

KYTC - Division of Environmental Analysis
Section 404 and 401 Permit Application Preparation Guidelines

Revision 10-31-2013

All 17 items will be required for an LOP

All items except #'s 11 & 12 are required for an IP and NWPs

All items except for #'s 10-15 are required for WQC application

1. Cover Letter
2. Permit Application Form
 - a. Fill out the appropriate permit application for Section 401 Water Quality Certification and Section 404 Department of the Army Permit Application
 - b. Applicant = KYTC, Agent = permit coordinator for that district
3. Project Vicinity Map
 - a. Label map as (Item No.) Project Vicinity Map, including item number, brief description (e.g., US 150 reconstruction), county and lat/long in decimal degrees
 - b. The base layer should be a Kentucky highway map
 - c. The specific location of project area should be clearly identified
 - d. The map should show at least one readily identifiable metropolitan area such as Louisville, Lexington, Paducah, Pikeville, Ashland, etc. as a geographic reference point
 - e. Insert a smaller map of the state with the county of the project area highlighted.
4. Alignment Map
 - a. Label map as the Project Alignment Map, including item number, brief description (e.g., US 150 reconstruction), county and lat/long in decimal degrees, and 14-digit HUC(s)
 - b. The base layer should be a USGS 7.5-minute quadrangle topographic map
 - c. Overlay the alignment in a contrasting color
 - d. Overlay the HUC-14 boundaries in a contrasting color
 - e. Indicate the line color used to identify the alignment and HUC boundaries in a key at the bottom of the page. (see example application)
5. Impact Stations Map
 - a. Label map as the Project Impact Stations Map, including item number, brief description (e.g., US 150 reconstruction), county and lat/long in decimal degrees.
 - b. The base layer should be a USGS 7.5-minute quadrangle topographic map
 - c. Overlay the alignment with station numbers identifying where impacts occur.
 - d. Indicate the line color used to identify the alignment in a key at the bottom of the page.

6. Summary of Section 404 Impacts For a Letter Permission
 - a. All stream and wetland impact locations must be identified by station number.
 - b. In the case of a channel change or other impact extending across stations, use a range of station numbers as the identifier. (e.g., Station 120+00 – 124+30)
 - c. Include lat/long in decimal degrees, type of activity (e.g., fill, culvert placement, channel change) length of impact, area of impact, watershed size, flow regime, and stream name.
 - d. If the activity is spanning a stream with a bridge, with no impacts below the ordinary high water mark, describe as such.
 - e. If a bridge is included in the design, describe the potential for the construction of a temporary crossing. The temporary crossing will be built to accommodate a 2-year storm event, with excess flow designed to overtop the structure, with the structure remaining intact.
 - f. Do not include the permit type (e.g., WQC, NW 14, Individual) in the Narrative of Impacts.
 - g. If a feature such as a stream or wetland is outside the disturbance limits of the project, or if an impact is within a non-jurisdictional stream or wetland, do not describe it in the narrative.

7. Impact Summary Table
 - a. The table column headings should be labeled from left to right: Station, Sheet, Name, HUC14, Stream Type, Impact Type, Length of Impact (ft), Acreage of Impact, Drainage Area (ac), RPB Score/Quality, Riffle/Pool, KDOW and USACE mitigation totals (AMUs, EIUs or wetland credits).
 - b. If a stream is designated a special use water, signify with an asterisk after the stream name and describe the designation in a footnote to the table.
 - c. “Sheet” means the page number of the Right-of-Way (ROW) plan sheets, which will be included in the permit application. Impacts should be listed by the station number order as they occur on the Right-of-Way Plan sheets.
 - d. If a feature such as a stream or wetland is outside the disturbance limits of the project, or if an impact is within a non-jurisdictional stream or wetland, do not describe it in the narrative.
 - e. Totals should be included for the following columns: Length of Impact, Acreage of Impact, KDOW mitigation totals, and USACE mitigation totals (AMUs, EIUs or wetland credits).

8. Photographs
 - a. All impacted streams and wetlands should be photographed and held on file. Field personnel should clearly label each photo file using the Station Number (for ease of future use). Only impacts requiring mitigation will be included within the photographic documentation in the application package. Each photograph in the application package should be identified by Station Number, flow type, RPB score and qualitative score (excellent, average, or poor) along the top margin of the photo (see example).
 - b. Photographs should be taken at or very near the area of impact and be representative of the quality and flow-type described in the permit application.
 - c. Photographs should be arranged in the document by station number just as they are arranged in the narrative of impacts and the impact summary table.

9. RPB Sheets and Wetland Delineation Forms
 - a. These should be arranged in the same order as found in the Narrative of Impacts and Impact Summary Table
 - b. Both pages of the scoring sheets and delineation form must be identified by Station Number.
 - c. RPB sheets must be completed for all streams requiring mitigation (including ephemeral streams with area impacts exceeding 0.1 acres, all jurisdictional streams associated with excess fill sites, intermittent and perennial streams exceeding 300 linear feet of impact, and intermittent or perennial streams within a 14-digit HUC that have cumulative impacted lengths exceeding 500', if there is any single impact within the watershed that has a drainage area exceeding 250 acres).

10. Preliminary Jurisdictional Form
 - a. The form should be completely filled out, where appropriate.
 - b. The table in the back should include all impacted streams and wetlands.

11. LOP Assessment of Environmental, Social, and Other Factors

12. LOP Checklist

13. Alternatives analysis, project description, purpose and need, statement of mitigation plan

14. Evidence of completion of Section 7 consultation (USFWS)

15. Evidence of completion of Section 106 consultation (Kentucky Heritage Council)

16. Roadway Plans
 - a. Plans (11" x 17") should be included with the permit application.

- b. Right-of-way plans (plan view only) are sufficient however; Grade, Drain and Surfacing Plans or Construction Plans are also acceptable. These plans can be obtained from DEA, the appropriate Highway District, or the design consultant (see example). Do not include cross sections, pipe sheets, aerial or topographic versions.
 - c. Plans should be black and white. Impacted stream lengths within the disturbance limits should be highlighted in color (e.g., blue), and structures such as culverts and bridges should be highlighted using a different color (e.g., yellow). Highlighting by hand or computer is acceptable; highlighting by-hand may produce a clearer depiction of impacts. Highlighting in this manner eliminates the need to turn off layers or otherwise electronically manipulating the plan set while at the same time providing the most readable and understandable product to the regulatory agencies. However, electronically highlighting and labeling the plans are acceptable as long as the effort produces a clear and readable map.
 - d. Each impact should be clearly labeled on the plan sheet using the Station Number and these Station Numbers must correspond to the Station Numbers used within the Summary of Impacts as well as the Impact Summary Table.
17. If the site requires a separate excess material site, the permit application should include a contour map showing the boundary of the site as well as the channels being filled.
- a. The naming system for impacts associated with excess material sites should follow this format: stream or wetland impact number followed by the flow type. Example: 1e = ephemeral stream; 2i = intermittent stream; 3p = perennial stream; 4w = wetland
 - b. This naming system should be used on the maps, narrative of impacts and impact summary table
 - c. KYTC projects that require excess material sites impacting jurisdictional streams require a Letter of Permission or Individual Permit.

Month XX, 20XX

Active Chief
Chief South Section – Regulatory Branch
U.S. Army Corps of Engineers – Louisville District
600 Dr. Martin Luther King Jr. Place
Louisville, Kentucky 40202

Active Supervisor
Supervisor, WQC Section
Kentucky Division of Water
200 Fair Oaks Lane
Frankfort, Kentucky 40601

Subject: Application for Letter of Permission and
 Section 401 Water Quality Certification
 Reconstruction of a section of US 68
 Marion County, Kentucky
 KYTC Item No: 4-192.2

Dear :

For illustration purposes only. DEA will provide the cover letter.

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)

**OMB APPROVAL NO.
0710-0003EXPIRES: 31 August 2012**

Public reporting burden for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please **DO NOT RETURN** your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
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(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME: First Middle Last- Company KYTC - E-mail Address -	8. AUTHORIZED AGENT'S NAME AND TITLE The consultant is the agent First Middle Last - Company - E-mail Address -
6. APPLICANT'S ADDRESS. KYTC 200 Mero St Address City - Frankfort State -KY Zip 40622- Country - USA	9. AGENT'S ADDRESS Address City - State - Zip - Country -
7. APPLICANT'S PHONE NOS. W/AREA CODE 502 564 7250 a. Residence b. Business c. Fax	10. AGENT'S PHONE NOS. W/AREA CODE a. Residence b. Business c. Fax CONSULTANTS INFO HERE

STATEMENT OF AUTHORIZATION

11. I hereby authorize, to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.
 KYTC PERMITTING SUBJECT MATTER EXPERT SIGNATURE
 HERE
 APPLICANT'S SIGNATURE DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions) 4-192.2 US 68 Reconstruction	
13. NAME OF WATERBODY, IF KNOWN (if applicable) Lander's Crk and UT	14. PROJECT STREET ADDRESS (if applicable) Address City State - Zip -
15. LOCATION OF PROJECT Latitude: °N 37.583706 Longitude: °W 85.102075	
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) State Tax Parcel ID Municipality Section - Township - Range -	
17. DIRECTIONS TO THE SITE just east of Lebanon KY, Marion Co.	

18. Nature of Activity (Description of project, include all features) RECONSTRUCTION OF US 68, PLACEMENT OF FILL, CONSTRUCTION OF CULVERTS AND BRIDGE

19. Project Purpose (Describe the reason or purpose of the project, see instructions) Reconstruction of US 68

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge TO COMPLETE CONSTRUCTION

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards: Type rip rap and culverts 424.10 cy

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions) Acres Or Liner Feet 0.004 acres of open water, 2,547' of stream and 0.28 acres of wetland

23. Description of Avoidance, Minimization, and Compensation (see instructions) Alternative Analysis is attached

24. Is Any Portion of the Work Already Complete? X No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list). Address -- City -- State -- Zip --

26. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application. AGENCY TYPE APPROVAL* IDENTIFICATION NUMBER DATE APPLIED DATE APPROVED DATE DENIED * Would include but is not restricted to zoning, building, and flood plain permits

AGENCY	TYPE	APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

27. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

_____ SIGNATURE OF APPLICANT _____ DATE _____ SIGNATURE OF AGENT _____ DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed. 18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES & ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER

APPLICATION FOR PERMIT TO CONSTRUCT ACROSS OR ALONG A STREAM
AND / OR WATER QUALITY CERTIFICATION

Chapter 151 of the Kentucky Revised Statutes requires approval from the Division of Water prior to any construction or other activity in or along a stream that could in any way obstruct flood flows or adversely impact water quality. *If the project involves work in a stream, such as bank stabilization, dredging or relocation, you will also need to obtain a 401 Water Quality Certification (WQC) from the Division of Water.* This completed form will be forwarded to the Water Quality Branch for WQC processing. The project may not start until all necessary approvals are received from the KDOW. For questions concerning the WQC process, contact the WQC section at 502/564-3410.

If the project will disturb more than 1 acre of soil, you will also need to complete the attached Notice of Intent for Storm Water Discharges, and return both forms to the Floodplain management Section of the KDOW. This general permit will require you to create an implement an erosion control plan for the project.

1. OWNER: Kentucky Transportation Cabinet
Give name of person(s), company, governmental unit, or other owner of proposed project.
MAILING ADDRESS: 200 Mero Street, Frankfort KY 40622

TELEPHONE #: 502 564 7250 EMAIL:
2. AGENT: Consulting Agency
Give name of person(s) submitting application, if other than owner.
ADDRESS: Consulting Agency address

TELEPHONE #: phone # EMAIL: email address
3. ENGINEER: P.E. NUMBER:
Contact Division of Water if waiver can be granted.
TELEPHONE #: EMAIL:
4. DESCRIPTION OF CONSTRUCTION: Reconstruction of an unsafe section of US 68
Describe the type and purpose of construction and describe stream impact

5. COUNTY: Marion NEAREST COMMUNITY: Lebanon/Gravel Switch
6. USGS QUAD NAME Lebanon East/Gravel Switch LATITUDE/LONGITUDE: N37.583706 W-85.102075
7. STREAM NAME: UT's to Lander's Creek WATERSHED SIZE (in acres): various,
8. LINEAR FEET OF STREAM IMPACTED: total = 2,547
9. DIRECTIONS TO SITE: Just east of Lebanon on US 68

10. IS ANY PORTION OF THE REQUESTED PROJECT NOW COMPLETE? Yes No If yes, identify the completed portion on the drawings you submit and indicate the date activity was completed. DATE: _____
11. ESTIMATED BEGIN CONSTRUCTION DATE: _____ Summer 2010 or 2011 _____
12. ESTIMATED END CONSTRUCTION DATE: ___ 1 year after start date _____
13. HAS A PERMIT BEEN RECEIVED FROM THE US ARMY, CORPS of ENGINEERS? Yes No If yes, attach a copy of that permit.
14. THE APPLICANT *MUST* ADDRESS PUBLIC NOTICE:

(a) PUBLIC NOTICE HAS BEEN GIVEN FOR THIS PROPOSAL BY THE FOLLOWING MEANS:

- ___ Public notice in newspaper having greatest circulation in area (provide newspaper clipping or affidavit)
- ___ Adjacent property owner(s) affidavits (Contact Division of Water for requirements.)

(b) ___ I REQUEST WAIVER OF PUBLIC NOTICE BECAUSE:

Contact Division of Water for requirements.

15. I HAVE CONTACTED THE FOLLOWING CITY OR COUNTY OFFICIALS CONCERNING THIS PROJECT:

Give name and title of person(s) contacted and provide copy of any approval city or county may have issued.

16. LIST OF ATTACHMENTS: _____ Please reference attached application package _____

List plans, profiles, or other drawings and data submitted. Attach a copy of a 7.5 minute USGS topographic map clearly showing the project location.

17. I, KYTC (owner) CERTIFY THAT THE OWNER OWNS OR HAS EASEMENT RIGHTS ON ALL PROPERTY ON WHICH THIS PROJECT WILL BE LOCATED OR ON WHICH RELATED CONSTRUCTION WILL OCCUR (for dams, this includes the area that would be impounded during the design flood).

18. REMARKS: _____

I hereby request approval for construction across or along a stream as described in this application and any accompanying documents. To the best of my knowledge, all the information provided is true and correct.

SIGNATURE: _____

Owner or Agent sign here. (If signed by Agent, a Power of Attorney should be attached.)

