

Illinois Department of Natural Resources
CONSERVATION PLAN (May 25, 2022)
(Application for an Incidental Take Authorization)
Per 520ILCS 10/5.5 and 17 Ill. Adm. Code 1080

150-day minimum required for public review, biological and legal analysis, and permitting

PROJECT APPLICANT: BP Midwest Products Pipeline Holdings LLC, 30 S. Wacker Dr., 10th Fl., Chicago, IL, 60606

PROJECT NAME: BP U.S. Pipelines & Logistics' Mississippi River Pipeline LDOC and Scour Mitigation

COUNTY: Hancock County, Illinois

AMOUNT OF IMPACT AREA: 596,644 ft² (13.7 acres) below OHWM of Mississippi River.

1. A description of the impact likely to result from the proposed taking of the species that would be covered by the authorization, including but not limited to:

- A. Identification of the **area to be affected** by the proposed action, includes a legal description and a detailed description including street address, map(s), and GIS shapefile. Include an indication of ownership or control of affected property. Attach photos of the project area.

A portion of BP's existing 20-inch crude pipeline on the bed of the Mississippi River has low depth of cover (LDOC) and/or exposures. The project is located at 2700-2898 N. Morman Springs Road, Nauvoo, IL (Township 7N, Range 8W, Section 17, and approximate coordinates are 40.597967 degrees latitude, -91.340672 degrees longitude). The primary objective of this project is to cover the LDOC and/or exposures along the pipeline and armor the surrounding area to provide long-term prevention of future scour, thereby minimizing the risks associated with LDOC and/or exposed pipelines in the waterway. At this site, there are two crude pipelines—an inactive 16-inch crude line, and the 20-inch active crude line. None of the pipelines will be disturbed by this project. BP plans to line the riverbed with a geotextile fabric then the pipelines will be protected via placement of geotextile gravel bags on the riverbed. The LDOC and/or exposures on the 20-inch line is approximately 600 ft in length and located 100 ft west from the left descending bank (Illinois side bank). The scour holes will then be filled with bulk rock fill (shot rock from blasting and drilling) and then covered with layer of rip rap. The area that requires scour mitigation is centered over the 20-inch pipeline and measures approximately 853 ft x 853 ft at its widest dimensions; actual dimensions of the permanent impact area are 347,997.2 ft² (7.99 acres) with an additional 248,646.3 ft² (5.7 acres) to allow for a 30 m (98 ft) temporary construction work-zone buffer to account for possible falling rip rap and barge spudding. The total (permanent and temporary construction) area that will be impacted is 596,644 ft² (13.7 acres).

All work will be supported from work boats and barges staged in the river. BP will use qualified pipeline contractors and licensed commercial divers who will lower and hand-

direct placement of each geotextile gravel bag over the affected section of pipeline and to build up the riverbed where the pipeline has LDOC and/or exposures.

BP will initially install the geotextile fabric over the permanent impact area (347,997.2 ft² [7.99 acres]). The geotextile should be placed by unwinding it from a roll that is pulled over the bottom or by immersing a frame (or sinker beam) to which it is attached. The geotextile should be temporarily stabilized with stones or sandbags that are placed by divers, until the armor stone layers are dumped on top. The textiles can also be pre-weighted on a grid pattern over the fabric and re-rolled on to metal tubes with appropriate pull ropes and then unrolled on the riverbed (CIRIA, CUR, CETMEF, 2007; Section 9.7.1). Geotextile fabric shall be placed within seven to 14 days to avoid degradation from ultraviolet light (Attachment D, Sheet G-1). Divers will then place geotextile gravel bags over an approximate 600-ft section of the 20-inch pipeline. The geotextile gravel bags will be placed across and centered over the pipeline and will be a minimum of 2-ft on each side of the pipeline and a minimum of 4-ft covering the top of the pipeline.

Following the geotextile gravel bag installation, bulk rock fill (274,512 ft² [6.3 acres]) will be placed into the scour holes. When working within 20 ft of the pipeline alignment a clamshell bucket working from a barge shall be used and drop heights shall not exceed 3 ft. Bulk rock consists of stone resulting from and/or as a quarry byproduct from drilling and blasting or other various methods of excavation. The material shall be quarried from ledges consisting of sound, durable rock reasonably free of objectionable deleterious material. The material for bulk rock fill shall meet the gradation limits for the gradation RR3 or RR4 as set out in section 1005 of Illinois Department of Transportation, Standard Specifications for road and bridges construction Jan1, 2012. Bulk rock fill will be secured in place by placing approximately 6-ft of rip rap (347,997.2 ft² [7.99 acres]) on top of the bulk rock fill and geotextile gravel bags over the pipeline for added protection. The rip rap will be gradually sloped around the perimeter (4:1) to aid in future scour prevention. Rock riprap shall be dense, durable, sound, resistant to the action of water and frost, and suitable in all respects for the purpose intended. Riprap shall be free from sod, roots, organic material, and debris prior to placement. Riprap shall be free from sandstone, mudstone, slate, and shale. Individual pieces of stone shall be free of defects such as seams or cracks that would cause rapid or excessive deterioration or degradation. Class VI Riprap shall be provided. Class VI riprap as defined in FHWA-NHI-09-111 Hydraulic Engineering Circular No. 23 Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Design Guidance 3rd Edition Volume 1 (<https://www.fhwa.dot.gov/Engineering/Hydraulics/Pubs/09111/09111.pdf>). Specific sizes and volumes are provided on Sheet Number G-1 of Attachment B: Engineering Plans in Attachment D (Joint Application) of this Conservation Plan. Terrestrial impact above the Ordinary High-Water Mark (OHWM) is not anticipated.

The total amount of fill associated with geotextile fabric, geotextile gravel bags, bulk rock fill, and rip rap is 347,997.2 ft² (7.99 acres) covering the river bottom.

No excavation in the river is planned. The project will not require equipment access (other than the work boats) or staging areas, nor will it require the use of temporary bladder dams or cofferdams. The site will be accessed via a nearby public boat launch. The barges will work from the inside out of the project area and may spud down within the 30 m (98 ft) temporary construction work-zone buffer to place the last layer of rip rap around the

perimeter of the permanent of impact area near the work area during active construction during daytime hours. Work barges and other vessels may remain in the project location during non-working hours. The property owner affected by this project is the Illinois Department of Conservation (BP's ROW easement holder) Reed Wildlife State Habitat Area. The pipeline easement is at the south end of the IDNR property, between where that road cuts off diagonally to the southwest, and a house (Shea and Jenny Seiber); BP will not be affecting the house (Figure 1).

See attached mapping (Figure 1: Topographic Quadrangle and Project Location, Figure 2: Area of Disturbance) and site photos (Attachment A); GIS shapefiles were provided to the Illinois Department of Natural Resources (IDNR) electronically.

B. **Biological data** on the affected species including life history needs and habitat characteristics. Attach all pre-construction biological survey reports.

A biological survey (2014) was conducted for threatened and endangered (T&E) species known from Hancock County. A habitat survey (2020) was also conducted to assess river substrate/mussel habitat suitability across the entire river. Findings from the 2014 mussel survey indicated that the impacts to T&E species would be limited to direct and indirect aquatic impacts to freshwater mussels. Please see the attached biological survey report (Attachment B) for complete findings. In the fall of 2020, a habitat survey was performed to review the river bottom substrates within the disturbance area and along the entire crossing as it spanned the Mississippi River. No formal report was submitted to the state; however, information has been discussed internally between EnviroScience and BP. The habitat survey results indicated the river was shallow (less than 10 ft deep) in the reaches outside the scour location. The bottom substrate was sand and mud; limited heterogeneity in substrate composition was observed.

BP performed database searches/reviews for federally and state-listed species through U.S. Fish and Wildlife Service's Information for Planning and Consultation (IPaC) and IDNR Ecological Compliance Assessment Tool (EcoCAT) (Attachment C). The following federally listed species are known to occur in the project vicinity:

- Higgins Eye (pearly mussel) (*Lampsilis higginsii*)
- Sheepnose Mussel (*Plethobasus cyphus*)
- Spectaclecase (mussel) (*Cumberlandia monodonta*)
- Indiana Bat (*Myotis sodalis*)
- Northern Long-Eared Bat (*Myotis septentrionalis*)
- Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)
- Western Prairie Fringed Orchid (*Platanthera praeclara*)
- Prairie Bush-Clover (*Lespedeza leptostachya*)

Project activities will be entirely below the OHWM of the Mississippi River. Tree clearing will not be required. Project activities are not likely to affect any of the terrestrial species.

The EcoCAT issued May 21, 2020, identified the following state-listed species as having potential for occurrence in/near the project area:

- Ohio Pigtoe (*Pleurobema cordatum*)
- Butterfly Mussel (*Ellipsaria lineolata*)

- Black Sandshell (*Ligumia recta*)

Validity of the IDNR consultation is two years; however, since coordination with IDNR was initiated and the consultation was concluded (June 1, 2020), the Illinois Endangered Species Protection Board proposed listing changes to several species of freshwater mussels. Specific to this ITA and project, listing changes included removal of Black Sandshell from listing and the addition of the Monkeyface (*Theeliderma metanevra*) to the Checklist of Illinois Endangered and Threatened Animals and Plants (IDNR, 2019). Monkeyface was not observed live in the 2014 biological survey (shell only); however, other sources list this species as commonly encountered within Pool 19 of the Mississippi River (Kelner, 2017). We have included Monkeyface in this ITA as an affected species due to the recent listing change and its potential to occur within the affected area. The Ohio Pigtoe may have been a misidentification in 2014 as it is not considered a Mississippi River species (Kelner, 2017). Though listed plant species are within the vicinity of the project, they do not need to be included in the Illinois Conservation Plan and therefore have been omitted from this document.

Life History Information – Mussels

Higgins Eye (pearlymussel) (*Lampsilis higginsii*) – Federally Endangered

The Higgins Eye Pearlymussel is known from, but is rarely collected in, surveys in Pool 19 of the Mississippi River. It does not usually appear in sample collections since populations are small either naturally or have declined and may or may not be near extirpation (Kelner, 2017). Habitat loss and degradation of the Mississippi River resulting from channel navigation improvements and pollution are attributed to this species' decline. The Higgins Eye is up to 15 cm (6 in) long, and the shell is yellow, greenish, reddish, or brown, often with green rays. The Higgins Eye occurs only in the Mississippi River and the lower portion of some of its large tributaries (Havlik, 1980). It occupies stable substrates that vary from sand to boulders, but not firmly packed clay, flocculent silt, organic material, bedrock, concrete, or unstable sand. Most often, Higgins Eye is collected within aggregations that contain at least 15 other species at densities greater than 0.01 individual/m² (USFWS, 2004).

The Higgins Eye are gravid in May and September, and they are a bradytictic brooder, which means the females brood their young long-term before they are released as glochidia. Once the glochidia are expelled from the female's gills, they attach to fish gills or fins by clamping. The glochidia live as parasites on the host fish until they develop into juvenile mussels, at which point they detach from the fish and fall to the streambed as free-living mussels. The bluegill (*Lepomis macrochirus*), freshwater drum (*Aplodinotus grunniens*), green sunfish (*Lepomis cyanellus*), largemouth bass (*Micropterus salmoides*), northern pike (*Esox lucius*), sauger (*Sander canadense*), smallmouth bass (*Micropterus dolomieu*), walleye (*Sander vitreus*), and yellow perch (*Perca flavescens*) have been reported to be viable host fish species for the glochidia of the Higgins Eye mussel (Waller and Holland-Bartels, 1988; Watters, 1994).

Sheepnose Mussel (*Plethobasus cyphus*) – Federally Endangered

The Sheepnose is a larger-stream species occurring primarily in shallow shoal habitats with moderate to swift currents over coarse sand and gravel (Oesch, 1984). Habitats with

Sheepnose may also have mud, cobble, and boulders. Sheepnose in larger rivers may occur in deep runs (Parmalee and Bogan, 1998). Strayer (1999) demonstrated in field trials that mussels in streams occur chiefly in flow refuges, or relatively stable areas that displayed little movement of particles during flood events. Flow refuges conceivably allow relatively immobile mussels to remain in the same general location throughout their entire lives (Butler, 2002).

Sheepnose glochidia are released in the form of conglutinates, which mimic fish food items. Conglutinates resemble small pink worms, which infect fish gills when the fish attempt to eat them (Butler, 2002). Glochidia must encounter a specific fish host(s) to survive. If they do not, they will perish. Little is known regarding Sheepnose host fishes (Roberts and Brenderman, 2000). The Sauger (*Sander canadensis*) and central stoneroller (*Campostoma anomalum*) are the only known natural hosts (Surber 1913, Wilson 1914; Waters et al. 2009, p 221). In many mussel species, a few weeks are spent parasitizing the fishes' gill tissue, after which time they drop off from the fish and begin a free-living existence on the stream bottom. Unless they drop off in a suitable habitat, they will die. Thus, there are several weak links in the life cycle that may prevent successful reproduction and recruitment of juveniles into existing populations (Butler, 2002). The state of Illinois lists Sheepnose as an "Endangered" species (IDNR, 2015).

Spectaclecase (mussel) (*Cumberlandia monodonta*) – Federally Endangered

The Spectaclecase mussel historically inhabited the Mississippi River in Minnesota (Thiel, 1981), with only rare sightings in Pool 19 of the Mississippi River. This species has very specific habitat requirements, occurring in colonies among boulders and under large rocks. The Spectaclecase is elongate and compressed with a concave ventral margin. It can be up to 23 cm (9 in.) long. The outside of the shell is dark brown to black and rayless. The Spectaclecase has a very narrow range of habitat preferences. Within these microhabitats, the Spectaclecase is often found among patches of boulders that are intermixed with mud, sand, and gravel substrates (Cummings and Mayer, 1992; Parmalee and Bogan, 1998). The Spectaclecase mussel is a bradyctictic (long-term) brooder, and the fish hosts for the glochidia of the Spectaclecase are currently unknown (Parmalee and Bogan, 1998). The colonial nature of this species makes it especially vulnerable to zebra mussel infestation. Other threats to Spectaclecase mussels include habitat modification, non-point and point source water pollution, and siltation.

Ohio Pigtoe (*Pleurobema cordatum*) – State Endangered

The Ohio Pigtoe is currently only reported to occur within the Ohio River basin in Illinois; there are no records for Ohio Pigtoe within the Mississippi River or in Hancock County per the Illinois Natural History Survey Mollusk Collection and Database (INHS, 2020). However, the EcoCAT review for the project returned Ohio Pigtoe as potentially occurring in the vicinity of the project. Additionally, the 2014 survey in the project area reported one live individual as well as fresh and weathered shell material of Ohio Pigtoe. Its occurrence in the Mississippi River is likely very uncommon, and additional collections are needed to confirm its presence in the Mississippi River.

The shells of this mussel are heavy and obliquely triangular. The shell is brown, and a sulcus is present anterior to the posterior ridge. It can be found in strong currents on substrates of sand and gravel. Only two species have been identified as potential hosts:

Bluegill (*Lepomis macrochirus*) and Rosefin Shiner (*Lythrurus ardens*) (Yokley, 1972; Fuller, 1974). The Ohio Pigtoe is likely tachytictic (short-term brooder) with females carrying glochidia May through August as females with glochidia have been observed in June (Parmalee and Bogan, 1998).

Butterfly Mussel (*Ellipsaria lineolata*) – State Threatened

The Butterfly Mussel within the Mississippi River in Illinois is commonly collected in Pool 19 of the Mississippi River (Kelner, 2017). Most specimens that have been collected and logged into the record of the Illinois Natural History Survey since 2001 have been collected in the Mississippi River (INHS, 2014). Records for the INHS collection include specimens that have been collected in the Mississippi River off the following counties of western Illinois, proceeding from north to south: Jo Daviess, Carroll, Whiteside, Rock Island, Mercer, Henderson, Hancock, Adams, Pike, Calhoun, Jersey, and Madison. The Butterfly Mussel usually inhabits areas of large rivers with swift currents in sand or gravel substrates.

The Butterfly Mussel is bradytictic, with females brooding their young long-term from August through July before they are released as glochidia (Baker, 1928). Known fish hosts for the glochidia of the Butterfly Mussel include Sunfish (*Lepomis spp.*), Sauger (*Stizostedion canadense*), and Drum (*Aplodinotus grunniens*) (Fuller, 1978).

Monkeyface (*Theliderma metanevra*) – State Threatened

Monkeyface were once widely distributed in the larger streams of the Mississippi basin, and it is known to occur in Pool 19 of the Mississippi River (Kelner, 2017). The shell of the monkeyface can reach up to 12.7 cm (5 in.) long. It is squarish in shape with thick valves and a prominent posterior ridge, which often has a series of large knobs surrounded by scattered pustules (bumps). The posterior slope of the shell is flattened, appearing winged, often with a series of small ridges that curve upward. The posterior shell margin is indented. The outside of the shell is yellowish, greenish, or brown, and usually marked with green chevrons (V-shaped markings). Fish hosts for the glochidia of the monkeyface are known to include sunfish (*Lepomis spp.*), bluegill (*L. macrochirus*), and sauger (*Stizostedion canadense*) (Parmalee and Bogan 1998).

The monkeyface is declining throughout most of its range. The viability of remaining populations is jeopardized by the continuing decline in habitat conditions on the Mississippi River associated with its management as a navigation canal, and from non-point and point source water and sediment pollution. Dams, channelization, and dredging increase siltation physically alter habitat conditions, and block the movement of fish hosts. The monkeyface is also being impacted by the infestation of non-native zebra mussels (*Dreissena polymorpha*) in the Mississippi River and its tributaries. Zebra mussels can attach in large numbers to the shells of native mussels, eventually causing death by suffocation. If observed trends cannot be reversed, the monkeyface will likely become endangered in the future. The Monkeyface was listed as “Threatened” by the IDNR in 2020.

- C. **Description of project activities** that will result in taking of an endangered or threatened species, including practices and equipment to be used (1), a timeline of proposed activities (2), and any permitting reviews (3), such as a U.S. Fish and Wildlife Service (USFWS) biological opinion (BO) or U.S. Army Corps of Engineers (USACE) wetland review. Please consider all potential impacts such as noise, vibration, light, predator/prey alterations, habitat alterations, increased traffic, etc.
1. Project activities potentially impacting in or resulting in a take of federal and/or state-listed species include:
- Equipment and materials staged within BP’s existing ROW and within the Mississippi River (Illinois; see Figure 2).
 - Salvage and relocation of mussels in direct impact areas (fall 2022).
 - Spudding of work barges within the area of disturbance.
 - Falling debris from work barge platforms.
 - Installation of geotextile fabric, geotextile gravel bags, bulk rock fill, and rip rap on the river bottom.

An anticipated timeline for completing all project activities is provided below. Construction is estimated to begin in spring 2022. Work is anticipated to take four weeks to complete, weather and other conditions permitting. It is BP’s intent to perform the work during the late summer/early fall months when river flow is historically lowest.

Proposed and Anticipated Timeline

<i>Proposed Action</i>	<i>Anticipated Action Schedule</i>	<i># Days of In-Stream Work</i>
Survey and relocation of mussels in direct impact areas	Fall 2022	28 days
Installation of geotextile fabric, geotextile gravel bags, bulk rock fill, and rip rap placement on the river bottom	Fall 2022	60 days
<i>TOTAL PROJECT DURATION</i>		<i>88 days</i>

2. **Permitting Activities**

A Joint Application was submitted to the U.S. Army Corps of Engineers in June 2020 (Subject: BP U.S. Pipelines & Logistics’ Mississippi River Pipeline LDOC and Scour Mitigation, Hancock County, Illinois) with an approved Addendum submitted August 2020. After the changes to the design in March 2022, a new Joint Application has been submitted to the USACE, IDNR, and Illinois Environmental Protection Agency (IEPA). A copy of the permit and related correspondence are provided in Attachment D.

Permitting Activities undertaken by BP for this Project

Permit	Submitted	Status	Comments
U.S. Army Corps of Engineers (Chicago District) Clean Water Act Section 404 Regional Permit Program	Yes	Pending	
U.S. Fish and Wildlife Service, Section 7 ESA coordination		Pending	Initiated by USACE
U.S. Coast Guard, coordination for work in a Section 10 river		Pending	Initiated by USACE
Illinois EPA, Section 401 Water Quality Certification	Yes	Pending	
Illinois DNR, Office of Water Resources Floodway Permit/Illinois Public Water	Yes	Pending	
Illinois DNR, Office of Realty and Capital Planning, Endangered Species Review		Pending	Internal with Office of Water Resources
Hancock County Floodplain Administrator coordination	Yes		Plans submitted

D. Explanation of the anticipated **adverse effects on listed species**.

- *How will the proposed action impact each of the species' life cycle stages?*

The scour repair can result in several temporary and permanent impacts to the riverbed, which in turn can result in adverse effects to resident aquatic and threatened or endangered species. Mussels are very susceptible to adverse effects to their habitat as they are relatively immobile. Direct impacts to mussel species living in the area of disturbance and adjacent areas include crushing, smothering, dislodging, or death. Temporary disturbance of the streambed and riverbanks could result in substrate shifts, localized altered flow regimes, and downstream sediment deposition, which are attributed to mussel decline (Fuller, 1974; Aldridge et al., 1987; Bogan, 1993; Williams, 1993). Indirect effects on mussels are associated with disruptions to their life cycle. Host fish activity may be altered by minor changes in habitat and turbidity, leading to disruption of unionids' life cycles. Mussel species in the immediate area of the construction could have less efficient reproduction as the mussel/host fish interaction is disrupted. Also, mussels living in the vicinity of the project could have interrupted feeding and respiration. Mussels that are salvaged and relocated will have some short-term adverse effects, including minor mortality, but these effects will be minimized by relocation and post-construction monitoring. The project construction methods were designed to minimize the above-listed effects.

- Describe potential impacts to individuals and the population. Include information on the species life history strategy (life span, age at first reproduction, fecundity, recruitment, survival) to indicate the most sensitive life history stages. Identify where there is uncertainty, place reasonable bounds around the uncertainty, and describe how the bounds were determined. For example, indicate if it is uncertain how many individuals will be taken, make a reasonable estimate with high and low bounds, and describe how those estimates were made.

The adult life stage of mussels will be primarily affected due to the short duration of the project. The number of listed species anticipated to be affected is relatively comparable to previously authorized projects with similar conservation commitments. Because the effects of this project will be short and temporary, it does not represent a threat to the continuation of the affected species within Illinois. The project's ultimate purpose is to maintain the integrity of the existing pipeline and scour protection to prevent additional impacts to the mussel resources from scour or an unintentional release from the pipeline that could potentially affect many more mussels compared to the impacts from the proposed repair.

Based on the 2014 survey, only general estimates of mussel abundance can be inferred. In that survey, a total of 477 live mussels were observed in the scour hole area and vicinity. Overall, 22 live species were detected, including two Illinois-listed species: Butterfly, and Ohio Pigtoe. It is unlikely Ohio Pigtoe occurs in the Mississippi River and was likely an inadvertent misidentification of the Round Pigtoe. Based on available data of mussel distribution of the Mississippi River, Ohio Pigtoe does not occur (Kelner, 2017). Since the EcoCAT returned Ohio Pigtoe for this project, it is included in the take estimate. It is assumed that these species still occur within the area of disturbance. Also collected in the scour area in 2014 was a weathered shell of the Sheepnose, a federally listed species.

Since the 2014 survey was a qualitative assessment, it is nearly impossible to determine the approximate density of the mussel community as a whole or for individual species. A survey of the entire pipeline and the salvage effort planned specifically for the area of disturbance for this project will determine with more accuracy take estimates of mussels present within the work area.

Based on the biological survey data and no terrestrial impacts, it is unlikely that additional impacts to listed species other than to mussels known from Hancock County will occur from the project activities.

2. Measures the applicant will take to minimize and mitigate that impact and the funding that will be available to undertake those measures, including, but not limited to:

- A) Plans to **minimize the area affected** by the proposed action, the estimated **number of individuals** of each endangered or threatened species that will be taken, and the **amount of habitat** affected (please provide an estimate of area by habitat type for each species).

Minimization Measures

- The proposed alternative was engineered to provide the minimum amount of unnecessary contact in the river. The working area along the pipeline and access corridor will also generally be limited to the area within and adjacent to BP's

existing ROW.

- A mussel salvage and relocation is proposed to minimize take of mussels present in the project area. The salvage effort will employ an adaptive relocation process, which entails a concentrated effort within areas demonstrating high mussel abundance and limiting effort in areas where few or no mussels are observed or habitat is not conducive to mussel colonization (e.g.: hardpan, loose and shifting sand, unconsolidated silt, high flow channels). A detailed salvage and relocation plan will be submitted to the IDNR for concurrence in conjunction with site specific collection permits required for the salvage and relocation. At a minimum the relocation plan will describe relocation site requirements, the collection methods and design, including mussel abundance thresholds and/or triggers signifying added effort for collecting, and mapping that will define areas as potentially hazardous for human health and safety (estimated to be approximately 2.7 acres [11,000 m²]; Figure 2).
 - The salvage areas determined to be safe for diving will be salvaged for mussels using a multiple pass design incorporating the adaptive relocation process. Site conditions will determine the mode of design but will entail either a grid cell search approach (e.g.: cells not exceeding 100 m² or a moving transect methodology to ensure complete coverage of the salvage area). The multi-pass method has been shown to achieve >70% salvage efficiency under good conditions (e.g., Will County, IL, 13,622 mussels at 90.6% efficiency [EnviroScience, 2018]; Hunter Station, PA, 130,000 mussels at 70% efficiency on listed mussels [EnviroScience, 2016]; Tidioute, PA, 25,425 mussels at 80% efficiency on listed mussels [EnviroScience, 2019]). For this salvage, an estimated 50% salvage rate is assumed for take estimation purposes (Table 1).
 - Immediately preceding the salvage effort, a relocation site will be identified in suitable habitat and relayed to the IDNR for concurrence. Preference will be given to a relocation site within the IDNR owned property that is adjacent to the project site and at least 500 m upstream. If suitable habitat is not detected on the IDNR property, mussels may be relocated to a downstream location that will not be affected by secondary, adverse effects during construction. Details regarding relocation site selection and methods for deeming its suitability will be provided in the salvage and relocation plan submitted for IDNR concurrence.
- The onsite personnel will be familiar with the minimization efforts and equipment will be outfitted with Global Positioning Systems to ensure materials are only placed within the permanent impact area and temporary construction work zone (equipment only) temporarily as needed.
- The selected contractor will have in place a “Loss of Material Contingency Plan” for rock, geotextile fabric, etc.

Take Estimate

- For the purposes of this document, data from the 2014 survey were used to determine the number of individuals that will be impacted and to develop density

and abundance estimates (Table 1); however, a pre-survey in the spring of 2022 may provide more accurate current information to further refine the densities and abundance. The search area associated with the 2014 survey was 200 ft by 22 ft (4,400 ft²) on an exposed portion of the pipeline and an additional 80 ft diameter circular area (5,027 ft²) centered on a suspended portion of the pipe for a total of 9,427 ft². All mussels encountered in that survey were relocated to suitable habitat approximately 0.3 miles (0.5 kilometers) upstream at coordinates 40.60113, -91.33592. The table below used the 2014 data to estimate the take per species for a 2022. A salvage effort is proposed as a minimization measure; and species take estimates may be refined based on quantitative data collected during a survey in the spring of 2022 if requested and required as part of this conservation plan. If no pre-survey is performed, the 2014 take estimates would apply.

- Data from the 2014 survey were used to develop the take estimate for the 2022 salvage only effort; however, these numbers may change with the proposed 2022 pre-survey, if approved. The abundance of each mussel from 2014 was divided by the 2014 project area to determine density. The 2014 density was then multiplied by the 2022 project area to determine the population abundance estimate. The 2022 population estimate was then multiplied by two to account for a 50% recovery rate to achieve the 2022 take estimate. Bolded species indicate state and /or federally listed species.
- An estimated >70% of relocated mussels will survive the relocation, with similar projects realizing between 70% and >90% success (e.g., Allison 2015; Tiemann et al., 2016a, 2016b).
- Since no terrestrial impacts will occur, take estimates for the listed mammals and plants described in Section 1.B are not warranted.

Table 1. 2022 Population estimate and proposed take estimate for the 2022 Project area.

Common Name	Scientific Name	Abundance 2014 ¹	2014 Density ²	Estimated within Project	Take Estimate ³
Mucket	<i>Actinonaias ligamentina</i>	4	0.005	253	506
Threeridge	<i>Amblema plicata</i>	114	0.130	7,213	14,427
Rock Pocketbook	<i>Arcidens confragosus</i>	1	0.001	63	127
Wartyback	<i>Cyclonaias nodulata</i>	5	0.006	316	633
Pimpleback	<i>Cyclonaias pustulosa</i>	58	0.066	3,670	7,340
Purple Wartyback	<i>Cyclonaias tuberculata</i>	D	-	1	2
Butterfly	<i>Ellipsaria lineolata</i>	6	0.007	380	759
Wabash Pigtoe	<i>Fusconaia flava</i>	2	0.002	127	253
Plain Pocketbook	<i>Lampsilis cardium</i>	6	0.007	380	759
Higgin's Eye	<i>Lampsilis higginsii</i> ⁴	Not Detected	-	1	2
Pearlymussel ⁴	<i>Lampsilis siliquoidea</i>	1	0.001	63	127
Fatmucket	<i>Lampsilis siliquoidea</i>	1	0.001	63	127
White Heelsplitter	<i>Lasmigona complanata</i>	19	0.022	1,202	2,404
Fragile Papershell	<i>Leptodea fragilis</i>	3	0.003	190	380
Black Sandshell	<i>Ligumia recta</i>	16	0.018	1,012	2,025
Spectaclecase ⁴	<i>Margaritifera monodonta</i> ⁴	Not Detected	-	1	2
Washboard	<i>Megalonaias nervosa</i>	24	0.027	1,519	3,037
Threehorn Wartyback	<i>Obliquaria reflexa</i>	33	0.038	2,088	4,176
Hickorynut	<i>Obovaria olivaria</i>	12	0.014	759	1,519
Sheepnose	<i>Plethobasus cyphus</i>	D	-	1	2
Ohio Pigtoe ⁵	<i>Pleurobema cordatum</i> ⁵	1	0.001	63	127
Pyramid Pigtoe	<i>Pleurobema rubrum</i>	D	-	1	2
Round Pigtoe	<i>Pleurobema sintoxia</i>	D	-	1	2
Pink heelsplitter	<i>Potamilus alatus</i>	15	0.017	949	1,898
Pink Papershell	<i>Potamilus ohioensis</i>	3	0.003	190	380
Giant Floater	<i>Pyganodon grandis</i>	1	0.001	63	127
Mapleleaf	<i>Quadrula</i>	151	0.172	9,555	19,109
Ebonysell	<i>Reginaia eburnus</i>	D	-	1	2
Monkeyface	<i>Theliderma metanevra</i>	D	-	1	2
Pistolgrip	<i>Tritogonia verrucosa</i>	D	-	1	2
Fawnsfoot	<i>Truncilla donaciformis</i>	1	0.001	63	127
Deertoe	<i>Truncilla truncata</i>	1	0.001	63	127
Total Live		477			
Total Species (Live)		22			

¹ Abundance observed in scour hole and buffer areas (2014).

² Presented as mussels per square meter (survey area 4,400 ft² [409 m²])

³ Density adjusted to account for mussels missed and those burrowed beyond the top six inches (50% recovery rate).

⁴ Mussels not detected in 2014, but were flagged in the IPaC as occurring in the vicinity

⁵ Species not known to occur in the Mississippi River and was likely a misidentification of *Pleurobema sintoxia* (Kelner, 2017)

Bolded species indicate state and /or federally listed species

Affected Habitat

- The scour repair and protection will be a brief, temporary impact outside the limits of the scour hole and protection area, and habitat and biota should recover to baseline conditions in the adjacent areas (248,646.3 ft² [5.7 acres] 30-m buffer zone) over time post-construction. Within the scour areas and associated protection areas (rip rap area) itself, there will be permanent impacts of biota. We anticipate a direct, permanent take of 347,997.2 ft² (7.99 acres) of river bottom and potentially suitable mussel habitat.
 - Since no terrestrial impacts including tree clearing or earth moving are needed for this project, loss of habitat estimates for the listed mammals and plants described in Section 1.B are not warranted.
- B) **Plans for management of the area** affected by the proposed action that will **enable continued use** of the area by endangered or threatened species by maintaining/re-establishing suitable habitat (for example: native species planting, invasive species control, use of other best management practices, restored hydrology, etc.).

All in-river work within the Mississippi River will be temporary. Post-construction monitoring of relocated mussels and any additional site scans will confirm that the habitat around the repair site is recovered or recovering. Any noted issues, such as scour development or remaining construction debris, will be quickly coordinated with Illinois DNR and resolved.

- C) Description of **all measures to be implemented to avoid, minimize, and mitigate** the effects of the proposed action on endangered or threatened species.

Avoidance measures include working outside the species' habitat.

- In-water impacts have been minimized as much as practical and will provide the most long-term scour protection feasible to reduce future emergency repair needs or further scour.

Minimization measures include timing work when species is less sensitive, reducing the project footprint, or relocating species out of the impact area.

- Work timing will be at normal or low flow.
- Listed mussel species will be relocated out of the area of disturbance to the extent feasible, and with concurrence from the IDNR:
 - A mussel salvage will be performed in the area of disturbance just ahead of construction. The survey will implement an agency-approved salvage and relocation plan that will include multiple passes in an adaptive relocation process to achieve the maximum search efficiency practicable in areas where mussels are concentrated for T&E mussels.
 - Mussels will be relocated at least 300 m upstream, or if approved, other areas of the Mississippi River to support T&E species recovery.

Mitigation is additional beneficial action that will be taken for the species such as needed research, conservation easements, propagation, habitat work, or recovery planning.

- If, for some reason, the conservation and minimization measures are not effective, such as salvage efficiency is not met, BP is committed to additional beneficial actions, specifically funding habitat work or propagation efforts.

It is the applicant's responsibility to propose mitigation measures. IDNR expects applicants to provide species conservation benefits 5.5 times larger than their adverse impact.

