying onto all surfaces exposed to water. Disinfection procedures must be conducted in an environmentally appropriate setting (off-site, gravel parking lot, etc.). Equipment not reused immediately may also be air dried for a period of greater than two weeks as an alternative measure to deactivate pathogens.

I agree to the following provisions and terms of this Scientific Permit.

Permittee's Signature: _____ Approved By: _____ Date: 8/10/18

(Permit not valid unless signed) Office of Resource Conservation

TERMS FOR SCIENTIFIC PERMIT

1. Under no circumstances shall a scientific permit be used in lieu of sport or commercial licenses.
2. All taking shall be performed by or under the direct supervision of the permittee. Permitte must be present with persons involved in actual taking.
3. All gear left unattended must be tagged bearing name and scientific permit number of permittee.
4. Permittee must be at least eighteen (18) years of age.
5. Permits are not transferable and PERMITTE SHALL CARRY PERMIT AT ALL TIMES WHEN TAKING FAUNA.
6. Agency, company or institution listed on the application is responsible for the taking activities and reports of the individual issued this permit
7. Scientific permits will not be valid for taking any species appearing on official State List of Endangered and Threatened Vertebrate Species of Illinois (see attached Administrative Rule, Part 1010) without specific written approval from the Department of Natural Resources.
8. A federal Permit is required for the taking of species protected by the Federal Government in addition to the State Scientific Permit.
9. The Division of Wildlife Resources may require special conditions or provsions on any Scientific Permit.
10. Use of rotenone or any other toxic materials for taking must have special written approval from the Department of Natural Resources and may need a variance from the Illinois Environmental Protection Agency.

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Authorization is hereby granted, under Section 5/3.22, Chapter 520, Section 5/20-100, Chapter 515 and Section 68/40-5, Chapter 510 of the Illinois compliled Statues to:

11. By january 31 of next year, an annual report of the permittee's activies must be submitted to the Division of Wildlife Resources. In addition, the permittee shall submit a copy of all written reports, etc. that result from the permitted activity. Permits will be renewed after these annual reports and appropriate publications have been received.
12. Any permit may be revoked or suspended at any time by the Department of Natural Resources.
13. Permits expire December 31 each calendar year unless otherwise specified.

The Department of Natural Resources is an equal opportunity employer.

ILLINOIS
NATURAL RESOURCES

Illinois Department of
Natural Resources

One Natural Resources Way Springfield, Illinois 62702-1271
www.dnr.illinois.gov

Bruce Rauner, Governor
Wayne A. Rosenthal, Director

Dear Scientific Permit Holder:

Enclosed is your Scientific Permit which is issued in accordance with Section 520:5/3.22 of the Illinois Wildlife Code, and Section 515:5/20-100 of the Illinois Fish Code. It authorizes, strictly for Scientific or salvage purposes, the taking of Illinois fauna by methods or in quantities otherwise prohibited by these Codes, or other Federal or State Statutes that may apply. Failure to comply with the provisions of this permit will lead to its revocation.

Records of all specimens taken will be maintained and shall be made available by the permittee for inspection at all reasonable hours by an authorized Department person. By January 31, 2019, an annual report of your activities must be submitted to the Department of Natural Resources, Office of Resource Conservation, on the enclosed form. In addition, the permittee shall submit one copy of all written reports, including but not limited to, research papers, theses progress reports, publications, and environmental assessment reports that result from the permitted activity. Permits will be renewed only after the annual report and appropriate publications have been received.

Please read the terms of your Scientific Permit closely and note that it will expire on December 31, 2018. It is important that you adhere to the species and methods listed on the Permit.

Sincerely,

Christopher L. Young, Director
Office of Resource Conservation

CLY:clr

Illinois Department of
Natural Resources
One Natural Resources Way Springfield, Illinois 62702-1271
www.dnr.illinois.gov

Bruce Rauner, Governor
Wayne A. Rosenthal, Director

ANNUAL SCIENTIFIC PERMIT REPORT

Scientific Permit Number _____ Year of Report _____

Name of Permit Holder _____

Street Address _____

City _____ State _____ Zip _____

Day Time Phone Number _____

Federal Permit Number (if applicable) _____

Have you attached any publications or reports that involved the use of this permit? Yes ____ No ____

If your permit is expiring, do you wish to have it renewed? Yes _____ No _____

I hereby certify that all statements in this report are correct to the best of my knowledge.

Permit Holder Signature: _____ Date: _____

Mail Annual Report to : Illinois Department of Natural Resources
ORC – Scientific Permits
One Natural Resources Way
Springfield, IL 62702-1271

Species Handled	Number	Origin of Specimen	Disposition (released, destroyed, donated to what institution)

Species Handled	Number	Origin of Specimen	Disposition (released, destroyed, donated to what institution)

FOR OFFICE USE ONLY

Route File and Report to: Natural Heritage _____

Wildlife _____

Fisheries _____

Date Routed: _____

Approved by: _____

(515 ILCS 5/20-100) (from Ch. 56, par. 20-100)
Scientific collector's permit

Sec. 20-100. Scientific collector's permit. Permits may be granted by the Department to properly accredited individuals of the age of 18 years and older permitting the collection for strictly scientific purposes of any aquatic life protected under this Code, and their nests, eggs, and spawn.

The application for a permit for scientific purposes shall be subject to the approval of the Department.

The holder of each scientific collector's permit shall make reports to the Department as required.
(Source: P.A. 89-66, eff. 1-1-96.)

(515 ILCS 5/20-105) (from Ch. 56, par. 20-105)
Sec. 20-105. Revocation and suspension; refusal to issue.

(a) Whenever a license or permit is issued to any person under this Code and its holder is found guilty of any misrepresentation in obtaining the license or permit or of a violation of any of the provisions of this Code, including administrative rules, the license or permit may be revoked by the Department and the Department may refuse to issue any permit or license to that person and may suspend the person from engaging in the activity requiring the permit or license for a period of time not to exceed 5 years following the revocation. Department revocation procedure shall be established by administrative rule.

(b) Whenever any person who has not been issued a license or a permit under the provisions of this Code is found guilty of a violation of the provisions of this Code, including administrative rules, the Department may refuse to issue any permit or license to that person, and suspend that person from engaging in the activity requiring the permit or license for a period of time not to exceed 5 years.

(c) Any person who knowingly or intentionally violates any of the provisions of this Code, including administrative rules, during the 5 years following the revocation of his or her license or permit under subsection (a) or during the time he is suspended under subsection (b), shall be guilty of a Class A misdemeanor as provided in Section 20-35.

(d) A person whose license or permit to engage in any activity regulated by this Code has been suspended or revoked may not, during the period of the suspension or revocation or until obtaining such a license or permit, (i) be in the company of any person engaging in the activity covered by the suspension or revocation or (ii) serve as a guide, outfitter, or facilitator for a person who is engaged or prepared to engage in the activity covered by the suspension or revocation.

(e) No person may be issued or obtain a license or permit or engage in any activity regulated by this Code during the time that the person's privilege to engage in the same or similar activities is suspended or revoked by another state, by a federal agency, or by a province of Canada.
(Source: P.A. 91-545, eff. 8-14-99.)

(515 ILCS 5/20-110) (from Ch. 56, par. 20-110)
Possession of license, permit, or stamp.

Sec. 20-110. Possession of license, permit, or stamp. Every person holding any license, salmon stamp, inland trout stamp, or permit issued under this Code shall have it in his or her possession for immediate presentation for inspection to the authorized employees of the Department, or to any sheriff, deputy sheriff, or any other peace officer, making a demand for it within his or her jurisdiction.
(Source: P.A. 87-833; 88-91.)

(520 ILCS 5/2.1) (from Ch. 61, par. 2.1)
Ownership

Sec. 2.1. The ownership of and title to all wild birds and wild mammals within the jurisdiction of the State are hereby declared to be in the State, and no wild birds or wild mammals shall be taken or killed, in any manner or at any time, unless the person or persons so taking or killing the same shall consent that the title thereto shall be and remain in the State for the purpose of regulating the taking, killing, possession, use, sale and transportation thereof, after such taking or killing, as hereinafter set forth. The taking or killing of wild birds or wild mammals at any time, in any manner, and by any person, shall be deemed a consent on the part of such person that the title to such wild birds or wild mammals shall remain in the State for the purpose of regulating the possession, use, sale and transportation thereof.

The regulation and licensing of the taking of wildlife in Illinois are exclusive powers and functions of the State. A home rule unit may not regulate or license the taking of wildlife. This Section is a denial and limitation of home rule powers and functions under subsection (h) of Section 6 of Article VII of the Illinois Constitution.
(Source: P.A. 87-296.)

(520 ILCS 5/3.22) (from Ch. 61, par. 3.22)
Permits to capture, band or collect.

Sec. 3.22. Permits may be granted by the Department to any properly accredited person at least 18 years of age, permitting the capture, banding or collecting (including nests, eggs or young), for strictly scientific purposes, of any of the fauna now protected under this Code. A special salvage permit may be granted to qualified individuals at least 15 years of age for the purpose of salvaging dead or crippled wildlife species protected by this Act for permanent donation to bona fide public or state scientific, educational or zoological institutions or, for the purpose of rehabilitation and subsequent release to the wild, or other disposal as directed by the Department. The application for such a permit shall be approved by the Department.

The holder of each such permit shall make to the Department, within 30 days after the expiration of his or her permit, a report in writing upon blanks furnished by the Department. Such report shall show the name and address of all persons from whom specimens were received, the kinds of specimens taken, disposition made of same, and any other information which the Department may consider necessary.
(Source: P.A. 85-150.)

(520 ILCS 5/3.36) (from Ch. 61, par. 3.36)
Sec. 3.36. Revocation and suspension.

(a) Whenever a license or permit is issued to any person under this Act, and the holder thereof is found guilty of any misrepresentation in obtaining such license or permit or of a violation of any of the provisions of this Act, including administrative rules, his license or permit may be revoked by the Department, and the Department may refuse to issue any permit or license to such person and may suspend the person from engaging in the activity requiring the permit or license for a period of time not to exceed 5 years following such revocation.

Department revocation procedures shall be established by Administrative rule.

(b) Whenever any person who has not been issued a license or a permit under the provisions of this Code is found guilty of a violation of the provisions of this Code, including administrative rules, the Department may refuse to issue any permit or license to that person, and suspend that person from engaging in the activity requiring the permit or license for a period of time not to exceed 5 years.

(c) Any person who knowingly or intentionally violates any of the provisions of this Act, including administrative rules, during such period when his license or permit is revoked or denied by virtue of this

Section or during the time he is suspended under subsection (b), shall be guilty of a Class A misdemeanor.

(d) Licenses and permits authorized to be issued under the provisions of this Act shall be prepared by the Department and be in such form as prescribed by the Department. The information required on each license shall be completed thereon by the issuing agent or his sub-agent at the time of issuance and each license shall be signed by the licensee, or initialed by the designated purchaser and then signed immediately upon receipt by the licensee, and countersigned by the issuing agent or his sub-agent at the time of issuance. All such licenses shall be supplied by the Department, subject to such rules and regulations as the Department may prescribe. Any license not properly prepared, obtained and signed as required by this Act shall be void.

(e) A person whose license or permit to engage in any activity regulated by this Code has been suspended or revoked may not, during the period of the suspension or revocation or until obtaining such a license or permit, (i) be in the company of any person engaging in the activity covered by the suspension or revocation or (ii) serve as a guide, outfitter, or facilitator for a person who is engaged or prepared to engage in the activity covered by the suspension or revocation.

(f) No person may be issued or obtain a license or permit or engage in any activity regulated by this Code during the time that the person's privilege to engage in the same or similar activities is suspended or revoked by another state, by a federal agency, or by a province of Canada.

(Source: P.A. 90-225, eff. 7-25-97; 91-545, eff. 8-14-99.)

TITLE 17: CONSERVATION
CHAPTER 1: DEPARTMENT OF NATURAL RESOURCES
SUBCHAPTER b: FISH AND WILDLIFE

PART 520
SCIENTIFIC PERMITS

Section

AUTHORITY: Implementing and authorized by Sections 1-120, 1-135 and 20-100 of the Fish and Aquatic Life Code [515 ILCS 5/1-120, 1-135, 20-100] and Sections 1.2, 1.3, 2.1, 2.4, 3.22, and 3.26 of the Wildlife Code [520 ILCS 5/1.2, 1.3, 2.1, 2.4, 3.22 and 3.26].

SOURCE: Adopted and codified at 7 Ill. Reg. 1236, effective January 26, 1983; amended at 12 Ill. Reg. 1815, effective December 31, 1987; amended at 14 Ill. Reg. 10811, effective June 20, 1990; recodified by changing the agency name from Department of Conservation to Department of Natural Resources at 20 Ill. Reg. 9389.

Section 520.10 Purpose

The following rules and regulations have been established to govern the taking and/or possession of Illinois Fauna (protected under 515 ILCS 5/2-25 and 520 ILCS 5/2.2) for scientific purposes and the issuance of said permits for such activities.

Section 520.20 Requirements and Application

Any person who wishes to take or salvage Illinois fauna for scientific purposes must obtain and possess a valid scientific permit from the Department.

a) To be eligible for a scientific permit for scientific research the applicant must be:

1) 18 years of age, and

2) Engaged in scientific research which may include, but not necessarily limited to, research sponsored by universities and/or colleges.

b) To be eligible for a scientific permit for salvage and subsequent rehabilitation of

crippled fauna the applicant must be or have:

1) 15 years of age,

2) A salvage permit the previous year or submit a reference statement from a licensed veterinarian, zoological curator, conservation police officer or a Department of Natural Resources Wildlife Resources, Natural Heritage, or Fisheries biologist as appropriate stating that the applicant has experience in treating and handling wild animals and
has facilities available to treat, care for and produce self-dependent fauna for release to the wild, and

3) Public or state scientific, educational or zoological institutions available which will take dead and/or permanently disabled fauna.

c) Application for scientific permit shall be made on forms provided by the Department's Division of Wildlife Resources and may be obtained by submitting a request to the Division at Lincoln Tower Plaza, 524 South Second St., Springfield, Ill. 62706.

d) Scientific permits will be issued by the Department provided the applicant has met the eligibility requirements as per this section and the application form has been completed and project description meets the criteria of 520.30.

e) Final judgment of applications will be made by the Chief, Division of Wildlife Resources on Wildlife permits; by the Chief, Division of Fisheries on Fisheries permits; and by the Chief, Division of Natural Heritage on Heritage permits based on the criteria contained in Section 520.20(d).

f) The taking of migratory or other species protected by Federal regulations must be approved by the U.S. Department of Interior after the Scientific Permit for Illinois is approved. The only exception to this is banding permits which will be issued only after issuance of a Federal permit. The taking of any endangered or threatened species must be done with concurrence of the Endangered Species Program Coordinator and, for taking of Federally listed species, the U.S. Department of the Interior.

(Source: Amended at 12 Ill. Reg. 1815, effective December 31, 1987)

Section 520.30 General Provisions

a) Permanent employees of state or federal conservation agencies, universities or other

scientific institutions (such as government museums and laboratories) shall be issued a scientific permit valid for the term of their employment, as long as that person continues to submit, by January 31 of each year, an annual report of the past year's activities. Scientific permits for persons not employed by an above referenced organization will be issued on an annual basis and will expire on December 31.

b) The scientific permit is valid for only the approved type of research and/or salvage stated on the permit. Under no circumstances shall a scientific permit be used in lieu of sport or commercial licenses.

c) Permittee's method of taking fauna must be approved by the Department. Approved methods include but are not limited to, seines, electro-fishing, nets, hand, snap traps, live traps and foot-hold traps. All devices used for taking, which are left unattended, must have the permittee's name, address and scientific permit number visible on them.

d) Taking and/or salvage of fauna shall be performed by or under the direct supervision of the permittee. Permittee must be present with person involved in actual taking of fauna.

e) Taking and/or salvage of fauna is only allowed in areas designated on the permit.

f) Taking and/or salvage of fauna on private properties requires oral or written landowner's permission. This permit does not allow the privilege of trespass.

g) Taking and/or salvage of fauna on state owned or managed lands is not permitted without the prior approval of the Site Superintendent.

h) The scientific permit must be carried on the person at all times when taking specimens and be presented, upon request, to Department personnel.

i) Fauna taken and/or salvaged and rehabilitated must be released to the wild or permanently donated to a public or state scientific educational or zoological institution.

j) Permittee is responsible for the taking activities and report of the individual issued the permit Permittee must maintain a record of all specimens taken and shall present such record upon request to Department personnel.

k) Permittee by January 31 of the next year shall submit an annual report to the Department of the past year's activities on forms provided by the Department, and mailed to address referred to in (Section 520.20 (c)). The permittee shall also

provide the Department (2) two copies of all written reports resulting from the permitted activities. Permits will be renewed only after copies of the annual report and all written reports have been received by the Department.

l) A scientific permit does not release the permittee from other provisions of the Ill. Adm. Code nor from Federal or State Statutes and does not supersede Federal permits.

m) Any person using rotenone or other toxic materials for taking of fauna must notify the Department prior to using such materials, and may need a variance from the Illinois Environmental Protection Agency.

(Source: Amended at 14 Ill. Reg. 10811, effective June 20, 1990)

Section 520.40 Renewal

Renewal of current permits, which require more than one year to complete the project, require the permittee to submit an annual report as prescribed in Section 520.30(j). Failure to provide these reports by March 31 will result in denial of subsequent renewal requests by the permittee.

Section 520.50 Revocation and Suspension of Permits - Hearings and Appeals

In accordance with Section 5.19 of the Fish Code and Section 3.36 of The Wildlife Code [515 ILCS 5/20-110 and 520 ILCS 5/3.23], failure to comply with the provisions of the scientific permit, Fish and Wildlife Codes of Illinois pertaining to scientific permits, and this Part or providing false information to obtain a scientific permit will result in suspension or revocation of the scientific permit. Suspension of the scientific permit will be for a period of not less than one year. The procedure by which suspensions and revocations are made, the rights of permittees to notice and hearing; and the procedures governing such hearings are set forth in 17 Ill. Adm. Code 2530.

Illinois Department of Natural Resources

Endangered and Threatened Species Permit

Permit Number: 2584

Issued Date: 8/29/2018 **Expiration Date: 12/31/2018**

This permit is valid for the following Counties in Illinois:

Vermilion

Pursuant to 520 ILCS 10/5 and 17 Ill. Adm. Code 1070.10-1070.80, this permit is issued to:

Cody Fleece
11687 Lebanon Road
Cincinatti, OH 45241

and covers the following additional personnel:

Dillon McNulty
Daniel Symonds
Kari Soltau

from:

Stantec Consulting

for the purpose of SCIENTIFIC RESEARCH involving the following specimens and/or products:

Species	*Item*	*# Specimens/ Products*	*Collection Method*	*Action*	*Disposition*
Mussels - Black Sandshell - Ligumia recta	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Butterfly - Ellipsaria lineolata	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Clubshell - Pleurobema clava	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Ebonyshell - Fusconaia ebena	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Elephant-ear - Elliptio crassidens	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Fanshell - Cyprogenia stegaria	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Fat Pocketbook - Potamilus capax	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Higgins Eye - Lampsilis higginsii	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Kidneyshell - Ptychobranchus fasciolaris	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Little Spectaclecase - Villosa lienosa	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**

Mussels - Northern Riffleshell - Epioblasma torulosa rangiana	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Ohio Pigtoe - Pleurobema cordatum	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Orange-foot Pimpleback - Plethobasus cooperianus	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Pink Mucket - Lampsilis abrupta	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Purple Lilliput - Toxolasma lividus	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Purple Wartyback - Cyclonaias tuberculata	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Rabbitsfoot - Quadrula cylindrica	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Rainbow - Villosa iris	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Salamander Mussel - Simpsonaias ambigua	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Scaleshell Mussel - Leptodea leptodon	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Sheepnose - Plethobasus cyphyus	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Slippershell - Alasmidonta viridis	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Snuffbox - Epioblasma triquetra	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Spectaclecase - Cumberlandia monodonta	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Spike - Elliptio dilatata	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**
Mussels - Wavy-rayed Lampmussel - Lampsilis fasciola	**Live Individual**	**N/A**	**Hand Capture**	**Observe**	**Catch and Release Live Specimen**

If the research project covered by this permit will involve propagation, the permit holder and additional personnel listed above are required to possess an IDNR endangered and threatened species permit Propagation Addendum.

Possession of federally listed species is covered by:

USDA Exhibitor Permit #

U.S. Fish and Wildlife Service Permit #

The research project covered by this permit will address:

- ☑ ***Distribution or status of the listed species***
- ☑ ***Life histroy of the listed species***
- ☐ ***Threats to the listed plants and animals and/or their habitats***
- ☐ ***Effects of exotic species on native populatins***

- [x] ***Ecological needs of the natural populations of the species***
- [x] ***Genetic diversity within population***
- [ ] ***Supplementing existing populations***
- [ ] ***Wildlife disease vectors and transmission***
- [ ] ***Captive rearing***
- [ ] ***Translocation to unoccupied locations within species' historic range***
- [ ] ***Effects of management actions on animals or plants***
- [ ] ***Impact of wind turbines on listed species***
- [x] ***Movement or habitat use***
- [ ] ***Propagation for release into the wild***
- [ ] ***Other:***

The specific locations where this research will be conducted are:

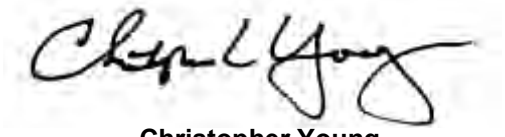
Research Location	*Nearest City*
Many within Vermilion County	

ITEMS LISTED ON THIS PERMIT MAY BE SOLD,

GIVEN AWAY, OR OTHERWISE DISPOSED OF ONLY

WITH PERMISSION OF THE ILLINOIS

DEPARTMENT OF NATURAL RESOURCES.

Signed: 

Christopher Young
Office Director
IDNR Office of Resource Conservation
As designee of IDNR Director, Wayne A. Rosenthal

Special Conditions (IF APPLICABLE):

Please note that this permit is not valid unless accompanied by any and all Federal/USFWS permits and/or provisions. Before any research is conducted within a State owned and/or operated site, permission from the Site Superintendent must be granted. Permittee must apply for and receive a Permit for Research in Illinois State Parks, Forests and Conservation Areas. Research within a Nature Preserve cannot occur unless written authorization/special use permit is granted from the Illinois Nature Preserves Commission.

Conditions:

- A copy of this permit must be in the possession of the permit holder when engaged in activities involving endangered or threatened species.
- There shall be no propagation of or attempt to propagate any endangered or threatened species covered by this permit unless a signed IDNR addendum approving propagation is attached. In addition, the Propagation Addendum must be in the possession of the permit holder when engaged in all activities involving propagation of an Illinois listed species.
- Permit holder cannot move/transport/translocate any endangered or threatened species outside of a designated project area/zone of impact without expressed written consent of the Director of the Illinois Department of Natural Resources.
- Permit holder shall notify IDNR of any changes to personal information within 10 days of making such changes.
- Permit holder shall notify IDNR of any changes to inventory of specimens through escape, theft, death or other unanticipated events within five working days of the discovery of loss.
- Permit holder must provide the Department with an electric copy or two hard copies of any reports, technical papers, or technical notes that result from studies conducted under the auspices of this permit.
- An annual report must be submitted to IDNR by January 31st of each year.

The holder of this permit may:

- Dispose of specimens or products covered by this permit through transfer or scrapping only afer a permit/written permission has been applied for and received from the Department.
- Allow temporary possession of the items covered by this permit by a licensed taxidermist for the purpose of providing taxidermic services.

This permit may be revoked if the Department finds that a permittee has falsified information on the application, failed to comply with facilities standard or animal welfare standards established in 17 Ill. Adm. Code 1070.60 and 1070.70, or violated state or federal laws.

DEPARTMENT OF THE INTERIOR
U.S. FISH & WILDLIFE SERVICE
Endangered Species Permit Office
5600 American Boulevard, West, Suite 990
Bloomington, MN 55437-1458
permitsR3ES@fws.gov

FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

STANTEC CONSULTING SERVICES
10509 TIMBERWOOD CIRCLE
SUITE 100
LOUISVILLE, KY 40223-2177
U.S.A.

2. AUTHORITY-STATUTES
16 USC 1539(a)
16 USC 1533(d)

REGULATIONS
50 CFR 17.22
50 CFR 17.32

50 CFR 13

3. NUMBER
TE38821A-3 AMENDMENT

4. RENEWABLE
☒ YES
☐ NO

5. MAY COPY
☒ YES
☐ NO

6. EFFECTIVE
07/29/2016

7. EXPIRES
12/31/2021

8. NAME AND TITLE OF PRINCIPAL OFFICER *(If #1 is a business)*
GEORGE ATHANASAKES
ECOSYSTEM RESTORATION SERVICES LEADER

9. TYPE OF PERMIT
NATIVE ENDANGERED & THREATENED SP. RECOVERY - E & T WILDLIFE

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED
ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL, TRIBAL, OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

C.1. FOR LISTED BAT SPECIES, VALID FOR USE BY JAMES KISER, DOUGLAS STEPHENS, JEFFREY BROWN, KRISTEN WATROUS, DAVID SAUGEY, JAMES EVANS, JOSEPH JOHNSON, AND LINDSAY WIGHT. TRAINED ASSISTANTS MAY WORK ON PERMITTED ACTIVITIES UNDER THE DIRECT AND ON-SITE SUPERVISION OF JAMES KISER, DOUGLAS STEPHENS, JEFFREY BROWN, OR KRISTEN WATROUS. **AT LEAST ONE NAMED PERMITTEE MUST REMAIN PRESENT AT EACH MIST-NET SITE WHILE IT IS BEING OPERATED.**

C.1.a. WES CUNNINGHAM MAY WORK UNDER THE AUTHORITY OF THIS PERMIT FOR GRAY BAT ONLY.

C.1.b. LYNDA MILLS MAY WORK UNDER THE AUTHORITY OF THIS PERMIT FOR GRAY BAT, NORTHERN LONG-EARED BAT AND INDIANA BAT ONLY.

C.2. FOR LISTED MUSSELS AND FISH SPECIES, VALID FOR USE BY JAMES KISER, DOUGLAS STEPHENS, SAM CALL, AND CODY FLEECE. TRAINED ASSISTANTS MAY WORK ON PERMITTED ACTIVITIES UNDER THE DIRECT AND ON-SITE SUPERVISION OF JAMES KISER, DOUGLAS STEPHENS, SAM CALL OR CODY FLEECE.

C.3. FOR COPPERBELLY WATERSNAKE, VALID FOR USE BY JAMES KISER. TRAINED ASSISTANTS MAY WORK ON PERMITTED ACTIVITIES UNDER THE DIRECT AND ON-SITE SUPERVISION OF JAMES KISER.