DATE: _____

SIGNATURE OF LOCAL FLOODPLAIN COORDINATOR:

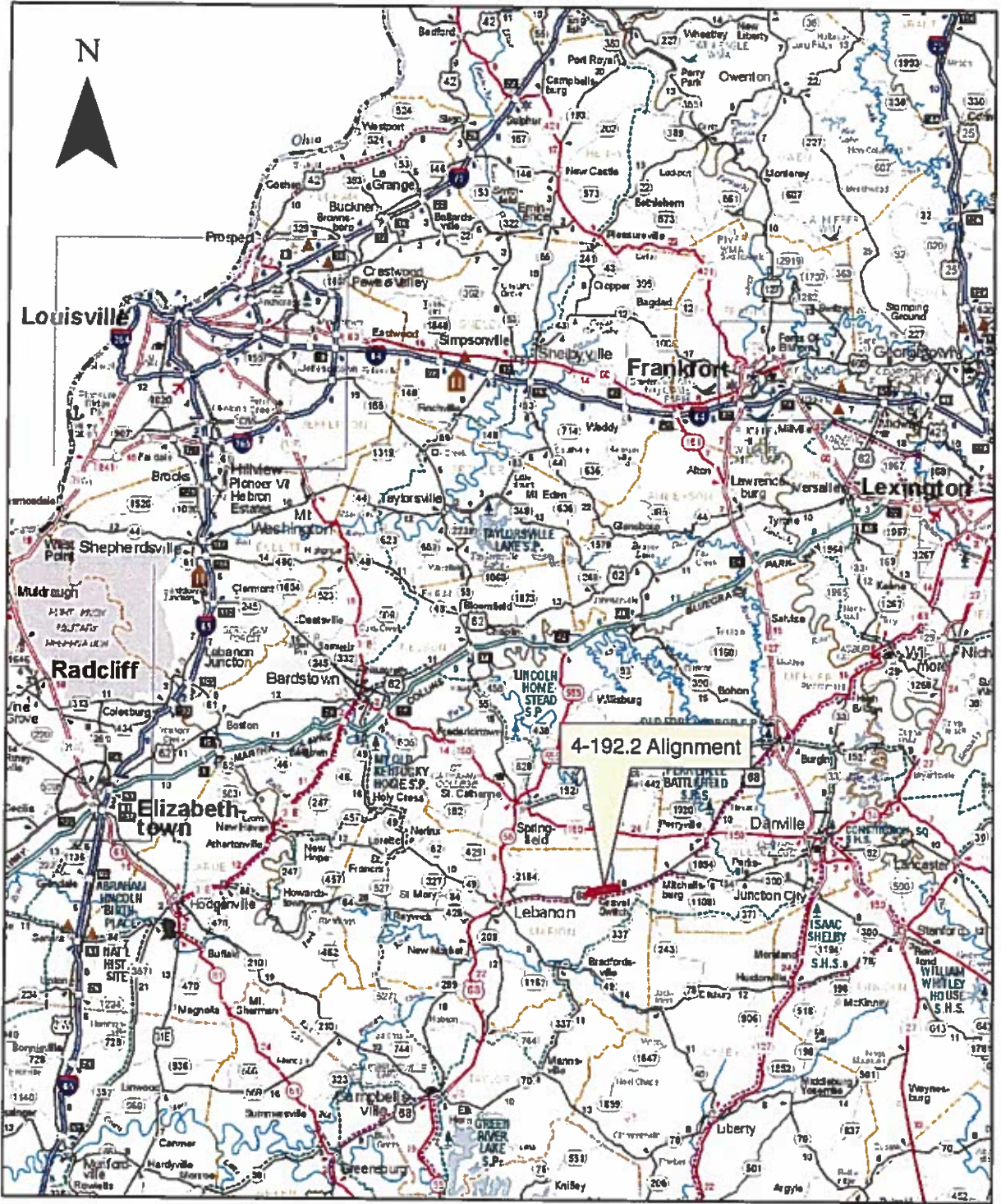
Permit application will be returned to applicant if not properly endorsed by the local floodplain coordinator.

DATE: _____

SUBMIT APPLICATION AND ATTACHMENTS TO:

Floodplain Management Section
 Division of Water
 14 Reilly Road
 Frankfort, KY 40601

4-192.2 Project Vicinity Map

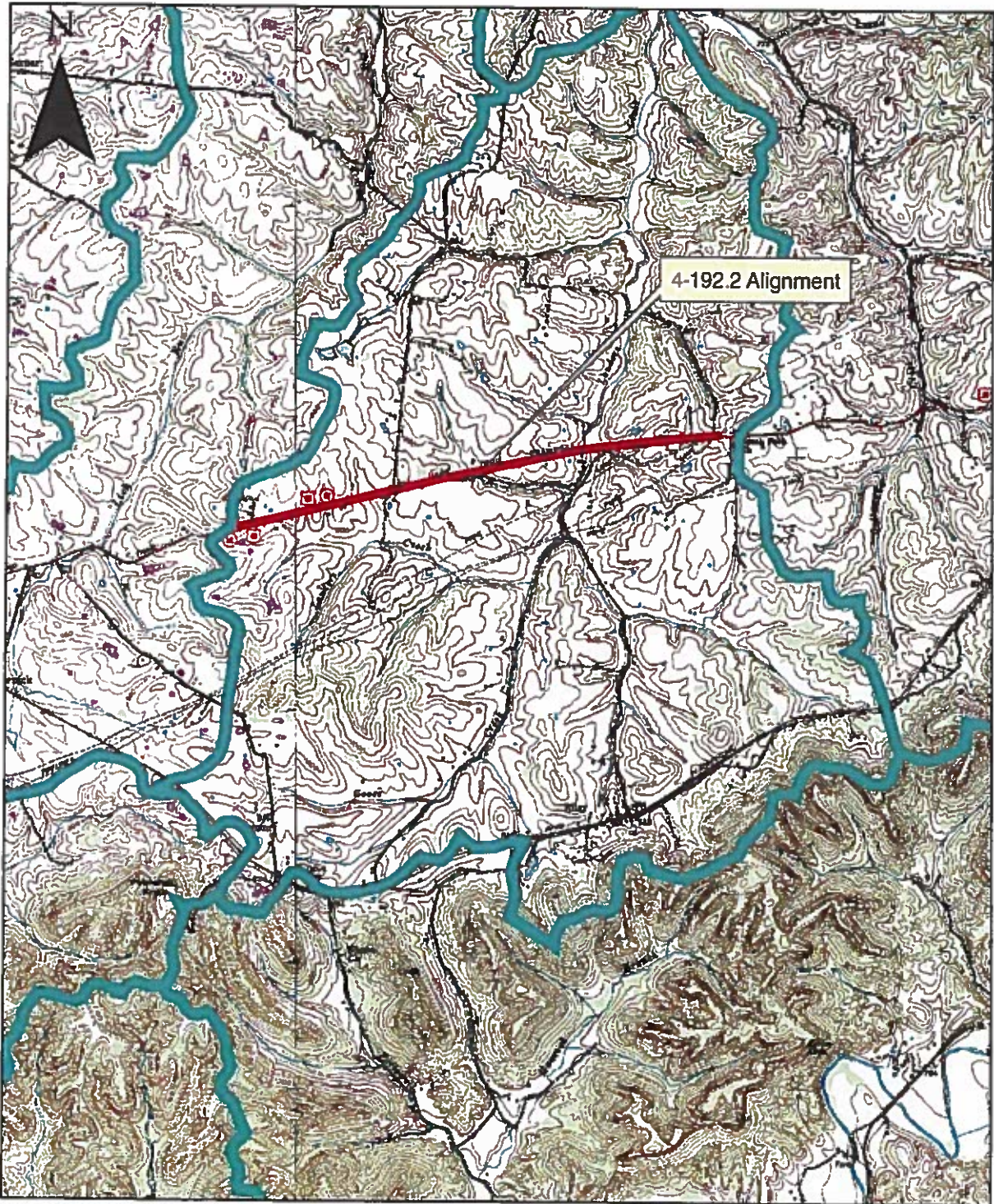


Marion County, KY
 Salt River Basin
 KYTC Item #4-192.2
 Reconstruction of US-68 from 4600' west of Hourigan Lane 1200' west of Beech Fork Church Road.
 HUC 14: 05140103-100-020



——— Project Alignment

4-192.2 Alignment Location Map

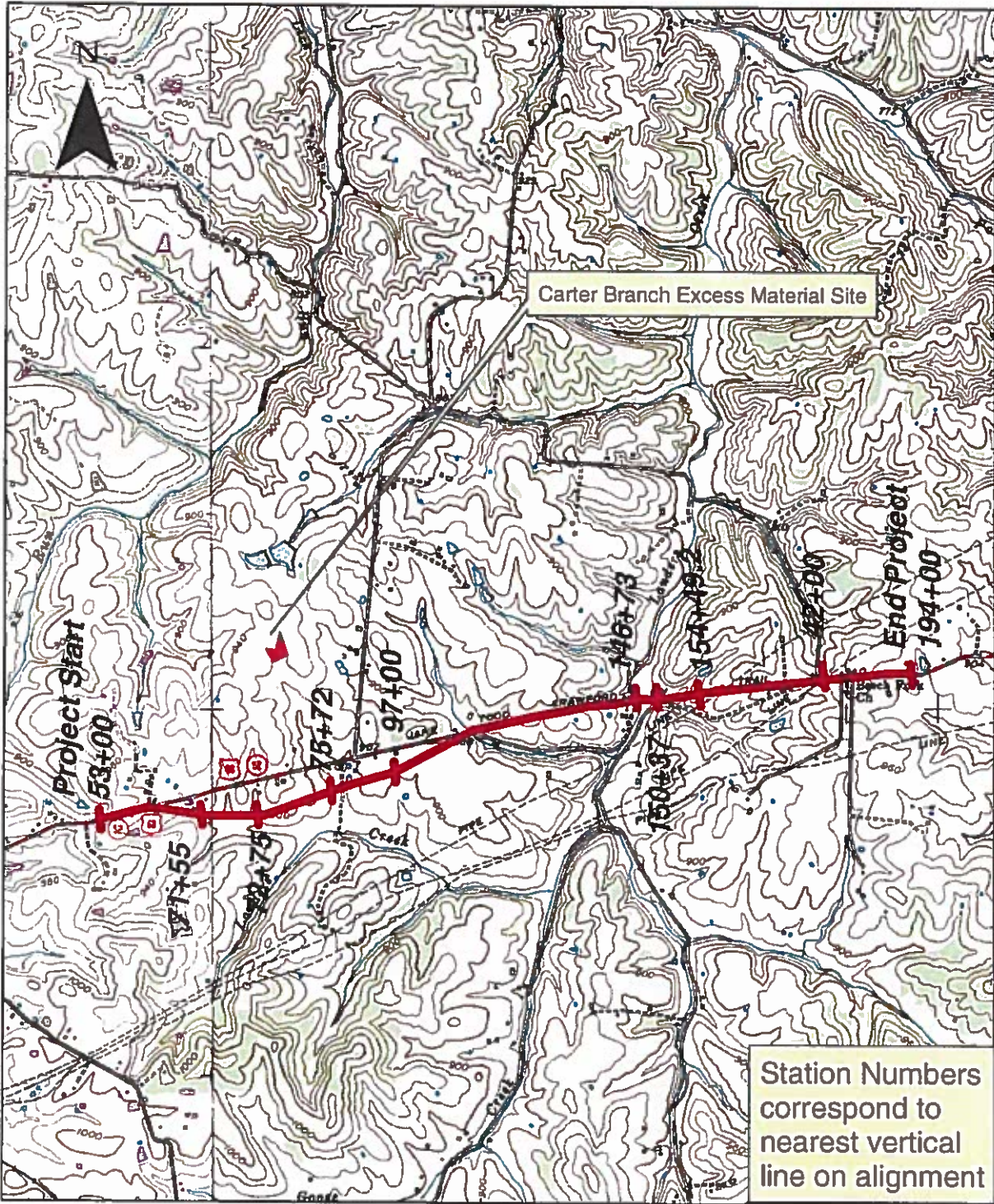


Marion County, KY
Salt River Basin
KYTC Item #4-192.2
Reconstruction of US-68 from 4600' west of Hourigan Lane to 1200' west of Beech Fork Church Road.
HUC 14: 05140103-100-020

-  14 digit HUC Boundary
-  Project Alignment



4-192.2 Impact Stations Map



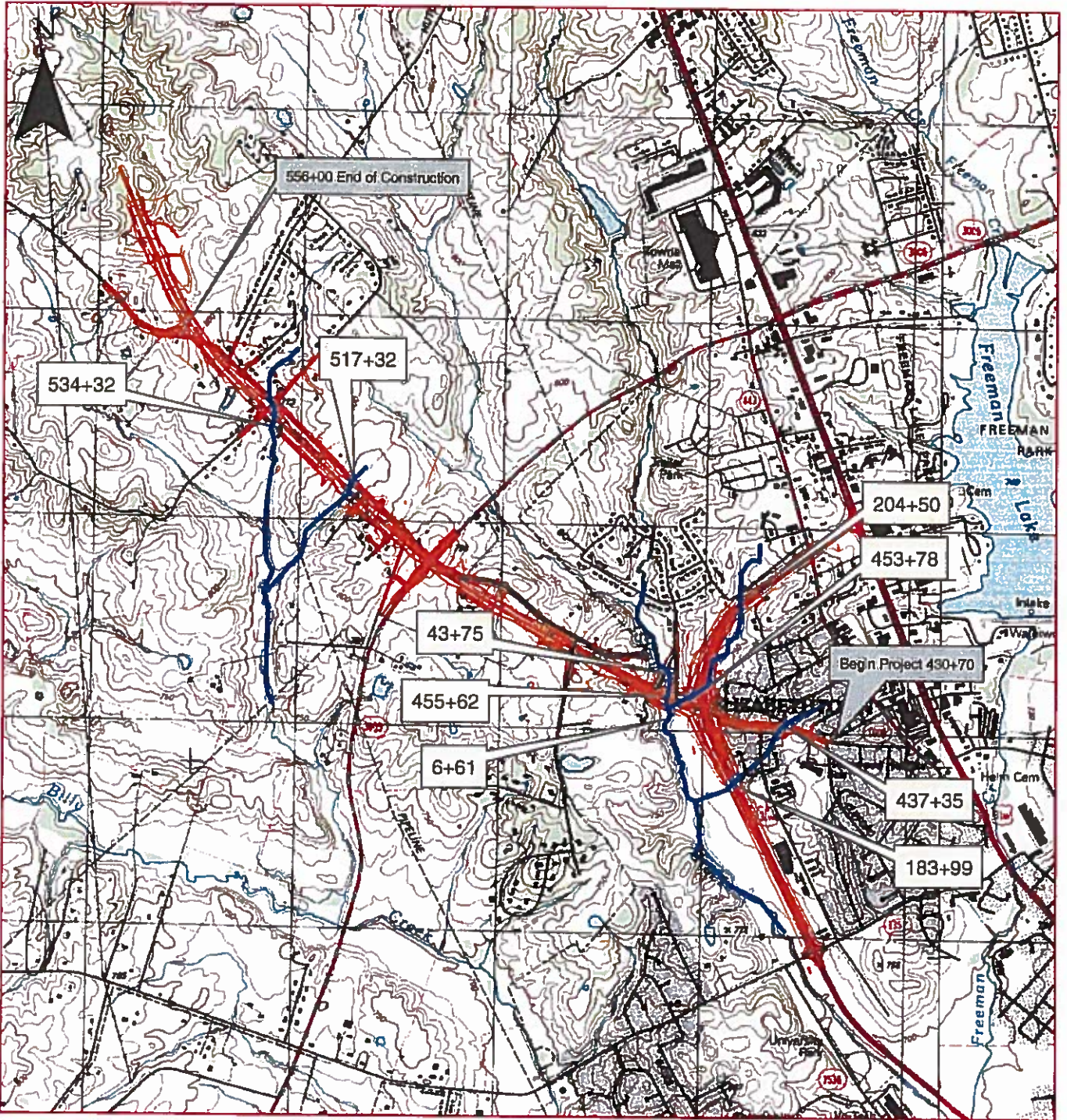
Marion County, KY *add name of Quad*
 Salt River Basin
 KYTC Item #4-192.2
 Reconstruction of US-68 from 4600' west of Hourigan Lane to 1200' west of Beech Fork Church Road.
 HUC 14: 05140103-100-020

— Project Alignment
 | Impact location



example of Microstation alignment layer over-layed on topo
(not specific to example project):