To minimize and mitigate the project's effects on the Higgins Eye Pearlymussel, Sheepnose, Spectaclecase, Butterfly, Ohio Pigtoe, and Monkeyface, mussels, the plan is to relocate individuals of these species from the project work area adjacent to the scour holes before construction begins to at least 70% efficiency. A salvage effort of mussel species will be completed within the area of disturbance after a mussel salvage and monitoring plan is developed with the appropriate agencies. Areas deemed unsafe for diving will be avoided and any mussels that may possibly be in these areas will be considered part of the take.

Suitable relocation areas (not more than five separate sites) will be surveyed prior to determining the most suitable location, which will be based on proximity to the project site, substrate composition, and resident mussel community, which will be like that of the area of disturbance. All T&E and non-listed mussels will be translocated to suitable habitat in the selected relocation site or per guidance from IDNR or USFWS. Salvage and relocation will occur during the acceptable sampling period for mussels, typically between May 1 and October 31 or as approved by the IDNR. Adjacent landowner permissions to relocate mussels will be obtained in advance of initiating the salvage and relocation, if warranted.

No other significant environmental impacts are anticipated as a result of this project.

- BP commits \$66,696 to mussel propagation research, habitat preservation, or mussel conservation efforts as recommended by the agencies. This number is contingent on the pre-survey effort proposed for the spring of 2022. This commitment will be achieved through the recommendation of the IDNR. Funds may be provided for research and propagation institutions (e.g., the Ohio State University/Columbus Zoo Mussel Propagation Facility, Genoa National Fish Hatchery, etc.) conservation funds (e.g., Illinois Wildlife Preservation Fund).
- D) Plans for **monitoring** the effects of the proposed actions on endangered or threatened species, such as monitoring the species' survival rates, reproductive rates, and habitat before and after construction, include a plan for follow-up **reporting to IDNR**. Monitoring surveys should be targeted at reducing the uncertainty identified in Section 1.D.

Three post-project monitoring events will occur at the relocation site to estimate relocation success. These events will occur at year-1, year-3, and year-5 post project. Prior to relocating mussels, the corners of the relocation area will be marked using a sub-meter accuracy GPS unit. The relocation area will be at least 300 m upstream of the project area (Figure 2). This property is owned by the IDNR and extends an additional 1,400 m upstream. To aid in detection, tracking, and monitoring, at least 10%, or a minimum of 300 mussels (if possible), of the mussels captured during the salvage effort will be affixed with a Passive Integrated Transponder (PIT) tag prior to

relocation and will be monitored at each event. If possible, state and federally listed mussels will receive priority for tagging and the remaining PIT tagged mussels will be supplemented with non-listed mussels. This PIT tagging method has been successful in the Kankakee River in Illinois (EnviroScience, 2018) and with mussels from the Hunter Station Bridge Replacement project on the Allegheny River in Pennsylvania (EnviroScience 2016) where a subset of federally endangered mussels was translocated to Illinois streams. Mussel placement within the grid will be so that the resident density does not increase by more than 50%. At each monitoring event, a permitted malacologist and qualified surveyors will scan the bottom of the river for PIT tagged mussels along a moving transect within the relocation area. All PIT tagged mussels will be hand collected and brought to the surface for processing. Species, sex (if sexually dimorphic), mortality, and shell length will be recorded along with photographic vouchers of a representative specimen of each species. All dead shells will be scored as either fresh dead (lustrous nacre, dead <1 year) or weathered dead (dull or chalky nacre, dead one to many years) and noted as present.

After correspondence with the IDNR on July 9, 2021, it was determined that “the state does not foresee mussel community recovery at the impact area. Side scanning sonar/habitat assessment of the impact area is not necessary. The impact will constitute a permanent loss of mussel habitat and so recolonization is not a 5-year goal for this site (the time limit we intend to write the ITA to cover).”

E) **Adaptive management practices** that will be used to deal with changed or unforeseen circumstances that may affect the endangered or threatened species.

- *Adaptive management is a way to make decisions in the face of uncertainty by monitoring the uncertain element over time and adjusting to the new information. Adaptive management requires identifying objectives and uncertainties, thinking through a range of potential outcomes, developing triggers that will lead to different actions being taken, and monitoring to detect those triggers.*
- *Consider environmental variables such as flooding, drought, and species dynamics as well as other catastrophes. Management practices should include contingencies and specific triggers. Note: Not foreseeing any changes does not qualify as an adaptive management plan.*

A qualified biologist will be available for consultation during key in-water construction tasks to ensure environmental commitments from the Conservation Plan, any issued USFWS BO, and stormwater/erosion control plan are met, and any unforeseen circumstances are quickly addressed and communicated to the resource agencies.

Mussels from the project area will be collected and relocated to an appropriate location outside of the project area using approved methods for handling mussels with minimal stress using qualified surveyors.

Since all work is proposed to occur from the river, erosion and sediment control are not anticipated. All equipment refueling will be performed at a commercial facility in town when possible. If needed, all fuel will be stored in containment on site.

- F) **Verification that adequate funding exists** to support and implement all minimization and mitigation activities described in the conservation plan. This may be in the form of bonds, certificates of insurance, escrow accounts, or other financial instruments adequate to carry out all aspects of the conservation plan.

BP commits the financial resources to support and implement all minimization and mitigation activities described in the Conservation Plan.

3. A description of alternative actions the applicant considered that would reduce take, and the reasons that each of those alternatives was not selected. A “no-action” alternative shall be included in this description of alternatives. Please describe the economic, social, and ecological tradeoffs of each action.

- *Consideration of alternative actions is an important tool in conservation planning as it allows for thinking of other options and evaluating the potential outcomes in terms of all relevant objectives. However, to be useful it requires creativity in developing alternatives and systematic analysis in evaluating the alternatives.*
- *In evaluating alternatives, describe the economic, social, and ecological tradeoffs of each.*

BP reviewed two alternatives for the scour repair, which are described below.

1. The No Action Alternative
 2. Alternative 1: Scour Repair (geotextile fabric, geotextile gravel bags, bulk rock fill, and rip rap placement)
- A. The No Action Alternative – BP performed a sonar survey of their three existing petroleum pipelines in the Mississippi River to assess the existing depth of cover over the pipeline and existing scour conditions around their lines. A review of the survey data indicated that significant scour has occurred around the 20-inch diameter crude oil pipeline on the riverbed. The deep scour holes pose a risk of a future unsupported pipeline span in the river, exposed to additional stresses, strikes from navigational vehicles, and debris. A minimum depth of cover is required for pipelines crossing inland bodies of water in accordance with federal requirements (49 Code of Federal Regulations 195.248). The scour is evidence that minimum thresholds of the depth of cover minimum requirements are not met. BP’s depth of cover survey is provided in Attachment E. The No Action Alternative would not meet the project objectives of stabilizing and securing the pipeline from inadvertent releases, breaks, and structural deterioration from pipeline exposure due to the scour incurring a greater hazard to the public and environment if left un-repaired.
- B. Alternative 1: Scour Repair – To mitigate the low depth of cover, exposure, and scour conditions, BP proposes to: install additional cover over their pipeline that includes geotextile fabric, geotextile gravel bags, bulk rock fill, and rip rap to fill in the scour holes on both sides of the pipeline and to provide for further protection. This alternative will mitigate human and environmental risks associated with inadvertent releases, breaks, and structural deterioration by re-stabilizing the pipeline where it is exposed. The rip rap will provide additional stability and protection from debris, high flow, and snagging. The scour hole repair fill elements provide a rise in local elevation grade,

preventing further scour from occurring. Alternative 1 is the preferred alternative to remedy the scour and prevent potential safety, environmental, and human risk if left unprotected.

4. Data and information to indicate that the proposed taking will not reduce the likelihood of the survival of the endangered or threatened species in the wild within the State of Illinois, the biotic community of which the species is a part, or the habitat essential to the species existence in Illinois.

We believe the scour repair and armoring may, over time, enhance mussel habitat by providing a grade control and substrate stability. While the present project represents a brief impact on resident T&E species, the long-term maintenance and stewardship of this site by BP are in the best interest of T&E species and the public.

5. An implementing agreement, which shall include, but be limited to (on a separate piece of paper containing signatures):

- A. Names and signatures of all participants in the execution of the conservation plan.
- B. The obligations and responsibilities of each of the identified participants with schedules and deadlines for completion of activities included in the conservation plan and a schedule for preparation of progress reports to be provided to the IDNR. The estimated schedule for submission of these progress reports to the IDNR is as follows:

Reporting Schedule and Subject Activities of Progress Reports:

REPORTING ACTIVITIES				
Year	Report Due on the last day of	Report Type	Resident Mussels	Relocated T&E Mussels
2022	June	Pre-survey	Pre-survey	
2022	December	Salvage Report	Salvage and Relocation	
2023	December	Year 1 Final		Relocation Site Monitoring (Intrusive)
2025	December	Year 3 Final		Relocation Site Monitoring (Intrusive)
2028	January 31	Final Summary Years 0-5		2027 Relocation Site Monitoring (Intrusive); Summary Years 1, 3, 5

- C. 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.
- D. Assurance of compliance with all other federal, state, and local regulations pertinent to the proposed action and to execution of the conservation plan.
- E. Copies of any final federal authorizations for a taking already issued to the applicant, if any.

Assurance of compliance with all other federal, state, and local regulations pertaining to the proposed action and to the execution of the Conservation Plan: Coordination by BP with the U.S. Army Corps of Engineers Rock Island District is ongoing. In addition,

the project is under continued coordination with the resource agencies. Since completing the EcoCAT and IPaC, regular email and call updates have been conducted to keep agencies informed of progress on the project, including the status of mussel surveys. Coordination has occurred or is occurring concurrently with the following agencies:

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- U.S. Coast Guard
- Illinois Environmental Protection Agency
- Illinois Department of Natural Resources
- Hancock County

Coordination with the U.S. Army Corps of Engineers Rock Island District is ongoing, and a Biological Assessment similar in composition to this Conservation Plan is concurrently in the process of being submitted. Copies of the final biological assessments, Biological Opinion, and federal incidental take statement will be forwarded to the IDNR office when completed/received.

6. CERTIFICATION:

BP certifies that it has the authority to complete the project as described in this Conservation Plan once USFWS federal approvals are received to address the issues proposed in the Incidental Take Plan in the event state-listed threatened or endangered species are encountered. BP oversees construction and directly or through designees will assure that all applicable state laws will be adhered to during the completion of the project and through the agreed-to monitoring commitments.

H.E. FALCON, Project Manager

05/25/22

Name, Title

Date:

BP Representative

*PLEASE SUBMIT TO: Incidental Take Authorization Coordinator, Illinois Department of
Natural Resources, Division of Natural Heritage, One Natural Resources Way,
Springfield, IL 62702 OR DNR.ITAcordinator@illinois.gov*

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ATTACHMENT A
Site Photos and Location Mapping

*BP U.S. Pipelines & Logistics' Mississippi River Pipeline
LDOC and Scour Mitigation
Photographed October 9, 2020*



Photo 1. View of pipeline crossing looking west. Photo taken from the Mississippi River on the right descending bank.



Photo 2. View from the pipeline crossing in the Mississippi River. View is looking south at the head of Hass's Island.

*BP U.S. Pipelines & Logistics' Mississippi River Pipeline
LDOC and Scour Mitigation
Photographed October 9, 2020*



Photo 3. View facing south. Photo is of the left descending bank upstream of the pipeline cross looking downstream.



Photo 4. View facing east. Photo is of left descending bank from the pipeline crossing, mid-channel of the Mississippi River.

*BP U.S. Pipelines & Logistics' Mississippi River Pipeline
LDOC and Scour Mitigation
Photographed October 9, 2020*



Photo 5. View facing north. Photo is of the left descending bank looking upstream of the pipeline crossing.



Photo 6. View facing east. Photo is looking from mid-channel towards the left descending bank over the scour area.

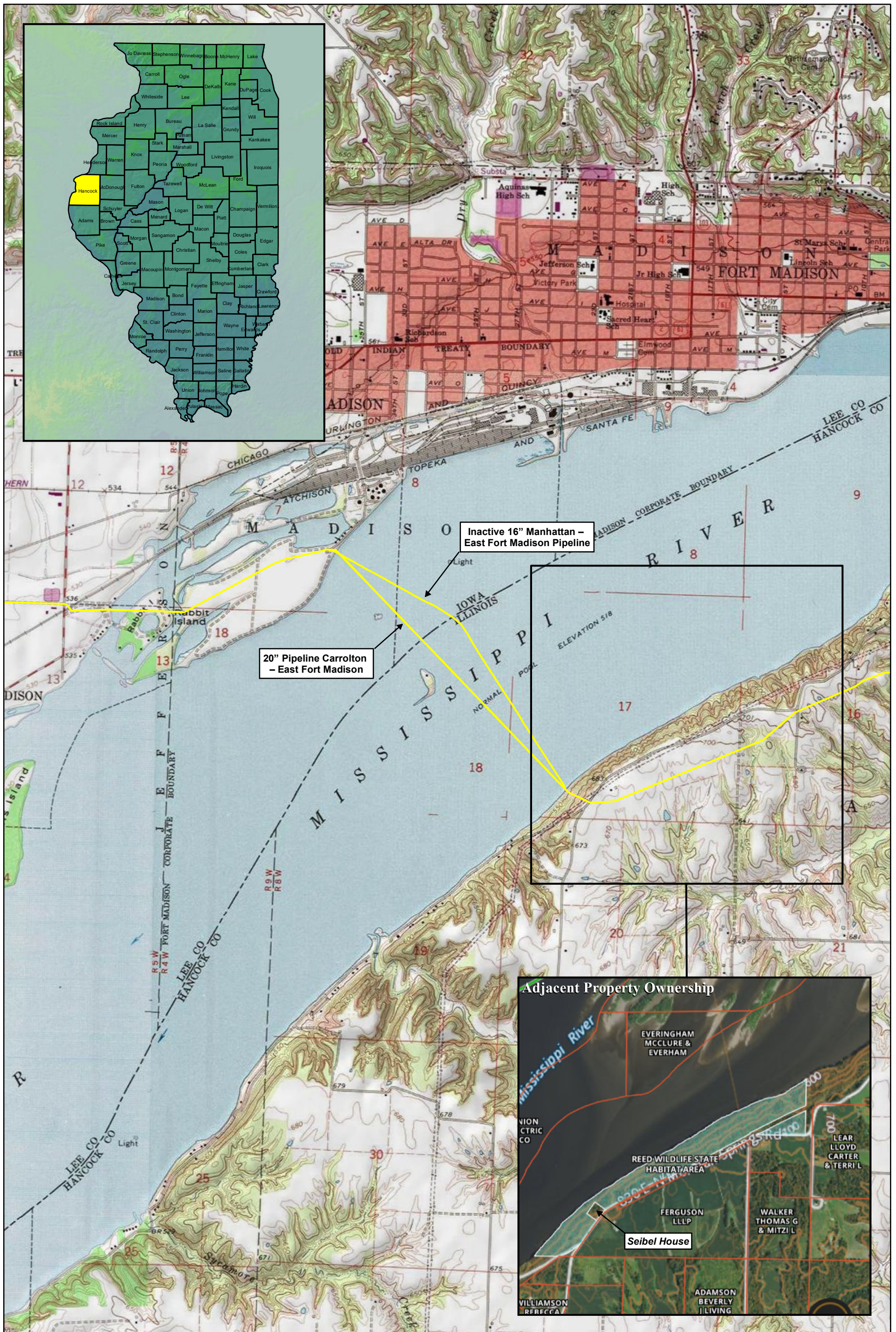
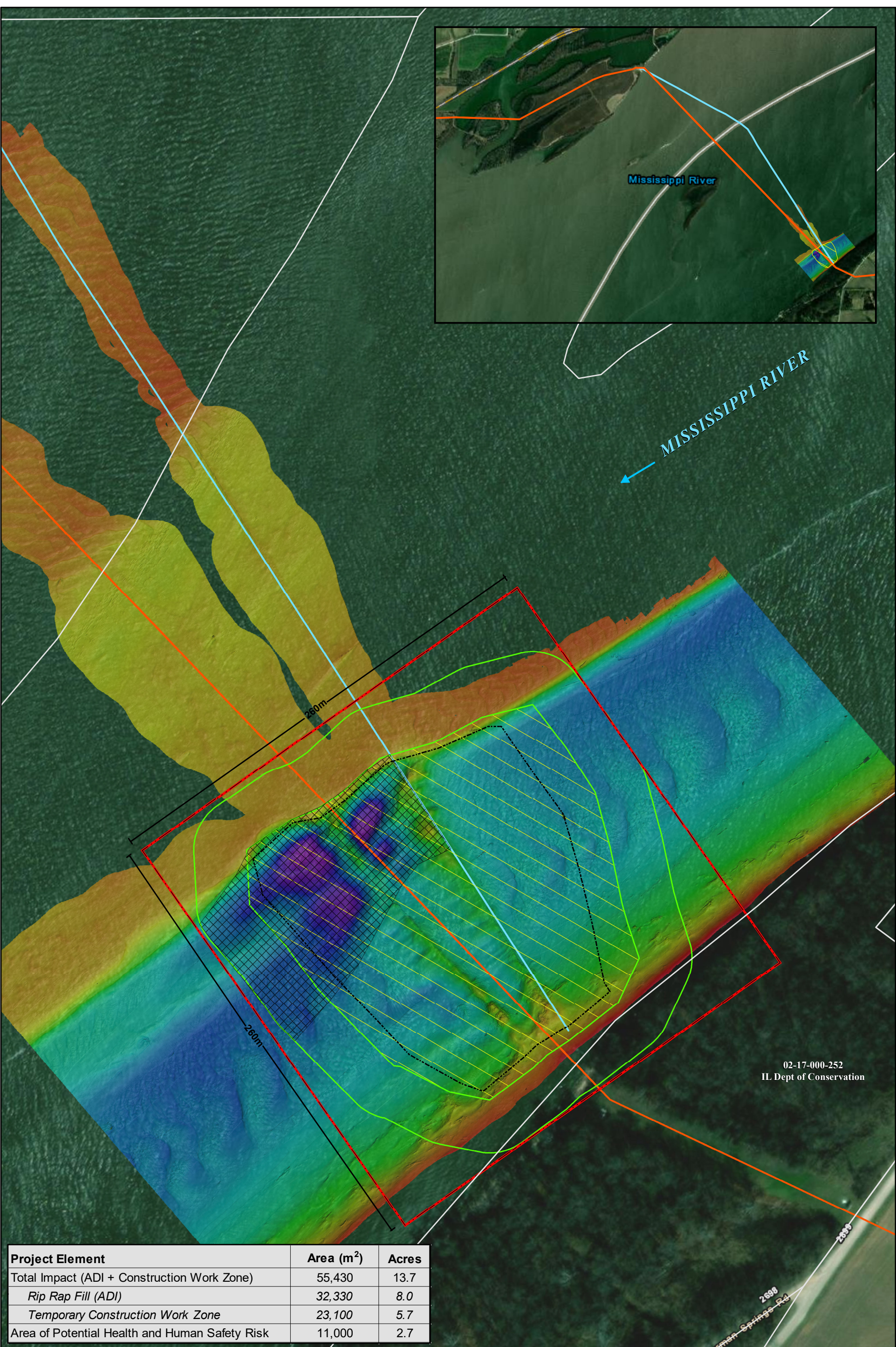


Figure 1. USGS 7.5-min Topographic Map of Niota Quadrangle. Mississippi River Pipeline LDOC and Scour Mitigation, Hancock County, Illinois.

— Pipeline



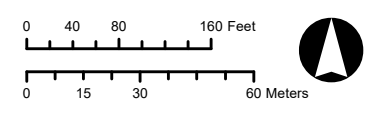
Date: 5/24/2022 Path: O:\10_Projects\BIBP\12923_FT_Madison-Prod\12923_MississippiRiver\GIS\Map2_Site_ZOOM_2022_V3_0524.mxd



Project Element	Area (m ²)	Acres
Total Impact (ADI + Construction Work Zone)	55,430	13.7
Rip Rap Fill (ADI)	32,330	8.0
Temporary Construction Work Zone	23,100	5.7
Area of Potential Health and Human Safety Risk	11,000	2.7

Figure 2. Aerial Map of Site.
Mississippi River Pipeline LDOC
and Scour Mitigation,
Hancock County, Illinois.

- - - - Bulk Rock Fill
- Pipeline
- Inactive Pipeline
- Rip Rap Fill Area (Area of Direct Impact [ADI])
- Temporary Construction Work Zone (30m Buffer)
- Project Location
- Area of Potential Health and Human Safety Risks



Basemap courtesy of Esri.

ATTACHMENT B
Biological Survey Report (2014)

Philip Mathias

From: Becca Winterringer
Sent: Friday, May 29, 2020 3:04 PM
To: Hayes, Bradley
Subject: RE: 2009769 EcoCAT BP pipeline 20" No. 1 System Crude Pipeline, Mississippi River, Hancock County, Illinois
Attachments: PB_PipelineEmergency_Interim_Report_Sept30_2014_REVISED05292020.pdf; Extracted pages from V2_6729_EnviroScience_General_Mussel_Proposal_MRM-223.pdf

Hi Brad:

Thanks for bringing that to my attention. I did a little back pedaling as this was before my time at EnviroScience. I talked to the lead person and confirmed that the river mile is indeed a typo. The results correspond to approximate river mile 380.5. We are making the changes internally here. Attached is page one from the 2014 survey proposal clearly identifying the subject project location. This also clearly misidentifies the river mile. I have re-attached the letter report with the correct river mile, noting the revision. The lat long referenced is clearly our project location.

My apologies on the confusion.

I'm available to discuss if you'd like to call me at 636-544-4754.

Thanks!
Becca

From: Hayes, Bradley <Bradley.Hayes@illinois.gov>
Sent: Friday, May 29, 2020 1:59 PM
To: Becca Winterringer <bwinterringer@enviroscienceinc.com>
Subject: Re: 2009769 EcoCAT BP pipeline 20" No. 1 System Crude Pipeline, Mississippi River, Hancock County, Illinois

Thanks Becca,

Are those the correct survey results? The river miles don't look right? Do you have a second to discuss?

Thanks,
Brad

From: Becca Winterringer <bwinterringer@enviroscienceinc.com>
Sent: Friday, May 29, 2020 12:41 PM
To: Hayes, Bradley <Bradley.Hayes@illinois.gov>
Subject: [External] RE: 2009769 EcoCAT BP pipeline 20" No. 1 System Crude Pipeline, Mississippi River, Hancock County, Illinois

Brad:

Attached are the results of the 2014 mussel survey. Let me know if you have any questions or need additional information.

Have a good weekend.

Thanks,
Becca

From: Hayes, Bradley <Bradley.Hayes@illinois.gov>

Sent: Wednesday, May 27, 2020 8:54 AM

To: Becca Winterringer <bwinterringer@enviroscienceinc.com>

Subject: Re: 2009769 EcoCAT BP pipeline 20" No. 1 System Crude Pipeline, Mississippi River, Hancock County, Illinois

Thanks Becca,

I think that works for now. I was just trying to get a better grasp on what the actual impact to the stream bed looked like, and the plans showed that pretty well. Do you happen to have the results of the 2014 survey?

Brad

From: Becca Winterringer <bwinterringer@enviroscienceinc.com>

Sent: Tuesday, May 26, 2020 3:21 PM

To: Hayes, Bradley <Bradley.Hayes@illinois.gov>

Subject: [External] RE: 2009769 EcoCAT BP pipeline 20" No. 1 System Crude Pipeline, Mississippi River, Hancock County, Illinois

Hi Brad,

See attached for the current elevation profile and plan sheets showing the pipeline crossing and scour hole. The hydrographic survey and remediation design is not expected to be completed for another 4-6 weeks; these are the only "plan" sheets available.

The scope of work provided in the EcoCAT description was provided by BP and is all I have at the moment. Is there something specific regarding the scope of work that you need? I expect specific details on exact placement within the repair area will not be known until the hydrographic survey is completed. I believe BP also performed a LDC emergency exposure repair along the same line at the same location in 2015. We have advised that a mussel survey may be requested by agencies. A mussel survey was performed in 2014 at the same location for the same issue.

BP is investigating a long term solution. In the interim, there is still a need to address the LDC in the short term. The Joint Application (IL and USACE) is expected to be submitted once the hydrographic survey is completed (6-8 weeks). They hope to initiate the LDC work in 2021.

Hope this is helpful. I am in and out of the field this week so feel free to call me at 636-544-5754.

Have a good day.

Thanks,
Becca

From: Hayes, Bradley <Bradley.Hayes@illinois.gov>

Sent: Tuesday, May 26, 2020 9:54 AM

To: Becca Winterringer <bwinterringer@enviroscienceinc.com>

Subject: 2009769 EcoCAT BP pipeline 20" No. 1 System Crude Pipeline, Mississippi River, Hancock County, Illinois

Hello Becca,

I have begun reviewing the project you submitted to EcoCAT for BP pipeline 20" No. 1 System Crude Pipeline, Mississippi River, Hancock County, Illinois and have a question? How quickly did you plan to get out there? Could you provide plans and more details on the scope of work? Are there any plans to survey the area for

mussels? We have records of state listed mussels along the bank just north of the site and downstream as well.

Thanks,
Brad

Brad Hayes

Resource Planner

Division of Real Estate Services and Consultation

Office of Realty & Capital Planning

Illinois Department of Natural Resources

One Natural Resources Way

Springfield, IL 62702

Bradley.Hayes@Illinois.gov

Phone: (217) 782-0031

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INTRODUCTION

EnviroScience, Inc. (ES) is pleased to submit this proposal and work scope to Central States Underwater Contracting (CSU) and BP North America (BP) to support the emergency pipeline scour repair at Mississippi River Mile 223.65 (left descending bank), Hancock County, Illinois three miles downstream from Niota, IL. The project location is at coordinates lat. 40.598713°, long. -91.341262° (decimal degrees WGS84) and is presented below. The scope of services is to assist BP to survey, salvage, and relocate mussels to suitable habitat. ES personnel have some of the most extensive endangered mussel survey and translocation experience in the country.

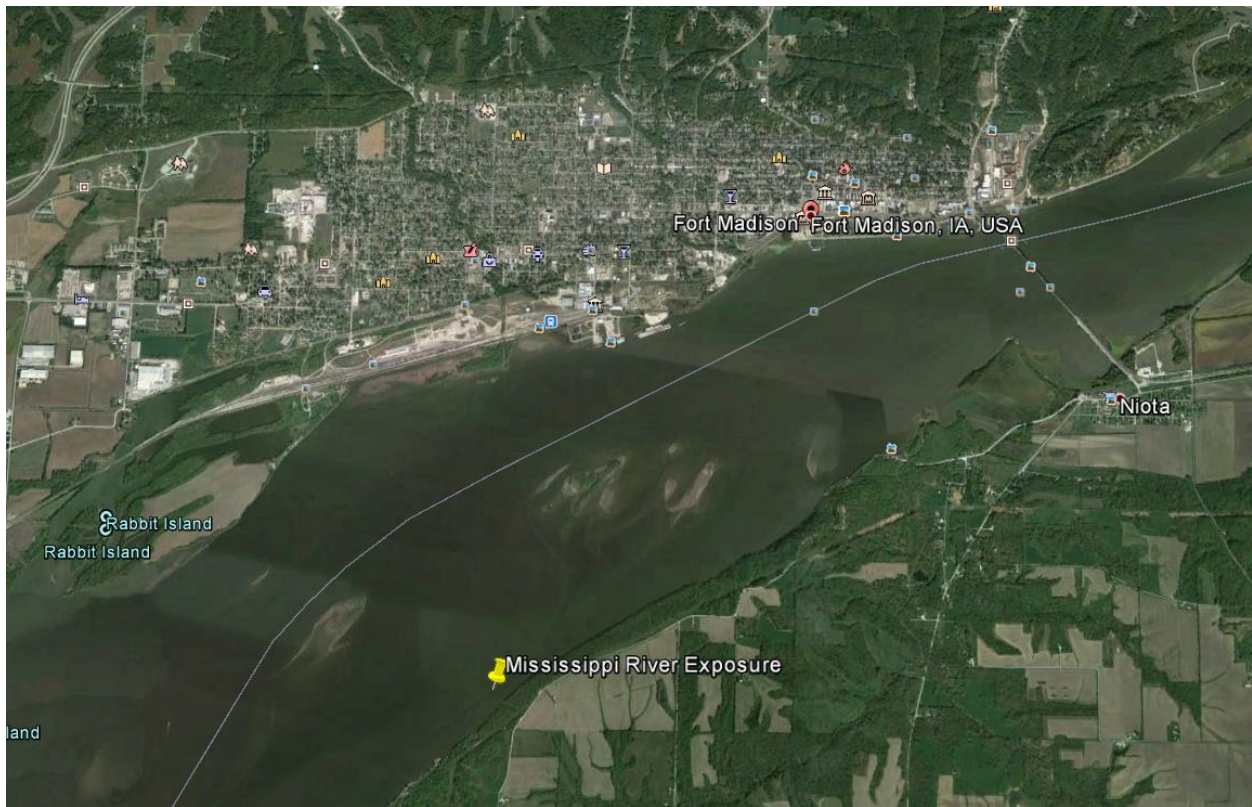


Figure 1. Project Location (Map source Google Earth)

Interim Mussel Survey Report
September 30, 2014

Aimee Mackey, CPESC
Project Manager
Parsons
919.324.4955
aimee.mackey@parsons.com

Re: Freshwater Mussel Survey / Relocation at BP Pipeline Emergency
Stabilization Project at Mississippi River Mile ~~223.65~~ (LDB)

Dear Ms. Mackey:

Freshwater mussel salvage and relocation work at the BP Pipeline Emergency Scour Repair Project at Mississippi River Mile ~~223.65~~ (LDB) was completed on September, 4th, 2014. A total of 477 living mussels of 22 species (See Table 1, below) were relocated to suitable habitat approximately 0.5km upstream from the project site at coordinates 40.60113, -91.33592 (decimal degrees, WGS84). This data includes data that was previously reported during the initial mussel survey and salvage phase on August 27th. An additional total of 7 species were only detected from dead shells, many of which were very old, possibly two to 3 decades or more.

Among the living mussels that were relocated were species listed as state endangered in Illinois (*Pleurobema cordatum*, Ohio pigtoe) and listed as threatened in both Iowa and Illinois (*Ellipsaria lineolata*, Butterfly) and threatened in Illinois (*Ligumia recta*, Black Sandshell). Weathered dead shells of the federally and state endangered Sheepsnose (*Plethobasus cyphus*) were collected but no live or fresh dead individuals were found.

Most mussels recovered originated from the western deep scour zone area where habitat was mud, sand, and gravel in approximately 30ft of water. The eastern portion of exposed pipeline was in shallower water (22ft) with a hard packed sand bottom and contained comparatively few mussels (Table 1).



5070 Stow Road
Stow, OH 44224

A full report will be submitted to your office and the Iowa DNR, Illinois DNR, and USFWS as part of EnviroScience's 2014 permit reporting commitments. If you have any questions or comments, please do not hesitate to contact me.

Very best regards,

A handwritten signature in blue ink, appearing to read "Greg Zimmerman", with a long horizontal flourish extending to the right.

Greg Zimmerman
Vice President

Table 1

Species, Common Names, Status, Numbers, and Relative Abundance of Freshwater Mussels Found at the BP Pipeline Scour Repair Project at Mississippi River Mile 380.5 (LDB)

Species	Common Name	Federal Status ¹	IA Status ¹	IL Status ¹	Living Mussels			Dead Mussels		Relative frequency (% total) Live	
					scour hole	Scour hole buffer	East exposed pipe	Live Total	FD		D
1	<i>Actinonaias ligametina</i>				3	1		4	x	x	0.8%
2	<i>Amblema plicata</i>				8	105	1	114	x	x	23.9%
3	<i>Arcidens confragosus</i>				1			1	x	x	0.2%
4	<i>Cyclonaias tuberculata</i>		T	T						x	0.0%
5	<i>Ellipsaria lineolata</i>		T	T	3	3		6		x	1.3%
6	<i>Fusconaia ebena</i>			T						x	
7	<i>Fusconaia flava</i>				2			2		x	0.4%
8	<i>Lampsilis cardium</i>				4	2		6		x	1.3%
9	<i>Lampsilis siliquoidea</i>				1			1		x	0.2%
10	<i>Lasmigona complanata</i>				9	10		19	x	x	4.0%
11	<i>Leptodea fragilis</i>				1	2		3	x	x	0.6%
12	<i>Ligumia recta</i>			T	3	13		16	x	x	3.4%
13	<i>Megaloniais nervosa</i>				9	14	1	24		x	5.0%
14	<i>Obliquaria reflexa</i>				10	21	2	33	x	x	6.9%
15	<i>Obovaria olivaria</i>				5	6	1	12	x	x	2.5%
16	<i>Plethobasus cyphus</i>	FE	E	E						x	
17	<i>Pleurobema cordatum</i>			E		1		1	x	x	0.2%
18	<i>Pleurobema rubrum</i>			E						x	
19	<i>Pleurobema sintoxia</i>		E							x	
20	<i>Potamilus alatus</i>				3	10	2	15	x	x	3.1%
21	<i>Potamilus ohioensis</i>				1	2		3		x	0.6%
22	<i>Pyganodon grandis</i>				1			1	x	x	0.2%
23	<i>Quadrula metanevra</i>									x	
24	<i>Quadrula nodulata</i>				2	3		5	x	x	1.0%
25	<i>Quadrula pustulosa</i>				31	27		58	x	x	12.2%
26	<i>Quadrula quadrula</i>				55	79	17	151	x	x	31.7%
27	<i>Tritogonia verrucosa</i>									x	
28	<i>Truncilla donaciformis</i>				1			1	x		0.2%
29	<i>Truncilla truncata</i>						1	1	x	x	0.2%
Total:					153	299	25	477			100.0%
No. of Live Species					20	16	7	22			

¹ E = Endangered; SC = Special Concern; T = Threatened

² FD=fresh dead shell, D=includes weathered dead and subfossil shells

ATTACHMENT C
EcoCAT and IPaC Coordination Results



Illinois Department of Natural Resources

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

JB Pritzker, Governor
Colleen Callahan, Director

June 1, 2020

Ms. Becca Winterringer
30 South Wacker Drive
Chicago, IL 60606

**RE: BP pipeline 20" No. 1 System Crude Pipeline, Mississippi River, Hancock County, Illinois
Consultation Program
EcoCAT Review #2009769
Hancock County**

Dear Ms. Winterringer:

The Department has received your submission for this project for the purposes of consultation 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 proposed action consists of covering an exposed portion of BP's existing 20-inch crude pipeline in the Mississippi River; thereby mitigating the risks associated with exposed pipelines in the water way. BP plans to cover the exposure via placement of grout bags on the riverbed over the pipeline. The exposure on the 20-inch line is 10 ft in length and located about 412 ft west of the Illinois side bank. The grout bags will be placed over the pipeline by a diver, and project support will be provided from work barges staged in the river. The project will not require equipment access (other than the boats), staging areas, or earth disturbances on either side of the river, nor will it require the use of temporary bladder dams or cofferdams or require excavation. The site will be accessed via a nearby public boat launch. No use of adjacent properties outside will be required.