D. ACCEPTANCE OF THIS PERMIT SERVES AS EVIDENCE THAT THE PERMITTEE AND ITS AUTHORIZED AGENTS UNDERSTAND AND AGREE TO ABIDE BY THE TERMS OF THIS PERMIT AND ALL SECTIONS OF TITLE 50 CODE OF FEDERAL REGULATIONS, PARTS 13 AND 17, PERTINENT TO ISSUED PERMITS (http://www.fws.gov/permits/ltr/ltr.html). SECTION 11 OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED, PROVIDES FOR CIVIL AND CRIMINAL PENALTIES FOR FAILURE TO COMPLY WITH PERMIT CONDITIONS.

E. Permittee (as described in condition C. above) is authorized to take Indiana bat (*Myotis sodalis*), gray bat (*M. grisescens*), northern long-eared bat (*M. septentrionalis*), Ozark big-eared bat (*Corynorhinus townsendii ingens*), Virginia big-eared bat (*C. t. virginianus*), listed mussel and fish species identified in Attachment 1, and copperbelly water snake (*Nerodia*

☒ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS
ANNUAL REPORT DUE: 01/31

ISSUED BY	TITLE	DATE
	CHIEF - ENDANGERED SPECIES	07/29/2016

erythrogaster neglecta) for scientific research aimed at recovery of the species: presence/absence surveys, studies to document habitat use, population monitoring, and evaluate potential impacts as described herein. This permit does not authorize the collection of voucher specimens.

F. Presence/absence surveys and studies to document habitat use are authorized at the following locations:

F.1. Locations within Region 3 of the USFWS: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin, upon receipt of written concurrence from Field Supervisor, as outlined in Condition G.

F.2. Locations within Region 4 of the USFWS: Alabama, Arkansas, Georgia, Louisiana, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee, upon receipt of written concurrence from Field Supervisor, as outlined in Condition G.

F.3. Locations within Region 5 of the USFWS: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia upon receipt of written concurrence from Field Supervisor, as outlined in Condition G.

F.4. Locations within Region 6 of the USFWS: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming, upon receipt of written concurrence from Field Supervisor, as outlined in Condition G.

F.5. Location within Region 2 of the USFWS: Texas and Oklahoma, upon receipt of written concurrence from Field Supervisor, and upon coordination with Ozark Plateau National Wildlife Refuge prior to 1) surveys of caves known to be used by federally-listed bats, and 2) examinations of caves suspected of containing federally-listed bats species (some presence/absence surveys may require the presence of a U.S. Fish and Wildlife Biologist), as outlined in Condition G.

G. For all locations specified in Condition F., Permittee shall request site specific authorization from the USFWS Field Supervisor for the state in which activities are proposed to occur at least 15 days prior to conducting any activities. Your notification must be in writing and must indicate:

G.1. Species for which proposed activities are being conducted.

G.2. Location of proposed activities, including project site, county, and state.

G.3. A description of the activities (i.e., surveys, radio-telemetry studies, etc.).

G.4. Dates when the project is proposed to take place.

G.5. Evidence that Permittee has received any required contracts to complete the activities.

G.6. Whether all annual reporting requirements have been fulfilled.

G.7. You may proceed with activities only upon receipt of written concurrence from the applicable USFWS Field Supervisor. *Your concurrence letter must be carried with this permit to authorize site-specific activities.*

H. Permittee shall adhere to following conditions involving capture and handling of bats:

H.1. Activities may be conducted by Stantec personnel as conditioned in Condition C.1.

H.2. Bats may be captured with mist nets following the protocol included in the Range-wide Indiana Bat Summer Survey Guidelines. Guidelines are available at: <http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html>. Note that you must use the most up-to-date version of the Summer Survey Guidelines, available at the USFWS web site, for your summer surveys. The monitoring interval for mist nets is +/- 10 minutes and may not exceed 15 minutes. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

H.3. Bats may be captured with harp traps with written concurrence from the Field Supervisor in the state in which trapping is proposed. Harp traps must be continually monitored. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

H.4. Permittee shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species specific data sheet

provided by the USFWS (e.g., Bat Reporting Spreadsheet, Condition H.2.). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

H.5. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least three days, or until the transmitter falls off, whichever occurs first. When conducting mist-netting within the white-nose syndrome (WNS) zone of the range of the northern long-eared bat in support of proposed tree removal activities, permittee is expected to radio-tag and track female and juvenile northern long-eared bats in an attempt to locate roost trees and/or hibernacula, unless otherwise directed by the appropriate Field Office identified in Condition Q. Specifics on the number of females or juveniles that are expected to be tracked will be determined in coordination with the appropriate Field Office, as specified in Condition G. (above).

H.6. No trapping activities shall occur within 20 meters of a known or potential summer or winter maternity roost site, either natural or artificial roosts, unless Permittee receives prior written approval from the U.S. Fish and Wildlife Service Field Supervisor for the state in which the activities are proposed to occur.

H.7. Caves, mines, or other suitable hibernation sites may be quietly searched in a manner that minimizes disturbance by utilizing the minimum number of people and time required to complete the survey. Surveys should not be repeated more often than once every other year in any given hibernaculum that is occupied by endangered or threatened bats. Where hibernacula area and safety conditions allow, individuals entering caves are recommended to utilize night vision goggles or red-filtered light and to remain in the cave no more than 90 minutes to complete the work.

H.8. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: <https://www.whitenosesyndrome.org/topics/decontamination>.

I. Permittee is authorized to take (only in the context of harass by survey) mussel species identified in Attachment 1 for scientific research aimed at recovery of the species. Permittee shall adhere to the following conditions involving presence/absence surveys for mussel species:

I.1. Presence/absence studies and surveys to monitor mussel communities shall be conducted by personnel identified in Condition C.2.

I.2. Permittee may take (remove from the substrate for identification, data collection and return) mussels by hand via wading, snorkeling, or using divers.

I.3. Permittee may temporarily hold specimens in mesh bags, either suspended in the water or held in a container containing river water, while awaiting identification and data collection. Specimens may be held for up to 3 hours provided that they are held in the water in bags that allow free movement of water the mussels were taken from or held in large containers of river water that is replaced every hour [every half-hour when air temperatures are at or above 80° Fahrenheit (F)] with water freshly taken from the water where the mussels were collected. Containers for temporary holding of mussels must remain in the shade. Specimens must be returned to the locality from which they were taken. No live specimens may be removed from the site. Live specimens that cannot be identified at the site must be photographed for identification purposes and immediately returned to the substrate.

I.4. Collection of specimens must be done only when the air temperature is above 32° F and the water temperature is above 40° F. Specimens may be returned to the substrate as follows: 1) for surveys at water temperatures at or above 50° F, mussels may be dropped back into the water after identification; 2) for surveys conducted at water temperatures between 40° F and 50° F, mussels must be returned to the substrate by divers. Divers must return the specimen to the substrate by hand, placing them on their side and allowing them to burrow on their own. Where the substrate is very compacted cobble, a hole just large enough to receive the animal to a depth of 3/4 of its length should be excavated and the mussel placed into it with the posterior end up and pointing upstream. Specimens must be returned unharmed within three hours to the locality where taken, or relocated as authorized by Condition I.6.

I.5. All live mussels will be measured (length and height) and, if possible, sexed and aged. No intrusive activities are permitted. Random samples will be taken using a 1-m^2 sampling frame, and sample locations will be determined using a stratified, random design. Data collected will include descriptions of external morphometry and reproductive status.

I.6. No live specimens may be removed from the survey sites, except for specimens encountered in circumstances which would reasonably be expected to result in stranding due to low or receding water. Such specimens may be moved to a suitable nearby location in deep water and returned to the substrate according to Condition I.4.

I.7. All specimens collected must be thoroughly inspected for the presence of zebra mussels (*Dreissena polymorpha*). Unionids with zebra mussels attached must be cleaned by scrubbing prior to returning the specimens to the substrate according to Condition I.4. In addition, any Asiatic clams (*Corbicula fluminea*) that are collected during your studies shall be destroyed.

J. Permittee is authorized to take (only in the context of harass by survey) fish species identified in Attachment 1 for scientific research aimed at recovery of the species. Permittee shall adhere to the following conditions involving presence/absence surveys for fish species:

J.1. Presence/absence studies and surveys to monitor fish communities shall be conducted conducted by personnel identified in Condition C.2.

J.2. Permittee may hold specimens for a maximum of 15 minutes for photographic documentation and non-intrusive data collection, and release unharmed at the point of capture.

J.3. Electrofishing surveys are only authorized by written concurrence of the U.S. Fish and Wildlife Service Field Supervisor for the state in which the activity is proposed.

K. Permittee shall adhere to the following conditions involving surveys for copperbelly water snake:

K.1. Activities may be conducted by personnel identified in Condition C.3., and only by visual searches of habitat to assess habitat quality and to determine presence or absence of copperbelly water snake.

K.2. Time searches shall be based on protocol developed and discussed by Bruce Kingsbury (Attachment 2).

K.3. Drift fences may also be employed for more quantifiable population estimates.

L. Upon determination that endangered or threatened species are present at previously undocumented sites, Permittee shall notify the following offices within 48 hours: the U.S. Fish and Wildlife Service Region 3 Office (Condition P.1.), and the USFWS Field Office within the geographic location of study areas (Condition Q.).

M. No injury or mortality is anticipated or allowed as a result of copperbelly water snake surveys. In the event that injury or mortality occurs, all activities must cease. The circumstances of any injury or mortality must be reported in writing within 48 hours to the office listed in Condition P.1., the USFWS East Lansing, Michigan Field Office (Condition Q.4.a), and the nearest USFWS Law Enforcement, Special Agent Office (http://www.fws.gov/offices). Before you reinitiate studies authorized by this permit, you must receive written authorization from the USFWS (Condition P.1.). Dead or moribund specimens may be retained for further study only with the written permission of the USFWS East Lansing, Michigan Field Office. Any specimens that are not authorized for retention are to be chilled and promptly transferred to the USFWS for potential necropsy and/or contaminants analysis (Condition Q.4.a).

N. Accidental injury and/or mortality of bats, mussels or fish may not exceed two specimens. In the event that this number is met, all activities must cease. Mortality or serious injury to listed specimens must be reported within 5 calendar days to the applicable USFWS office(s) listed in Condition Q. and to the nearest USFWS Law Enforcement, Special Agent Office (http://www.fws.gov/offices). Dead or moribund bats may be retained for further study only with the written permission of the USFWS. Bats are to be chilled and promptly transferred to the U.S. Fish and Wildlife Service for potential necropsy and/or contaminants analysis (Condition P.6.). Disposition of any mussels or fish that are accidently killed shall be completed in accordance with instructions from the Field Supervisor in the state in which the incident occurred (Condition Q.).

O. An annual report of activities conducted under the authority of this permit is due by January 31 each year the permit is in effect. In addition, copies of all reports and publications resulting from data obtained under this permit must be submitted as they become available. Failure to furnish any reports required by this permit is cause for permit revocation and/or denial of future permit applications. At a minimum, your report must include:

O.1. The date, time, and geographic locations (including datum and projection information), of all specimens encountered as well as all data collected on the individuals (i.e., age, sex, and weight).

O.1.a. For bats, your report must include a completed data collection form as found in the Summer Survey Guidelines, Appendix B, cited in Condition H.2., and band numbers of all bats banded.

O.1.b. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data form provided by the USFWS (e.g., INDIANA BAT SURVEY AND BANDING DATA forms, the data collection forms found in the current Rangewide Indiana Bat Summer Survey Guidelines cited in Condition H.2., or other species specific forms). Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

O.2. A description of locations surveyed for threatened/endangered species where no specimens were encountered.

O.3. Location and characteristics of bat roost trees and bat colonies.

O.4. Information on any injuries and/or mortalities and disposition of specimens.

O.5. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

O.6. Copies of all site-specific authorization letters required under Condition G.

If no activities occurred over the course of the year, indication of such shall be submitted as an annual report.

P. Copies of your reports shall be sent to the offices listed below. When possible, electronic copies shall be submitted in lieu of hard copies in MS Word, Rich Text Format, or other file format that is compatible with the receiving office.

P.1. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Midwest Region (Region 3)
Ecological Services -- Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

P.2. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Southeast Region (Region 4)
Endangered Species Permits Office
1875 Century Blvd., Suite 200
Atlanta, Georgia 30345-3301
(404/679-7140; fax 404/679-7081)
permitsR4ES@fws.gov

P.3. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Northeast Region (Region 5)
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(703/358-2402; fax 413/253-8482)
permitsR5ES@fws.gov

P.4. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service - Southwest Region (Region 2)
Endangered Species Permits Office
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6649; fax 505/248-6788)
permitsR2ES@fws.gov

P.5. ESA Assistant Recovery Coordinator & Permit Coordinator
U.S. Fish and Wildlife Service - Mountain-Prairie Region (Region 6)

Endangered Species Permits Office
Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489
(719/628-2670; fax 303/236-0027)
permitsR6ES@fws.gov

P.6. For all studies involving Indiana bat:

Lori Pruitt
Endangered Species Coordinator
U.S. Fish and Wildlife Service
Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)

Q. Additionally, based on geographic area, reports and publications shall be submitted to the following:

Q.1. For studies conducted in Illinois:

Q.1.a. Kristen Lundh
Endangered Species Coordinator for Illinois/Iowa
U.S. Fish and Wildlife Service
Ecological Services Field Office
1511 47th Avenue
Moline, Illinois 61265
(309/757-5800, x215; fax 309/757-5807)

Q.1.b. Joseph A. Kath
Endangered Species Manager/Bat Specialist
Illinois Department of Natural Resources
One Natural Resource Way
Springfield, Illinois 62702-1271
(217/785-8764; fax 217/785-2438)

Q.2. For studies conducted in Indiana:

Q.2.a. Lori Pruitt
Endangered Species Coordinator
U.S. Fish and Wildlife Service
Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)

Q.2.b. Scott Johnson
Indiana Department of Natural Resources
Division of Fish and Wildlife
402 W. Washington Street, Room W273
Indianapolis, Indiana 46204-2781
(317/234-9586; fax 317/232-8150)

Q.3. For studies conducted in Iowa:

Q.3.a. Kristen Lundh
Endangered Species Coordinator
U.S. Fish and Wildlife Service
Ecological Services Field Office
1511 47th Avenue
Moline, Illinois 61265
(309/757-5800, x215; fax 309/757-5807)

Q.3.b. Kelly Poole

Endangered Species Coordinator
Iowa Department of Natural Resources
Parks, Recreation, and Preserves
Wallace State Office Building
East 9th and Grand Avenue
Des Moines, Iowa 50319-0034
(515/281-8463)

Q.4. For studies conducted in Michigan:

Q.4.a. Jack Dingledine
Deputy Field Supervisor
U.S. Fish and Wildlife Service
Ecological Services Field Office
2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823
(517/351-6326; fax 517/351-1443)

Q.4.b. Dan Kennedy
Endangered Species Coordinator
Michigan Department of Natural Resources
Wildlife Division
P.O. Box 30444
Lansing, Michigan 48909-7444
(517/284-6194; fax 517/373-6705)

Q.5. For studies conducted in Missouri:

Q.5.a. Shauna Marquardt
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-2132
(573/234-2132; fax 573/234-2181)

Q.5.b. Tara Jennings
Scientific Collecting Permit Coordinator
Missouri Department of Conservation
Endangered Species and Natural History Division
2901 W. Truman Blvd.
P.O. Box 180
Jefferson City, Missouri 65102-0180
(573/751-4115 ext. 3322; fax 573/751-4864)

Q.6. For studies conducted in Ohio:

Q.6.a. Angela Boyer
Endangered Species Coordinator
U.S. Fish and Wildlife Service
Ecological Services Field Office
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614/416-8993, x22; fax 614/416-8994)

Q.6.b. Kate Haley Parsons
Terrestrial Endangered Species & Wildlife Diversity Program Administrator
Ohio Department of Natural Resources
Division of Wildlife
2045 Morse Road, Building G3
Columbus, Ohio 43229-6693
(614/265-6329; fax 614/262-1143)

Q.6.c. John Navarro
Aquatic Program Administrator
Ohio Department of Natural Resources
Division of Wildlife
2045 Morse Road, Building G3
Columbus, Ohio 43229-6693
(614/265-6346; fax 614/262-1143)

Q.7. For studies conducted in Minnesota and Wisconsin:

Q.7.a. Phil Delphey
Endangered Species Coordinator
U.S. Fish and Wildlife Service
Ecological Services Field Office
4101 American Blvd. E.
Bloomington, Minnesota 55425
(952/252-0092 x206; fax 952/646-2873)

Q.7.b. Owen Boyle
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, Wisconsin 53707-7921
(608/266-5244; fax 608/266-2925)

Q.7.c. Richard Baker
Endangered Species Coordinator
Minnesota Department of Natural Resources
Division of Ecological and Water Resources
500 Lafayette Road, Box 25
St. Paul, Minnesota 55155
(651/259-5073)

Q.8. For studies conducted in Alabama:

U.S. Fish and Wildlife Service
Daphne Field Office
Field Supervisor
1208-B Main Street
Daphne, Alabama 36526
(251/441-5181)

Q.9. For studies conducted in Arkansas:

U.S. Fish and Wildlife Service
Arkansas Field Office
Field Supervisor
110 South Amity, Suite 300
Conway, Arkansas 72032-8975
(501/513-4470)

Q.10. For studies conducted in Connecticut, Massachusetts, New Hampshire, Rhode Island and Vermont:

U.S. Fish and Wildlife Service
New England Field Office
Field Supervisor
70 Commercial Street, Suite 300
Concord, New Hamshire 03301
(603/223-2541)

Q.11. For studies conducted in Delaware and Maryland:

U.S. Fish and Wildlife Service

Chesapeake Bay Field Office
Field Supervisor
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
(410/573-4573)

Q.12. For studies conducted in Texas:

U.S. Fish and Wildlife Service
Arlington Field Office
Field Supervisor
2005 NE Green Oaks Blvd, Suite 140
Arlington, Texas 76006-3247

Q.13. For studies conducted in Georgia:

U.S. Fish and Wildlife Service
Georgia Field Office
Field Supervisor
105 West Park Drive, Suite D
Athens, Georgia 30606-3175
(706/613-9493; fax 706/613-6059)

Q.14. For studies conducted in Kansas:

U.S. Fish and Wildlife Service
Kansas Field Office
Field Supervisor
2609 Anderson Avenue
Manhattan, Kansas 68502
(785/539-3474; fax 785/539-8567)

Q.15. For studies conducted in Kentucky:

U.S. Fish and Wildlife Service
Frankfort Field Office
Field Supervisor
J C Watts Federal Bldg., Room 265
330 West Broadway
Frankfort, Kentucky 40601-8670
(502/695-0468)

Q.16. For studies conducted in Louisiana:

U.S. Fish and Wildlife Service
Louisiana Field Office
Field Supervisor
646 Cajundome Blvd., Suite 400
Lafayette, Louisiana 70506-4290
(337/291-3100)

Q.17. For studies conducted in Maine:

U.S. Fish and Wildlife Service
Maine Field Office
Field Supervisor
17 Godrey Drive, Suite 2
Orono, Maine 04473-3702
(207/866-3344)

Q.18. For studies conducted in Mississippi:

U.S. Fish and Wildlife Service

Mississippi Field Office
Field Supervisor
6578 Dogwood View Pkwy, Suite A
Jackson, Mississippi 39213-7856
(601/321-1122)

Q.19. For studies conducted in Montana:

U.S. Fish and Wildlife Service
Montana Field Office
Field Supervisor
585 Shepard Way
Helena, Montana 59601
(406/449-5225)

Q.20. For studies conducted in Nebraska:

U.S. Fish and Wildlife Service
Nebraska Field Office
Field Supervisor
9325 South Alda Road
Wood River, Nebraska 68883
(308/382-6468)

Q.21. For studies conducted in New Jersey:

U.S. Fish and Wildlife Service
New Jersey Field Office
Field Supervisor
927 N. Main Street, Building D
Pleasantville, New Jersey 08232-1454
(609/646-9310)

Q.22. For studies conducted in New York:

U.S. Fish and Wildlife Service
New York Field Office
Field Supervisor
3817 Luker Road
Cortland, New York 13045
(607/753-9334)

Q.23. For studies conducted in North Carolina:

U.S. Fish and Wildlife Service
Asheville Field Office
Field Supervisor
160 Zillicoa Street
Asheville, North Carolina 28801-1082
(828/258-3939)

Q.24. For studies conducted in North Dakota

U.S. Fish and Wildlife Service
North Dakota Field Office
Field Supervisor
3425 Miriam Avenue
Bismarck, North Dakota 58501-7926
(701/250-4481)

Q.25. For studies conducted in Oklahoma:

U.S. Fish and Wildlife Service

Oklahoma Field Office
Field Supervisor
9014 E. 21st Street
Tulsa, Oklahoma 74129-1428
(918/382-4501)

Q.26. For studies conducted in Pennsylvania:

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Field Supervisor
315 S. Allen Street, Suite 322
State College, Pennsylvania 16801-4850
(814/234-4090)

Q.27. For studies conducted in South Carolina:

U.S. Fish and Wildlife Service
Charleston Field Office
Field Supervisor
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407-7558
(843/727-4707 x212)

Q.28. For studies conducted in South Dakota

U.S. Fish and Wildlife Service
South Dakota Field Office
Field Supervisor
420 S. Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408
(605/224-8693)

Q.29. For studies conducted in Tennessee:

U.S. Fish and Wildlife Service
Cookeville Field Office
Field Supervisor
446 Neal Street
Cookeville, Tennessee 38501-4027
(931/528-6481)

Q.30. For studies conducted in Virginia:

U.S. Fish and Wildlife Service
Virginia Field Office
Field Supervisor
6669 Short Lane
Gloucester, Virginia 23061
(804/693-6694)

Q.31. For studies conducted in West Virginia:

U.S. Fish and Wildlife Service
West Virginia Field Office
Field Supervisor
Route 250 South, Elkins Shopping Plaza
694 Beverly Pike
Elkins, West Virginia 26241
(304/636-6586)

Q.32. For studies conducted in Wyoming:

U.S. Fish and Wildlife Service
Wyoming Field Office
Field Supervisor
5353 Yellowstone Road, Suite 308A
Cheyenne, Wyoming 82009
(307/772-2374)

cc: FWS/Regions 2, 4, 5, and 6 (Attn: Recovery Permits Coordinator)
FWS, TE Coordinators for IL, IN, IA, MI, MN, MO, OH, and WI
DNR/DOC, TE Administrator/Coordinators for IL, IN, IA, MI, MN, MO, OH, and WI

END

Stantec Consulting Services, Inc.
Attachment 1 to Fish and Wildlife Permit TE38821A-1

Fish

Etheostoma chienense	Relict darter
Etheostoma percnurum	Duskytail darter
Notropis albizonatus	Palezone shiner
Phoxinus cumberlandensis	Blackside dace
Scaphirhynchus albus	Pallid sturgeon

Mussels

Alasmidonta atropurpurea	Cumberland elktoe
Conradilla caelata	Birdwing pearlymussel
Cumberlandia monodonta	Spectaclecase
Cyprogenia stegaria	Fanshell
Dromus dromas	Dromedary pearlymussel
Epioblasma brevidens	Cumberland combshell
Epioblasma capsaeformis	Oyster mussel
Epioblasma florentina walkeri	Tan riffleshell
Epioblasma obliquata obliquata	Purple catspaw
Epioblasma torulosa rangiana	Northern riffleshell
Epioblasma triquetra	Snuffbox
Fusconaia cuneolus	Finerayed pigtoe
Fusconaia cor	Shiny pigtoe
Hemistena lata	Cracking pearlymussel
Lampsilis abrupta	Pink mucket
Lampsilis higginsii	Higgins eye
Obovaria retusa	Ring pink
Pegias fibula	Littlewing pearlymussel
Plethobasus cicatricosus	White wartyback pearlymussel
Plethobasus cooperianus	Orangefoot pimpleback
Plethobasus cyphyus	Sheepnose
Pleurobema clava	Clubshell
Pleurobema plenum	Rough pigtoe
Pleuronaia dolabelloides	Slabside pearlymussel
Potamilus capax	Fat pocketbook
Ptychobranchus subtentum	Fluted kidneyshell
Quadrula cylindrica cylindrica	Rabbitsfoot
Quadrula cylindrica strigillata	Rough rabbitsfoot
Villosa fabalis	Rayed bean
Villosa perpurpurea	Purple bean
Villosa trabilis	Cumberland bean

APPENDIX B

Site Figures

Stantec

VISTRA ENERGY

Legend

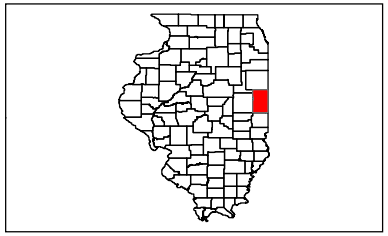
Project Area

0 800 1,600 Feet

1:16,000 (At original document size of 8.5x11)

Notes

1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
2. Base Imagery: ESRI Map Services.