4-8103 Impact Station Map



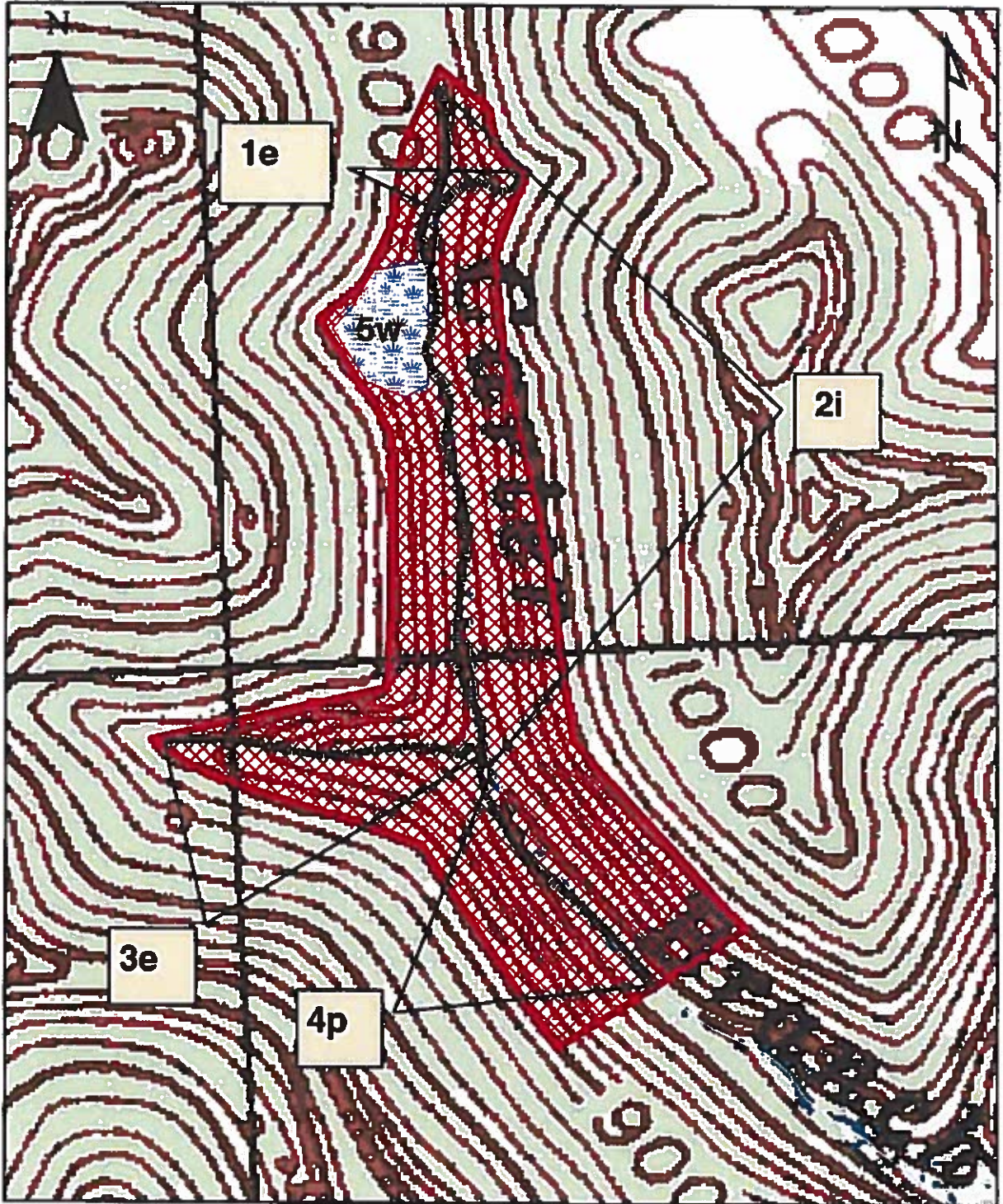
Construction of a new connector road
from KY 313 at Radcliff West of US-31W to the E'town Bypass
Hardin County
Begin long/lat (from the east): -85.880893 37.709262 Decimal Degrees
End long/lat (from the west): -85.921595 37.729650 Decimal Degrees

Orange lines = alignment of new road

Station numbers in text boxes indicate impact sites cross reference with
Impact Summary Table in application for details



Carter Branch Excess Material Site Map



Marion County, KY
Salt River Basin
KYTC Item #4-192.2
Reconstruction of US-68 from 4600'
west of Hourigan Lane to 1200' west of
Beech Fork Church Road
HUC 14: 05140103-100-020

 Excess Material Site Boundary



SUMMARY OF SECTION 404 IMPACTS

For a Letter Of Permission

Marion County

US 68 Re-alignment

Item No. 4-192.20

Station 71+55
See sheet R5

Construct 100 linear feet of 48 inch pipe culvert under the road. The inlet and outlet areas of the pipe culvert will have Class II channel lining and will impact an additional 82 feet. A total of approximately **362** feet of **intermittent** stream (UT to Landers Creek) will be impacted by roadway fill with redirection to 6-foot and 2-foot flat bottom ditches containing Class II and III channel lining. This impact measures **0.56 acres**. The drainage area at the culvert pipe is **36.7 acres**.

Lat./Long.: 37.578792, -85.125726

Station 72+75
See Sheet R5

Construct the new alignment and toe of slope which will fill this **wetland**. This wetland is an old farm pond which was breached by the farmer at some point and drained. The impact is **0.11 acres**.

Lat./Long.: 37.578459, -85.12408

Station 75+72
See sheet R5

Construct 110 linear feet of 36 inch pipe culvert under the road. The inlet and outlet areas of the pipe culvert will have Class II channel lining and will impact an additional 50 feet. A total of approximately **160** feet of **intermittent** stream (UT to Landers Creek) will be impacted measuring **0.011 acres**. The drainage area at the culvert pipe is **22.96 acres**.

Lat./Long.: 37.578833, -85.122374

Station 97+00
See Sheet R5

Construct 220 linear foot 36 inch pipe culvert which will drain a 180 X 150' pond (0.6 acres). The pond was constructed by damming an ephemeral channel that was approximately 1.0' in width. The total stream estimated to be impounded by this pond is 180' but total impacted ponded + free flowing stream = 220' length X 1.0' width = **0.004 acres** of impact. The drainage area at the mouth of the pond is **5.58 acres**.

Lat./Long.: 37.580139, -85.117153

Station 146+72.5
See sheet R15

Construct a 270' X 44' wide 3-span bridge over Landers Creek. The bridge replaces an existing 67 foot triple 12' X 10.5' box culvert. No direct impacts to the perennial stream will occur. **Pier 1 and Pier 2 will be set outside of the ordinary high water mark** and cyclopean rip-rap will be used around the abutment slopes to reduce scour during large flood events. The drainage area at the bridge is **5.27 square miles**. A temporary crossing may be constructed. It will be built to accommodate a 2-year storm event, with excess flow designed to overtop the structure, with the structure remaining intact.
Lat./Long.: 37.583903, -85.100563

Station 150+37
See sheet R15

Construct 200 linear feet of 72 inch pipe culvert under Riley Road. This pipe culvert replaces an existing 80 foot 8' X 6' box culvert under the road. The inlet area of the pipe culvert will have 50 feet of Class III channel lining placed within a 10 foot flat bottom ditch. The outlet area of the pipe will have 150 feet of Class III channel lining placed within a 10 foot flat bottom ditch. A total of **400** linear feet of **intermittent** stream (UT to Landers Creek) will be impacted measuring **0.055 acres** with a drainage area of **141.54 acres**.
Lat./Long.: 37.583984, -85.0099384

Station 154+49
See sheet R15, 17

Construct 312 linear feet of 48 inch pipe culvert under the road. This pipe culvert replaces an existing 120 foot 4' X 3' box culvert under the road. The inlet area of the pipe culvert will have 25 feet of Class II channel lining. The outlet area of the pipe will have 20 feet of Class IA channel lining. A total of **260** linear feet of **intermittent** stream (UT to Landers Creek) will be impacted measuring **0.023 acres** with a drainage area of **47.88 acres**.
Lat./Long.: 37.584176, -85.097025

Landers Creek Road

Station 42+00
See sheet R19

Construct 190 linear feet of 30 inch pipe culvert under the road. This inlet area of the pipe will have 18 feet of Class II channel lining while the outlet area will have 15 feet of Class III. A total of **230** linear feet of **intermittent** stream (UT to Landers Creek) will be impacted measuring **0.015 acres** with a drainage area of **8.77 acres**.
Lat./Long.: 37.58604, -85.090216

Excess Material Site

- 1e
See attached Sheet Construct a controlled fill impacting **105'** of an **ephemeral** U.T. to Carter Branch. This segment of stream will be filled with excavated material and the drainage conveyed through two constructed channels on each side of the fill. The drainage area is **12.8 acres** and the impact is **0.010 acres**.
Lat./Long.: 37.58604, -85.090216
- 2i
See attached Sheet Construct a controlled fill impacting **303'** of an **intermittent** U.T. to Carter Branch. This segment of stream will be filled with excavated material and the drainage conveyed through two constructed channels on each side of the fill. The drainage area is **11.6 acres** and the impact is **0.028 acre**.
Lat./Long.: 37.58603, -85.090236
- 3e
See attached Sheet Construct a controlled fill impacting **87'** of an **ephemeral** U.T. to Carter Branch. This segment of stream will be filled with excavated material and the drainage conveyed through two constructed channels on each side of the fill. The drainage area is **13.8 acres** and the impact is **0.016 acre**.
Lat./Long.: 37.58624, -85.09000
- 4p
See attached Sheet Construct a controlled fill impacting **420'** of an **perennial** U.T. to Carter Branch. This segment of stream will be filled with excavated material and the drainage conveyed through two constructed channels on each side of the fill. The drainage area is **28.1 acres** and the impact is **0.039 acres**.
Lat./Long.: 37.58704, -85.090217
- 5w
See attached Sheet Construct a controlled fill impacting **0.17 acres** of **wetland**. This wetland to be filled with excavated material
Lat./Long.: 37.66604, -85.090111

PHOTOS OF IMPACTED WATERS REQUIRING MITIGATION

Station 71+55, Sheet R5, Intermittent, RBP score 35/poor



Station 72+75 Sheet R5, Wetland



Station 75+72, Sheet R5, Intermittent, RBP Score 33/poor



Station 97+00, Sheet R9, Pond, no defined channel leading into pond



97+00 Pond outlet channel, Ephemeral, downstream of below photograph, RBP score 49/poor



97+00 Substrate of channel leaving pond at immediate outlet, Ephemeral, RBP score 49/poor



Station 150+37, Sheet R15, Intermittent, RBP score 117/poor



Station 154+49, Sheet R15, Intermittent, RBP score 110/poor



Station 42+00, Sheet R19, Intermittent, RBP score 113/poor



Carter Branch Excess Material Site

1e, see Carter Branch map sheet, Ephemeral, RBP score 103/poor



2i, see Carter Branch map sheet, Intermittent, RBP score 114/poor



3e, see Carter Branch map sheet, Ephemeral, RBP score 110/poor



4p, see Carter Branch map sheet, Perennial, RBP score 100/poor



5w, see Carter Branch map sheet, Wetland



Appendix A-1 High Gradient Stream Data Sheet

STREAM NAME: <u>UTLANDERS CRK</u>		LOCATION: <u>US 68 4-192.2</u>		
STATION #: <u>71+55</u> MILE:		BASIN/WATERSHED: <u>SALT</u>		
LAT.: _____ LONG: _____		COUNTY: <u>MARION</u> USGS 7.5 TOPO:		
DATE: <u>10/13/2009</u> TIME: <input type="checkbox"/> AM <input type="checkbox"/> PM		INVESTIGATORS: <u>D. PEAKE, T. FERRESEN</u>		
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.				
WEATHER: <input type="checkbox"/> New Past 24 hours <input checked="" type="checkbox"/> Has there been a heavy rain in the last 7 days? <input type="checkbox"/> Heavy rain <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Steady rain Air Temperature _____ °C. Inches rainfall in past 24 hours _____ in. <input type="checkbox"/> Intermittent showers _____ % Cloud Cover <input checked="" type="checkbox"/> Clear/sunny				
P-Chem: Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(±U.) _____ Cond. _____ <input type="checkbox"/> Grab				
INSTREAM WATERSHED FEATURES: Stream Width <u>4'</u> Range of Depth <u>10 in. to 1 ft</u> Average Velocity _____ ft/s Discharge _____ Est. Reach Length _____		LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input checked="" type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers		
Hydraulic Structures: <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Inland <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other _____		Stream Flow: <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input checked="" type="checkbox"/> Normal <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential Stream Type: <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep		
Riparian Vegetation: Dom. Tree/Shrub Taxa _____ Dominant Type: <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Number of strata _____		Canopy Cover: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)		
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.		Channel Alterations: <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)		
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.		Riffle _____ % Run _____ % Pool _____ %		
Silt/Clay (<0.06 mm)				
Sand (0.06 - 2 mm)				
Gravel (2-64 mm)				
Cobble (64 - 256 mm)				
Boulders (>256 mm)				
Bedrock				
Condition Category				
Habitat	Optimal	Suboptimal	Marginal	Poor
Parameter				
1. Epifaunal Substrate/Avaliable Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of magt, submerged logs, undercut banks, cobble or other stable habitat and at steps to allow full colonization potential (i.e., logs are not now full and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of gravel, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE				
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE				
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Flow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
SCORE				

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE				
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE				
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE				
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE				
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected. Note: determine left or right side by facing downstream.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "new" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)				
SCORE (RB)				
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)				
SCORE (RB)				
10. Riparian Vegetative Zone Width (score each bank; riparian zone)	Width of riparian zone >15 meters; human activities (i.e., parking lots, roadsides, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-15 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)				
SCORE (RB)				

Total Score **35** NOTES/COMMENTS:

KDOW Biological Assessment Methods

**DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)**

Project/Site: <u>72+75</u> Applicant/Owner: <u>KYTC</u> Investigator: <u>D. PEASE, T. FERGUSON</u>	Date: <u>10-13-2007</u> County: <u>WASHINGTON</u> State: <u>KY</u>
Do Normal Circumstances exist on the site? <input checked="" type="radio"/> Yes <input type="radio"/> No Is the site significantly disturbed (Atypical Situation)? <input type="radio"/> Yes <input checked="" type="radio"/> No Is the area a potential Problem Area? <input type="radio"/> Yes <input checked="" type="radio"/> No (If needed, explain on reverse.)	Community ID: <u>EMERGENT</u> Transect ID: <u>X/A</u> Plot ID: <u>N/A</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Nasturtium officinale</u>	<u>Herb</u>	<u>OBL</u>	9. _____	_____	_____
2. <u>Dicentra uniflorum</u>	<u>Herb</u>	<u>FAC-</u>	10. _____	_____	_____
3. <u>Polygonum pennsylvanicum</u>	<u>Herb</u>	<u>FACW+</u>	11. _____	_____	_____
4. <u>Juncus effusus</u>	<u>Herb</u>	<u>OBL</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

"Percent of Dominant Species that are OBL, FACW or FAC"
(excluding FAC-). 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input checked="" type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>0.5-3</u> (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	

Remarks:

THIS WETLAND IS AN OLD FARM POND THAT WAS DRAINED IN THE PAST. IT IS UNKNOWN HOW LONG THE POND HAS BEEN DRAINED.