EcoCAT has indicated records for the state-listed Ohio pigtoe (*Pleurobema cordatum*) and butterfly mussel (*Ellipsaria lineolata*) in the vicinity of the project. The Department recommends the applicant seek an Incidental Take Authorization (ITA) pursuant to Part 1080 and Section 5.5 of the *Illinois Endangered Species Protection Act*. Be advised, an ITA can take at least four months to obtain and requires a public notice period. All questions pertaining to ITA should be directed to the ITA coordinator, Jenny Skufca (jenny.skufca@illinois.gov). Visit the link below for information on the ITA process:

<https://www.dnr.illinois.gov/conservation/NaturalHeritage/Pages/ApplyingforanIncidentalTakeAuthorization.aspx>.

The Department also requests a mussel relocation be conducted, in coordination with the above requested ITA, to minimize impacts to native freshwater mussel pursuant to *Fish and Aquatic Life Code* [515 ILCS 5/1-50], Title 17 *Illinois Administrative Code* Part 860. The project proponent should request an *Aquatic Life Relocation Permit* from our Fisheries Division. Relocation methodology should be sent to the Department for concurrence prior to the relocation effort and results of the relocation should be sent to the Department for review. Native mussels collected during the relocation should be promptly released at prearranged locations. Be advised, state-listed threatened and endangered species may not be relocated without an ITA.

Given the above recommendations are adopted, the Department has determined that impacts are unlikely. 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
Office of Realty & Capital Planning
Illinois Dept. of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271
bradley.hayes@illinois.gov
Phone: (217) 782-0031

cc. Jenny Skufca – Incidental Take Authorization Coordinator

Applicant: BP US Pipelines & Logistics
Contact: Becca Winterringer
Address: 30 South Wacker Drive
Chicago, IL 60606

IDNR Project Number: 2009769
Date: 05/21/2020

Project: BP pipeline 20" No. 1 System Crude Pipeline, Mississippi River, Hancock County, Illinois
Address: Mississippi River, near 2898-2700 N Morman Springs Rd , Nauvoo

Description: A portion of BP's existing 20-inch crude pipeline on the bed of the Mississippi River has become exposed. The primary objective for this project is to cover the exposed pipe thereby mitigating the risks associated with exposed pipelines in the water way. At this site, there are a total of three pipelines—an inactive, abandoned 12-inch petroleum line, an inactive 16-inch petroleum line, and the 20-inch active crude line. The 12-inch and 16-inch petroleum lines will not be disturbed by this project. BP plans to cover the exposure on the 20-inch line via placement of grout bags on the riverbed over the pipeline. The exposure on the 20-inch line is 10 ft in length and located about 412 ft west of the Illinois side bank. The grout bags will be placed over the pipeline by a diver, and project support will be provided from work barges staged in the river. The project will not require equipment access (other than the boats), staging areas, or earth disturbances on either side of the river, nor will it require the use of temporary bladder dams or cofferdams or require excavation. The site will be accessed via a nearby public boat launch. No use of adjacent properties outside will be required.

Natural Resource Review Results

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

Black Sandshell (*Ligumia recta*)
Black Sandshell (*Ligumia recta*)
Butterfly (*Ellipsaria lineolata*)
Butterfly (*Ellipsaria lineolata*)
Ohio Pigtoe (*Pleurobema cordatum*)

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: Hancock

Township, Range, Section:
7N, 8W, 17



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

Government Jurisdiction
U.S. Army Corps of Engineers

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.

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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.
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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.

Becca Winterringer

From: Hayes, Bradley <Bradley.Hayes@illinois.gov>
Sent: Wednesday, June 3, 2020 11:28 AM
To: Becca Winterringer; Skufca, Jenny
Cc: Philip Mathias; Hoeting, Diane
Subject: Re: 2009769 EcoCAT BP pipeline 20" No. 1 System Crude Pipeline, Mississippi River, Hancock County, Illinois

Becca,

If safety becomes an issue with the survey and relocation, then we can withdraw that request based on those concerns. I would be happy to discuss that and any future projects with you.

Brad

From: Becca Winterringer <bwinterringer@enviroscienceinc.com>
Sent: Wednesday, June 3, 2020 9:13 AM
To: Hayes, Bradley <Bradley.Hayes@illinois.gov>; Skufca, Jenny <Jenny.Skufca@Illinois.gov>
Cc: Philip Mathias <pmathias@enviroscienceinc.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>
Subject: [External] RE: 2009769 EcoCAT BP pipeline 20" No. 1 System Crude Pipeline, Mississippi River, Hancock County, Illinois

Thanks Brad.

I have a question regarding the requested relocation. I believe there may have been some prior conversations discussing the hazards with diving within the scour hole with Ms. Skufca prior to my involvement with the project. Just want to make sure I am on the same page so I can incorporate appropriate relocation/survey language and strategy in the ITA. It was discussed that due to the 40' depth that safety may preclude relocation within the zone of impact. Might me best to re-convene a call with you an Jenny?

The permitting strategy being undertaken by BP includes future work for the entire pipeline crossing. I didn't want to interfere with the immediate work that is associated with localized issue detailed in 2009769 EcoCAT. I will be submitting another EcoCAT request to address the entire pipeline crossing plus a 1/2 mile buffer on each side. BP does not have a definitive remediation design plan though for the long-term. Maybe we could discuss this as well?

Have a good day!

Thanks,

Becca Winterringer
Senior Scientist/Project Manager



EnviroScienceInc.com

Office: (330) 688-0111 / **Toll-Free:** (800) 940-4025 / **Cell:** (636) 544-4754 / **24h Emergency:** (888) 866-8540
5070 Stow Road, Stow, OH 44224

From: Hayes, Bradley <Bradley.Hayes@illinois.gov>

Sent: Monday, June 1, 2020 11:30 AM

To: Becca Winterringer <bwinterringer@enviroscienceinc.com>

Cc: Skufca, Jenny <Jenny.Skufca@Illinois.gov>

Subject: 2009769 EcoCAT BP pipeline 20" No. 1 System Crude Pipeline, Mississippi River, Hancock County, Illinois

Hello Becca,

Attached is our consultation letter recommending you pursue an ITA for mussels, as discussed previously. I have also requested a native mussel relocation be conducted in coordination with the ITA. Please let me know if you have any questions regarding my review.

Thanks,

Brad Hayes

Resource Planner

Division of Real Estate Services and Consultation

Office of Realty & Capital Planning

Illinois Department of Natural Resources

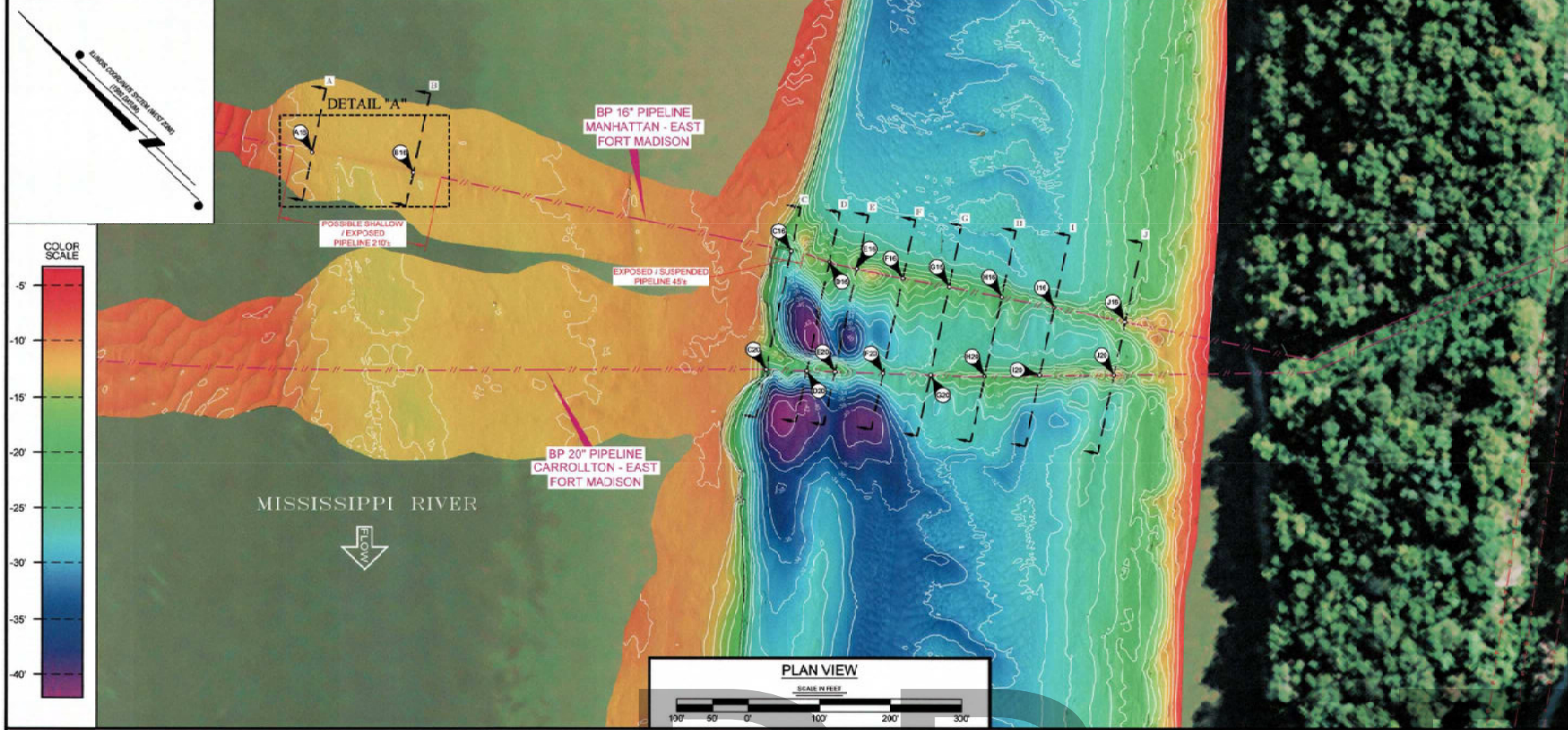
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Springfield, IL 62702

Bradley.Hayes@Illinois.gov

Phone: (217) 782-0031

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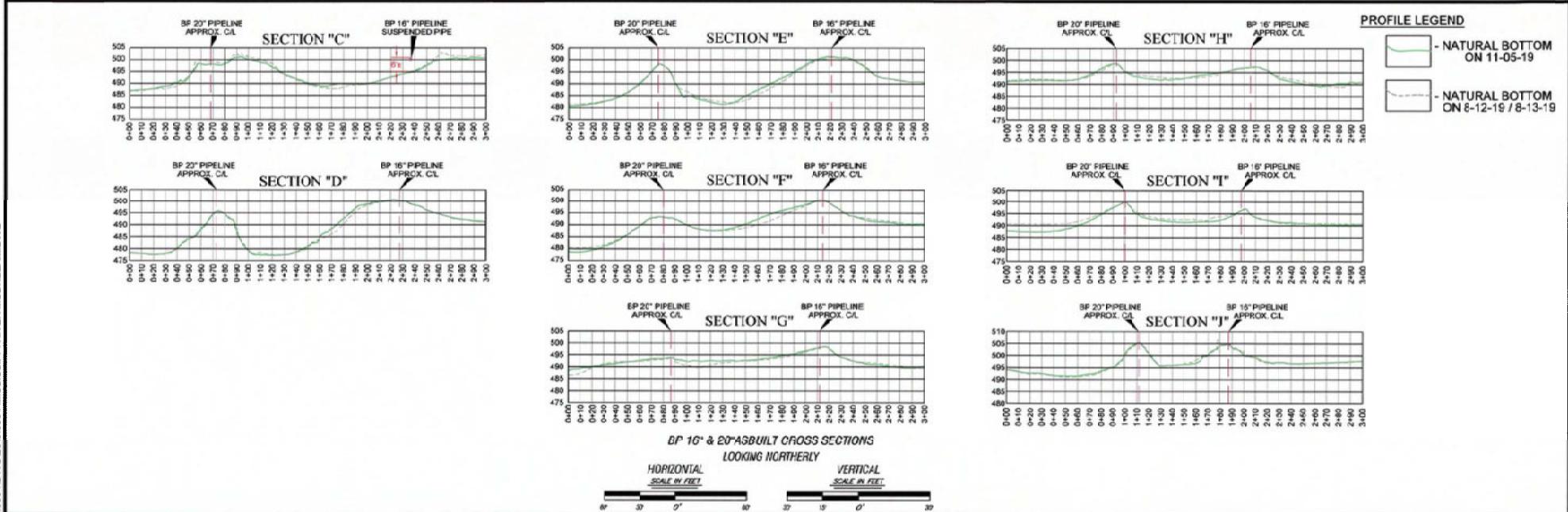
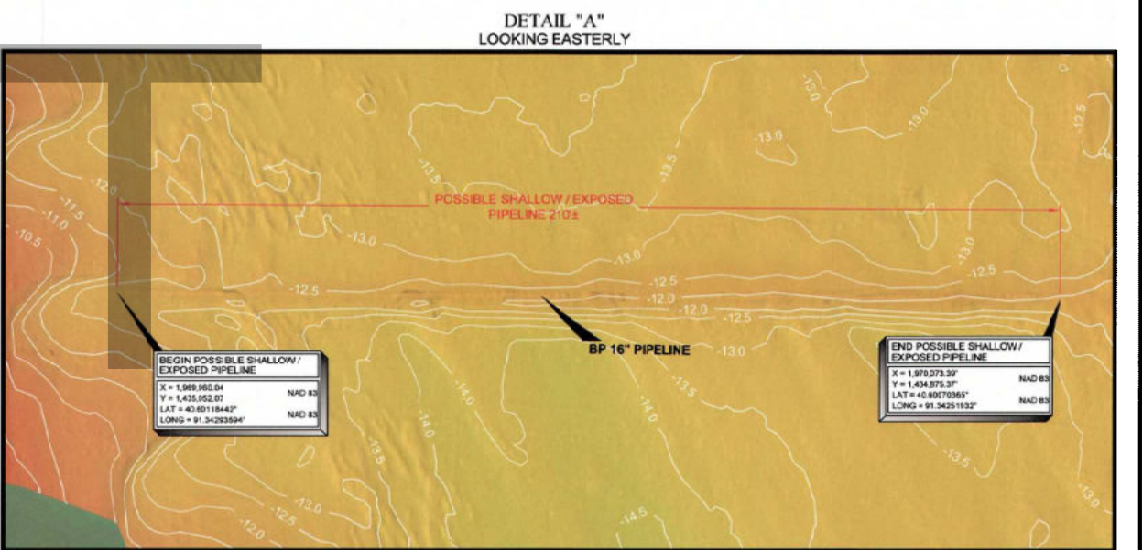
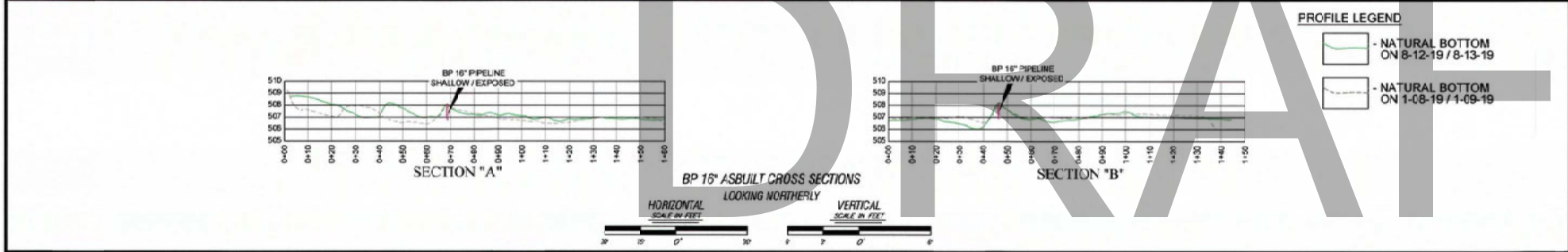
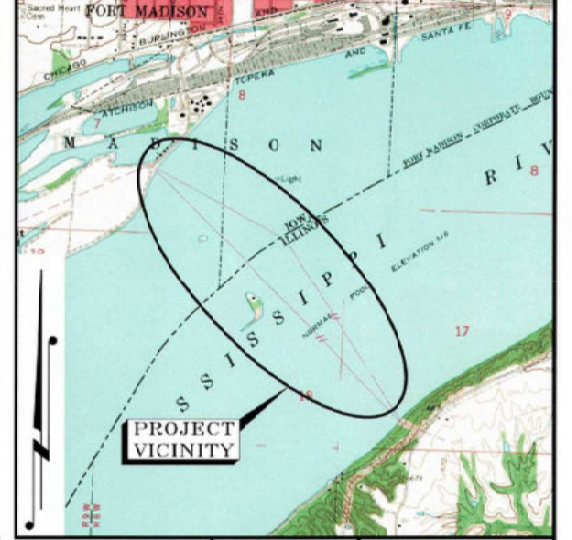


CROSS SECTION LOCATIONS

POINT NUMBER	LATITUDE NAD (83)	LONGITUDE
A16	40.6011867°	91.3428864°
B16	40.6007927°	91.3426809°
C16	40.5995498°	91.3415107°
D16	40.5992382°	91.3410369°
E16	40.59941224°	91.34143051°
F16	40.59917986°	91.3418984°
G16	40.59931880°	91.34135868°
H16	40.59909368°	91.3418900°
I16	40.59915749°	91.34122726°

CROSS SECTION LOCATIONS

POINT NUMBER	LATITUDE NAD (83)	LONGITUDE
F20	40.59896517°	91.34163481°
G16	40.59901993°	91.34199234°
G20	40.59883169°	91.34147075°
H16	40.59884905°	91.34094038°
H20	40.59868011°	91.34128065°
I16	40.59867778°	91.34078854°
I20	40.59853375°	91.34107860°
J16	40.59844570°	91.34058488°
J20	40.59833200°	91.34081368°



ROYCE P. JONES
 035-00984
 PROFESSIONAL
 LAND SURVEYOR
 STATE OF ILLINOIS

I, BAKER SMITH, LLC USES PIPELINE LOCATING EQUIPMENT WHICH MAY INCLUDE MAGNETIC TAPS AND/OR GRADOMETERS IN AN EFFORT TO LOCATE UNDERGROUND AND UNDERWATER PIPELINES IN ADVANCE OF DREDGING, CONSTRUCTION OR ABANDONMENT ACTIVITY. WHILE REASONABLE EFFORTS ARE MADE TO LOCATE ALL THE PIPELINES, THE EQUIPMENT USED AND THE CHARACTERISTICS OF PIPELINES THEMSELVES MAKE IT PRACTICALLY IMPOSSIBLE TO GUARANTEE TOTAL SUCCESS. ACCORDINGLY, IT IS INCUMBENT UPON THE OPERATORS AND/OR CONTRACTORS CONDUCTING OPERATIONS INCLUDING DREDGING AND EXCAVATION TO CONDUCT THEIR OPERATIONS WITH EXTREME CAUTION AND RECOGNIZE THAT HAZARDS IN ADDITION TO THOSE DETECTED AND MARKED BY T. BAKER SMITH, LLC MAY EXIST WITHIN THE AREAS OF OPERATION IN SPITE OF OUR MOST DILIGENT EFFORTS.

PIPELINES SHOWN ON THIS MAP COME FROM VARIOUS SOURCES INCLUDING T. BAKER SMITH, LLC SURVEY DATA, AND DATA FROM OTHER SOURCES. THE BAKER SMITH, LLC HAS NO RESPONSIBILITY FOR ANY PIPELINES THAT MAY BE UNINTENTIONALLY OMITTED FROM THIS MAP.

I CERTIFY THAT THE HYDROGRAPHIC SURVEY DEPICTED ON THIS PLAN WAS PERFORMED ON THE GROUND LINE BY MY SUPERVISOR AND I AM RESPONSIBLE WITH GENERALLY ACCEPTED SURVEY PRACTICES. THIS SURVEY DOES NOT MEET THE STANDARDS OF PRACTICE FOR BOUNDARY SURVEYS AS SET FORTH BY THE ILLINOIS PROFESSIONAL ENGINEERS AND LAND SURVEYORS BOARD.

APPROVED: *[Signature]*
 ROYCE P. JONES, P.L.S.
 ILL. REG. LAND SURVEYOR NO. 035-00984
 LICENSE EXPIRATION DATE: 11/30/2029
 248 BOWER ROAD, MADISON, IL 61455
 (309) 533-2534

NOTES:

NO.	DATE	DESCRIPTION	BY

TBS T. BAKER SMITH
 A CENTURY OF SOLUTIONS
 412 South Van Ave., Houma, LA 70363
 (965) 868-1050 - tbsmith.com



DRAWN BY:	CMT	APPROVED BY:	CMC
DATE:	1/27/2019	JOB NO:	2019.0954
DRAWING NAME: 2019.0954 MISS. RIVER MULTIBEAM.dwg			
PROJECTION: ILLINOIS WEST 1282 GEC. DATUM: NAD83 VERT. DATUM: NAVD88 GRID UNITS: US SURVEY FEET			
SHEET NO:	3	OF	4

WATERWAY CROSSING INSPECTION
 BP US Pipelines & Logistics
 HYDROGRAPHIC SURVEY OF
 BP 16" & 20" PIPELINE
 CROSSING THE MISSISSIPPI RIVER
 LOCATED IN SEC. 7, T67N-R4W & SEC. 17 & 18, T7N-R8W
 LEE COUNTY, IA & HANCOCK COUNTY, IL

1/29/2019 - P:\19-2019\2019.0954\DWG\2019.0954 MISSISSIPPI RIVER MULTIBEAM.dwg

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DRAFT





SHEET INDEX:

No.	TITLE
C-101	EXISTING CONDITIONS
C-102	ENLARGED AREA PLAN
C-401	PROPOSED PLAN

SURVEY NOTES:

1. SURVEY NAMED "HYDRAULIC MULTIBEAM INSPECTION SURVEY TO MONITOR THE MISSISSIPPI RIVER CROSSINGS NEAR FORT MADISON, IOWA" DATED 11/5/2019, WAS PROVIDED BY T. BAKER SMITH.
2. ALL LOCATIONS OF UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE. ACTUAL PIPELINE LOCATION SHOWN IS ESTIMATED SHALL BE VERIFIED PRIOR TO CONSTRUCTION.
3. LOCATION OF RIGHT OF WAY SHOWN IS APPROXIMATE, INFORMATION WAS PROVIDED BY OWNER AND IS FOR INFORMATIONAL PURPOSES ONLY.
4. WATER ELEVATION WAS SURVEYED AT ELEV.=520.01'.

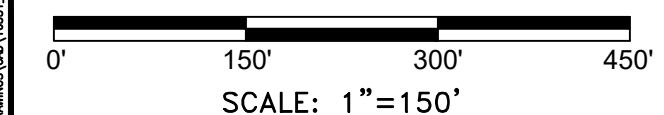
LEGEND:

	EXPOSED PIPELINE
	BURIED PIPELINE
	APPARENT RIGHT OF WAY
	FLOW DIRECTION

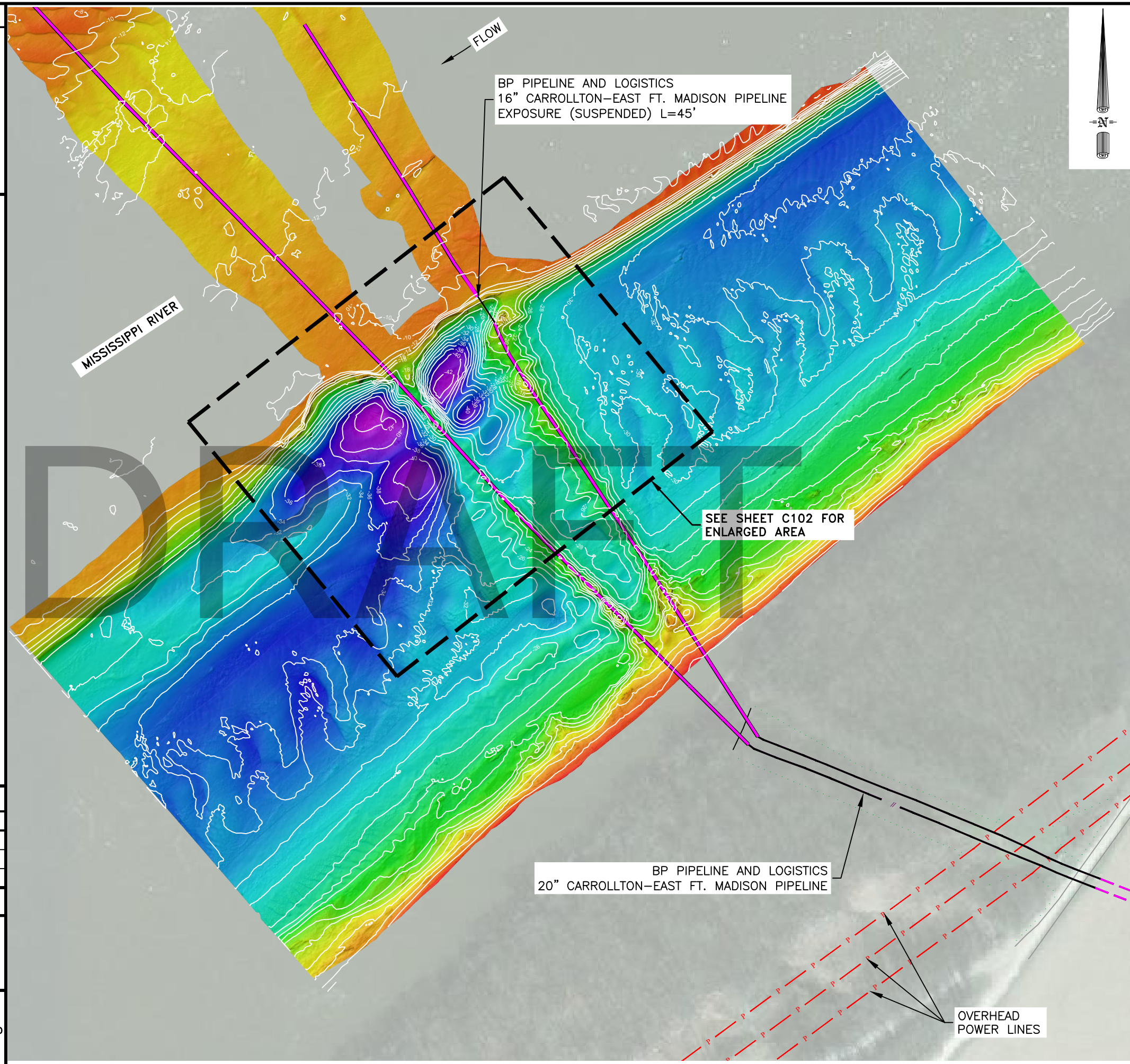
CONTROL POINTS:

No.	NORTHING (N)	EASTING (E)	ELEVATION (Z)

SITE LOCATION: N40.59794° W91.34027°



THESE CONCEPTUAL DRAWINGS ARE PREPARED BY SUBMAR FOR ESTIMATING PURPOSES ONLY AND ARE NOT CONSTRUCTION DRAWINGS. THESE CONFIDENTIAL DRAWINGS MAY NOT BE COPIED UNLESS APPROVED BY SUBMAR, INC. COPYRIGHT © SUBMAR, INC. 2019 ALL RIGHTS RESERVED.



SUBMAR
 1711 DUNN STREET
 HOUMA, LA 70360
 PH. 985-868-0001
 WEBSITE: WWW.SUBMAR.COM

No.	REVISION DESCRIPTION	DATE	DWN: MJP	CHK: JMF

DATE: 1/9/2020
 PROJECT No: 16531

bp

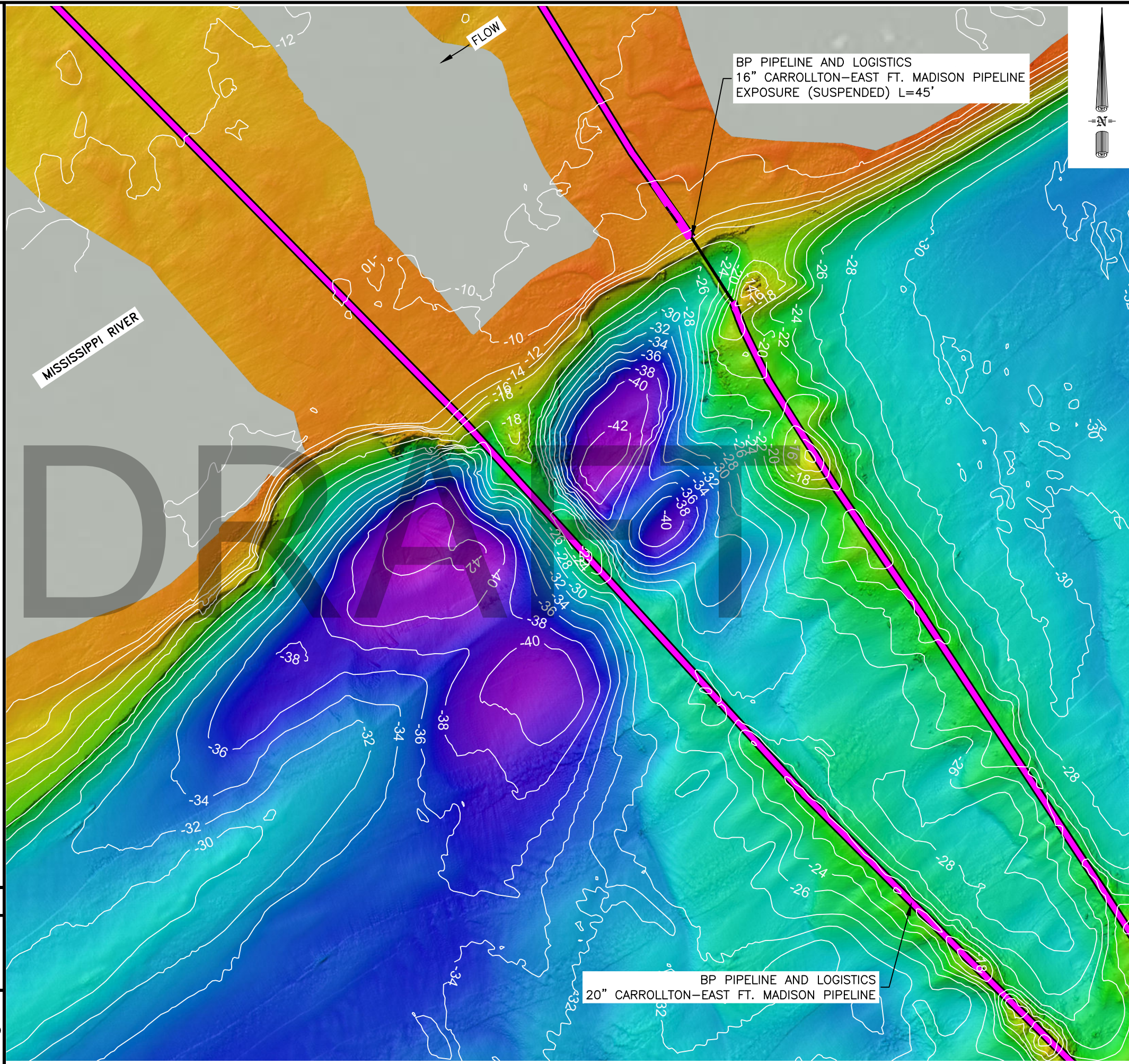
CONTACT: STEVE SHAHEEN
 PHONE No: 832-664-3166

MISSISSIPPI RIVER
 16" AND 20" CARROLLTON -
 EAST FORT MADISON
 PIPELINES
 HANCOCK COUNTY
 NIOTA, IL

SHEET TITLE:
 EXISTING
 CONDITIONS

SHEET No:
C-101

N:\16500\16531_BP_IL\DRAWINGS\CAD\16531_BP_NIOTA_L_BASE



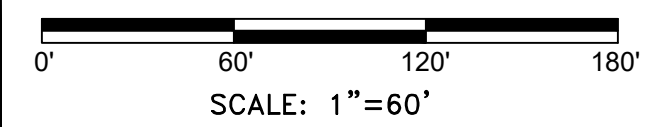
BP PIPELINE AND LOGISTICS
 16" CARROLLTON-EAST FT. MADISON PIPELINE
 EXPOSURE (SUSPENDED) L=45'

BP PIPELINE AND LOGISTICS
 20" CARROLLTON-EAST FT. MADISON PIPELINE

LEGEND:

- EXPOSED PIPELINE
- BURIED PIPELINE
- APPARENT RIGHT OF WAY
- FLOW DIRECTION

SITE LOCATION: N40.59794° W91.34027°



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N:\16500\16531_BP_IL\DRAWINGS\CAD\16531_BP_NIOTA_L_BASE



SUBMAR
 1711 DUNN STREET
 HOUMA, LA 70360
 PH. 985-868-0001
 WEBSITE: WWW.SUBMAR.COM

No.	REVISION	DESCRIPTION	DATE

DATE: 1/9/2020
 PROJECT No: 16531
 DWN: MJP
 CHK: JMF

bp

CONTACT: STEVE SHAHEEN
 PHONE No: 832-664-3166

MISSISSIPPI RIVER
 16" AND 20" CARROLLTON -
 EAST FORT MADISON
 PIPELINES
 HANCOCK COUNTY
 NIOTA, IL

SHEET TITLE:
 ENLARGED AREA
 PLAN

SHEET No:
C-102

CONSTRUCTION NOTES:

1. ALL WORK IS TO BE PERFORMED IN LOW FLOW CONDITIONS WHEN POSSIBLE. IT IS PREFERRED THAT WORK OCCURS DURING THE DRY SEASON (OR OTHERWISE UPSTREAM CONTROLS MANAGED TO MINIMIZE FLOW), CONTRACTOR SHALL MONITOR WEATHER CONDITIONS AND PLAN CONSTRUCTION ACTIVITIES ACCORDINGLY TO AVOID IN-STREAM WORK DURING RAIN EVENTS AND MINIMIZE EXPOSURE OF DISTURBED SOILS TO RAINFALL.
2. CONSTRUCTION EQUIPMENT AND VEHICLES SHALL BE IN GOOD WORKING CONDITION AND FREE OF HYDRAULIC, FUEL OR OIL LEAKS. THERE SHOULD BE A PORT-O-POT ONSITE . FUEL, HEAVY EQUIPMENT AND ALL CHEMICAL PRODUCTS SHOULD HAVE ADEQUATE CONTAINMENT.
3. PERIMETER EROSION AND SEDIMENT CONTROLS SHALL BE ESTABLISHED ALLOWING FOR SUBSEQUENT CLEARING AND GRUBBING WITHIN THE PROJECT AREA.
4. SALVAGE, FURNISH AND WASTE MATERIALS SHALL BE TEMPORARILY STOCKPILED IN A DESIGNATED APPROVED AREA UNTIL FINAL HANDLING FOR ULTIMATE PLACEMENT. IT IS THE RESPONSIBILITY OF THE SELECTED CONTRACTOR TO ESTABLISH APPROVED STOCKPILE, STAGING AND ACCESS AREAS. IF A RAIN EVENT IS EMINENT, THEN A SILT FENCE SHALL BE INSTALLED BETWEEN THE STOCKPILE SOIL AND THE EXISTING STREAM.
5. UPON COMPLETION OF WORK, ALL EXCESS OR TEMPORARILY STOCKPILED SOILS, STUMPS OR OTHER MATERIAL SHALL BE PERMANENTLY REMOVED AND PLACED IN UPLAND STORAGE AREAS, PER LOCAL, STATE AND FEDERAL REQUIREMENTS.
6. IT MAY BE NECESSARY TO DIVERT STREAM FLOW AROUND THE WORKING AREA TO FACILITATE CONSTRUCTION USING A BYPASS PUMP OR JERSEY BARRIER. IN NO INSTANCE SHALL SILT LADEN WATER BE DISCHARGED INTO THE STREAM, DIRECTLY OR INDIRECTLY.
7. ALL TEMPORARY ACCESS, STAGING, STOCKPILE OR OTHER TEMPORARILY DISTURBED AREAS SHALL BE STABILIZED AND REESTABLISHED TO THEIR PRE-CONSTRUCTION CONDITIONS, INCLUDING GRADE AND VEGETATION.
8. ALTHOUGH THIS PLAN MAKES EVERY ATTEMPT TO ACCOUNT FOR EROSION AND SEDIMENT CONTROL, BANK STABILIZATION AND CONSTRUCTION LOGISTICS, UNFORESEEN CIRCUMSTANCES MAY ARISE THAT REQUIRE ADDITIONAL OR MODIFIED MEASURES TO CONTROL SEDIMENT, STABILIZE RIPARIAN STREAM BANKS AND FACILITATE STRUCTURE INSTALLATION. CONTRACTOR SHALL WORK WITH CLIENT AND ENGINEER, AS NECESSARY, TO ENSURE THAT THE PROJECT IS CONSTRUCTED IN ACCORDANCE WITH THE INTENT OF THESE PLANS.

