APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): June 25, 2013

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: St. Louis District; Winter Brothers Material Co. Eureka Site; MVS-2012-680
This AJD pertains to Tributary 2; abutting Wetlands 2, 3, and 9; and adjacent Wetland 4: 2012-680-002-SNR_Tributary 2, Wetland 2, Wetland 3, Wetland 9, Wetland 4

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State: Missouri County/parish/borough: St. Louis County City: Eureka
Center coordinates of site (lat/long in degree decimal format): Lat. 38.4992° **N**, Long. -90.5973° **W**.
Universal Transverse Mercator: 15
Name of nearest waterbody: Tributary 1 / Meramec River
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Meramec River
Name of watershed or Hydrologic Unit Code (HUC): 7140102
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☒ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☒ Office (Desk) Determination. Date: June 25, 2013
☒ Field Determination. Date(s): February 1, 2013; April 5, 2013

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☒ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: The St. Louis District has determined that the Meramec River is a TNW from Mile 0 to Mile 49 at Pacific, MO; located 1.5 miles downstream of the Highway F bridge.

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☒ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☒ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☒ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: 1,165 linear feet: 2 width (ft) and/or 0.05 acres. Tributary 2
      Wetlands: 3.55 acres. Wetland 2 = 0.19 ac.; Wetland 3 = 3.0 ac.; Wetland 4 = 0.02 ac.; Wetland 9 = 0.34 ac.

   c. **Limits (boundaries) of jurisdiction** based on: **Established by OHWM. And 1987 Manual w/ Midwest Regional Supplement**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: **Meramec River**.

Summarize rationale supporting determination: The St. Louis District has determined that the Meramec River is a TNW from Mile 0 to Mile 49 at Pacific, MO; located 1.5 miles downstream of the Highway F bridge.

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: 2,150 **square miles** Meramec watershed 07140102
Drainage area: ~100 **acres** Best estimate; drainage area includes relatively flat floodplain w/ little or no contour lines; also, area has been significantly borrowed from, which does not appear to be accurately shown on USGS, and affects drainage dynamic
Average annual rainfall: 40 inches
Average annual snowfall: 18 inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☒ Tributary flows through **2** tributaries before entering TNW. Tributary 2 flows to Tributary 1 before entering the Meramec River

Project waters are **1 (or less)** river miles from TNW.

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Project waters are **Pick List** river miles from RPW. Tributary 1 does not enter an RPW
Project waters are **1 (or less)** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW. Tributary 1 does not enter an RPW
Project waters cross or serve as state boundaries. Explain: The relevant reach water is intrastate.
Identify flow route to TNW[5]: Tributary 2 flows into Tributary 1, near the confluence of Tributary 1 with the Meramec River.
Tributary stream order, if known: First order.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☒ Manipulated (man-altered). Explain: Tributary 2 is located within an area in which widespread borrow is presumed to have occurred. Therefore, Tributary 2 may have been created intentionally or unintentionally as part of the alteration of this area and its effects on site drainage.

Tributary properties with respect to top of bank (estimate):
Average width: Varies greatly through length. Near confluence with Tributary1, estimated 25 feet at TOB. Upstream of existing culvert, width at TOB estimated 15 feet and diminishes rapidly to 5 feet or less.
Average depth: 10-15 feet at confluence, 4 to 2 feet upstream of existing culvert.
Average side slopes: 2:1.

Primary tributary substrate composition (check all that apply):

☒ Silts	☐ Sands	☐ Concrete
☐ Cobbles	☒ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain: .		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: Relatively stable, with some areas of scour and sloughing at downstream end, along outside banks of meanders.
Presence of run/riffle/pool complexes. No Explain:
Tributary geometry: **Relatively straight** Meanders present downstream of existing culvert, near confluence. However, majority of tributary is straight, ditch-like.
Tributary gradient (approximate average slope): <1 percent slope based on USGS contours

(c) Flow:

Tributary provides for: Ephemeral flow
Estimate average number of flow events in review area/year: 11-20
Describe flow regime: Subject to runoff from the agricultural field to the east. Also receives drainage from the adjacent, mature pin oak timber stand located to the west. (West of the more open, cedar/oak savannah area immediately adjacent and west of Tributary 2). The pin oak timber stand to the west was likely entirely a former wetland. However, the cedar/savannah area immediately west of Tributary 2 has been cut down an estimated 4 to 6 feet in elevation. Conditions at the site indicate that this change in elevation likely results in both runoff and groundwater moving from the higher pin oak timber stand, through the cedar/savannah area, to Tributary 2. The very downstream end of Tributary 2 may also be subject to backwater influence from Meramec River.
Other information on duration and volume: .