SOILS

Map Unit Name (Series and Phase): <u>Nicholson silt loam</u>		Drainage Class <u>U1/1/1/1</u>	
Taxonomy (Subgroup) <u>UNKNOWN</u>		Field Observations Confirm Mapped Type? Yes <input type="radio"/> No <input checked="" type="radio"/>	

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
<u>1-3</u>	<u>A</u>	<u>10YR 5/3</u>			
<u>5-12</u>	<u>A/B</u>	<u>10YR 7/1</u>			

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input checked="" type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks NICHOLSON SILT LOAM IS NOT A HYDRIC SOIL. THE INUNDATION CREATED BY THE POND CLEARLY CREATED THE HYDRIC SOIL CONDITIONS NOW PRESENT

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	<input checked="" type="radio"/> Yes <input type="radio"/> No (Circle)	
Wetland Hydrology Present?	<input checked="" type="radio"/> Yes <input type="radio"/> No (Circle)	
Hydric Soils Present?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Is this Sampling Point Within a Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No

Remarks THIS WETLAND WAS A FARM POND THAT HAS NOW BEEN DRAINED. THE WETLAND IS 100' X 50' = 5000 SQ FT 0.11 ACRES

Appendix A-1 High Gradient Stream Data Sheet

STREAM NAME: <u>UT. LANDERS CRK</u>		LOCATION: <u>45.68 4-192.2</u>		
STATION #: <u>75+72</u> MILE:		BASIN/WATERSHED: <u>SALT</u>		
LAT.: _____ LONG.: _____		COUNTY: <u>MARION</u> USGS 7.5 TOPO:		
DATE: <u>10/13/2009</u> TIME: <input type="checkbox"/> AM <input type="checkbox"/> PM		INVESTIGATORS: <u>D. PEAKE, T. FERSEN</u>		
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.				
WEATHER: Now Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input checked="" type="checkbox"/> Clear/sunny				
Has there been a heavy rain in the last 7 days? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Air Temperature _____ °C. Inches rainfall in past 24 hours _____ in. % Cloud Cover _____				
P-Chem: Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(8.11) _____ Cond. _____ <input type="checkbox"/> Grab				
INSTREAM WATERSHED FEATURES: Stream Width <u>3</u> ft Range of Depth <u>0.6-1.0</u> ft Average Velocity _____ ft/s Discharge _____ Est. Reach Length _____		LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers		
Hydraulic Structures: <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other _____		Stream Flow: <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input checked="" type="checkbox"/> Normal <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential		
Riparian Vegetation: Dom. Tree/Shrub Taxa _____ Dominant Type: <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Number of strata _____		Stream Type: <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Scop		
Channel Alterations: <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (Full/Partial)		Canopy Cover: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)		
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.		Riffle _____ % Run _____ % Pool _____ %		
Silt/Clay (<0.06 mm)				
Sand (0.06 - 2 mm)				
Gravel (2-64 mm)				
Cobble (64 - 256 mm)				
Boulders (>256 mm)				
Bedrock				
Condition Category				
Habitat	Optimal	Suboptimal	Marginal	Poor
Parameter				
1. Epifaunal Substrate/Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of large, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/mats that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrata in the form of snags, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE				
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE				
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/s, deep is >0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
SCORE				

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE				
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE				
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE				
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE				
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Note: determine left or right side by facing downstream.				
SCORE (LB)				
SCORE (RB)				
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)				
SCORE (RB)				
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)				
SCORE (RB)				

Total Score **33** NOTES/COMMENTS:
 KDOW Biological Assessment Methods

Appendix A-1 High Gradient Stream Data Sheet

STREAM NAME: <u>UT. LANDERS CRK</u>		LOCATION: <u>45.68 4-192.2</u>		
STATION #: <u>97+00</u> MILE: <u>(POVD)</u>		BASIN/WATERSHED: <u>SALT</u>		
LAT.: _____ LONG.: _____		COUNTY: <u>MARION</u> USGS 7.5 TOPO: _____		
DATE: <u>10/13/2009</u> TIME: <input type="checkbox"/> AM <input type="checkbox"/> PM		INVESTIGATORS: <u>D. PEAKE, J. FERSSAEN</u>		
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.				
WEATHER: Now Past 24 hours Has there been a heavy rain in the last 7 days? <input type="checkbox"/> Heavy rain <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Steady rain Air Temperature _____ °C. Inches rainfall in past 24 hours _____ in. <input type="checkbox"/> Intermittent showers _____ % Cloud Cover <input checked="" type="checkbox"/> Clear/sunny				
P-Chem: Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ <input type="checkbox"/> Grab				
INSTREAM WATERSHED FEATURES: Stream Width _____ ft Range of Depth <u>2-10</u> ft Average Velocity _____ ft/s Discharge _____ Est. Reach Length _____		LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input checked="" type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers		
Hydraulic Structures: <input type="checkbox"/> Dams <input type="checkbox"/> Bridges Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other _____		Stream Flow: <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep		
Riparian Vegetation: Dom. Tree/Shrub Taxa Dominate Type: <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Number of strata _____		Canopy Cover: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)		
Channel Alterations: <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (CPull <input type="checkbox"/> Partial)				
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.		Riffle _____ % Run _____ % Pool _____ %		
Silt/Clay (<0.06 mm)				
Sand (0.06 - 2 mm)				
Gravel (2-64 mm)				
Cobble (64 - 256 mm)				
Boulders (>256 mm)				
Bedrock				
Condition Category				
Habitat	Optimal	Suboptimal	Marginal	Four
Parameter				
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of mats, submerged logs, undercut banks, cobble or other stable habitat and at stages to allow full colonization potential (i.e., logs/slogs that are not new fall and not treatment).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE				
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE				
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/s, deep is >0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
SCORE				

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE				
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE				
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dioding, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE				
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffles or bend; bottom contours provide same habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE				
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected. Note: determine left or right side by facing downstream.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)				
SCORE (RB)				
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or neawoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)				
SCORE (RB)				
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)				
SCORE (RB)				

Total Score **49** NOTES/COMMENTS:

Appendix A-1 High Gradient Stream Data Sheet

STREAM NAME: <u>UTLANDERS CRK</u>		LOCATION: <u>45.68 4-19.2.2</u>		
STATION #: <u>150+37 MILE</u>		BASIN/WATERSHED: <u>SALT</u>		
LAT: _____	LONG: _____	COUNTY: <u>MARION</u> USGS 7.5 TOPO: _____		
DATE: <u>10/13/2007</u> TIME: <input type="checkbox"/> AM <input type="checkbox"/> PM		INVESTIGATORS: <u>D. PEAKE, J. FERGAHAN</u>		
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrates <input type="checkbox"/> FISH <input type="checkbox"/> BACT.				
WEATHER: New Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input checked="" type="checkbox"/> Clear/sunny				
Has there been a heavy rain in the last 7 days? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Air Temperature _____ °C. Inches rainfall in past 24 hours _____ in. % Cloud Cover _____				
P-Chem: Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ <input type="checkbox"/> Grab				
INSTREAM WATERSHED FEATURES: Stream Width <u>6</u> ft Range of Depth <u>0.4-1.0</u> ft Average Velocity _____ ft/s Discharge _____ Est. Reach Length _____		LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input checked="" type="checkbox"/> OR Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers		
Hydraulic Structures: <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other _____		Stream Flow: <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input checked="" type="checkbox"/> Normal <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential		
Riparian Vegetation: Dom. Tree/Shrub Taxa _____ Dominate Type: <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Number of strata _____		Stream Type: <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep		
Canopy Cover: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)		Channel Alterations: <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)		
Substrate <input type="checkbox"/> Est. CP.C.	Riffle _____ %	Run _____ %	Pool _____ %	
Silt/Clay (<0.06 mm)				
Sand (0.06 - 2 mm)				
Gravel (2-64 mm)				
Cobble (64 - 256 mm)				
Boulders (>256 mm)				
Bedrock				
Condition Category				
Habitat	Optimal	Suboptimal	Marginal	Poor
Parameter				
1. Epifaunal Substrate/Avaliable Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at range to allow full colonization potential (i.e., logs/snags that are not now full and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrata in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE				
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE				
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <0.3 m/s, deep is >0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
SCORE				

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE				
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE				
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE				
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE				
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)				
SCORE (RB)				
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)				
SCORE (RB)				
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)				
SCORE (RB)				

Total Score **117** NOTES/COMMENTS:
 KDOW Biological Assessment Methods

Appendix A-1 High Gradient Stream Data Sheet

STREAM NAME: <u>UTLANDERS CRK</u>		LOCATION: <u>US 68 4-192.2</u>		
STATION #: <u>154+49</u> MILE:		BASIN/WATERSHED: <u>SALT</u>		
LAT: _____	LONG: _____	COUNTY: <u>MARION</u> USGS 7.5 TOPO: _____		
DATE: <u>10/13/2009</u> TIME: <input type="checkbox"/> AM <input type="checkbox"/> PM		INVESTIGATORS: <u>D. PEAKE, J. FERSEN</u>		
TYPES SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.				
WEATHER: Now Past 24 hours <input type="checkbox"/> Heavy rain <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Steady rain <input type="checkbox"/> Intermittent showers <input checked="" type="checkbox"/> Clear/sunny				
Has there been a heavy rain in the last 7 days? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Air Temperature _____ °C. Inches rainfall in past 24 hours _____ in. % Cloud Cover _____				
P-Chem: Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ <input type="checkbox"/> Grab				
INSTREAM WATERSHED FEATURES: Stream Width _____ ft Range of Depth <u>0.4 - 1.0</u> ft Average Velocity _____ ft/s Discharge _____ Est. Reach Length _____		LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers		
Hydraulic Structures: <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other _____		Stream Flow: <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input checked="" type="checkbox"/> Normal <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential		
Riparian Vegetation: Dom. Tree/Shrub Taxa _____ Dominant Type: <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Number of strata _____		Stream Type: <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep		
Canopy Cover: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)		Channel Alterations: <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (Full/Partial)		
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.	Riffle _____ %	Run _____ %	Pool _____ %	
Silt/Clay (<0.06 mm)				
Sand (0.06 - 2 mm)				
Gravel (2-64 mm)				
Cobble (64 - 256 mm)				
Boulders (>256 mm)				
Bedrock				
Condition Category				
Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of logs, submerged logs, undercut banks, cobble or other stable habitat and at stages to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-sited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrates in the form of snags, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE				
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE				
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow): (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
SCORE				

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE				
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <15% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE				
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE				
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE				
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)				
SCORE (RB)				
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)				
SCORE (RB)				
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)				
SCORE (RB)				

Total Score **110** NOTES/COMMENTS:
KDOW Biological Assessment Methods

Appendix A-1 High Gradient Stream Data Sheet

STREAM NAME: <u>UT LANDERS CRK</u>		LOCATION: <u>US 68 4-1.2.2</u>		
STATION #: <u>42+00</u> MILE:		BASIN/WATERSHED: <u>SALT</u>		
LAT.: _____ LONG.: _____		COUNTY: <u>MARION</u> USGS 7.5 TOPO: _____		
DATE: <u>10/13/2007</u> TIME: <input type="checkbox"/> AM <input type="checkbox"/> PM		INVESTIGATORS: <u>D. PEAKE, J. FERGUSON</u>		
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.				
WEATHER: Now Past 24 hours Has there been a heavy rain in the last 7 days? <input type="checkbox"/> <input type="checkbox"/> Heavy rain <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> <input type="checkbox"/> Steady rain Air Temperature _____ °C. Inches rainfall in past 24 hours _____ in. <input type="checkbox"/> <input type="checkbox"/> Intermittent showers _____ % Cloud Cover <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Clear/bunny				
P-Chem: Temp(°C) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ <input type="checkbox"/> Grab				
INSTREAM WATERSHED FEATURES: Stream Width <u>2.5</u> ft Range of Depth <u>0.4-1.0</u> ft Average Velocity _____ ft/s Discharge _____ Est. Reach Length _____		LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers		
Hydraulic Structures: <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other _____		Stream Flow: <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input checked="" type="checkbox"/> Normal <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential		
Riparian Vegetation: Dom. Tree/Shrub Taxa _____ Dominated Type: <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Number of strata _____		Channel Alterations: <input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (CFull CPartial)		
Substrate <input type="checkbox"/> Est. <input type="checkbox"/> P.C.		Stream Type: <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep		
Riffle _____ %		Run _____ %		
Pool _____ %				
Silt/Clay (<0.06 mm)				
Sand (0.06 - 2 mm)				
Gravel (2-64 mm)				
Cobble (64 - 256 mm)				
Boulders (>256 mm)				
Bedrock				
Condition Category				
Habitat	Optimal	Suboptimal	Marginal	Poor
Parameter				
1. Epifaunal Substrate/Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE				
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE				
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (80w in <0.3 m/s, deep is >0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
SCORE				

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE				
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE				
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or sheering structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE				
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE				
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)				
SCORE (RB)				
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)				
SCORE (RB)				
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)				
SCORE (RB)				

Total Score **113** NOTES/COMMENTS:
 KDOW Biological Assessment Methods

High Gradient Stream Data Sheet

STREAM NAME: <u>1e</u>		LOCATION: <u>Carter Branch Excess Material Site</u>		
STATION:	DRAINAGE AREA (AC)	BASIN/WATERSHED		
LAT:	LONG:	COUNTY: <u>Marion</u>	USGS 7.5 TOPO:	
DATE: <u>11-3-2009</u>	TIME: : <input type="checkbox"/> AM <input type="checkbox"/> PM	INVESTIGATORS: <u>Rigney, Purdy</u>		
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.				
WEATHER: Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Has there been a heavy rain in the last 7 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
<input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input checked="" type="checkbox"/> Intermittent showers <input checked="" type="checkbox"/> Clear/sunny Air temperature _____ °F. Inches rainfall in past 24 hours _____ in _____ % Cloud Cover				
P-Chem: Temp (°F) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. µs _____ <input type="checkbox"/> Grab				
INSTREAM WATERSHED FEATURES		LOCAL WATERSHED FEATURES:		
Stream Width EOW <u>2</u> ft Stream Width BF _____ ft Range of Depth <u>0.6-1.0</u> ft Bank Full Depth _____ ft Est. Reach Length _____ ft		Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers		
Hydraulic Structures:		Stream Flow;		Stream Type;
<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Other <input type="checkbox"/> Waterfalls <input type="checkbox"/> Culverts		<input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> Normal <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential		<input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral <input type="checkbox"/> Seep
Riparian Vegetation:		Dom. Tree/Shrub Taxa	Canopy Cover;	Channel Alterations;
Dominate Type: <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Number of Strata _____			<input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)	<input type="checkbox"/> Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)
Substrate <input checked="" type="checkbox"/> Est. <input type="checkbox"/> P.C		Riffle _____ %	Run; _____ %	Pool _____ %
Silt/Clay (<0.06 mm)		"		
Sand (0.06-2 mm)				
Gravel (2-64 mm)				
Cobble (64-256 mm)				
Boulders (>256 mm)				
Bedrock				
Habitat		Condition Category		
Parameter	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

1e

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0

Total Score

103

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: <u>2i</u>		LOCATION: <u>Carter Branch Excess Material Site</u>	
STATION:	DRAINAGE AREA (AC)	BASIN/WATERSHED	
LAT:	LONG:	COUNTY: <u>Marion</u>	USGS 7.5 TOPO:
DATE: <u>11-3-2009</u> TIME: : <input type="checkbox"/> AM <input type="checkbox"/> PM		INVESTIGATORS: <u>Rigney, Purdy</u>	
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.			
WEATHER: Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Has there been a heavy rain in the last 7 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
<input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input checked="" type="checkbox"/> Intermittent showers <input type="checkbox"/> Clear/sunny Air temperature _____ °F. Inches rainfall in past 24 hours _____ in _____ % Cloud Cover			
P-Chem: Temp (°F) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. µs _____ <input type="checkbox"/> Grab			
INSTREAM WATERSHED FEATURES		LOCAL WATERSHED FEATURES:	
Stream Width EOW <u>3</u> ft Stream Width BF _____ ft Range of Depth <u>0.6-1.0</u> ft Bank Full Depth _____ ft Est. Reach Length _____ ft		Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers	
Hydraulic Structures:		Stream Flow;	
<input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential <input type="checkbox"/> Other <input type="checkbox"/> Culverts		Stream Type: <input type="checkbox"/> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep	
Riparian Vegetation:		Channel Alterations;	
Dominate Type: <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Number of Strata _____		Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)	
Dom. Tree/Shrub Taxa		Canopy Cover;	
		<input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)	
Substrate <input checked="" type="checkbox"/> Est. <input type="checkbox"/> P.C		Riffle _____ %	
		Run; _____ %	
		Pool _____ %	
Silt/Clay (<0.06 mm)			
Sand (0.06-2 mm)			
Gravel (2-64 mm)			
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			
Habitat		Condition Category	
Parameter		Optimal	
1. Epifaunal Substrate/ Available Cover		Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	
SCORE		20 19 18 17 16 15 14 13 12 11	
2. Embeddedness		40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	
SCORE		20 19 18 17 16 15 14 13 12 11	
3. Velocity/Depth Regime		20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	
SCORE		20 19 18 17 16 15 14 (13) 12 11	
		Marginal 20 19 18 17 16 10 (9) 8 7 6	
		Poor Less than 20% stable habitat" lack of habitat is obvious; substrate unstable or lacking.	
		5 4 3 2 1 0	