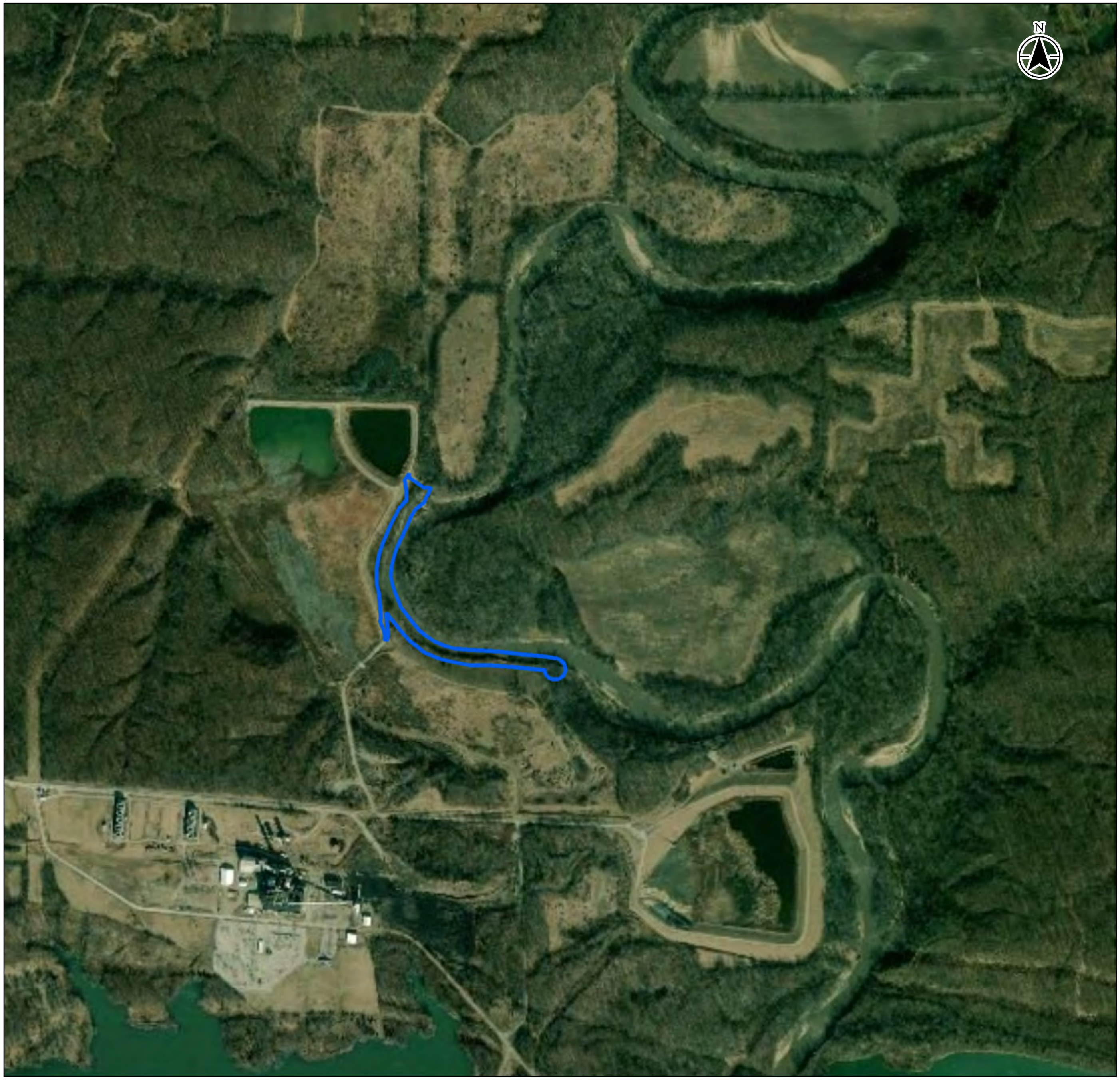
Project Location
Vermillion Co., IL

123456789
Prepared by EKD on 2018-11-08
Technical Review by WCF on 2018-11-XX
Independent Review by DS on 2018-11-XX

Client/Project
Vistra Energy
Middle Fork Vermillion River
Conservation Plan

Figure No.
1

Title
Project Location Map



Stantec

VISTRA ENERGY

Legend

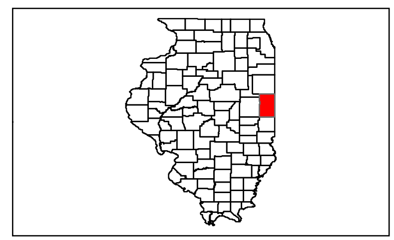
Project Area

0 800 1,600 Feet

1:16,000 (At original document size of 8.5x11)

Notes

1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
2. Base Imagery: ESRI Map Services.



Project Location 123456789

Vermillion Co., IL

Prepared by EKD on 2018-11-08
Technical Review by WCF on 2018-11-XX
Independent Review by DS on 2018-11-XX

Client/Project

Vistra Energy
Middle Fork Vermillion River
Conservation Plan

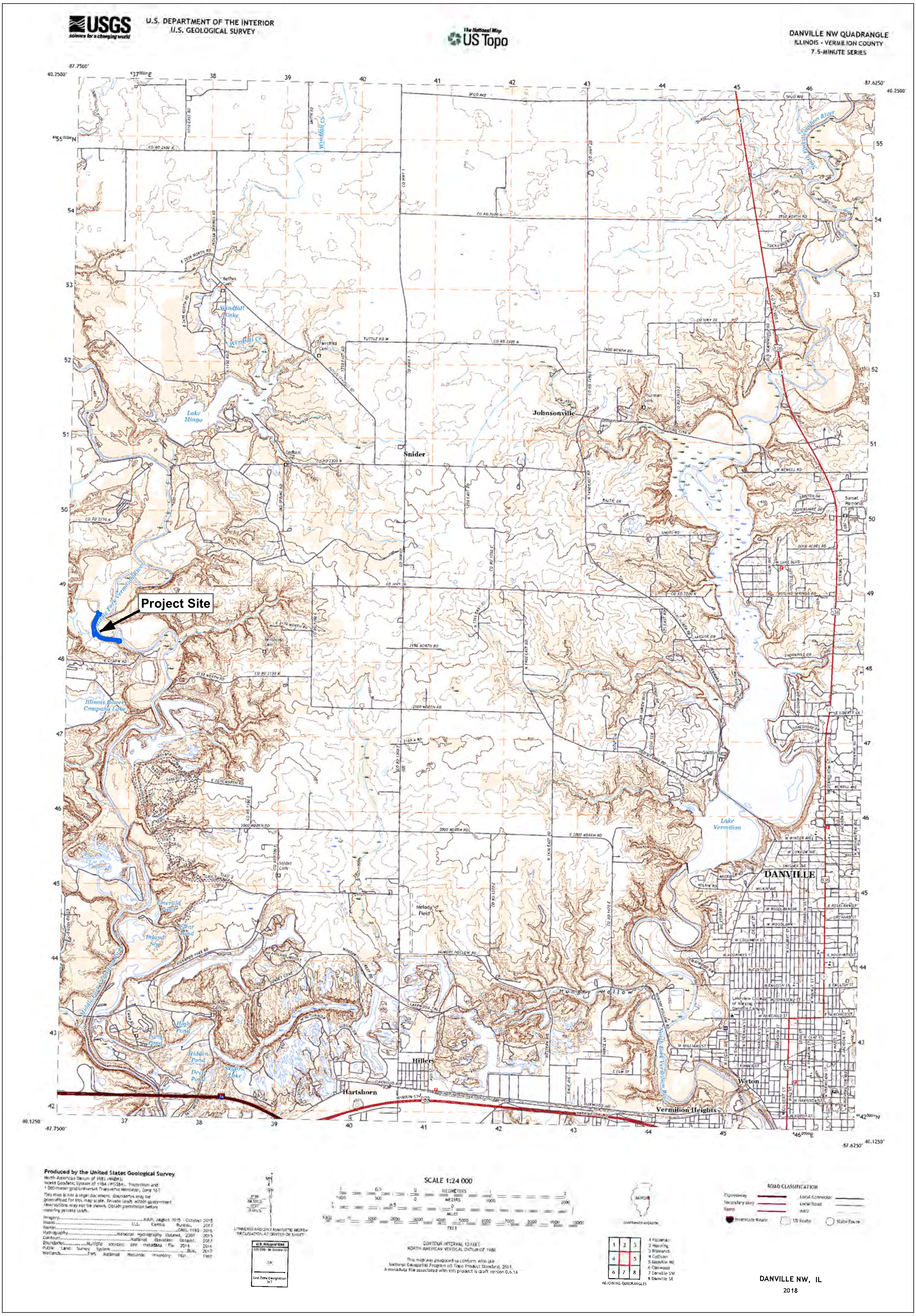
Figure No.

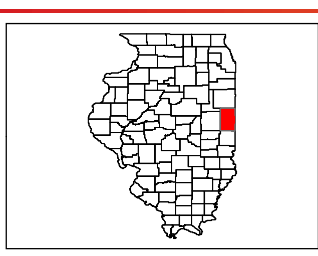
2

Title

Project Location Map
Aerial Imagery

U:\1734\Vermilion_River_ Mussel_Survey\03_Data\gis_cad\mxd\Vermilion River Project Location Imagery 20181108.mxd Revised: 2018-11-16 By: edilbone





0 2,500 5,000 Feet

1:48,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
2. Base Imagery: USGS Topographic Quadrangle Map, Danville Northwest, IL

Stantec

Project Location	175657154
Vermillion Co., IL	Prepared by EKD on 2018-11-19 Reviewd by DS on 2018-11-19 Reviewed by CF on 2018-11-XX

Client/Project
Vistra Energy
Middle Fork Vermillion River
Conservation Plan

Figure No.
3

Title
Topographic Map

APPENDIX C

Construction Plans

VICINITY MAP
NOT TO SCALE

MIDDLE FORK VERMILION RIVER EROSION MITIGATION AND RIVERBANK STABILIZATION

OAKWOOD, ILLINOIS

DRAWINGS FOR CONSTRUCTION

INDEX OF DRAWINGS

PREPARED FOR:

VISTRA ENERGY

1500 EASTPORT PLAZA DRIVE
COLLINSVILLE, ILLINOIS 62234

SEPTEMBER 2018

90% DESIGN ISSUED FOR BID

GENERAL NOTES

1. DEFINITIONS: WHENEVER THE FOLLOWING TERMS ARE USED IN THESE PLANS FOR CONSTRUCTION, IT IS UNDERSTOOD THAT THEY REPRESENT THE FOLLOWING:

   IDOT: THE ILLINOIS DEPARTMENT OF TRANSPORTATION, SPECIFIC REFERENCE IS MADE TO THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION. ANY MATERIAL DESIGNATED AS "IDOT" IS TO CONFORM TO THE MATERIAL STANDARDS NOTED AND PLACEMENT/INSTALLATIONS METHODOLOGY SPECIFIED IN THE CURRENT EDITION OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION". WHERE APPLICABLE, IDOT STANDARD DRAWINGS ARE REFERENCED FOR INCORPORATION INTO THESE DRAWINGS.

   CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN: REFERS TO A DOCUMENT THAT ESTABLISHES MINIMUM CONSTRUCTION QUALITY ASSURANCE/ QUALITY CONTROL REQUIREMENTS, TESTING FREQUENCY, AND QUALITY OVERSIGHT RESPONSIBILITY.

   CONSTRUCTION QUALITY ASSURANCE (CQA) OFFICER: A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF ILLINOIS THAT IS RESPONSIBLE FOR THE QUALITY OF THE CONSTRUCTED PROJECT. THE CQA TEAM CONSISTS OF QUALIFIED PERSONNEL THAT WORK UNDER THE DIRECT SUPERVISION OF THE CQA OFFICER. CQA TEAM PERSONNEL ARE INDIVIDUALS THAT ARE FAMILIAR WITH THE MATERIALS UTILIZED AND THE CONSTRUCTION COMPONENTS.

   CONSTRUCTION MANAGER: A REPRESENTATIVE APPOINTED BY THE OWNER RESPONSIBLE FOR THE PLANNING, COORDINATION AND CONTROL OF CONSTRUCTION.

   CONTRACT DOCUMENTS: PLANS FOR CONSTRUCTION, TECHNICAL SPECIFICATIONS, CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN, AND OTHER REFERENCED SPECIFICATIONS OR STANDARDS CONSTITUTE THE COMPLETE CONTRACT DOCUMENTS FOR THIS PROJECT.

   CONTRACTOR: ENTITY RESPONSIBLE FOR CONSTRUCTION.

   ENGINEER: STANTEC CONSULTING SERVICES INC. (STANTEC).

   OWNER: VISTRA ENERGY

2. THESE DRAWINGS WERE PREPARED BY STANTEC CONSULTING, INC. USING A DETAILED TOPOGRAPHIC SURVEY THAT WAS COMPLETED ON MARCH 26, 2018 BY INGENAE. PUBLICLY AVAILABLE LIDAR WAS USED TO SUPPLEMENT EXISTING TOPOGRAPHY BEYOND THE LIMITS OF THE DETAILED SURVEY.

3. THE CONTRACTOR SHALL PERFORM REQUIRED UTILITY LOCATION SERVICES, SURVEY AND DOCUMENT THOSE LOCATIONS. THE LOCATIONS OF EXISTING UNDERGROUND AND ABOVE GROUND UTILITIES SHOWN ON THE DRAWINGS SHALL BE CONSIDERED APPROXIMATE. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF ALL UTILITIES SHOWN AND NOT SHOWN AND SHALL PROVIDE NECESSARY MEASURES TO PROTECT UTILITIES FROM DAMAGE DUE TO THE CONTRACTOR'S WORK. SHOULD CONDUITS OR OTHER UTILITIES THAT ARE NOT SHOWN ON THE DRAWINGS BE ENCOUNTERED, THE CONTRACTOR SHALL CONTACT THE CONSTRUCTION MANAGER IMMEDIATELY.

4. THE CONTRACTOR SHALL CONSULT WITH OWNER TO IDENTIFY CONSTRUCTION LIMITS FOR THIS WORK AND ACCEPTABLE ACTIVITIES WITHIN THOSE LIMITS. OWNER WILL CONTINUE TO ACCESS THE SITE AND MAY PERIODICALLY ACCESS AND WORK WITHIN THE CONSTRUCTION LIMITS. THE CONTRACTOR SHALL COOPERATE AT ALL TIMES WITH THE OWNER, OTHER CONTRACTORS AND OTHER CONSULTANTS TO HELP RESOLVE ANY SCHEDULING OR OTHER CONFLICTS THAT MIGHT ARISE.

5. THE CONTRACTOR SHALL COORDINATE THE PLACEMENT OF OFFICES AND EMPLOYEE PARKING WITH OWNER, AND NO OTHER AREAS SHALL BE USED WITHOUT PERMISSION FROM OWNER. AT A MINIMUM, THE PARKING AREA SHALL HAVE A GRAVEL SURFACE CONSISTING OF 4 INCHES OF IDOT CA3 AGGREGATE OVERLAIN BY IDOT TYPE A AGGREGATE. THE CONTRACTOR SHALL MAINTAIN THIS AREA IN A CLEAN AND WORKMAN-LIKE MANNER AT ALL TIMES.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF ALL ACCESS ROADS, STAGING AREAS AND STORAGE AREAS USED DURING CONSTRUCTION, UNLESS THE OWNER GIVES WRITTEN PERMISSION TO THE CONTRACTOR EXCLUDING CERTAIN ROADS OR AREAS FROM MAINTENANCE, AT THE COMPLETION OF CONSTRUCTION. THE CONTRACTOR SHALL RESTORE THESE AREAS, INCLUDING THE OFFICE AND EMPLOYEE PARKING AREAS, TO THEIR ORIGINAL CONDITION OR BETTER, UNLESS OWNER GIVES WRITTEN PERMISSION TO THE CONTRACTOR TO RETAIN THE AREA "AS-IS".

7. PRIOR TO ANY SITE WORK, THE CONTRACTOR SHALL WORK WITH THE OWNER TO DEVELOP AND MAINTAIN A CONSTRUCTION SCHEDULE AND TRAFFIC PLAN THAT INDICATE SEQUENCING OF WORK AND SCHEDULED MATERIAL DELIVERIES.

8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HEALTH AND SAFETY OF ITS PERSONNEL. THE CONTRACTOR SHALL ADHERE TO OWNER REQUIREMENTS FOR SAFETY AND CONSTRUCTION UNLESS OSHA OR OTHER REGULATORY REQUIREMENTS ARE MORE STRINGENT AND /OR SUPERSEDE OWNER REQUIREMENTS.

9. THE CONTRACTOR SHALL CONDUCT HIS/HER OPERATIONS IN A MANNER WHICH DOES NOT DESTABILIZE THE PERIMETER EMBANKMENT OR EXISTING SLOPES ALONG THE NORTH AND OLD EAST ASH PONDS. AT A MINIMUM, THE CONTRACTOR SHALL:

   A. AVOID LOADING THE TOP OF THESE SLOPES AND DIKES WITH MATERIALS, EARTHWORK EQUIPMENT OR HAUL TRUCKS.

   B. MONITOR SLOPE CONDITIONS DAILY THROUGHOUT CONSTRUCTION.

   C. ANY CONCERNS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE CQA OFFICER AND CONSTRUCTION MANAGER.

   D. USE OF VIBRATORY (COMPACTION) EQUIPMENT REQUIRES OWNER'S WRITTEN AUTHORIZATION.

10. THE CONTRACTOR SHALL CONDUCT ALL OPERATIONS IN ACCORDANCE WITH APPLICABLE ENVIRONMENTAL PERMITS, RULES, LAWS, AND REGULATIONS.

11. THE CONTRACTOR IS RESPONSIBLE FOR SITE DRAINAGE THROUGHOUT CONSTRUCTION AND SHALL INSTALL TEMPORARY DRAINAGE DITCHES, STRUCTURES, AND/OR PUMP WATER AS NECESSARY TO PREVENT INTERFERENCE WITH THE WORK. SUCH TEMPORARY DRAINAGE FEATURES SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF ENVIRONMENTAL PERMITS AND THE PROVISIONS CONTAINED IN THE SWPPP AND APPROVED BY THE ENGINEER.

12. VEGETATIVE AND ORGANIC MATERIALS PRESENT WITHIN THE CLEARING AND GRUBBING AREA SHALL BE REMOVED IN SEQUENCE, STOCKPILED AND IF POSSIBLE REUSED ALONG THE FINAL GRADE.

13. THE EROSION AND SEDIMENT CONTROL PLAN MEASURES SHOWN AND DESCRIBED IN THE SWPPP SHALL BE CONSIDERED THE MINIMUM; SUPPLEMENTAL MEASURES SHALL BE PROVIDED BY THE CONTRACTOR AS FIELD CONDITIONS DICTATE OR AS DIRECTED BY THE ENGINEER, OWNER, OR ANY REGULATORY AUTHORITY.

14. DURING CONSTRUCTION, THE CONTRACTOR SHALL CLEAN AND MAINTAIN ALL SEDIMENT CONTROL DEVICES AS OUTLINED IN THE SWPPP AND TECHNICAL SPECIFICATIONS.

15. THE CONTRACTOR SHALL CONTROL FUGITIVE DUST EMISSIONS DURING CONSTRUCTION IN SUCH A MANNER AS TO COMPLY WITH APPLICABLE REGULATIONS. DUST CONTROL MEASURES SHALL BE SUBJECT TO APPROVAL OF THE CONSTRUCTION MANAGER.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION SURVEYING, INCLUDING BUT NOT LIMITED TO CONSTRUCTION STAKING, SURVEYS REQUIRED BY THE CONTRACT DOCUMENTS TO VERIFY LOCATIONS OF SITE FEATURES AND GRADES, AND AS-BUILT SURVEYS. THE CONTRACTOR SHALL BEAR ALL COST OF ALL SURVEYING NECESSARY TO CONTROL AND COMPLETE THE WORK ACCORDING TO THE CONTRACT DOCUMENTS. SURVEYING SHALL BE PERFORMED, OR OVERSEEN, BY A SURVEYOR LICENSED IN THE STATE OF ILLINOIS. ALL ESTABLISHED BENCH MARKS OR OTHER MONUMENTS SHALL BE PRESERVED AND PROTECTED. ANY ESTABLISHED MARKER OR BENCHMARK THAT IS DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE REPLACED BY THE CONTRACTOR AT ITS OWN COST UNLESS OTHERWISE DIRECTED BY THE OWNER.

17. THE CONTRACTOR SHALL COMMUNICATE CONSTRUCTION ISSUES, PROBLEMS OR DISCREPANCIES IN THE PLANS FOR CONSTRUCTION TO THE ENGINEER, CQA OFFICER AND CONSTRUCTION MANAGER IMMEDIATELY UPON BECOMING AWARE OF SUCH ISSUES.

18. ANY PROPOSED MODIFICATION TO DESIGN FEATURES AS SHOWN (OR DESCRIBED) IN THE APPROVED ISSUED FOR CONSTRUCTION CONTRACT DOCUMENTS SHALL BE CONTINGENT UPON ENGINEER APPROVAL.

19. CQA SURVEYING WILL BE PERFORMED BY A THIRD PARTY SURVEYOR RETAINED BY THE OWNER. THE PURPOSE OF THE SURVEYS IS TO VERIFY THAT ACTUAL THICKNESS AND GRADES OF THE CONSTRUCTION COMPONENTS ARE IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS.

20. CONTRACTOR TO TAKE NOTE OF THE OVERHEAD ELECTRIC LINES. WORK IN AND ADJACENT TO THESE LINES IS RESTRICTED AND SHALL BE IN ACCORDANCE WITH OWNER SITE-SPECIFIC AND OSHA SAFETY REQUIREMENTS.

21. FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN SEVEN (7) CALENDAR DAYS ON ALL SWALES, DITCHES, AND ALL SLOPES GREATER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1), AND WITHIN FOURTEEN (14) DAYS ON ALL OTHER DISTURBED OR GRADED AREAS. THE REQUIREMENTS OF THIS SECTION DO NOT APPLY TO THOSE AREAS WHICH ARE SHOWN ON THE PLAN AND ARE CURRENTLY BEING USED FOR MATERIAL STORAGE OR FOR THOSE AREAS ON WHICH ACTUAL CONSTRUCTION ACTIVITIES ARE CURRENTLY BEING PERFORMED.

22. ALL EROSION AND SEDIMENT CONTROLS SHALL BE PROPERLY MAINTAINED IN GOOD WORKING CONDITION.

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Client/Project
DYNEGY MIDWEST GENERATION, LLC

MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
GENERAL NOTES

Project Number: 175657154

File Name: 57154c-102-gnotes.dwg

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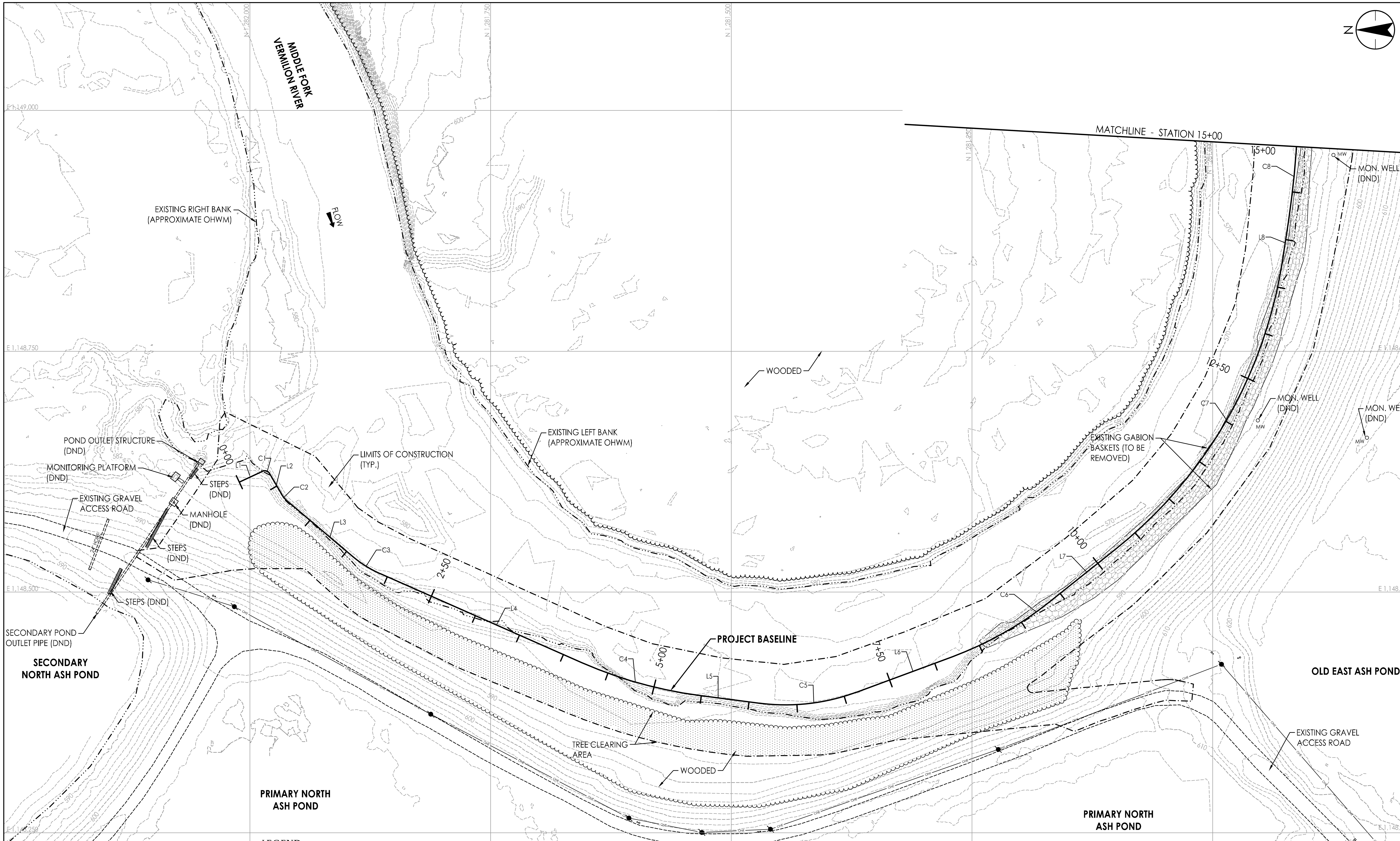
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. 2

Revision 0

Sheet 2 of 16



EXISTING CONTROL MONUMENT TABLE			
MONUMENT	NORTHING	EASTING	ELEVATION (FEET)
CP-1 *	1,279,787.07	1,150,197.79	657.47
CP-2 *	1,279,014.35	1,151,116.12	619.61
CP-3 *	1,282,593.25	1,147,676.61	605.67
CP-4 *	1,282,570.07	1,148,578.31	594.81
CP-5	1,279,835.46	1,149,244.85	661.56
CP-6 *	1,279,836.33	1,148,276.35	685.18
CP-7 *	1,280,066.77	1,151,088.05	620.00
CP-8 *	1,280,004.01	1,146,199.62	713.29

* EXISTING CONTROL POINTS LOCATED OUTSIDE OF THESE DRAWING LIMITS. ADDITIONAL CONTROL POINTS WILL NEED TO BE ESTABLISHED PRIOR TO THE START OF CONSTRUCTION.

LEGEND:

- 600 — EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- OHE — OVERHEAD ELECTRIC LINE
- POWER POLE
- GUY WIRE
- MW — EXISTING MONITORING WELL
- EXISTING BANK
- EXTENT OF EXISTING GABIONS
- TREE CLEARING AREA
- PROPOSED LIMITS OF CONSTRUCTION
- (DND) — DO NOT DISTURB
- L2 — PROJECT BASELINE TANGENT LABEL
- C2 — PROJECT BASELINE CURVE LABEL
- PROJECT BASELINE

NOTES:

1. DETAILED TOPOGRAPHIC SURVEY WAS COMPLETED ON MARCH 26, 2018 BY INGENAE. PUBLICLY AVAILABLE LIDAR WAS USED TO SUPPLEMENT EXISTING TOPOGRAPHY BEYOND THE LIMITS OF THE DETAILED SURVEY.
2. SEE DRAWING 4 FOR TABLE OF BASELINE COORDINATES.