Surface flow is: Confined. Characteristics: Tributary may overtop during periods of high discharge; lower end appears confined by banks.

Subsurface flow: **Unknown**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☒ Bed and banks
☒ OHWM[6] (check all indicators that apply):

☒ clear, natural line impressed on the bank	☒ the presence of litter and debris
☒ changes in the character of soil	☐ destruction of terrestrial vegetation
☐ shelving	☐ the presence of wrack line
☒ vegetation matted down, bent, or absent	☐ sediment sorting
☒ leaf litter disturbed or washed away	☒ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

☐ other (list):
☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☒ High Tide Line indicated by:
- ☐ oil or scum line along shore objects
- ☐ fine shell or debris deposits (foreshore)
- ☐ physical markings/characteristics
- ☐ tidal gauges
- ☐ other (list):

☒ Mean High Water Mark indicated by:
- ☐ survey to available datum;
- ☐ physical markings;
- ☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain: No chemical characteristics were observed during the field review. The watershed is a mix of forested hill slopes, and agricultural fields. The agricultural fields indicate a potential for the contribution of agrichemicals such as fertilizer nutrients and pesticides. Its receiving waterbody, the Meramec River, is listed on the 2010 303(d) list for bacteria and lead.

Identify specific pollutants, if known:.

(iv) Biological Characteristics. Channel supports (check all that apply):

☒ Riparian corridor. Characteristics (type, average width): Narrow line of trees on either bank, generally no greater than a single tree canopy in width, along downstream end (~600 LF). Remainder is bordered by open, savannah-like stand of trees on RD side.

☒ Wetland fringe. Characteristics: Tributary 2 originates from Wetland 2, a 0.19-acre emergent wetland.

☒ Habitat for:
- ☐ Federally Listed species. Explain findings: .
- ☐ Fish/spawn areas. Explain findings: .
- ☐ Other environmentally-sensitive species. Explain findings: .
- ☒ Aquatic/wildlife diversity. Explain findings: Nominal function as habitat. Lower end likely used as travel corridor for terrestrial wildlife, between the forested corridor of the Meramec River and the forested areas in the northern part of the site. May also provide corridor for aquatic species such as amphibians and reptiles, between the Meramec River and Wetlands 2, 3, 4 and 9. The downstream end of Tributary 2 may provide habitat for riverine aquatic species during backwater events, but Tributary 2 is generally not believed to be a significant source of habitat for fish and other riverine species.

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: 3.55 acres Wetland 2 = 0.19 ac.; Wetland 3 = 3.0 ac.; Wetland 4 = 0.02 ac.; Wetland 9 = 0.34 ac.

Wetland type. Explain: Wetland 2 is emergent; Wetlands 3,4 and 9 are forested.

Wetland quality. Explain: Wetland 2 is relatively low quality, and occurs in an area that may be disturbed through agricultural practices. Wetland 3 appears to have moderate quality and diversity. Wetland 3 appears to have formed as a result of past borrowing activity and drainage manipulation within the site. Wetlands 4 and 9 are remnant features that occur in what appears to be a former high-quality bottomland hardwood forested wetland. The borrowing activity that is presumed to have occurred east of the bottomland hardwood, appears to have resulted in the loss of hydrology from the overall forested wetland area. Wetlands 4 and 9 are respectively depressional and ditch-like features that have maintained hydrology in the otherwise converted wetland. Wetland 9 may have been artificially created in the past, as its linear characteristics may indicate that it formerly served as a drainage ditch.

Project wetlands cross or serve as state boundaries. Explain:.

(b) General Flow Relationship with Non-TNW:

Flow is: **Ephemeral flow**. Explain: Wetland 2 and 3 drain directly into Tributary 2, which appears to be an ephemeral tributary. Wetland 9 does not exhibit a direct surface hydrologic connection to Tributary 2 or its abutting wetlands, but is adjacent and nearby. Wetland 9 likely exchanges hydrology with Tributary 2 from surface overland flow and/or groundwater exchange. Wetland 4 is adjacent to Tributary 2 and its abutting wetlands, but is more remote. Wetlands 2 and 3, as well as Tributary 2, appear to be fed by subsurface hydrology draining from the pin oak forested area in which Wetlands 4 and 9 are located. The hydrologic exchange appears to be due to the fact that the area in which Wetlands 2 and 3 occur has presumably been borrowed several feet below the elevation of the pin oak forest.