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score

114

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: <u>3e</u>		LOCATION: <u>Carter Branch Excess Material Site</u>		
STATION:	DRAINAGE AREA (AC)	BASIN/WATERSHED		
LAT:	LONG:	COUNTY: <u>Marion</u> USGS 7.5 TOPO:		
DATE: <u>11-3-2009</u>	TIME: : <input type="checkbox"/> AM <input type="checkbox"/> PM	INVESTIGATORS: <u>Rigney, Purdy</u>		
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.				
WEATHER: <input checked="" type="checkbox"/> Now <input type="checkbox"/> Past 24 hours <input type="checkbox"/> Heavy rain <input type="checkbox"/> Steady rain <input checked="" type="checkbox"/> Intermittent showers <input checked="" type="checkbox"/> Clear/sunny				
Has there been a heavy rain in the last 7 days? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Air temperature _____ °F. Inches rainfall in past 24 hours _____ in _____ % Cloud Cover				
P-Chem: Temp (°F) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. µs _____ <input type="checkbox"/> Grab				
INSTREAM WATERSHED FEATURES Stream Width E ₀ W <u>1</u> ft Stream Width BF _____ ft Range of Depth <u>0.10-1.0</u> ft Bank Full Depth _____ ft Est. Reach Length _____ ft		LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers		
Hydraulic Structures: <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other <input type="checkbox"/> Culverts		Stream Flow; <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input type="checkbox"/> Normal <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential		
Riparian Vegetation: Dominate Type: <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Number of Strata _____		Dom. Tree/Shrub Taxa _____ Canopy Cover; <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)		
Channel Alterations; Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)				
Substrate <input checked="" type="checkbox"/> Est. <input type="checkbox"/> P.C.		Riffle _____ % Run; _____ % Pool _____ %		
Silt/Clay (<0.06 mm)		"		
Sand (0.06-2 mm)				
Gravel (2-64 mm)				
Cobble (64-256 mm)				
Boulders (>256 mm)				
Bedrock				
Habitat		Condition Category		
Parameter	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

3e

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 (6)	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0

Total Score

110

NOTES/COMMENTS:

High Gradient Stream Data Sheet

STREAM NAME: <u>4p</u>			LOCATION: <u>Carter Branch Excess Material Site</u>																																
STATION:		DRAINAGE AREA (AC)	BASIN/WATERSHED																																
LAT:		LONG:	COUNTY: <u>Marion</u> USGS 7.5 TOPO;																																
DATE: <u>11-3-2009</u> TIME: _____ : <input type="checkbox"/> AM <input type="checkbox"/> PM		INVESTIGATORS: <u>Rigney, Purdy</u>																																	
TYPE SAMPLE: <input type="checkbox"/> P-CHEM <input type="checkbox"/> Macroinvertebrate <input type="checkbox"/> FISH <input type="checkbox"/> BACT.																																			
WEATHER: <table style="width: 100%; border: none;"> <tr> <td style="width: 20%;">Now</td> <td style="width: 20%;">Past 24 hours</td> <td colspan="2">Has there been a heavy rain in the last 7 days?</td> <td colspan="2"></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/> Heavy rain</td> <td><input type="checkbox"/> Yes</td> <td><input checked="" type="checkbox"/> No</td> <td colspan="2"></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/> Steady rain</td> <td colspan="2">Air temperature _____ °F.</td> <td colspan="2">Inches rainfall in past 24 hours _____ in</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/> Intermittent showers</td> <td colspan="2">% Cloud Cover _____</td> <td colspan="2"></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/> Clear/sunny</td> <td colspan="4"></td> </tr> </table>						Now	Past 24 hours	Has there been a heavy rain in the last 7 days?				<input type="checkbox"/>	<input type="checkbox"/> Heavy rain	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No			<input type="checkbox"/>	<input type="checkbox"/> Steady rain	Air temperature _____ °F.		Inches rainfall in past 24 hours _____ in		<input type="checkbox"/>	<input checked="" type="checkbox"/> Intermittent showers	% Cloud Cover _____				<input checked="" type="checkbox"/>	<input type="checkbox"/> Clear/sunny				
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<input type="checkbox"/>	<input checked="" type="checkbox"/> Intermittent showers	% Cloud Cover _____																																	
<input checked="" type="checkbox"/>	<input type="checkbox"/> Clear/sunny																																		
P-Chem: Temp (°F) _____ D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond. µs _____ <input type="checkbox"/> Grab																																			
INSTREAM WATERSHED FEATURES Stream Width EOW <u>4</u> ft Stream Width BF _____ ft Range of Depth <u>0.1-1.0</u> ft Bank Full Depth _____ ft Est. Reach Length _____ ft			LOCAL WATERSHED FEATURES: Predominant Surrounding Land Use: <input type="checkbox"/> Surface Mining <input type="checkbox"/> Construction <input type="checkbox"/> Forest <input type="checkbox"/> Deep Mining <input type="checkbox"/> Commercial <input type="checkbox"/> Pasture/Grazing <input type="checkbox"/> Oil Wells <input type="checkbox"/> Industrial <input type="checkbox"/> Silviculture <input type="checkbox"/> Land Disposal <input type="checkbox"/> Row Crops <input type="checkbox"/> Urban Runoff/Storm Sewers																																
Hydraulic Structures: <input type="checkbox"/> Dams <input type="checkbox"/> Bridge Abutments <input type="checkbox"/> Island <input type="checkbox"/> Waterfalls <input type="checkbox"/> Other <input type="checkbox"/> Culverts		Stream Flow: <input type="checkbox"/> Dry <input type="checkbox"/> Pooled <input type="checkbox"/> Low <input checked="" type="checkbox"/> Normal <input type="checkbox"/> High <input type="checkbox"/> Very Rapid or Torrential		Stream Type: <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/> Seep																															
Riparian Vegetation: Dominate Type: <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Number of Strata _____		Dom. Tree/Shrub Taxa _____ Canopy Cover: <input type="checkbox"/> Fully Exposed (0-25%) <input type="checkbox"/> Partially Exposed (25-50%) <input type="checkbox"/> Partially Shaded (50-75%) <input type="checkbox"/> Fully Shaded (75-100%)		Channel Alterations; Dredging <input type="checkbox"/> Channelization (<input type="checkbox"/> Full <input type="checkbox"/> Partial)																															
Substrate <input checked="" type="checkbox"/> Est. <input type="checkbox"/> P.C		Riffle _____ %	Run; _____ %	Pool _____ %																															
Silt/Clay (<0.06 mm)																																			
Sand (0.06-2 mm)																																			
Gravel (2-64 mm)																																			
Cobble (64-256 mm)																																			
Boulders (>256 mm)																																			
Bedrock																																			
Habitat		Condition Category																																	
Parameter	Optimal	Suboptimal	Marginal	Poor																															
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.																															
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0																															
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.																															
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0																															
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.																															
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0																															

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0
7. Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0

Total Score

100

NOTES/COMMENTS;

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Carter Branch Excess Material Site / 5W</u> Applicant/Owner: <u>KYTC</u> Investigator: <u>Rigney, Purdy</u>	Date: <u>11-3-2009</u> County: <u>Marion</u> State: <u>KY</u>			
Do Normal Circumstances exist on the site? Is the site significantly disturbed (Atypical Situation)? Is the area a potential Problem Area? (If needed, explain on reverse.)	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Yes <input checked="" type="radio"/> No <input type="radio"/></td> </tr> <tr> <td style="text-align: center;">Yes <input type="radio"/> No <input checked="" type="radio"/></td> </tr> <tr> <td style="text-align: center;">Yes <input type="radio"/> No <input checked="" type="radio"/></td> </tr> </table>	Yes <input checked="" type="radio"/> No <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>
Yes <input checked="" type="radio"/> No <input type="radio"/>				
Yes <input type="radio"/> No <input checked="" type="radio"/>				
Yes <input type="radio"/> No <input checked="" type="radio"/>				
Community ID: <u>Emergent</u> Transect ID: <u>NA</u> Plot ID: <u>NA</u>				

VEGETATION

Dominant Plant Species	Stratum	Indicator	
1. <u>Typhus latifolia</u>	<u>Herb</u>	<u>OBL</u>	9. _____
2. <u>Potamogeton Crispus</u>	<u>Herb</u>	<u>OBL</u>	10. _____
3. <u>Potamogeton Hillii</u>	<u>Herb</u>	<u>OBL</u>	11. _____
4. <u>Juncus effusus</u>	<u>Herb</u>	<u>OBL</u>	12. _____
5. _____	_____	_____	13. _____
6. _____	_____	_____	14. _____
7. _____	_____	_____	15. _____
8. _____	_____	_____	16. _____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100 %

Remarks: _____

HYDROLOGY

<p>Recorded Data (Describe in Remarks):</p> <p><input type="checkbox"/> Stream, Lake, or Tide Gauge</p> <p><input type="checkbox"/> Aerial Photographs</p> <p><input type="checkbox"/> Other</p> <p><input type="checkbox"/> No Recorded Data Available</p> <hr/> <p>Field Observations:</p> <p>Depth of Surface Water: <u>0.5 - 3</u> (in.)</p> <p>Depth to Free Water in Pit: _____ (in.)</p> <p>Depth to Saturated Soil: _____ (in.)</p>	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicators:</p> <p><input checked="" type="checkbox"/> Inundated</p> <p><input type="checkbox"/> Saturated in Upper 12 Inches</p> <p><input type="checkbox"/> Water Marks</p> <p><input type="checkbox"/> Drift Lines</p> <p><input type="checkbox"/> Sediment Deposits</p> <p><input checked="" type="checkbox"/> Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required):</p> <p><input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches</p> <p><input type="checkbox"/> Water-Stained Leaves</p> <p><input type="checkbox"/> Local Soil Survey Data</p> <p><input type="checkbox"/> FAC-Neutral Test</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>
Remarks: _____	

SW

SOILS

Map Unit Name (Series and Phase): <u>Nicholson Silt Loam</u>		Drainage Class: <u>Unknown</u>	
Taxonomy (Subgroup): <u>unknown</u>		Field Observations Confirm Mapped Type? Yes <input type="radio"/> No <input checked="" type="radio"/>	
Profile Description:			
Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)
<u>1-3</u>	<u>A</u>	<u>10YR 5/3</u>	
<u>3-12</u>	<u>A/B</u>	<u>10YR 7/1</u>	
Hydric Soil Indicators:			
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input checked="" type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)	
Remarks: <u>Nicholson Silt Loam is not a hydric soil. The inundation has clearly created the hydric soil conditions now present.</u>			

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No (Circle) Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Hydric Soils Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	(Circle) Is this Sampling Point Within a Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No
Remarks: <u>The wetland is 7500 ft² = 0.17 acres.</u>	

Approved by HQUSACE 3/82

ATTACHMENT

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): 8/21/2009

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:
Danny Peake, KYTC, 200 Mero Street Frankfort, KY 40622

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: CELRL, Blankenbaker Parkway Extension, LRL-2009-

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
LEBANON-DANVILLE; RECONSTRUCTION OF US-68 FROM 4600' WEST OF HOURIGAN LANE TO 1200' WEST OF BEECH FORK CHURCH ROAD. FOR THE PURPOSE OF SAFETY IMPROVEMENTS – ELIMINATION OF CURVES, WIDEN ROAD TO MEET DAILY TRAFFIC VOLUME SAFETY SPECIFICATIONS AND IMPROVE SITE DISTANCE.

(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State:KY County/parish/borough: Marion City: Lebanon
Center coordinates of site (lat/long in degree decimal format): Lat. N 37.583706 Pick List, Long. W-85.102075 Pick List.

Universal Transverse Mercator:

Name of nearest waterbody: Landers Creek

Identify (estimate) amount of waters in the review area:

Non-wetland waters: 2,547 linear feet: width (ft) and/or 0.537 acres.

Cowardin Class: Riverine - R4

Stream Flow: Ephemeral, Intermittant and Perennial

Wetlands: 0.28 acres.

Cowardin Class: P

Name of any water bodies on the site that have been identified as Section 10 waters:

Tidal:

Non-Tidal:

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

Office (Desk) Determination. Date:

Field Determination. Date(s): 13 July 2009 and 2nd visit on 10 Oct 2009

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable. This preliminary JD finds that there "*may be*" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should 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: .
- 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: .
- 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: 1:24,000 – Lebanon East and Gravel Switch
- USDA Natural Resources Conservation Service Soil Survey. Citation: .
- National wetlands inventory map(s). Cite name: National Wetland Inventory Polygons – GIS coverage.
- State/Local wetland inventory map(s): .
- FEMA/FIRM maps: .
- 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
- Photographs: Aerial (Name & Date): FSA Color Ortho Imagery 2006 – 2 foot coverage.
or Other (Name & Date): .
- Previous determination(s). File no. and date of response letter: .
- Other information (please specify): .

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Signature and date of
Regulatory Project Manager
(REQUIRED)

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining
the signature is impracticable)

Site number	Latitude	Longitude	Cowardin Class	Estimated amount of aquatic resource in review area	Class of aquatic resource in review area
71+55	37.578792	-85.125726	R4	0.033	non-section 10 – non-wetland
72+75	37.578459	-85.12408	P	0.110	non-section 10 – wetland
75+72	37.578833	-85.122374	R4	0.011	non-section 10 – non-wetland
97+00	37.580139	-85.117153	R2	0.004	non-section 10 – non-wetland
146+73	37.583903	-85.100563	R4	0	non-section 10 – non-wetland
150+37	37.583984	-85.099384	R4	0.055	non-section 10 – non-wetland
154+49	37.584176	-85.097025	R4	0.23	non-section 10 – non-wetland
42+00	37.58604	-85.090216	R4	0.015	non-section 10 – non-wetland
1e	37.58604	-85.090216	R4	0.010	non-section 10 – non-wetland
2i	37.58603	-85.090236	R4	0.028	non-section 10 – non-wetland
3e	37.58624	-85.09	R4	0.016	non-section 10 – non-wetland
4p	37.58704	-85.090217	R2	0.039	non-section 10 – non-wetland
5w	37.66604	-85.090111	P	0.17	non-section 10 – wetland

KYTC Item No. 4-192.2
Marion County, US 68 Improvement

LOP ASSESSMENT OF ENVIRONMENTAL, SOCIAL, AND OTHER FACTORS

Threatened and Endangered Species: Proper consultation with the US Fish and Wildlife Service (USFWS) has occurred to satisfy the requirements of Section 7 of the Endangered Species Act. USFWS provided KYTC with a county-based list of Endangered Species. KYTC also considered species lists maintained by the Kentucky Nature Preserves Commission and the Kentucky Department of Fish and Wildlife Resources. There were three species of concern listed for Marion County; *Myotis sodalis*, *Pseudoanopthalmus parvus*, and *Haliaeetus leucocephalus*. KYTC addressed the federally protected and listed species by conducting a Habitat Assessment and determined that suitable habitat for *Myotis sodalis* does exist within the project area. The Federal Highway Administration (FHWA) concurred with this finding through Memorandum of Understanding with KYTC dated September 27, 2005). The KYTC mitigated for the loss of 10.06 acres and 23 trees through payment into the Indiana Bat Conservation Fund in accordance with the Biological Opinion FWS#06-0466 dated June 9, 2006.

Economics: The project will have a positive impact on the local economy by improving community connectivity between Lebanon and Danville. There have already been several improvements to the US 68 corridor between Lebanon and Danville increasing the safety of travel and reducing travel time between the two communities.

Aesthetics: This project would alter the current aesthetics of the existing landscape. Whether changes to the surrounding aesthetics would be viewed as beneficial or detrimental is subjective and dependent on a person's perspective. However the corridor is currently already impacted by residential development.

Special Aquatic Sites: The project would not affect any Special Aquatic Sites (SAS).

Historical Properties: The KYTC has addressed Cultural and Historic Resources in accordance with Section 106 of the National Historic Preservation Act. Identification of historic properties within the area of potential effect has been conducted. There were two properties identified as eligible for the National Register of Historic Places. The KYTC has determined that the chosen alignment will have No Effect on Historic Properties. Concurrence with this conclusion was rendered by the Kentucky Heritage Council, State Historic Preservation Officer (SHPO) by form signed November 20, 2002 (see attachments). The potential for impact to archaeological sites was also considered within the project limits. Phase I archaeological testing was performed and no significant sites were found within the jurisdictional areas.

Fish and Wildlife Values: Due to the nature of the existing land use the availability of habitat for fish and wildlife is minimal. The KYTC proposes to mitigate for impacts to

fish and wildlife habitat through use of appropriate sediment and erosion control BMPs during construction.