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GRAPHIC SCALE: 1" = 50'
CONTOUR INTERVAL = 2'

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Client/Project
DYNEGY MIDWEST GENERATION, LLC

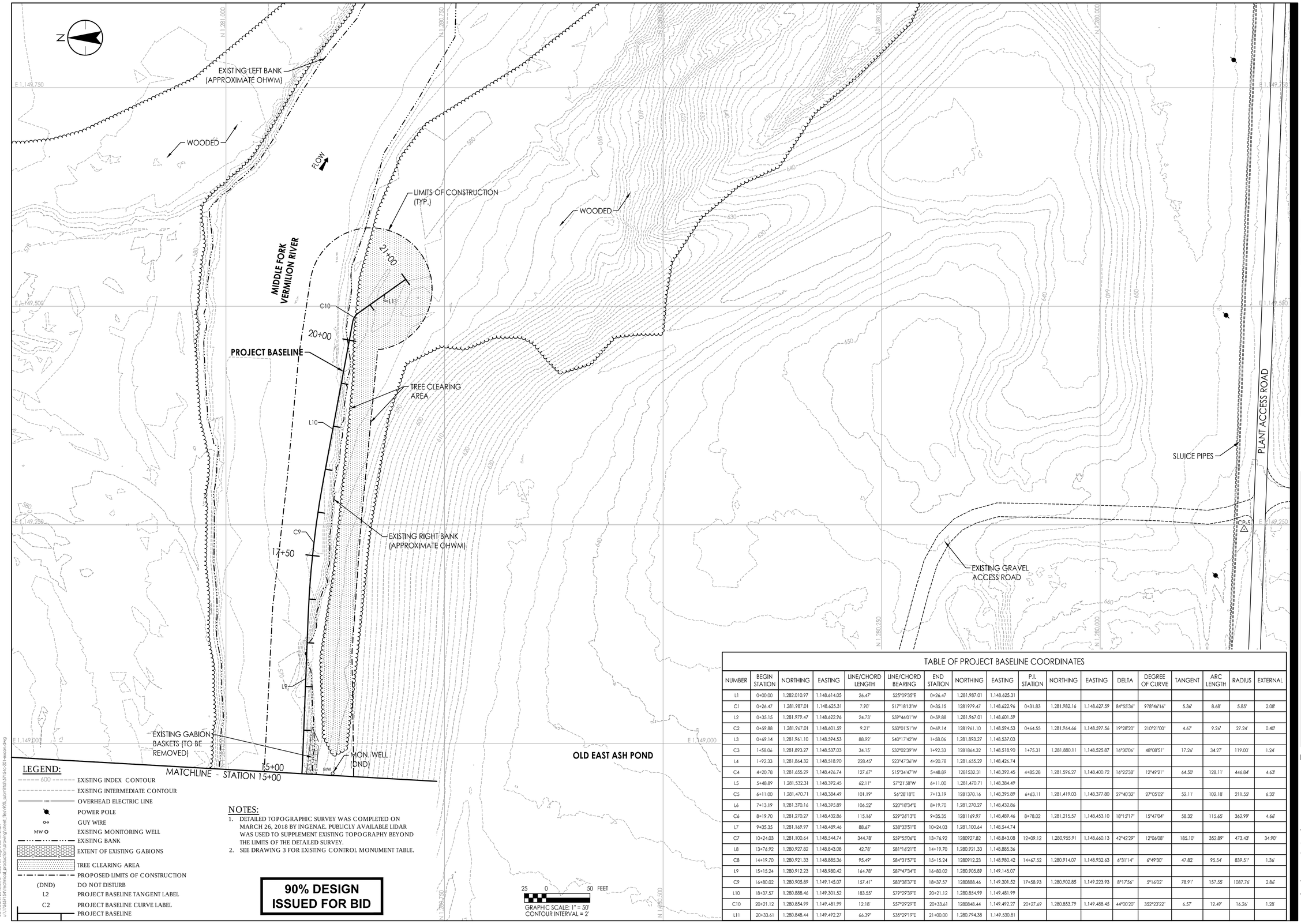
MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
EXISTING CONDITIONS AND
PROJECT BASELINE LAYOUT

Project Number: 175657154
File Name: 57154c-201-excon.dwg

BFS	SDP	TCD	18.09.07
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. 3
Revision 0
Sheet 3 of 16



LEGEND:

- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- OHE — OVERHEAD ELECTRIC LINE
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2. SEE DRAWING 3 FOR EXISTING CONTROL MONUMENT TABLE.

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CONTOUR INTERVAL = 2'

TABLE OF PROJECT BASELINE COORDINATES

NUMBER	BEGIN STATION	NORTHING	EASTING	LINE/CHORD LENGTH	LINE/CHORD BEARING	END STATION	NORTHING	EASTING	P.I. STATION	NORTHING	EASTING	DELTA	DEGREE OF CURVE	TANGENT	ARC LENGTH	RADIUS	EXTERNAL
L1	0+00.00	1,282,010.97	1,148,614.05	26.47'	S25°09'35"E	0+26.47	1,281,987.01	1,148,625.31									
C1	0+26.47	1,281,987.01	1,148,625.31	7.90'	S17°18'13"W	0+35.15	1281979.47	1,148,622.96	0+31.83	1,281,982.16	1,148,627.59	84°55'36"	978°46'16"	5.36'	8.68'	5.85'	2.08'
L2	0+35.15	1,281,979.47	1,148,622.96	24.73'	S59°46'01"W	0+59.88	1,281,967.01	1,148,601.59									
C2	0+59.88	1,281,967.01	1,148,601.59	9.21'	S50°01'51"W	0+69.14	1281961.10	1,148,594.53	0+64.55	1,281,964.66	1,148,597.56	19°28'20"	210°21'00"	4.67'	9.26'	27.24'	0.40'
L3	0+69.14	1,281,961.10	1,148,594.53	88.92'	S40°17'42"W	1+58.06	1,281,893.27	1,148,537.03									
C3	1+58.06	1,281,893.27	1,148,537.03	34.15'	S32°02'39"W	1+92.33	1281864.32	1,148,518.90	1+75.31	1,281,880.11	1,148,525.87	16°30'06"	48°08'51"	17.26'	34.27'	119.00'	1.24'
L4	1+92.33	1,281,864.32	1,148,518.90	228.45'	S23°47'36"W	4+20.78	1,281,655.29	1,148,426.74									
C4	4+20.78	1,281,655.29	1,148,426.74	127.67'	S15°34'47"W	5+48.89	1281532.31	1,148,392.45	4+85.28	1,281,596.27	1,148,400.72	16°25'38"	12°49'21"	64.50'	128.11'	446.84'	4.63'
L5	5+48.89	1,281,532.31	1,148,392.45	62.11'	S7°21'58"W	6+11.00	1,281,470.71	1,148,384.49									
C5	6+11.00	1,281,470.71	1,148,384.49	101.19'	S6°28'18"E	7+13.19	1281370.16	1,148,395.89	6+63.11	1,281,419.03	1,148,377.80	27°40'32"	27°05'02"	52.11'	102.18'	211.55'	6.32'
L6	7+13.19	1,281,370.16	1,148,395.89	106.52'	S20°18'34"E	8+19.70	1,281,270.27	1,148,432.86									
C6	8+19.70	1,281,270.27	1,148,432.86	115.16'	S29°26'13"E	9+35.35	1281169.97	1,148,489.46	8+78.02	1,281,215.57	1,148,453.10	18°15'17"	15°47'04"	58.32'	115.65'	362.99'	4.66'
L7	9+35.35	1,281,169.97	1,148,489.46	88.67'	S38°33'51"E	10+24.03	1,281,100.64	1,148,544.74									
C7	10+24.03	1,281,100.64	1,148,544.74	344.78'	S59°55'06"E	13+76.92	1280927.82	1,148,843.08	12+09.12	1,280,955.91	1,148,660.13	42°42'29"	12°06'08"	185.10'	352.89'	473.43'	34.90'
L8	13+76.92	1,280,927.82	1,148,843.08	42.78'	S81°16'21"E	14+19.70	1,280,921.33	1,148,885.36									
C8	14+19.70	1,280,921.33	1,148,885.36	95.49'	S84°31'57"E	15+15.24	128092.23	1,148,980.42	14+67.52	1,280,914.07	1,148,932.63	6°31'14"	6°49'30"	47.82'	95.54'	839.51'	1.36'
L9	15+15.24	1,280,912.23	1,148,980.42	164.78'	S87°47'34"E	16+80.02	1,280,905.89	1,149,145.07									
C9	16+80.02	1,280,905.89	1,149,145.07	157.41'	S83°38'37"E	18+37.57	1280888.46	1,149,301.52	17+58.93	1,280,902.85	1,149,223.93	8°17'56"	5°16'02"	78.91'	157.55	1087.76'	2.86'
L10	18+37.57	1,280,888.46	1,149,301.52	183.55'	S79°29'39"E	20+21.12	1,280,854.99	1,149,481.99									
C10	20+21.12	1,280,854.99	1,149,481.99	12.18	S57°29'29"E	20+33.61	1280848.44	1,149,492.27	20+27.69	1,280,853.79	1,149,488.45	44°00'20"	352°23'22"	6.57'	12.49'	16.26'	1.28'
L11	20+33.61	1,280,848.44	1,149,492.27	66.39'	S35°29'19"E	21+00.00	1,280,794.38	1,149,530.81									

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MIDDLE FORK VERMILION RIVER
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Title
EXISTING CONDITIONS AND
PROJECT BASELINE LAYOUT

Project Number: 175657154

File Name: 57154c-201-excon.dwg

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Drawing No. 4

Revision	Sheet
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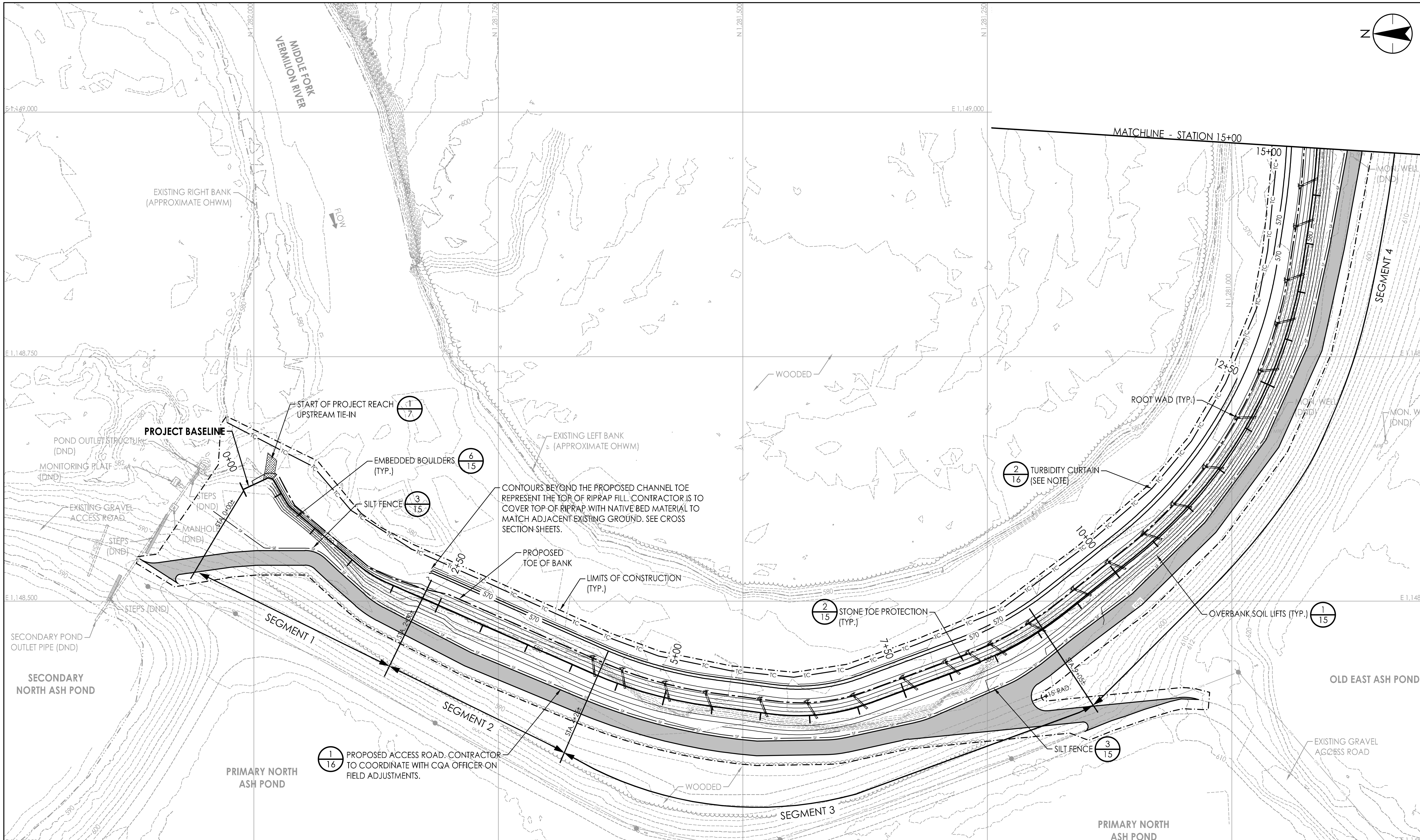

LEGEND:

600	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
OHE	OVERHEAD ELECTRIC LINE
	EXISTING BANK
	POWER POLE
	GUY WIRE
MW	EXISTING MONITORING WELL
	PROJECT SEGMENT
	PROPOSED LIMITS OF CONSTRUCTION
	PROPOSED BANK TOE
SF	PROPOSED SILT FENCE
TC	PROPOSED TURBIDITY CURTAIN
	PROPOSED ROOT WAD
	PROPOSED ACCESS ROAD

NOTES:

1. DETAILED TOPOGRAPHIC SURVEY WAS COMPLETED ON MARCH 26, 2018 BY INGENAE. PUBLICLY AVAILABLE LIDAR WAS USED TO SUPPLEMENT EXISTING TOPOGRAPHY BEYOND THE LIMITS OF THE DETAILED SURVEY.
2. THE CONTRACTOR SHALL DEPLOY THE TURBIDITY CURTAIN IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION OR AS DIRECTED BY THE OWNER. THE CONFIGURATION SHOWN IS FOR ILLUSTRATION PURPOSES ONLY.

SECTION OR DETAIL NO.
SHEET WHERE SHOWN
REFERENCE KEY

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MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
BANK STABILIZATION PLAN

Project Number: 175657154
File Name: 57154c-301-const.dwg

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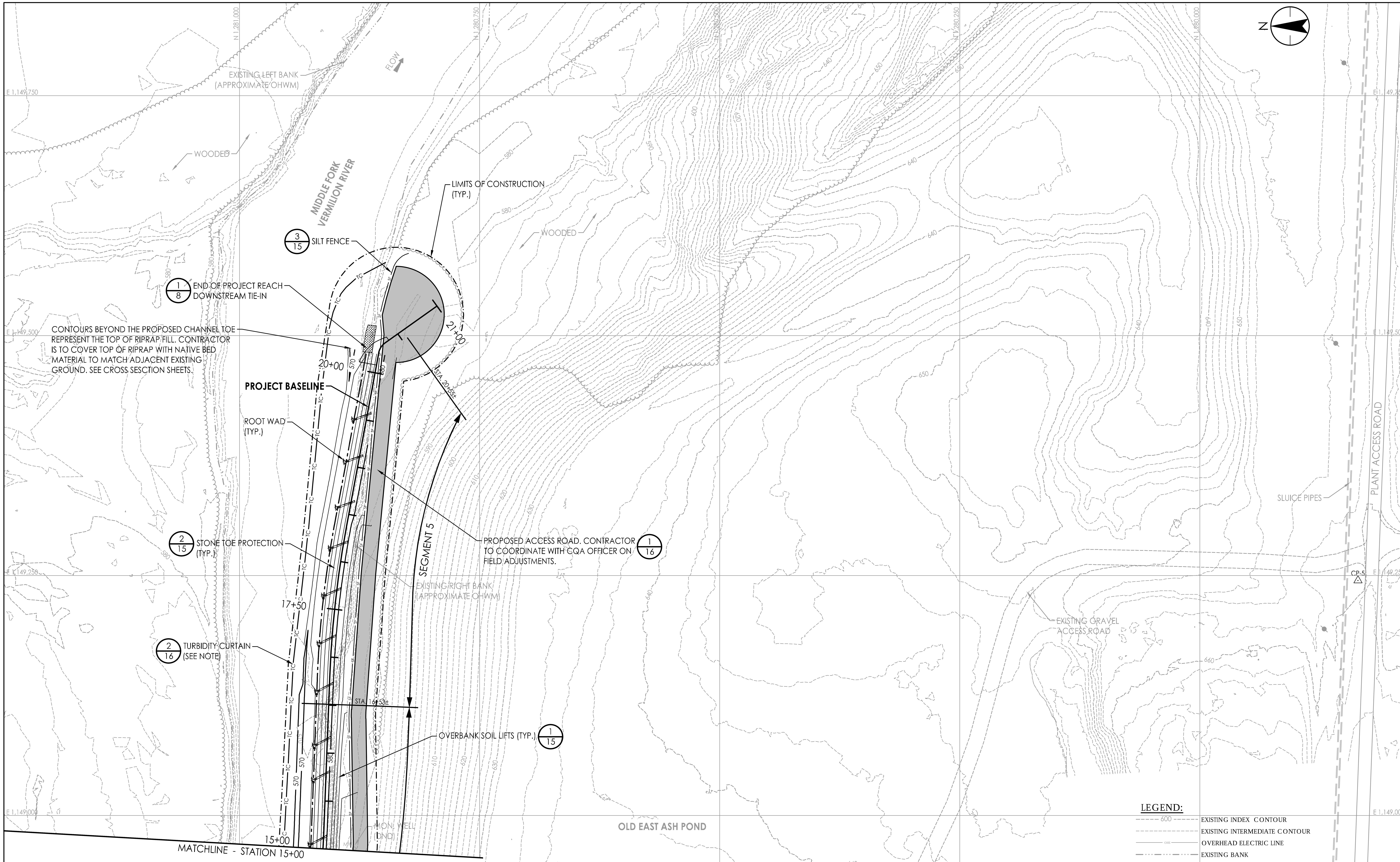
Drawing No. 5
Revision 0
Sheet 5 of 16



EXISTING LEFT BANK (APPROXIMATE OHWM)
FLOW
WOODED
MIDDLE FORK VERMILION RIVER
LIMITS OF CONSTRUCTION (TYP.)
WOODED
3/15 SILT FENCE
1/8 END OF PROJECT REACH DOWNSTREAM TIE-IN
CONTOURS BEYOND THE PROPOSED CHANNEL TOE REPRESENT THE TOP OF RIPRAP FILL. CONTRACTOR IS TO COVER TOP OF RIPRAP WITH NATIVE BED MATERIAL TO MATCH ADJACENT EXISTING GROUND. SEE CROSS SESCTION SHEETS.
21+00
20+00
STA 20+55±
PROJECT BASELINE
ROOT WAD (TYP.)
SEGMENT 5
PROPOSED ACCESS ROAD. CONTRACTOR TO COORDINATE WITH CQA OFFICER ON FIELD ADJUSTMENTS. 1/16
2/15 STONE TOE PROTECTION (TYP.)
EXISTING RIGHT BANK (APPROXIMATE OHWM)
17+50
2/16 TURBIDITY CURTAIN (SEE NOTE)
STA 16+53±
OVERBANK SOIL LIFTS (TYP.) 1/15
15+00
MATCHLINE - STATION 15+00
MON. WELL
OLD EAST ASH POND
SLUICE PIPES
PLANT ACCESS ROAD
CP-5
EXISTING GRAVEL ACCESS ROAD
N

SECTION OR DETAIL NO.

SHEET WHERE SHOWN

REFERENCE KEY

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LEGEND:

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- EXISTING MONITORING WELL
- PROJECT SEGMENT
- PROPOSED LIMITS OF CONSTRUCTION
- PROPOSED BANK TOE
- PROPOSED SILT FENCE
- PROPOSED TURBIDITY CURTAIN
- PROPOSED ROOT WAD
- PROPOSED ACCESS ROAD

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Revision | By | Appd. | YY.MM.DD

Issued | By | Appd. | YY.MM.DD

Client/Project
DYNEGY MIDWEST GENERATION, LLC

MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
BANK STABILIZATION PLAN

Permit-Seal

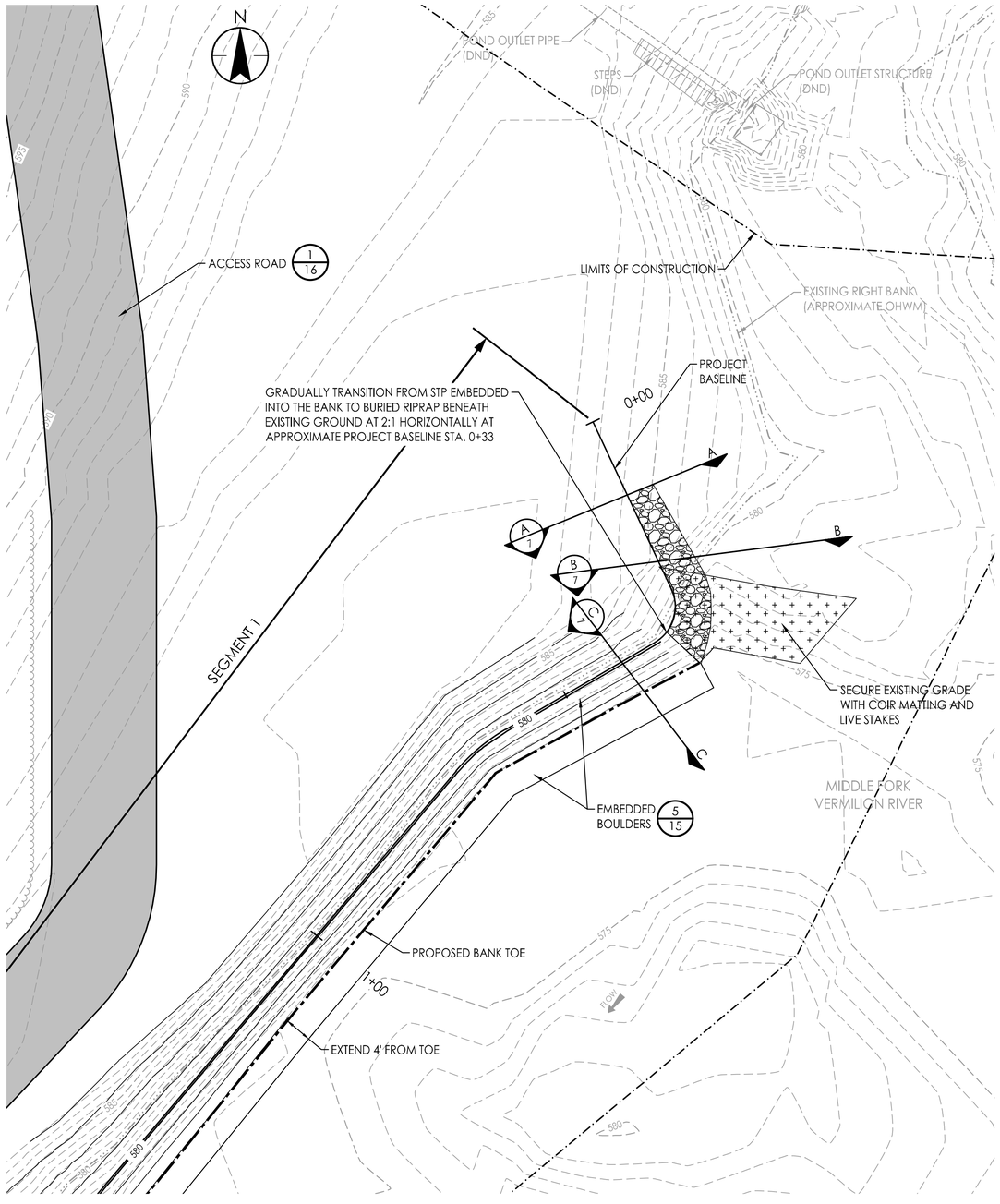
Project Number: 175657154

File Name: 57154c-301-const.dwg

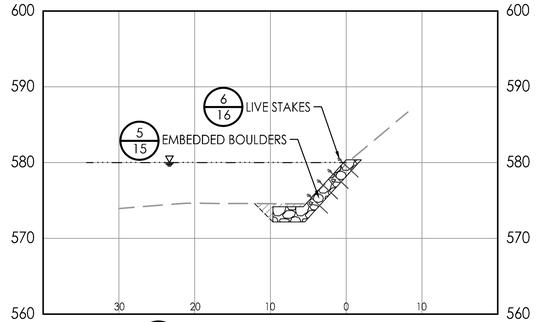
BFS	SDP	TCD	18.09.07
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. 6

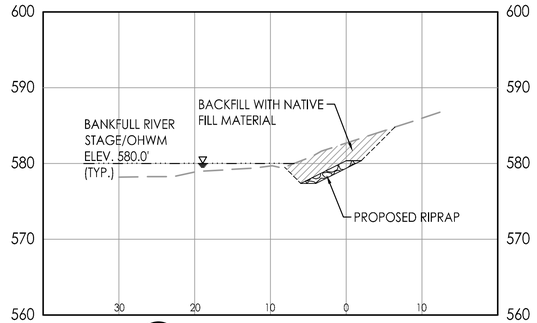
Revision 0



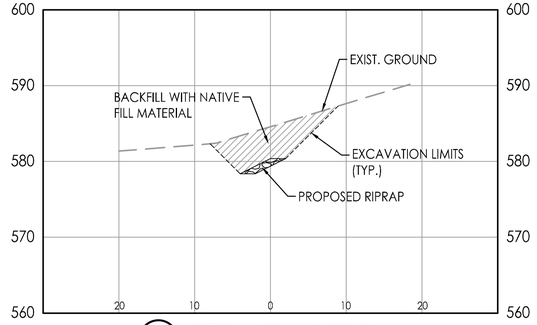
1/7 PLAN - UPSTREAM TIE-IN
SCALE: 1"=10'



C/7 UPSTREAM TIE-IN - SECTION C
SCALE: 1"=10'



B/7 UPSTREAM TIE-IN - SECTION B
SCALE: 1"=10'



A/7 UPSTREAM TIE-IN - SECTION A
SCALE: 1"=10'

LEGEND:

- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- OHE — OVERHEAD ELECTRIC LINE
- EXISTING BANK
- POWER POLE
- GUY WIRE
- MW O — EXISTING MONITORING WELL
- PROJECT SEGMENT
- PROPOSED LIMITS OF CONSTRUCTION
- PROPOSED BANK TOE
- SF — PROPOSED SILT FENCE
- TC — PROPOSED TURBIDITY CURTAIN
- PROPOSED ROOT WAD
- PROPOSED ACCESS ROAD

NOTE:
DETAILED TOPOGRAPHIC SURVEY WAS COMPLETED ON MARCH 26, 2018 BY INGENAE. PUBLICLY AVAILABLE LIDAR WAS USED TO SUPPLEMENT EXISTING TOPOGRAPHY BEYOND THE LIMITS OF THE DETAILED SURVEY.