LEGEND:

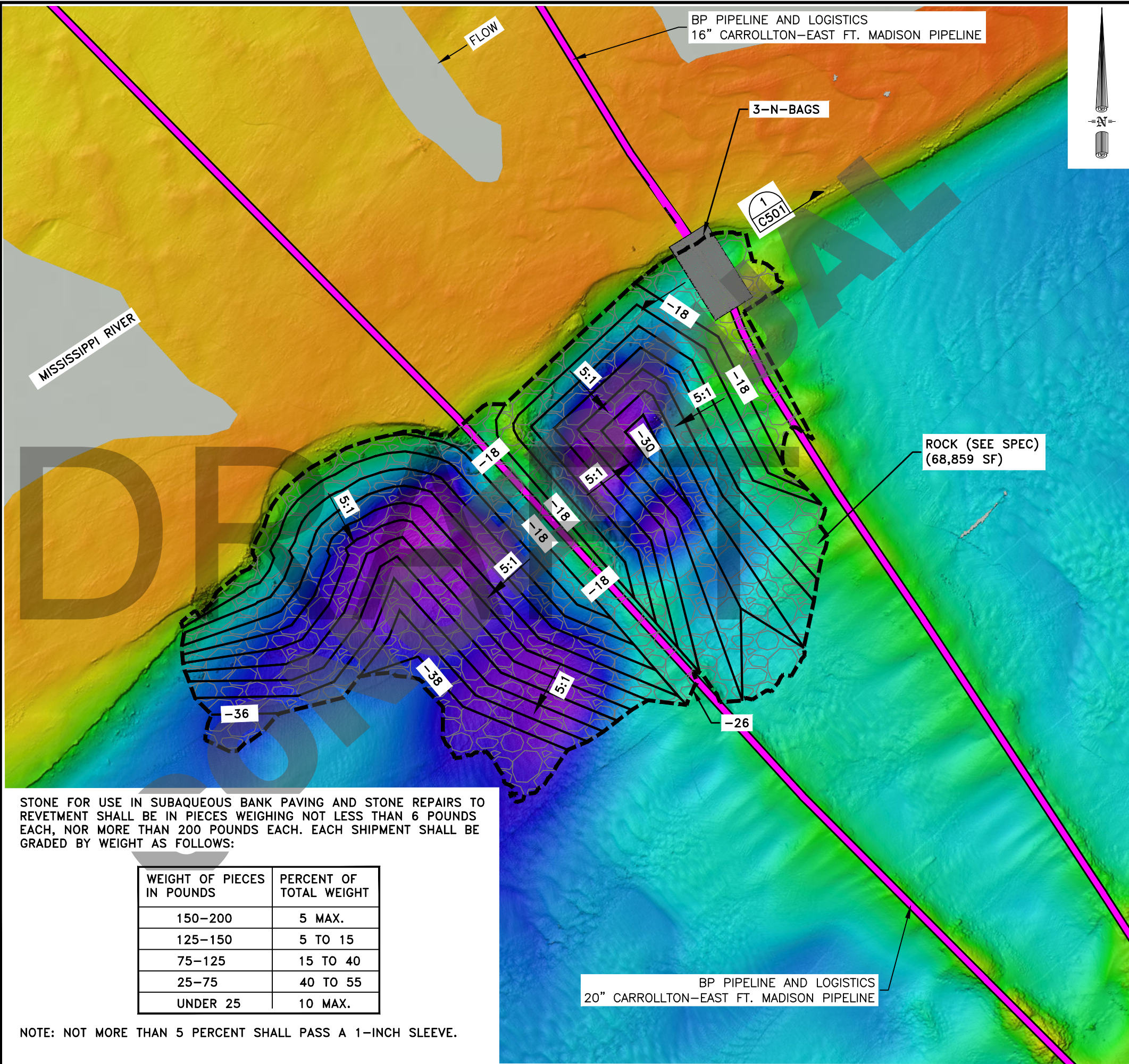
- == == == BURIED PIPELINE
- --- APPARENT RIGHT OF WAY
- FLOW FLOW DIRECTION

SITE LOCATION: N40.59794° W91.34027°



SCALE: 1"=60'

THESE CONCEPTUAL DRAWINGS ARE PREPARED BY SUBMAR FOR ESTIMATING PURPOSES ONLY AND ARE NOT CONSTRUCTION DRAWINGS. THESE CONFIDENTIAL DRAWINGS MAY NOT BE COPIED UNLESS APPROVED BY SUBMAR, INC. COPYRIGHT © SUBMAR, INC. 2019 ALL RIGHTS RESERVED.



STONE FOR USE IN SUBAQUEOUS BANK PAVING AND STONE REPAIRS TO REVETMENT SHALL BE IN PIECES WEIGHING NOT LESS THAN 6 POUNDS EACH, NOR MORE THAN 200 POUNDS EACH. EACH SHIPMENT SHALL BE GRADED BY WEIGHT AS FOLLOWS:

WEIGHT OF PIECES IN POUNDS	PERCENT OF TOTAL WEIGHT
150-200	5 MAX.
125-150	5 TO 15
75-125	15 TO 40
25-75	40 TO 55
UNDER 25	10 MAX.

NOTE: NOT MORE THAN 5 PERCENT SHALL PASS A 1-INCH SLEEVE.

SUBMAR
 1711 DUNN STREET
 HOUMA, LA 70360
 PH. 985-868-0001
 WEBSITE: WWW.SUBMAR.COM

No.	REVISION	DESCRIPTION	DATE

DATE: 1/9/2020
 PROJECT No: 16531
 DWN: MJP
 CHK: JMF

bp

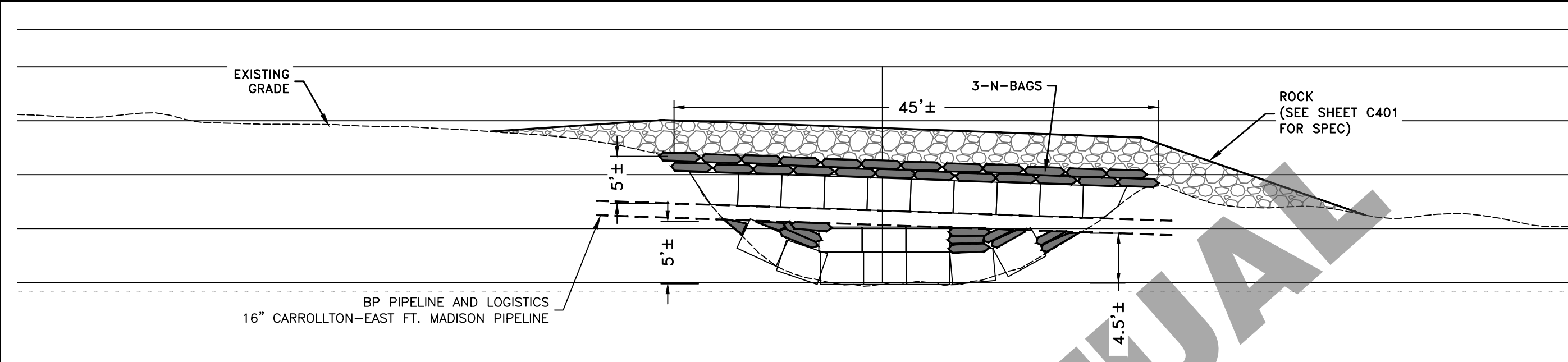
CONTACT: STEVE SHAHEEN
 PHONE No: 832-664-3166

MISSISSIPPI RIVER
 16" AND 20" CARROLLTON -
 EAST FORT MADISON
 PIPELINES
 HANCOCK COUNTY
 NIOTA, IL

SHEET TITLE:
 PROPOSED
 PLAN

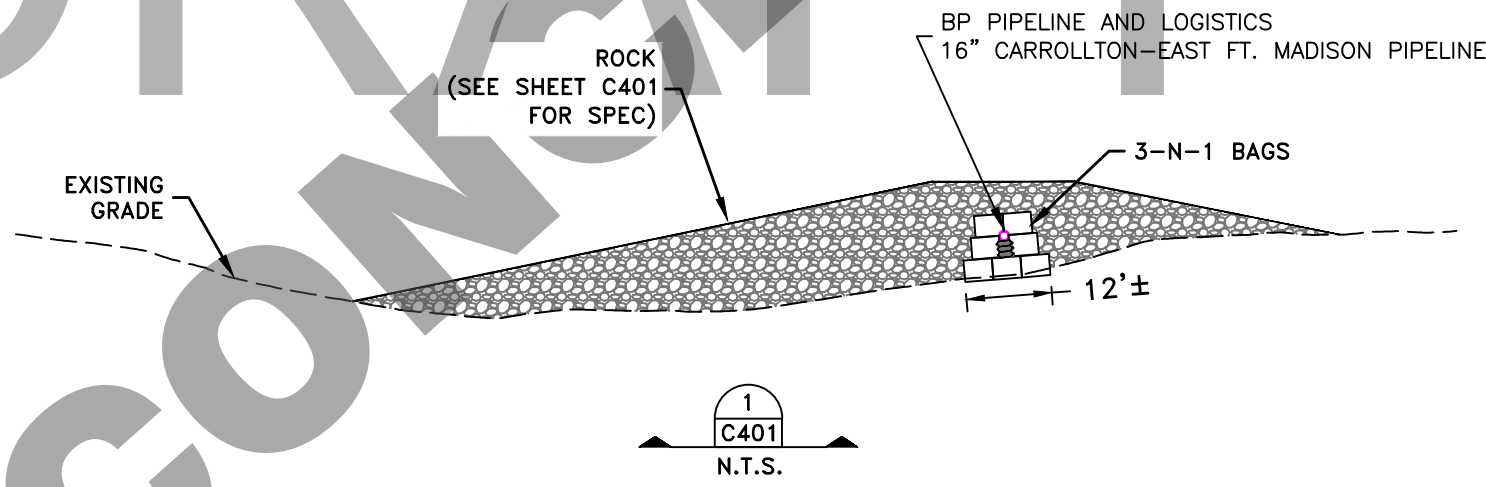
SHEET No:
C-401

N:\16500\16531_BP_IL\DRAWINGS\CAD\16531_BP_NIOTA_IL_BASE_REDESIGN_1






PROFILE
 SCALE: 1" = 10'


DRAFT
 CONCEPTUAL



LEGEND:

	BURIED PIPELINE
	PROPOSED FILL
	PROPOSED CUT
O.H.W.M.	ORDINARY HIGH WATER MARK

SITE LOCATION: N40.59794° W91.34027°



SCALE: 1"=10'

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No.	REVISION	DESCRIPTION	DATE

DATE: 1/9/2020	DWN: MJP
PROJECT No: 16531	CHK: JMF

bp

CONTACT: STEVE SHAHEEN
 PHONE No: 832-664-3166

MISSISSIPPI RIVER
 16" AND 20" CARROLLTON -
 EAST FORT MADISON
 PIPELINES
 HANCOCK COUNTY
 NIOTA, IL

SHEET TITLE:
 PROFILE AND
 CROSS SECTION

SHEET No:
C-501

N:\16500\16531_BP_IL\DRAWINGS\CAD\16531_BP_NIOTA_IL_BASE_REDESIGN_1



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Illinois-Iowa Ecological Services Field Office
Illinois & Iowa Ecological Services Field Office
1511 47th Ave
Moline, IL 61265-7022
Phone: (309) 757-5800 Fax: (309) 757-5807

In Reply Refer To:

May 06, 2020

Consultation Code: 03E18000-2020-SLI-1594

Event Code: 03E18000-2020-E-03760

Project Name: BP LDC Maintenance - Mississippi River Exposure Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies any federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat if present within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-federal representative) must consult with the Service if they determine their project "may affect" listed species or critical habitat.

Under 50 CFR 402.12(e) (the regulations that implement Section 7 of the Endangered Species Act) the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally. You may verify the list by visiting the ECOS-IPaC website <http://ecos.fws.gov/ipac/> at regular intervals during project planning and implementation and completing the same process you used to receive the attached list. As an alternative, you may contact this Ecological Services Field Office for updates.

Please use the species list provided and visit the U.S. Fish and Wildlife Service's Region 3 Section 7 Technical Assistance website at - <http://www.fws.gov/midwest/endangered/section7/s7process/index.html>. This website contains step-by-step instructions which will help you

determine if your project will have an adverse effect on listed species and will help lead you through the Section 7 process.

For all wind energy projects, please contact this field office directly for assistance, even if no federally listed plants, animals or critical habitat are present within your proposed project or may be affected by your proposed project.

Although no longer protected under the Endangered Species Act, be aware that bald eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.) and Migratory Bird Treaty Act (16 U.S.C. 703 et seq), as are golden eagles. Projects affecting these species may require measures to avoid harming eagles or may require a permit. If your project is near an eagle nest or winter roost area, see our Eagle Permits website at <http://www.fws.gov/midwest/midwestbird/EaglePermits/index.html> to help you determine if you can avoid impacting eagles or if a permit may be necessary.

We appreciate your concern for threatened and endangered species. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Wetlands
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Illinois-Iowa Ecological Services Field Office

Illinois & Iowa Ecological Services Field Office

1511 47th Ave

Moline, IL 61265-7022

(309) 757-5800

Project Summary

Consultation Code: 03E18000-2020-SLI-1594

Event Code: 03E18000-2020-E-03760

Project Name: BP LDC Maintenance - Mississippi River Exposure Project

Project Type: OIL OR GAS

Project Description: Two portions of BP's existing 16-inch and 20-inch pipelines on the bed of the Mississippi River have become exposed. The primary objective for this project is to cover the exposed pipes thereby mitigating the risks associated with exposed pipelines in the waterway. The 16-inch line is an idle line; the 20-inch line is currently active (crude). BP plans to cover the exposures via placement of grout bags on the river bed and over the pipeline. The grout bags will be placed over the pipeline by a diver, and project support will be provided from boats staged in the river. The project will not require equipment access, staging areas, or earth disturbances on either side of the river, nor will it require the use of temporary bladder dams or cofferdams or require excavation.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/40.60541594542326N91.34889134846634W>



Counties: Lee, IA | Hancock, IL

Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat <i>Myotis sodalis</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Clams

NAME	STATUS
Higgins Eye (pearlymussel) <i>Lampsilis higginsii</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5428	Endangered
Sheepnose Mussel <i>Plethobasus cyphus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6903	Endangered
Spectaclecase (mussel) <i>Cumberlandia monodonta</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7867	Endangered

Flowering Plants

NAME	STATUS
Eastern Prairie Fringed Orchid <i>Platanthera leucophaea</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/601	Threatened
Prairie Bush-clover <i>Lespedeza leptostachya</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4458	Threatened
Western Prairie Fringed Orchid <i>Platanthera praeclara</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1669	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER EMERGENT WETLAND

- [PEM1A](#)
- [PEM1C](#)
- [PEM1Cx](#)
- [PEM1F](#)

FRESHWATER FORESTED/SHRUB WETLAND

- [PFO1A](#)
- [PFO1C](#)
- [PSS1A](#)

FRESHWATER POND

- [PUBGx](#)
- [PUBKx](#)
- [PUBGh](#)

LAKE

- [L1UBH](#)

RIVERINE

- [R2UBH](#)
 - [R4SBC](#)
-

ATTACHMENT D
Permits Applications and
Correspondence

Philip Mathias

From: Osborn, Heather <Heather.Osborn@Illinois.gov>
Sent: Wednesday, May 18, 2022 2:22 PM
To: Diane.Hoeting@parsons.com; Philip Mathias; Metzke, Brian
Cc: Falcon, Ernest; Becca Winterringer; Hoeting, Diane (Parsons Environmental)
Subject: RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

Phil and Diane,

Thanks for your responses to finding a time for a call to discuss what's next for the pipeline scour in the Mississippi River – Hancock Co.

Brian and I can be available Friday afternoon (5/20) at 1 pm for a meeting/call. I had held back that date since we have a meeting at 10 am with a long agenda and no set end time. By then it should be over, or we've decided to walk out.

Let me know if that does NOT work. Otherwise, I'll send out a WebEx invite by the close of business today.

Heather

Heather Osborn
Incidental Take Authorization Coordinator
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702

Cell: (217)720-8910
Desk phone: (217)782-2456
ITA: (217)557-8243

From: Diane.Hoeting@parsons.com <Diane.Hoeting@parsons.com>
Sent: Tuesday, May 17, 2022 9:58 AM
To: Osborn, Heather <Heather.Osborn@Illinois.gov>; Philip Mathias <pmathias@envirosienceinc.com>; Metzke, Brian <Brian.Metzke@Illinois.gov>
Cc: Falcon, Ernest <ERNEST.FALCON@bp.com>; Becca Winterringer <bwinterringer@envirosienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>
Subject: [External] RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

I am free this morning/early afternoon today. Likewise Friday is fairly open. I am out of the office and in the field Wed and Thurs.

From: Osborn, Heather <Heather.Osborn@Illinois.gov>
Sent: Tuesday, May 17, 2022 10:46 AM
To: Philip Mathias <pmathias@envirosienceinc.com>; Metzke, Brian <Brian.Metzke@Illinois.gov>
Cc: Falcon, Ernest <ERNEST.FALCON@bp.com>; Hoeting, Diane [US-US] <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@envirosienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>
Subject: [EXTERNAL] RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

Phil,

Thanks for the feedback. Do you know if Diane Hoeting will join the call? Brian and I were hoping that we could get someone from BP on that call so that the message could get passed on that much quicker. If not, we can work to narrow down the best time for a call with just us three.

Heather

Heather Osborn
Incidental Take Authorization Coordinator
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702

Cell: (217)720-8910
Desk phone: (217)782-2456
ITA: (217)557-8243

From: Philip Mathias <pmathias@enviroscienceinc.com>
Sent: Friday, May 13, 2022 11:25 AM
To: Osborn, Heather <Heather.Osborn@Illinois.gov>; Metzke, Brian <Brian.Metzke@Illinois.gov>
Cc: Falcon, Ernest <ERNEST.FALCON@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>
Subject: [External] RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

Hi Heather,

I'm good any of those times except for Wed May 18, I will likely be traveling.

Thanks,

Phil

Philip Mathias
Senior Scientist | Malacologist
[EnviroScience, Inc. \[secure-web.cisco.com\]](https://www.enviroscience.com)
O. 800.940.4025 | C. 419.340.2487

From: Osborn, Heather <Heather.Osborn@Illinois.gov>
Sent: Friday, May 13, 2022 12:22 PM
To: Philip Mathias <pmathias@enviroscienceinc.com>; Metzke, Brian <Brian.Metzke@Illinois.gov>
Cc: Falcon, Ernest <ERNEST.FALCON@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>
Subject: RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

Hi Phil

Brian and I reviewed the report in the Conservation Plan again. We want to discuss the prospect of a new survey this summer and on mussel relocation before the projects commences. We think a call will be easier than emails. It would be open to anyone on this chain, and if you or Diane Hoeting thinks anyone else needs to be on it.

From our schedules, we have these open blocks of time that could be used for an hour meeting/call:
Tuesday May 17, 9 am – noon
Wednesday, May 18 1 pm – 4 pm tentatively (we may have a meeting that hasn't made it to the schedule)
Monday, May 22, 9 am – 1:30 pm is open
Tuesday May 23, 9am-4pm is open
Wednesday May 24, 1-3 pm is open

Once we find a block or time that works, I can send out an invite.

Thanks!
Heather

Heather Osborn
Incidental Take Authorization Coordinator
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702

Cell: (217)720-8910
Desk phone: (217)782-2456
ITA: (217)557-8243

From: Philip Mathias <pmathias@enviroscienceinc.com>
Sent: Thursday, May 12, 2022 3:26 PM
To: Metzke, Brian <Brian.Metzke@Illinois.gov>; Osborn, Heather <Heather.Osborn@Illinois.gov>
Cc: Falcon, Ernest <ERNEST.FALCON@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>
Subject: [External] RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

Brian,

Thanks for the clarification. I apologize for my delayed response, I was in the field all day. No final or additional report was prepared or sent beyond the included report. After speaking with the report author, there was some back and forth discussions if an additional report was needed at the time and it was decided that the interim/summary report included the necessary information needed. This was also the copy of the report submitted with the 2014 federal permit's annual report. Please let me know if you have any additional questions/concerns.

Thanks,

Phil

Philip Mathias
Senior Scientist | Malacologist
[EnviroScience, Inc. \[secure-web.cisco.com\]](http://EnviroScience, Inc. [secure-web.cisco.com])
O. 800.940.4025 | C. 419.340.2487

From: Metzke, Brian <Brian.Metzke@Illinois.gov>
Sent: Thursday, May 12, 2022 8:55 AM
To: Philip Mathias <pmathias@enviroscienceinc.com>; Osborn, Heather <Heather.Osborn@Illinois.gov>
Cc: Falcon, Ernest <ERNEST.FALCON@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer

<bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>

Subject: RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

Phil,

I see a summary report in the Conservation Plan. That report states: A full report will be submitted to your office and the Iowa DNR, Illinois DNR, and USFWS as part of EnviroScience's 2014 permit reporting commitments. Do you have the "full report"?

Brian Metzke
State Aquatic Ecologist
Aquatic Ecology Program, IDNR Division of Natural Heritage
1 Natural Resources Way
Springfield, IL 62702
Office: 217-557-9251
Cell: 217-836-0680
brian.metzke@illinois.gov
Learn more about the DNR [Aquatic Ecology Program \[illinois.gov\]](#)

From: Philip Mathias <pmathias@enviroscienceinc.com>

Sent: Wednesday, May 11, 2022 9:26 PM

To: Osborn, Heather <Heather.Osborn@Illinois.gov>

Cc: Falcon, Ernest <ERNEST.FALCON@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>; Metzke, Brian <Brian.Metzke@Illinois.gov>

Subject: [External] RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

Hi Heather,

I am working through your comments and wanted to address the first issue. Attachment B (pages 28-35) in the submitted conservation plan contains the report that was submitted to the DNR in 2014.

The remainder of the comments will be updated and submitted in the next few days.

Thanks,

Phil

Philip Mathias
Senior Scientist | Malacologist

[EnviroScience, Inc. \[secure-web.cisco.com\]](#)
O. 800.940.4025 | C. 419.340.2487

From: Philip Mathias

Sent: Tuesday, May 10, 2022 10:12 AM

To: Osborn, Heather <Heather.Osborn@Illinois.gov>

Cc: Falcon, Ernest <ERNEST.FALCON@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>; Metzke, Brian <Brian.Metzke@Illinois.gov>

Subject: RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

Hi Heather,

Thank you for the review. We will address these comments and get back to you within the week.

Thanks,

Phil

Philip Mathias

Senior Scientist | Malacologist

[EnviroScience, Inc. \[secure-web.cisco.com\]](mailto:secure-web.cisco.com)

O. 800.940.4025 | C. 419.340.2487

From: Osborn, Heather <Heather.Osborn@Illinois.gov>

Sent: Tuesday, May 10, 2022 10:06 AM

To: Philip Mathias <pmathias@enviroscienceinc.com>

Cc: Falcon, Ernest <ERNEST.FALCON@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>; Metzke, Brian <Brian.Metzke@Illinois.gov>

Subject: RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

Hi Phil,

We've had a chance to review the latest Conservation Plan, there are still items which need to be addressed before we can call it complete.

First, can you send us the PDF of the 2014 mussel survey report? We don't see it included as an attachment to the CP, but would like to review it before we make recommendations on the prospect of a new survey this summer and on mussel relocation before the projects commences.

Below are the other items that need to be addressed before the next submission

Page 1: The Amount of Impact Area section only needs to have the first sentence. The rest will be covered in the text of the Conservation Plan.

Page 2: The timeline of the sequence of events for addressing the loss of coverage is a little unclear. How long is the geotextile fabric in place before the gravel bags are placed? If it takes a few days to switch from placing it to the gravel bags, how is the geotextile fabric secured?

Page 2: We are unclear on the difference between bulk rock fill and riprap. Please provide further explanation of the size or other characteristic that sets them apart.

Page 3-7: For the Illinois Conservation Plan, plants do not need to be included. While necessary for the federal documents, they can be omitted from this document, or a statement on page 3 as part of the last paragraph that starts "Validity of them IDNR consultation."

Page 13: We want to look more into where the funds will go. With the Kankakee River project raising questions from Ohio State University, we want to make sure they go somewhere they can be used easily. We consider that the Illinois Wildlife Preservation Fund to be a better option for mussels from in Illinois waters.

Let me know if you have questions,

Heather

Heather Osborn
Incidental Take Authorization Coordinator
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702

Cell: (217)720-8910
Desk phone: (217)782-2456
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From: Osborn, Heather
Sent: Monday, April 11, 2022 8:27 AM
To: Philip Mathias <pmathias@enviroscienceinc.com>; DNR.ITACoordinator <DNR.ITACoordinator@Illinois.gov>
Cc: Falcon, Ernest <ERNEST.FALCON@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>; Metzke, Brian <Brian.Metzke@Illinois.gov>
Subject: RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

Hi Phil,

Thanks for getting the updated Conservation Plan to me. I will get that on the calendar, and get comments back on or before May 11.

Heather

Heather Osborn
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From: Philip Mathias <pmathias@enviroscienceinc.com>
Sent: Friday, April 8, 2022 5:51 PM
To: Osborn, Heather <Heather.Osborn@Illinois.gov>; DNR.ITACoordinator <DNR.ITACoordinator@Illinois.gov>
Cc: Falcon, Ernest <ERNEST.FALCON@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>; Metzke, Brian <Brian.Metzke@Illinois.gov>
Subject: [External] RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

Hello Heather,

Attached is the most recent Conservation Plan and associated shapefiles. The joint application (half of Appendix D) was too large to attach, therefore I will be sending it in a separate email. The comments from August were addressed, the increased impact area was accounted for, and construction design changes have been incorporated. The majority of the document remains the same.

The monitoring has been changed to include intrusive PIT tag monitoring only as we discussed on the phone on 3/24/2022. This method has worked well for us elsewhere as referenced in the Plan.

We are proposing a pre-survey this spring to get a better handle on the relocation effort and possibly updating the take estimates, however the 2014 salvage data have been used to calculate the estimates in this document. These activities are outlined in the Plan.

Please let us know if you have any questions or comments on the Conservation Plan. We will have a draft of the public notice ready for submittal soon after your review.

Thank you have a great weekend!

Phil

Philip Mathias
Senior Scientist | Malacologist

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O. 800.940.4025 | C. 419.340.2487

From: Osborn, Heather <Heather.Osborn@Illinois.gov>

Sent: Tuesday, August 17, 2021 4:23 PM

To: Philip Mathias <pmathias@enviroscienceinc.com>; DNR.ITACoordinator <DNR.ITACoordinator@Illinois.gov>

Cc: Suits, Brian <brian.suits@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>; Metzke, Brian <Brian.Metzke@Illinois.gov>

Subject: RE: Conservation Plan for BPUSPL Mississippi River Pipeline (ITA#234)

Hi Phillip,

Apologies that we're running a day behind getting the Department comments out on the Conservation Plan review for this project. We see the improvements from the previous draft, yet there are still items that need to be addressed before the Department is satisfied with the CP, and some of these items are drilling into the details now that some of the larger questions have been addressed.

1. Please indicate where the barge will be spudding, generally. Will it be within the Area of Direct Impact where minimization (relocation) and mitigation take place, or will it be a separate impact? Although the footprint of the spud pile will be much smaller than the impact from armoring the pipeline, it still will be an impact on the riverbed and have potential to crush or bury mussels within the square footage.
2. Top of Page 8, please include the status of each permitting activity, especially for the Federal authorizations that need to be completed before the Department can proceed. Keep the appendices but include a couple of words on this page to make it a quick reference.
3. Page 10, the table should have another column (either in addition or instead of 2021 abundance adjusted) to show take. Essentially all those mussels will be relocated (harassed, a form of take), but information in the Conservation Plan includes an estimated relocation success of 70%, leaving a potential 30% of the abundance at risk of being killed by the armoring.
4. The Department will compel that mussels are relocated a minimum of 300 meters upstream of the area of disturbance. Additionally, the Department requires a buffer of 30 meter around the ADI to account for possible falling riprap during that part of the process. A note on the language for the CP, this is minimization as defined in the statute not mitigation.
5. In terms of mitigation, the Department is requiring that \$66,696 be contributed to mussel research and propagation for the state-listed species, in addition the already listed amount for the federal species.
6. For monitoring the survival of non-listed species that were relocated,
 - a. the Department will only require some sort of marking (e.g., glitter glue, etching, etc.), not PIT tags. We will confirm with US FWS and their permits that they do not want PIT tags, but likely they will concur.

b. The Department will require that monitoring occurs with a moving transect plan, rather than a proposed cell subsampling. This will allow for easier comparison with the data.

A final note, the timeline of starting this work this fall is highly ambitious. We will need to check the river gauges to ensure that a safe water temperature for mussel relocation can be met when the ITA is issued. Until the ITA is issued, relocation cannot occur. The way the Conservation Plan stands now, with changes needed we will not be likely to get the ITA issued before water conditions are no longer suitable for a successful relocation in 2021 based on estimates we have made with another project.

Heather

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From: Osborn, Heather
Sent: Friday, July 16, 2021 3:32 PM
To: Philip Mathias <pmathias@enviroscienceinc.com>; DNR.ITACoordinator <DNR.ITACoordinator@Illinois.gov>
Cc: Suits, Brian <brian.suits@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>; Metzke, Brian <Brian.Metzke@Illinois.gov>
Subject: RE: Conservation Plan for BPUSPL Mississippi River Pipeline LDOC and Scour Mitigation prepared by EnviroScience

Phil,

Thank you for getting the updated version to me. I will put it on the list to review in the next 30 days or less.

Heather

Heather Osborn
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From: Philip Mathias <pmathias@enviroscienceinc.com>
Sent: Friday, July 16, 2021 2:24 PM
To: Osborn, Heather <Heather.Osborn@Illinois.gov>; DNR.ITACoordinator <DNR.ITACoordinator@Illinois.gov>
Cc: Suits, Brian <brian.suits@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>; Metzke, Brian <Brian.Metzke@Illinois.gov>

Subject: [External] RE: Conservation Plan for BPUSPL Mississippi River Pipeline LDOC and Scour Mitigation prepared by EnviroScience

Hi Heather,

Thank you for review and the conversation yesterday. I have attached the revised Conservation Plan for the IDNR review. All of your comments have been addressed in the attached document, but in summary:

1. The introduction had old language, I updated the conservation plan introduction to include the proper impact area.
2. I changed the language to be “A salvage effort of mussel species will be completed within the area of disturbance after a mussel salvage and monitoring plan is developed with the appropriate agencies.”
3. I incorporated the changes listed here to hand collect at the relocation area at two events and removed the monitoring from the project area.
4. After talking to you on July 15, 2021 and explaining we were not going to do a survey, just a salvage, I clarified in the text and table the take and population estimate determinations. All mussels collected will be identified to species, counted, etc. as described in the conservation plan. We will work closely with the DNR after the ITA is issued to develop a comprehensive salvage and monitoring plan to best protect the resources in/near the project area.

Please let us know if you have any questions or need further clarification.