Flood Hazards: The KYTC minimizes, whenever possible, encroachment upon the flood plain. Water control structures within the flood plain are designed and then analyzed using HEC-RAS to assure that these do not adversely effect flood elevations.

Flood Plain Values: The KYTC complies with the state floodplain regulations and the National Insurance Act. KYTC projects minimize the placement of fill material into flood plains and include features such as flood plain compensation and storm water detention basins. Thus, KYTC projects have minimal impacts to floodplain values and functions.

Land Use Classification: Land use in the project area is primarily rural residential and agricultural. Population growth within Lebanon and Marion County may result in additional residential growth near the project, but this project is not expected to directly influence changes in land use within Marion County.

Navigation: There are no navigable waterways within the project area.

Shore Erosion and Accretion Patterns: Shore erosion and accretion patterns would not be affected by this project as it is not located on a lake or a major tributary.

Recreation: The project would not affect existing recreational opportunities.

Existing and Potential Water Supplies; Conservation: The project would not affect existing water supplies. No construction activities occur within the vicinity of existing water supplies.

Water Quality: This project would have temporary impacts to water quality during the construction phase. This project will minimize those impacts via compliance with the KPDES General Storm Water Permit for Construction, achievement and compliance with a 401 Water Quality Certification and compliance with SMS4 requirements and local ordinances, where appropriate. Compliance is generally achieved through structural BMPs (silt fence, silt checks, detention basins etc) or non-structural BMPs such as mulching, seeding, grading, etc.

Energy Needs: This project would result in a short-term increase in energy consumption during construction. Overall, the project would decrease energy consumption by alleviating congestion, reducing travel times and improving traffic flow patterns.

Safety: The project would improve the safety of US 68 by providing additional shoulder width, eliminating dangerously close vertical curves, and increasing site distance from entrances to the highway.

Food and Fiber Production: The project would have minimal impact on food and fiber production. There is one farming operation that would be disrupted by the highway project, but this loss was necessary to preserve the historic Purdem House.

Mineral Needs: This project would have no impact on mineral needs. No naturally occurring reserves of fossil fuels or other vital resources have been noted in the area.

Consideration of Property Ownership: The proposed project would require the relocation of two five dwellings. No agencies or institutions would be displaced. To minimize the unavoidable affects of Right of Way acquisition and residential and business displacements the KYTC must comply with *Uniform Relocation Assistance and Real Property Acquisition Policies Act, the Title 6 of the Civil Rights Act and Executive Order 12898-Federal Actions to Address Environmental Justice in Low Income and Minority Populations*. If decent and safe and sufficient sanitary housing is not available KYTC may be required to use the Last Resort Housing Program. Thus, in association with this project, property ownership has been considered and addressed by KYTC.

LOP Transportation Projects Complete Application Check List.

Project Name: 4-192.2 US 68	Corps I. D.	Corps PM: J.Thomason	
Applicant: KYTC, Danny Peake	Agent:	KTC Item No. 4-192.2	
Application Information		Completed	
	N/A	Yes	No
D.A. Application w/signature		X	
Alt. Analysis		X	
Maps		X	
Agency Coordination			X
Site Visit		X	
Approved JD		X	
Section 106 Concurrence		7/7/2008	
Section 7 Concurrence		2/18/2009	
Wetland Data Sheets		NA	
Stream Functional Assessment/RBP Sheets		X	
Final Mitigation Plan		NA	
Cumulative Impacts Table		X	
Individual WQC			X
Other:			
Public Interest/Environmental Effects		Addressed	
	N/A	Yes	No
Economics		2/10/2010	
Aesthetics		2/10/2010	
Special Aquatic Sites		2/10/2010	
Fish and Wildlife Values		2/10/2010	
Flood Hazards		2/10/2010	
Land Use Classification		2/10/2010	
Navigation		2/10/2010	
Shore Erosion/Accretion Patterns		2/10/2010	
Recreation		2/10/2010	
Existing and Potential Water Supplies, Conservation		2/10/2010	
Water Quality		2/10/2010	
Energy Needs		2/10/2010	
Safety		2/10/2010	
Food and Fiber Production		2/10/2010	
Mineral Needs		2/10/2010	
Consideration of Property Ownership		2/10/2010	
Other:			

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

The US 68 project area is located east of Lebanon. The reconstruction begins just east of Barbers Mill Road and extends easterly approximately 12 miles to a point east of the Marion and Boyle County line. There are three separate sections of US 68 that are proposed to be reconstructed. The project excludes areas of spot improvements that have already been completed.

1.2 NEED FOR PROJECT

The purpose of the reconstruction of US 68 is to increase capacity and to improve safety. The improvement objectives are in direct response to existing geometric deficiencies. The reconstruction is needed to reduce potentially dangerous accidents and to provide a better roadway for the anticipated growth in the region that will increase traffic.

2.0 CONSIDERED ALTERNATES

2.1 SECTION 1 – ALTERNATE NO. 1

At the beginning of this section the reconstruction of US 68 would be along the existing alignment. Starting around Eastland Acres, the new road would be located 30-40 feet south of the existing road until it ties into existing improvements just east of Garret Lane. The reconstruction would start again at a point just west of Pope Creek Road. From there, the new road would be located 30-40 feet south of the existing road to a point just east of Hundley Lane. It would then cross the existing road and then curve back such that it would be 50-80 feet south of the existing road tying into existing improvements at a point just west of Mays Chapel Road. This alternate would not have any relocations.

2.2 SECTION 1 – ALTERNATE NO. 2

At the beginning of this section the new road would be located 30-40 feet north of the existing road and then cross back across the existing road just west of Eastland Acres. The new road would then be located 60-80 feet south of the existing road until it ties into existing improvements just east of Garret Lane. The reconstruction would start again at a point just west of Pope Creek Road. From there, the new road would be located 50-100 feet north of the existing road and then go back across the existing road just west of Hundley Lane. From Hundley Lane the new road would be located 50 feet south of the existing road. It would then cross back over the existing road to the north tying into existing improvements at a point just west of Mays Chapel Road. This alternate results in a number of relocations.

2.3 SECTION 1 – ALTERNATE NO. 3

This alternate follows the alignment of the existing road. Vertical alignment improvements are required. Therefore, in order to maintain traffic during construction, temporary pavement would be constructed along the entire section on the north and/or south sides of the road. This alternate would result in impacts to a greater number of parcels.

2.4 SECTION 2 – ALTERNATE NO. 1

The new road would be located approximately 80 feet north of the existing road. This

alternate is considered to have an adverse impact on the historical significance of the Coyle Property. An unmarked cemetery would also be impacted by this alternate.

2.5 SECTION 2 – ALTERNATE NO. 1A

This alternate is basically the same as Alternate 1 except impact to the Coyle Property is avoided. To accomplish this, the new road at the beginning of the section would curve to the south and be located approximately 500 feet from the existing road and it would then curve back to the north tying into the alignment developed for Alternate 1 just east of Hourigan Lane. An unmarked cemetery would be impacted by this alternate. An existing portion of existing US 68 would be left in place to serve local residents and farms. Approach roads would be constructed to provide access to the portion remaining.

2.6 SECTION 2 – ALTERNATE NO. 1B

This alternate is basically the same as Alternate 1A except impact to the unmarked cemetery is avoided. To accomplish this, the new road would remain south of the existing road until just past the cemetery that is located on the north side of the road. It would then curve back to the north and tie to the alignment developed for Alternate 1.

2.7 SECTION 2 – ALTERNATE NO. 2

From the beginning of the section to Hourigan Lane, the new road would be located 50-150 feet north of the existing road. At Hourigan Lane, it would then curve to south and be located along the existing road approximately 75 feet to the south until it ties into the existing improvement just east of Beech Fork Church Road. This alternate is considered to have an adverse impact on the historical significance of the Coyle Property. It would also result in a number of relocations.

2.8 SECTION 2 – ALTERNATE NO. 3

The new road for this alternate would be located within a different corridor to the north. The new road would be located approximately 300-500 feet north of the existing road. Most of existing US 68 would be left in place to serve local residents and farms. Approach roads would be constructed to provide access to the portion remaining. This alternate is considered to have an adverse impact on the historical significance of the Coyle Property. It also dissects a number of farms.

2.9 SECTION 2 – ALTERNATE NO. 3A

This alternate is basically the same as Alternate 3 except impact to the Coyle Property is avoided. To accomplish this, the new road at the beginning of the section would curve to the south, similar to Alternate 1A and 1B, and be located approximately 500 feet from the existing road and it would then curve back to the north tying into the alignment developed for Alternate 3 just east of Hourigan Lane.

2.10 SECTION 3 – ALTERNATE NO. 1

From the beginning of this section, the new road would be located in a new corridor to the north and then curve back toward the existing road at a point near Craintown Road. A portion of existing US 68 would be left in place to serve local residents and farms. Approach roads would be constructed to provide access to the portion remaining. From Craintown Road, the new road would be located 40 feet north of the existing road to a point near the county line. It would then curve further to the north away from the existing road for a short distance and then continue along the existing road approximately 40 feet to the north until it ties into the existing improvements.

2.11 SECTION 3 – ALTERNATE NO. 2

From the beginning of this section the new road would be located approximately 90 feet north of the existing road. It would curve further to the north as it approaches Craintown Road. The new road would continue to be located north of the existing road until it crosses over the existing road at a point just east of Ward's Branch Road. From there, it would be located 50-90 feet south of the existing road until it ties into the existing improvements. This alternate results in an adverse amount of channel change to a blueline stream in the east end of the section.

2.12 SECTION 3 – ALTERNATE NO. 3

This alternate is similar to Alternate 1, except in the beginning of the section, the new road would be located in a new corridor not quite as far to the north. The remainder of this section is basically the same as Alternate 1. This alternate causes more of an adverse impact with respect to dissection of farmland in the west end of the section.

2.13 SECTION 3 – ALTERNATE NO. 3-1

This alternate is a combination of Alternate 3 and Alternate 1. It would include the first 4000 feet of Alternate No. 3 with the remainder of the section being that of Alternate No. 1.

2.14 SECTION 3 – ALTERNATE NO. 2-1

This alternate is a combination of Alternate 2 and Alternate 1. It would include the first 4000 feet of Alternate No. 2 with the remainder of the section being that of Alternate No. 1.

2.15 DO NOTHING ALTERNATE

With this alternate there would be no improvements to the existing road. It would remain geometrically deficient and capacity would not be increased to keep up with the projected growth in the region. Further, the unsafe conditions in many areas of each section would not be corrected and there would be no remedy to curb the potential of future accidents.

3.0 MAINTENANCE OF TRAFFIC

For each section, the construction can be accomplished with part-width construction and phasing the construction on one side and then the other. For the most part, two lanes of traffic will be maintained at all times. At times, one lane may need to be closed for short periods of time, but this will be controlled by the contractor's flagmen. There will be no major detouring or traffic needed along the mainline. Construction of some temporary pavement for run-arounds will be required in some areas.

4.0 RECOMMENDATIONS

A Public Meeting was held in Lebanon on December 11, 2001. Subsequent meetings were held with concerned property owners in Section 2 and Section 3 on January 15, 2002 and January 8, 2002, respectively. The Project Development Team (PDT) met on January 31, 2002 to discuss the comments from the Public Meeting and the meetings held with property owners. The PDT

agreed that the historic property and cemetery in Section 2 should be avoided. The recommended alternate for each section is as follows:

- Section 1 – Alternate No. 1
- Section 2 – Alternate No. 1B
- Section 3 – Alternate No. 2-1

Estimated costs of the recommended alternates for each section are shown below.

RECOMMENDED ALTERNATES				
SECTION	Right of Way	Utility Relocations	Construction	TOTAL
1 (Alt. #1)	\$700,000	\$1,000,000	\$5,500,000	\$7,200,000
2 (Alt. #1B)	\$2,100,000	\$1,300,000	\$6,700,000	\$10,100,000
3 (Alt. #2-1)	\$1,000,000	\$700,000	\$5,700,000	\$7,400,000
TOTALS:	\$3,800,000	\$3,000,000	\$17,900,000	\$24,700,000

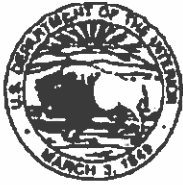
The funding and schedule for all sections in the approved June 2000 Six Year Plan is as follows:

JUNE 2000 SIX YEAR PLAN			
PHASE	FUNDING	GA YEAR	AMOUNT
Right of Way	State Project	2003	\$2,500,000
Utility Relocations	State Project	2005	\$2,000,000
Construction	State Project	2006	\$13,000,000
TOTAL:			\$17,500,000

The original estimates were prepared in the fall of 1999 with limited information. All were based on historical averages, for the area using a cost per mile basis and USGS map.

The existing corridor of US68 has experienced quite a bit of residential development during the last 3 years. The preferred alignments maintain this existing corridor as much as possible. Increase in R/W and Utility costs are directly related to this development spike. Section 2 contributing factors to these cost increases are also related to avoidance of the historic property and cemetery identified above.

Increases in construction cost are due to the limited information available at the onset. With more detailed mapping and plan preparation, a better estimate has now been prepared.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
330 West Broadway, Suite 265
Frankfort, Kentucky 40601
(502) 695-0468

October 17, 2008

Mr. David Waldner
Kentucky Transportation Cabinet
200 Mero Street
Frankfort, Kentucky 40622

Re: FWS Log # 2008-B-0711; Biological Assessment for running buffalo in association with the US 68 reconstruction from 4600 feet west of Hourigan Lane to 1200 feet west of Beech Fork Church Road in Boyle and Marion Counties, Kentucky;
KYTC Item Number: 4-192.3

Dear Mr. Waldner:

The U.S. Fish and Wildlife Service (USFWS) has reviewed your June 26, 2008 letter and attached BA dated June 17, 2008 for the above referenced project proposal. Additionally, the KYTC intends to address potential adverse effects on the Indiana bat by use of the June 9, 2006 Indiana bat programmatic biological opinion provided by our office. Therefore, an effects determination for the Indiana bat within this BA is not appropriate because the 2006 programmatic consultation addressed effects of this type of action on the Indiana bat. Based on our review of the information received:

- We concur with your determination that the proposed action is "not likely to adversely affect" the federally listed running buffalo clover. In view of this, we believe that the requirements of section 7 of the Act have been fulfilled with regards to potential affects of the proposed project on these species.

If you should have any questions, please contact Phil DeGarmo at (502) 695-0468, and please reference the above FWS Log No.

Sincerely,

Virgil Lee Andrews, Jr.
State Field Office Supervisor
Kentucky Ecological Services Field Office



Commonwealth of Kentucky
Transportation Cabinet
Frankfort, Kentucky 40622

James C. Codell, III
Secretary of Transportation

Paul E. Patton
Governor

Clifford C. Linkes, P.E.
Deputy Secretary

April 11, 2003

Mr. David Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer
300 Washington Street
Frankfort, KY 40601

Dear Mr. Morgan:

SUBJECT: *An Archaeological Survey of the Proposed US 68 Reconstruction Project in Marion and Boyle Counties, Kentucky (Item No. 4-192.00).*
By David Kush
Marion and Boyle Counties, Kentucky
State Item Number 4-192.00

Enclosed for you review and concurrence are two copies of the subject report. The staff of this Division and the staff of the State Historic Preservation Office have previously reviewed the referenced archaeological report concurrently. Following our edits and comments, the report has been revised.

The report presents the results of Phase I survey. A total of 25 previously unidentified archaeological sites (15Mn77-15Mn97 and 15Bo80-15Bo83) and six isolated finds were recorded. One previously recorded site (15Mn337) was also revisited.

The author considers site 15Mn88 potentially eligible for listing in the National Register of Historic Places and recommends Phase II testing. This office concurs with this recommendation.

The author does not consider sites 15Mm77, 5Mm78, 15Mm79, 15Mm80, 15Mm81, 15Mm82, 15Mm83, 15Mm84, 15Mm85, 15Mm86, 15Mm87, 15Mm89, 15Mm90, 15Mm93, 15Mm94, 15Mm95, 15Mm96, 15Bo81, 15Bo82, 15Bo83, and Isolated Finds 1 through 6 to be eligible for listing in the National Register of Historic Places and recommends no further work. This office concurs with this recommendation.