90% DESIGN ISSUED FOR BID

SECTION OR DETAIL NO.
SHEET WHERE SHOWN
REFERENCE KEY

5 0 10 FEET
GRAPHIC SCALE: 1" = 10'
CONTOUR INTERVAL = 1'

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Client/Project
DYNEGY MIDWEST GENERATION, LLC

MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
UPSTREAM TIE-IN PLAN AND CROSS SECTIONS

Permit-Seal

Project Number: 175657154
File Name: 57154c-602-tie.dwg

BFS	SDP	TCD	18.09.07
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. 7
Revision 0
Sheet 7 of 16

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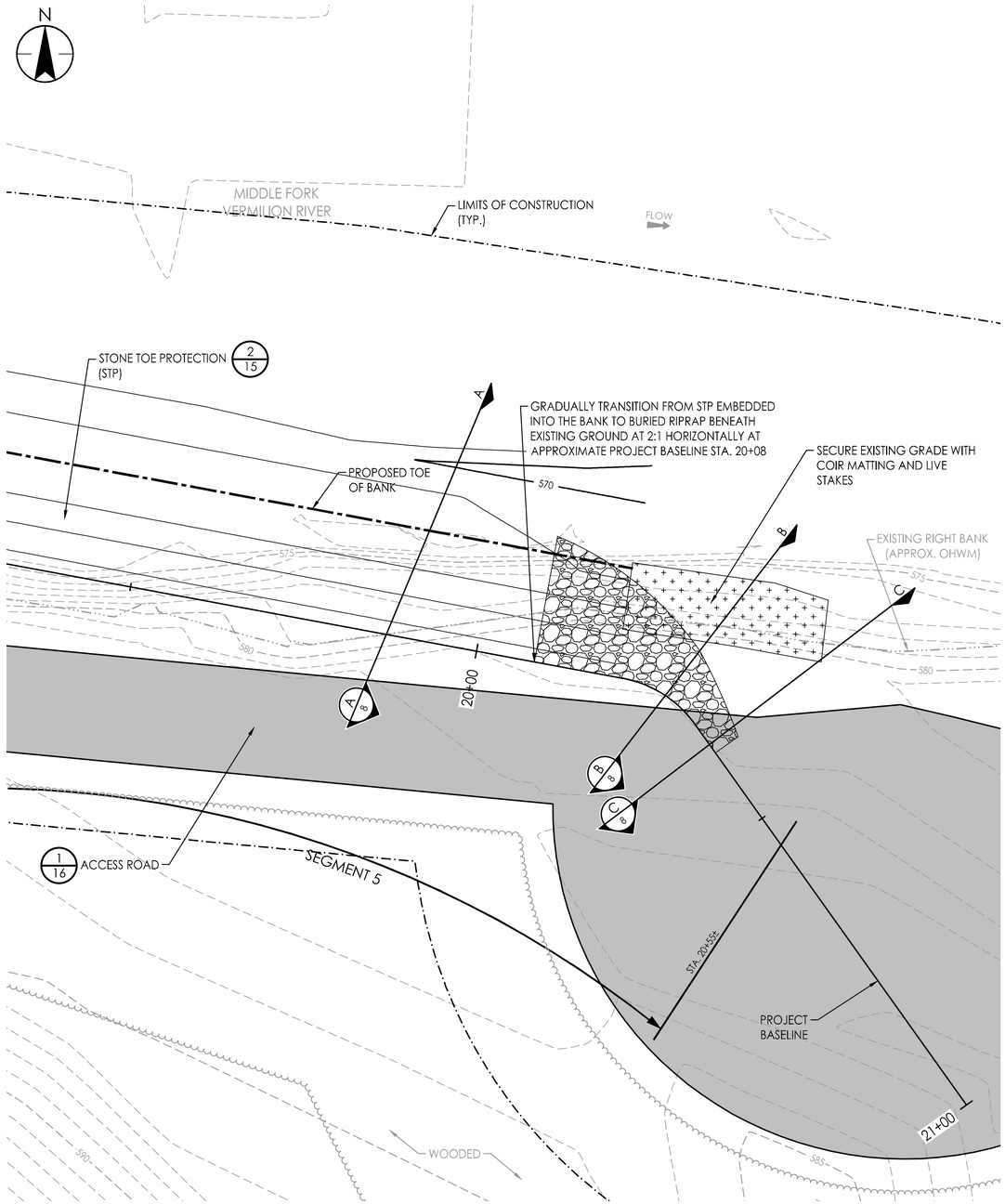
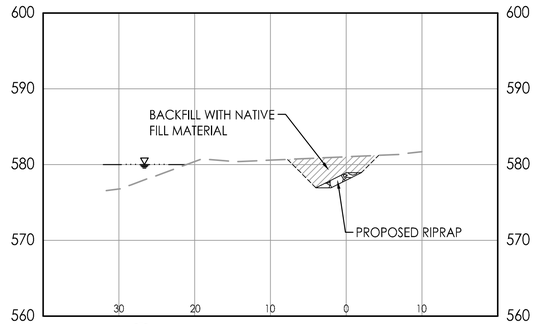
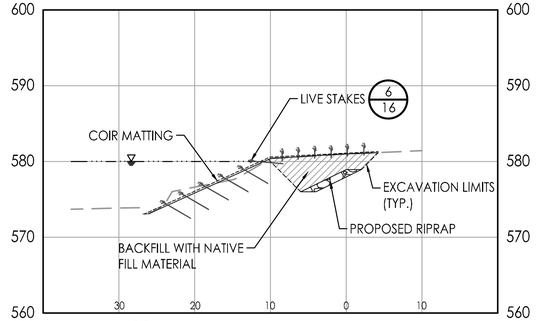


1/8 PLAN - DOWNSTREAM TIE-IN
SCALE: 1"=10'



C/8 DOWNSTREAM TIE-IN - SECTION C
SCALE: 1"=10'



B/8 DOWNSTREAM TIE-IN - SECTION B
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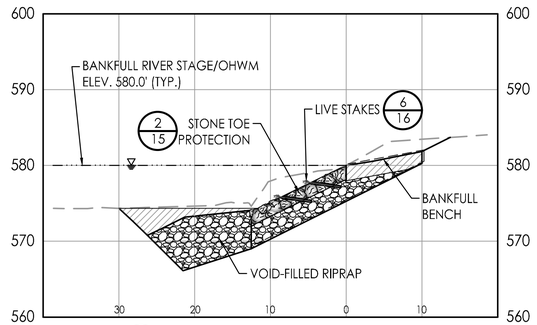

A/8 DOWNSTREAM TIE-IN - SECTION A
SCALE: 1"=10'

NOTE:
DETAILED TOPOGRAPHIC SURVEY WAS COMPLETED ON MARCH 26, 2018 BY INGENAE. PUBLICLY AVAILABLE LIDAR WAS USED TO SUPPLEMENT EXISTING TOPOGRAPHY BEYOND THE LIMITS OF THE DETAILED SURVEY.

LEGEND:

- 600 — EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- OHE — OVERHEAD ELECTRIC LINE
- EXISTING BANK
- POWER POLE
- GUY WIRE
- MW — EXISTING MONITORING WELL
- PROJECT SEGMENT
- PROPOSED LIMITS OF CONSTRUCTION
- PROPOSED BANK TOE
- SF — PROPOSED SILT FENCE
- TC — PROPOSED TURBIDITY CURTAIN
- PROPOSED ROOT WAD
- PROPOSED ACCESS ROAD

90% DESIGN ISSUED FOR BID

SECTION OR DETAIL NO.
SHEET WHERE SHOWN
REFERENCE KEY

5 0 10 FEET
GRAPHIC SCALE: 1" = 10'
CONTOUR INTERVAL = 1'

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Client/Project
DYNEGY MIDWEST GENERATION, LLC

MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
DOWNSTREAM TIE-IN PLAN AND CROSS SECTIONS

Permit-Seal

Project Number: 175657154

File Name: 57154c-602-tie.dwg

BFS	SDP	TCD	18.09.07
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. 8

Revision	Sheet
0	8 of 16

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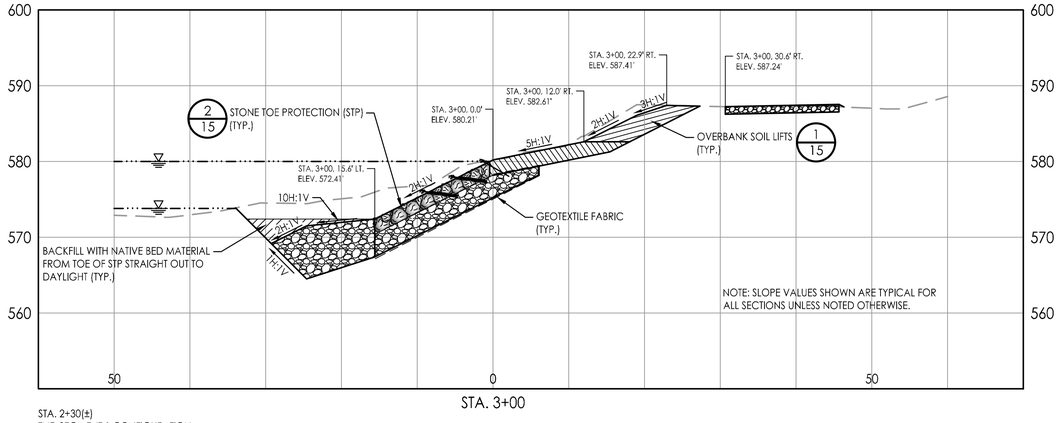

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STA. 2+30(±)
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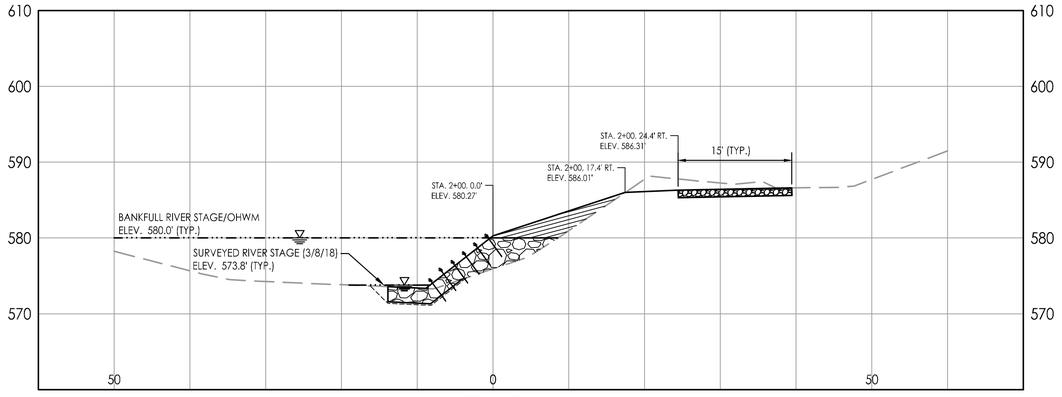

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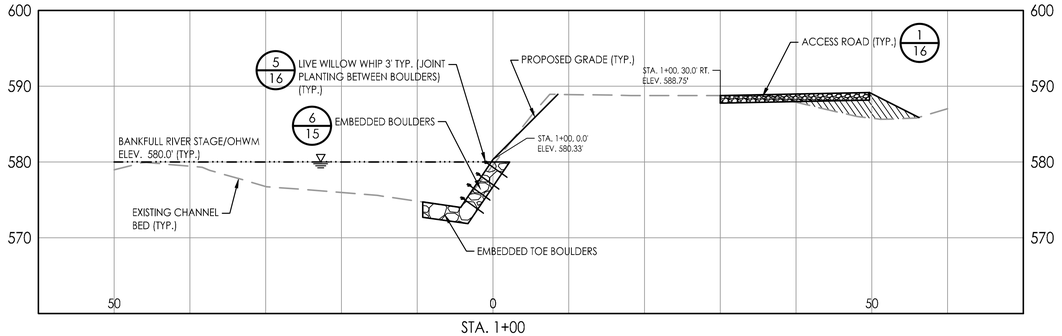

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STA. 0+00(±)
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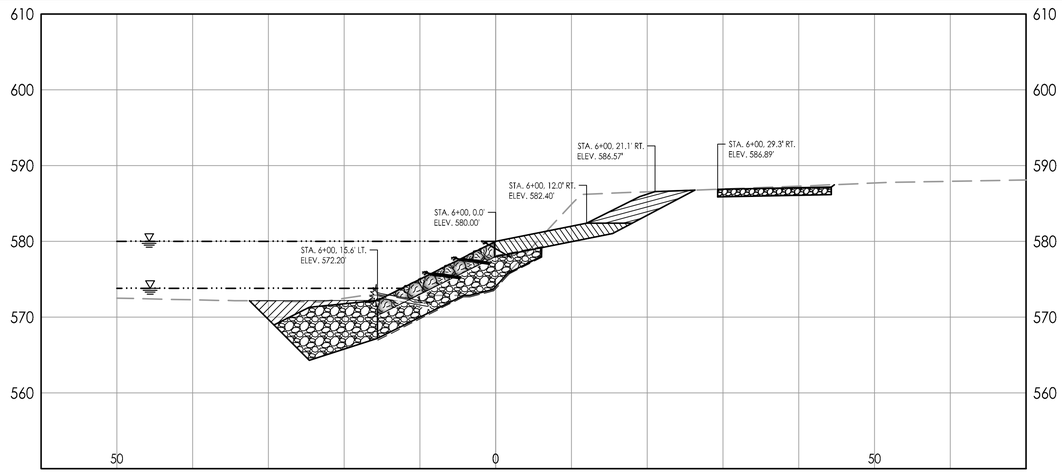

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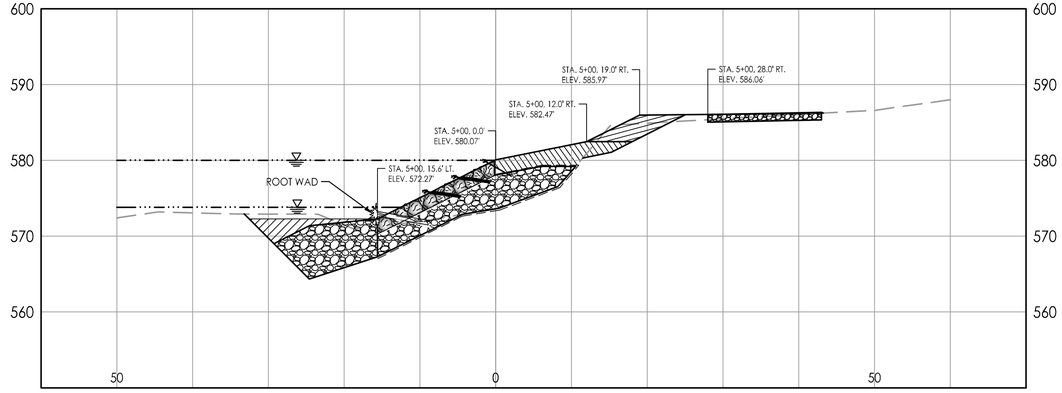

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STA. 4+25(±)
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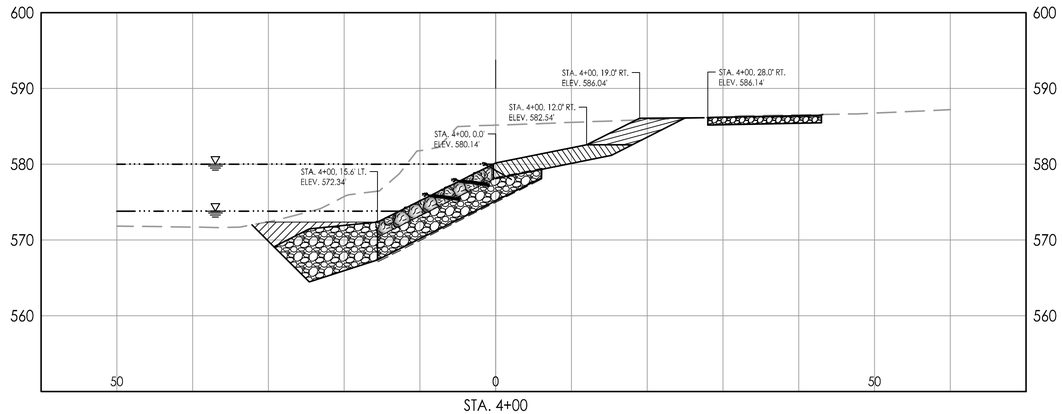

STA. 4+00

SECTION OR DETAIL NO.
TARGET DRAWING
REFERENCE KEY

5 0 10 FEET
GRAPHIC SCALE: 1" = 10'

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Client/Project
DYNEGY MIDWEST GENERATION, LLC

MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
CROSS SECTIONS
STA. 1+00 TO STA. 6+00

Permit-Seal

Project Number: 175657154
File Name: 57154c-401-xsecs.dwg

BFS	PS	TCD	18.09.07
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Drawing No. 9
Revision 0
Sheet 9 of 16

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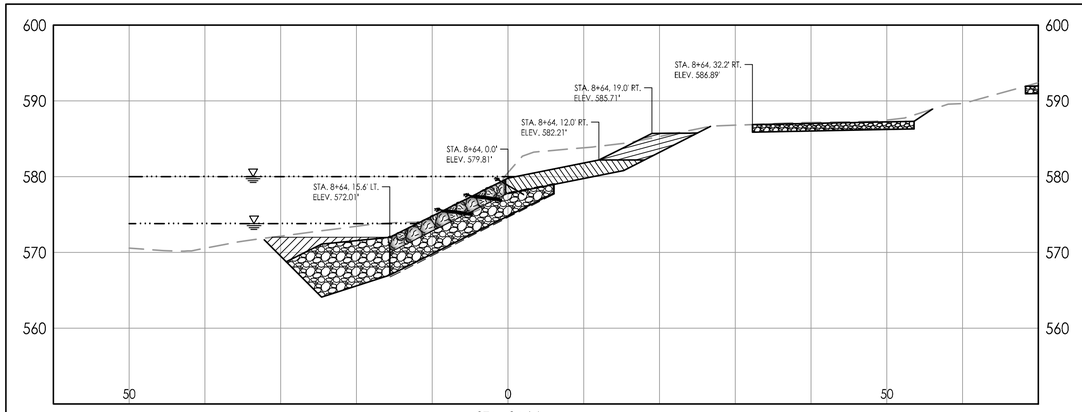
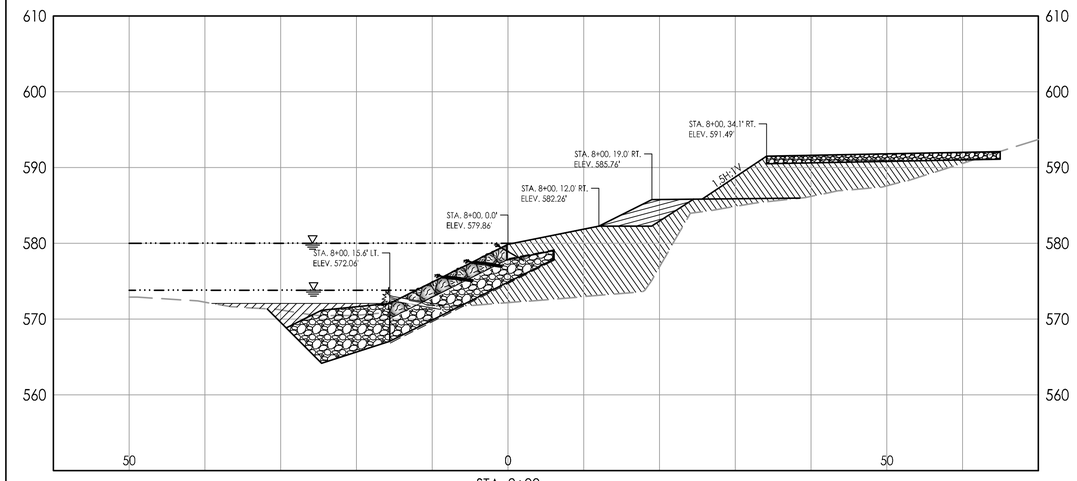


STA. 8+64



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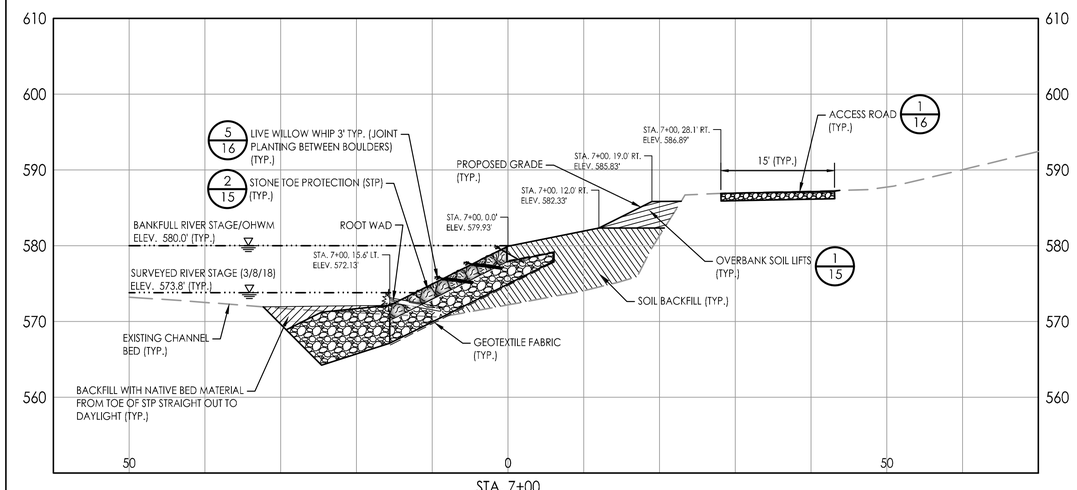

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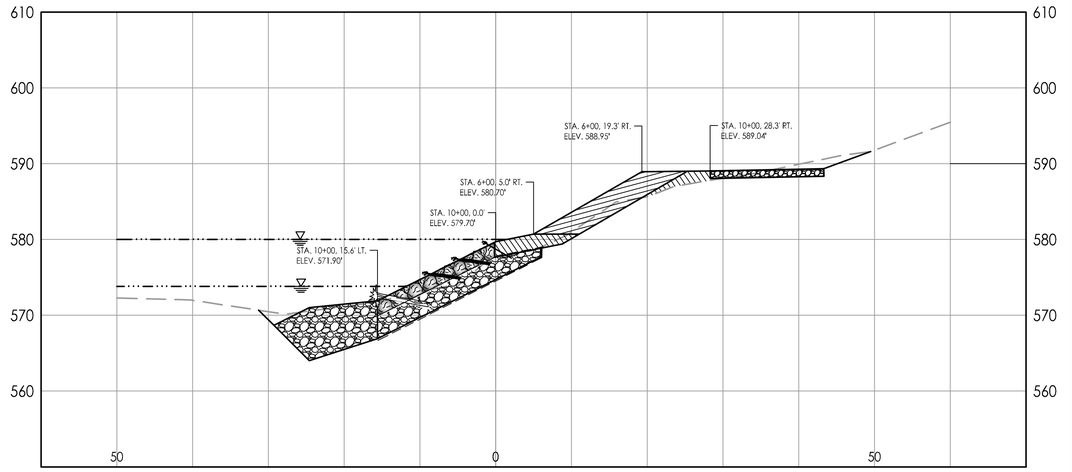

STA. 10+00

STA. 9+05(±)
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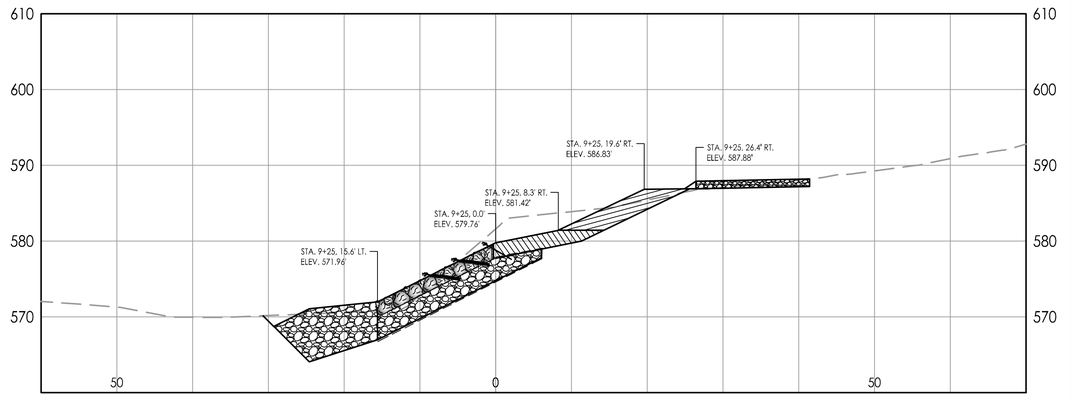

STA. 9+25

SECTION OR DETAIL NO.
TARGET DRAWING
REFERENCE KEY

5 0 10 FEET
GRAPHIC SCALE: 1" = 10'

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Client/Project
DYNEGY MIDWEST GENERATION, LLC

MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
CROSS SECTIONS
STA. 7+00 TO STA. 10+00