Thank you,

Phil

Philip Mathias
Senior Scientist | Malacologist

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From: Osborn, Heather <Heather.Osborn@Illinois.gov>

Sent: Friday, July 9, 2021 12:09 PM

To: Philip Mathias <pmathias@enviroscienceinc.com>; DNR.ITACoordinator <DNR.ITACoordinator@Illinois.gov>

Cc: Suits, Brian <brian.suits@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>; Metzke, Brian <Brian.Metzke@Illinois.gov>

Subject: RE: Conservation Plan for BPUSPL Mississippi River Pipeline LDOC and Scour Mitigation prepared by EnviroScience

Hi Phillip,

We've had a chance to review the attached second draft of the Conservation Plan, and the Department has additional concerns. As you and Becca know, we raised the issue of Federal review with the FWS and Kristen Lundh has had some email traffic with you about that.

Here are the other issues we found

1. There is a discrepancy in impact area. The introduction states 100,000 square feet (250x400ft) and on page 11, it is stated that it will 3.07 acres (~134,00 sq ft). Does the number on page 11 include a buffer?
2. An “agency-approved mussel salvage and monitoring plan” (pg 12) is mentioned. We do not have this developed yet, as it will require federal coordination. The CP provides only a summary of monitoring and relocation...which leads to these from our aquatic ecologist:

3. The proposed monitoring includes events in years 1, 3, and 5 at relocation site only. Monitoring consists of scanning for presence of PIT tags. Habitat evaluation only at impact site.

The State seeks these changes:

- a. Reduce from three events to two (Years 1 and 5) pending FWS concurrence. This would decrease the risk slightly with fewer events.
 - b. More robust monitoring of relocation site required. This should include hand grabbing mussels using a transect or cell subsampling approach (our standard monitoring framework). We cannot be confident that presence of a PIT tag is sufficient proof of life of relocated listed individuals.
 - c. After further review, the state does not foresee mussel community recovery at the impact area. Side scanning sonar/habitat assessment of the impact area is not necessary. The impact will constitute a permanent loss of mussel habitat and so recolonization is not a 5 year goal for this site (the time limit we intend to write the ITA to cover).
4. After review of the minimization and commitment to relocation mussels in the areas safe to dive, the department finds that additional mitigation will be needed to cover propagation costs. This will be easier to evaluate with the 2021 survey results that would provide a take estimate. The Conservation Plan does include a number of individuals Estimated within Project on page 10, but new population data would be helpful as questions have arisen about the numbers.

Thanks,
Heather

Heather Osborn
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From: Osborn, Heather
Sent: Thursday, June 17, 2021 1:59 PM
To: Philip Mathias <pmathias@enviroscienceinc.com>; DNR.ITACoordinator <DNR.ITACoordinator@Illinois.gov>
Cc: Suits, Brian <brian.suits@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>
Subject: RE: Conservation Plan for BPUSPL Mississippi River Pipeline LDOC and Scour Mitigation prepared by EnviroScience

Hi Phil,

Thanks for that updated Conservation Plan and the shapefiles. I will get those on our list to review before July 19th, including running the proposed monitoring by our aquatic ecologist again.

Heather

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From: Philip Mathias <pmathias@enviroscienceinc.com>
Sent: Thursday, June 17, 2021 10:16 AM
To: Osborn, Heather <Heather.Osborn@Illinois.gov>; DNR.ITACoordinator <DNR.ITACoordinator@Illinois.gov>
Cc: Suits, Brian <brian.suits@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>; Hoeting, Diane (Parsons Environmental) <Diane.Hoeting@bp.com>
Subject: [External] RE: Conservation Plan for BPUSPL Mississippi River Pipeline LDOC and Scour Mitigation prepared by EnviroScience

Hi Heather,

Please find the revised Conservation Plan attached. We have addressed the Departments comments from May 3, 2021. Per our conversation on June 3, 2021, in order to advocate for safety, we are still requesting a no-dive monitoring plan, however we understand that the department may require diving and that will be encompassed in the ITA. I have also attached the requested shapefiles. Please let me know if you have any issues with the documents.

Thank you,

Phil

Philip Mathias
Senior Scientist | Malacologist

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From: Osborn, Heather <Heather.Osborn@Illinois.gov>
Sent: Monday, May 3, 2021 2:30 PM
To: Philip Mathias <pmathias@enviroscienceinc.com>; DNR.ITACoordinator <DNR.ITACoordinator@Illinois.gov>
Cc: Suits, Brian <brian.suits@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>
Subject: RE: Conservation Plan for BPUSPL Mississippi River Pipeline LDOC and Scour Mitigation prepared by EnviroScience

Hi, Patrick,

We've had a chance to look over the first submission of the Conservation Plan, and we do have some follow up questions/comments.

1. There is no legal description of the area to be affected in the text of the Conservation Plan. Please ensure that information is in the text of the Conservation Plan, as well as the Township, Range, and Section information. From the included EcoCAT letter this address appears to be approximately 2700-2898 N. Morman Springs Road, Nauvoo, IL.
2. Per Admin Rule 1080, please explain who Ferguson LLP is and how they relate to the "indicia of ownership or control of the affected property." Are they the ROW easement holder for BP?
3. Since Black Sandshell was delisted in 2020, the Department does not find the inclusion relevant to the Conservation Plan or ITA process.
4. If no tree clearing will be needed, then bats do not need to be included in the Conservation Plan or the ITA, including in the Biological Data section. However, if the USFWS review does indicate that bats are potentially included in an HCP, the State will follow.

5. The Department will need an estimate of the numbers of individuals that could be taken by the project. Preferably a per species estimate that is a range from 1 to a reasonable upper limit.
6. Mitigation value is subject to review, the State will likely seek additional mitigation funds for the state-listed species.
7. The Department will require changes to the monitoring plan. At least one, if not more, will require divers to recover mussels and check for mortality in a quantitative survey. There will also be one or more quantitative survey at the project site to assess community recovery/recolonization.
8. The Department requests the GIS shapefiles of the area of direct impact. From the Conservation Plan, it sounds like they were submitted, but the ITA program has not received them yet.

Let me know if you have any follow up questions to these.

Thanks!
Heather

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From: Osborn, Heather
Sent: Monday, April 12, 2021 10:25 AM
To: Philip Mathias <pmathias@enviroscienceinc.com>; DNR.ITACoordinator <DNR.ITACoordinator@Illinois.gov>
Cc: Suits, Brian <brian.suits@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>
Subject: RE: Conservation Plan for BPUSPL Mississippi River Pipeline LDOC and Scour Mitigation prepared by EnviroScience

Philip,

Thank you for submitting this Conservation Plan, we have created a new file for this project, it is **number 234**. We will schedule the first review and make every effort to get comments back to you on or before May 12, 2021. However, we are entering a busy season of getting permits issued for other projects, and planning meetings for others.

Heather
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From: Philip Mathias <pmathias@enviroscienceinc.com>
Sent: Monday, April 12, 2021 7:48 AM

To: DNR.ITACoordinator <DNR.ITACoordinator@Illinois.gov>

Cc: Suits, Brian <brian.suits@bp.com>; Hoeting, Diane <Diane.Hoeting@parsons.com>; Becca Winterringer <bwinterringer@enviroscienceinc.com>

Subject: [External] Conservation Plan for BPUSPL Mississippi River Pipeline LDOC and Scour Mitigation prepared by EnviroScience

Heather,

On the behalf of BP and prepared by EnviroScience, Inc., please find the attached conservation plan for BP's low depth of cover and scour mitigation project on the Mississippi River in Hancock County, Illinois. Please let us know if you have any questions and we look forward to your initial 30 day review and will prepare the public notices to be published when we are notified to proceed.

Thank you,

Philip Mathias

Philip Mathias

Senior Scientist | Malacologist



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ATTACHMENT E
Depth of Cover Report

Mississippi River (Fort Madison)

Carrollton-East Fort Madison (20in)

Positional & Depth of Cover Study

Nauvoo, IL

Prepared by:



Prepared for:



Survey Date(s):

3/11/2022 - 3/12/2022 & 3/14/2022 - 3/15/2022

Report Issued:

5/3/2022

Report Contents

This report includes the following media:

- **Full Report**
 - Executive Summary
 - Project Description
 - Personnel
 - Equipment
 - Site Summaries & Photos
 - PDF Plot Sheet Drawings
 - Overview Imagery
 - Detailed Imagery
 - DoC Study Control Point Verification Sheet

- **Methods Addendum Document**

- **Electronic Files**
 - Full Report PDF
 - Methods Addendum Document
 - Plot Sheet PDFs
 - Overview PDFs
 - CAD-Importable CSV & XYZ Files
 - Google Earth KMZ

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Appendix A: Site Summary, Survey Area Overview, and Plot Sheets

Appendix B: Control Point Verification Sheet

Executive Summary

On 3/11/2022 - 3/12/2022 & 3/14/2022 - 3/15/2022, DoC Mapping was tasked with determining the position (Easting, Northing, and Elevation) and Depth of Cover (DoC) for the Carrollton-East Fort Madison (20in) line crossing the Mississippi River (Fort Madison) near Nauvoo, IL and to gather bathymetric data over the Abandoned (16in) line crossing upstream of the active line. Using advanced electromagnetic locating systems in conjunction with survey grade sonar and GPS systems, DoC Mapping was able to obtain positions and DoC readings for the Carrollton-East Fort Madison (20in) line.

During the study, the following was noted:

- Carrollton-East Fort Madison (20in)
 - 180 DoC points total
 - 155 DoC points within the waterway
 - Minimum DoC recorded within the waterway was -0.50 ft at point #164
 - A 12ft long crowning exposure was visible in the multibeam sonar imagery at point #164
 - The pipe appears to be fully supported by sediment and is exposed from 10 to 2 o'clock
 - The exposure begins 7,608 ft from the downstream top of bank and ends 7,620 ft from the downstream top of bank.
 - The exposure begins 231 ft from the upstream top of bank and ends 243 ft from the upstream top of bank.
 - The pipe crosses at a 90° crossing angle
 - The crossing is 7,850 ft from highwater to highwater
- Abandoned (16in)
 - Based on an overlay of newly acquired single beam sonar data with pipe positions extracted from two visibly exposed segments in the April 2021 multibeam sonar data, there appeared to be three crowning exposures on the abandoned line during this most recent survey:
 - A 15 ft segment where the top of pipe is reading right at the mudline
 - A 45 ft crowning segment with some areas where the pipe appears to be exposed by as much as 0.2 ft.
 - A very small approximately 2ft long crowning exposure.

This report details the equipment and means used to acquire this data and provides representations of the data obtained and point tables of the data collected.

Project Description

DoC Mapping was contracted by BP to perform a Depth of Cover study for the Carrollton-East Fort

Madison (20in) line crossing the Mississippi River (Fort Madison) near Nauvoo, IL. The Mississippi River (Fort Madison) flows from northeast to southwest and the line crosses in a northwest to southeast orientation. BP provided information for this site and DoC Mapping used these materials as a starting point to create a survey plan and a full suite of electromagnetic locating equipment was deployed to the site.

Bathymetric data was collected over the Abandoned (16in) line that crosses upstream of the active line. Due to shallow water depths and poor weather conditions, it was unsafe to deploy a multibeam sonar outside of the deeper channel areas during this survey. To document the previously exposed sections of the abandoned line, the single beam sonar data was overlaid with pipe points extracted from the April 2021 multibeam sonar data.

See Appendices for site summary, survey area overviews, plot sheets and data tables.

Personnel

DoC Mapping supplied 3 technicians to perform the DoC study. Technicians included:

- Ben Oshell, Crew Lead / Supervisor
- Matthew Hampshire, Systems Technician
- Ben Southard, Systems Technician

A BP representative was the point of contact for the duration of this survey and was kept informed of daily field operations.

Equipment

The following equipment was used during the course of this survey. Equipment specifications are available upon request.

Survey Vessel(s) and/or Vehicle(s)

26' Survey Vessel was outfitted with the equipment and sensors listed below and acted as the primary data collection vehicle during survey operations.

Locating Equipment

Underwater EM Locating System is a towed locating sensor array that is tied into the survey computer running both hydrographic software and locating software simultaneously.

Pole/Hull-Mounted EM Locating System is a dual-spar locating sensor array that is tied back into the locating software. This system can also be mounted on a survey pole while locating on land or wading within the waterway.

A Vixax Loc-150Tx EM Signal Transmitter was used to generate a signal frequency on the target line which can be detected by the EM locating sensors.

GPS Survey Equipment

Hemisphere S321 Base Station w/ Radio was tied to the survey suite and set up to provide RTK accuracy for the rover system.

Hemisphere S321 Rover & Data Collector was tied into the various other systems in order to provide survey grade coordinates for all data points. RTK corrections were utilized during the survey to enhance the accuracy of the GPS readings.

Sonar Equipment

Single-Beam Sonar was used for the single beam bathymetric survey. Data from this system is also tied into the EM Locating System.

Multi-Beam Sonar was used to generate a bathymetric surface of the entire survey area. This system includes an on-board inertial RTK system in order to achieve the highest degree of precision during bathymetric operations. The imagery from this system is also used as a secondary check for exposures in areas where Depth of Cover is minimal.

Appendix A:

Site Summary, Survey Area Overview, and Plot Sheets

Mississippi River (Fort Madison) Site Summary

Carrollton-East Fort Madison (20in)

Description:

On 3/11/2022 - 3/12/2022 & 3/14/2022 - 3/15/2022, a depth of cover study was performed on the Carrollton-East Fort Madison (20in) line and bathymetric data was collected over the Abandoned (16in) line. These BP lines cross the Mississippi River (Fort Madison) in a roughly northwest to southeast trajectory. The active line crosses at a 90° crossing angle while the abandoned line curves upstream with an 110° crossing angle near the southeastern shoreline and an 80° crossing angle near the northwestern shoreline. The abandoned line is upstream (northeast) of the active line. The crossing is 7,850 ft from highwater to highwater.

Site Observations:

The Mississippi River flows from northeast to southwest with an approximate flow velocity of 2 ft/sec at this crossing site. The northwestern shoreline consists of a short bank that rises approximately three and a half feet from the waterline to the high-water mark. Beyond the high water mark the ROW is generally flat leading to a BP valve yard. The sediment sample collected on this bank consisted of dirt and sand. Large rocks approximately two feet in diameter were present near the water line. There was little to no vegetation other than a few large trees on either side of the ROW. The southeastern shoreline consists of a steep cut bank that rises roughly 20ft above the water line. The bank continues at a steep slope through the ROW to North Mormon Springs Road. The sediment sample from this bank consisted of dirt and sand. The bank was vegetated by tall grass and thorn bushes. The ROW is lined by large trees on both sides. A sediment sample was collected in the river channel which consisted of fine silty sand and small rocks. A visual survey was also performed and photo-documented for these shorelines. Some downed trees and other debris caused a few gaps in the locate and bathymetric data. Due to weather conditions and low water depth, it was unsafe to deploy a multibeam sonar in the shallower areas of this crossing therefore single beam sonar data was collected through out the shallower portions of the survey area.

Signal Application Notes:

The active line was located while the transmitter was directly connected via a CP station, located northwest of this crossing site. The CP test station was located inside of the BP valve yard on the west side of the crossing. For a map view, see the *Survey Area Overview* Appendix. A signal frequency of 98Hz was selected and the signal strength output from the transmitter was set to 4A. This line was successfully detected and mapped as a result of this transmitter connection.

Plot Sheet Notes:

Carrollton-East Fort Madison (20in) - 180 total DoC data points were taken, 155 of which were collected in the waterway. 25 on-land DoC data points were obtained, 12 on the northwestern shoreline and 13 on the southeastern shoreline. Exposure length in the waterway was 12 ft. The exposure appears to be fully supported by sediment with the pipe exposed from 10 to 2 o'clock. The exposure begins 7,608 ft from the downstream top of bank and ends 7,620 ft from the downstream top of bank. The exposure begins 231 ft from the upstream top of bank and ends 243 ft from the upstream top of bank.

** DoC Mapping provides confidence levels and MSDoC in an effort to provide an easily understood representation of the overall accuracy of each data point in the survey. Safety margins should always be added or physical verification performed when data is to be used for critical projects such as dredging, drilling or other activities that have potential to impact the target infrastructure. DoC Mapping is not responsible for movement of or changes to the target infrastructure subsequent to this survey's completion.*

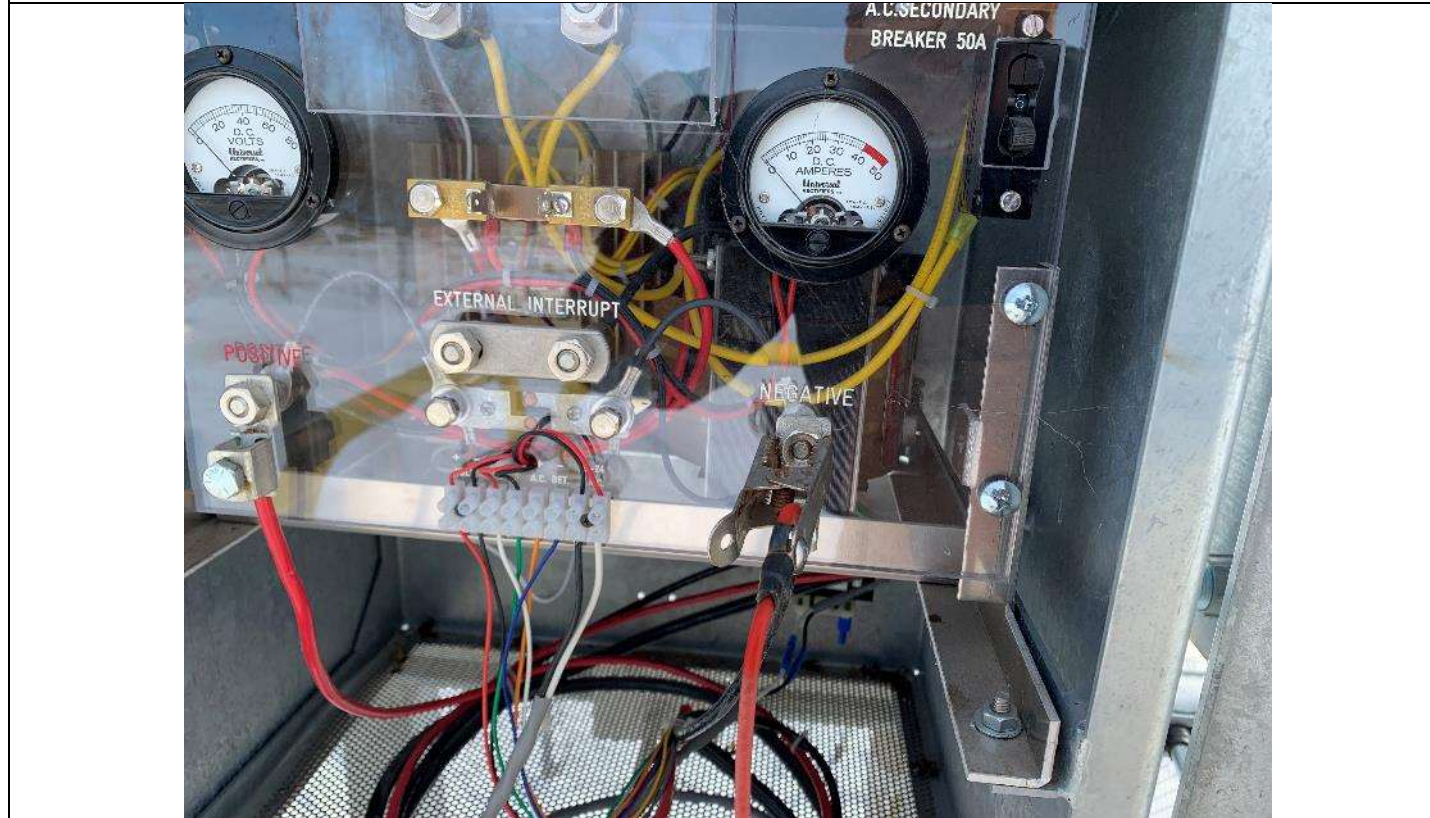
Additional Notes:

Bathymetric data was limited to single beam sonar for the majority of the crossing due to low water depths and poor weather conditions which made it unsafe to deploy the multibeam sonar outside of the two deeper channel areas.

Transmitter Connection(s)



Transmitter Connection Site Overview

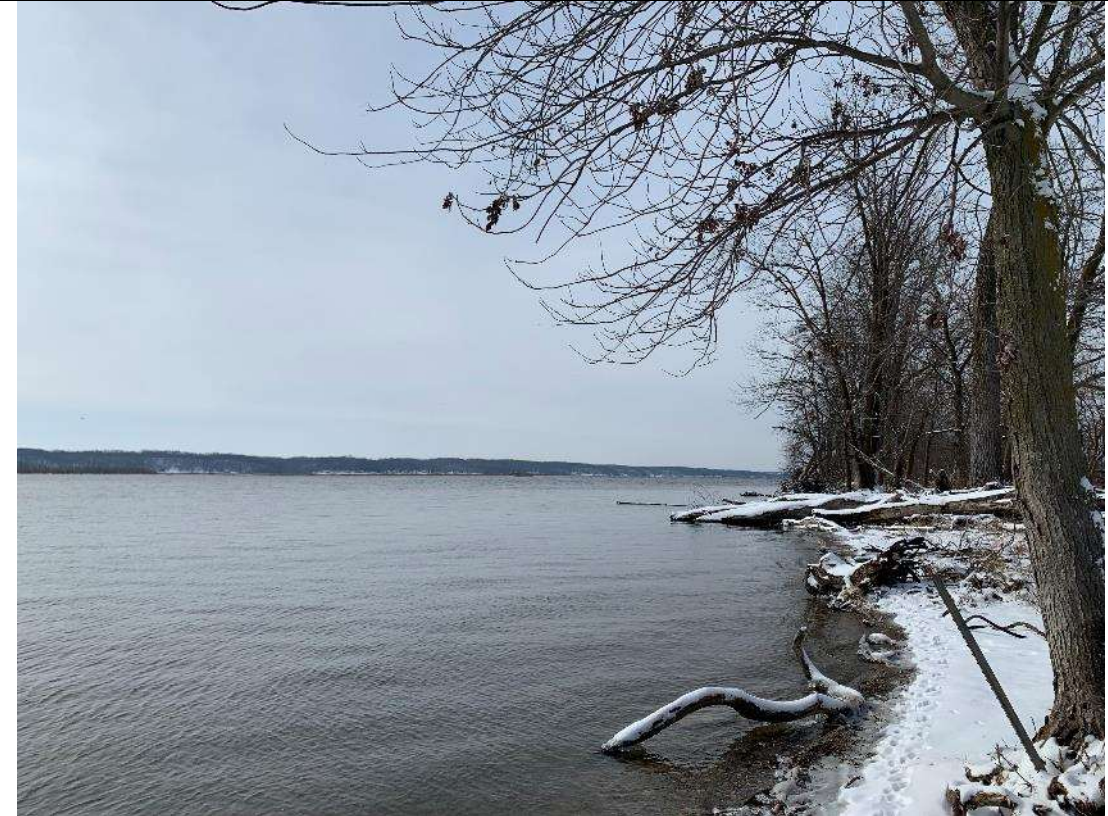


Transmitter Connection Closeup

Shoreline Photos (northwestern shore)



Upstream view (facing northeast) from northwestern shoreline at crossing



Downstream view (facing southwest) from northwestern shoreline at crossing



View across waterway of opposite bank from northwestern shoreline at crossing (facing southeast)



Right-of-way view from northwestern shoreline at crossing (facing northwest)

Shoreline Photos (southeastern shore)



Upstream view (facing northeast) from southeastern shoreline at crossing



Downstream view (facing southwest) from southeastern shoreline at crossing



View across waterway of opposite bank from southeastern shoreline at crossing (facing northwest)



Right-of-way view from southeastern shoreline at crossing (facing southeast)

Sediment Photos



Sample 1 taken from (Northwest Shoreline)



Sample 2 taken from (Middle of Channel)



Side view of sample 1



Side view of sample 2

Sediment Photos (continued)

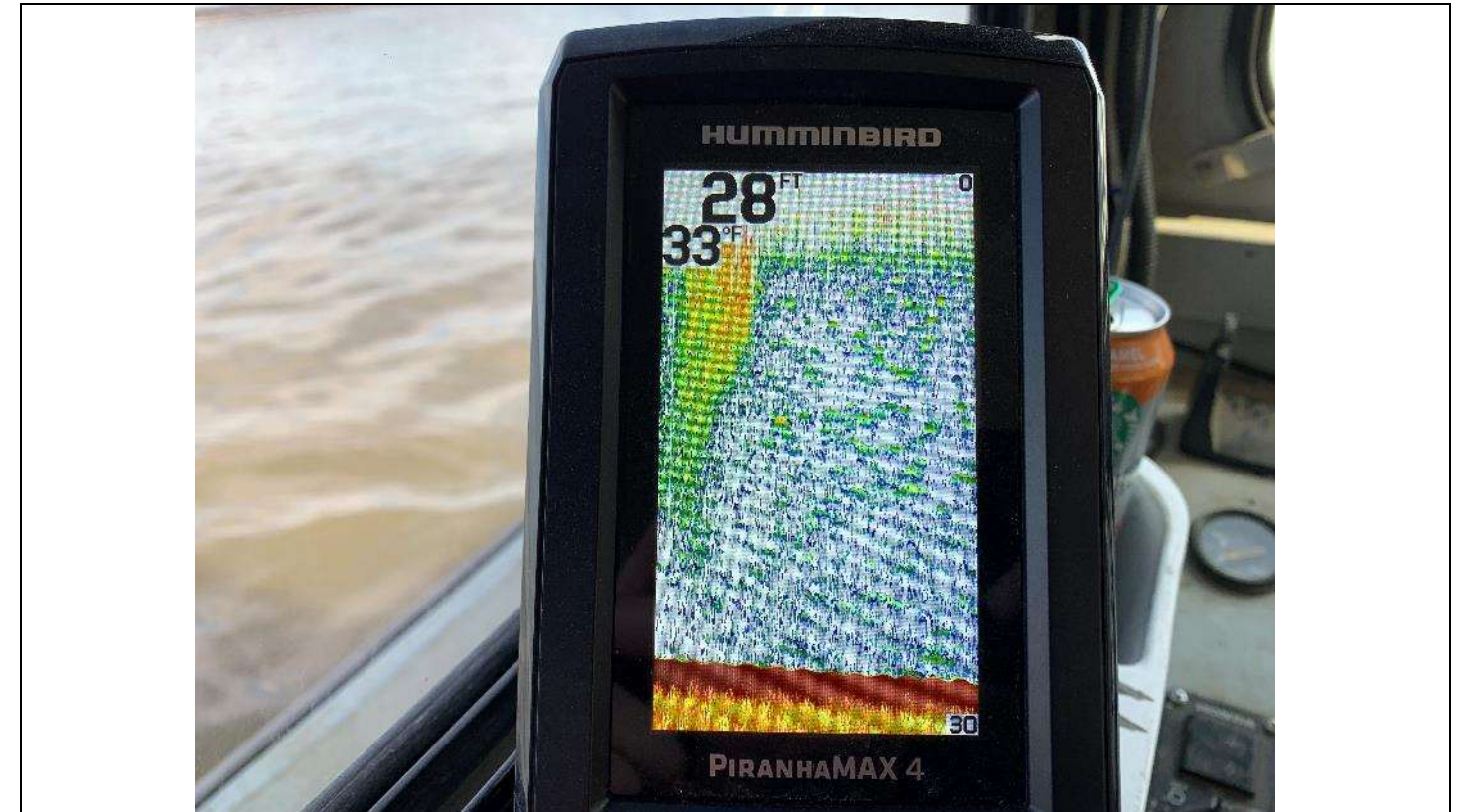


Sample 3 taken from (Southeast Shoreline)



Side view of sample 3

Additional Photos



Water Temp at time of Bathymetric Survey

Control Point Photos



Control Point "OPUS" Overview



Control Point "OPUS" Closeup



Control Point "CO1" Overview



Control Point "CO1" Closeup

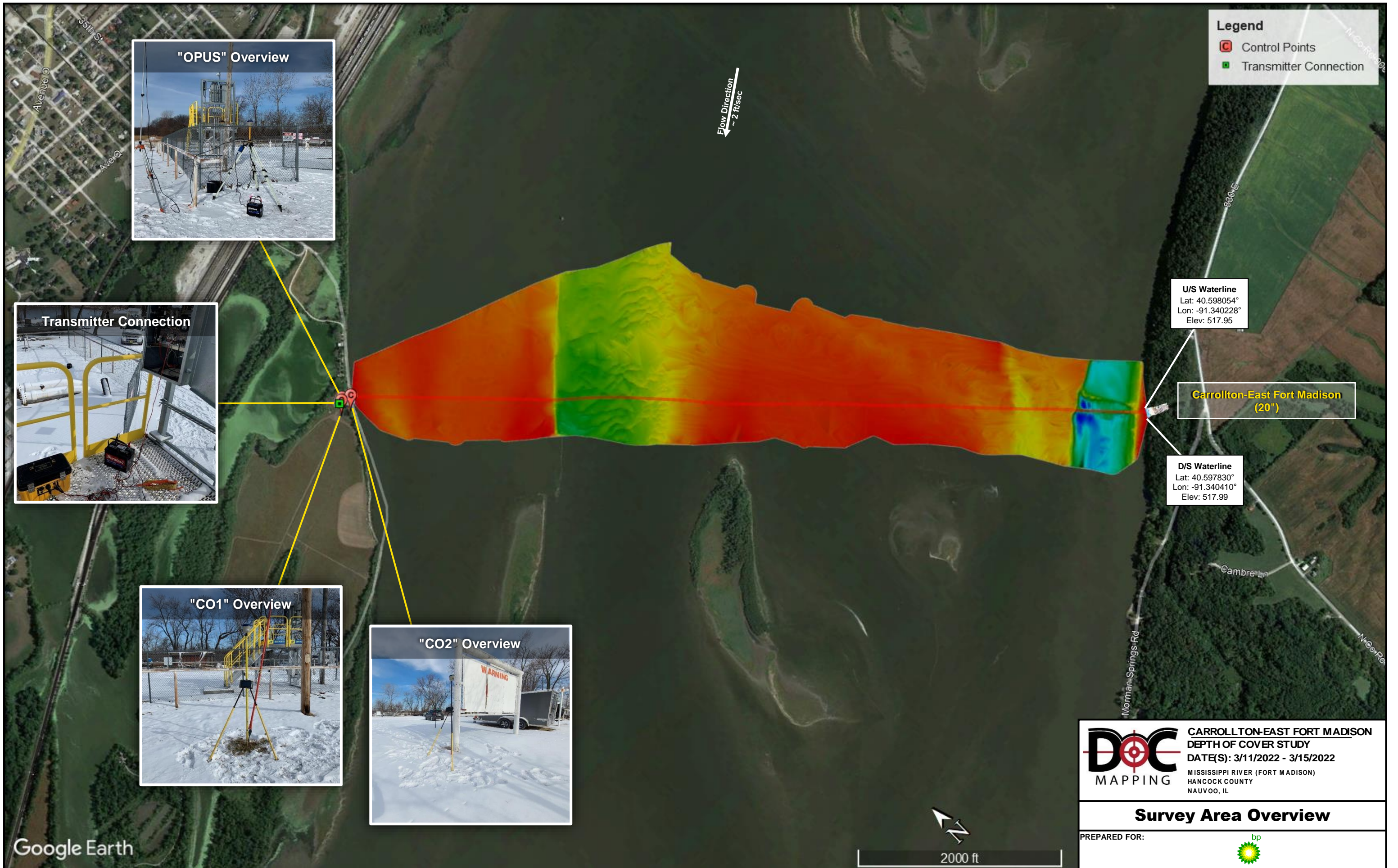
Control Point Photos (continued)



Control Point "CO2" Overview



Control Point "CO2" Closeup



Legend

- Control Points
- Transmitter Connection



U/S Waterline
 Lat: 40.598054°
 Lon: -91.340228°
 Elev: 517.95

Carrollton-East Fort Madison (20")

D/S Waterline
 Lat: 40.597830°
 Lon: -91.340410°
 Elev: 517.99

DOC MAPPING CARROLLTON-EAST FORT MADISON
 DEPTH OF COVER STUDY
 DATE(S): 3/11/2022 - 3/15/2022
 MISSISSIPPI RIVER (FORT MADISON)
 HANCOCK COUNTY
 NAUVOO, IL

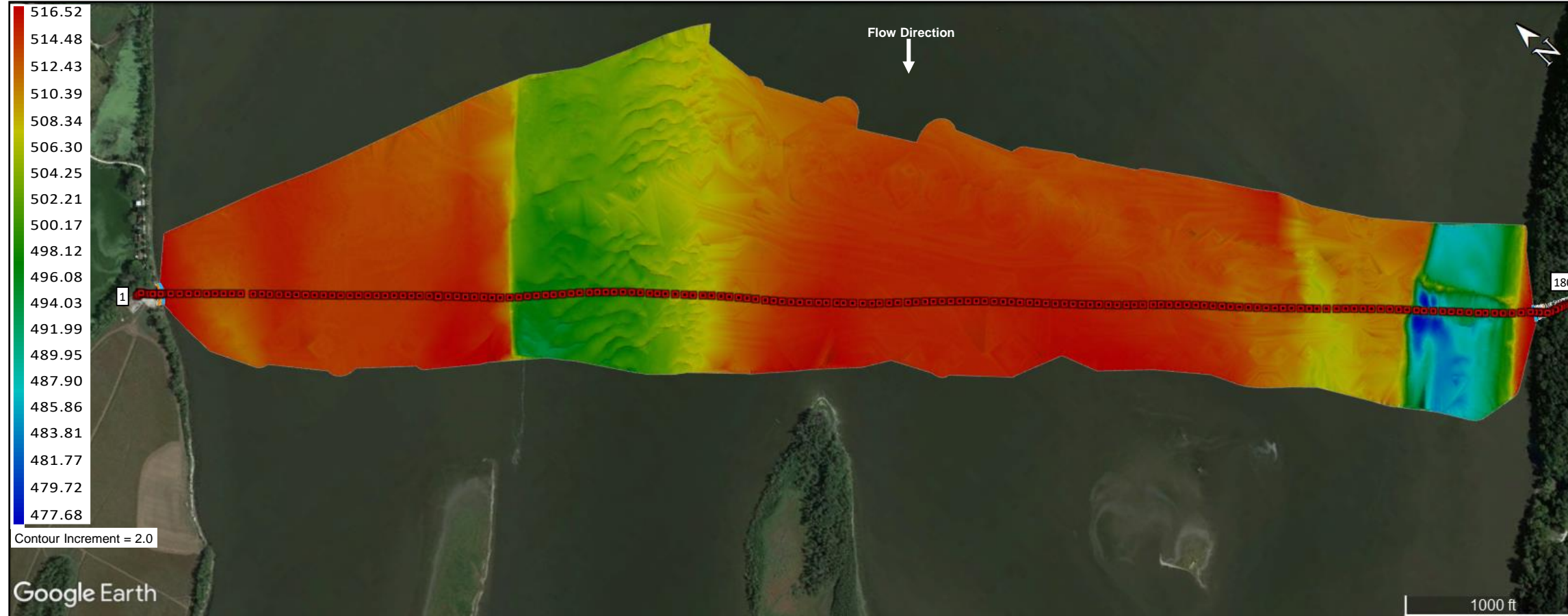
Survey Area Overview

PREPARED FOR:



Google Earth

PLAN VIEW

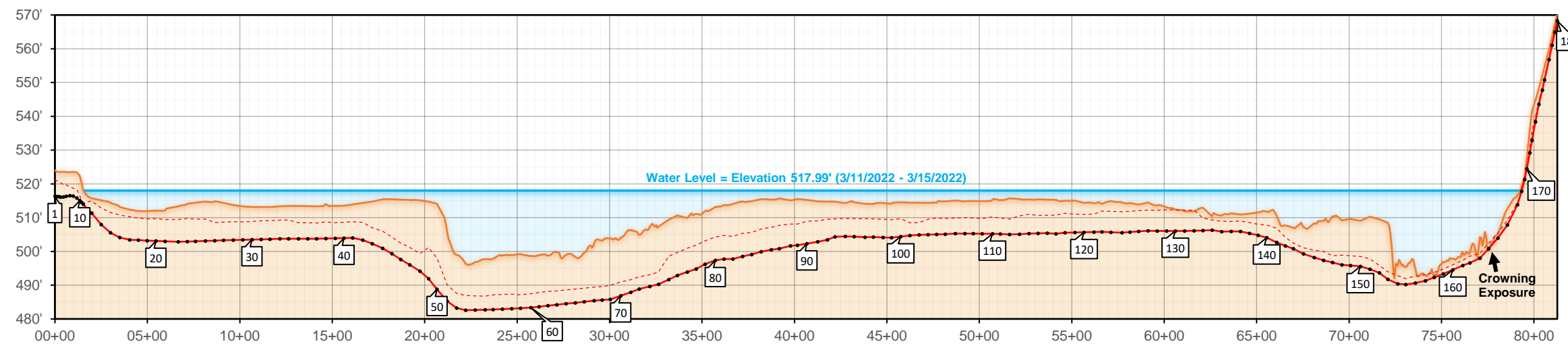


DoC DATA

Pt. ID	STA#	Latitude	Longitude	Topo Elev. (ft)	T.O.P. Elev. (ft)	DoC (ft)	MS DoC* (ft)
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Due to a high number of pipeline depth of cover points in this crossing, all point data can be referenced within the provided Excel spreadsheet for this particular line.