Surface flow is**: Discrete and confined**

Characteristics: See description above in "General Flow Relationship". Surface flow appears to be a combination of

[7]Ibid.

groundwater seepage into and through depressional areas, as well as through ditch-like connections to Tributary 2.

Subsurface flow: **Yes**. Explain findings: See description above in "General Flow Relationship". Forested/savannah area in which Wetlands 2 and 3 occur appears to be draining hydrology from former pin oak, bottomland hardwood forested wetland in which Wetlands 4 and 9 occur. Hydrology appears to move as seepage from the pin oak forest at a higher elevation, to the forested/savannah area which has presumably been cut to a lower elevation.

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

☒ Directly abutting Wetlands 2 and 3 are directly abutting Tributary 2. Tributary 2 originates at Wetland 2. Wetland 3 gathers hydrology throughout the forested/savannah area in which borrow activity is presumed to have occurred, but eventually drains directly to Tributary 2 through narrow, ditch-like drainageways.

☒ Not directly abutting Wetlands 4 and 9 are adjacent. See description in 2 (i)(b).

☒ Discrete wetland hydrologic connection. Explain: See remarks above for 2 (i)(b).

☒ Ecological connection. Explain: Wetlands 4 and 9 occur in an apparent former high-quality hardwood forested wetland that abuts the open woods/savannah area in which Wetlands 2 and 3 occur. The proximity of Wetlands 4 and 9 to Wetlands 2 and 3, which have a direct hydrologic connection to Tributary 2 and downstream waters, reasonably allows them to serve as additional habitat for mammalian, reptilian/amphibian, and avian species utilizing the latter connected wetlands. Additionally, the wetlands all occur within a more or less contiguous habitat area. The wetland functions associated with Wetland 2 and 3 (such as nutrient capture, runoff and overflow storage, etc.) likely affect the chemical and physical characteristics of Tributary 2. The overall hydrology of the Wetlands 2,3/Tributary 2 complex appears to be derived in large part from drainage seeping from the area in which Wetlands 4 and 9 occur.

☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **1 (or less)** river miles from TNW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Flow is from: **Wetland to navigable waters**.
Estimate approximate location of wetland as within the **100 - 500-year** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: No chemical characteristics for the water within Wetland 1 have been documented. However, Wetland 2 occurs immediately adjacent to a large agricultural field used for row-crop production. Therefore, the wetland is likely subject to hydrologic introduction of agrichemicals such as fertilizers, herbicides and pesticides. The entire review area is within approximately 1,000 feet of the Interstate 44 corridor. Therefore, there may be some introduction of petrochemicals and salt from roadway runoff.

Identify specific pollutants, if known:.

(iii) Biological Characteristics. Wetland supports (check all that apply):

☐ Riparian buffer. Characteristics (type, average width): .

☒ Vegetation type/percent cover. Explain: Emergent vegetation including *Carex* and *Cyperus* spp., *Xanthium* sp., and others. Percent vegetative coverage within Wetland 1 varies widely from year to year depending upon seasonal hydrology. In aerial photos, during years with wet seasonal hydrology, large portions of Wetland 1 appear to exhibit vegetative suppression due to inundation. During years with dry seasonal hydrology, Wetland 1 appears to be almost entirely vegetated, with a verdant appearance distinguishing it from its non-wetland adjacent areas.

☒ Habitat for:

☐ Federally Listed species. Explain findings: .

☐ Fish/spawn areas. Explain findings: .

☐ Other environmentally-sensitive species. Explain findings: .

☒ Aquatic/wildlife diversity. Explain findings: The position of Wetlands 2,3,4 and 9 within the undeveloped Meramic River floodplain, as well as their setting within forested areas adjacent to the Meramec's forested corridor, indicate a likelihood for utilization by wildife. Deer and turkey occur within the project area, and portions of the wetland areas appear suitable for use by wading bird species that are likely found along the Meramec River. The hydrology of Wetlands 2 and 3 and connectivity to drainage patterns within the site also indicate a potential for utilization by amphibian species. Wetlands 4 and 9 appear to be suitable for amphibians that utilize vernal forest settings, such as some salamanders and frogs of the Hylidae and Microhylidae families.