Permit-Seal

Project Number: 175657154

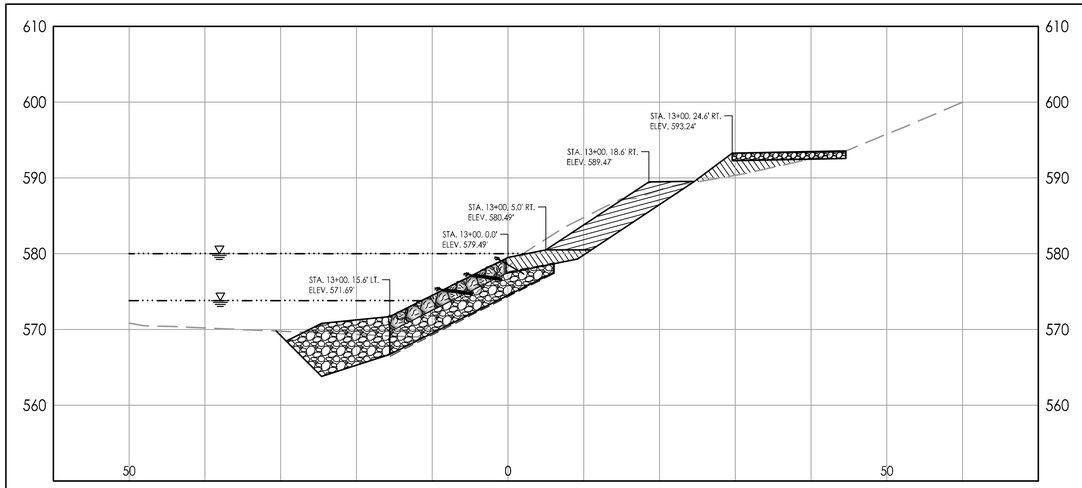
File Name: 57154c-401-xsecs.dwg

BFS	PS	TCD	18.09.07
Dwn.	Chkd.	Dsgn.	YY.MM.DD

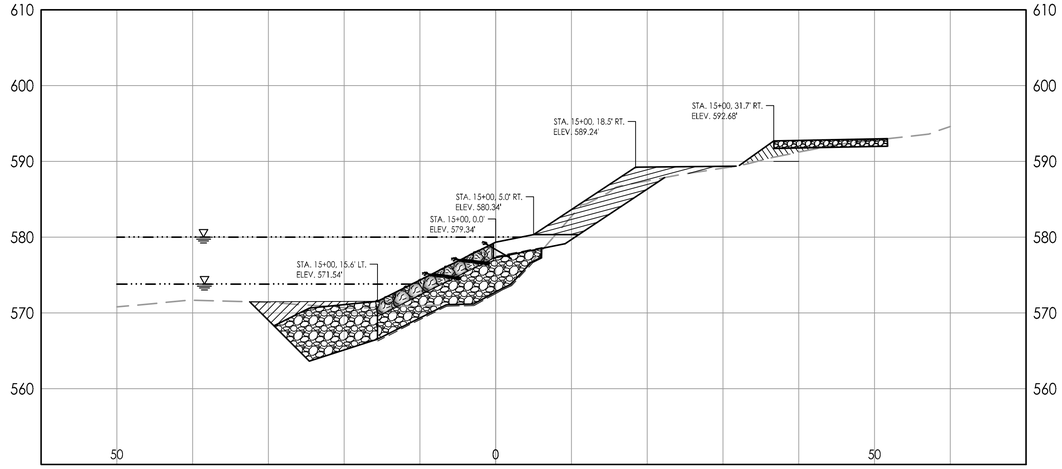
Drawing No. 10

Revision 0

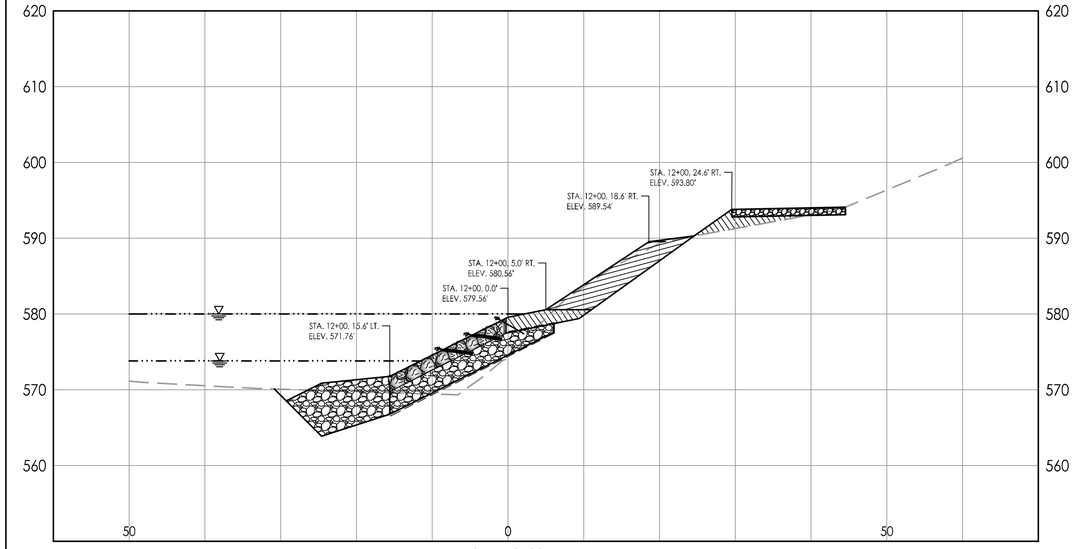
Sheet 10 of 16



STA. 13+00



STA. 15+00



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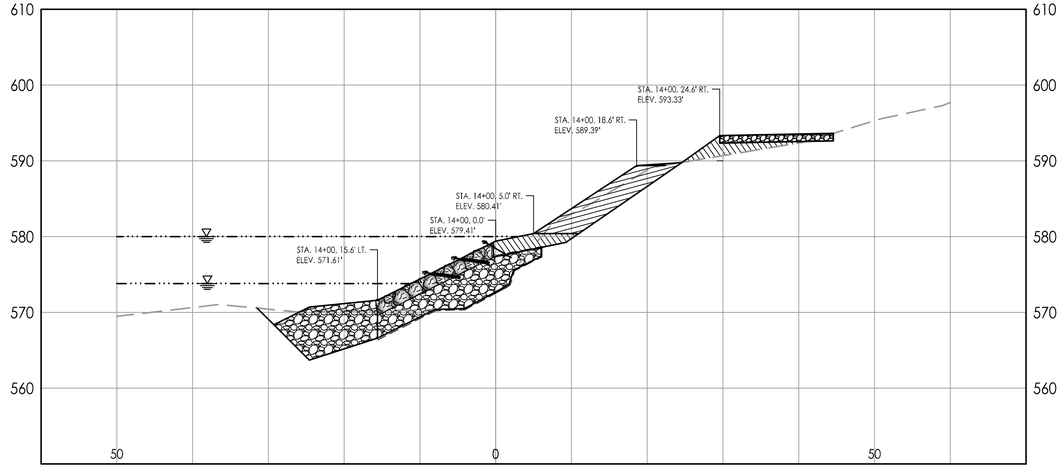
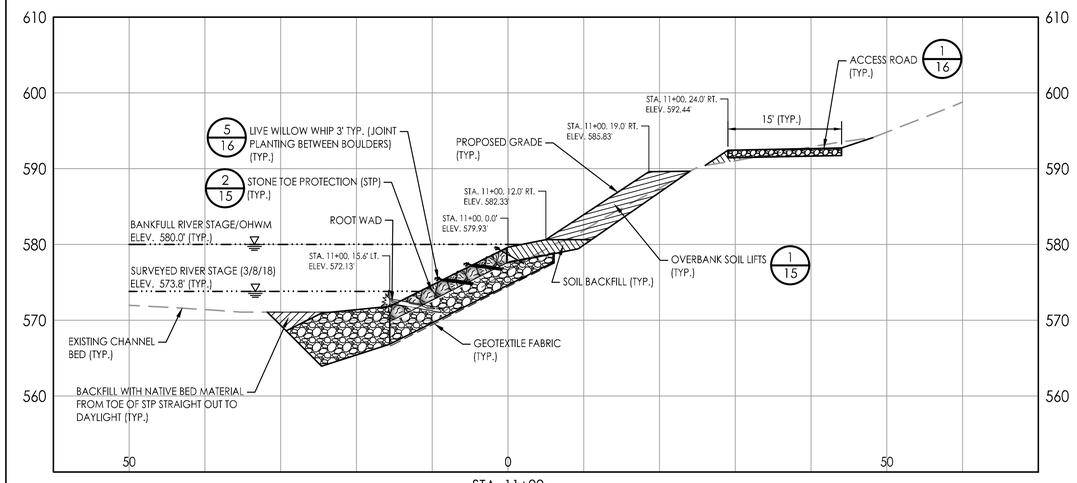


STA. 14+00



STA. 11+00

SECTION OR DETAIL NO.
TARGET DRAWING
REFERENCE KEY

5 0 10 FEET
GRAPHIC SCALE: 1" = 10'

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Client/Project
DYNEGY MIDWEST GENERATION, LLC

Permit-Seal

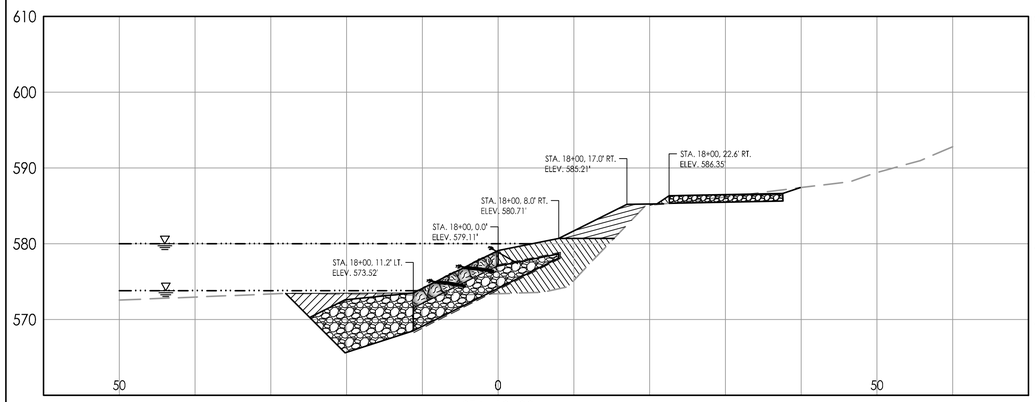
MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
CROSS SECTIONS
STA. 11+00 TO STA. 15+00

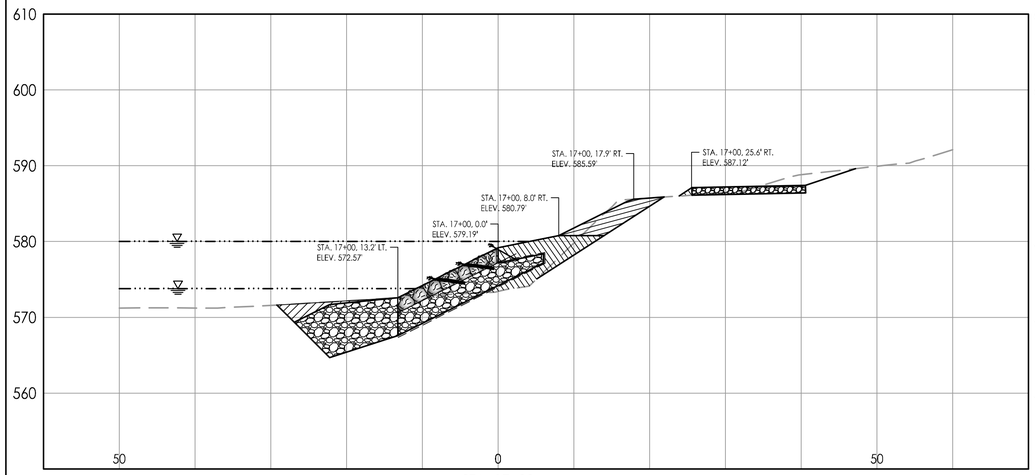
Project Number: 175657154
File Name: 57154c-401-xsecs.dwg

BFS	PS	TCD	18.09.07
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. 11
Revision 0
Sheet 11 of 16



STA. 18+00



STA. 17+00

STA. 16+53(±)
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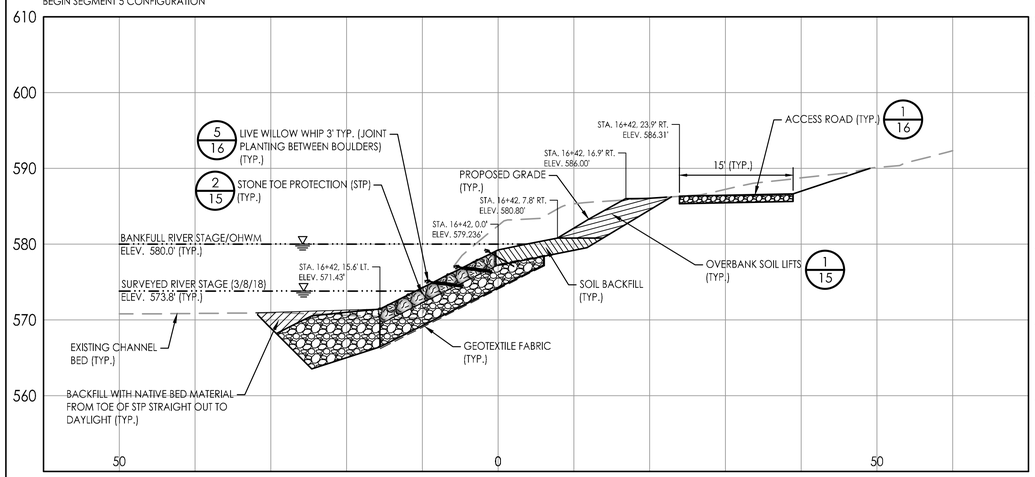

STA. 16+42

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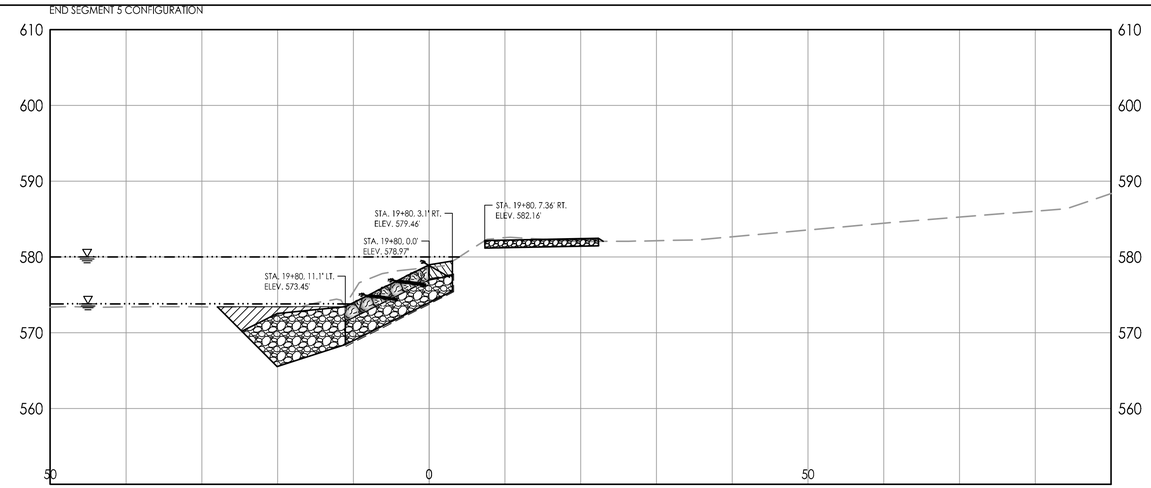
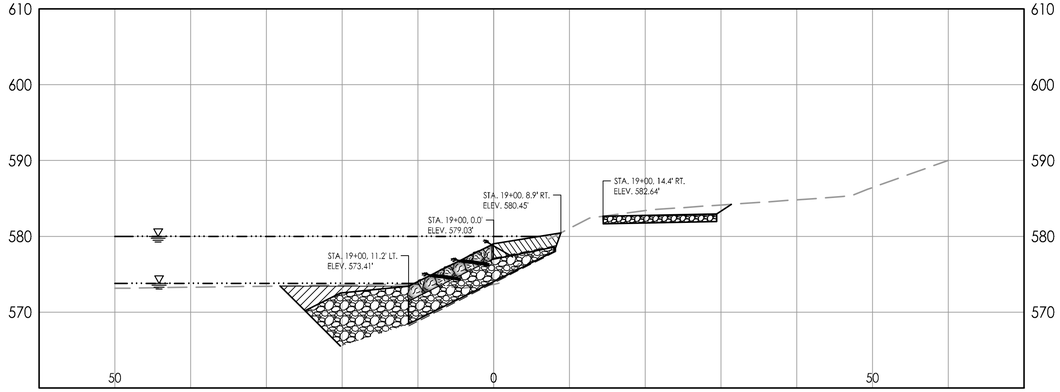


STA. 19+80



STA. 19+00

SECTION OR DETAIL NO.
TARGET DRAWING
REFERENCE KEY

5 0 10 FEET
GRAPHIC SCALE: 1" = 10'

90% DESIGN ISSUED FOR BID

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Client/Project
DYNEGY MIDWEST GENERATION, LLC

MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
CROSS SECTIONS
STA. 16+42 TO STA. 19+80

Permit-Seal

Project Number: 175657154

File Name: 57154c-401-xsecs.dwg

BFS	PS	TCD	18.09.07
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Drawing No. 1212

Revision 0

Sheet 12 of 16

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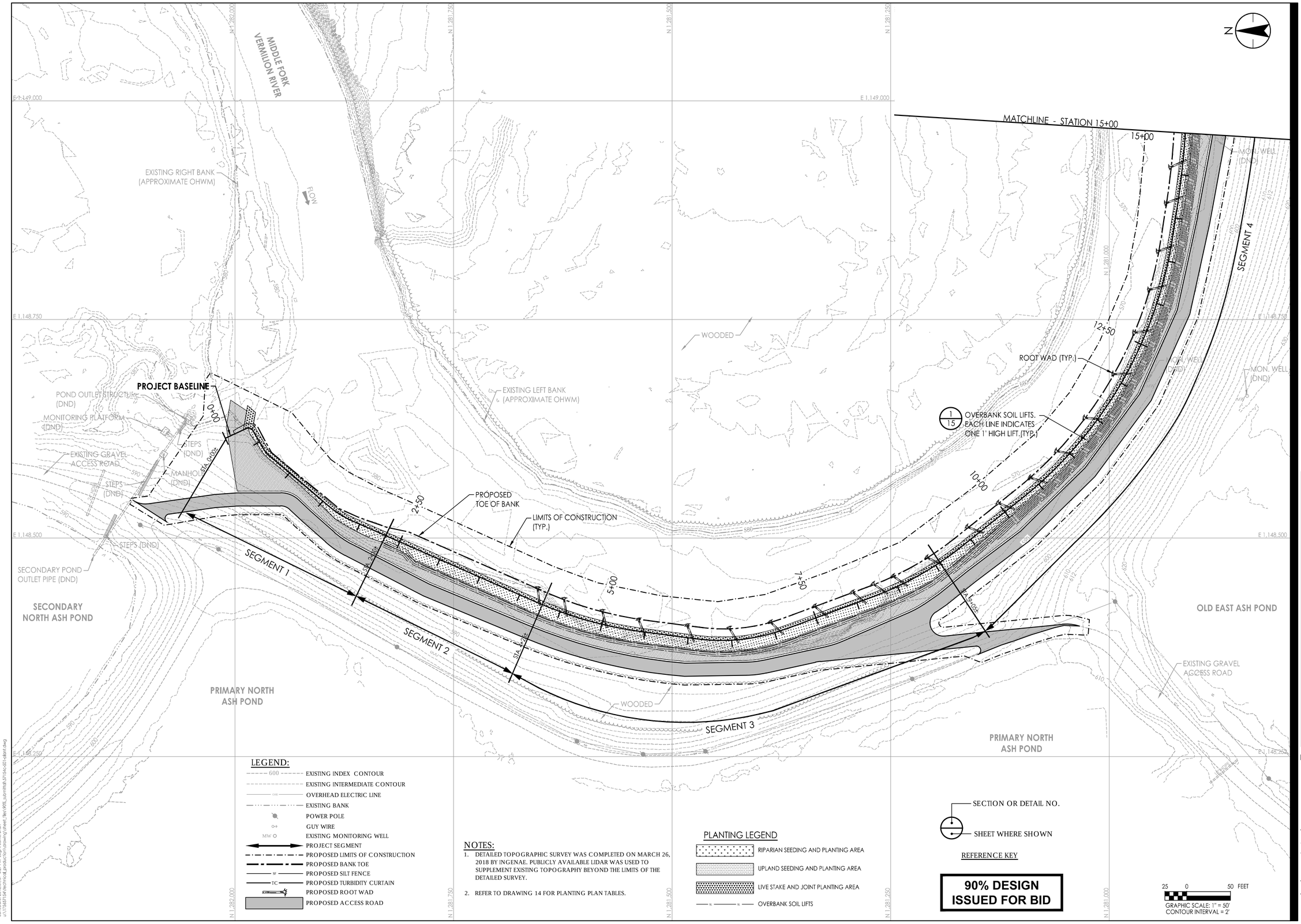

LEGEND:

- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- OHE — OVERHEAD ELECTRIC LINE
- EXISTING BANK
- POWER POLE
- GUY WIRE
- MW — EXISTING MONITORING WELL
- PROJECT SEGMENT
- PROPOSED LIMITS OF CONSTRUCTION
- PROPOSED BANK TOE
- SF — PROPOSED SILT FENCE
- TC — PROPOSED TURBIDITY CURTAIN
- PROPOSED ROOT WAD
- PROPOSED ACCESS ROAD

NOTES:

1. DETAILED TOPOGRAPHIC SURVEY WAS COMPLETED ON MARCH 26, 2018 BY INGENAE. PUBLICLY AVAILABLE LIDAR WAS USED TO SUPPLEMENT EXISTING TOPOGRAPHY BEYOND THE LIMITS OF THE DETAILED SURVEY.
2. REFER TO DRAWING 14 FOR PLANTING PLAN TABLES.

PLANTING LEGEND

- RIPARIAN SEEDING AND PLANTING AREA
- UPLAND SEEDING AND PLANTING AREA
- LIVE STAKE AND JOINT PLANTING AREA
- SL — SL — OVERBANK SOIL LIFTS

SECTION OR DETAIL NO.

SHEET WHERE SHOWN

REFERENCE KEY

90% DESIGN ISSUED FOR BID

25 0 50 FEET
GRAPHIC SCALE: 1" = 50'
CONTOUR INTERVAL = 2'

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MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
PLANTING PLAN

Permit-Seal

Project Number: 175657154

File Name: 57154c-S01-plant.dwg

BFS	SDP	TCD	18.09.07
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. 13

Revision 0

Sheet 13 of 16

Save Date: 2018/09/07 2:27 PM Login: Sams, Brian
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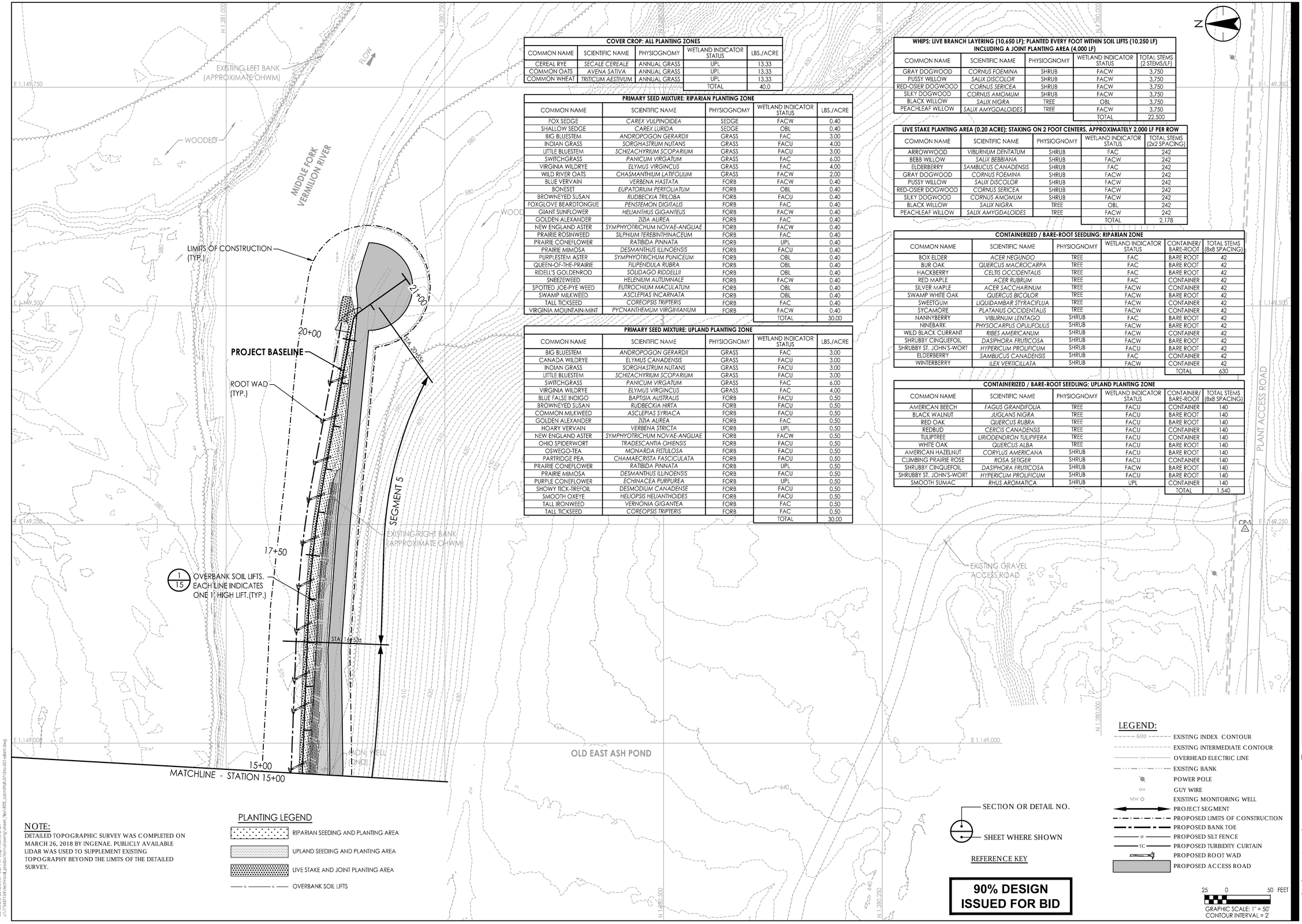

COVER CROP: ALL PLANTING ZONES

COMMON NAME	SCIENTIFIC NAME	PHYSIOGNOMY	WETLAND INDICATOR STATUS	LBS./ACRE
CEREAL RYE	*SECALE CEREALE*	ANNUAL GRASS	UPL	13.33
COMMON OATS	*AVENA SATIVA*	ANNUAL GRASS	UPL	13.33
COMMON WHEAT	*TRITICUM AESTIVUM*	ANNUAL GRASS	UPL	13.33
			TOTAL	40.0

PRIMARY SEED MIXTURE: RIPARIAN PLANTING ZONE

COMMON NAME	SCIENTIFIC NAME	PHYSIOGNOMY	WETLAND INDICATOR STATUS	LBS./ACRE
FOX SEDGE	*CAREX VULPINOIDEA*	SEDGE	FACW	0.40
SHALLOW SEDGE	*CAREX LURIDA*	SEDGE	OBL	0.40
BIG BLUESTEM	*ANDROPOGON GERARDII*	GRASS	FAC	3.00
INDIAN GRASS	*SORGHASTRUM NUTANS*	GRASS	FACU	4.00
LITTLE BLUESTEM	*SCHIZACHYRIUM SCOPARIUM*	GRASS	FACU	3.00
SWITCHGRASS	*PANICUM VIRGATUM*	GRASS	FAC	6.00
VIRGINIA WILDRYE	*ELYMUS VIRGINCUS*	GRASS	FAC	4.00
WILD RIVER OATS	*CHASMANTHIUM LATIFOLIUM*	GRASS	FACW	2.00
BLUE VERVAIN	*VERBENA HASTATA*	FORB	FACW	0.40
BONESET	*EUPATORIUM PERFOLIATUM*	FORB	OBL	0.40
BROWNEYED SUSAN	*RUDBECKIA TRILOBA*	FORB	FACU	0.40
FOXGLOVE BEARDTONGUE	*PENSTEMON DIGITALIS*	FORB	FAC	0.40
GIANT SUNFLOWER	*HELIANTHUS GIGANTEUS*	FORB	FACW	0.40
GOLDEN ALEXANDER	*ZIZIA AUREA*	FORB	FAC	0.40
NEW ENGLAND ASTER	*SYMPHYOTRICHUM NOVAE-ANGLIAE*	FORB	FACW	0.40
PRAIRIE ROSINWEED	*SILPHIUM TERBIBINTHINACEUM*	FORB	FAC	0.40
PRAIRIE CONEFLOWER	*RATIBIDA PINNATA*	FORB	UPL	0.40
PRAIRIE MIMOSA	*DESMANTHUS ILLINOENSIS*	FORB	FACU	0.40
PURPLESTEM ASTER	*SYMPHYOTRICHUM PUNICEUM*	FORB	OBL	0.40
QUEEN-OF-THE-PRAIRIE	*FILIPENDULA RUBRA*	FORB	OBL	0.40
RIDELL'S GOLDENROD	*SOLIDAGO RIDDELLII*	FORB	OBL	0.40
SNEEZEWEED	*HELENIUM AUTUMNALE*	FORB	FACW	0.40
SPOTTED JOE-PYE WEED	*EUTROCHIUM MACULATUM*	FORB	OBL	0.40
SWAMP MILKWEED	*ASCLEPIAS INCARNATA*	FORB	OBL	0.40
TALL TICKSEED	*COREOPSIS TRIPTERIS*	FORB	FAC	0.40
VIRGINIA MOUNTAIN-MINT	*PYCNANTHEMUM VIRGINIANUM*	FORB	FACW	0.40
			TOTAL	30.00