KENTUCKY TRANSPORTATION CABINET
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WHICH PROMOTES ECONOMIC GROWTH AND ENHANCES THE QUALITY OF LIFE IN KENTUCKY"
"AN EQUAL OPPORTUNITY EMPLOYER M/F/D"

The author does not consider the portions of sites 15Mn91, 15Mn92, 15Mn337, and 15Bo80 impacted by the project to be eligible for listing in the National Register of Historic Places. However, should project boundaries shift, impacting additional portions of these sites, the author recommends Phase II testing. This office concurs with this recommendation, on the condition that any additional work be considered on a case by case basis in consultation between KYTC and the SHPO.

One parcel (Parcel 85) could not be surveyed due to lack of landowner permission. The author recommends no additional work for this 2.7-acre parcel, as this portion of residential land is similar to surrounding parcels, which are disturbed. This office disagrees, and recommends the portions of Parcel 85 that will be impacted by this project be surveyed once right-of-entry is obtained.

We request your concurrence with our recommendations and that your office grant archaeological clearance for this report by May 12, 2003. If you have any questions, please contact Carl Shields of my staff at (502) 564-7250.

Very truly yours,



David M. Waldner, P.E., Director
Division of Environmental Analysis

DMW/crs
enclosures

c: Paul Rawlings
Carl Shields
Tony Vinegar
Jeff Schaefer (District 4)
Doug Lambert (Palmer)
Charles Niquette (CRA)
Archaeology Files

D-4



Commonwealth of Kentucky
Transportation Cabinet
Frankfort, Kentucky 40622

James C. Codell, III
Secretary of Transportation

Paul E. Patton
Governor

Clifford C. Linkes, P.E.
Deputy Secretary

May 14, 2003

Mr. David Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer
300 Washington Street
Frankfort, KY 40601

Dear Mr. Morgan:

SUBJECT: *An Archaeological Survey of the Proposed US 68 Reconstruction Project in Marion and Boyle Counties, Kentucky (Item No. 4-192.00). By David Kush Marion and Boyle Counties, Kentucky State Item Number 4-192.00*

In our April 11, 2003 letter requesting concurrence for the findings on the subject report, KYTC disagreed with the author regarding the recommendation for Parcel 85. This parcel could not be surveyed due to lack of landowner permission. The author recommended no additional work for this 2.7-acre parcel, as this portion of residential land was similar to surrounding parcels, which are disturbed. This office disagreed, and recommended this parcel be surveyed once right-of-entry was obtained.

Portions of this 2.7-acre parcel included a survey buffer that would provide the design team room for minor road adjustments. Final plans have now been developed (see enclosed). The area to be impacted by the project (0.133 acres) is much smaller than 2.7 acres. Given the small size, the level of disturbance in the adjacent parcels, and the low probability that this parcel would contain archaeological deposits, this office is revising its recommendation, and recommends no additional archaeological survey for this parcel.

We request your concurrence with our revised recommendation for this report. If you have any questions, please contact Carl Shields of my staff at (502) 564-7250.

Very truly yours,

David M. Waldner, P.E., Director
Division of Environmental Analysis

DMW/crs
copy with enclosure:

- Paul Rawlings, Carl Shields
- Tony Vinegar, Archaeology Files
- Jeff Schaefer (District 4)
- Doug Lambert (Palmer)
- Charles Niquette (CRA)



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Kentucky Archaeological Survey

Jointly administered by the Kentucky Heritage Council
and the University of Kentucky Department of Anthropology



April 18, 2008

Mr. David M. Waldner, P.E., Director
Division of Environmental Analysis
Transportation Cabinet
125 Holmes Street
Frankfort, Kentucky 40622

**Re: Archaeological Investigation of Site 15Mn88
Marion County - Item No. 4-192.20**

Dear Mr. Waldner:

The Kentucky Archaeological Survey (KAS) has completed its investigation of archaeological site 15Mn88. Based on the results of this project, archaeological site 15Mn88 appears to be a multi-component site that does not contain significant intact subplowzone deposits. The prehistoric component consists entirely of lithic debris and tools, including Archaic through Late Prehistoric diagnostic projectile points, that were recovered from disturbed contexts.

The Historic component dates from the early-nineteenth to mid-twentieth century. Intact subplowzone deposits associated with this component include the remains of a stone house foundation, two postmolds, and a trash midden. Unfortunately, within these deposits no clear separation of historic materials could be identified, with nineteenth and twentieth century materials being recovered from the same contexts.

The work conducted by KAS has exhausted the research potential of archaeological site 15Mn88, and we have no objections to the remainder of the site located with the project right-of-way being impacted by the proposed reconstruction of US 68. Should you have any questions, feel free to contact me at (502) 564-7005, ext 123.

Sincerely,

A handwritten signature in black ink, appearing to read "David Pollack".

David Pollack, Ph.D., Director
Kentucky Archaeological Survey and
Site Protection Program Manager
Kentucky Heritage Council



TRANSPORTATION CABINET
ENVIRONMENTAL ANALYSIS

Nov 21 1 47 PM '02

Education, Arts and Humanities Cabinet

KENTUCKY HERITAGE COUNCIL

The State Historic Preservation Office

Paul E. Patton
Governor
Marlene M. Helm
Cabinet Secretary

David L. Morgan
Executive Director and
SHPO

November 20, 2002

Mr. David M. Waldner, Director
Division of Environmental Analysis
Kentucky Transportation Cabinet
125 Holmes Street
Frankfort, KY 40622

Re: A Cultural Historic Survey of the Proposed Reconstruction of US 68 in Marion County, Kentucky (Item No. 4-192.00)

Dear Mr. Waldner:

The State Historic Preservation Office has received for review and approval the above referenced cultural historic survey prepared by F. Rogers, T. Spurlock, and J. Kirkwood of Cultural Resource Analysts, Inc. We are in agreement that Site 1 (MN-115), Site 2 (MN-116), Site 3 (MN-117), Site 4 (MN-118), Site 5 (MN-119), Site 6 (MN-120), Site 7 (MN-121), Site 8 (MN-122), Site 9 (MN-123), Site 10 (MN-124), Site 11 (MN-125), Site 12 (MN-126), Site 13 (MN-127), Site 14 (MN-128), Site 15 (MN-129), Site 17 (MN-130), Site 18 (MN-131), Site 19 (MN-132), Site 20 (MN-133), Site 21 (MN-134), Site 22 (MN-135), Site 23 (MN-136), Site 24 (MN-137), Site 25 (MN-138), Site 26 (MN-139), Site 27 (MN-140), Site 28 (MN-141), Site 29 (MN-142), Site 30 (MN-143), Site 31 (MN-144), Site 33 (MN-146), Site 34 (BO-100), Site 35 (BO-99), Site 36 (BO-435), Site 37 (BO-98), Site 38 (BO-436), and Site 39 (BO-97) are not eligible for listing on the National Register individually or within the context of a historic district.

We also concur that Site 16 (MN-98) and Site 32 (MN-145) are individually eligible for listing on the National Register under Criteria C. While we agree that the boundary determinations for Site 32 are appropriate, more information will be required for justifying the proposed boundary at Site 16. It is stated in the report that, "The extant outbuildings and barns do not appear to contribute to the period of significance for the home; therefore, the recommended NRHP boundary only included the area immediately around the house." (pp. 22) While these outbuildings were lettered B through J, no corresponding photographs or descriptions were provided. Furthermore, the authors did not provide any support for the exclusion of these outbuildings other than the statement that they did not appear to be contributing.

300 Washington Street
Frankfort, Kentucky 40601
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Telephone (502) 564-7005

FAX (502) 564-5820

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Mr. David M. Waldner
November 20, 2002
Page 2

Despite the questions that remain concerning appropriate boundaries for Site 16, it is the determination of this office that Alternate 1B will have No Effect on Historic Properties due to its position south of each resource. Should you have any questions, please feel free to contact Craig Potts of my staff at (502) 564-7005 ext. 121.

Sincerely,

A handwritten signature in cursive script that reads "David L. Morgan". The signature is written in dark ink and includes a stylized flourish at the end.

David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

Cc: Karen Hudson, Ph.D. (CRAI)

COUNTY OF MARION
ITEM NO. 4-192.20
SHEET NO. 8

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

**FINAL REVIEW PLANS
NOT FOR CONSTRUCTION
OCTOBER 3, 2008**

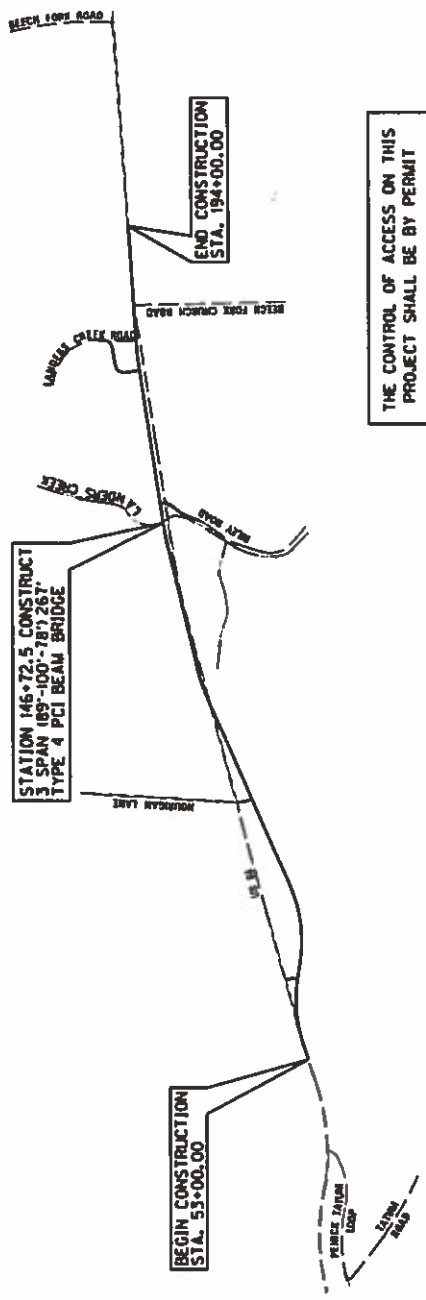
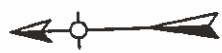
PLANS OF
PROPOSED PROJECT
MARION COUNTY

US 68 - SECTION 2

PENICK TATUM LOOP TO BEECH FORK CHURCH ROAD
ITEM NO. 4-192.20

FD04 1550 C078

GRADE, DRAIN, AND SURFACING PLANS



THE CONTROL OF ACCESS ON THIS PROJECT SHALL BE BY PERMIT

GRAPHIC SCALE IN FEET
0 1000 2000 3000

LAYOUT MAP

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COUNTY OF MARION
 HIGHWAY NO. 4-192.20
 SHEET NO. R3

ENTRANCE CONSTRUCTION - LEFT

STATIONING TYPE	PIPE LENGTH AND SIZE	ASPH. CURB (TONS)	ASPH. BASE (TONS)	AREA (SQ YD)
52+4.3 TO 52+12.0	77.7' 12" DIA	1	0	73
52+12.0 TO 52+20.0	77.7' 12" DIA	1	0	73

DITCH CONSTRUCTION - LEFT

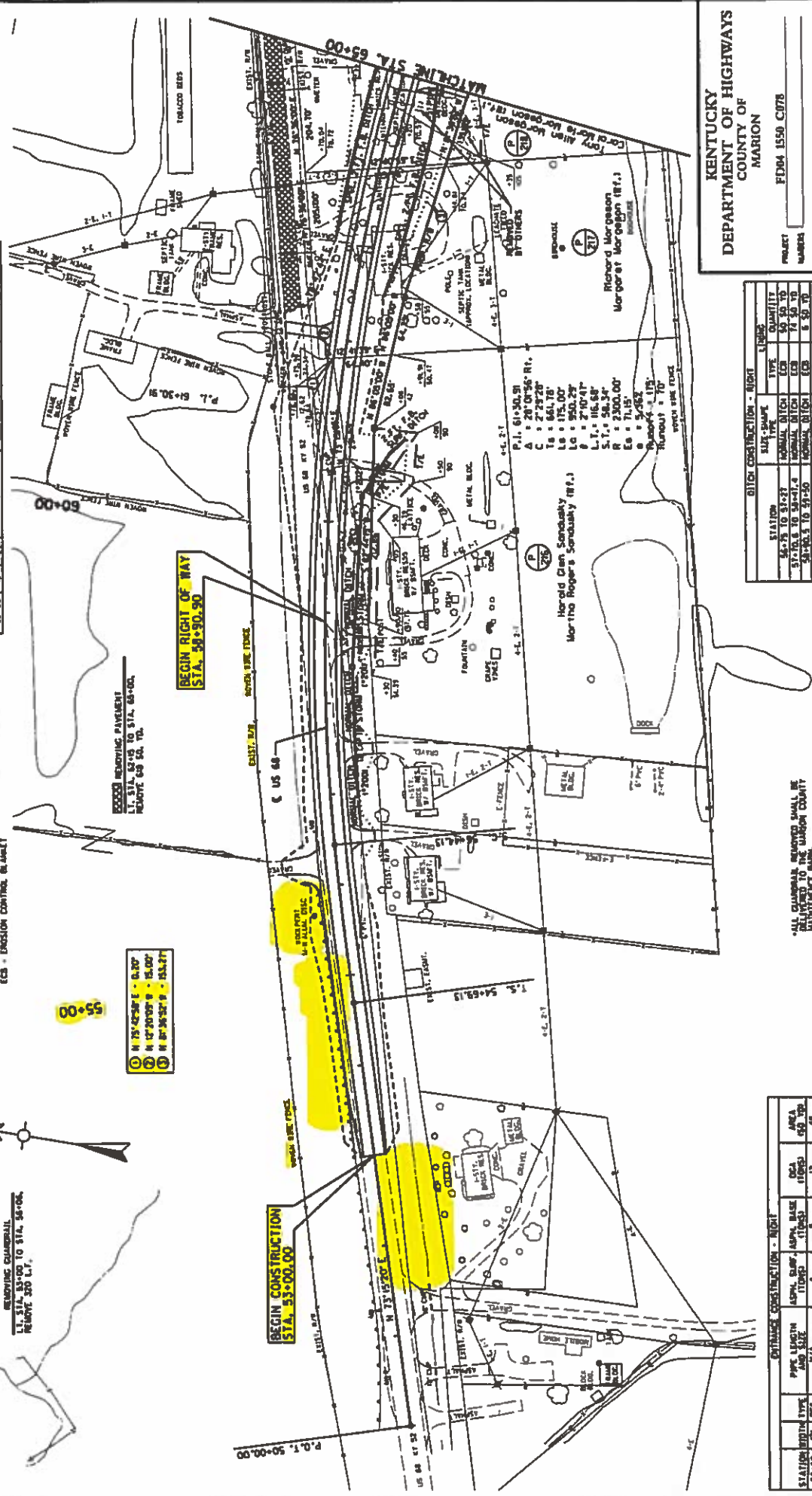
STATION	SIZING TYPE	QUANTITY
53+00 TO 53+20	TRANSITION	23.50 TO 27.50 TO
53+20 TO 55+00	SPEC. 2' x 8" E.C.	27.50 TO 29.50 TO

ENTRANCE CONSTRUCTION - RIGHT

STATIONING TYPE	PIPE LENGTH AND SIZE	ASPH. CURB (TONS)	ASPH. BASE (TONS)	AREA (SQ YD)
55+00 TO 55+10	77.7' 12" DIA	1	0	73
55+10 TO 55+20	77.7' 12" DIA	1	0	73

STEEL "I" BEAM GUARDRAIL
 LT. STA. 53+00 TO STA. 54+08 CONST.
 340 L.F. BY TERMINAL SECTION NO. 1.

REMOVING GUARDRAIL
 RT. STA. 53+00 TO STA. 54+08
 REMOVE 350 L.F.