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **4**
Approximately (3.55) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Wetland 2 abuts	0.19	Wetland 3 abuts	3.0
Wetland 4 is not abutting	0.02	Wetland 9 is not abutting	0.34

Summarize overall biological, chemical and physical functions being performed: Wetlands 2 and 3 are abutting Tributary 2, which has a direct hydrologic connection to the Meramec River. In addition to their hydrologic input to downstream waterbodies, these wetlands likely provide habitat for mammalian, reptilian/amphibian, and avian species utilizing the Meramec River floodplain and forested corridor. Wetlands 4 and 9 are not directly abutting and have not surface hydrologic connection, but are reasonably proximal and occur within a generally contiguous habitat area, such that their ecological functions are determined to be equivalent to the connected Wetlands 2 and 3.

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Tributary 2 is a non-Relatively Permanent Flow water (RPW) that possesses features of an ephemeral tributary with defined bed and bank, and an ordinary high water mark (OHW). The total drainage area of the tributary is estimated to be approximately 100 acres. The channel is fed from a series of hydrologically-connected wetland depressions and swales, which form Wetland 3. Additionally, Tributary 2 receives runoff from the adjacent field to the east, originating in an emergent wetland (Wetland 2) that appears to be part of the field. Much of the hydrology of Tributary 2 appears to be derived from groundwater seepage from an apparent former high-quality forested wetland located to the west. The hydrology from the former pin oak dominated wetland appears to be draining into the Wetland 3 complex via seepage, as a result of borrow activity east of the pin oak forest. The borrow activity is presumed to be associated with the construction of nearby Interstate 44. As hydrology from the higher elevation, former pin oak forest is drained via sub-surface flow into the lower-elevation Wetland 3 complex, it emerges as surface hydrology. This hydrology is then carried directly to Tributary 2. At the start of Tributary 2, its width averages approximately 2 feet at the OHW and 2 to 5 feet at the top-of-bank. At the downstream end of Tributary 2, its width averages approximately 5 feet at the OHW and 25 feet at the top-of-bank. The channel is incised approximately 2 feet at its upstream jurisdictional beginning, and 10-15 feet at its downstream end. The OHW was observed to be approximately 0.5 feet at the upstream end, and 1.5 feet at its downstream end. Features observed supporting clear evidence of flow and an OHW throughout the entire channel include: scour, leaf litter washed away, angular definition between bed and bank, and a clear line impressed upon the bank. Based on observed characteristics and its location within the Meramec River watershed, on-site Tributary 2 is considered to be a first order stream. We observed that Tributary 2 has the capacity to carry surface flow hydrology via a confined channel to a primary tributary to the Meramec River (Tributary 1). At the confluence point between Tributary 1 and the Meramec River, the Meramec River has been designated as a Traditional Navigable Waterway (TNW) by the St. Louis District. Since Tributary 2 maintains hydrologic connectivity to the Meramec River, a significant nexus has been established between the non-RPW and a TNW. Hydrologic connectivity refers to the flow that transports organic matter and nutrients, energy, and/or aquatic organisms throughout the system (Freeman et al., 2006). The following outlines how the non-RPW Tributary 2 and its associated Wetlands 2,3,4 and9 maintain a significant nexus through hydrologic and/or ecologic connectivity to the Meramec River, a TNW.

Tributary 2 contributes to the chemical and physical make-up of the Meramec River, through its ability to convey sediments and attached nutrients during hydrologic pulses generated by precipitation events. As previously described, the on-site channel is enveloped in a narrow wooded corridor in its downstream end, and is bordered by an open woods on its upstream end. Partly because of this corridor, the channel appears relatively stable and allows for stable rates of sediment transport. The drainage area of Tributary 2 contains agricultural area. Runoff from agricultural areas is typically subject to contamination at some level from nutrients from fertilizers, as well as agrichemicals such as herbicides and pesticides. Tributary 2 is believed to transmit these substances, therefore affecting the Meramec River with increased levels of non-point source pollutant loads. Conversely, Wetland 2 may offset these effects by capturing and uptaking nutrients, or preventing transport by storing surface runoff. Storage of run-off within Wetland 2may also influence the hydrologic characteristics of the Meramec River. The drainage area of Tributary 2 also contains the Interstate 44 corridor. Roadways are a source for contaminants such as petro-chemicals and road salts. The dynamic of pollutant transmittal/buffering from this source is believed to occur between Tributary 2 and its associated wetlands, and the Meramec River.