PRIMARY SEED MIXTURE: UPLAND PLANTING ZONE

COMMON NAME	SCIENTIFIC NAME	PHYSIOGNOMY	WETLAND INDICATOR STATUS	LBS./ACRE
BIG BLUESTEM	*ANDROPOGON GERARDII*	GRASS	FAC	3.00
CANADA WILDRYE	*ELYMUS CANADENSIS*	GRASS	FACU	3.00
INDIAN GRASS	*SORGHASTRUM NUTANS*	GRASS	FACU	3.00
LITTLE BLUESTEM	*SCHIZACHYRIUM SCOPARIUM*	GRASS	FACU	3.00
SWITCHGRASS	*PANICUM VIRGATUM*	GRASS	FAC	6.00
VIRGINIA WILDRYE	*ELYMUS VIRGINCUS*	GRASS	FAC	4.00
BLUE FALSE INDIGO	*BAPTISIA AUSTRALIS*	FORB	FACU	0.50
BROWNEYED SUSAN	*RUDBECKIA HIRTA*	FORB	FACU	0.50
COMMON MILKWEED	*ASCLEPIAS SYRIACA*	FORB	FACU	0.50
GOLDEN ALEXANDER	*ZIZIA AUREA*	FORB	FAC	0.50
HOARY VERVAIN	*VERBENA STRICTA*	FORB	UPL	0.50
NEW ENGLAND ASTER	*SYMPHYOTRICHUM NOVAE-ANGLIAE*	FORB	FACW	0.50
OHIO SPIDERWORT	*TRADESCANTIA OHIENSIS*	FORB	FACU	0.50
OSWEGO-TEA	*MONARDA FISTULOSA*	FORB	FACU	0.50
PARTRIDGE PEA	*CHAMAECRISTA FASCICULATA*	FORB	FACU	0.50
PRAIRIE CONEFLOWER	*RATIBIDA PINNATA*	FORB	UPL	0.50
PRAIRIE MIMOSA	*DESMANTHUS ILLINOENSIS*	FORB	FACU	0.50
PURPLE CONEFLOWER	*ECHINACEA PURPUREA*	FORB	UPL	0.50
SHOWY TICK-TREFOIL	*DESMODIUM CANADENSE*	FORB	FACU	0.50
SMOOTH OXEYE	*HELIOPSIS HELIANTHOIDES*	FORB	FACU	0.50
TALL IRONWEED	*VERNONIA GIGANTEA*	FORB	FAC	0.50
TALL TICKSEED	*COREOPSIS TRIPTERIS*	FORB	FAC	0.50
			TOTAL	30.00

WHIPS: LIVE BRANCH LAYERING (10,650 LF); PLANTED EVERY FOOT WITHIN SOIL LIFTS (10,250 LF) INCLUDING A JOINT PLANTING AREA (4,000 LF)

COMMON NAME	SCIENTIFIC NAME	PHYSIOGNOMY	WETLAND INDICATOR STATUS	TOTAL STEMS (2 STEMS/LF)
GRAY DOGWOOD	*CORNUS FOEMINA*	SHRUB	FACW	3,750
PUSSY WILLOW	*SALIX DISCOLOR*	SHRUB	FACW	3,750
RED-OSIER DOGWOOD	*CORNUS SERICEA*	SHRUB	FACW	3,750
SILKY DOGWOOD	*CORNUS AMOMUM*	SHRUB	FACW	3,750
BLACK WILLOW	*SALIX NIGRA*	TREE	OBL	3,750
PEACHLEAF WILLOW	*SALIX AMYGDALOIDES*	TREE	FACW	3,750
			TOTAL	22,500

LIVE STAKE PLANTING AREA (0.20 ACRE); STAKING ON 2 FOOT CENTERS, APPROXIMATELY 2,000 LF PER ROW

COMMON NAME	SCIENTIFIC NAME	PHYSIOGNOMY	WETLAND INDICATOR STATUS	TOTAL STEMS (2x2 SPACING)
ARROWWOOD	*VIBURNUM DENTATUM*	SHRUB	FAC	242
BEBB WILLOW	*SALIX BEBBIANA*	SHRUB	FACW	242
ELDERBERRY	*SAMBUCUS CANADENSIS*	SHRUB	FAC	242
GRAY DOGWOOD	*CORNUS FOEMINA*	SHRUB	FACW	242
PUSSY WILLOW	*SALIX DISCOLOR*	SHRUB	FACW	242
RED-OSIER DOGWOOD	*CORNUS SERICEA*	SHRUB	FACW	242
SILKY DOGWOOD	*CORNUS AMOMUM*	SHRUB	FACW	242
BLACK WILLOW	*SALIX NIGRA*	TREE	OBL	242
PEACHLEAF WILLOW	*SALIX AMYGDALOIDES*	TREE	FACW	242
			TOTAL	2,178

CONTAINERIZED / BARE-ROOT SEEDLING; RIPARIAN ZONE

COMMON NAME	SCIENTIFIC NAME	PHYSIOGNOMY	WETLAND INDICATOR STATUS	CONTAINER/ BARE-ROOT	TOTAL STEMS (8x8 SPACING)
BOX ELDER	*ACER NEGUNDO*	TREE	FAC	BARE ROOT	42
BUR OAK	*QUERCUS MACROCARPA*	TREE	FAC	BARE ROOT	42
HACKBERRY	*CELTIS OCCIDENTALIS*	TREE	FAC	BARE ROOT	42
RED MAPLE	*ACER RUBRUM*	TREE	FAC	CONTAINER	42
SILVER MAPLE	*ACER SACCHARINUM*	TREE	FACW	CONTAINER	42
SWAMP WHITE OAK	*QUERCUS BICOLOR*	TREE	FACW	BARE ROOT	42
SWEETGUM	*LIQUIDAMBAR STYRACIFLUA*	TREE	FACW	CONTAINER	42
SYCAMORE	*PLATANUS OCCIDENTALIS*	TREE	FACW	CONTAINER	42
NANNYBERRY	*VIBURNUM LENTAGO*	SHRUB	FAC	BARE ROOT	42
NINEBARK	*PHYSOCARPUS OPULIFOLIUS*	SHRUB	FACW	BARE ROOT	42
WILD BLACK CURRANT	*RIBES AMERICANUM*	SHRUB	FACW	CONTAINER	42
SHRUBBY CINQUEFOIL	*DASIPHORA FRUTICOSA*	SHRUB	FACW	BARE ROOT	42
SHRUBBY ST. JOHN'S-WORT	*HYPERICUM PROLIFICUM*	SHRUB	FACU	BARE ROOT	42
ELDERBERRY	*SAMBUCUS CANADENSIS*	SHRUB	FAC	CONTAINER	42
WINTERBERRY	*ILEX VERTICILLATA*	SHRUB	FACW	CONTAINER	42
				TOTAL	630

CONTAINERIZED / BARE-ROOT SEEDLING; UPLAND PLANTING ZONE

COMMON NAME	SCIENTIFIC NAME	PHYSIOGNOMY	WETLAND INDICATOR STATUS	CONTAINER/ BARE-ROOT	TOTAL STEMS (8x8 SPACING)
AMERICAN BEECH	*FAGUS GRANDIFOLIA*	TREE	FACU	CONTAINER	140
BLACK WALNUT	*JUGLANS NIGRA*	TREE	FACU	BARE ROOT	140
RED OAK	*QUERCUS RUBRA*	TREE	FACU	BARE ROOT	140
REDBUD	*CERCIS CANADENSIS*	TREE	FACU	CONTAINER	140
TULIPTREE	*LIRIODENDRON TULIPIFERA*	TREE	FACU	CONTAINER	140
WHITE OAK	*QUERCUS ALBA*	TREE	FACU	BARE ROOT	140
AMERICAN HAZELNUT	*CORYLUS AMERICANA*	SHRUB	FACU	BARE ROOT	140
CLIMBING PRAIRIE ROSE	*ROSA SETIGER*	SHRUB	FACU	CONTAINER	140
SHRUBBY CINQUEFOIL	*DASIPHORA FRUTICOSA*	SHRUB	FACW	BARE ROOT	140
SHRUBBY ST. JOHN'S-WORT	*HYPERICUM PROLIFICUM*	SHRUB	FACU	BARE ROOT	140
SMOOTH SUMAC	*RHUS AROMATICA*	SHRUB	UPL	CONTAINER	140
			TOTAL		1,540

NOTE:
DETAILED TOPOGRAPHIC SURVEY WAS COMPLETED ON MARCH 26, 2018 BY INGENAE. PUBLICLY AVAILABLE LIDAR WAS USED TO SUPPLEMENT EXISTING TOPOGRAPHY BEYOND THE LIMITS OF THE DETAILED SURVEY.

PLANTING LEGEND
- RIPARIAN SEEDING AND PLANTING AREA
- UPLAND SEEDING AND PLANTING AREA
- LIVE STAKE AND JOINT PLANTING AREA
- OVERBANK SOIL LIFTS

LEGEND:
- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- OHE — OVERHEAD ELECTRIC LINE
- EXISTING BANK
- POWER POLE
- GUY WIRE
- MW — EXISTING MONITORING WELL
- PROJECT SEGMENT
- PROPOSED LIMITS OF CONSTRUCTION
- PROPOSED BANK TOE
- SF — PROPOSED SILT FENCE
- TC — PROPOSED TURBIDITY CURTAIN
- PROPOSED ROOT WAD
- PROPOSED ACCESS ROAD

SECTION OR DETAIL NO.
SHEET WHERE SHOWN
REFERENCE KEY

90% DESIGN ISSUED FOR BID

25 0 50 FEET
GRAPHIC SCALE: 1" = 50'
CONTOUR INTERVAL = 2'

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Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

Client/Project
DYNEGY MIDWEST GENERATION, LLC
Permit-Seal
MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS
Title
PLANTING PLAN

Project Number: 175657154
File Name: 57154c-S01-plant.dwg

BFS	SDP	TCD	18.09.07
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. 14
Revision 0
Sheet 14 of 16

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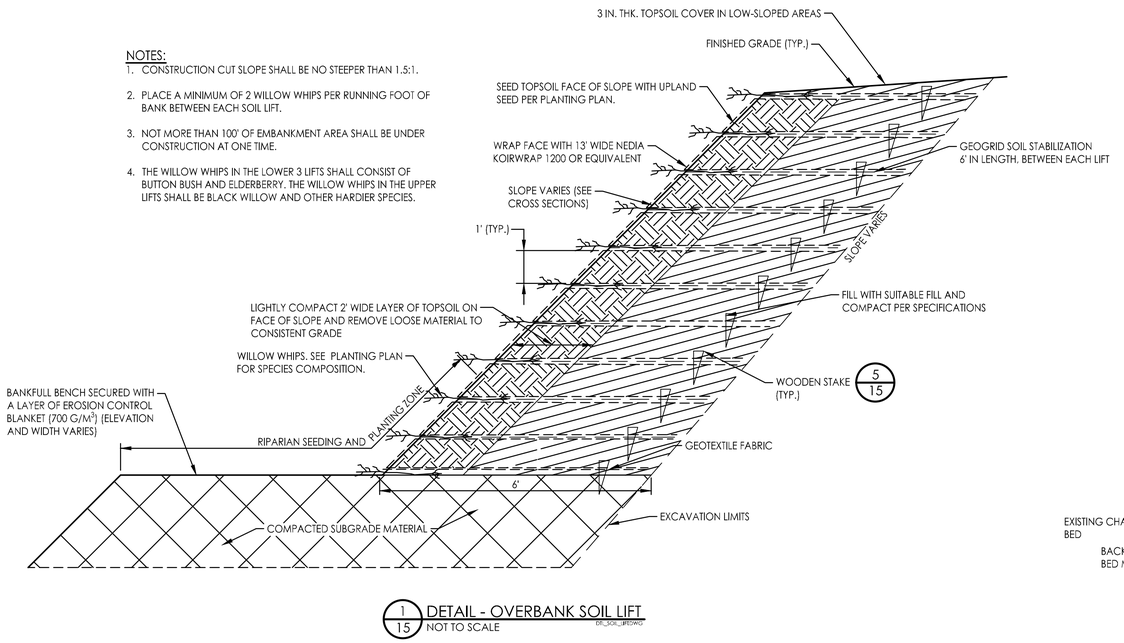
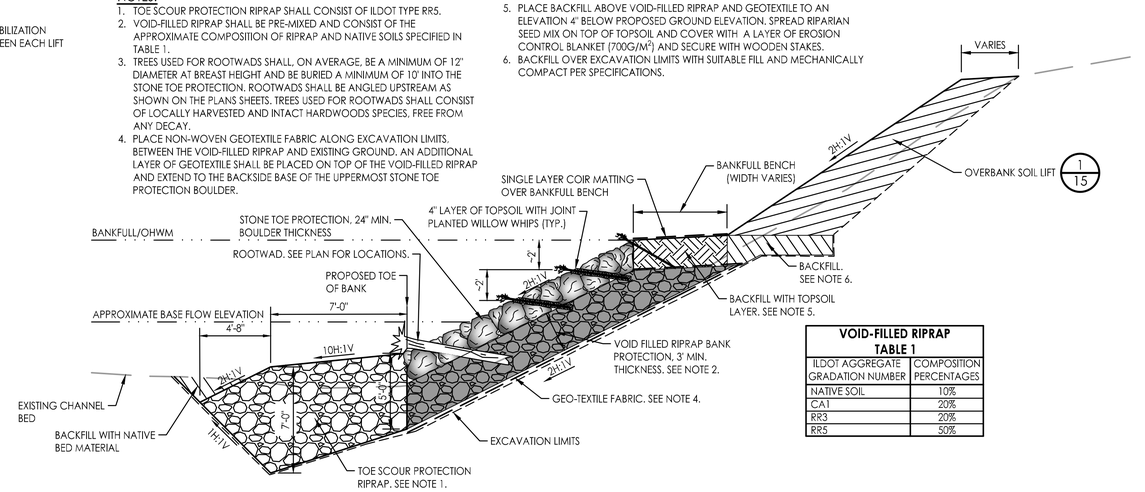


NOTES:
1. CONSTRUCTION CUT SLOPE SHALL BE NO STEEPER THAN 1.5:1.
2. PLACE A MINIMUM OF 2 WILLOW WHIPS PER RUNNING FOOT OF BANK BETWEEN EACH SOIL LIFT.
3. NOT MORE THAN 100' OF EMBANKMENT AREA SHALL BE UNDER CONSTRUCTION AT ONE TIME.
4. THE WILLOW WHIPS IN THE LOWER 3 LIFTS SHALL CONSIST OF BUTTON BUSH AND ELDERBERRY. THE WILLOW WHIPS IN THE UPPER LIFTS SHALL BE BLACK WILLOW AND OTHER HARDIER SPECIES.

1/15 DETAIL - OVERBANK SOIL LIFT
NOT TO SCALE
DTL_SOIL_LIFT.DWG

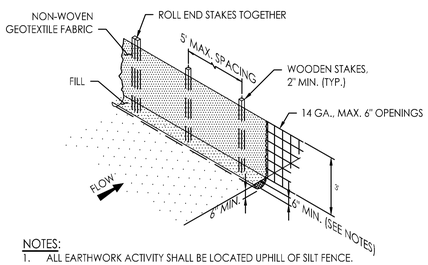
NOTES:
1. TOE SCOUR PROTECTION RIPRAP SHALL CONSIST OF ILDOT TYPE RR5.
2. VOID-FILLED RIPRAP SHALL BE PRE-MIXED AND CONSIST OF THE APPROXIMATE COMPOSITION OF RIPRAP AND NATIVE SOILS SPECIFIED IN TABLE 1.
3. TREES USED FOR ROOTWADS SHALL, ON AVERAGE, BE A MINIMUM OF 12" DIAMETER AT BREAST HEIGHT AND BE BURIED A MINIMUM OF 10' INTO THE STONE TOE PROTECTION. ROOTWADS SHALL BE ANGLED UPSTREAM AS SHOWN ON THE PLANS SHEETS. TREES USED FOR ROOTWADS SHALL CONSIST OF LOCALLY HARVESTED AND INTACT HARDWOODS SPECIES, FREE FROM ANY DECAY.
4. PLACE NON-WOVEN GEOTEXTILE FABRIC ALONG EXCAVATION LIMITS. BETWEEN THE VOID-FILLED RIPRAP AND EXISTING GROUND. AN ADDITIONAL LAYER OF GEOTEXTILE SHALL BE PLACED ON TOP OF THE VOID-FILLED RIPRAP AND EXTEND TO THE BACKSIDE BASE OF THE UPPERMOST STONE TOE PROTECTION BOULDER.
5. PLACE BACKFILL ABOVE VOID-FILLED RIPRAP AND GEOTEXTILE TO AN ELEVATION 4" BELOW PROPOSED GROUND ELEVATION. SPREAD RIPARIAN SEED MIX ON TOP OF TOPSOIL AND COVER WITH A LAYER OF EROSION CONTROL BLANKET (700G/M2) AND SECURE WITH WOODEN STAKES.
6. BACKFILL OVER EXCAVATION LIMITS WITH SUITABLE FILL AND MECHANICALLY COMPACT PER SPECIFICATIONS.



VOID-FILLED RIPRAP TABLE 1

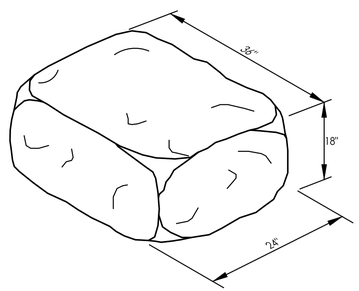
ILDOT AGGREGATE GRADATION NUMBER	COMPOSITION PERCENTAGES
NATIVE SOIL	10%
CA1	20%
RR3	20%
RR5	50%

2/15 DETAIL - STONE TOE PROTECTION (STP)
NOT TO SCALE
DTL_STONE_PROTECTION.DWG



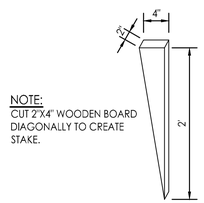
NOTES:
1. ALL EARTHWORK ACTIVITY SHALL BE LOCATED UPHILL OF SILT FENCE.
2. SILT FENCE SHALL BE INSTALLED ACROSS SLOPES ON THE CONTOUR LINE.
3. ATTACH FILTER FABRIC TO WOODEN STAKES WITH STAPLES, HOGRINGS OR OTHER MATERIALS APPROVED BY THE ENGINEER.
4. WOODEN STAKES SHALL BE INSTALLED ON THE DOWNHILL SIDE OF FILTER FABRIC.
5. BURY THE BOTTOM 12 INCHES OF FILTER FABRIC IN A 6"X6" TRENCH (TO PREVENT SEDIMENT FROM ESCAPING UNDER THE FENCE) AND BACK FILL WITH SOIL.
6. JOIN SILT FENCE SECTIONS BY ROLLING END STAKES TOGETHER TO CREATE AN UNBROKEN SEDIMENT BARRIER.

3/15 DETAIL - SILT FENCE
NOT TO SCALE
DTL_SILT_FENCE.DWG



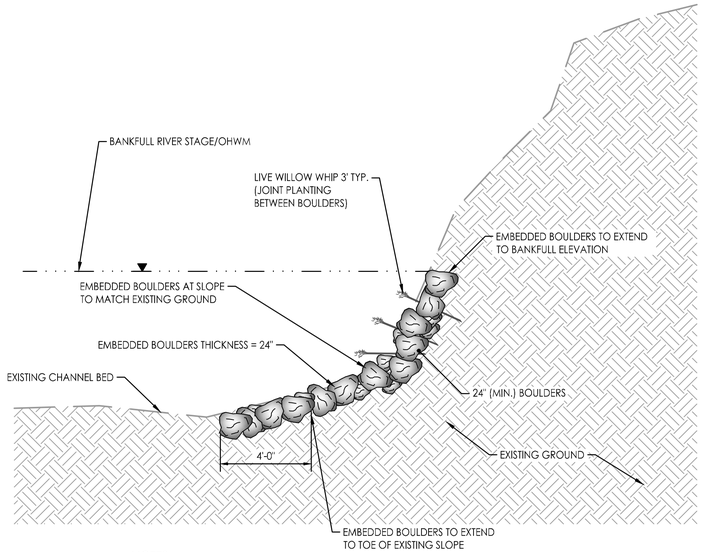
NOTES:
1. USE DURABLE DOLOMITE, GRANITE, OR LIMESTONE BOULDERS WITH APPROXIMATE DIMENSIONS SHOWN, WEIGHING APPROXIMATELY 1,500 LBS. EACH.
2. BOULDERS ARE NOT CUT AND SHAPED RECTANGULAR STONES. RECTANGULAR SHAPE ON THIS DETAIL IS TO SHOW MINIMUM DIMENSIONS.

3/15 DETAIL - TYPICAL BOULDER
NOT TO SCALE
DTL_TYP_BOULDER.DWG



NOTE:
CUT 2"X4" WOODEN BOARD DIAGONALLY TO CREATE STAKE.

5/15 DETAIL - WOODEN STAKE
NOT TO SCALE
STK_WOOD_STAKE.DWG



NOTES:
1. EMBEDDED BOULDERS SHOULD BE PLACED ALONG THE EXISTING GROUND AND HAMMERED INTO THE GROUND USING THE BACKSIDE OF THE TRACKHOE BUCKET. NO OEXCAVATION OF EXISTING GROUND IS REQUIRED.
2. POTENTIAL SLOUGHING OF EXISTING GROUND ABOVE THE TOP OF THE EMBEDDED BOULDERS IS EXPECTED, AS THE SLOPE NATURALLY SETTLES AT A MILDER SLOPE.

6/15 DETAIL - EMBEDDED BOULDERS - SEGMENT 1
NOT TO SCALE
DTL_BOULDER_EMBED2.DWG

SECTION OR DETAIL NO.
SHEET WHERE SHOWN
REFERENCE KEY

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Client/Project
DYNEGY MIDWEST GENERATION, LLC

MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
DETAILS

Permit-Seal

Project Number: 175657154
File Name: 57154c-701-dtls.dwg

BFS	SDP	TCD	18.09.07
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. 15
Revision 0
Sheet 15 of 16

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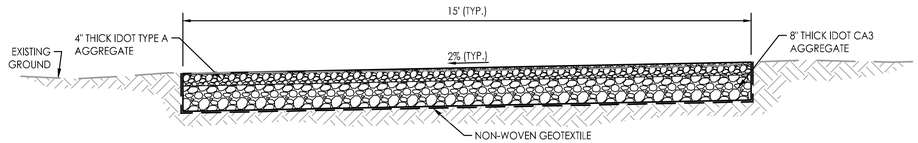
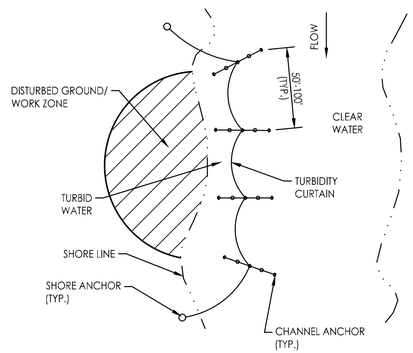


1/16 DETAIL - PROPOSED ACCESS ROAD
SCALE: 1/2"=1'-0"
DTL_ACC_ROD.DWG



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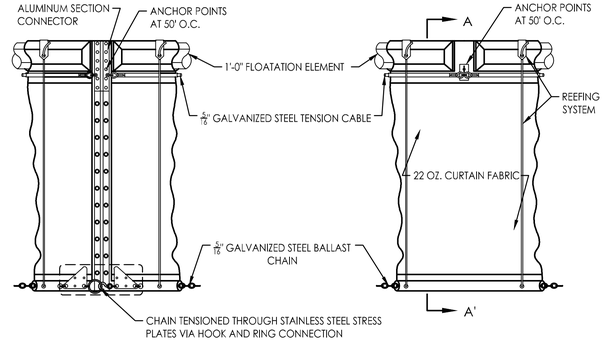
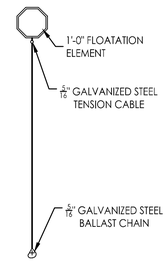
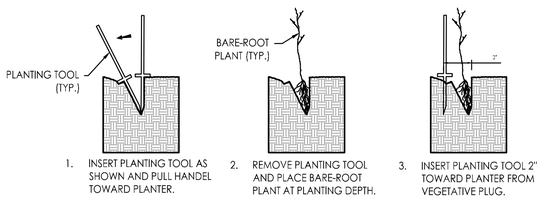


ELEVATION



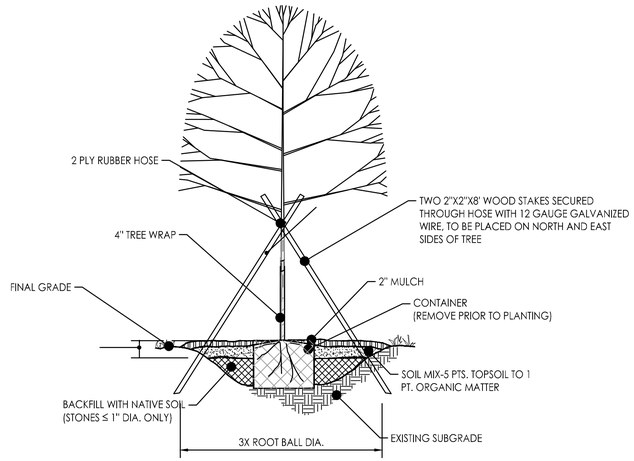
SECTION A-A'

2/16 DETAIL - TURBIDITY CURTAIN
NOT TO SCALE
DTL_TURB_CURTAIN.DWG



NOTES:
1. PLANTING HOLES SHALL BE EXCAVATED BY HAND USING A DIBBLE BAR, MATTOCK, PICK, OR IRON BAR.
2. PLANTING HOLES SHALL BE EXCAVATED DEEP ENOUGH TO ACCOMMODATE THE ENTIRETY OF THE TAP ROOT VERTICALLY WITHOUT "J-ROOTING" THE PLANT, AND TO ALLOW THE FIRST LATERAL ROOT OF THE ROOT MASS TO BE FLUSH WITH THE EXISTING GRADE.
3. ROOTS PROTRUDING ABOVE THE SOIL SURFACE WILL BE REJECTED.
4. ENSURE THAT PLANT REMAINS STRAIGHT WHILE PLACING BACKFILL, BEING CAREFUL TO AVOID BREAKING ROOTS.
5. PRUNE AS DIRECTED BY PRODUCER.