PROFILE VIEW



Land Data
Underwater Data
Italics = Projected topo or bathymetric points and DoC / MSDoC

LEGEND	DEFINITIONS	GEODETIC SETTINGS	PLOT NOTES	CONTROL POINT VERIFICATION			
<ul style="list-style-type: none"> Water Level Topo / Bathymetry Projected Topo / Bathymetry +VSDV T.O.P. Point No Data (obstruction, loss of signal) Overlaid Data (if applicable) 	<p>DoC - Depth of Cover</p> <p>T.O.P. - Top of Pipe (or Cable, Conduit, etc.)</p> <p>+VSDV - Positive aspect of vertical confidence level. Represents a 95% likelihood that the true position of the target lies deeper than this point.</p> <p>MSDoC* - Minimum Statistical Depth of Cover. This reflects the measured distance from the +VSDV component to the Topo / Bathymetry line.</p>	<p>NAD83 - Iowa South 1402 NAVD88-GEOID12B (Conus) Units = sft</p> <p>RTK corrections provided by DoC Mapping base station w/ OPUS post-processing.</p>	<p>A single-beam sonar and a multi-beam sonar were used to determine bathymetric elevations in the area surrounding this crossing site.</p>	<p>CONTROL POINTS WERE ESTABLISHED AND/OR REFERENCED BY DoC MAPPING TO ADJUST FOR HORIZONTAL AND VERTICAL VARIANCE DURING THE TIME OF THIS SURVEY. INFORMATION FOR THE CONTROL POINTS BELOW:</p> <table border="0"> <tr> <td>ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513</td> <td>ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886</td> <td>ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580</td> </tr> </table> <p>PLEASE REFER TO THE "CONTROL POINT VERIFICATION SHEET" FOR MORE DETAILS ON THE CONTROL POINT(S) AND DoC MAPPING'S OBSERVATIONS.</p>	ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513	ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886	ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580
ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513	ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886	ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580					

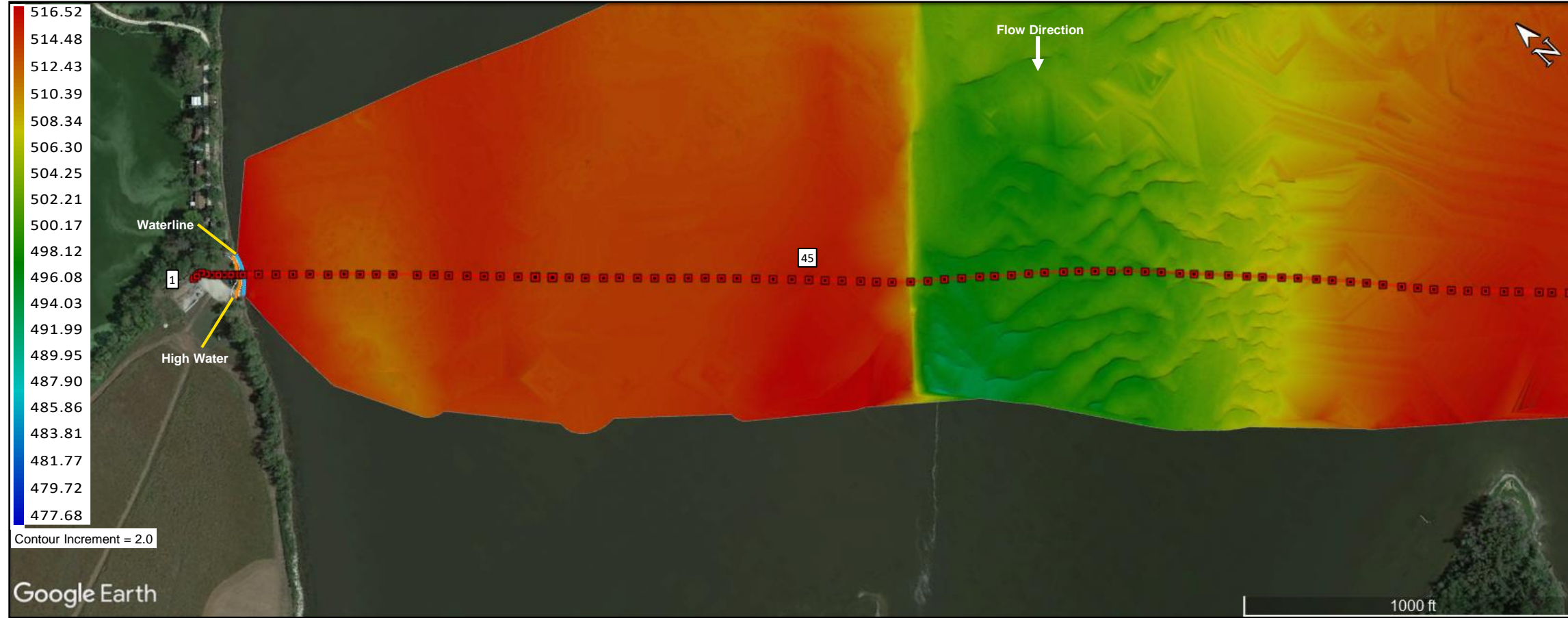
DoC MAPPING

CARROLLTON-EAST FORT MADISON (20")
DEPTH OF COVER STUDY
DATE(S): 3/11/2022 - 3/15/2022
MISSISSIPPI RIVER (FORT MADISON)
HANCOCK COUNTY
NAUVOO, IL

PLAN / PROFILE

PREPARED FOR:

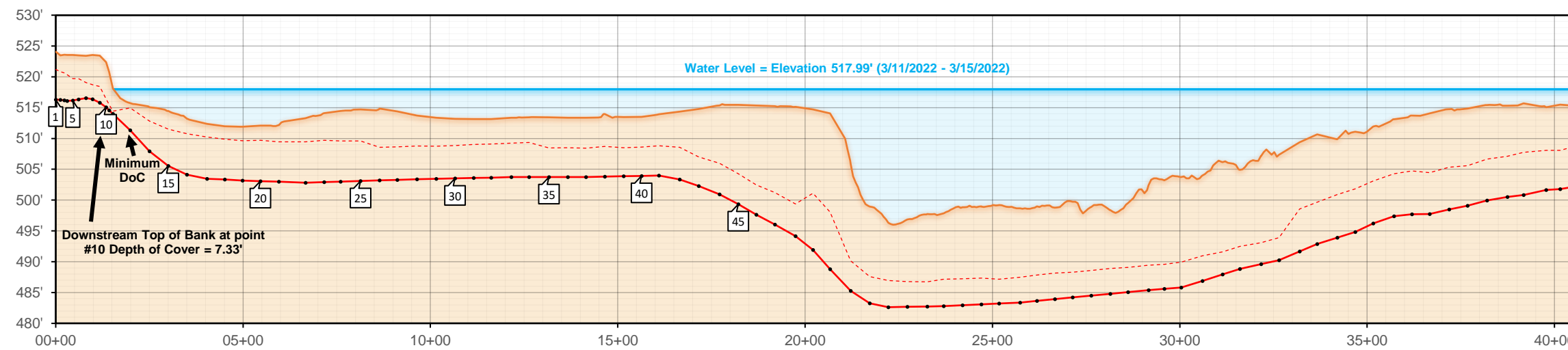
PLAN VIEW



DoC DATA

Pt. ID	STA#	Latitude	Longitude	Topo Elev. (ft)	T.O.P. Elev. (ft)	DoC (ft)	MS DoC* (ft)
1	00+00	40.61331389	-91.36047129	524.08	516.32	7.77	2.88
2	00+12	40.61331200	-91.36042733	523.49	516.26	7.23	2.64
3	00+23	40.61331656	-91.36039022	523.59	516.19	7.40	2.95
4	00+30	40.61330468	-91.36036674	523.55	516.10	7.45	3.20
5	00+46	40.61327008	-91.36033661	523.55	516.15	7.40	3.82
6	00+61	40.61323513	-91.36030681	523.49	516.35	7.14	3.79
7	00+81	40.61319721	-91.36025548	523.42	516.56	6.87	4.34
8	00+98	40.61316367	-91.36020982	523.54	516.37	7.16	4.83
9	01+18	40.61312731	-91.36015949	523.43	515.80	7.63	4.98
10	01+34	40.61309396	-91.36011678	522.39	515.07	7.33	5.99
11	01+42	40.61307948	-91.36009528	520.77	514.56	6.21	5.30
12	01+53	40.61306123	-91.36006797	518.10	513.99	4.12	3.69
13	01+99	40.61297435	-91.35994575	515.73	511.35	4.37	0.77
14	02+50	40.61287493	-91.35981497	515.06	507.94	7.12	2.25
15	03+00	40.61277964	-91.35968411	514.47	505.54	8.93	2.95
16	03+50	40.61268592	-91.35955393	513.22	504.13	9.10	2.45
17	04+04	40.61257984	-91.35942066	512.38	503.46	8.92	2.14
18	04+51	40.61249248	-91.35929398	511.96	503.36	8.60	2.07
19	04+98	40.61240109	-91.35917391	511.90	503.18	8.72	2.28
20	05+46	40.61230932	-91.35905029	512.07	503.08	8.99	2.37
21	05+95	40.61221477	-91.35892447	512.14	502.98	9.16	2.69
22	06+67	40.61207399	-91.35874482	513.30	502.83	10.48	3.84
23	07+16	40.61198029	-91.35861584	514.09	502.92	11.18	4.39
24	07+60	40.61189276	-91.35850829	514.45	503.00	11.45	4.86
25	08+14	40.61178804	-91.35837250	514.72	503.10	11.62	5.12
26	08+64	40.61168885	-91.35824382	514.84	503.19	11.65	6.27
27	09+11	40.61159847	-91.35812304	514.38	503.28	11.10	5.73
28	09+64	40.61149404	-91.35799054	513.73	503.38	10.35	4.96
29	10+15	40.61139460	-91.35786148	513.36	503.45	9.91	4.61
30	10+66	40.61129661	-91.35773354	513.17	503.52	9.66	4.33
31	11+15	40.61120012	-91.35760803	513.14	503.58	9.56	4.12
32	11+62	40.61110753	-91.35748880	513.14	503.65	9.49	4.04
33	12+16	40.61100456	-91.35735029	513.36	503.72	9.64	4.13
34	12+63	40.61091506	-91.35722710	513.43	503.73	9.71	4.10
35	13+16	40.61081278	-91.35709128	513.44	503.73	9.71	4.99
36	13+67	40.61071456	-91.35696279	513.37	503.74	9.63	4.88
37	14+15	40.61062218	-91.35683982	513.36	503.74	9.62	4.94
38	14+66	40.61052616	-91.35670757	513.96	503.81	10.15	5.25
39	15+16	40.61042986	-91.35657778	513.48	503.87	9.61	4.99
40	15+64	40.61033648	-91.35645751	513.52	503.93	9.59	4.93
41	16+10	40.61024777	-91.35633983	513.94	503.99	9.95	5.12
42	16+65	40.61013946	-91.35619796	514.36	503.34	11.02	5.78
43	17+16	40.61003923	-91.35607145	514.76	502.29	12.47	7.75
44	17+72	40.60993124	-91.35592937	515.33	500.93	14.40	9.35
45	18+22	40.60983311	-91.35580307	515.47	499.33	16.14	11.21

PROFILE VIEW



LEGEND

- Water Level
- Topo / Bathymetry
- - - Projected Topo / Bathymetry
- - - +VSDV
- T.O.P. Point
- - - No Data (obstruction, loss of signal)
- Overlaid Data (if applicable)

DEFINITIONS

DoC - Depth of Cover

T.O.P. - Top of Pipe (or Cable, Conduit, etc.)

+VSDV - Positive aspect of vertical confidence level. Represents a 95% likelihood that the true position of the target lies deeper than this point.

MSDoC* - Minimum Statistical Depth of Cover. This reflects the measured distance from the +VSDV component to the Topo / Bathymetry line.

GEODETIC SETTINGS

NAD83 - Iowa South 1402
NAVD88-GEOID12B (Conus)
Units = sft

RTK corrections provided by DoC Mapping base station w/ OPUS post-processing.

PLOT NOTES

A single-beam sonar and a multi-beam sonar were used to determine bathymetric elevations in the area surrounding this crossing site.

CONTROL POINT VERIFICATION

CONTROL POINTS WERE ESTABLISHED AND/OR REFERENCED BY DoC MAPPING TO ADJUST FOR HORIZONTAL AND VERTICAL VARIANCE DURING THE TIME OF THIS SURVEY. INFORMATION FOR THE CONTROL POINTS BELOW:

ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513	ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886	ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580
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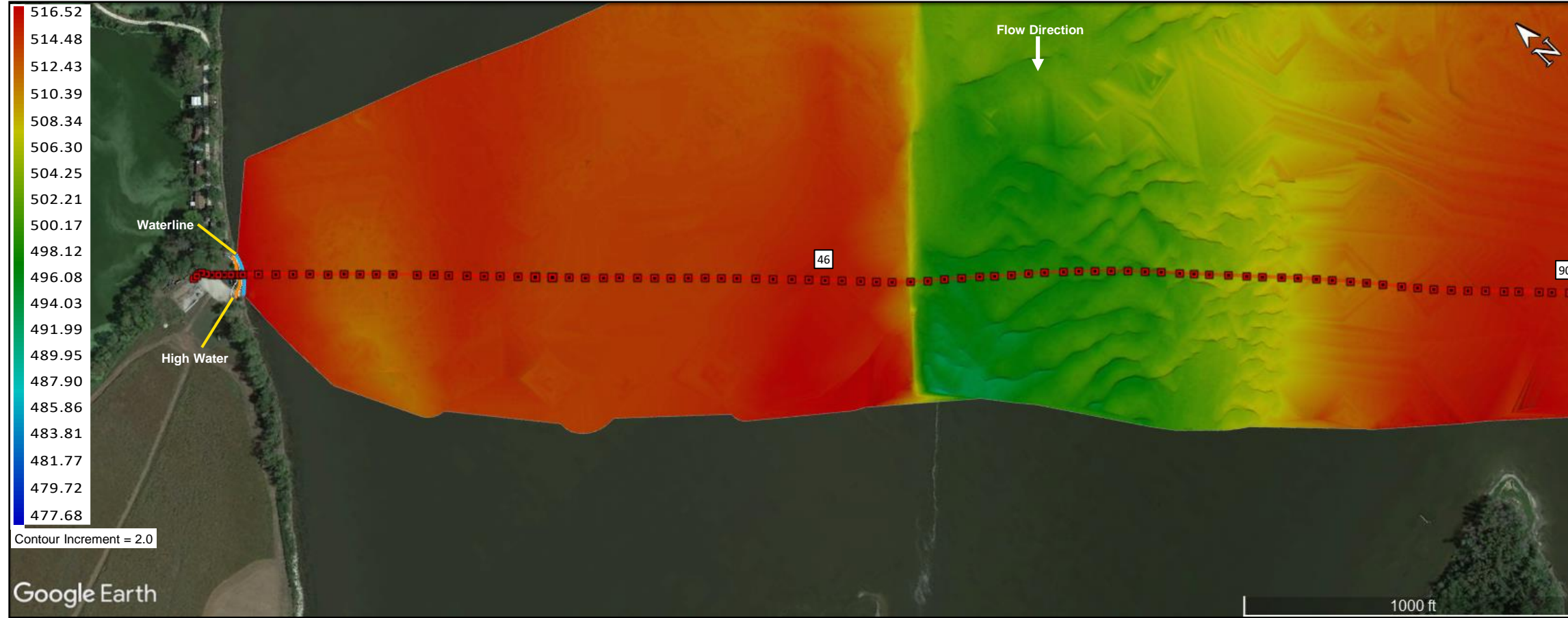
PLEASE REFER TO THE "CONTROL POINT VERIFICATION SHEET" FOR MORE DETAILS ON THE CONTROL POINT(S) AND DoC MAPPING'S OBSERVATIONS.

CARROLLTON-EAST FORT MADISON (20")
DEPTH OF COVER STUDY
DATE(S): 3/11/2022 - 3/15/2022
MISSISSIPPI RIVER (FORT MADISON)
HANCOCK COUNTY
NAUVOO, IL

PROFILE DETAIL (Point #1 to Point #90)

PREPARED FOR:

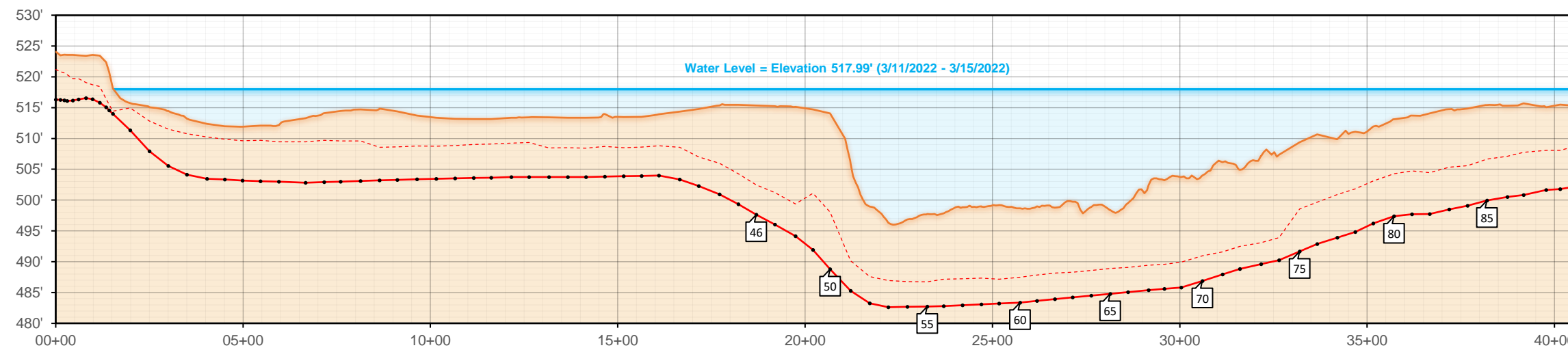
PLAN VIEW



DoC DATA

Pt. ID	STA#	Latitude	Longitude	Topo Elev. (ft)	T.O.P. Elev. (ft)	DoC (ft)	MS DoC* (ft)
46	18+70	40.60973728	-91.35568539	515.34	497.63	17.71	12.88
47	19+19	40.60964052	-91.35555889	515.25	496.05	19.20	14.04
48	19+74	40.60953262	-91.35542044	515.14	494.14	21.00	15.78
49	20+21	40.60943922	-91.35530580	514.72	491.92	22.81	13.62
50	20+67	40.60935004	-91.35518941	514.07	488.79	25.28	16.01
51	21+22	40.60924697	-91.35504504	505.92	485.26	20.66	15.79
52	21+72	40.60915393	-91.35490896	498.95	483.25	15.70	11.35
53	22+22	40.60906992	-91.35476897	496.33	482.62	13.71	9.38
54	22+73	40.60897941	-91.35462999	496.84	482.68	14.17	10.06
55	23+26	40.60888532	-91.35448284	497.73	482.73	14.99	11.00
56	23+70	40.60880571	-91.35436446	497.85	482.78	15.07	10.69
57	24+20	40.60871561	-91.35422852	498.83	482.92	15.91	11.59
58	24+71	40.60862803	-91.35408650	498.96	483.07	15.89	11.62
59	25+18	40.60854471	-91.35395628	499.19	483.20	15.99	12.03
60	25+74	40.60844148	-91.35380799	498.68	483.36	15.32	11.20
61	26+19	40.60835865	-91.35368690	498.97	483.63	15.34	11.13
62	26+66	40.60826786	-91.35356332	498.78	483.91	14.87	10.64
63	27+14	40.60817777	-91.35343982	499.74	484.20	15.54	11.44
64	27+64	40.60808184	-91.35331168	498.89	484.50	14.39	10.31
65	28+14	40.60798179	-91.35318606	498.38	484.79	13.60	9.50
66	28+62	40.60788769	-91.35306684	499.52	485.07	14.45	10.44
67	29+16	40.60777596	-91.35293532	502.43	485.38	17.05	13.00
68	29+59	40.60769133	-91.35281146	503.20	485.60	17.61	13.62
69	30+04	40.60760138	-91.35272110	503.74	485.82	17.92	13.82
70	30+60	40.60748968	-91.35257935	503.98	486.88	17.10	13.04
71	31+14	40.60738075	-91.35244868	506.17	487.93	18.24	14.57
72	31+60	40.60728722	-91.35233489	504.90	488.83	16.07	12.42
73	32+17	40.60717576	-91.35219280	507.14	489.60	17.54	14.06
74	32+65	40.60708128	-91.35207304	507.36	490.25	17.10	13.46
75	33+20	40.60696971	-91.35194030	509.39	491.67	17.72	10.83
76	33+66	40.60687427	-91.35182871	510.66	492.87	17.79	11.01
77	34+20	40.60676205	-91.35170144	509.88	493.91	15.97	8.97
78	34+68	40.60666392	-91.35158858	511.09	494.83	16.26	9.28
79	35+16	40.60656191	-91.35147770	511.95	496.22	15.73	8.84
80	35+72	40.60644468	-91.35134996	513.11	497.37	15.74	8.83
81	36+19	40.60634630	-91.35123730	513.70	497.71	15.99	8.98
82	36+67	40.60624711	-91.35112593	514.06	497.75	16.31	9.60
83	37+19	40.60614305	-91.35099888	514.74	498.48	16.26	9.40
84	37+68	40.60604575	-91.35087680	514.86	499.09	15.77	9.28
85	38+20	40.60594476	-91.35074458	515.43	499.93	15.50	8.78
86	38+74	40.60583773	-91.35060718	515.32	500.52	14.80	8.19
87	39+17	40.60575406	-91.35049683	515.69	500.82	14.87	7.95
88	39+78	40.60563518	-91.35034456	515.08	501.65	13.43	7.01
89	40+15	40.60556210	-91.35025163	515.48	501.80	13.67	7.41
90	40+67	40.60545997	-91.35011919	515.22	502.30	12.92	6.29

PROFILE VIEW



Land Data
Underwater Data
Italics = Projected topo or bathymetric points and DoC / MSDoC

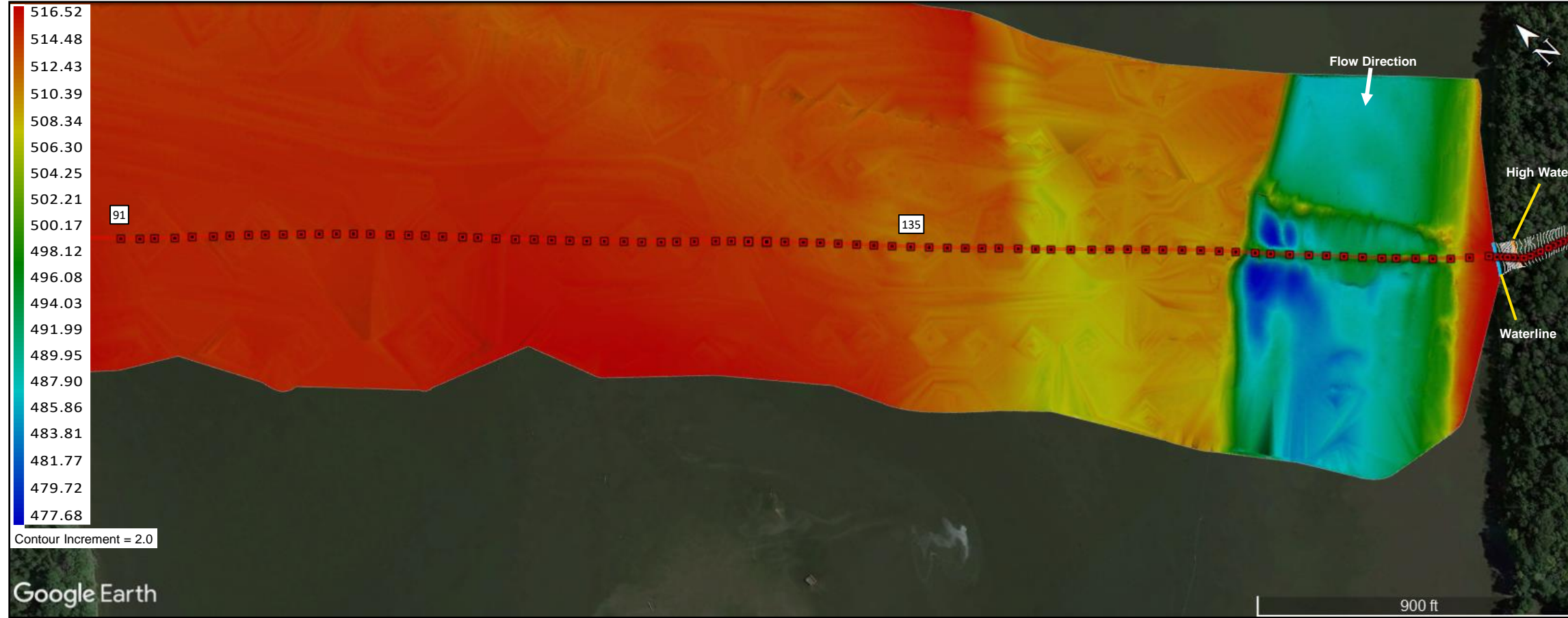
LEGEND	DEFINITIONS	GEODETIC SETTINGS	PLOT NOTES	CONTROL POINT VERIFICATION			
<ul style="list-style-type: none"> Water Level Topo / Bathymetry Projected Topo / Bathymetry +VSDV T.O.P. Point No Data (obstruction, loss of signal) Overlaid Data (if applicable) 	<p>DoC - Depth of Cover</p> <p>T.O.P. - Top of Pipe (or Cable, Conduit, etc.)</p> <p>+VSDV - Positive aspect of vertical confidence level. Represents a 95% likelihood that the true position of the target lies deeper than this point.</p> <p>MSDoC* - Minimum Statistical Depth of Cover. This reflects the measured distance from the +VSDV component to the Topo / Bathymetry line.</p>	<p>NAD83 - Iowa South 1402 NAVD88-GEOID12B (Conus) Units = sft</p> <p>RTK corrections provided by DoC Mapping base station w/ OPUS post-processing.</p>	<p>A single-beam sonar and a multi-beam sonar were used to determine bathymetric elevations in the area surrounding this crossing site.</p>	<p>CONTROL POINTS WERE ESTABLISHED AND/OR REFERENCED BY DoC MAPPING TO ADJUST FOR HORIZONTAL AND VERTICAL VARIANCE DURING THE TIME OF THIS SURVEY. INFORMATION FOR THE CONTROL POINTS BELOW:</p> <table border="0"> <tr> <td>ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513</td> <td>ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886</td> <td>ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580</td> </tr> </table> <p>PLEASE REFER TO THE "CONTROL POINT VERIFICATION SHEET" FOR MORE DETAILS ON THE CONTROL POINT(S) AND DoC MAPPING'S OBSERVATIONS.</p>	ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513	ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886	ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580
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CARROLLTON-EAST FORT MADISON (20")
DEPTH OF COVER STUDY
DATE(S): 3/11/2022 - 3/15/2022
MISSISSIPPI RIVER (FORT MADISON)
HANCOCK COUNTY
NAUVOO, IL

PROFILE DETAIL (Point #1 to Point #90)

PREPARED FOR:

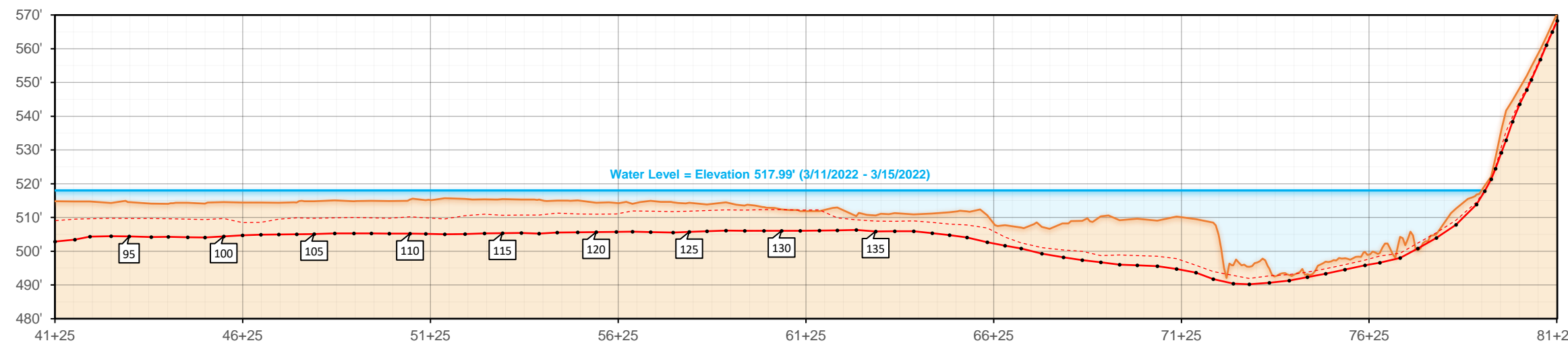
PLAN VIEW



DoC DATA

Pt. ID	STA#	Latitude	Longitude	Topo Elev. (ft)	T.O.P. Elev. (ft)	DoC (ft)	MS DoC* (ft)
91	41+25	40.60534814	-91.34997241	514.81	502.85	11.96	5.74
92	41+78	40.60524584	-91.34983784	514.72	503.43	11.29	5.22
93	42+18	40.60517058	-91.34972962	514.73	504.30	10.42	5.07
94	42+74	40.60506532	-91.34958288	514.30	504.47	9.83	4.56
95	43+23	40.60497931	-91.34945118	514.57	504.36	10.22	4.91
96	43+81	40.60486909	-91.34929723	514.09	504.22	9.87	4.41
97	44+27	40.60478629	-91.34917425	514.04	504.25	9.79	4.39
98	44+79	40.60469078	-91.34903598	514.35	504.15	10.19	4.87
99	45+25	40.60460390	-91.34891513	514.10	504.07	10.03	4.72
100	45+74	40.60451045	-91.34878483	514.55	504.40	10.15	4.83
101	46+24	40.60441581	-91.34865491	514.39	504.72	9.67	5.93
102	46+74	40.60432276	-91.34852635	514.44	504.89	9.55	5.88
103	47+21	40.60423169	-91.34840277	514.37	504.97	9.40	4.87
104	47+69	40.60414088	-91.34827915	514.45	505.04	9.41	4.57
105	48+15	40.60405133	-91.34816026	514.78	505.12	9.67	5.05
106	48+70	40.60394272	-91.34802528	515.03	505.31	9.72	5.12
107	49+21	40.60384198	-91.34789546	514.84	505.29	9.55	4.81
108	49+67	40.60375139	-91.34777927	514.92	505.26	9.66	5.06
109	50+15	40.60365425	-91.34766338	514.85	505.23	9.62	5.10
110	50+71	40.60354573	-91.34752446	515.31	505.20	10.11	5.09
111	51+13	40.60346233	-91.34741947	515.13	505.13	10.00	5.24
112	51+63	40.60336023	-91.34729629	515.72	505.05	10.67	6.14
113	52+17	40.60325307	-91.34716358	515.48	505.07	10.41	4.93
114	52+69	40.60315322	-91.34703119	515.40	505.31	10.10	4.46
115	53+17	40.60305734	-91.34691089	515.46	505.35	10.11	4.82
116	53+67	40.60295798	-91.34678565	515.32	505.39	9.94	4.64
117	54+14	40.60286529	-91.34666590	515.30	505.24	10.06	4.58
118	54+63	40.60277177	-91.34654307	515.01	505.51	9.50	3.75
119	55+17	40.60266538	-91.34640538	515.09	505.59	9.50	4.08
120	55+66	40.60256856	-91.34628199	514.37	505.65	8.71	3.40
121	56+20	40.60246618	-91.34614409	514.30	505.73	8.58	3.25
122	56+63	40.60238493	-91.34603115	514.05	505.79	8.26	2.13
123	57+12	40.60229246	-91.34590440	514.92	505.68	9.23	3.08
124	57+71	40.60218111	-91.34574813	514.50	505.56	8.94	2.74
125	58+14	40.60209874	-91.34563621	514.37	505.72	8.65	2.54
126	58+62	40.60200597	-91.34551658	513.86	505.91	7.95	1.79
127	59+12	40.60190796	-91.34538811	514.47	506.10	8.37	2.20
128	59+62	40.60181175	-91.34526091	513.52	506.07	7.45	1.33
129	60+13	40.60171154	-91.34513126	513.09	506.04	7.05	0.75
130	60+60	40.60161840	-91.34501401	512.40	506.06	6.35	0.12
131	61+10	40.60151879	-91.34489260	511.88	506.08	5.80	-0.30
132	61+61	40.60141567	-91.34476715	511.88	506.10	5.78	-0.36
133	62+08	40.60132048	-91.34465050	512.93	506.20	6.73	3.02
134	62+59	40.60121941	-91.34452637	510.37	506.31	4.06	1.08
135	63+11	40.60111665	-91.34439787	510.59	505.88	4.71	1.66

PROFILE VIEW



Land Data
Underwater Data
Italics = Projected topo or bathymetric points and DoC / MSDoC

LEGEND

- Water Level
- Topo / Bathymetry
- - - Projected Topo / Bathymetry
- - - +VSDV
- T.O.P. Point
- - - No Data (obstruction, loss of signal)
- Overlaid Data (if applicable)

DEFINITIONS

DoC - Depth of Cover

T.O.P. - Top of Pipe (or Cable, Conduit, etc.)