The presence of the forested riparian corridor also suggests a continual source of organic input through transfer of leaf litter and coarse woody debris. Coarse particulate organic matter and fine particulate organic matter is transferred downstream, benefitting aquatic invertebrate populations. Additionally, particulate organic matter provides a food source for invertebrates functioning at the decomposer level. While the on-site channel does not appear to sustain benthic macroinvertebrate populations, the channel does contribute to the medium required for healthy invertebrate populations in downstream reaches. The diversity of aquatic fauna in headwater streams contributes to the biodiversity of the larger receiving waters (Meyer et al. 2007). Given the proximity of Tributary 2 to the Meramec River, its ability to carry organic particulates likely contributes directly to the biodiversity of the Meramec River.

The characteristics of headwater streams can have a direct impact on the physical and chemical properties of receiving waters in other ways unrelated to the direct input of nutrients or pollutants. The temperature of waters conducted through a stream system can have a direct effect on the health of aquatic ecosystems. Runoff collected from exposed surfaces such as agricultural fields can be elevated in temperature from solar heating. Exposed stream systems (those lacking a wooded canopy) can also experience elevated water temperatures due to solar heating. Stream systems with wooded canopy shade their water from the sun, allowing water temperatures to cool to ranges considered beneficial to aquatic ecosystems. Since on-site Tributary 2 possesses a wooded canopy in part, it likely contributes to the health and function of the Meramec River by lowering the temperature of water entering into it.

Lastly, headwater streams have been documented as providing necessary habitat for a variety of birds, mammals, reptiles, and amphibious populations. Because headwater streams have a small catchment, area, they are varied and maintain some of the most diverse habitats within a lotic system. Headwaters streams are utilized not only by species unique to headwaters streams, but are also used by animals requiring headwater streams for certain life stages and/or are utilized by animals that migrate between headwater environments and larger waters (Meyer et al. 2007). Tributary 2 may function periodically as a backwater of the Meramec River during high flow events, providing resting and foraging habitat during such events. The forested corridor of Tributary 2 is located between large tracts of forested upland areas to the west, and the forested corridor of the Meramec River to the east. Therefore, Tributary 2 and its corridor also likely function as a wildlife corridor between the two areas. These forested areas also contain Wetlands 3,4, and 9, which likely increase the diversity of habitat for species within the Meramec River floodplain.

The non-RPW Tributary 2 is considered primarily as an ephemeral stream flowing less than 1/2 mile prior to reaching the Meramec River, a TNW. Tributary 2 has the capacity to provide positive benefits to the Meramec River, as it is a segment partially enveloped in a wooded corridor. Tributary 2 contributes hydrology to downstream waters, carries sediments and other pollutants, provides habitat for aquatic life cycles, and provides organic input to downstream waters. Wetlands 2, 3, 4 and 9 are abutting and adjacent wetlands that likely affect Tributary 2 through hydrologic input and/or buffering, nutrient uptake and pollutant removal, and other physical and chemical processes. These wetlands also provide habitat diversity within the overall Meramec River floodplain. The functions of the wetlands; including chemical, physical, and ecological; affect not only Tributary 2, but downstream Tributary 1 and hence the Meramec River as well. Based on these hydrologic and ecologic connections, it has been determined that Tributary 2 and Wetlands 2, 3, 4 and 9 maintain a significant nexus to the Meramec River.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:.

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   ☒ TNWs: 14,175 linear feet 240 width (ft), Or, 80 acres.
   ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**

☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .

☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. Non-RPWs[8] that flow directly or indirectly into TNWs.

☒ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☒ Tributary waters: **1,165** linear feet **2** width (ft). Tributary 2
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.

☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.

☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.

☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: **3.55** acres.

7. Impoundments of jurisdictional waters.[9]

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .

[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters:. List type of aquatic resource:
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Hanson delineation report dated May 2013.
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☒ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☒ Data sheets prepared by the Corps: Stream description information form dated 2/1/2013.
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: MO-House Springs 1:24K Series (GIS).
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: USDA-NCSS Web Soil Survey.
☒ National wetlands inventory map(s). Cite name: GIS.
☐ State/Local wetland inventory map(s):.
☒ FEMA/FIRM maps: GIS.
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): GIS 2012; Google Earth various 1992-2012.
or ☒ Other (Name & Date): Hanson delineation report May 2013.
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☒ Other information (please specify): Site visits conducted February 1 and April 5, 2013.

B. ADDITIONAL COMMENTS TO SUPPORT JD: .