3/16 DETAIL - BARE-ROOT PLANTING
NOT TO SCALE
DTL_BARE_ROOT.DWG



NOTE:
PRUNE AS DIRECTED BY PRODUCER.

4/16 DETAIL - CONTAINER-GROWN SPECIMEN PLANTING
NOT TO SCALE
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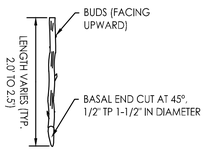
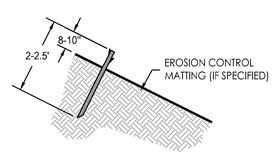


LIVE STAKE DETAIL



INSTALLED LIVE STAKE DETAIL

NOTES:
1. LIVE STAKES SHALL BE INSTALLED ALONG THE BANK OF THE RIVER BETWEEN BANKFULL AND LOW FLOW, AT THE LOCATIONS AND INTERVALS SHOWN ON THE PLANS.
2. LIVE STAKES SHALL BE CUT FROM AN APPROVED SOURCE WITH A SHARP TOOL. STAKES SHALL BE FREE FROM DISEASE OR EXCESS DEAD TWIGS. 2 TO 2.5 FEET IN LENGTH WITH A BASAL END 0.5 TO 1.5 INCH IN DIAMETER. PRIOR TO INSTALLATION BASAL END SHALL BE CUT AT A 45 DEGREE ANGLE AND THE OPPOSITE END SHALL BE CUT FLAT WITHOUT CRACKS.
3. LIVE STAKES SHALL BE INSTALLED BY GENTLY TAMPING INTO THE SOIL LEAVING 8 TO 10 INCHES EXPOSED (I.E. 8 INCHES FOR 2 FEET LONG STAKES).
4. STAKES SHALL BE PLACED IN A RANDOM PATTERN AT A RATE OF 1 LIVE STAKE PER 3 LINEAR FEET PER LIFT.
5. AREA THAT IS SPECIFIED TO RECEIVE HIGH DENSITY LIVE STAKES SHALL BE STAKED AT A RATE OF 1 LIVE STAKE PER 1 LINEAR FOOT.
6. LIVE STAKES SHALL BE INSTALLED WHEN THEY ARE DORMANT, WHICH TYPICALLY OCCURS BETWEEN NOVEMBER 1 AND MARCH 31.

5/16 DETAIL - LIVE STAKE
NOT TO SCALE
DTL_LIVE_STAKES.DWG

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Client/Project
DYNEGY MIDWEST GENERATION, LLC

MIDDLE FORK VERMILION RIVER
EROSION MITIGATION AND RIVERBANK STABILIZATION
OAKWOOD, ILLINOIS

Title
DETAILS

Permit-Seal

Project Number: 175657154
File Name: 57154c-701-dtls.dwg

BFS	SDP	TCD	18.09.07
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Drawing No. 16
Revision 0
Sheet 16 of 16

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APPENDIX D
Agency Correspondence

Illinois Department of
Natural Resources
One Natural Resources Way Springfield, Illinois 62702-1271
www.dnr.illinois.gov

Bruce Rauner, Governor
Wayne A. Rosenthal, Director

November 19, 2018

Mr. Phil Morris
Vistra Energy
1500 Eastport Plaza Drive
Collinsville, IL62234

RE: Middle Fork Vermilion River Bank Stabilization
Endangered Species Consultation Program
EcoCAT Review # 1903080

Dear Mr. Morris:

This letter is regarding a consultation for EcoCAT #1903080 submitted for an IEPA review. The project was reviewed pursuant to the *Illinois Endangered Species Protection Act* [520 ILCS 10/11], the *Illinois Natural Areas Preservation Act* [525 ILCS 30/17], and Title 17 *Illinois Administrative Code* Part 1075. Additionally, the Department may offer advice and recommendations for species covered under the *Fish & Aquatic Life Code* [515 ILCS 5, *et seq.*]; the *Illinois Wildlife Code* [520 ILCS 5, *et seq.*]; and the *Herptiles-Herps Act* [510 ILCS 69].

The project is located approximately at the coordinates 40.18307°N, -87.74537°W, at 10188 E 2050N in Oakwood, IL. The proposed action consists of approximately 1900 linear feet of river bank stabilization along the right descending bank of the Middle Fork, Vermilion River at the Dynegy Midwest Generation - Vermilion site. Proposed work includes laying back the embankments and the construction access bench at the toe of embankment. Stabilization methods will include a combination of stone toe protection, embedded toe boulders, void filled riprap, and live branch layering. The existing gabion baskets will be removed.

Freshwater Mussels

A survey[1] to determine the presence and density of mussel species within the vicinity of the proposed project was conducted on September 16 and 17 of 2018. The survey collected 33 live individuals representing eight species. Additionally, 140 weathered (dead) or subfossil specimens where identified, representing an additional 16 species. Species of note collected during the survey include the six-live state-endangered **Wavy-Rayed Lampmussels (*Lampsilis fasciola*)** and one weathered shell of the state and federally-endangered Northern **Riffleshell (*Epioblasma rangiana*)** in the project area. The Illinois Natural History Survey (INHS)

[1] *Draft Freshwater Mussel Survey on the Middle Fork Vermillion River at the Illinois Power Company Vermillion Station (River Mile 8.1), Vermillion County, Illinois, October 2018*. Stantec Consulting Services Inc.

translocating 686 Northern Riffleshells between 2013-2014 from Pennsylvania to four sites on the Middle Fork Vermilion River, upstream of the project area. The weathered shell is considered to be from this translocated population and the Department considers it is possible for live individuals to occur in the project area.

Given the scope of the project, the Department has determined that a high likelihood of "take," as defined under the *Illinois Endangered Species Protection Act [520 ILCS 10/2],* exists for Wavy-Rayed Lampshell and take of Northern Rriffleshell is also possible considering a translocated population exists upstream. The Department recommends Vistra Energy seek an Incidental Take Authorization (ITA) for these species' pursuant to *Part 1080* and *Section 5.5* of the *Illinois Endangered Species Protection Act.*

However, due to the status of the Northern Riffleshell mussel being listed as federally-endangered, the Department cannot issue such an ITA until after the U.S. Fish and Wildlife Service (USFWS) has issued a federal Incidental Take Permit (ITP) for the species pursuant to *Section 10* of the federal *Endangered Species Act*. Please contact the USFWS for further guidance on a federal ITP.

Fish

During the mussel survey conducted in October of 2018, the state-endangered **Bluebreast Darter (*Etheostoma camurum*)** was observed in the project area. Upon further review of the habitat, location, and existing data, the Department has determined that the state-endangered **Bigeye Chub (*Hybopsis amblops*)** and state-threatened **Eastern Sand Darter (*Ammocrypta pellucida*)** are also likely to be in the vicinity of the project. The Department recommends that Vistra Energy pursue an ITA for Bluebreast Darter, Bigeye Chub, and Eastern Sand Darter.

Bats

A bat habitat assessment was performed in the project area on February 27, 2018. It was determined based onsite characteristics and surrounding land use, that the project area has low suitability as **Indiana Bat (*Myotis sodalis*)** or **Northern Long-Eared Bat (*Myotis septentrionalis*)** summer roosting habitat. However, the Department recommends that all suitable habitat trees be removed between October 15th and March 31st. Suitable habitat tree species include but are not limited to, shagbark and shellbark hickory, bitternut hickory, green ash, American elm, slippery elm, eastern cottonwood, silver maple, sugar maple, white oak, red oak, post oak, and shingle oak. This includes tress that are dead, dying, broken, or damaged, with slabs or plates of loose or peeling bark on the trunks or limbs. All non-suitable trees may be cut at any time.

For additional information on applying for an ITA, the project applicant should visit the link below. Be advised, an ITA can take at least four months to process and requires a public notice period. All questions pertaining to ITA should be directed to the ITA coordinator, Jenny Skufca at jenny.skufca@illinois.gov.

ITA Application Link:
https://www.dnr.illinois.gov/conservation/NaturalHeritage/Pages/ApplyingforanIncidentalTakeAuthorization.aspx

In accordance with 17 Ill. Adm. Code 1075.40(h), please notify the Department of your decision regarding these recommendations. Consultation on the part of the Department is closed unless the applicant desires additional information or advice related to this proposal. Consultation for Part 1075 is valid for two years unless new information becomes available which was not previously considered; the proposed action is modified; or additional species, essential habitat, or Natural Areas are identified in the vicinity. If the action has not been implemented within two years of the date of this letter, or any of the above listed conditions develop, a new consultation is necessary.

The natural resource review reflects the information existing in the Illinois Natural Heritage Database at the time of the project submittal and should not be regarded as a final statement on the project being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are unexpectedly encountered during the project's implementation, the applicant must comply with the applicable statutes and regulations. Please contact me with any questions about this review.

Sincerely,

Bradley Hayes
Resource Planner
Impact Assessment Section
Department of Natural Resources
(217) 787-0031
bradley.hayes@illinois.gov

cc. Jenny Skufca – IDNR, ORC - Incidental Take Authorization Coordinator
Sgt. Eric Rollins – IDNR - Conservation Police
Trent Thomas – IDNR, Fisheries
Matt Mangan, USFWS, Southern Illinois Sub-Office
Sarah Keller – USACE, Louisville District

EcoCAT
Ecological Compliance Assessment Tool

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Applicant: Vistra Energy
Contact: Phil Morris
Address: 1500 Eastport Plaza Drive
Collinsville, IL 62234

IDNR Project Number: 1903080
Date: 09/18/2018
Alternate Number: 1811584

Project: Middle Fork Vermilion River Bank Stabilization
Address: Middle Fork Vermilion River, Oakwood

Description: The project will stabilize approximately 1,900 linear feet (LF) of the riverbank. This portion of the Middle Fork Vermilion River is experiencing erosion along the right descending bank
within the northern portion of the Vermilion Site, located near Oakwood, Illinois.

Natural Resource Review Results

Consultation for Endangered Species Protection and Natural Areas Preservation (Part 1075)

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Kennekuk Cove County Park INAI Site
Middle Fork Of The Vermilion River INAI Site
Orchid Hill INAI Site
Vermilion040 INAI Site
Kickapoo Hill Prairie Land And Water Reserve
Orchid Hill Natural Heritage Landmark
Bluebreast Darter *(Etheostoma camurum)*
Bluebreast Darter *(Etheostoma camurum)*
Clubshell *(Pleurobema clava)*
Fibrous-Rooted Sedge *(Carex communis)*
Little Spectaclecase *(Villosa lienosa)*
Northern Riffleshell *(Epioblasma torulosa rangiana)*
Purple Wartyback *(Cyclonaias tuberculata)*
Salamander Mussel *(Simpsonaias ambigua)*
Wavy-Rayed Lampmussel *(Lampsilis fasciola)*
Wavy-Rayed Lampmussel *(Lampsilis fasciola)*

An IDNR staff member will evaluate this information and contact you to request additional information or to terminate consultation if adverse effects are unlikely.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Vermilion

Township, Range, Section:
20N, 12W, 20

IL Department of Natural Resources
Contact
Bradley Hayes
217-785-5500
Division of Ecosystems & Environment

Government Jurisdiction
IL Environmental Protection Agency
Scott Twait
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

Terms of Use

By using this website, you acknowledge that you have read and agree to these terms. These terms may be revised by IDNR as necessary. If you continue to use the EcoCAT application after we post changes to these terms, it will mean that you accept such changes. If at any time you do not accept the Terms of Use, you may not continue to use the website.

1. The IDNR EcoCAT website was developed so that units of local government, state agencies and the public could request information or begin natural resource consultations on-line for the Illinois Endangered Species Protection Act, Illinois Natural Areas Preservation Act, and Illinois Interagency Wetland Policy Act. EcoCAT uses databases, Geographic Information System mapping, and a set of programmed decision rules to determine if proposed actions are in the vicinity of protected natural resources. By indicating your agreement to the Terms of Use for this application, you warrant that you will not use this web site for any other purpose.

2. Unauthorized attempts to upload, download, or change information on this website are strictly prohibited and may be punishable under the Computer Fraud and Abuse Act of 1986 and/or the National Information Infrastructure Protection Act.

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Unauthorized use, tampering with or modification of this system, including supporting hardware or software, may subject the violator to criminal and civil penalties. In the event of unauthorized intrusion, all relevant information regarding possible violation of law may be provided to law enforcement officials.

Privacy

EcoCAT generates a public record subject to disclosure under the Freedom of Information Act. Otherwise, IDNR uses the information submitted to EcoCAT solely for internal tracking purposes.

APPENDIX E

Freshwater Mussel Relocation Proposal

December 21, 2018
File: 175657154

Attention: Illinois Department of Natural Resources
Nathan Grider
Aquaculture Project Specialist
Aquaculture and Aquatic Nuisance Species Program
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271
Phone: 217-558-4743
Fax: 217-785-2438
nathan.grider@illinois.gov

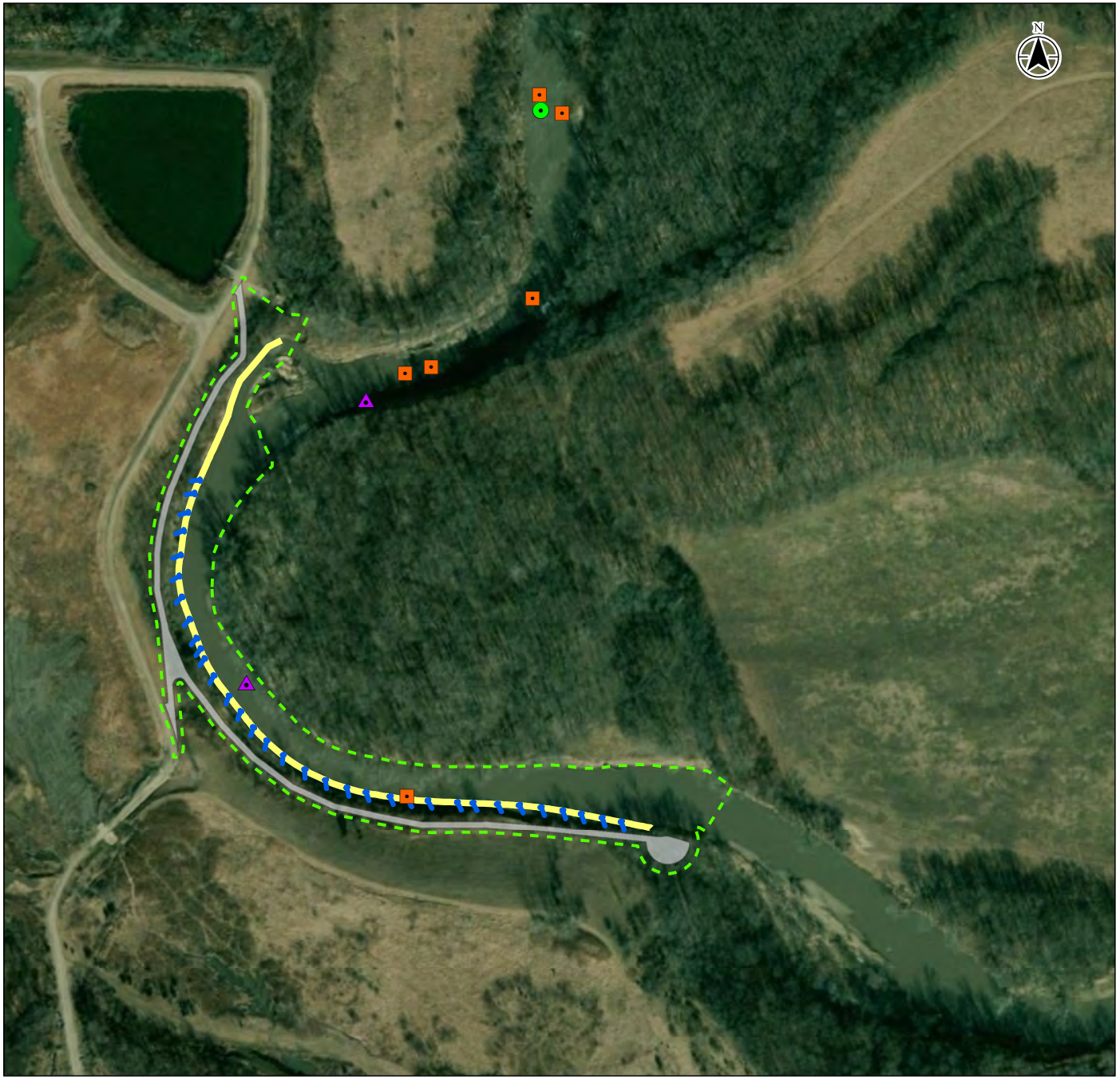
Dear Mr. Grider,

Reference: Middle Fork - Vermilion Relocation Plan

This correspondence was prepared to seek your approval on a proposed relocation plan for freshwater mussels and fish on the Middle Fork Vermilion River in Vermilion County, Illinois. This work will be conducted by Stantec Consulting Services Inc. on behalf of Dynegy Midwest Generation, LLC. The primary objective of this study is to minimize the impact of this project on native freshwater mussels and fish in the area of direct impact (ADI).

BACKGROUND

Dynegy Midwest Generation, LLC seeks to conduct river stabilization work along approximately 1,900 linear feet of the right descending bank of the Middle Fork Vermillion River. A combination of stone toe protection, embedded toe boulders, void-filled riprap, and live branch layering is being proposed to stabilize a segment of the riverbank on the project site. As part of the project, the existing gabion baskets along the river edge within the central portion of the project area will be removed. Sedimentation and placement of fill will affect freshwater mussels including the state endangered *Lampsilis fasciola* (Wavyrayed Lampmussel). Inflatable dams will be installed in the channel and portions of the river will be dewatered during construction activities. It is expected that the dewatering could potentially affect freshwater fish populations including: *Ammocrypta pellucida* (Eastern Sand Darter, Illinois threatened) and Illinois endangered *Hybopsis amblops* (Bigeye Chub, Illinois endangered). It anticipated that effects for *Etheostoma camurum* (Bluebreast Darter, Illinois endangered) will be avoided because most construction will occur in pool habitats. The coordinates for the project location are presented in Table 1 and a map of the relocation areas is presented in Figure 1.



Stantec

Legend

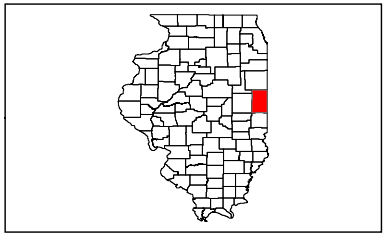
- Relocation Site
- *Lampsilis fasciola*
- *E. torulosa rangiana*
- Root Wad
- Stone Toe Protection
- Area of Direct Impact
- Access Road

0 275 550 Feet

1:5,500 (At original document size of 8.5x11)

Notes

1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
2. Base Imagery: ESRI Map Services.



Project Location
Oakwood, IL
Vermillion Co.

175657154
Prepared by JSea on 2018-11-28
Technical Review by WCF on 2018-11-30
Independent Review by DS on 2018-11-30

Client/Project
Dynegy Midwest Generation, LLC
Middle Fork Vermillion River
Erosion Mitigation and Riverbank Stabilization

Figure No.
1

Title
Freshwater Mussel Relocation Plan

C:\Projects\Vermillion River\GIS\Mussel\MXD\Vermillion River Survey with Design_20181128.mxd Revised: 2018-12-04 By: jseamands

Table 1. Project Coordinates

Waterbody	Latitude	Longitude
Middle Fork Vermilion River	40.183358	-87.745952

METHODS

FRESHWATER MUSSELS

Freshwater mussels will be relocated using a moving transect method. Transect lines will be set every two meters across the wetted width of the river within the ADI. Field staff will search one meter upstream and one meter downstream of each transect line. Each transect line will be extended the entire wetted width of the river segments. Mussels will be collected and recorded by each transect segment. A minimum effort of 0.2 minutes per m^2 will be spent searching for mussels per pass. Successive passes will be made until mussel counts are less than 20 percent of the initial pass or fewer than two mussels are collected. Mussels will be collected by visual or tactile searches, including moving cobble and woody debris, hand sweeping away silt, sand, and/or small detritus, and disturbing/probing the upper five centimeters (two inches) of substrate. Mussels will be collected in mesh bags and brought to shore for identification and data collection. Mussels will be identified to species level, measured for length, and sexed, where possible. Mussels will be transported upstream to an area of equal or better habitat as quickly and efficiently as practical to minimize handling stress and the associated potential for mortality. Representative specimens will be photographed and spent valves may be retained as vouchers.

During the initial presence/absence survey Stantec staff identified a site upstream of the construction limits that appears to be a suitable relocation site. This site contains similar mussel assemblage and higher densities than the ADI. The coordinates for the relocation site are presented below in Table 2. Special status taxa will be tagged with Passive Integrated Transponder (PIT) tags in order to locate them during monitoring surveys approximately one- and three-years post construction. Non-listed animals will be tagged and/or marked to distinguish resident animals from transplanted individuals in subsequent monitoring events.

Table 2. Relocation Site Coordinates

Waterbody	Latitude	Longitude
Middle Fork Vermilion River	40.186796	-87.742874

FISH

During the initial stages of construction, it will be necessary to remove all fish within the project footprint after the inflatable dams are installed but before dewatering. The relocation will be conducted by a five-person crew using a

generator and booms from a tote barge, using dip nets to collect fish. Block nets will be used to prevent other fish from entering the survey areas. A minimum of three passes will be made to clear the ADI of fish. Captured fish will be held temporarily in aerated buckets, identified to species, measured for length, counted, and relocated upstream of the project footprint to an area with equal or better habitat. Any special status species will be tagged with elastomer tags to assess survivorship in the one and three-year follow-up/survival surveys.

REPORTING

Upon completion of the relocation effort and each year's monitoring event, Stantec staff will prepare a technical report describing:

- Habitat conditions at the relocation and project sites;
- Relocation site coordinates;
- River discharge;
- Methods used to complete the relocation;
- Level of effort;
- A list of species present and their relative abundance;
- Site photographs; and
- Photographs of representative specimens.

CONCLUSION

Stantec's federal collecting permit is TE38821A-3. Please respond with authorization to proceed with this survey at your earliest opportunity. If you have questions or concerns regarding this study plan, please contact me at (513) 262-3994.

Regards,

Stantec Consulting Services Inc.

Cody Fleece
Associate Ecologist
Phone: 513 842 8238
Fax: 513-842-8250
Cody.Fleece@stantec.com

Attachment: None

APPENDIX F

Verification of Funding & Implementing Agreement

Luminant

Dianna Tickner
Asset Closure
Luminant
1500 Eastport Plaza Drive
Collinsville, Illinois, 62234
o 618.343.7929
m 618.381.3124

Illinois Department of Natural Resources
Office of Realty & Capital Planning
One Natural Resources Way
Springfield, Illinois 62702-1271
ATTN: Jeannie Skufca

December 21, 2018

RE: Middle Fork Vermilion River Erosion Mitigation and Streambank Stabilization – Conservation Plan Addendum to include Verification of Funding and Implementation Agreement

Ms. Skufea,

As an addendum to the Middle Fork Vermilion River (MFVR) conservation plan, Dynegy Midwest Generation, LLC offers the following:

Verification of funding:

Dynegy Midwest Generation (DMG), LLC will fully fund the Middle Fork Vermilion River (MFVR) erosion mitigation and streambank stabilization project. DMG, LLC will also fund, support, and implement all activities described in the MFVR conservation plan.

Implementation Agreement:

- Names and signatures of all participants in the execution of the conservation plan:

  DMG, LLC

  Dianna Tickner, P.E.
  Director – Asset Closure
  1500 Eastport Plaza Drive
  Collinsville, Illinois, 62234
  Office: 618-343-7929
  Mobile: 618-381-2124
  Dianna.Tickner@vistraenergy.com

  Signature of this participant is included at the end of this formal letter.

- The obligations and responsibilities of each of the identified participants:

  The Illinois Department of Natural Resources is responsible for the review of the conservation plan and the subsequent issuance of the incidental take authorization (ITA).

  DMG, LLC is ultimately responsible for securing authorization for the incidental take and for implementing the MFVR conservation plan, which will include hiring Stantec Consultation Services, Inc. (Stantec) to conduct a mussel survey and relocation, prior to construction, and to conduct a fish relocation after cofferdam installation and before dewatering. DMG LLC is also responsible for securing all necessary permits, for the MFVR erosion mitigation and streambank stabilization project.

  For further clarification, Stantec is the consulting company retained by DMG, LLC to conduct the September 2018 mussel survey; prepare the conservation plan; and assist with implementing the conservation plan.

  As discussed in the conservation plan, project construction is anticipated to start in June 2019, after issuance of the ITA and after mussel relocation. Fish will be relocated after cofferdam installation and before dewatering. Project completion is anticipated in May 2020.

- Certification that each participant in the execution of the conservation plan has the legal authority to carry out their respective obligations and responsibilities under the conservation plan:

  By DMG, LLC's signature, DMG, LLC certifies that prior to starting work on the project, DMG, LLC will obtain all necessary permits, authorizations, and permissions to carry out the obligations and responsibilities under the conservation plan.

- Assurance of compliance with all federal, state, and local regulations pertinent to the proposed action and to execution of conservation plan:

  DMG, LLC and its contractors will comply with all federal, state, and local regulations. DMG, LLC and its contractors will comply with all conditions and requirements associated with the authorizations and permits, obtained to execute this project and this conservation plan.

- Copies of any final federal authorizations for a taking, already issued to the applicant:

  During the September 2018 mussel survey, spent shells of the federally-endangered mussel species *Epioblasma rangiana* were identified. As a result, DMG, LLC will be drafting and submitting a biological assessment to the United States Fish and Wildlife, in application for a ITA. Upon receipt, the federal ITA will be forwarded to your office.

If you have any questions or concerns, please contact Mr. Phil Morris, a member of our Corporate Environmental team, at phil.morris@vistraenergy.com or (618) 343-7794.

Sincerely,
Dynegy Midwest Generation, LLC

Dianna Tickner
Director – Asset Closure

Date of signature: 20 December 2018