+VSDV - Positive aspect of vertical confidence level. Represents a 95% likelihood that the true position of the target lies deeper than this point.

MSDoC* - Minimum Statistical Depth of Cover. This reflects the measured distance from the +VSDV component to the Topo / Bathymetry line.

GEODETTIC SETTINGS

NAD83 - Iowa South 1402
NAVD88-GEOID12B (Conus)
Units = sft

RTK corrections provided by DoC Mapping base station w/ OPUS post-processing.

PLOT NOTES

A single-beam sonar and a multi-beam sonar were used to determine bathymetric elevations in the area surrounding this crossing site.

CONTROL POINT VERIFICATION

CONTROL POINTS WERE ESTABLISHED AND/OR REFERENCED BY DoC MAPPING TO ADJUST FOR HORIZONTAL AND VERTICAL VARIANCE DURING THE TIME OF THIS SURVEY. INFORMATION FOR THE CONTROL POINTS BELOW:

ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513	ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886	ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580
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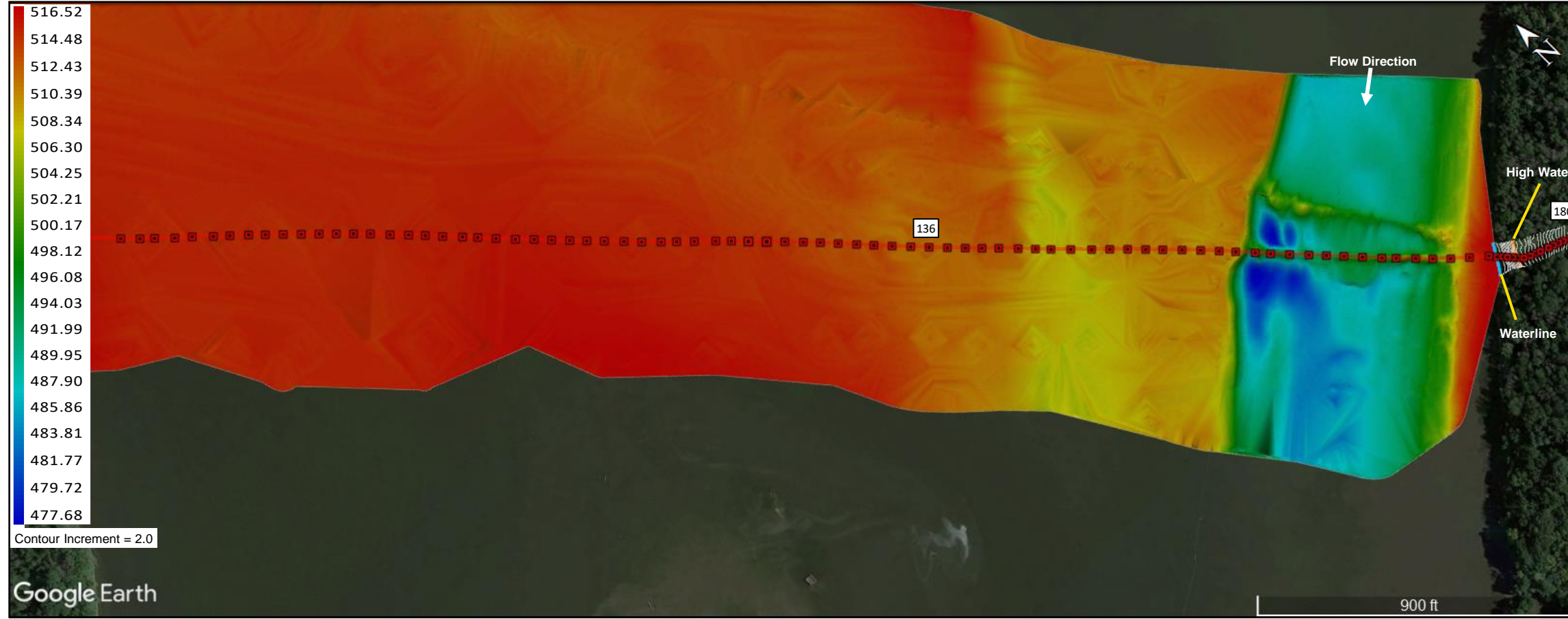
PLEASE REFER TO THE "CONTROL POINT VERIFICATION SHEET" FOR MORE DETAILS ON THE CONTROL POINT(S) AND DoC MAPPING'S OBSERVATIONS.

CARROLLTON-EAST FORT MADISON (20")
DEPTH OF COVER STUDY
DATE(S): 3/11/2022 - 3/15/2022
MISSISSIPPI RIVER (FORT MADISON)
HANCOCK COUNTY
NAUVOO, IL

PROFILE DETAIL (Point #91 to Point #180)

PREPARED FOR:

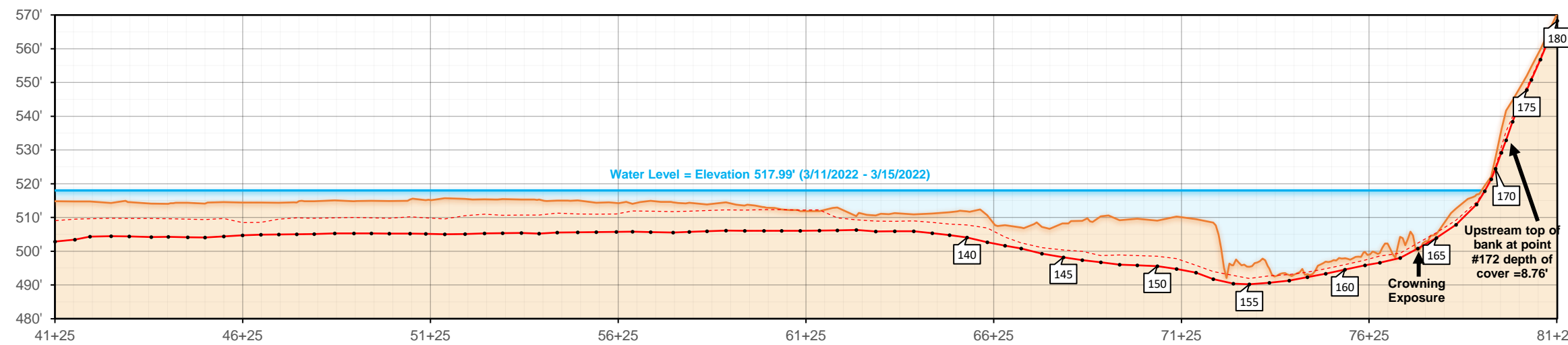
PLAN VIEW



DoC DATA

Pt. ID	STA#	Latitude	Longitude	Topo Elev. (ft)	T.O.P. Elev. (ft)	DoC (ft)	MS DoC* (ft)
136	63+61	40.60101644	-91.34427094	511.26	505.91	5.35	2.42
137	64+12	40.60091708	-91.34414391	510.93	505.94	4.99	1.97
138	64+61	40.60082052	-91.34401917	511.13	505.33	5.80	2.62
139	65+08	40.60073043	-91.34390131	511.53	504.77	6.76	3.52
140	65+54	40.60064169	-91.34378077	511.82	504.05	7.78	4.06
141	66+08	40.60053691	-91.34364516	510.64	502.63	8.01	3.76
142	66+55	40.60044306	-91.34352581	507.69	501.67	6.02	3.52
143	66+98	40.60035876	-91.34341715	507.02	500.80	6.22	4.52
144	67+53	40.60025309	-91.34327640	507.18	499.29	7.89	6.13
145	68+11	40.60014228	-91.34312880	508.23	498.22	10.01	7.87
146	68+61	40.60004759	-91.34299708	508.99	497.33	11.66	9.04
147	69+10	40.59995379	-91.34286979	510.36	496.70	13.66	11.65
148	69+60	40.59985672	-91.34274258	509.19	496.04	13.16	10.28
149	70+08	40.59976398	-91.34262310	509.64	495.82	13.82	10.91
150	70+61	40.59966090	-91.34248759	509.07	495.57	13.50	10.59
151	71+12	40.59956058	-91.34235702	510.26	494.73	15.53	12.46
152	71+64	40.59945827	-91.34223011	509.50	493.68	15.82	13.71
153	72+10	40.59936597	-91.34211669	508.46	491.71	16.76	14.48
154	72+63	40.59925768	-91.34198614	495.82	490.39	5.42	3.00
155	73+06	40.59917048	-91.34188300	495.38	490.17	5.21	3.43
156	73+59	40.59906565	-91.34175068	494.89	490.67	4.22	2.21
157	74+12	40.59896068	-91.34161818	492.96	491.27	1.69	-0.15
158	74+60	40.59886504	-91.34149745	493.21	492.30	0.91	-0.59
159	75+09	40.59876830	-91.34137707	496.93	493.34	3.59	2.13
160	75+60	40.59866481	-91.34125110	497.94	494.54	3.40	1.91
161	76+14	40.59855733	-91.34112028	499.79	495.80	3.98	2.40
162	76+53	40.59848129	-91.34101941	499.46	496.57	2.89	0.86
163	77+07	40.59837562	-91.34088180	504.24	498.02	6.21	4.83
164	77+55	40.59828347	-91.34076181	500.32	500.82	-0.50	-2.09
165	78+04	40.59818937	-91.34063292	505.01	503.93	1.08	-0.49
166	78+56	40.59809606	-91.34049142	512.61	507.84	4.76	3.41
167	79+11	40.59800021	-91.34034065	516.80	513.83	2.97	2.27
168	79+33	40.59795402	-91.34028996	519.43	517.81	1.63	1.44
169	79+50	40.59792125	-91.34024634	522.14	521.35	0.80	0.69
170	79+61	40.59789739	-91.34021786	527.70	524.43	3.27	2.82
171	79+77	40.59786579	-91.34018067	535.88	529.18	6.70	4.97
172	79+90	40.59783958	-91.34015115	541.63	532.86	8.76	6.13
173	80+07	40.59780564	-91.34010595	544.68	538.37	6.31	4.83
174	80+26	40.59778219	-91.34004585	548.34	543.56	4.78	3.85
175	80+45	40.59776484	-91.33998234	551.97	547.75	4.22	3.29
176	80+57	40.59775361	-91.33994062	554.65	550.76	3.88	3.20
177	80+81	40.59773175	-91.33985805	559.81	556.80	3.01	2.42
178	80+97	40.59771693	-91.33980303	563.57	561.04	2.52	2.05
179	81+13	40.59770233	-91.33975162	567.33	565.00	2.33	1.89
180	81+26	40.59768905	-91.33970620	570.46	568.26	2.20	1.89

PROFILE VIEW



Land Data
Underwater Data
Italics = Projected topo or bathymetric points and DoC / MSDoC

LEGEND

- Water Level
- Topo / Bathymetry
- Projected Topo / Bathymetry
- +VSDV
- T.O.P. Point
- No Data (obstruction, loss of signal)
- Overlaid Data (if applicable)

DEFINITIONS

DoC - Depth of Cover

T.O.P. - Top of Pipe (or Cable, Conduit, etc.)

+VSDV - Positive aspect of vertical confidence level. Represents a 95% likelihood that the true position of the target lies deeper than this point.

MSDoC* - Minimum Statistical Depth of Cover. This reflects the measured distance from the +VSDV component to the Topo / Bathymetry line.

GEODETIC SETTINGS

NAD83 - Iowa South 1402
NAVD88-GEOID12B (Conus)
Units = sft

RTK corrections provided by DoC Mapping base station w/ OPUS post-processing.

PLOT NOTES

A single-beam sonar and a multi-beam sonar were used to determine bathymetric elevations in the area surrounding this crossing site.

CONTROL POINT VERIFICATION

CONTROL POINTS WERE ESTABLISHED AND/OR REFERENCED BY DoC MAPPING TO ADJUST FOR HORIZONTAL AND VERTICAL VARIANCE DURING THE TIME OF THIS SURVEY. INFORMATION FOR THE CONTROL POINTS BELOW:

ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513	ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886	ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580
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PLEASE REFER TO THE "CONTROL POINT VERIFICATION SHEET" FOR MORE DETAILS ON THE CONTROL POINT(S) AND DoC MAPPING'S OBSERVATIONS.

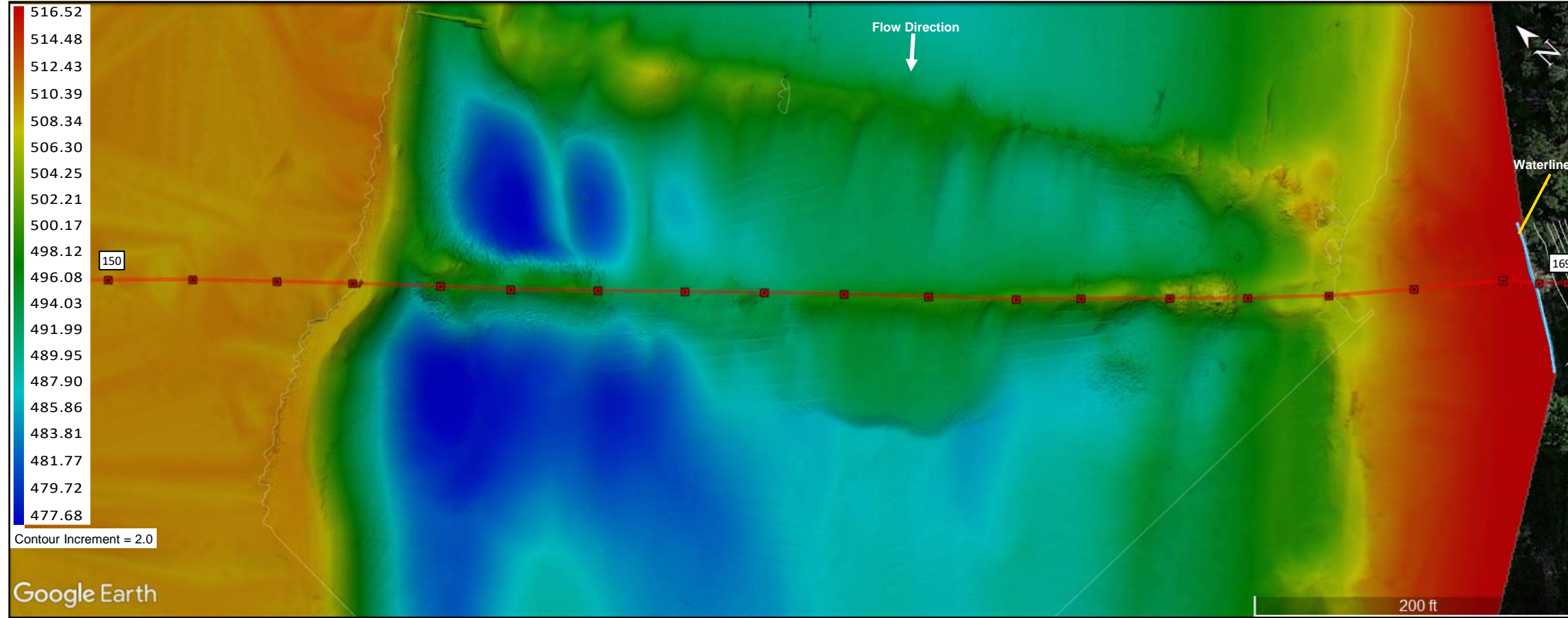
DOC MAPPING

CARROLLTON-EAST FORT MADISON (20")
DEPTH OF COVER STUDY
DATE(S): 3/11/2022 - 3/15/2022
MISSISSIPPI RIVER (FORT MADISON)
HANCOCK COUNTY
NAUVOO, IL

PROFILE DETAIL (Point #91 to Point #180)

PREPARED FOR:

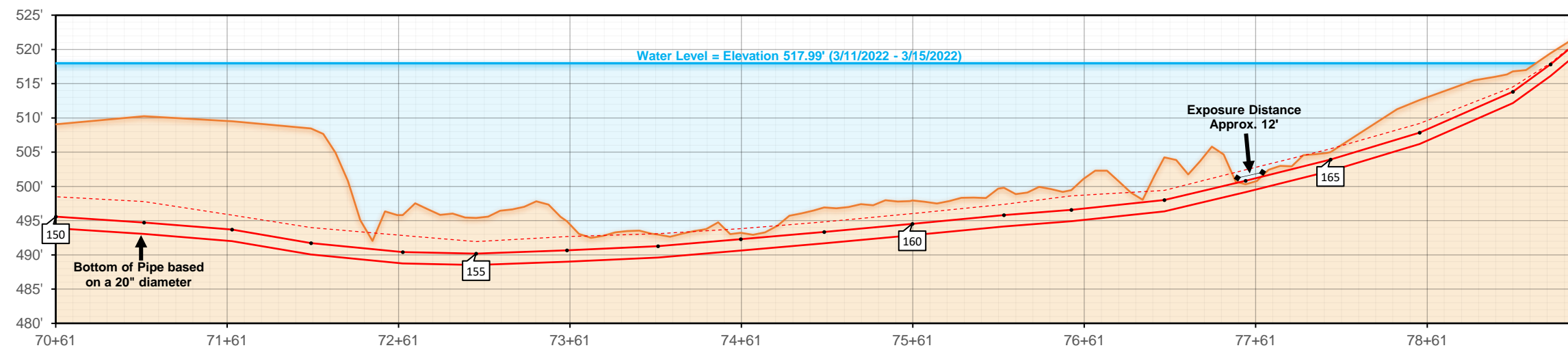
PLAN VIEW



DoC DATA

Pt. ID	STA#	Latitude	Longitude	Topo Elev. (ft)	T.O.P. Elev. (ft)	DoC (ft)	MS DoC* (ft)
150	70+61	40.59966090	-91.34248759	509.07	495.57	13.50	10.59
151	71+12	40.59956058	-91.34235702	510.26	494.73	15.53	12.46
152	71+64	40.59945827	-91.34223011	509.50	493.68	15.82	13.71
153	72+10	40.59936597	-91.34211669	508.46	491.71	16.76	14.48
154	72+63	40.59925768	-91.34198614	495.82	490.39	5.42	3.00
155	73+06	40.59917048	-91.34188300	495.38	490.17	5.21	3.43
156	73+59	40.59906565	-91.34175068	494.89	490.67	4.22	2.21
157	74+12	40.59896068	-91.34161818	492.96	491.27	1.69	-0.15
158	74+60	40.59886504	-91.34149745	493.21	492.30	0.91	-0.59
159	75+09	40.59876830	-91.34137707	496.93	493.34	3.59	2.13
160	75+60	40.59866481	-91.34125110	497.94	494.54	3.40	1.91
161	76+14	40.59855733	-91.34112028	499.79	495.80	3.98	2.40
162	76+53	40.59848129	-91.34101941	499.46	496.57	2.89	0.86
163	77+07	40.59837562	-91.34088180	504.24	498.02	6.21	4.83
164	77+55	40.59828347	-91.34076181	500.32	500.82	-0.50	-2.09
165	78+04	40.59818937	-91.34063292	505.01	503.93	1.08	-0.49
166	78+56	40.59809606	-91.34049142	512.61	507.84	4.76	3.41
167	79+11	40.59800021	-91.34034065	516.80	513.83	2.97	2.27
168	79+33	40.59795402	-91.34028996	519.43	517.81	1.63	1.44
169	79+50	40.59792125	-91.34024634	522.14	521.35	0.80	0.69

PROFILE VIEW



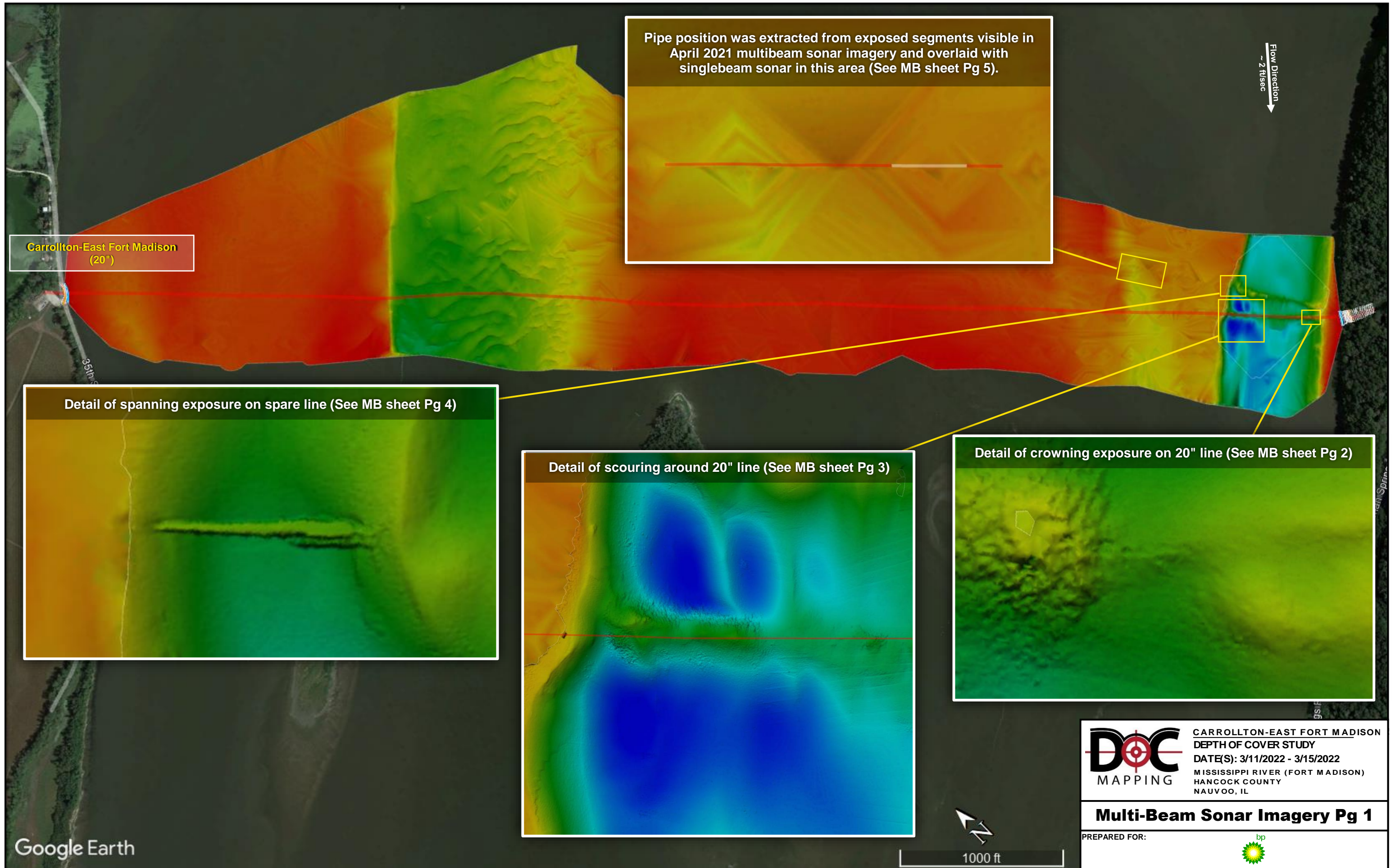
Land Data
Underwater Data
Italics = Projected topo or bathymetric points and DoC / MSDoC

LEGEND	DEFINITIONS	GEODETIC SETTINGS	PLOT NOTES	CONTROL POINT VERIFICATION			
<ul style="list-style-type: none"> Water Level Topo / Bathymetry Projected Topo / Bathymetry +VSDV T.O.P. Point No Data (obstruction, loss of signal) Overlaid Data (if applicable) 	<p>DoC - Depth of Cover</p> <p>T.O.P. - Top of Pipe (or Cable, Conduit, etc.)</p> <p>+VSDV - Positive aspect of vertical confidence level. Represents a 95% likelihood that the true position of the target lies deeper than this point.</p> <p>MSDoC* - Minimum Statistical Depth of Cover. This reflects the measured distance from the +VSDV component to the Topo / Bathymetry line.</p>	<p>NAD83 - Iowa South 1402 NAVD88-GEOID12B (Conus) Units = sft</p> <p>RTK corrections provided by DoC Mapping base station w/ OPUS post-processing.</p>	<p>An approximately 12ft crowning exposure appears visible in the multibeam sonar imagery at point #164.</p>	<p>CONTROL POINTS WERE ESTABLISHED AND/OR REFERENCED BY DoC MAPPING TO ADJUST FOR HORIZONTAL AND VERTICAL VARIANCE DURING THE TIME OF THIS SURVEY. INFORMATION FOR THE CONTROL POINTS BELOW:</p> <table border="0"> <tr> <td>ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513</td> <td>ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886</td> <td>ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580</td> </tr> </table> <p>PLEASE REFER TO THE "CONTROL POINT VERIFICATION SHEET" FOR MORE DETAILS ON THE CONTROL POINT(S) AND DoC MAPPING'S OBSERVATIONS.</p>	ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513	ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886	ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580
ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513	ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886	ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580					

CARROLLTON-EAST FORT MADISON (20")
DEPTH OF COVER STUDY
DATE(S): 3/11/2022 - 3/15/2022
MISSISSIPPI RIVER (FORT MADISON)
HANCOCK COUNTY
NAUVOO, IL

PROFILE DETAIL (Point #150 to Point #169)

PREPARED FOR:



Pipe position was extracted from exposed segments visible in April 2021 multibeam sonar imagery and overlaid with singlebeam sonar in this area (See MB sheet Pg 5).

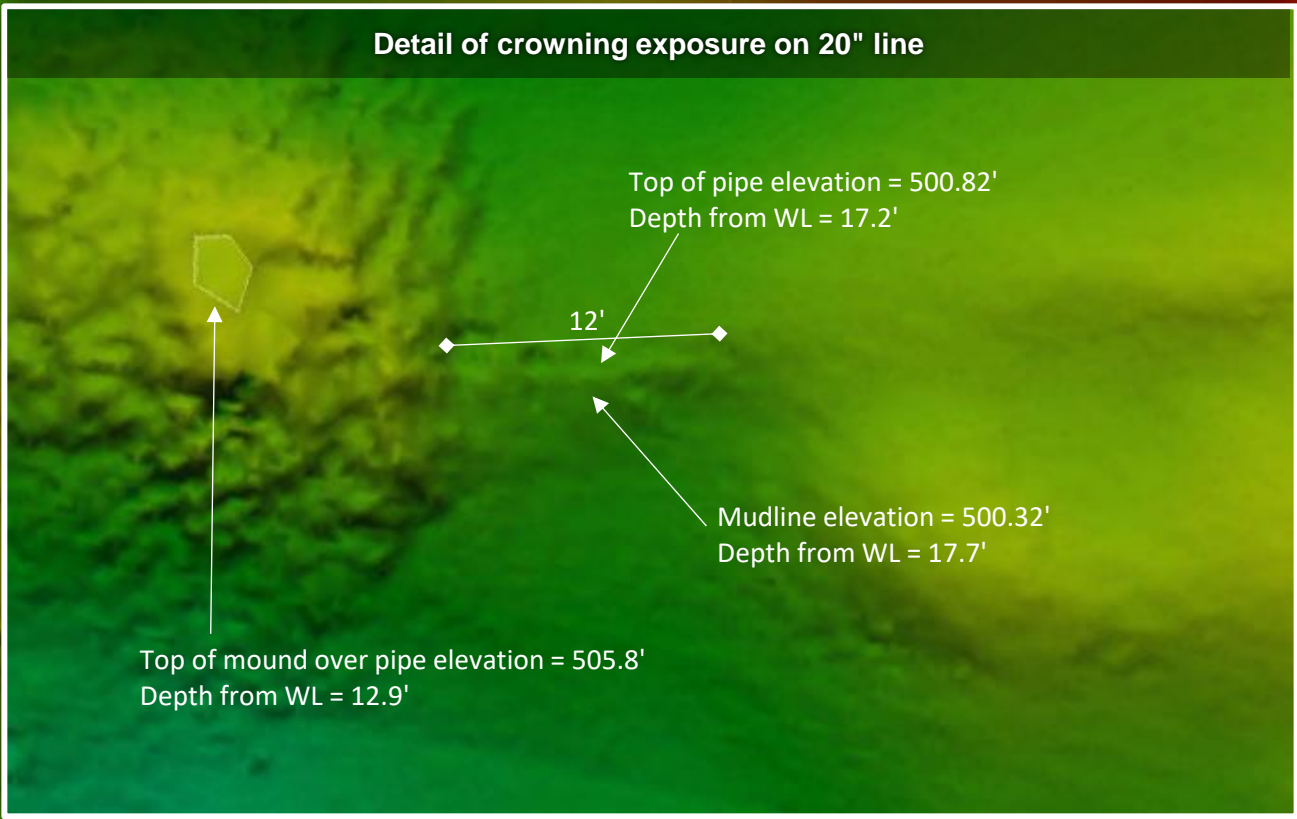
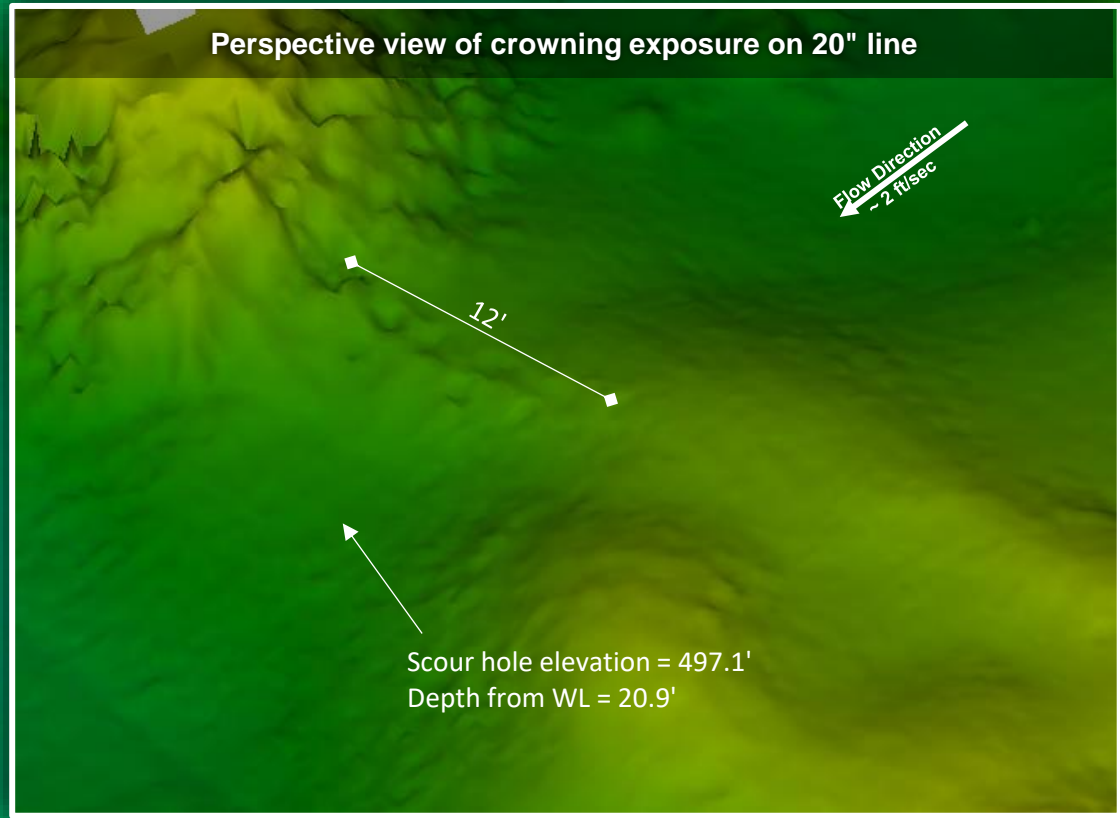
Carrollton-East Fort Madison (20")

Flow Direction
~ 2 ft/sec

Detail of spanning exposure on spare line (See MB sheet Pg 4)

Detail of scouring around 20" line (See MB sheet Pg 3)

Detail of crowning exposure on 20" line (See MB sheet Pg 2)



Carrollton-East Fort Madison
(20")