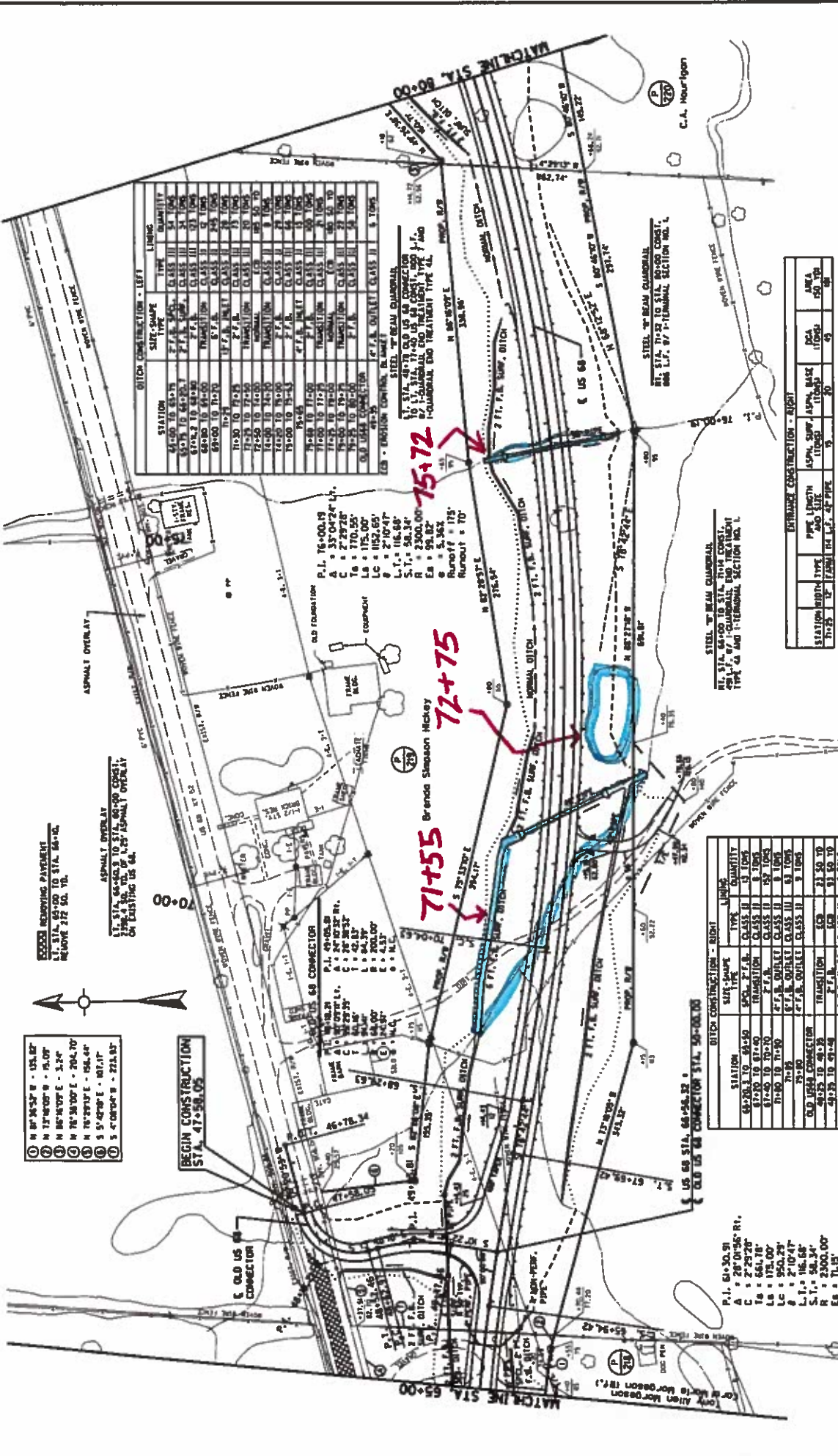
KENTUCKY
 DEPARTMENT OF HIGHWAYS
 COUNTY OF MARION
 PROJECT NUMBER: FD04 1550 C078
 GRADE, DRAIN, AND SURFACING PLAN
 US 68 - SECTION 2
 STA. 53+00 TO STA. 65+00

DITCH CONSTRUCTION - RIGHT

STATION	SIZING TYPE	QUANTITY
54+75 TO 51+77	TRANSITION	90.20 TO 92.20 TO
51+77.5 TO 51+77.9	TRANSITION	7.4 TO 7.5 TO
51+77.9 TO 51+50	TRANSITION	27.5 TO 29.5 TO
51+50 TO 51+20	SPEC. 2' x 8" E.C.	30.0 TO 32.0 TO
51+20 TO 51+00	SPEC. 2' x 8" E.C.	20.0 TO 22.0 TO
51+00 TO 51+00.3	SPEC. 2' x 8" E.C.	0.3 TO 0.3 TO
51+00.3 TO 51+00.3	SPEC. 2' x 8" E.C.	0.0 TO 0.0 TO

ALL GUARDRAIL REMOVAL SHALL BE SUBJECT TO THE LOCAL COUNTY SUBSTRUCTURE BUREAU.





- 1 N 87°34'37" W - 154.82'
- 2 N 17°40'07" E - 31.07'
- 3 N 86°30'07" E - 3.24'
- 4 N 76°30'00" E - 204.70'
- 5 S 79°17'17" E - 156.40'
- 6 S 5°47'00" E - 107.11'
- 7 S 4°08'04" W - 273.93'

BEGIN CONSTRUCTION STA. 47+59.05

OLD US 68 CONNEXION
 P.I. 49+05.89
 A = 28'01.56" R.I.
 C = 2'29.78"
 Tc = 661.78'
 Lc = 175.00'
 S.T. = 58.34'
 Ea = 59.82'
 Runoff = 175'
 Runout = 170'

71+55

72+75

75+72

STATION	SIZE - SHAPE	LINING TYPE	QUANTITY
65+00 TO 66+50	36" P.F.A.	CLASS II	13 1095
67+25 TO 67+00	TRANSITION	CLASS II	8 1095
67+45 TO 70+20	P.F.A.	CLASS II	29 1095
71+00 TO 71+25	P.F.A. INLET	CLASS III	63 1095
71+25 TO 71+50	P.F.A. INLET	CLASS III	9 1095
71+50 TO 71+50	TRANSITION	CLASS II	23 30 10
71+50 TO 71+50	P.F.A. INLET	CLASS II	53 50 10
71+50 TO 71+50	P.F.A. INLET	CLASS II	3 1095

P.I. 61+30.91
 A = 28'01.56" R.I.
 C = 2'29.78"
 Tc = 661.78'
 Lc = 175.00'
 S.T. = 58.34'
 Ea = 59.82'
 Runoff = 175'
 Runout = 170'

STATION	SIZE - SHAPE	LINING TYPE	QUANTITY
61+00 TO 61+75	P.F.A.	CLASS II	54 1095
61+75 TO 64+20	P.F.A.	CLASS II	54 1095
64+20 TO 64+20	TRANSITION	CLASS II	8 1095
64+20 TO 64+20	P.F.A.	CLASS II	29 1095
64+20 TO 64+20	P.F.A. INLET	CLASS III	63 1095
64+20 TO 64+20	P.F.A. INLET	CLASS III	9 1095
64+20 TO 64+20	TRANSITION	CLASS II	23 30 10
64+20 TO 64+20	P.F.A. INLET	CLASS II	53 50 10
64+20 TO 64+20	P.F.A. INLET	CLASS II	3 1095

STATION	PIPE LENGTH	PIPE TYPE	PIPE DIA.	PIPE WALL THICK.	PIPE	AREA
71+50 TO 71+50	30	ASPH. BASE	18"	30	AS	531.00
71+50 TO 71+50	30	ASPH. BASE	18"	30	AS	531.00
71+50 TO 71+50	30	ASPH. BASE	18"	30	AS	531.00

GRADE, DRAIN, AND SURFACING PLAN
 US 68 - SECTION 2
 STA. 65+00 TO STA. 80+00

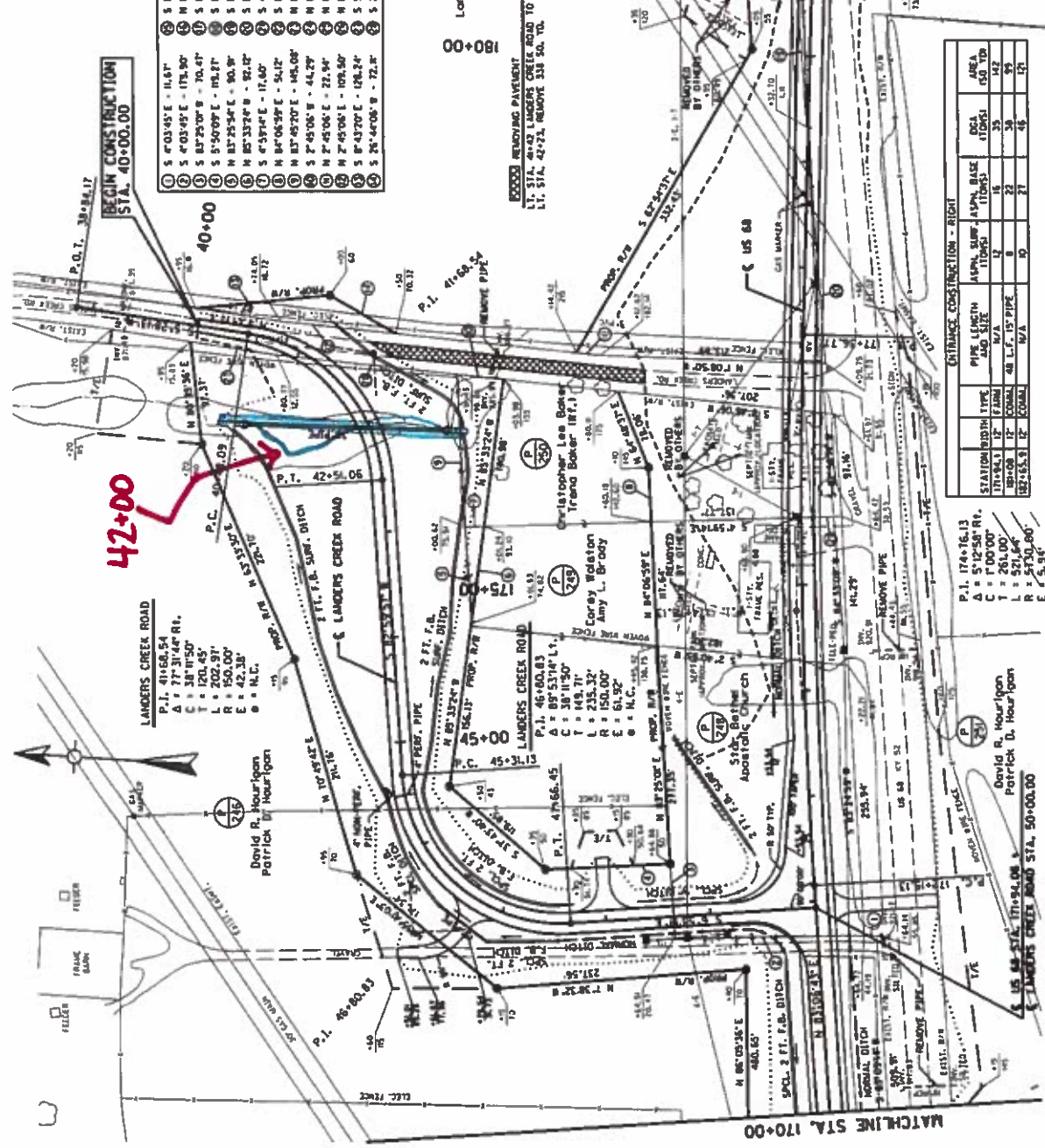
GRAPHIC SCALE IN FEET
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ENTRANCE CONSTRUCTION - LEFT			
STATION	WIDTH TYPE	PIPE LENGTH AND SIZE	APPROX. AREA (TONKS)
170+00	12" N.C.	N/A	12
175+00	12" N.C.	N/A	12
180+00	12" N.C.	N/A	12
185+00	12" N.C.	N/A	12
190+00	12" N.C.	N/A	12
195+00	12" N.C.	N/A	12
200+00	12" N.C.	N/A	12
205+00	12" N.C.	N/A	12
210+00	12" N.C.	N/A	12
215+00	12" N.C.	N/A	12
220+00	12" N.C.	N/A	12
225+00	12" N.C.	N/A	12
230+00	12" N.C.	N/A	12
235+00	12" N.C.	N/A	12
240+00	12" N.C.	N/A	12
245+00	12" N.C.	N/A </tr	

ENTRANCE CONSTRUCTION - RIGHT			
STATION	WIDTH TYPE	PIPE LENGTH AND SIZE	APPROX. AREA (TONKS)
170+00	12" N.C.	N/A	12
175+00	12" N.C.	N/A	12
180+00	12" N.C.	N/A	12
185+00	12" N.C.	N/A	12
190+00	12" N.C.	N/A	12
195+00	12" N.C.	N/A	12
200+00	12" N.C.	N/A	12
205+00	12" N.C.	N/A	12
210+00	12" N.C.	N/A	12
215+00	12" N.C.	N/A	12
220+00	12" N.C.	N/A	12
225+00	12" N.C.	N/A	12
230+00	12" N.C.	N/A	12
235+00	12" N.C.	N/A	12
240+00	12" N.C.	N/A	12
245+00	12" N.C.	N/A	12

ENTRANCE CONSTRUCTION - LEFT			
STATION	PIPE LENGTH AND SIZE	APPROX. AREA (TONKS)	AREA (SQ. YD)
170+00	12" N.C.	12	192
175+00	12" N.C.	12	192
180+00	12" N.C.	12	192
185+00	12" N.C.	12	192
190+00	12" N.C.	12	192
195+00	12" N.C.	12	192
200+00	12" N.C.	12	192
205+00	12" N.C.	12	192
210+00	12" N.C.	12	192
215+00	12" N.C.	12	192
220+00	12" N.C.	12	192
225+00	12" N.C.	12	192
230+00	12" N.C.	12	192
235+00	12" N.C.	12	192
240+00	12" N.C.	12	192
245+00	12" N.C.	12	192

ENTRANCE CONSTRUCTION - RIGHT			
STATION	PIPE LENGTH AND SIZE	APPROX. AREA (TONKS)	AREA (SQ. YD)
170+00	12" N.C.	12	192
175+00	12" N.C.	12	192
180+00	12" N.C.	12	192
185+00	12" N.C.	12	192
190+00	12" N.C.	12	192
195+00	12" N.C.	12	192
200+00	12" N.C.	12	192
205+00	12" N.C.	12	192
210+00	12" N.C.	12	192
215+00	12" N.C.	12	192
220+00	12" N.C.	12	192
225+00	12" N.C.	12	192
230+00	12" N.C.	12	192
235+00	12" N.C.	12	192
240+00	12" N.C.	12	192
245+00	12" N.C.	12	192



BEGIN CONSTRUCTION
STA. 40+00.00

42+00

180+00

FOODS REMOVING PAVEMENT
LT. STA. 40+25. Langers Creek Road to
LT. STA. 42+25. REMOVE 318 SQ. YD.

ENTRANCE CONSTRUCTION - RIGHT			
STATION	WIDTH TYPE	PIPE LENGTH AND SIZE	APPROX. AREA (TONKS)
170+00	12" N.C.	N/A	12
175+00	12" N.C.	N/A	12
180+00	12" N.C.	N/A	12
185+00	12" N.C.	N/A	12
190+00	12" N.C.	N/A	12
195+00	12" N.C.	N/A	12

P.I. 174+16.13
A = 5'12"58" R.R.
C = P.00'00"
T = 281.00'
L = 221.64'
R = 251.64'
G = 2.45%
Runoff = 50'
Runoff = 50'

GRAPHIC SCALE IN FEET
0 50 100 150

David R. Hourigan
Patrick D. Hourigan

US 68 - STA. 170+94.00
LANGERS CREEK ROAD STA. 50+00.00

MATCHLINE STA. 195+00

MATCHLINE STA. 170+00

GRADE, DRAIN, AND SURFACING PLAN
US 68 - SECTION 2
STA. 170+00 TO STA. 185+00