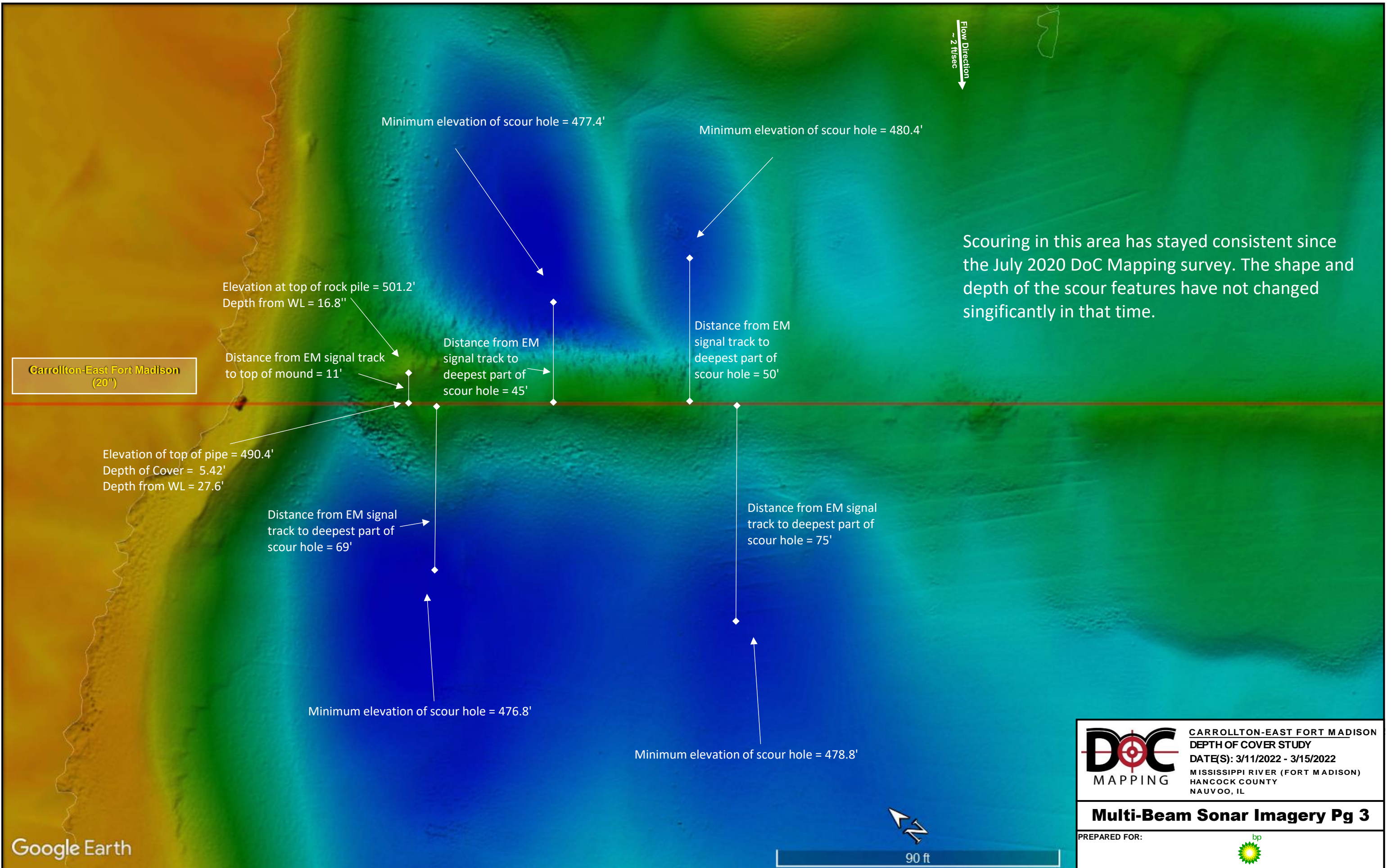




Flow Direction
= 2 ft/sec

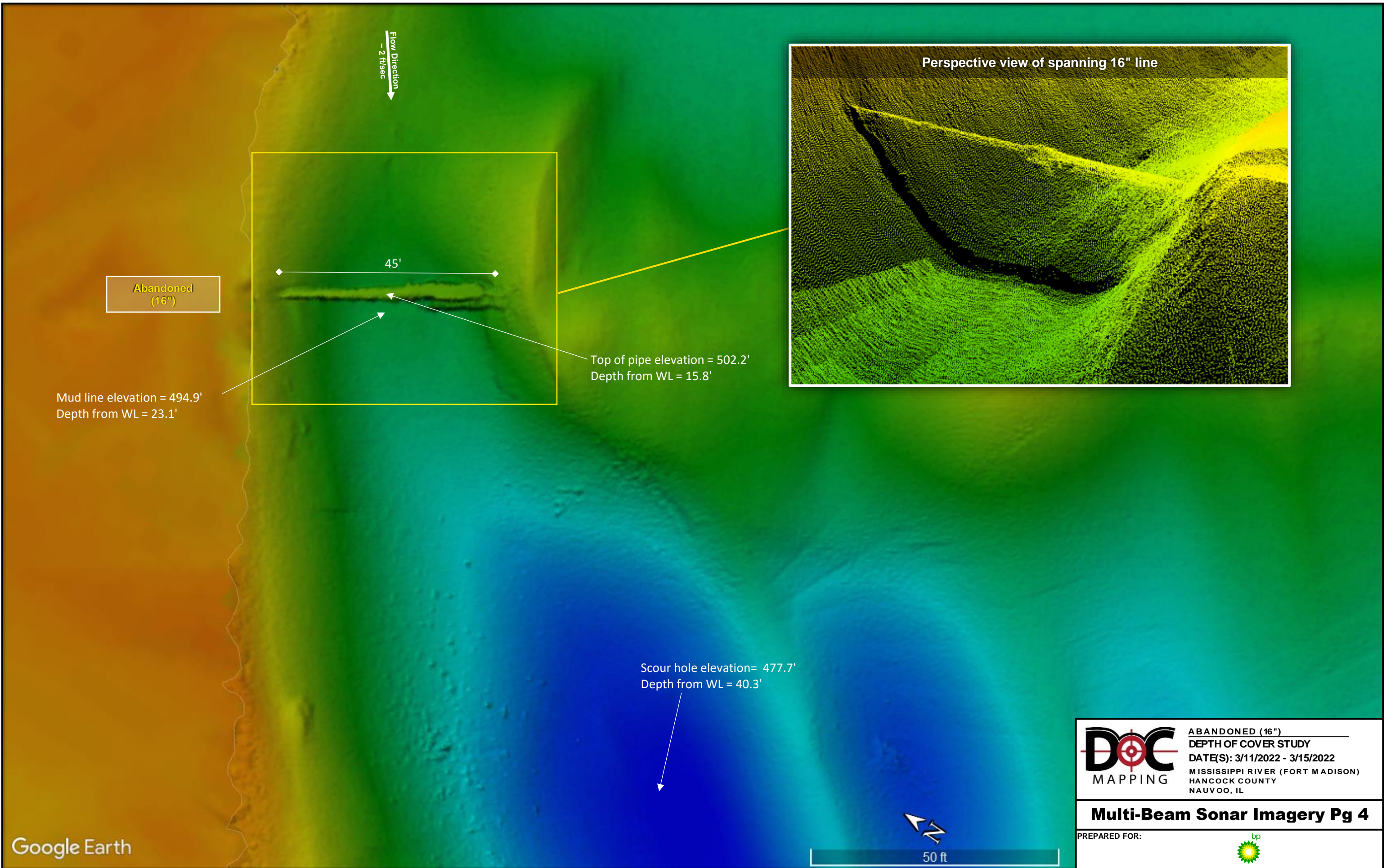



60 ft

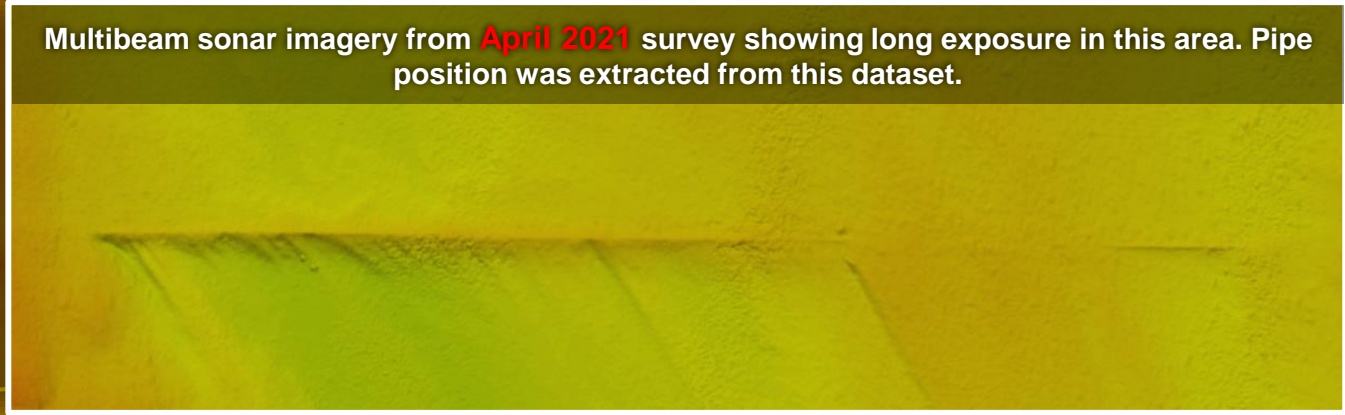
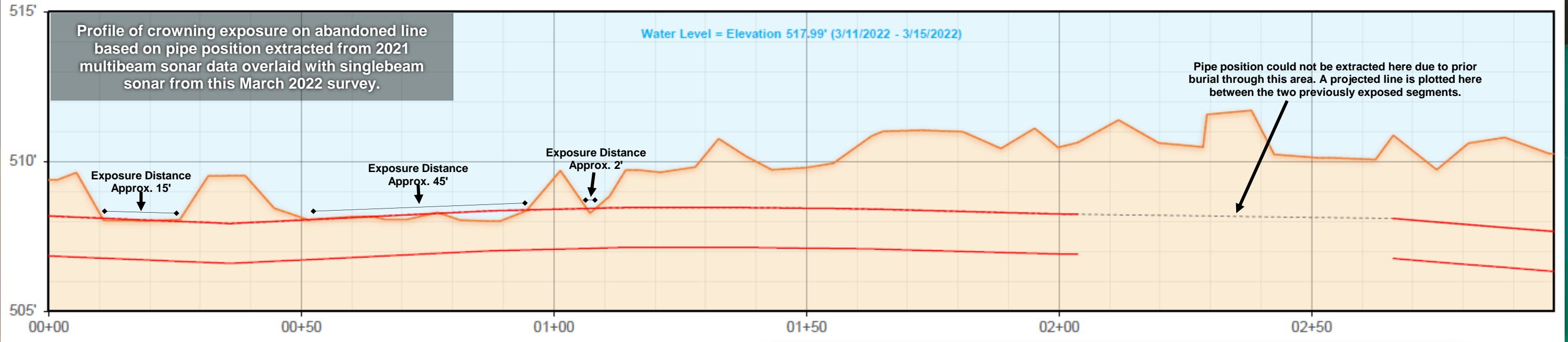




	CARROLLTON-EAST FORT MADISON DEPTH OF COVER STUDY DATE(S): 3/11/2022 - 3/15/2022 MISSISSIPPI RIVER (FORT MADISON) HANCOCK COUNTY NAUVOO, IL
	Multi-Beam Sonar Imagery Pg 3
PREPARED FOR:	



DOC MAPPING	ABANDONED (16")
	DEPTH OF COVER STUDY
	DATE(S): 3/11/2022 - 3/15/2022
	MISSISSIPPI RIVER (FORT MADISON)
	HANCOCK COUNTY
	NAUVOO, IL
Multi-Beam Sonar Imagery Pg 4	
PREPARED FOR:	



Abandoned (16")

Flow Direction
~ 2 ft/sec

DOC MAPPING

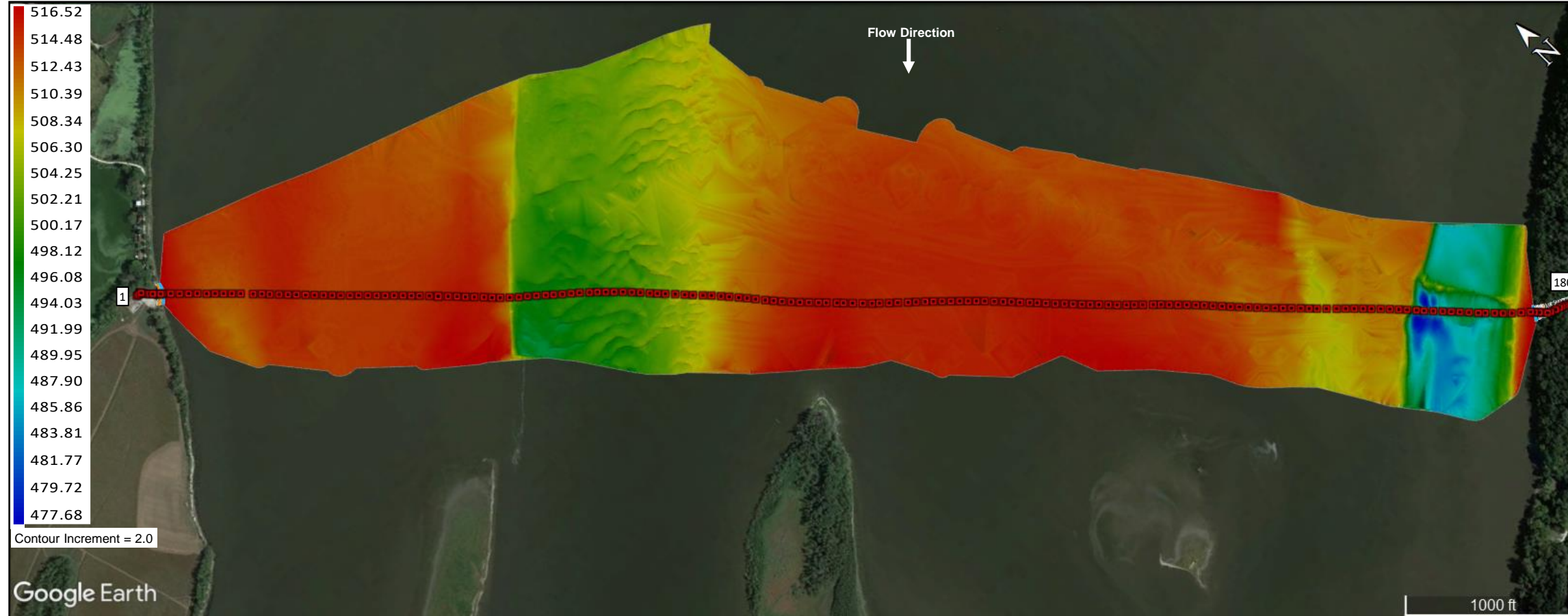
ABANDONED (16")
DEPTH OF COVER STUDY
DATE(S): 3/11/2022 - 3/15/2022
MISSISSIPPI RIVER (FORT MADISON)
HANCOCK COUNTY
NAUVOO, IL

Multi-Beam Sonar Imagery Pg 5

PREPARED FOR:



PLAN VIEW

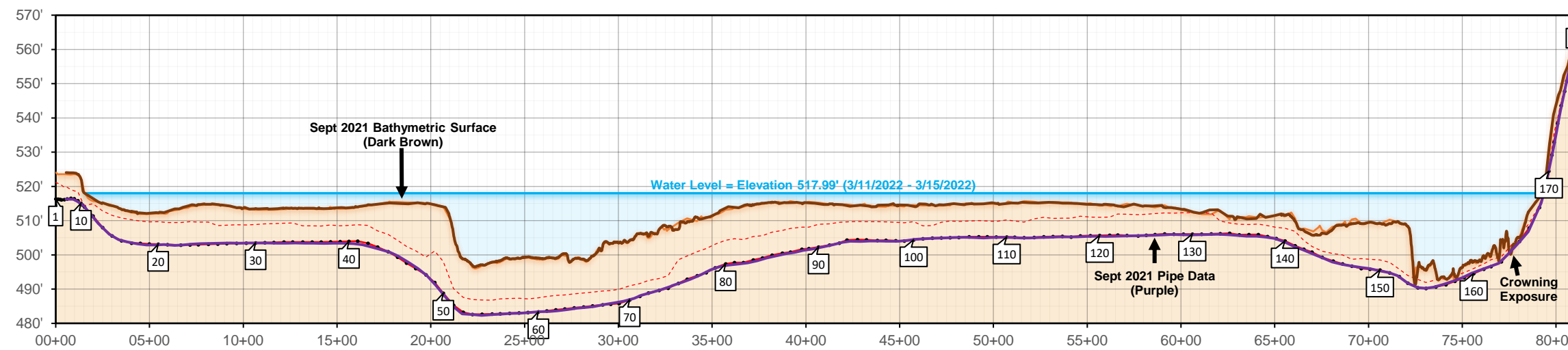


DoC DATA

Pt. ID	STA#	Latitude	Longitude	Topo Elev. (ft)	T.O.P. Elev. (ft)	DoC (ft)	MS DoC* (ft)
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Due to a high number of pipeline depth of cover points in this crossing, all point data can be referenced within the provided Excel spreadsheet for this particular line.

PROFILE VIEW



Land Data
Underwater Data
Italics = Projected topo or bathymetric points and DoC / MSDoC

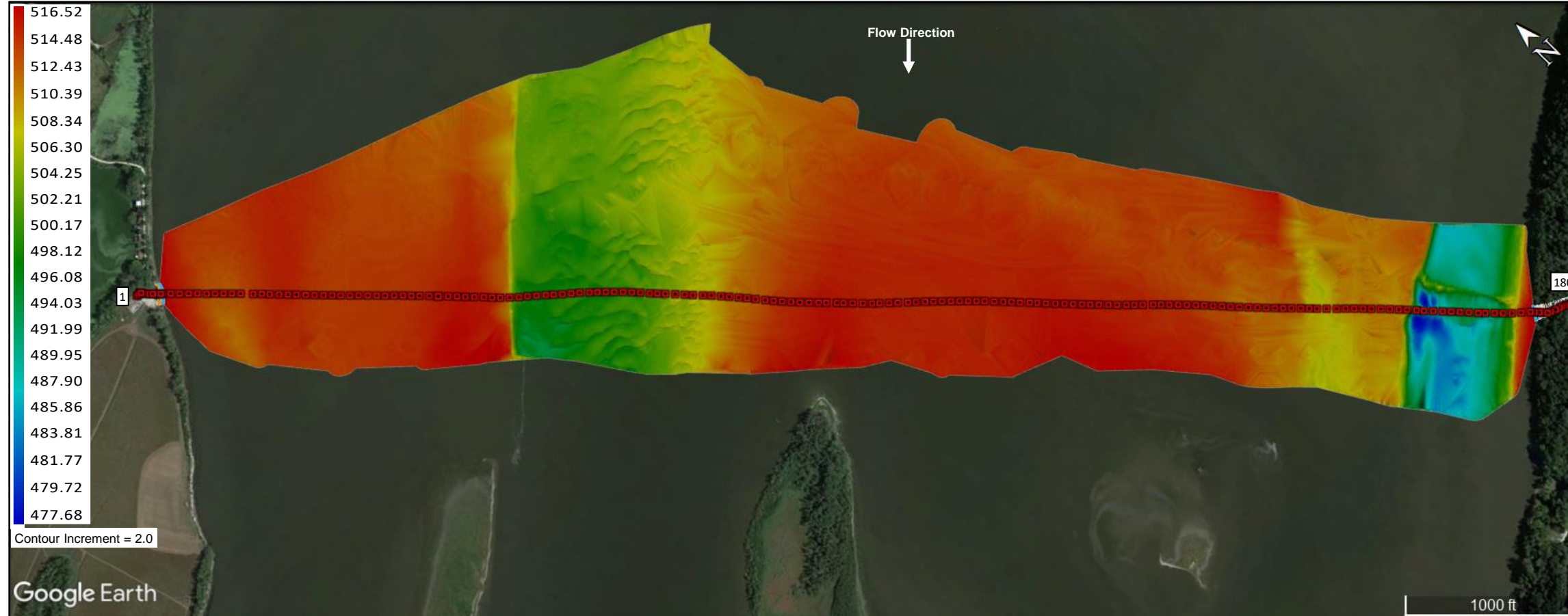
LEGEND	DEFINITIONS	GEODETIC SETTINGS	PLOT NOTES	CONTROL POINT VERIFICATION			
<ul style="list-style-type: none"> Water Level Topo / Bathymetry Projected Topo / Bathymetry +VSDV T.O.P. Point No Data (obstruction, loss of signal) Overlaid Data (if applicable) 	<p>DoC - Depth of Cover</p> <p>T.O.P. - Top of Pipe (or Cable, Conduit, etc.)</p> <p>+VSDV - Positive aspect of vertical confidence level. Represents a 95% likelihood that the true position of the target lies deeper than this point.</p> <p>MSDoC* - Minimum Statistical Depth of Cover. This reflects the measured distance from the +VSDV component to the Topo / Bathymetry line.</p>	<p>NAD83 - Iowa South 1402 NAVD88-GEOID12B (Conus) Units = sft</p> <p>RTK corrections provided by DoC Mapping base station w/ OPUS post-processing.</p>	<p>Data from the Sept. 2021 DoC Mapping Survey is overlaid above to show a comparison with this most recent survey data. There were no significant changes noted between the two surveys.</p>	<p>CONTROL POINTS WERE ESTABLISHED AND/OR REFERENCED BY DoC MAPPING TO ADJUST FOR HORIZONTAL AND VERTICAL VARIANCE DURING THE TIME OF THIS SURVEY. INFORMATION FOR THE CONTROL POINTS BELOW:</p> <table border="0"> <tr> <td>ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513</td> <td>ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886</td> <td>ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580</td> </tr> </table> <p>PLEASE REFER TO THE "CONTROL POINT VERIFICATION SHEET" FOR MORE DETAILS ON THE CONTROL POINT(S) AND DoC MAPPING'S OBSERVATIONS.</p>	ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513	ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886	ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580
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CARROLLTON-EAST FORT MADISON (20")
DEPTH OF COVER STUDY
DATE(S): 3/11/2022 - 3/15/2022
MISSISSIPPI RIVER (FORT MADISON)
HANCOCK COUNTY
NAUVOO, IL

PRIOR SURVEY COMPARISON (9/15/21)

PREPARED FOR:

PLAN VIEW

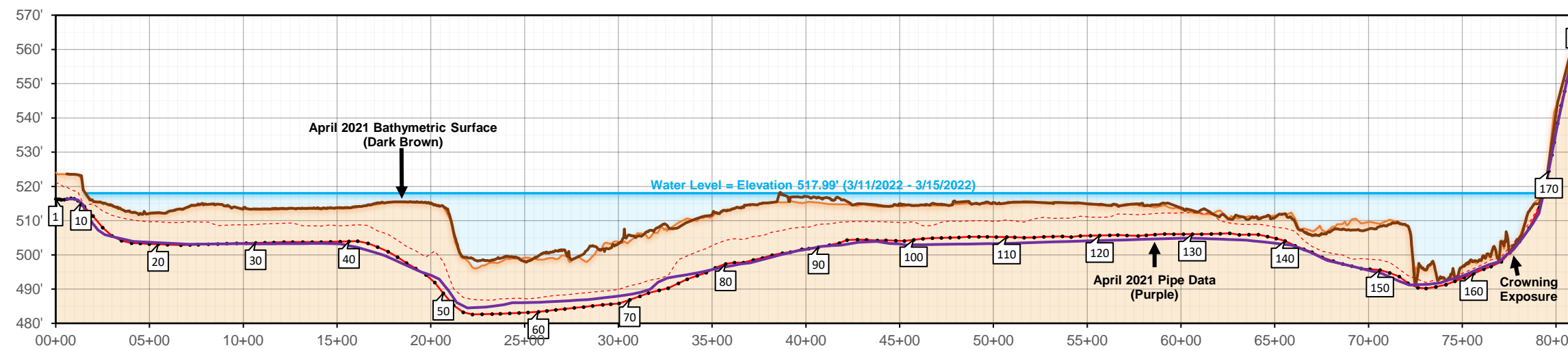


DoC DATA

Pt. ID	STA#	Latitude	Longitude	Topo Elev. (ft)	T.O.P. Elev. (ft)	DoC (ft)	MS DoC* (ft)
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Due to a high number of pipeline depth of cover points in this crossing, all point data can be referenced within the provided Excel spreadsheet for this particular line.

PROFILE VIEW



Land Data
Underwater Data
Italics = Projected topo or bathymetric points and DoC / MSDoC

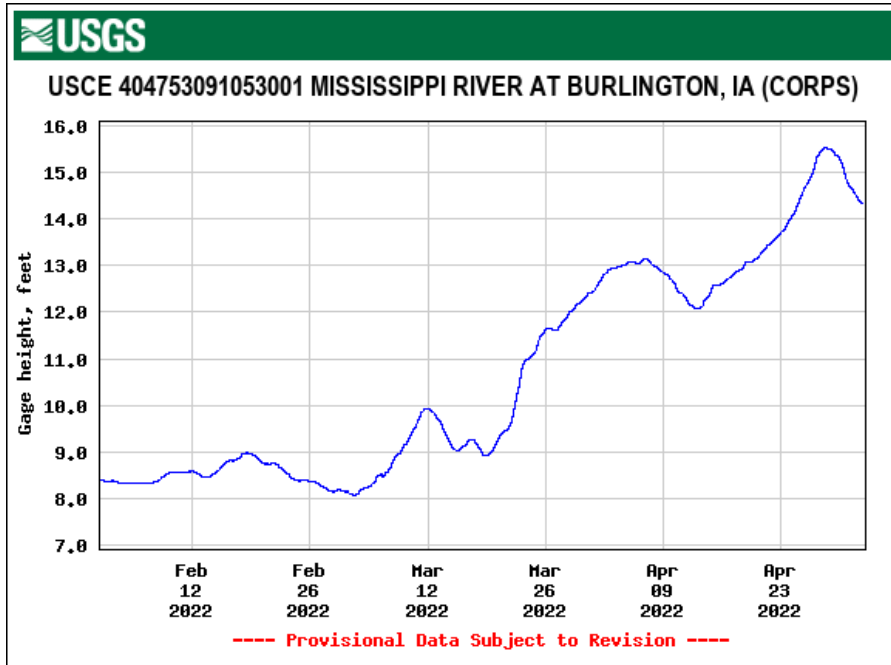
LEGEND	DEFINITIONS	GEODETIC SETTINGS	PLOT NOTES	CONTROL POINT VERIFICATION			
<ul style="list-style-type: none"> Water Level Topo / Bathymetry Projected Topo / Bathymetry +VSDV T.O.P. Point No Data (obstruction, loss of signal) Overlaid Data (if applicable) 	<p>DoC - Depth of Cover</p> <p>T.O.P. - Top of Pipe (or Cable, Conduit, etc.)</p> <p>+VSDV - Positive aspect of vertical confidence level. Represents a 95% likelihood that the true position of the target lies deeper than this point.</p> <p>MSDoC* - Minimum Statistical Depth of Cover. This reflects the measured distance from the +VSDV component to the Topo / Bathymetry line.</p>	<p>NAD83 - Iowa South 1402 NAVD88-GEOID12B (Conus) Units = sft</p> <p>RTK corrections provided by DoC Mapping base station w/ OPUS post-processing.</p>	<p>Data from the April 2021 DoC Mapping Survey is overlaid above to show a comparison with this most recent survey data. There were no significant changes noted between the two surveys.</p>	<p>CONTROL POINTS WERE ESTABLISHED AND/OR REFERENCED BY DoC MAPPING TO ADJUST FOR HORIZONTAL AND VERTICAL VARIANCE DURING THE TIME OF THIS SURVEY. INFORMATION FOR THE CONTROL POINTS BELOW:</p> <table border="0"> <tr> <td>ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513</td> <td>ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886</td> <td>ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580</td> </tr> </table> <p>PLEASE REFER TO THE "CONTROL POINT VERIFICATION SHEET" FOR MORE DETAILS ON THE CONTROL POINT(S) AND DoC MAPPING'S OBSERVATIONS.</p>	ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513	ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886	ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580
ID: OPUS E: 2234373.881 N: 230703.899 EL: 523.513	ID: CO1 E: 2234348.512 N: 230687.785 EL: 522.886	ID: CO2 E: 2234449.933 N: 230662.585 EL: 522.580					

CARROLLTON-EAST FORT MADISON (20")
DEPTH OF COVER STUDY
DATE(S): 3/11/2022 - 3/15/2022
 MISSISSIPPI RIVER (FORT MADISON)
 HANCOCK COUNTY
 NAUVOO, IL

PRIOR SURVEY COMPARISON (4/7/21)

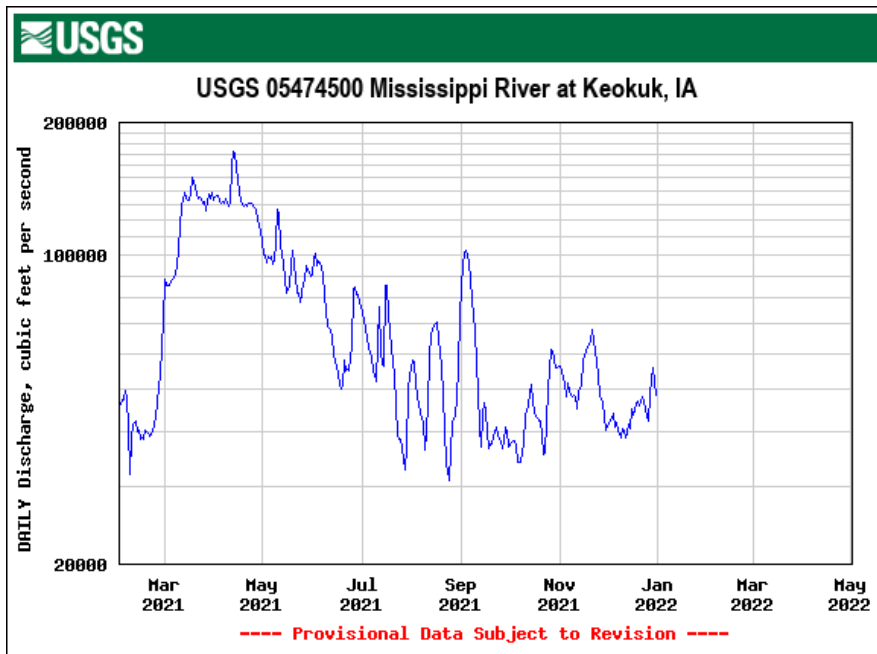
PREPARED FOR:

Upstream River Gauge Information:



https://waterdata.usgs.gov/nwis/uv/?ts_id=205944&format=img_default&site_no=404753091053001&set_arithscale_y=on&begin_date=20220201&end_date=20220502&agency_cd=USCE

Downstream River Gauge Information:



https://waterdata.usgs.gov/ia/nwis/dv/?ts_id=224327&format=img_default&site_no=05474500&begin_date=20210201&end_date=20220501

Appendix B

Control Point Verification Sheet

Job: Mississippi River (Fort Madison) - Carrollton-East Fort Madison (20in)

Client: BP

Survey Date(s): 3/11/2022 - 3/12/2022 & 3/14/2022 - 3/15/2022

DoC Mapping's Geodetic Settings

Horizontal Datum & Zone: NAD83 - Iowa South 1402

Geoid: NAVD88-GEOID12B (Conus)

Units: sft

Control Point Notes:

DoC Mapping established an OPUS control point ("OPUS") near the crossing site and using this point, established 2 additional control points ("CO1" & "CO2") in 2 different locations near the crossing site. These controls were referenced for base station setup during the time of this survey. See following page for the NGS OPUS Solution Report. The coordinates and elevations for these control points are as follows:

OPUS: Established on 3/11/2022

Easting	Northing	Elevation
2234373.881	230703.899	523.513

CO1: Established on 3/11/2022

Easting	Northing	Elevation
2234348.512	230687.785	522.886

CO2: Established on 3/11/2022

Easting	Northing	Elevation
2234449.933	230662.585	522.580

FILE: 03_0_11032022_225210.22o OP1649696472072

NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: <https://www.ngs.noaa.gov/OPUS/about.jsp#accuracy>

USER: madeleine.mullins@docmapping.com DATE: April 11, 2022
RINEX FILE: 03_0070o.22o TIME: 17:04:40 UTC

SOFTWARE: page5 2008.25 [master257.pl](#) 16032 START: 2022/03/11 14:52:00
EPHEMERIS: igs22005.eph [precise] STOP: 2022/03/11 21:06:00
NAV FILE: brdc0700.22n OBS USED: 13862 / 15525 : 89%
ANT NAME: HEMS321 NONE # FIXED AMB: 100 / 109 : 92%
ARP HEIGHT: 1.7336 OVERALL RMS: 0.018(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2022.1911)

X:	-115122.810(m)	0.035(m)	-115123.751(m)	0.035(m)
Y:	-4847392.809(m)	0.014(m)	-4847391.444(m)	0.014(m)
Z:	4129990.280(m)	0.016(m)	4129990.179(m)	0.016(m)

LAT:	40 36 47.42269	0.021(m)	40 36 47.44854	0.021(m)
E LON:	268 38 22.24939	0.035(m)	268 38 22.20799	0.035(m)
W LON:	91 21 37.75061	0.035(m)	91 21 37.79201	0.035(m)
EL HGT:	126.252(m)	0.002(m)	125.167(m)	0.002(m)
ORTHO HGT:	159.567(m)	0.058(m)	[NAVD88 (Computed using GEOID18)]	

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 15)	SPC (1402 IA S)
Northing (Y) [meters]	4497108.920	70318.689
Easting (X) [meters]	638691.521	681038.521
Convergence [degrees]	1.06740833	1.40930000
Point Scale	0.99983677	1.00000062
Combined Factor	0.99981697	0.99998082

US NATIONAL GRID DESIGNATOR: 15TXE3869297109(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DQ9780	IABF IABF BLOOMFIELDIA CORS ARP	N404421.299	W0922435.211	89812.5
DP1316	IADO IADT DONNELLSON CORS ARP	N403848.982	W0913357.389	17782.7
DP1251	IAWN IADT WASHINGTON CORS ARP	N411834.120	W0914044.748	81848.0

NEAREST NGS PUBLISHED CONTROL POINT

LD0470	7A	N4037000047	W09118000051	4335.3
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.